

**CONTRATAÇÃO DE EMPRESA ESPECIALIZADA PARA ELABORAÇÃO  
DE ESTUDOS E PROJETOS, GERENCIAMENTO, SUPERVISÃO E  
APOIO NA FISCALIZAÇÃO DE OBRAS DE INFRAESTRUTURA DE  
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## 1. NORMAS

As normas que foram utilizadas na elaboração deste documento ou contêm instruções e procedimentos aplicáveis são:

NORMA	DESCRIÇÃO
NBR 6118/2014	Projeto e Execução de Obras de Concreto Armado;
NBR 6122/2019	Projeto e Execução de Fundações;
NBR 6120/2019	Cargas para o Cálculo de Estruturas de Edificações;
NBR 6123/1988-COR.2013	Forças devidas ao vento em edificações;
NBR 12655/2015	Concreto de cimento Portland - Preparo, controle e recebimento – Procedimento.

## 2. ETA - MURO DE DIVISA

### 2.1 RESUMO DOS RESULTADOS

#### 2.1.1 Cargas verticais

- Peso próprio = 0.79 tf
- Total = 0.79 tf

#### 2.1.2 Deslocamento horizontal

- $X+ = 0.00$  cm (limite 0.19)
- $X- = 0.00$  cm (limite 0.19)
- $Y+ = 0.01$  cm (limite 0.19)
- $Y- = 0.01$  cm (limite 0.19)

#### 2.1.3 Verificação de estabilidade (Gama-Z)

- $X+ = 1.00$  (limite 1.10)



- $X^- = 1.00$  (limite 1.10)
- $Y^+ = 1.01$  (limite 1.10)
- $Y^- = 1.01$  (limite 1.10)

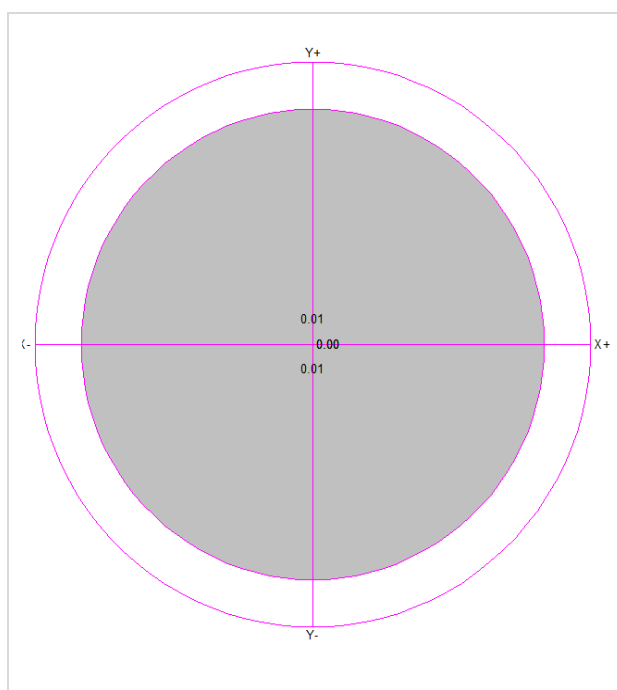
## 2.1.4 Análise de 2ª ordem

Processo P-Delta

Deslocamentos no topo da edificação:

- Vento  $Y^+$ :  $0.05 \gg 0.05$  (+0.25%)
- Vento  $Y^-$ :  $0.05 \gg 0.05$  (+0.25%)

## 2.2 DESLOCAMENTOS HORIZONTAIS DEVIDO À AÇÃO DO VENTO



Verificações	X+	X-	Y+	Y-
Altura total da edificação (cm)	315.00			
Deslocamento limite (cm)	0.19			
Deslocamento característico (cm)	0.00	0.00	0.04	-0.04
gf2	0.30	0.30	0.30	0.30
Deslocamento combinações frequentes (cm)	0.00	0.00	0.01	-0.01

Pavimento	Altura (cm)	Deslocamento combinações frequentes (cm)	Diferença (cm)	Limite (cm)
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		X+	X-	Y+	Y-	X+	X-	Y+	Y-	
NÍVEL 02	165.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.01	-0.01	0.19
NÍVEL 01	150.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18

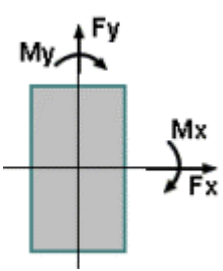
## 2.3 RELATÓRIO DE ESFORÇOS NAS FUNDAÇÕES POR ELEMENTOS

Fundação S1						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	0.26	0.00	0.00	0.00	0.00	0.00
Adicional (G2)	0.00	265.00	0.00	0.00	-0.10	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.00	0.00	0.00	0.00	0.00	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	0.00	0.00	0.00
Vento Y+ (V3)	0.00	-62.60	0.00	0.00	0.03	0.00
Vento Y- (V4)	0.00	62.60	0.00	0.00	-0.03	0.00
Desaprumo X+ (D1)	0.00	0.00	2.20	0.00	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	-2.20	0.00	0.00	0.00
Desaprumo Y+ (D3)	0.00	-2.20	0.00	0.00	0.00	0.00
Desaprumo Y- (D4)	0.00	2.20	0.00	0.00	0.00	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	0.26	265.00	0.00	0.00	-0.10	0.00
G1+G2+0.6V3+D3	0.26	225.24	0.00	0.00	-0.08	0.00
G1+G2+0.6V4+D4	0.26	304.76	0.00	0.00	-0.12	0.00
G1+G2+D1	0.26	265.00	2.20	0.00	-0.10	0.00
G1+G2+D2	0.26	265.00	-2.20	0.00	-0.10	0.00
G1+G2+D3	0.26	262.80	0.00	0.00	-0.10	0.00
G1+G2+D4	0.26	267.20	0.00	0.00	-0.10	0.00
G1+G2+V3+0.6D3	0.26	201.08	0.00	0.00	-0.07	0.00
G1+G2+V4+0.6D4	0.26	328.92	0.00	0.00	-0.13	0.00

Fundação S2						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	0.26	0.00	0.00	0.00	0.00	0.00
Adicional (G2)	0.00	265.00	0.00	0.00	-0.10	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.00	0.00	0.00	0.00	0.00	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	0.00	0.00	0.00
Vento Y+ (V3)	0.00	-62.60	0.00	0.00	0.03	0.00
Vento Y- (V4)	0.00	62.60	0.00	0.00	-0.03	0.00
Desaprumo X+ (D1)	0.00	0.00	2.20	0.00	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	-2.20	0.00	0.00	0.00
Desaprumo Y+ (D3)	0.00	-2.20	0.00	0.00	0.00	0.00
Desaprumo Y- (D4)	0.00	2.20	0.00	0.00	0.00	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00

G1+G2	0.26	265.00	0.00	0.00	-0.10	0.00
G1+G2+0.6V3+D3	0.26	225.24	0.00	0.00	-0.08	0.00
G1+G2+0.6V4+D4	0.26	304.76	0.00	0.00	-0.12	0.00
G1+G2+D1	0.26	265.00	2.20	0.00	-0.10	0.00
G1+G2+D2	0.26	265.00	-2.20	0.00	-0.10	0.00
G1+G2+D3	0.26	262.80	0.00	0.00	-0.10	0.00
G1+G2+D4	0.26	267.20	0.00	0.00	-0.10	0.00
G1+G2+V3+0.6D3	0.26	201.08	0.00	0.00	-0.07	0.00
G1+G2+V4+0.6D4	0.26	328.92	0.00	0.00	-0.13	0.00

Fundação S3						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	0.26	0.00	0.00	0.00	0.00	0.00
Adicional (G2)	0.00	265.00	0.00	0.00	-0.10	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.00	0.00	0.00	0.00	0.00	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	0.00	0.00	0.00
Vento Y+ (V3)	0.00	-62.60	0.00	0.00	0.03	0.00
Vento Y- (V4)	0.00	62.60	0.00	0.00	-0.03	0.00
Desaprumo X+ (D1)	0.00	0.00	2.20	0.00	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	-2.20	0.00	0.00	0.00
Desaprumo Y+ (D3)	0.00	-2.20	0.00	0.00	0.00	0.00
Desaprumo Y- (D4)	0.00	2.20	0.00	0.00	0.00	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	0.26	265.00	0.00	0.00	-0.10	0.00
G1+G2+0.6V3+D3	0.26	225.24	0.00	0.00	-0.08	0.00
G1+G2+0.6V4+D4	0.26	304.76	0.00	0.00	-0.12	0.00
G1+G2+D1	0.26	265.00	2.20	0.00	-0.10	0.00
G1+G2+D2	0.26	265.00	-2.20	0.00	-0.10	0.00
G1+G2+D3	0.26	262.80	0.00	0.00	-0.10	0.00
G1+G2+D4	0.26	267.20	0.00	0.00	-0.10	0.00
G1+G2+V3+0.6D3	0.26	201.08	0.00	0.00	-0.07	0.00
G1+G2+V4+0.6D4	0.26	328.92	0.00	0.00	-0.13	0.00

Legenda	
	- Caso: indica o caso de carregamento no qual serão apresentados os esforços atuantes;
	- Elemento: nome da fundação;
	- N: esforço axial na fundação;
	- Mx: momento fletor na fundação, atuante em torno do eixo X global;
	- My: momento fletor na fundação, atuante em torno do eixo Y global;
	- Fx: esforço cortante na fundação, atuante no plano paralelo à direção X global;
	- Fy: esforço cortante na fundação, atuante no plano paralelo à direção Y global;
	- Mt: momento de torção atuante.

## 2.4 QUADRO DE CARGAS DOS PILARES

	NÍVEL 01		NÍVEL 02	
Pilares	NPos (tf)	NNeg	NPos (tf)	NNeg
P1	0.26	0.00	0.16	0.00
P2	0.26	0.00	0.16	0.00
P3	0.26	0.00	0.16	0.00

## 2.5 SAPATAS - PAVIMENTO NÍVEL 01

### 2.5.1 Relatório de resultados das sapatas

NÍVEL 01	fck = 250.00 kgf/cm <sup>2</sup>	E = 241500 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 4.50 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	95.00	40.00	8 ø 8.0 c/12	8 ø 8.0 c/12	5 ø 8.0 c/20	5 ø 8.0 c/20
	95.00	40.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )	(2.51 cm <sup>2</sup> )	(2.51 cm <sup>2</sup> )
S2	95.00	40.00	8 ø 8.0 c/12	8 ø 8.0 c/12	5 ø 8.0 c/20	5 ø 8.0 c/20
	95.00	40.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )	(2.51 cm <sup>2</sup> )	(2.51 cm <sup>2</sup> )
S3	95.00	40.00	8 ø 8.0 c/12	8 ø 8.0 c/12	5 ø 8.0 c/20	5 ø 8.0 c/20
	95.00	40.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )	(2.51 cm <sup>2</sup> )	(2.51 cm <sup>2</sup> )

### 2.5.2 Relatório de cálculo das sapatas

NÍVEL 01	fck = 250.00 kgf/cm <sup>2</sup>	E = 241500 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 4.50 cm	

### 2.5.3 Esforços e Pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm <sup>2</sup> )	Pressão Sig2 (kgf/cm <sup>2</sup> )	Pressão Sig3 (kgf/cm <sup>2</sup> )	Pressão Sig4 (kgf/cm <sup>2</sup> )
S1	328.92	0.13	0.26	0.00	0.46	0.46	0.00
	2.20	0.00	2.10	(lim = 5.00)	(lim = 5.00)	(lim = 5.00)	(lim = 5.00)
S2	328.92	0.13	0.26	0.00	0.46	0.46	0.00
	2.20	0.00	2.10	(lim = 5.00)	(lim = 5.00)	(lim = 5.00)	(lim = 5.00)
S3	328.92	0.13	0.26	0.00	0.46	0.46	0.00
	2.20	0.00	2.10	(lim = 5.00)	(lim = 5.00)	(lim = 5.00)	(lim = 5.00)

### 2.5.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msds (kgf.m)	Mrd / Msds	Mrd Msds (kgf.m)	Mrd / Msds	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	997.02	3.03	997.02	453.61	0.85	6.70		
	328.92	(lim = 1.50)	2.20	(lim = 1.50)	0.13	lim = (1.50)		

S2	997.02 328.92	3.03 (lim = 1.50)	997.02 2.20	453.61 (lim = 1.50)	0.85 0.13	6.70 lim = (1.50)		
S3	997.02 328.92	3.03 (lim = 1.50)	997.02 2.20	453.61 (lim = 1.50)	0.85 0.13	6.70 lim = (1.50)		

## 2.5.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) A's (cm²/m)	Md (kgf.m/m) A's (cm²/m)
S1	370.37 0.42	73.47 0.10	180.32 0.20	0.00 0.10
S2	370.37 0.42	73.47 0.10	180.32 0.20	0.00 0.10
S3	370.37 0.42	73.47 0.10	180.32 0.20	0.00 0.10

## 2.6 PILARES – PAVIMENTO NÍVEL 01

### 2.6.1 Relatório de resultado dos pilares

NÍVEL 01	fck = 250.00 kgf/cm²	E = 241500 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 3.00 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:20	20.00 X 20.00	0.00 100.00	315.00 RR 315.00 RR	0.34 0.16	282 460	2 3	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	54.50 54.50
P2 1:20	20.00 X 20.00	0.00 100.00	315.00 RR 315.00 RR	0.34 0.16	282 460	2 3	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	54.50 54.50
P3 1:20	20.00 X 20.00	0.00 100.00	315.00 RR 315.00 RR	0.34 0.16	282 460	2 3	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	54.50 54.50

## 2.6.2 Relatório de cálculo dos pilares

NÍVEL 01	fck = 250.00 kgf/cm <sup>2</sup>	E = 241500 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 3.00 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
P1	20.00 X 20.00	RR 54.50 RR 54.50	0.34 0.16	460 7	1036 16	2.25	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P2	20.00 X 20.00	RR 54.50 RR 54.50	0.34 0.16	460 7	1036 16	2.25	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	20.00 X 20.00	RR 54.50 RR 54.50	0.34 0.16	460 7	1036 16	2.25	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

## 2.7 PILARES – PAVIMENTO NÍVEL 02

### 2.7.1 Relatório de resultados dos pilares – Pavimento Nível 02

NÍVEL 02	fck = 250.00 kgf/cm <sup>2</sup>	E = 241500 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:20	20.00 X 20.00	165.00 165.00	315.00 RR 315.00 RR	0.21 0.00	0 282	0 2	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	54.50 54.50
P2 1:20	20.00 X 20.00	165.00 165.00	315.00 RR 315.00 RR	0.21 0.00	0 282	0 2	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	54.50 54.50
P3 1:20	20.00 X 20.00	165.00 165.00	315.00 RR 315.00 RR	0.21 0.00	0 282	0 2	1.57 2 ø 10.0 1.57 2 ø 10.0	ø 5.0 c/12	54.50 54.50

							0.8	4 ø		
							10.0			

## 2.7.2 Relatório de cálculo dos pilares

NÍVEL 02	fck = 250.00 kgf/cm <sup>2</sup>	E = 241500 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
P1	20.00 X 20.00	RR 54.50 RR 54.50	0.21 0.00	284 0	1033 0	3.64	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P2	20.00 X 20.00	RR 54.50 RR 54.50	0.21 0.00	284 0	1033 0	3.64	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	20.00 X 20.00	RR 54.50 RR 54.50	0.21 0.00	284 0	1033 0	3.64	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

## 3. ETA - BASE DO DECANTADOR LAMELAR

### 3.1 RESUMO DOS RESULTADOS

#### 3.1.1 Cargas verticais

- Peso próprio = 6.01 tf
- Adicional = 29.06 tf
- Acidental = 1.39 tf
- Total = 36.46 tf
- Área aproximada = 9.24 m<sup>2</sup>
- Relação = 3945.97 kgf/m<sup>2</sup>

#### 3.1.2 Deslocamento horizontal

- X+ = 0.00 cm (limite 0.13)

- $X^- = 0.00$  cm (limite 0.13)
- $Y^+ = 0.00$  cm (limite 0.13)
- $Y^- = 0.00$  cm (limite 0.13)

### 3.1.3 Verificação de estabilidade (Gama-Z)

- $X^+ = 1.01$  (limite 1.10)
- $X^- = 1.01$  (limite 1.10)
- $Y^+ = 1.01$  (limite 1.10)
- $Y^- = 1.01$  (limite 1.10)

### 3.1.4 Análise de 2ª ordem

Processo P-Delta

Sem deslocamentos no topo da edificação

## 3.2 SAPATAS - PAVIMENTO TÉRREO

### 3.2.1 Relatório de resultados das sapatas

TÉRREO	$f_{ck} = 400.00$ kgf/cm <sup>2</sup>	$E = 318758$ kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 4.50 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	90.00 90.00	40.00 40.00	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )		
S2	90.00 90.00	40.00 40.00	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )		
S3	90.00 90.00	40.00 40.00	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )		
S4	90.00 90.00	40.00 40.00	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )	9 $\varnothing$ 10.0 c/10 (7.07 cm <sup>2</sup> )		

### 3.2.2 Relatório de cálculo das sapatas

TÉRREO	$f_{ck} = 400.00$ kgf/cm <sup>2</sup>	$E = 318758$ kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 4.50 cm	



### 3.2.3 Esforços e Pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm²)	Pressão Sig2 (kgf/cm²)	Pressão Sig3 (kgf/cm²)	Pressão Sig4 (kgf/cm²)
S1	91.93	0.46	9.19	1.29	1.44	1.29	1.14
	91.93	0.88	10.46	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
S2	91.93	0.46	9.19	1.29	1.44	1.29	1.14
	91.93	0.88	10.46	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
S3	91.93	0.46	9.19	1.29	1.44	1.29	1.14
	91.93	0.88	10.46	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
S4	91.93	0.46	9.19	1.29	1.44	1.29	1.14
	91.93	0.88	10.46	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)

### 3.2.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	4703.69	51.23	4703.69	51.23	3.79	3.92		
	91.82	(lim = 1.50)	91.82	(lim = 1.50)	0.97	lim = (1.50)		
S2	4703.69	51.23	4703.69	51.23	3.79	3.92		
	91.82	(lim = 1.50)	91.82	(lim = 1.50)	0.97	lim = (1.50)		
S3	4703.69	51.23	4703.69	51.23	3.79	3.92		
	91.82	(lim = 1.50)	91.82	(lim = 1.50)	0.97	lim = (1.50)		
S4	4703.69	51.23	4703.69	51.23	3.79	3.92		
	91.82	(lim = 1.50)	91.82	(lim = 1.50)	0.97	lim = (1.50)		

### 3.2.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) A's (cm²/m)	Md (kgf.m/m) A's (cm²/m)
S1	6950.81	6950.81	0.00	0.00
	7.88	7.88	0.00	0.00
S2	6950.81	6950.81	0.00	0.00
	7.88	7.88	0.00	0.00
S3	6950.81	6950.81	0.00	0.00
	7.88	7.88	0.00	0.00
S4	6950.81	6950.81	0.00	0.00
	7.88	7.88	0.00	0.00

## 3.3 PILARES – PAVIMENTO TÉRREO

### 3.3.1 Relatório de resultado dos pilares

<b>TÉRREO</b>	<b>fck = 400.00 kgf/cm²</b>	<b>E = 318758 kgf/cm²</b>	<b>Peso Espec = 2500.00 kgf/m³</b>
<b>Lance 1</b>		<b>cobr = 4.50 cm</b>	

Dados	Resultados
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Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:40	30.00 X 30.00	0.00 80.00	155.00 RR 155.00 RR	12.72 8.48	506 0	979 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.5 4 ø 12.5	ø 5.0 c/15	17.88 17.88
P2 1:40	30.00 X 30.00	0.00 80.00	155.00 RR 155.00 RR	12.72 8.48	506 0	979 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.5 4 ø 12.5	ø 5.0 c/15	17.88 17.88
P3 1:40	30.00 X 30.00	0.00 80.00	155.00 RR 155.00 RR	12.72 8.48	506 0	979 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.5 4 ø 12.5	ø 5.0 c/15	17.88 17.88
P4 1:40	30.00 X 30.00	0.00 80.00	155.00 RR 155.00 RR	12.72 8.48	506 0	979 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.5 4 ø 12.5	ø 5.0 c/15	17.88 17.88

### 3.3.2 Relatório de cálculo dos pilares

<b>TÉRREO</b>	<b>fck = 400.00 kgf/cm²</b>	<b>E = 318758 kgf/cm²</b>	<b>Peso Espec = 2500.00 kgf/m³</b>
<b>Lance 1</b>		<b>cobr = 4.50 cm</b>	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	30.00 X 30.00	RR 17.88 RR 17.88	12.72 8.48	456 979	1783 3826	3.91	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P2	30.00 X 30.00	RR 17.88 RR 17.88	12.72 8.48	456 979	1783 3826	3.91	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P3	30.00 X 30.00	RR 17.88 RR 17.88	12.72 8.48	456 979	1783 3826	3.91	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P4	30.00 X 30.00	RR 17.88 RR 17.88	12.72 8.48	456 979	1783 3826	3.91	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)

### 3.4 PILARES - PAVIMENTO TOPO

#### 3.4.1 Relatório de resultado dos pilares

TOPO	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:40	30.00 X 30.00	75.00 75.00	155.00	12.49 8.31	980 506	1896 979	2.45 2 ø	ø 5.0 c/9	17.88 17.88
			RR				12.5		
			155.00				2.45 2 ø		
			RR				12.5		
P2 1:40	30.00 X 30.00	75.00 75.00	155.00	12.49 8.31	980 506	1896 979	0.5 4 ø	ø 5.0 c/9	17.88 17.88
			RR				12.5		
			155.00				2.45 2 ø		
			RR				12.5		
P3 1:40	30.00 X 30.00	75.00 75.00	155.00	12.49 8.31	980 506	1896 979	2.45 2 ø	ø 5.0 c/9	17.88 17.88
			RR				12.5		
			155.00				2.45 2 ø		
			RR				12.5		
P4 1:40	30.00 X 30.00	75.00 75.00	155.00	12.49 8.31	980 506	1896 979	0.5 4 ø	ø 5.0 c/9	17.88 17.88
			RR				12.5		
			155.00				2.45 2 ø		
			RR				12.5		

#### 3.4.2 Relatório de cálculo dos pilares

TOPO	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 4.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
P1	30.00 X 30.00	RR	12.49 8.31	884 1896	1774 3805	2.01	2.45
		17.88					(2 ø 12.5)
		RR					2.45
P2	30.00	RR	12.49	884	1774	2.01	(2 ø 12.5)
							2.45

	X 30.00	17.88 RR 17.88	8.31	1896	3805		(2 ø 12.5) 2.45 (2 ø 12.5)
P3	30.00 X 30.00	RR 17.88 RR 17.88	12.49 8.31	884 1896	1774 3805	2.01	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P4	30.00 X 30.00	RR 17.88 RR 17.88	12.49 8.31	884 1896	1774 3805	2.01	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)

### 3.5 LAJES – PAVIMENTO TOPO

#### 3.5.1 Dados da laje

TOPO	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 4.00 cm	

Seção (cm)						Cargas (kgf/m <sup>2</sup> )				Temperatura Caso T1 Caso T2 (°C)	Retração ou Deform. X Deform. Y (‰)
Laje	Tipo	H	ee ec	en ey	ee ey	Peso Próprio	Acidental Revestimento	Paredes Outras	Total		
L1	Maciça	20				500.00	150.00 100.00	0.00 3045.00	3795.00		

#### 3.5.2 Relatório de resultados da laje

TOPO	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 4.00 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	20	3795.00	1616	1000	As = 2.44 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)	As = 2.57 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m)

#### 3.5.3 Relatório de cálculo da laje

TOPO	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 4.00 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial	Verificação axial	Seção	Flexão	Verificação axial	Verificação axial			



				(compr essão)	(traçã o)			(compr essão)	(traçã o)			
L 1	X	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf. m/m As = 2.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.85 tf Situaçã o: GE As = 2.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		bw = 100.0 cm h = 20.0 cm	Md = 1647 kgf. m/m As = 2.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.85 tf Situaçã o: GE As = 2.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 2.44 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.11 mm	A's = 3.00 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	vsd = 15.33 tf/m vrd1 = 12.49 tf/m Modelo I vrd2 = 97.85 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf. m/m As = 2.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.72 tf Situaçã o: GE As = 1.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.34 tf Situaç ão: GE As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 20.0 cm	Md = 2709 kgf. m/m As = 4.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.72 tf Situaçã o: GE As = 4.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.34 tf Situaç ão: GE As = 4.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.57 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m) fiss = 0.05 mm	A's = 4.32 cm <sup>2</sup> /m ø10.0 c/18 (4.36 cm <sup>2</sup> /m)	vsd = 15.04 tf/m vrd1 = 11.98 tf/m vrd2 = 92.66 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 4. ETA - BASE DO RESERVATÓRIO DE ACÚMULO DE LÔDO

### 4.1 RESUMO DOS RESULTADOS

#### 4.1.1 Cargas verticais

- Peso próprio = 2.36 tf
- Adicional = 8.24 tf
- Acidental = 0.60 tf
- Total = 11.20 tf
- Área aproximada = 4.00 m<sup>2</sup>

- Relação = 2800.00 kgf/m<sup>2</sup>

#### 4.1.2 Deslocamento horizontal

- X+ = 0.00 cm (limite 0.09)
- X- = 0.00 cm (limite 0.09)
- Y+ = 0.00 cm (limite 0.09)
- Y- = 0.00 cm (limite 0.09)

#### 4.1.3 Verificação de estabilidade (Gama-Z)

- X+ = 1.00 (limite 1.10)
- X- = 1.00 (limite 1.10)
- Y+ = 1.00 (limite 1.10)
- Y- = 1.00 (limite 1.10)

#### 4.1.4 Análise de 2ª ordem

Processo P-Delta

Sem deslocamentos no topo da edificação

### 4.2 SAPATAS - PAVIMENTO TÉRREO

#### 4.2.1 Relatório de resultados das sapatas

<b>TÉRREO</b>	<b>fck = 400.00 kgf/cm<sup>2</sup></b>	<b>E = 318758 kgf/cm<sup>2</sup></b>	<b>Peso Espec = 2500.00 kgf/m<sup>3</sup></b>
<b>Lance 1</b>		<b>cobr = 4.50 cm</b>	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	65.00	40.00	7 ø 10.0 c/9	7 ø 10.0 c/9		
	65.00	40.00	(5.50 cm <sup>2</sup> )	(5.50 cm <sup>2</sup> )		
S2	65.00	40.00	7 ø 10.0 c/9	7 ø 10.0 c/9		
	65.00	40.00	(5.50 cm <sup>2</sup> )	(5.50 cm <sup>2</sup> )		
S3	65.00	40.00	7 ø 10.0 c/9	7 ø 10.0 c/9		
	65.00	40.00	(5.50 cm <sup>2</sup> )	(5.50 cm <sup>2</sup> )		
S4	65.00	40.00	7 ø 10.0 c/9	7 ø 10.0 c/9		

	65.00	40.00	(5.50 cm <sup>2</sup> )	(5.50 cm <sup>2</sup> )		
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#### 4.2.2 Relatório de cálculo das sapatas

<b>TÉRREO</b>	<b>fck = 400.00 kgf/cm<sup>2</sup></b>	<b>E = 318758 kgf/cm<sup>2</sup></b>	<b>Peso Espec = 2500.00 kgf/m<sup>3</sup></b>
<b>Lance 1</b>		<b>cobr = 4.50 cm</b>	

#### 4.2.3 Esforços e Pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm <sup>2</sup> )	Pressão Sig2 (kgf/cm <sup>2</sup> )	Pressão Sig3 (kgf/cm <sup>2</sup> )	Pressão Sig4 (kgf/cm <sup>2</sup> )
S1	113.68 113.68	0.37 0.37	2.81 3.47	1.30 (lim = 1.50)	0.81 (lim = 1.50)	0.35 (lim = 1.50)	0.83 (lim = 1.50)
S2	113.68 113.68	0.37 0.37	2.81 3.47	0.81 (lim = 1.50)	1.30 (lim = 1.50)	0.83 (lim = 1.50)	0.35 (lim = 1.50)
S3	113.68 113.68	0.37 0.37	2.81 3.47	0.83 (lim = 1.50)	0.35 (lim = 1.50)	0.81 (lim = 1.50)	1.30 (lim = 1.50)
S4	113.68 113.68	0.37 0.37	2.81 3.47	0.35 (lim = 1.50)	0.83 (lim = 1.50)	1.30 (lim = 1.50)	0.81 (lim = 1.50)

#### 4.2.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	1129.30 113.68	9.93 (lim = 1.50)	1129.30 113.68	9.93 (lim = 1.50)	1.26 0.51	2.47 lim = (1.50)		
S2	1129.30 113.68	9.93 (lim = 1.50)	1129.30 113.68	9.93 (lim = 1.50)	1.26 0.51	2.47 lim = (1.50)		
S3	1129.30 113.68	9.93 (lim = 1.50)	1129.30 113.68	9.93 (lim = 1.50)	1.26 0.51	2.47 lim = (1.50)		
S4	1129.30 113.68	9.93 (lim = 1.50)	1129.30 113.68	9.93 (lim = 1.50)	1.26 0.51	2.47 lim = (1.50)		

#### 4.2.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm <sup>2</sup> /m)	Md (kgf.m/m) As (cm <sup>2</sup> /m)	Md (kgf.m/m) A's (cm <sup>2</sup> /m)	Md (kgf.m/m) A's (cm <sup>2</sup> /m)
S1	6950.81 8.29	6950.81 8.29	0.00 0.00	0.00 0.00
S2	6950.81 8.29	6950.81 8.29	0.00 0.00	0.00 0.00
S3	6950.81 8.29	6950.81 8.29	0.00 0.00	0.00 0.00
S4	6950.81 8.29	6950.81 8.29	0.00 0.00	0.00 0.00

#### 4.3 PILARES – PAVIMENTO TÉRREO

##### 4.3.1 Relatório de resultado dos pilares

<b>TÉRREO</b>	<b>fck = 400.00 kgf/cm<sup>2</sup></b>	<b>E = 318758 kgf/cm<sup>2</sup></b>	<b>Peso Espec = 2500.00 kgf/m<sup>3</sup></b>
Lance 1		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:40	20.00 X 20.00	0.00 80.00	90.00 RR 90.00 RR	3.87 2.56	254 157	254 157	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	15.57 15.57
P2 1:40	20.00 X 20.00	0.00 80.00	90.00 RR 90.00 RR	3.87 2.56	254 157	254 157	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	15.57 15.57
P3 1:40	20.00 X 20.00	0.00 80.00	90.00 RR 90.00 RR	3.87 2.56	254 157	254 157	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	15.57 15.57
P4 1:40	20.00 X 20.00	0.00 80.00	90.00 RR 90.00 RR	3.87 2.56	254 157	254 157	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	15.57 15.57

##### 4.3.2 Relatório de cálculo dos pilares

<b>TÉRREO</b>	<b>fck = 400.00 kgf/cm<sup>2</sup></b>	<b>E = 318758 kgf/cm<sup>2</sup></b>	<b>Peso Espec = 2500.00 kgf/m<sup>3</sup></b>
Lance 1		cobr = 4.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
P1	20.00 X 20.00	RR 15.57 RR 15.57	3.87 2.56	254 248	1000 979	3.94	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P2	20.00	RR	3.87	254	1000	3.94	1.57



	X 20.00	15.57 RR 15.57	2.56	248	979		(2 ø 10.0) 1.57 (2 ø 10.0)
P3	20.00 X 20.00	RR 15.57 RR 15.57	3.87 2.56	254 248	1000 979	3.94	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P4	20.00 X 20.00	RR 15.57 RR 15.57	3.87 2.56	254 248	1000 979	3.94	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

#### 4.4 PILARES - PAVIMENTO TOPO

##### 4.4.1 Relatório de resultado dos pilares

<b>TOPO</b>	<b>fck = 400.00 kgf/cm<sup>2</sup></b>	<b>E = 318758 kgf/cm<sup>2</sup></b>	<b>Peso Espec = 2500.00 kgf/m<sup>3</sup></b>
Lance 2		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:40	20.00 X 20.00	10.00 10.00	90.00 RR 90.00 RR	3.77 2.55	305 254	305 254	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/5	15.57 15.57
P2 1:40	20.00 X 20.00	10.00 10.00	90.00 RR 90.00 RR	3.77 2.55	305 254	305 254	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/5	15.57 15.57
P3 1:40	20.00 X 20.00	10.00 10.00	90.00 RR 90.00 RR	3.77 2.55	305 254	305 254	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/5	15.57 15.57
P4 1:40	20.00 X 20.00	10.00 10.00	90.00 RR 90.00 RR	3.77 2.55	305 254	305 254	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/5	15.57 15.57

##### 4.4.2 Relatório de cálculo dos pilares

<b>TOPO</b>	<b>fck = 400.00 kgf/cm<sup>2</sup></b>	<b>E = 318758 kgf/cm<sup>2</sup></b>	<b>Peso Espec = 2500.00 kgf/m<sup>3</sup></b>
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Lance 2		cobr = 4.50 cm	
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Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	20.00 X 20.00	RR 15.57 RR 15.57	3.77 2.55	305 297	998 974	3.27	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P2	20.00 X 20.00	RR 15.57 RR 15.57	3.77 2.55	305 297	998 974	3.27	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	20.00 X 20.00	RR 15.57 RR 15.57	3.77 2.55	305 297	998 974	3.27	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P4	20.00 X 20.00	RR 15.57 RR 15.57	3.77 2.55	305 297	998 974	3.27	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

#### 4.5 LAJES – PAVIMENTO TOPO

##### 4.5.1 Dados da laje

TOPO	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 4.00 cm	

Seção (cm)						Cargas (kgf/m²)				Temperatura Caso T1 Caso T2 (°C)	Retração o Deform. X Deform. Y (%)
Laje	Tipo	H	ee ec	en ey	ee ey	Peso Próprio	Acidental Revestimento	Paredes Outras	Total		
L1	Maciça	20				500.00	150.00 100.00	0.00 1960.00	2710.00		

##### 4.5.2 Relatório de resultados da laje

TOPO	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 4.00 cm	

Nome	Espessura (cm)	Carga (kgf/m²)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	20	2710.00	771	771	As = 2.44 cm²/m (ø8.0 c/20 - 2.51 cm²/m)	As = 2.57 cm²/m (ø8.0 c/19 - 2.65 cm²/m)

#### 4.5.3 Relatório de cálculo da laje

TOPO	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cofr = 4.00 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf.m/m As = 2.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.76 tf Situação: GE As = 1.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		bw = 100.0 cm h = 20.0 cm	Md = 514 kgf.m/m As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.76 tf Situação: GE As = 0.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 2.44 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.00 cm <sup>2</sup> /m ø6.3 c/10 (3.12 cm <sup>2</sup> /m)	vsd = 3.76 tf/m vrd1 = 12.49 tf/m Modelo I vrd2 = 97.85 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf.m/m As = 2.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.76 tf Situação: GE As = 1.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		bw = 100.0 cm h = 20.0 cm	Md = 514 kgf.m/m As = 0.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.76 tf Situação: GE As = 0.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 2.57 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.16 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	vsd = 3.76 tf/m vrd1 = 11.98 tf/m vrd2 = 92.66 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 5. ETA - BASE DOS FILTROS DESCENDENTES

### 5.1 RESUMO DOS RESULTADOS

#### 5.1.1 Cargas verticais

- Peso próprio = 11.51 tf

- Adicional = 35.21 tf
- Acidental = 2.60 tf
- Total = 49.32 tf
- Área aproximada = 17.34 m<sup>2</sup>
- Relação = 2843.94 kgf/m<sup>2</sup>

#### 5.1.2 Deslocamento horizontal

- X+ = 0.00 cm (limite 0.09)
- X- = 0.00 cm (limite 0.09)
- Y+ = 0.00 cm (limite 0.09)
- Y- = 0.00 cm (limite 0.09)

#### 5.1.3 Verificação de estabilidade (Gama-Z)

- X+ = 1.37 (limite 1.10)
- X- = 1.37 (limite 1.10)
- Y+ = 1.02 (limite 1.10)
- Y- = 1.02 (limite 1.10)

#### 5.1.4 Análise de 2ª ordem

Processo P-Delta

Sem deslocamentos no topo da edificação

### 5.2 SAPATAS - PAVIMENTO TÉRREO

#### 5.2.1 Relatório de resultados das sapatas

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	



Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S2	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S3	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S4	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S5	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S6	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S7	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S8	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S9	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S10	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S11	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S12	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S13	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		
S14	70.00 70.00	40.00 40.00	8 ø 10.0 c/8 (6.28 cm²)	8 ø 10.0 c/8 (6.28 cm²)		

## 5.2.2 Relatório de cálculo das sapatas

<b>TÉRREO</b>	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 1</b>		cobr = 4.50 cm	

## 5.2.3 Esforços e Pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm²)	Pressão Sig2 (kgf/cm²)	Pressão Sig3 (kgf/cm²)	Pressão Sig4 (kgf/cm²)
S1	37.11 94.07	0.18 0.31	3.46 4.21	0.63 (lim = 1.50)	0.75 (lim = 1.50)	1.08 (lim = 1.50)	0.96 (lim = 1.50)
S2	58.56 105.36	0.12 0.34	3.97 4.72	0.90 (lim = 1.50)	0.69 (lim = 1.50)	1.02 (lim = 1.50)	1.23 (lim = 1.50)
S3	48.17 101.75	0.10 0.33	3.91 4.66	0.85 (lim = 1.50)	0.71 (lim = 1.50)	1.05 (lim = 1.50)	1.19 (lim = 1.50)
S4	83.00 84.83	0.31 0.27	3.18 3.93	0.52 (lim = 1.50)	0.81 (lim = 1.50)	1.07 (lim = 1.50)	0.78 (lim = 1.50)
S5	40.62 105.47	0.06 0.34	4.06 4.81	0.73 (lim = 1.50)	0.87 (lim = 1.50)	1.24 (lim = 1.50)	1.09 (lim = 1.50)
S6	83.69	0.27	3.15	1.18	0.92	0.41	0.67

	146.06	0.49	3.90	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S7</b>	63.53	0.19	3.01	0.53	0.74	1.00	0.78
	81.58	0.27	3.75	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S8</b>	37.11	0.18	3.46	0.75	0.63	0.96	1.08
	94.07	0.31	4.21	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S9</b>	58.56	0.12	3.97	0.69	0.90	1.23	1.02
	105.36	0.34	4.72	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S10</b>	48.17	0.10	3.91	1.19	1.05	0.71	0.85
	101.75	0.33	4.66	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S11</b>	83.00	0.31	3.18	0.81	0.52	0.78	1.07
	84.83	0.27	3.93	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S12</b>	40.62	0.06	4.06	0.87	0.73	1.09	1.24
	105.47	0.34	4.81	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S13</b>	146.06	0.49	3.15	0.41	0.92	1.18	0.67
	83.69	0.27	3.90	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S14</b>	63.53	0.19	3.01	0.74	0.53	0.78	1.00
	81.58	0.27	3.75	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)

## 5.2.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
<b>S1</b>	1468.62	39.57	1472.16	15.65	1.54	4.46		
	37.11	(lim = 1.50)	94.07	(lim = 1.50)	0.34	lim = (1.50)		
<b>S2</b>	1578.73	27.68	1652.30	15.68	1.73	4.82		
	57.03	(lim = 1.50)	105.36	(lim = 1.50)	0.36	lim = (1.50)		
<b>S3</b>	1557.72	32.74	1630.90	16.03	1.71	5.02		
	47.58	(lim = 1.50)	101.75	(lim = 1.50)	0.34	lim = (1.50)		
<b>S4</b>	1301.30	15.68	1374.28	16.20	1.36	3.52		
	82.98	(lim = 1.50)	84.83	(lim = 1.50)	0.39	lim = (1.50)		
<b>S5</b>	1681.00	41.44	1682.73	15.95	1.76	5.08		
	40.57	(lim = 1.50)	105.47	(lim = 1.50)	0.35	lim = (1.50)		
<b>S6</b>	1363.54	16.29	1290.40	8.83	1.35	2.47		
	83.69	(lim = 1.50)	146.06	(lim = 1.50)	0.55	lim = (1.50)		
<b>S7</b>	1253.06	19.72	1313.86	16.10	1.32	4.30		
	63.53	(lim = 1.50)	81.58	(lim = 1.50)	0.31	lim = (1.50)		
<b>S8</b>	1468.62	39.57	1472.16	15.65	1.54	4.46		
	37.11	(lim = 1.50)	94.07	(lim = 1.50)	0.34	lim = (1.50)		
<b>S9</b>	1578.73	27.68	1652.30	15.68	1.73	4.82		
	57.03	(lim = 1.50)	105.36	(lim = 1.50)	0.36	lim = (1.50)		
<b>S10</b>	1557.72	32.74	1630.90	16.03	1.71	5.02		
	47.58	(lim = 1.50)	101.75	(lim = 1.50)	0.34	lim = (1.50)		
<b>S11</b>	1301.30	15.68	1374.28	16.20	1.36	3.52		
	82.98	(lim = 1.50)	84.83	(lim = 1.50)	0.39	lim = (1.50)		
<b>S12</b>	1681.00	41.44	1682.73	15.95	1.76	5.08		
	40.57	(lim = 1.50)	105.47	(lim = 1.50)	0.35	lim = (1.50)		
<b>S13</b>	1290.40	8.83	1363.54	16.29	1.35	2.47		
	146.06	(lim = 1.50)	83.69	(lim = 1.50)	0.55	lim = (1.50)		
<b>S14</b>	1253.06	19.72	1313.86	16.10	1.32	4.30		
	63.53	(lim = 1.50)	81.58	(lim = 1.50)	0.31	lim = (1.50)		

## 5.2.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H



	Md (kgf.m/m) As (cm <sup>2</sup> /m)	Md (kgf.m/m) As (cm <sup>2</sup> /m)	Md (kgf.m/m) A's (cm <sup>2</sup> /m)	Md (kgf.m/m) A's (cm <sup>2</sup> /m)
S1	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S2	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S3	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S4	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S5	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S6	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S7	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S8	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S9	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S10	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S11	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S12	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S13	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00
S14	6950.81 9.33	6950.81 9.33	0.00 0.00	0.00 0.00

### 5.3 PILARES – PAVIMENTO TÉRREO

#### 5.3.1 Relatório de resultado dos pilares

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
<b>P1 1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.77 3.09	142 51	208 130	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P2 1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	5.48 3.57	55 81	233 146	1.57 2 ø 10.0 2.36 3 ø 10.0	ø 5.0 c/12	10.38 10.38



							0.5 6 ø 10.0		
<b>P3</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	5.39 3.51	39 67	225 141	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P4</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.37 2.77	226 116	185 117	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P5</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	5.60 3.65	38 27	235 146	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P6</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.32 2.74	184 115	347 205	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P7</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.14 2.64	129 90	180 113	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P8</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.77 3.09	142 51	208 130	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P9</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	5.48 3.57	55 81	233 146	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P10</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	5.39 3.51	39 67	225 141	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P11</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.37 2.77	226 116	185 117	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P12</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR	5.60 3.65	38 27	235 146	1.57 2 ø 10.0	ø 5.0 c/12	10.38 10.38



			90.00 RR				2.36 3 ø 10.0 0.5 6 ø 10.0		
<b>P13</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.32 2.74	347 205	184 115	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38
<b>P14</b> <b>1:40</b>	30.00 X 30.00	0.00 80.00	90.00 RR 90.00 RR	4.14 2.64	129 90	180 113	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/12	10.38 10.38

### 5.3.2 Relatório de cálculo dos pilares

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
<b>P1</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.77 3.09	140 208	1915 2848	13.69	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P2</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.48 3.57	131 233	1670 2965	12.70	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P3</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.39 3.51	129 225	1697 2951	13.11	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P4</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.37 2.77	221 185	2691 2246	12.16	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P5</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.60 3.65	134 235	1703 2972	12.67	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P6</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.32 2.74	165 347	1356 2855	8.23	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P7</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.14 2.64	117 180	1807 2796	15.50	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P8</b>	30.00 X	RR 10.38	4.77 3.09	140 208	1915 2848	13.69	1.57 (2 ø 10.0)

	30.00	RR 10.38					2.36 (3 ø 10.0)
<b>P9</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.48 3.57	131 233	1670 2965	12.70	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P10</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.39 3.51	129 225	1697 2951	13.11	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P11</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.37 2.77	221 185	2691 2246	12.16	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P12</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.60 3.65	134 235	1703 2972	12.67	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P13</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.32 2.74	347 165	2836 1347	8.17	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P14</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.14 2.64	117 180	1807 2796	15.50	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)

#### 5.4 PILARES - PAVIMENTO TOPO

##### 5.4.1 Relatório de resultado dos pilares

<b>TOPO</b>	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vinc lih vinc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
<b>P1 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	4.54 3.07	166 142	250 208	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P2 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	5.24 3.54	72 55	281 233	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P3 1:40</b>	30.00 X	10.00 10.00	90.00 RR	5.16 3.48	52 39	271 225	1.57 2 ø 10.0	ø 5.0 c/5	10.38 10.38



	30.00		90.00 RR				2.36 3 ø 10.0 0.5 6 ø 10.0		
<b>P4 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	4.13 2.75	268 226	222 185	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P5 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	5.37 3.63	46 38	282 235	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P6 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	4.09 2.72	221 184	416 347	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P7 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	3.90 2.62	156 129	217 180	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P8 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	4.54 3.07	166 142	250 208	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P9 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	5.24 3.54	72 55	281 233	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P10 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	5.16 3.48	52 39	271 225	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P11 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	4.13 2.75	268 226	222 185	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P12 1:40</b>	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	5.37 3.63	46 38	282 235	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38

<b>P13</b> 1:40	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	4.09 2.72	416 347	221 184	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38
<b>P14</b> 1:40	30.00 X 30.00	10.00 10.00	90.00 RR 90.00 RR	3.90 2.62	156 129	217 180	1.57 2 ø 10.0 2.36 3 ø 10.0 0.5 6 ø 10.0	ø 5.0 c/5	10.38 10.38

#### 5.4.2 Relatório de cálculo dos pilares

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 4.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
<b>P1</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.54 3.07	162 250	1834 2836	11.34	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P2</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.24 3.54	126 281	1342 2993	10.66	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P3</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.16 3.48	124 271	1364 2980	11.01	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P4</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.13 2.75	262 222	2650 2254	10.13	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P5</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.37 3.63	129 282	1371 3001	10.64	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P6</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.09 2.72	197 416	1343 2831	6.81	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P7</b>	30.00 X 30.00	RR 10.38 RR 10.38	3.90 2.62	140 217	1791 2774	12.78	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P8</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.54 3.07	162 250	1834 2836	11.34	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P9</b>	30.00 X 30.00	RR 10.38	5.24 3.54	126 281	1342 2993	10.66	1.57 (2 ø 10.0)

	30.00	RR 10.38					2.36 (3 ø 10.0)
<b>P10</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.16 3.48	124 271	1364 2980	11.01	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P11</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.13 2.75	262 222	2650 2254	10.13	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P12</b>	30.00 X 30.00	RR 10.38 RR 10.38	5.37 3.63	129 282	1371 3001	10.64	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P13</b>	30.00 X 30.00	RR 10.38 RR 10.38	4.09 2.72	416 197	2811 1333	6.76	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
<b>P14</b>	30.00 X 30.00	RR 10.38 RR 10.38	3.90 2.62	140 217	1791 2774	12.78	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)

## 5.5 LAJES – PAVIMENTO TOPO

### 5.5.1 Dados da laje

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 4.00 cm	

Seção (cm)						Cargas (kgf/m <sup>2</sup> )				Temperatura Caso T1 Caso T2 (°C)	Retração o Deform. X Deform. Y (%)
Laje	Tipo	H	ee ec	en ey	ee ey	Peso Próprio	Acidental Revestimento	Paredes Outras	Total		
<b>L1</b>	Maciça	20				500.00	150.00 100.00	1930.46 0.00	2680.46		

### 5.5.2 Relatório de resultados da laje

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 4.00 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
<b>L1</b>	20	2680.46	441	764	As = 2.44 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)	As = 2.57 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m)

### 5.5.3 Relatório de cálculo da laje

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
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Lance 2		cobr = 4.00 cm	
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ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf.m/m As = 2.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.88 tf Situação: GE As = 0.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.06 tf Situação: GE As = 0.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 20.0 cm	Md = 332 kgf.m/m As = 0.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.88 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.06 tf Situação: GE As = 0.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.44 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 3.00 cm <sup>2</sup> /m ø6.3 c/10 (3.12 cm <sup>2</sup> /m)	vsd = 3.85 tf/m vrd1 = 12.49 tf/m Modelo I vrd2 = 97.85 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf.m/m As = 2.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.09 tf Situação: GE As = 1.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.05 tf Situação: GE As = 1.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 20.0 cm	Md = 1131 kgf.m/m As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.09 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.05 tf Situação: GE As = 1.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.57 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.17 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	vsd = 10.22 tf/m vrd1 = 11.98 tf/m vrd2 = 92.66 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 6. ETA - BASE DOS FLOCULADORES HIDRÁULICOS DE BANDEJA

### 6.1 RESUMO DOS RESULTADOS

#### 6.1.1 Cargas verticais

- Peso próprio = 5.30 tf
- Adicional = 29.71 tf

- Acidental = 1.37 tf
- Total = 36.38 tf
- Área aproximada = 9.10 m<sup>2</sup>

### 6.1.2 Deslocamento horizontal

- X+ = 0.00 cm (limite 0.11)
- X- = 0.00 cm (limite 0.11)
- Y+ = 0.00 cm (limite 0.11)
- Y- = 0.00 cm (limite 0.11)

### 6.1.3 Verificação de estabilidade (Gama-Z)

- X+ = 1.38 (limite 1.10)
- X- = 1.39 (limite 1.10)
- Y+ = 1.05 (limite 1.10)
- Y- = 1.05 (limite 1.10)

### 6.1.4 Análise de 2ª ordem

Processo P-Delta

Sem deslocamentos no topo da edificação

## 6.2 SAPATAS - PAVIMENTO TÉRREO

### 6.2.1 Relatório de resultados das sapatas

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
<b>S1</b>	80.00	40.00	8 ø 10.0 c/10	8 ø 10.0 c/10		

	80.00	40.00	(6.28 cm <sup>2</sup> )	(6.28 cm <sup>2</sup> )		
<b>S2</b>	80.00	40.00	8 ø 10.0 c/10	8 ø 10.0 c/10		
	80.00	40.00	(6.28 cm <sup>2</sup> )	(6.28 cm <sup>2</sup> )		
<b>S3</b>	80.00	40.00	8 ø 10.0 c/10	8 ø 10.0 c/10		
	80.00	40.00	(6.28 cm <sup>2</sup> )	(6.28 cm <sup>2</sup> )		
<b>S4</b>	80.00	40.00	8 ø 10.0 c/10	8 ø 10.0 c/10		
	80.00	40.00	(6.28 cm <sup>2</sup> )	(6.28 cm <sup>2</sup> )		
<b>S5</b>	80.00	40.00	8 ø 10.0 c/10	8 ø 10.0 c/10		
	80.00	40.00	(6.28 cm <sup>2</sup> )	(6.28 cm <sup>2</sup> )		
<b>S6</b>	80.00	40.00	8 ø 10.0 c/10	8 ø 10.0 c/10		
	80.00	40.00	(6.28 cm <sup>2</sup> )	(6.28 cm <sup>2</sup> )		

## 6.2.2 Relatório de cálculo das sapatas

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

## 6.2.3 Esforços e Pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm <sup>2</sup> )	Pressão Sig2 (kgf/cm <sup>2</sup> )	Pressão Sig3 (kgf/cm <sup>2</sup> )	Pressão Sig4 (kgf/cm <sup>2</sup> )
<b>S1</b>	157.89	0.36	6.38	1.41	1.05	0.90	1.26
	85.19	0.22	7.40	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S2</b>	50.39	0.07	5.72	1.27	1.18	0.84	0.93
	148.49	0.34	6.75	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S3</b>	157.34	0.36	6.17	1.21	0.86	1.04	1.39
	96.29	0.18	7.20	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S4</b>	85.19	0.22	6.38	0.90	1.05	1.41	1.26
	157.89	0.36	7.40	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S5</b>	50.39	0.07	5.72	0.93	0.84	1.18	1.27
	148.49	0.34	6.75	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)
<b>S6</b>	96.29	0.18	6.17	1.04	0.86	1.21	1.39
	157.34	0.36	7.20	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)	(lim = 1.50)

## 6.2.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
<b>S1</b>	2931.88	18.57	2914.70	34.40	2.68	6.63		
	157.86	(lim = 1.50)	84.73	(lim = 1.50)	0.40	lim = (1.50)		
<b>S2</b>	2602.84	52.78	2674.06	18.01	2.45	7.21		
	49.32	(lim = 1.50)	148.49	(lim = 1.50)	0.34	lim = (1.50)		
<b>S3</b>	2851.79	18.13	2834.96	29.62	2.61	6.70		
	157.31	(lim = 1.50)	95.71	(lim = 1.50)	0.39	lim = (1.50)		
<b>S4</b>	2914.70	34.40	2931.88	18.57	2.68	6.63		
	84.73	(lim = 1.50)	157.86	(lim = 1.50)	0.40	lim = (1.50)		
<b>S5</b>	2602.84	52.78	2674.06	18.01	2.45	7.21		
	49.32	(lim = 1.50)	148.49	(lim = 1.50)	0.34	lim = (1.50)		
<b>S6</b>	2834.96	29.62	2851.79	18.13	2.61	6.70		
	95.71	(lim = 1.50)	157.31	(lim = 1.50)	0.39	lim = (1.50)		



## 6.2.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm <sup>2</sup> /m)	Md (kgf.m/m) As (cm <sup>2</sup> /m)	Md (kgf.m/m) A's (cm <sup>2</sup> /m)	Md (kgf.m/m) A's (cm <sup>2</sup> /m)
<b>S1</b>	6950.81 7.88	6950.81 7.88	0.00 0.00	0.00 0.00
<b>S2</b>	6950.81 7.88	6950.81 7.88	0.00 0.00	0.00 0.00
<b>S3</b>	6950.81 7.88	6950.81 7.88	0.00 0.00	0.00 0.00
<b>S4</b>	6950.81 7.88	6950.81 7.88	0.00 0.00	0.00 0.00
<b>S5</b>	6950.81 7.88	6950.81 7.88	0.00 0.00	0.00 0.00
<b>S6</b>	6950.81 7.88	6950.81 7.88	0.00 0.00	0.00 0.00

## 6.3 PILARES – PAVIMENTO TÉRREO

### 6.3.1 Relatório de resultado dos pilares

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
<b>P1 1:40</b>	20.00 X 20.00	0.00 80.00	125.00 RR 125.00 RR	8.83 5.99	182 219	121 118	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P2 1:40</b>	20.00 X 20.00	0.00 80.00	125.00 RR 125.00 RR	7.93 5.37	8 70	170 206	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P3 1:40</b>	20.00 X 20.00	0.00 80.00	125.00 RR 125.00 RR	8.55 5.80	182 218	67 134	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P4 1:40</b>	20.00 X 20.00	0.00 80.00	125.00 RR 125.00 RR	8.83 5.99	121 118	182 219	1.57 2 ø 10.0 1.57 2 ø 10.0	ø 5.0 c/12	21.63 21.63

							0.8 4 ø 10.0		
<b>P5</b> <b>1:40</b>	20.00 X 20.00	0.00 80.00	125.00 RR 125.00 RR	7.93 5.37	8 70	170 206	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P6</b> <b>1:40</b>	20.00 X 20.00	0.00 80.00	125.00 RR 125.00 RR	8.55 5.80	67 134	182 218	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63

### 6.3.2 Relatório de cálculo dos pilares

<b>TÉRREO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
<b>P1</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.83 5.99	219 186	1252 1060	5.71	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P2</b>	20.00 X 20.00	RR 21.63 RR 21.63	7.93 5.37	167 206	1007 1247	6.05	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P3</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.55 5.80	218 180	1259 1035	5.76	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P4</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.83 5.99	186 219	1060 1252	5.71	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P5</b>	20.00 X 20.00	RR 21.63 RR 21.63	7.93 5.37	167 206	1007 1247	6.05	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P6</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.55 5.80	180 218	1035 1259	5.76	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

## 6.4 PILARES - PAVIMENTO TOPO

### 6.4.1 Relatório de resultado dos pilares

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 4.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib víncl lih víncl (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
<b>P1</b> <b>1:40</b>	20.00 X 20.00	45.00 45.00	125.00 RR 125.00 RR	8.73 5.95	407 182	256 121	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P2</b> <b>1:40</b>	20.00 X 20.00	45.00 45.00	125.00 RR 125.00 RR	7.82 5.32	51 8	381 170	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P3</b> <b>1:40</b>	20.00 X 20.00	45.00 45.00	125.00 RR 125.00 RR	8.45 5.75	406 182	180 67	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P4</b> <b>1:40</b>	20.00 X 20.00	45.00 45.00	125.00 RR 125.00 RR	8.73 5.95	256 121	407 182	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P5</b> <b>1:40</b>	20.00 X 20.00	45.00 45.00	125.00 RR 125.00 RR	7.82 5.32	51 8	381 170	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63
<b>P6</b> <b>1:40</b>	20.00 X 20.00	45.00 45.00	125.00 RR 125.00 RR	8.45 5.75	180 67	406 182	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	21.63 21.63

### 6.4.2 Relatório de cálculo dos pilares

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
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<b>Lance 2</b>		cobr = 4.50 cm	
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Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
<b>P1</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.73 5.95	407 236	1427 826	3.51	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P2</b>	20.00 X 20.00	RR 21.63 RR 21.63	7.82 5.32	164 381	617 1430	3.75	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P3</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.45 5.75	406 177	1460 637	3.59	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P4</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.73 5.95	236 407	826 1427	3.51	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P5</b>	20.00 X 20.00	RR 21.63 RR 21.63	7.82 5.32	164 381	617 1430	3.75	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
<b>P6</b>	20.00 X 20.00	RR 21.63 RR 21.63	8.45 5.75	177 406	637 1460	3.59	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

## 6.5 LAJES – PAVIMENTO TOPO

### 6.5.1 Dados da laje

<b>TOPO</b>	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 4.00 cm	

Seção (cm)						Cargas (kgf/m²)				Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Laje	Tipo	H	ee ec	en ey	ee xy	Peso Próprio	Acidental Revestimento	Paredes Outras	Total		
<b>L1</b>	Maiçã	20				500.00	150.00 100.00	3164.12 0.00	3914.12		

### 6.5.2 Relatório de resultados da laje

<b>TOPO</b>	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 4.00 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	20	3914.12	1117	801	As = 2.44 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)	As = 2.57 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m)

### 6.5.3 Relatório de cálculo da laje

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cofr = 4.00 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf.m/m As = 2.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.08 tf Situação: GE As = 1.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.63 tf Situação: GE As = 1.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 20.0 cm	Md = 775 kgf.m/m As = 1.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.08 tf Situação: GE As = 0.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.63 tf Situação: GE As = 1.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.44 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.06 mm	A's = 3.00 cm <sup>2</sup> /m ø6.3 c/10 (3.12 cm <sup>2</sup> /m)	vsd = 19.79 tf/m vrd1 = 12.49 tf/m Modelo I vrd2 = 97.85 tf/m vsw = 3.90 tf/m asw = 9.68 cm <sup>2</sup> /m
	Y	bw = 100.0 cm h = 20.0 cm	Md = 1630 kgf.m/m As = 2.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.50 tf Situação: GE As = 1.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.65 tf Situação: GE As = 1.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 20.0 cm	Md = 3097 kgf.m/m As = 4.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.50 tf Situação: GE As = 4.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.65 tf Situação: GE As = 5.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.57 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 4.99 cm <sup>2</sup> /m ø8.0 c/10 (5.03 cm <sup>2</sup> /m)	vsd = 14.80 tf/m vrd1 = 11.98 tf/m vrd2 = 92.66 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## **7. ETA - CAIXA DE INSPEÇÃO**

### **7.1 RESUMO DOS RESULTADOS**

#### **7.1.1 Cargas verticais:**

- Peso próprio = 1.17 tf
- Adicional = 0.19 tf
- Acidental = 0.43 tf
- Total = 1.79 tf
- Área aproximada = 1.43 m<sup>2</sup>
- Relação = 1255.86 kgf/m<sup>2</sup>

#### **7.1.2 Deslocamento horizontal:**

- X+ = 0.00 cm (limite 0.04)
- X- = 0.00 cm (limite 0.04)
- Y+ = 0.00 cm (limite 0.04)
- Y- = 0.00 cm (limite 0.04)

#### **7.1.3 Aceleração horizontal:**

- X+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- X- = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y- = 0.000 m/s<sup>2</sup> (limite 0.147)

#### **7.1.4 Verificação de estabilidade (Gama-Z):**

- X+ = 1.00 (limite 1.10)
- X- = 1.00 (limite 1.10)
- Y+ = 1.00 (limite 1.10)
- Y- = 1.00 (limite 1.10)

### 7.1.5 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

### 7.1.6 Análise dinâmica:

Frequência natural: 10.21 Hz

## 7.2 RESERVATÓRIO – PAVIMENTO TOPO

### 7.2.1 Dados dos Reservatórios

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RES1)	15.00	0.00	200.23	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
L1 (RES1)	15.00	0.00	200.23	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
L1 (RES1)	15.00	0.00	200.23	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
PAR1 (RES1)	15.00	0.00	265.23	243.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000.00	480.00		
PAR2 (RES1)	15.00	0.00	265.23	243.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000.00	480.00		
PAR3 (RES1)	15.00	0.00	265.23	243.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000.00	480.00		
PAR4 (RES1)	15.00	0.00	265.23	243.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000.00	480.00		

### 7.2.2 Resultados do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

### 7.2.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	0.21 -0.06	0.18 -0.16	4	4	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 2.25 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 2.25 cm²/m ø8.0 c/20 (2.51 cm²/m)
L1	0.04 -0.02	0.06 -0.10	59	49	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 2.25 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 2.25 cm²/m ø8.0 c/20 (2.51 cm²/m)
L1	0.00 0.00	0.01 -0.05	11	10	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 2.25 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 2.25 cm²/m ø8.0 c/20 (2.51 cm²/m)
PAR1	0.40 -0.07	0.67 -0.01	15	56	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)
PAR2	0.40 -0.07	0.67 -0.01	15	56	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)
PAR3	0.34 -0.01	0.26 -0.01	13	8	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)
PAR4	0.50 -0.35	0.67 -0.08	17	56	As = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	As = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.52 cm²/m ø8.0 c/20 (2.51 cm²/m)	A's = 1.64 cm²/m ø8.0 c/20 (2.51 cm²/m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR3	-6		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 L1	-6		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-56		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-17		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	



Barra	L1 PAR4	-56		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-14		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR1	-56		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 L1	-17		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2	-32		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4	-33		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR4			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR1	-33		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR3	-32		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR1			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	

### 7.2.3 Cálculos do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

#### 7.2.3.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trec ho	Dire ção	Momento positivo			Momento negativo			Armada ura inferio r	Armada ura superi or	Cisalha mento
		Flex ão	Verificaç ão axial (compre ssão)	Verifica ção axial (tração )	Flex ão	Verificaç ão axial (compre ssão)	Verifica ção axial (tração )			
L1	X	Md = 757 kgf. m/m  As = 1.52		Fd = 0.07 tf Situaçã o: GE As = 0.02 cm <sup>2</sup> /m			Fd = 0.07 tf Situaçã o: PE As = 0.01 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.05 tf/m vrd1 = 8.02 tf/m Modelo I



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m			A's = 0.00 cm <sup>2</sup> /m	fiss = 0.00 mm		vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.20 tf Situaçã o: PE As = 0.04 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m			Fd = 0.20 tf Situaçã o: PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vds = 0.05 tf/m vr1 = 7.54 tf/m vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.04 tf Situação: GE As = 0.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.03 tf Situaçã o: GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 6 kgf. m/m  As = 0.01 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.03 tf Situaçã o: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vds = 0.14 tf/m vr1 = 8.02 tf/m Modelo I vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.06 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.12 tf Situaçã o: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 49 kgf. m/m  As = 0.11 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.06 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.12 tf Situaçã o: GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vds = 0.65 tf/m vr1 = 7.54 tf/m vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m						As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vds = 0.21 tf/m vr1 = 8.02 tf/m Modelo I vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.06 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 10 kgf. m/m As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.06 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.15 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 1	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.39 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.67 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.22 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.39 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64			Md = 757 kgf. m/m As = 1.64	Fd = 0.67 tf Situação: GE As = 0.01 cm <sup>2</sup> /m		As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.22 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m		fiss = 0.00 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 3	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.31 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.19 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.42 tf Situaçã o: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.42 tf Situaçã o: PE As = 0.09 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.36 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.10 tf Situaçã o: PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.67 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.10 tf Situaçã o: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.20 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1	Momento negativo			Momento positivo			Armaduras finais
	Laje 2	Flexão	Flexo compressão	Flexo tração	Flexão	Flexo compressão	Flexo tração	
Barra	L1 PAR3	Md = 1130 kgf.m/m As = 2.29 cm²/m A's = 0.00 cm²/m						As = 2.29 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.00 mm
Barra	PAR3 L1	Md = 1130 kgf.m/m As = 2.29 cm²/m A's = 0.00 cm²/m						As = 2.29 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.00 mm
Barra	L1 PAR2	Md = 1130 kgf.m/m As = 2.29 cm²/m A's = 0.00 cm²/m	Fd = 0.67 tf Situação: GE As = 0.01 cm²/m A's = 0.00 cm²/m	Fd = 0.42 tf Situação: GE As = 0.17 cm²/m A's = 0.00 cm²/m				As = 2.29 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.00 mm
Barra	PAR2 L1	Md = 1130 kgf.m/m As = 2.29 cm²/m A's = 0.00 cm²/m		Fd = 0.42 tf Situação: GE As = 0.10 cm²/m A's = 0.00 cm²/m				As = 2.29 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.00 mm
Barra	L1 PAR4	Md = 1130 kgf.m/m As = 2.29 cm²/m A's = 0.00 cm²/m	Fd = 0.67 tf Situação: GE As = 0.01 cm²/m A's = 0.00 cm²/m	Fd = 0.09 tf Situação: GE As = 0.12 cm²/m A's = 0.00 cm²/m				As = 2.29 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.00 mm
Barra	PAR4 L1	Md = 1130 kgf.m/m		Fd = 0.09 tf Situação: GE				As = 2.29 cm²/m (ø8.0 c/20 - 2.51 cm²/m)



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				fiss = 0.00 mm
Barra	L1 PAR1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.67 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.42 tf Situação: GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.42 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2 PAR3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR3 PAR2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.34 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4 PAR2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.42 tf Situação: PE As = 0.05 cm <sup>2</sup> /m A's = 0.05 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2 PAR4	Md = 1130 kgf.m/m		Fd = 0.42 tf Situação: GE				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)

		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				fiss = 0.00 mm
Barra	PAR1 PAR4	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.42 tf Situação: PE As = 0.05 cm <sup>2</sup> /m A's = 0.05 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4 PAR1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.42 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1 PAR3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.34 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR3 PAR1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

## 8. ETA - CASA DE QUÍMICA

### 8.1 RESUMO DOS RESULTADOS

#### 8.1.1 Cargas verticais

- Peso próprio = 31.53 tf

- Adicional = 27.59 tf
- Acidental = 12.85 tf
- Total = 71.98 tf
- Área aproximada = 71.77 m<sup>2</sup>
- Relação = 1002.91 kgf/m<sup>2</sup>

#### **8.1.2 Deslocamento horizontal**

- X+ = 0.00 cm (limite 0.24)
- X- = 0.00 cm (limite 0.24)
- Y+ = 0.01 cm (limite 0.24)
- Y- = 0.01 cm (limite 0.24)

#### **8.1.3 Verificação de estabilidade (Gama-Z)**

- X+ = 1.03 (limite 1.10)
- X- = 1.02 (limite 1.10)
- Y+ = 1.03 (limite 1.10)
- Y- = 1.02 (limite 1.10)

#### **8.1.4 Análise de 2ª ordem**

Processo P-Delta

Deslocamentos no topo da edificação:

- Vento X+: 0.01 »» 0.01 (+2.12%)
- Vento X-: 0.01 »» 0.01 (+2.12%)
- Vento Y+: 0.06 »» 0.06 (+2.69%)
- Vento Y-: 0.06 »» 0.06 (+2.69%)



- Desaprumo X+: 0.02 »» 0.02 (+2.23%)
- Desaprumo X-: 0.02 »» 0.02 (+2.23%)
- Desaprumo Y+: 0.02 »» 0.03 (+2.89%)
- Desaprumo Y-: 0.02 »» 0.03 (+2.89%)

## 8.2 VERIFICAÇÃO DE ESTABILIDADE GLOBAL DA ESTRUTURA

### 8.2.1 Maior coeficiente Gama-Z

Combinação: 1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T1+0.84V1+0.84D1							
Pavimento	Altura relativa (cm)	Carga vertical (tf)	Carga horizontal (tf)	Deslocamento horizontal (cm)	Momento 2a. ordem (kgf.m)	Momento tombamento (kgf.m)	Gama-Z
NÍVEL 02	402.00	31.71	0.06	0.02	5.53	222.89	1.03 (lim=1.10)
NÍVEL 01	150.00	65.90	0.01	0.00	1.00	20.29	
TOTAL					6.53	243.18	

### 8.2.2 Limitações

Em estruturas com Gama-Z maior que 1.10 é necessário fazer a verificação dos efeitos de 2ª ordem com a análise P-Delta.

O Gama-Z é um parâmetro de estabilidade para avaliação de estruturas simétricas (tanto geometria quanto carregamento) e edificações com mais de 4 pavimentos. Nos demais casos, recomenda-se a verificação dos efeitos de 2ª ordem com a análise P-Delta.

### 8.2.3 Coeficiente Gama-Z por combinação

Combinação	Momento 2a. ordem (kgf.m)	Momento tombamento (kgf.m)	Gama-Z
1.3G1+1.4G2+1.3S+0.72T1+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+0.72T1+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+0.72T1+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+0.72T1+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+0.72T1+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+0.72T1+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+0.72T1+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+0.72T1+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+0.72T2+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+0.72T2+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+0.72T2+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+0.72T2+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+0.72T2+1.4V1+0.84D1	5.50	405.31	1.01



1.3G1+1.4G2+1.3S+0.72T2+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+0.72T2+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+0.72T2+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T1+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.72T2+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T1+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.72T2+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V3+1.4D3	24.73	1044.87	1.02



1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.1AS+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+0.98Q+1.1A+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V1+0.84D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V2+0.84D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V3+0.84D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V4+0.84D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T1+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V1+0.84D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V2+0.84D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V3+0.84D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V4+0.84D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.72T2+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V1+0.84D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V2+0.84D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V3+0.84D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V4+0.84D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.1AS+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.1AS+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.1AS+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.1AS+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.2R+0.72T1+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T1+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T2+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T2+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T2+0.84V3+1.4D3	21.02	1044.87	1.02



1.3G1+1.4G2+1.3S+1.2R+0.72T2+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T2+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.2R+0.72T2+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T2+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.72T2+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T1+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.72T2+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+1.4D1	5.62	243.18	1.02



1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V1+0.84D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V1+1.4D1	5.62	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V2+0.84D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V2+1.4D2	5.28	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V3+0.84D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V3+1.4D3	24.73	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V4+0.84D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+0.84V4+1.4D4	17.53	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.1AS+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.4V1+0.84D1	7.71	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.4V2+0.84D2	7.07	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.4V3+0.84D3	38.74	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+0.98Q+1.1A+1.4V4+0.84D4	31.52	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V1+0.84D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V2+0.84D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V3+0.84D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V4+0.84D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T1+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V1+0.84D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V2+0.84D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V3+0.84D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V4+0.84D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+1.4V2+0.84D2	6.81	405.31	1.02





1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.72T2+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V1+0.84D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V1+1.4D1	3.79	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V2+0.84D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V2+1.4D2	4.98	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V3+0.84D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V3+1.4D3	21.02	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V4+0.84D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+0.84V4+1.4D4	15.70	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.2R+1.1AS+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.1AS+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T1+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T1+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T1+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T1+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T2+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T2+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T2+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.72T2+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.2R+1.4Q+1.1A+1.1AS+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.2R+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.2R+1.4V4+0.84D4	27.87	1741.45	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T1+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T1+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T1+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T1+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T2+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T2+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T2+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.72T2+0.84V4+0.84D4	18.30	1044.87	1.02



1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.84V1+0.84D1	6.53	243.18	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.84V2+0.84D2	5.48	243.18	1.02
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.84V3+0.84D3	26.38	1044.87	1.03
1.3G1+1.4G2+1.3S+1.4Q+1.1A+1.1AS+0.84V4+0.84D4	18.30	1044.87	1.02
1.3G1+1.4G2+1.3S+1.4V1+0.84D1	5.50	405.31	1.01
1.3G1+1.4G2+1.3S+1.4V2+0.84D2	6.81	405.31	1.02
1.3G1+1.4G2+1.3S+1.4V3+0.84D3	33.19	1741.45	1.02
1.3G1+1.4G2+1.3S+1.4V4+0.84D4	27.87	1741.45	1.02
G1+G2+S+0.72T1+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+0.72T1+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+0.72T1+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+0.72T1+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+0.72T1+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+0.72T1+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+0.72T1+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+0.72T1+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+0.72T2+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+0.72T2+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+0.72T2+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+0.72T2+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+0.72T2+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+0.72T2+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+0.72T2+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+0.72T2+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+0.98Q+1.1A+0.72T1+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+0.72T1+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+0.72T1+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+0.72T1+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+0.72T1+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+0.98Q+1.1A+0.72T1+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+0.98Q+1.1A+0.72T1+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+0.98Q+1.1A+0.72T1+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+0.98Q+1.1A+0.72T2+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+0.72T2+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+0.72T2+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+0.72T2+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+0.72T2+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+0.98Q+1.1A+0.72T2+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+0.98Q+1.1A+0.72T2+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+0.98Q+1.1A+0.72T2+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+0.98Q+1.1A+0.84V1+1.4D1	4.25	243.18	1.02



G1+G2+S+0.98Q+1.1A+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T1+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.72T2+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V1+0.84D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V2+0.84D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V3+0.84D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V4+0.84D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+0.98Q+1.1A+1.1AS+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+0.98Q+1.1A+1.1AS+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+0.98Q+1.1A+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+0.98Q+1.1A+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+0.98Q+1.1A+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+0.98Q+1.1A+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.1AS+0.72T1+0.84V1+0.84D1	2.66	243.18	1.01
G1+G2+S+1.1AS+0.72T1+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.1AS+0.72T1+0.84V2+0.84D2	3.25	243.18	1.01
G1+G2+S+1.1AS+0.72T1+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.1AS+0.72T1+0.84V3+0.84D3	15.32	1044.87	1.01
G1+G2+S+1.1AS+0.72T1+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.1AS+0.72T1+0.84V4+0.84D4	12.27	1044.87	1.01
G1+G2+S+1.1AS+0.72T1+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.1AS+0.72T1+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.1AS+0.72T1+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.1AS+0.72T1+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.1AS+0.72T1+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.1AS+0.72T2+0.84V1+0.84D1	2.66	243.18	1.01
G1+G2+S+1.1AS+0.72T2+0.84V1+1.4D1	2.66	243.18	1.01





G1+G2+S+1.1AS+0.72T2+0.84V2+0.84D2	3.25	243.18	1.01
G1+G2+S+1.1AS+0.72T2+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.1AS+0.72T2+0.84V3+0.84D3	15.32	1044.87	1.01
G1+G2+S+1.1AS+0.72T2+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.1AS+0.72T2+0.84V4+0.84D4	12.27	1044.87	1.01
G1+G2+S+1.1AS+0.72T2+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.1AS+0.72T2+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.1AS+0.72T2+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.1AS+0.72T2+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.1AS+0.72T2+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.1AS+0.84V1+0.84D1	2.66	243.18	1.01
G1+G2+S+1.1AS+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.1AS+0.84V2+0.84D2	3.25	243.18	1.01
G1+G2+S+1.1AS+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.1AS+0.84V3+0.84D3	15.32	1044.87	1.01
G1+G2+S+1.1AS+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.1AS+0.84V4+0.84D4	12.27	1044.87	1.01
G1+G2+S+1.1AS+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.1AS+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.1AS+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.1AS+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.1AS+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.2R+0.72T1+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.2R+0.72T1+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.2R+0.72T1+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.2R+0.72T1+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.2R+0.72T1+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.2R+0.72T1+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.2R+0.72T1+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.2R+0.72T1+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.2R+0.72T2+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.2R+0.72T2+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.2R+0.72T2+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.2R+0.72T2+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.2R+0.72T2+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.2R+0.72T2+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.2R+0.72T2+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.2R+0.72T2+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.2R+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.2R+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.2R+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.2R+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T1+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+1.4V3+0.84D3	29.82	1741.45	1.02



G1+G2+S+1.2R+0.98Q+1.1A+0.72T2+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T1+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.72T2+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V1+0.84D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V1+1.4D1	4.25	243.18	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V2+0.84D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V2+1.4D2	3.47	243.18	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V3+0.84D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V3+1.4D3	18.82	1044.87	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V4+0.84D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+0.84V4+1.4D4	14.31	1044.87	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.1AS+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.4V1+0.84D1	6.02	405.31	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.4V2+0.84D2	4.98	405.31	1.01
G1+G2+S+1.2R+0.98Q+1.1A+1.4V3+0.84D3	29.82	1741.45	1.02
G1+G2+S+1.2R+0.98Q+1.1A+1.4V4+0.84D4	25.30	1741.45	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V1+0.84D1	2.66	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V2+0.84D2	3.25	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V3+0.84D3	15.32	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V4+0.84D4	12.27	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.2R+1.1AS+0.72T1+1.4V4+0.84D4	21.43	1741.45	1.01



G1+G2+S+1.2R+1.1AS+0.72T2+0.84V1+0.84D1	2.66	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V2+0.84D2	3.25	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V3+0.84D3	15.32	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V4+0.84D4	12.27	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.2R+1.1AS+0.72T2+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.2R+1.1AS+0.84V1+0.84D1	2.66	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.84V1+1.4D1	2.66	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.84V2+0.84D2	3.25	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.84V2+1.4D2	3.25	243.18	1.01
G1+G2+S+1.2R+1.1AS+0.84V3+0.84D3	15.32	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.84V3+1.4D3	15.32	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.84V4+0.84D4	12.27	1044.87	1.01
G1+G2+S+1.2R+1.1AS+0.84V4+1.4D4	12.27	1044.87	1.01
G1+G2+S+1.2R+1.1AS+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.2R+1.1AS+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.2R+1.1AS+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.2R+1.1AS+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.2R+1.4Q+1.1A+0.72T1+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.72T1+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.72T1+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.72T1+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.2R+1.4Q+1.1A+0.72T2+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.72T2+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.72T2+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.72T2+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.2R+1.4Q+1.1A+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.2R+1.4Q+1.1A+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.2R+1.4Q+1.1A+1.1AS+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.2R+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.2R+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.2R+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.2R+1.4V4+0.84D4	21.43	1741.45	1.01
G1+G2+S+1.4Q+1.1A+0.72T1+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.4Q+1.1A+0.72T1+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.4Q+1.1A+0.72T1+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.4Q+1.1A+0.72T1+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.4Q+1.1A+0.72T2+0.84V1+0.84D1	5.05	243.18	1.02



G1+G2+S+1.4Q+1.1A+0.72T2+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.4Q+1.1A+0.72T2+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.4Q+1.1A+0.72T2+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.4Q+1.1A+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.4Q+1.1A+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.4Q+1.1A+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.4Q+1.1A+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T1+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T1+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T1+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T1+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T2+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T2+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T2+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.72T2+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.4Q+1.1A+1.1AS+0.84V1+0.84D1	5.05	243.18	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.84V2+0.84D2	3.61	243.18	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.84V3+0.84D3	20.39	1044.87	1.02
G1+G2+S+1.4Q+1.1A+1.1AS+0.84V4+0.84D4	15.17	1044.87	1.01
G1+G2+S+1.4V1+0.84D1	4.11	405.31	1.01
G1+G2+S+1.4V2+0.84D2	4.72	405.31	1.01
G1+G2+S+1.4V3+0.84D3	24.49	1741.45	1.01
G1+G2+S+1.4V4+0.84D4	21.43	1741.45	1.01

### 8.3 RELATÓRIO DE ESFORÇOS NAS FUNDAÇÕES POR ELEMENTOS

Fundação S1						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	2.82	0.00	0.00	-0.22	0.07	0.00
Adicional (G2)	2.37	0.00	0.00	-0.82	0.22	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.03	0.00	0.00	-0.27	0.09	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	-0.01	0.00	0.00	0.01	0.00	0.00
Vento X- (V2)	0.01	0.00	0.00	-0.01	0.00	0.00
Vento Y+ (V3)	0.09	0.00	0.00	0.00	0.05	0.00
Vento Y- (V4)	-0.09	0.00	0.00	0.00	-0.05	0.00
Desaprumo X+ (D1)	-0.01	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	0.01	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	0.04	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	-0.04	0.00	0.00	0.00	-0.03	0.00
Supressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	5.19	0.00	0.00	-1.04	0.29	0.00
G1+G2+0.6V1+D1	5.17	0.00	0.00	-1.01	0.29	0.00
G1+G2+0.6V2+D2	5.21	0.00	0.00	-1.08	0.29	0.00
G1+G2+0.6V3+D3	5.28	0.00	0.00	-1.04	0.36	0.00
G1+G2+0.6V4+D4	5.10	0.00	0.00	-1.05	0.22	0.00
G1+G2+0.7Q+0.6V1+D1	5.89	0.00	0.00	-1.20	0.35	0.00
G1+G2+0.7Q+0.6V2+D2	5.93	0.00	0.00	-1.26	0.35	0.00
G1+G2+0.7Q+0.6V3+D3	6.00	0.00	0.00	-1.23	0.42	0.00
G1+G2+0.7Q+0.6V4+D4	5.82	0.00	0.00	-1.23	0.28	0.00
G1+G2+0.7Q+V1+0.6D1	5.90	0.00	0.00	-1.21	0.35	0.00
G1+G2+0.7Q+V2+0.6D2	5.93	0.00	0.00	-1.25	0.35	0.00



G1+G2+0.7Q+V3+0.6D3	6.02	0.00	0.00	-1.23	0.42	0.00
G1+G2+0.7Q+V4+0.6D4	5.80	0.00	0.00	-1.23	0.28	0.00
G1+G2+D1	5.18	0.00	0.00	-1.02	0.29	0.00
G1+G2+D2	5.20	0.00	0.00	-1.07	0.29	0.00
G1+G2+D3	5.23	0.00	0.00	-1.05	0.32	0.00
G1+G2+D4	5.15	0.00	0.00	-1.04	0.25	0.00
G1+G2+Q	6.22	0.00	0.00	-1.31	0.38	0.00
G1+G2+Q+0.6V1+0.6D1	6.21	0.00	0.00	-1.29	0.38	0.00
G1+G2+Q+0.6V2+0.6D2	6.23	0.00	0.00	-1.33	0.38	0.00
G1+G2+Q+0.6V3+0.6D3	6.29	0.00	0.00	-1.31	0.43	0.00
G1+G2+Q+0.6V4+0.6D4	6.15	0.00	0.00	-1.31	0.32	0.00
G1+G2+Q+D1	6.21	0.00	0.00	-1.28	0.38	0.00
G1+G2+Q+D2	6.23	0.00	0.00	-1.34	0.38	0.00
G1+G2+Q+D3	6.26	0.00	0.00	-1.31	0.41	0.00
G1+G2+Q+D4	6.18	0.00	0.00	-1.31	0.34	0.00
G1+G2+V1+0.6D1	5.17	0.00	0.00	-1.02	0.29	0.00
G1+G2+V2+0.6D2	5.21	0.00	0.00	-1.07	0.29	0.00
G1+G2+V3+0.6D3	5.30	0.00	0.00	-1.04	0.36	0.00
G1+G2+V4+0.6D4	5.08	0.00	0.00	-1.05	0.21	0.00

Fundação S2						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	4.45	0.00	0.00	0.11	0.13	0.00
Adicional (G2)	3.80	0.00	0.00	0.27	0.23	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.99	0.00	0.00	0.12	0.17	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.01	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	-0.01	0.00	0.00
Vento Y+ (V3)	0.09	0.00	0.00	0.00	0.04	0.00
Vento Y- (V4)	-0.09	0.00	0.00	0.00	-0.04	0.00
Desaprumo X+ (D1)	-0.01	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	0.01	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	0.04	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	-0.04	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	8.25	0.00	0.00	0.38	0.36	0.00
G1+G2+0.6V1+D1	8.24	0.00	0.00	0.42	0.36	0.00
G1+G2+0.6V2+D2	8.25	0.00	0.00	0.34	0.36	0.00
G1+G2+0.6V3+D3	8.34	0.00	0.00	0.38	0.41	0.00
G1+G2+0.6V4+D4	8.16	0.00	0.00	0.38	0.30	0.00
G1+G2+0.7Q+0.6V1+D1	9.63	0.00	0.00	0.51	0.47	0.00
G1+G2+0.7Q+0.6V2+D2	9.65	0.00	0.00	0.42	0.47	0.00
G1+G2+0.7Q+0.6V3+D3	9.73	0.00	0.00	0.46	0.53	0.00
G1+G2+0.7Q+0.6V4+D4	9.55	0.00	0.00	0.47	0.42	0.00
G1+G2+0.7Q+V1+0.6D1	9.63	0.00	0.00	0.50	0.47	0.00
G1+G2+0.7Q+V2+0.6D2	9.64	0.00	0.00	0.43	0.47	0.00
G1+G2+0.7Q+V3+0.6D3	9.75	0.00	0.00	0.46	0.53	0.00
G1+G2+0.7Q+V4+0.6D4	9.53	0.00	0.00	0.47	0.42	0.00
G1+G2+D1	8.24	0.00	0.00	0.41	0.36	0.00
G1+G2+D2	8.25	0.00	0.00	0.34	0.36	0.00
G1+G2+D3	8.28	0.00	0.00	0.38	0.39	0.00
G1+G2+D4	8.21	0.00	0.00	0.38	0.33	0.00





G1+G2+Q	10.23	0.00	0.00	0.50	0.52	0.00
G1+G2+Q+0.6V1+0.6D1	10.23	0.00	0.00	0.53	0.52	0.00
G1+G2+Q+0.6V2+0.6D2	10.24	0.00	0.00	0.47	0.52	0.00
G1+G2+Q+0.6V3+0.6D3	10.31	0.00	0.00	0.50	0.56	0.00
G1+G2+Q+0.6V4+0.6D4	10.16	0.00	0.00	0.50	0.48	0.00
G1+G2+Q+D1	10.23	0.00	0.00	0.54	0.52	0.00
G1+G2+Q+D2	10.24	0.00	0.00	0.47	0.52	0.00
G1+G2+Q+D3	10.27	0.00	0.00	0.50	0.55	0.00
G1+G2+Q+D4	10.20	0.00	0.00	0.50	0.49	0.00
G1+G2+V1+0.6D1	8.24	0.00	0.00	0.41	0.36	0.00
G1+G2+V2+0.6D2	8.25	0.00	0.00	0.34	0.36	0.00
G1+G2+V3+0.6D3	8.36	0.00	0.00	0.38	0.41	0.00
G1+G2+V4+0.6D4	8.14	0.00	0.00	0.38	0.30	0.00

Fundação S3						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	4.98	0.00	0.00	-0.23	0.17	0.00
Adicional (G2)	4.56	0.00	0.00	-0.45	0.32	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.98	0.00	0.00	-0.14	0.14	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.02	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	-0.02	0.00	0.00
Vento Y+ (V3)	0.10	0.00	0.00	0.00	0.06	0.00
Vento Y- (V4)	-0.10	0.00	0.00	0.00	-0.06	0.00
Desaprumo X+ (D1)	0.00	0.00	0.00	0.05	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	0.00	-0.05	0.00	0.00
Desaprumo Y+ (D3)	0.05	0.00	0.00	0.00	0.04	0.00
Desaprumo Y- (D4)	-0.05	0.00	0.00	0.00	-0.04	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	9.54	0.00	0.00	-0.68	0.49	0.00
G1+G2+0.6V1+D1	9.54	0.00	0.00	-0.62	0.49	0.00
G1+G2+0.6V2+D2	9.54	0.00	0.00	-0.73	0.49	0.00
G1+G2+0.6V3+D3	9.65	0.00	0.00	-0.68	0.57	0.00
G1+G2+0.6V4+D4	9.43	0.00	0.00	-0.68	0.42	0.00
G1+G2+0.7Q+0.6V1+D1	10.93	0.00	0.00	-0.72	0.59	0.00
G1+G2+0.7Q+0.6V2+D2	10.92	0.00	0.00	-0.83	0.59	0.00
G1+G2+0.7Q+0.6V3+D3	11.03	0.00	0.00	-0.78	0.67	0.00
G1+G2+0.7Q+0.6V4+D4	10.82	0.00	0.00	-0.78	0.52	0.00
G1+G2+0.7Q+V1+0.6D1	10.92	0.00	0.00	-0.74	0.59	0.00
G1+G2+0.7Q+V2+0.6D2	10.92	0.00	0.00	-0.82	0.59	0.00
G1+G2+0.7Q+V3+0.6D3	11.05	0.00	0.00	-0.78	0.67	0.00
G1+G2+0.7Q+V4+0.6D4	10.79	0.00	0.00	-0.78	0.51	0.00
G1+G2+D1	9.54	0.00	0.00	-0.63	0.49	0.00
G1+G2+D2	9.54	0.00	0.00	-0.72	0.49	0.00
G1+G2+D3	9.59	0.00	0.00	-0.68	0.53	0.00
G1+G2+D4	9.49	0.00	0.00	-0.68	0.46	0.00
G1+G2+Q	11.52	0.00	0.00	-0.82	0.63	0.00
G1+G2+Q+0.6V1+0.6D1	11.52	0.00	0.00	-0.78	0.63	0.00
G1+G2+Q+0.6V2+0.6D2	11.52	0.00	0.00	-0.86	0.63	0.00
G1+G2+Q+0.6V3+0.6D3	11.61	0.00	0.00	-0.82	0.69	0.00
G1+G2+Q+0.6V4+0.6D4	11.43	0.00	0.00	-0.82	0.58	0.00
G1+G2+Q+D1	11.52	0.00	0.00	-0.78	0.63	0.00



G1+G2+Q+D2	11.52	0.00	0.00	-0.87	0.63	0.00
G1+G2+Q+D3	11.56	0.00	0.00	-0.82	0.67	0.00
G1+G2+Q+D4	11.47	0.00	0.00	-0.82	0.60	0.00
G1+G2+V1+0.6D1	9.54	0.00	0.00	-0.64	0.49	0.00
G1+G2+V2+0.6D2	9.54	0.00	0.00	-0.72	0.49	0.00
G1+G2+V3+0.6D3	9.67	0.00	0.00	-0.68	0.58	0.00
G1+G2+V4+0.6D4	9.41	0.00	0.00	-0.68	0.41	0.00

Fundação S4						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	3.18	0.00	0.00	0.36	0.09	0.00
Adicional (G2)	2.85	0.00	0.00	0.99	0.20	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.08	0.00	0.00	0.30	0.05	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.01	0.00	0.00	0.01	0.00	0.00
Vento X- (V2)	-0.01	0.00	0.00	-0.01	0.00	0.00
Vento Y+ (V3)	0.08	0.00	0.00	0.00	0.04	0.00
Vento Y- (V4)	-0.08	0.00	0.00	0.00	-0.04	0.00
Desaprumo X+ (D1)	0.02	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	-0.02	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	0.03	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	-0.03	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	6.03	0.00	0.00	1.35	0.28	0.00
G1+G2+0.6V1+D1	6.06	0.00	0.00	1.38	0.28	0.00
G1+G2+0.6V2+D2	6.01	0.00	0.00	1.32	0.28	0.00
G1+G2+0.6V3+D3	6.11	0.00	0.00	1.34	0.34	0.00
G1+G2+0.6V4+D4	5.95	0.00	0.00	1.35	0.23	0.00
G1+G2+0.7Q+0.6V1+D1	6.81	0.00	0.00	1.59	0.32	0.00
G1+G2+0.7Q+0.6V2+D2	6.76	0.00	0.00	1.53	0.32	0.00
G1+G2+0.7Q+0.6V3+D3	6.86	0.00	0.00	1.55	0.37	0.00
G1+G2+0.7Q+0.6V4+D4	6.71	0.00	0.00	1.56	0.27	0.00
G1+G2+0.7Q+V1+0.6D1	6.81	0.00	0.00	1.58	0.32	0.00
G1+G2+0.7Q+V2+0.6D2	6.76	0.00	0.00	1.54	0.32	0.00
G1+G2+0.7Q+V3+0.6D3	6.88	0.00	0.00	1.55	0.38	0.00
G1+G2+0.7Q+V4+0.6D4	6.69	0.00	0.00	1.56	0.26	0.00
G1+G2+D1	6.05	0.00	0.00	1.37	0.28	0.00
G1+G2+D2	6.01	0.00	0.00	1.32	0.28	0.00
G1+G2+D3	6.06	0.00	0.00	1.34	0.32	0.00
G1+G2+D4	6.00	0.00	0.00	1.35	0.25	0.00
G1+G2+Q	7.11	0.00	0.00	1.65	0.34	0.00
G1+G2+Q+0.6V1+0.6D1	7.13	0.00	0.00	1.67	0.34	0.00
G1+G2+Q+0.6V2+0.6D2	7.09	0.00	0.00	1.63	0.34	0.00
G1+G2+Q+0.6V3+0.6D3	7.17	0.00	0.00	1.64	0.38	0.00
G1+G2+Q+0.6V4+0.6D4	7.04	0.00	0.00	1.65	0.29	0.00
G1+G2+Q+D1	7.13	0.00	0.00	1.68	0.34	0.00
G1+G2+Q+D2	7.09	0.00	0.00	1.62	0.34	0.00
G1+G2+Q+D3	7.14	0.00	0.00	1.64	0.37	0.00
G1+G2+Q+D4	7.07	0.00	0.00	1.65	0.30	0.00
G1+G2+V1+0.6D1	6.05	0.00	0.00	1.37	0.28	0.00
G1+G2+V2+0.6D2	6.01	0.00	0.00	1.32	0.28	0.00
G1+G2+V3+0.6D3	6.13	0.00	0.00	1.34	0.34	0.00



<b>G1+G2+V4+0.6D4</b>	<b>5.93</b>	<b>0.00</b>	<b>0.00</b>	<b>1.35</b>	<b>0.23</b>	<b>0.00</b>
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Fundação S5						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	3.13	0.00	0.00	-0.33	-0.07	0.00
Adicional (G2)	2.53	0.00	0.00	-0.85	-0.21	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.28	0.00	0.00	-0.40	-0.09	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	-0.01	0.00	0.00	0.00	0.00	0.00
Vento X- (V2)	0.01	0.00	0.00	0.00	0.00	0.00
Vento Y+ (V3)	-0.09	0.00	0.00	0.00	0.03	0.00
Vento Y- (V4)	0.09	0.00	0.00	0.00	-0.03	0.00
Desaprumo X+ (D1)	-0.01	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	0.01	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	-0.04	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	0.04	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	5.67	0.00	0.00	-1.18	-0.28	0.00
G1+G2+0.6V1+D1	5.65	0.00	0.00	-1.15	-0.28	0.00
G1+G2+0.6V2+D2	5.68	0.00	0.00	-1.21	-0.28	0.00
G1+G2+0.6V3+D3	5.58	0.00	0.00	-1.18	-0.23	0.00
G1+G2+0.6V4+D4	5.75	0.00	0.00	-1.18	-0.33	0.00
G1+G2+0.7Q+0.6V1+D1	6.54	0.00	0.00	-1.43	-0.34	0.00
G1+G2+0.7Q+0.6V2+D2	6.58	0.00	0.00	-1.49	-0.34	0.00
G1+G2+0.7Q+0.6V3+D3	6.47	0.00	0.00	-1.47	-0.29	0.00
G1+G2+0.7Q+0.6V4+D4	6.65	0.00	0.00	-1.46	-0.39	0.00
G1+G2+0.7Q+V1+0.6D1	6.54	0.00	0.00	-1.44	-0.34	0.00
G1+G2+0.7Q+V2+0.6D2	6.58	0.00	0.00	-1.49	-0.34	0.00
G1+G2+0.7Q+V3+0.6D3	6.45	0.00	0.00	-1.47	-0.29	0.00
G1+G2+0.7Q+V4+0.6D4	6.67	0.00	0.00	-1.46	-0.40	0.00
G1+G2+D1	5.65	0.00	0.00	-1.15	-0.28	0.00
G1+G2+D2	5.68	0.00	0.00	-1.21	-0.28	0.00
G1+G2+D3	5.63	0.00	0.00	-1.18	-0.25	0.00
G1+G2+D4	5.70	0.00	0.00	-1.18	-0.31	0.00
G1+G2+Q	6.94	0.00	0.00	-1.59	-0.37	0.00
G1+G2+Q+0.6V1+0.6D1	6.93	0.00	0.00	-1.57	-0.37	0.00
G1+G2+Q+0.6V2+0.6D2	6.96	0.00	0.00	-1.60	-0.37	0.00
G1+G2+Q+0.6V3+0.6D3	6.87	0.00	0.00	-1.59	-0.33	0.00
G1+G2+Q+0.6V4+0.6D4	7.02	0.00	0.00	-1.58	-0.41	0.00
G1+G2+Q+D1	6.93	0.00	0.00	-1.56	-0.37	0.00
G1+G2+Q+D2	6.96	0.00	0.00	-1.61	-0.37	0.00
G1+G2+Q+D3	6.91	0.00	0.00	-1.58	-0.34	0.00
G1+G2+Q+D4	6.98	0.00	0.00	-1.59	-0.40	0.00
G1+G2+V1+0.6D1	5.65	0.00	0.00	-1.16	-0.28	0.00
G1+G2+V2+0.6D2	5.68	0.00	0.00	-1.20	-0.28	0.00
G1+G2+V3+0.6D3	5.56	0.00	0.00	-1.18	-0.23	0.00
G1+G2+V4+0.6D4	5.77	0.00	0.00	-1.18	-0.33	0.00

Fundação S6						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)





Peso próprio (G1)	4.68	0.00	0.00	0.12	-0.14	0.00
Adicional (G2)	3.97	0.00	0.00	0.28	-0.24	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.29	0.00	0.00	0.14	-0.17	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.01	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	-0.01	0.00	0.00
Vento Y+ (V3)	-0.09	0.00	0.00	0.00	0.04	0.00
Vento Y- (V4)	0.09	0.00	0.00	0.00	-0.04	0.00
Desaprumo X+ (D1)	-0.01	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	0.01	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	-0.04	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	0.04	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	8.65	0.00	0.00	0.40	-0.37	0.00
G1+G2+0.6V1+D1	8.64	0.00	0.00	0.44	-0.37	0.00
G1+G2+0.6V2+D2	8.66	0.00	0.00	0.36	-0.37	0.00
G1+G2+0.6V3+D3	8.56	0.00	0.00	0.40	-0.32	0.00
G1+G2+0.6V4+D4	8.74	0.00	0.00	0.40	-0.43	0.00
G1+G2+0.7Q+0.6V1+D1	10.25	0.00	0.00	0.55	-0.49	0.00
G1+G2+0.7Q+0.6V2+D2	10.26	0.00	0.00	0.46	-0.49	0.00
G1+G2+0.7Q+0.6V3+D3	10.16	0.00	0.00	0.50	-0.44	0.00
G1+G2+0.7Q+0.6V4+D4	10.34	0.00	0.00	0.50	-0.55	0.00
G1+G2+0.7Q+V1+0.6D1	10.25	0.00	0.00	0.54	-0.49	0.00
G1+G2+0.7Q+V2+0.6D2	10.26	0.00	0.00	0.47	-0.49	0.00
G1+G2+0.7Q+V3+0.6D3	10.14	0.00	0.00	0.50	-0.44	0.00
G1+G2+0.7Q+V4+0.6D4	10.36	0.00	0.00	0.50	-0.55	0.00
G1+G2+D1	8.64	0.00	0.00	0.44	-0.37	0.00
G1+G2+D2	8.66	0.00	0.00	0.37	-0.37	0.00
G1+G2+D3	8.61	0.00	0.00	0.40	-0.34	0.00
G1+G2+D4	8.69	0.00	0.00	0.40	-0.40	0.00
G1+G2+Q	10.94	0.00	0.00	0.55	-0.55	0.00
G1+G2+Q+0.6V1+0.6D1	10.94	0.00	0.00	0.57	-0.55	0.00
G1+G2+Q+0.6V2+0.6D2	10.95	0.00	0.00	0.52	-0.55	0.00
G1+G2+Q+0.6V3+0.6D3	10.87	0.00	0.00	0.55	-0.51	0.00
G1+G2+Q+0.6V4+0.6D4	11.02	0.00	0.00	0.54	-0.59	0.00
G1+G2+Q+D1	10.93	0.00	0.00	0.58	-0.55	0.00
G1+G2+Q+D2	10.95	0.00	0.00	0.51	-0.55	0.00
G1+G2+Q+D3	10.90	0.00	0.00	0.55	-0.52	0.00
G1+G2+Q+D4	10.98	0.00	0.00	0.54	-0.58	0.00
G1+G2+V1+0.6D1	8.64	0.00	0.00	0.44	-0.37	0.00
G1+G2+V2+0.6D2	8.66	0.00	0.00	0.37	-0.37	0.00
G1+G2+V3+0.6D3	8.54	0.00	0.00	0.40	-0.32	0.00
G1+G2+V4+0.6D4	8.76	0.00	0.00	0.40	-0.43	0.00

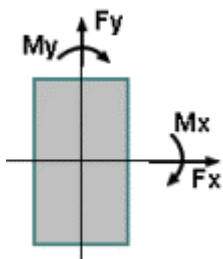
Fundação S7						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	5.12	0.00	0.00	-0.17	-0.17	0.00
Adicional (G2)	4.66	0.00	0.00	-0.40	-0.32	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.14	0.00	0.00	-0.06	-0.14	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.02	0.00	0.00



Vento X- (V2)	0.00	0.00	0.00	-0.02	0.00	0.00
Vento Y+ (V3)	-0.10	0.00	0.00	0.00	0.06	0.00
Vento Y- (V4)	0.10	0.00	0.00	0.00	-0.06	0.00
Desaprumo X+ (D1)	0.00	0.00	0.00	0.05	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	0.00	-0.05	0.00	0.00
Desaprumo Y+ (D3)	-0.05	0.00	0.00	0.00	0.04	0.00
Desaprumo Y- (D4)	0.05	0.00	0.00	0.00	-0.04	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	9.77	0.00	0.00	-0.57	-0.49	0.00
G1+G2+0.6V1+D1	9.77	0.00	0.00	-0.51	-0.49	0.00
G1+G2+0.6V2+D2	9.77	0.00	0.00	-0.62	-0.49	0.00
G1+G2+0.6V3+D3	9.66	0.00	0.00	-0.57	-0.41	0.00
G1+G2+0.6V4+D4	9.88	0.00	0.00	-0.57	-0.56	0.00
G1+G2+0.7Q+0.6V1+D1	11.27	0.00	0.00	-0.56	-0.58	0.00
G1+G2+0.7Q+0.6V2+D2	11.27	0.00	0.00	-0.67	-0.58	0.00
G1+G2+0.7Q+0.6V3+D3	11.16	0.00	0.00	-0.61	-0.51	0.00
G1+G2+0.7Q+0.6V4+D4	11.38	0.00	0.00	-0.62	-0.66	0.00
G1+G2+0.7Q+V1+0.6D1	11.27	0.00	0.00	-0.57	-0.58	0.00
G1+G2+0.7Q+V2+0.6D2	11.27	0.00	0.00	-0.66	-0.58	0.00
G1+G2+0.7Q+V3+0.6D3	11.14	0.00	0.00	-0.61	-0.50	0.00
G1+G2+0.7Q+V4+0.6D4	11.40	0.00	0.00	-0.61	-0.66	0.00
G1+G2+D1	9.77	0.00	0.00	-0.52	-0.49	0.00
G1+G2+D2	9.77	0.00	0.00	-0.62	-0.49	0.00
G1+G2+D3	9.72	0.00	0.00	-0.57	-0.45	0.00
G1+G2+D4	9.82	0.00	0.00	-0.57	-0.53	0.00
G1+G2+Q	11.91	0.00	0.00	-0.63	-0.62	0.00
G1+G2+Q+0.6V1+0.6D1	11.91	0.00	0.00	-0.59	-0.62	0.00
G1+G2+Q+0.6V2+0.6D2	11.91	0.00	0.00	-0.67	-0.62	0.00
G1+G2+Q+0.6V3+0.6D3	11.82	0.00	0.00	-0.63	-0.57	0.00
G1+G2+Q+0.6V4+0.6D4	12.00	0.00	0.00	-0.63	-0.68	0.00
G1+G2+Q+D1	11.91	0.00	0.00	-0.59	-0.62	0.00
G1+G2+Q+D2	11.91	0.00	0.00	-0.68	-0.62	0.00
G1+G2+Q+D3	11.86	0.00	0.00	-0.63	-0.59	0.00
G1+G2+Q+D4	11.96	0.00	0.00	-0.63	-0.66	0.00
G1+G2+V1+0.6D1	9.77	0.00	0.00	-0.53	-0.49	0.00
G1+G2+V2+0.6D2	9.77	0.00	0.00	-0.61	-0.49	0.00
G1+G2+V3+0.6D3	9.64	0.00	0.00	-0.57	-0.41	0.00
G1+G2+V4+0.6D4	9.90	0.00	0.00	-0.57	-0.57	0.00

Fundação S8						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	3.18	0.00	0.00	0.36	-0.08	0.00
Adicional (G2)	2.85	0.00	0.00	0.99	-0.20	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.07	0.00	0.00	0.30	-0.05	0.00
Água (A)	0.00	0.00	0.00	0.00	0.00	0.00
Vento X+ (V1)	0.01	0.00	0.00	0.01	0.00	0.00
Vento X- (V2)	-0.01	0.00	0.00	-0.01	0.00	0.00
Vento Y+ (V3)	-0.08	0.00	0.00	0.00	0.04	0.00
Vento Y- (V4)	0.08	0.00	0.00	0.00	-0.04	0.00
Desaprumo X+ (D1)	0.02	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	-0.02	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	-0.03	0.00	0.00	0.00	0.03	0.00

Desaprumo Y- (D4)	0.03	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	6.03	0.00	0.00	1.35	-0.28	0.00
G1+G2+0.6V1+D1	6.05	0.00	0.00	1.38	-0.28	0.00
G1+G2+0.6V2+D2	6.00	0.00	0.00	1.32	-0.28	0.00
G1+G2+0.6V3+D3	5.95	0.00	0.00	1.35	-0.23	0.00
G1+G2+0.6V4+D4	6.11	0.00	0.00	1.34	-0.34	0.00
G1+G2+0.7Q+0.6V1+D1	6.80	0.00	0.00	1.59	-0.32	0.00
G1+G2+0.7Q+0.6V2+D2	6.75	0.00	0.00	1.53	-0.32	0.00
G1+G2+0.7Q+0.6V3+D3	6.70	0.00	0.00	1.57	-0.26	0.00
G1+G2+0.7Q+0.6V4+D4	6.86	0.00	0.00	1.56	-0.37	0.00
G1+G2+0.7Q+V1+0.6D1	6.80	0.00	0.00	1.58	-0.32	0.00
G1+G2+0.7Q+V2+0.6D2	6.76	0.00	0.00	1.54	-0.32	0.00
G1+G2+0.7Q+V3+0.6D3	6.68	0.00	0.00	1.57	-0.26	0.00
G1+G2+0.7Q+V4+0.6D4	6.88	0.00	0.00	1.56	-0.37	0.00
G1+G2+D1	6.05	0.00	0.00	1.38	-0.28	0.00
G1+G2+D2	6.01	0.00	0.00	1.32	-0.28	0.00
G1+G2+D3	5.99	0.00	0.00	1.35	-0.25	0.00
G1+G2+D4	6.06	0.00	0.00	1.35	-0.32	0.00
G1+G2+Q	7.10	0.00	0.00	1.65	-0.33	0.00
G1+G2+Q+0.6V1+0.6D1	7.12	0.00	0.00	1.67	-0.33	0.00
G1+G2+Q+0.6V2+0.6D2	7.08	0.00	0.00	1.63	-0.33	0.00
G1+G2+Q+0.6V3+0.6D3	7.04	0.00	0.00	1.66	-0.29	0.00
G1+G2+Q+0.6V4+0.6D4	7.17	0.00	0.00	1.65	-0.37	0.00
G1+G2+Q+D1	7.12	0.00	0.00	1.68	-0.33	0.00
G1+G2+Q+D2	7.08	0.00	0.00	1.62	-0.33	0.00
G1+G2+Q+D3	7.07	0.00	0.00	1.66	-0.30	0.00
G1+G2+Q+D4	7.14	0.00	0.00	1.65	-0.36	0.00
G1+G2+V1+0.6D1	6.05	0.00	0.00	1.37	-0.28	0.00
G1+G2+V2+0.6D2	6.01	0.00	0.00	1.33	-0.28	0.00
G1+G2+V3+0.6D3	5.93	0.00	0.00	1.35	-0.23	0.00
G1+G2+V4+0.6D4	6.12	0.00	0.00	1.35	-0.34	0.00

Legenda	
	- Caso: indica o caso de carregamento no qual serão apresentados os esforços atuantes;
	- Elemento: nome da fundação;
	- N: esforço axial na fundação;
	- Mx: momento fletor na fundação, atuante em torno do eixo X global;
	- My: momento fletor na fundação, atuante em torno do eixo Y global;
	- Fx: esforço cortante na fundação, atuante no plano paralelo à direção X global;
	- Fy: esforço cortante na fundação, atuante no plano paralelo à direção Y global;
	- Mt: momento de torção atuante.

#### 8.4 QUADRO DE CARGA DOS PILARES

Pilares	NÍVEL 01		NÍVEL 02	
	NPos (tf)	NNeg	NPos (tf)	NNeg
P1	6.29	0.00	2.31	0.00

P2	10.31	0.00	3.67	0.00
P3	11.61	0.00	3.72	0.00
P4	7.17	0.00	2.27	0.00
P5	7.02	0.00	2.46	0.00
P6	11.02	0.00	3.64	0.00
P7	12.00	0.00	3.72	0.00
P8	7.17	0.00	2.27	0.00

## 8.5 SAPATAS - PAVIMENTO NÍVEL 01

### 8.5.1 Relatório de resultados das sapatas

<b>NÍVEL 01</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	60.00	35.00	8 ø 8.0 c/8	8 ø 8.0 c/6		
	70.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S2	60.00	35.00	8 ø 8.0 c/6	8 ø 8.0 c/6		
	60.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S3	55.00	35.00	8 ø 8.0 c/8	8 ø 8.0 c/6		
	70.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S4	55.00	35.00	8 ø 8.0 c/8	8 ø 8.0 c/6		
	70.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S5	60.00	35.00	8 ø 8.0 c/8	8 ø 8.0 c/6		
	70.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S6	60.00	35.00	8 ø 8.0 c/6	8 ø 8.0 c/6		
	60.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S7	55.00	35.00	8 ø 8.0 c/8	8 ø 8.0 c/6		
	70.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		
S8	55.00	35.00	8 ø 8.0 c/8	8 ø 8.0 c/6		
	70.00	35.00	(4.02 cm <sup>2</sup> )	(4.02 cm <sup>2</sup> )		

### 8.5.2 Relatório de cálculo das sapatas

<b>NÍVEL 01</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.50 cm	

### 8.5.3 Esforços e Pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm <sup>2</sup> )	Pressão Sig2 (kgf/cm <sup>2</sup> )	Pressão Sig3 (kgf/cm <sup>2</sup> )	Pressão Sig4 (kgf/cm <sup>2</sup> )
S1	41.96 62.94	0.43 1.34	6.29 6.95	1.68 (lim = 5.00)	1.88 (lim = 5.00)	1.63 (lim = 5.00)	1.43 (lim = 5.00)
S2	68.73 68.73	0.56 0.54	10.31 10.88	3.02 (lim = 5.00)	3.40 (lim = 5.00)	3.02 (lim = 5.00)	2.64 (lim = 5.00)



S3	58.03 116.06	0.69 0.87	11.61 12.22	3.27 (lim = 5.00)	3.60 (lim = 5.00)	3.08 (lim = 5.00)	2.75 (lim = 5.00)
S4	35.87 71.74	0.38 1.68	7.17 7.79	2.08 (lim = 5.00)	2.28 (lim = 5.00)	1.96 (lim = 5.00)	1.76 (lim = 5.00)
S5	46.77 70.16	0.41 1.61	7.02 7.68	1.86 (lim = 5.00)	2.08 (lim = 5.00)	1.80 (lim = 5.00)	1.57 (lim = 5.00)
S6	73.43 73.43	0.59 0.58	11.02 11.59	3.22 (lim = 5.00)	3.63 (lim = 5.00)	3.22 (lim = 5.00)	2.81 (lim = 5.00)
S7	60.00 119.99	0.68 0.68	12.00 12.61	3.37 (lim = 5.00)	3.71 (lim = 5.00)	3.18 (lim = 5.00)	2.84 (lim = 5.00)
S8	35.84 71.67	0.37 1.68	7.17 7.78	2.08 (lim = 5.00)	2.28 (lim = 5.00)	1.96 (lim = 5.00)	1.76 (lim = 5.00)

#### 8.5.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	2085.88 41.96	49.71 (lim = 1.50)	2433.53 62.94	38.67 (lim = 1.50)	18.90 1.39	13.60 lim = (1.50)		
S2	3264.96 68.73	47.51 (lim = 1.50)	3264.96 68.73	47.51 (lim = 1.50)	16.20 0.76	21.46 lim = (1.50)		
S3	3360.15 58.03	57.90 (lim = 1.50)	4276.56 116.06	36.85 (lim = 1.50)	17.32 1.08	16.11 lim = (1.50)		
S4	2141.33 35.87	59.69 (lim = 1.50)	2725.33 71.74	37.99 (lim = 1.50)	17.32 1.71	10.14 lim = (1.50)		
S5	2302.53 46.77	49.23 (lim = 1.50)	2686.29 70.16	38.29 (lim = 1.50)	18.90 1.65	11.42 lim = (1.50)		
S6	3476.80 73.43	47.35 (lim = 1.50)	3476.80 73.43	47.35 (lim = 1.50)	16.20 0.80	20.24 lim = (1.50)		
S7	3468.18 60.00	57.81 (lim = 1.50)	4414.05 119.99	36.79 (lim = 1.50)	17.32 0.93	18.62 lim = (1.50)		
S8	2139.36 35.84	59.70 (lim = 1.50)	2722.82 71.67	37.99 (lim = 1.50)	17.32 1.71	10.12 lim = (1.50)		

#### 8.5.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) A's (cm²/m)	Md (kgf.m/m) A's (cm²/m)
S1	831.46 1.12	845.23 1.13	0.00 0.00	0.00 0.00
S2	1590.73 2.13	1590.73 2.13	0.00 0.00	0.00 0.00
S3	1658.04 2.22	1702.04 2.28	0.00 0.00	0.00 0.00
S4	1025.11 1.38	1052.32 1.41	0.00 0.00	0.00 0.00
S5	926.93 1.24	942.28 1.26	0.00 0.00	0.00 0.00
S6	1699.63 2.28	1699.63 2.28	0.00 0.00	0.00 0.00
S7	1714.13 2.30	1759.63 2.36	0.00 0.00	0.00 0.00
S8	1024.09	1051.27	0.00	0.00

	1.37	1.41	0.00	0.00
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## 8.6 PILARES – PAVIMENTO NÍVEL 01

### 8.6.1 Relatório de resultado dos pilares

<b>NÍVEL 01</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 1</b>		cobr = 4.00 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:20	20.00 X 30.00	10.00 80.00	80.00 RR 80.00 RR	8.53 4.92	477 0	1481 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.5 4 ø 10.0	ø 5.0 c/12	13.84 9.23
P2 1:20	20.00 X 20.00	10.00 80.00	80.00 RR 80.00 RR	13.99 8.01	624 0	594 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	13.84 13.84
P3 1:20	15.00 X 30.00	10.00 80.00	80.00 RR 80.00 RR	15.75 9.27	765 0	953 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	18.45 9.23
P4 1:20	15.00 X 30.00	10.00 80.00	80.00 RR 80.00 RR	9.73 5.81	418 0	1848 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	18.45 9.23
P5 1:20	20.00 X 30.00	10.00 80.00	80.00 RR 80.00 RR	9.51 5.40	453 0	1781 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.5 4 ø 10.0	ø 5.0 c/12	13.84 9.23
P6 1:20	20.00 X 20.00	10.00 80.00	80.00 RR 80.00 RR	14.95 8.42	649 0	641 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	13.84 13.84

P7 1:20	15.00 X 30.00	10.00 80.00	80.00 RR 80.00 RR	16.29 9.50	753 0	746 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	18.45 9.23
P8 1:20	15.00 X 30.00	10.00 80.00	80.00 RR 80.00 RR	9.72 5.80	413 0	1853 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	18.45 9.23

#### 8.6.1.1 Relatório de cálculo dos pilares

<b>NÍVEL 01</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
P1	20.00 X 30.00	RR 13.84 RR 9.23	8.53 4.92	416 1514	669 2436	1.61	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P2	20.00 X 20.00	RR 13.84 RR 13.84	13.99 8.01	624 609	1148 1121	1.84	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	15.00 X 30.00	RR 18.45 RR 9.23	18.90 11.12	993 1084	1131 1234	1.14	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P4	15.00 X 30.00	RR 18.45 RR 9.23	11.67 6.97	548 2176	600 2386	1.10	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P5	20.00 X 30.00	RR 13.84 RR 9.23	9.51 5.40	408 1818	573 2555	1.41	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P6	20.00 X 20.00	RR 13.84 RR 13.84	14.95 8.42	709 600	1251 1058	1.76	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P7	15.00 X 30.00	RR 18.45 RR 9.23	19.55 11.40	982 834	1199 1018	1.22	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P8	15.00 X 30.00	RR 18.45 RR 9.23	11.66 6.96	540 2182	592 2394	1.10	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)



## 8.7 VIGAS - PAVIMENTO NÍVEL 01

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	1988.79 1101.95 2762.11	2 ø 10.0 2 ø 8.0 2 ø 12.5		-2377.48 -2598.44 -2811.58 -2981.57	2 ø 12.5 2 ø 12.5 2 ø 12.5 2 ø 12.5		Aviso 101
V2	2338.16 1368.03 2760.28	2 ø 12.5 2 ø 10.0 2 ø 12.5		-2893.96 -2955.93 -2844.14 -2969.59	2 ø 12.5 2 ø 12.5 2 ø 12.5 2 ø 12.5		Aviso 101
V3	941.21	2 ø 8.0		-859.24 -872.97	2 ø 8.0 2 ø 8.0		
V4	1406.67	2 ø 10.0		-1250.96 -1234.28	2 ø 8.0 2 ø 8.0		
V5	2393.21	2 ø 12.5		-1224.06 -1253.21	2 ø 10.0 2 ø 10.0		
V6	2106.58	2 ø 12.5					
V7	911.49	2 ø 8.0		-683.65 -683.24	2 ø 8.0 2 ø 8.0		

### 8.7.1 Resultados Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P1	30.00			2 ø 12.5 1.93					0.12
1	462.50	15.00 x 35.00	2 ø 10.0 1.59			ø 5.0 c/ 18			0.16
P2	20.00			2 ø 12.5 2.12					0.15
2	347.50	15.00 x 35.00	2 ø 8.0 0.86			ø 5.0 c/ 18			0.09
P3	30.00			2 ø 12.5 2.31					0.18
3	411.95	15.00 x 35.00	2 ø 12.5 2.26			ø 5.0 c/ 17			0.17
P4	30.00			2 ø 12.5 2.46					0.20

### 8.7.2 Resultados Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>





Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P5	30.00			2 ø 12.5 2.38					0.18
1	462.50	15.00 x 35.00	2 ø 12.5 1.90			ø 5.0 c/ 17			0.11
P6	20.00			2 ø 12.5 2.43					0.18
2	347.50	15.00 x 35.00	2 ø 10.0 1.08			ø 5.0 c/ 18			0.07
P7	30.00			2 ø 12.5 2.33					0.18
3	411.95	15.00 x 35.00	2 ø 12.5 2.26			ø 5.0 c/ 17			0.17
P8	30.00			2 ø 12.5 2.45					0.20

### 8.7.3 Resultados Viga V3

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P5	20.00			2 ø 8.0 0.79					0.05
1	270.00	15.00 x 35.00	2 ø 8.0 0.79			ø 5.0 c/ 18			0.07
P1	20.00			2 ø 8.0 0.79					0.05

### 8.7.4 Resultados Viga V4

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P6	20.00			2 ø 8.0 0.98					0.11
1	270.00	15.00 x 35.00	2 ø 10.0 1.11			ø 5.0 c/ 18			0.07
P2	20.00			2 ø 8.0 0.97					0.10

### 8.7.5 Resultados Viga V5

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P7	15.00			2 ø 10.0 1.57					0.05
1	280.00	30.00 x 35.00	2 ø 12.5 1.89			ø 5.0 c/ 11			0.12
P3	15.00			2 ø 10.0 1.57					0.06

### 8.7.6 Resultados Viga V6

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V2	15.00								0.00
1	280.00	15.00 x 35.00	2 ø 12.5 1.70			ø 5.0 c/ 17			0.09
V1	15.00								0.00

### 8.7.7 Resultados Viga V7

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P8	15.00			2 ø 8.0 0.79					0.03
1	280.00	15.00 x 35.00	2 ø 8.0 0.79			ø 5.0 c/ 18			0.07
P4	15.00			2 ø 8.0 0.79					0.03

## 8.8 LAJES – PAVIMENTO NÍVEL 01

### 8.8.1 Relatório de resultado da laje

<b>NÍVEL 01</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cofr = 3.50 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	10	731.50	1767	754	As = 7.72 cm <sup>2</sup> /m (ø6.3 c/4 - 7.79 cm <sup>2</sup> /m)	As = 3.36 cm <sup>2</sup> /m (ø6.3 c/9 - 3.46 cm <sup>2</sup> /m)
L2	10	731.50	1168	621	As = 4.79 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m)	As = 2.73 cm <sup>2</sup> /m (ø6.3 c/11 - 2.83 cm <sup>2</sup> /m)
L3	10	654.50	419	430	As = 1.61 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)	As = 1.85 cm <sup>2</sup> /m (ø6.3 c/16 - 1.95 cm <sup>2</sup> /m)
L4	10	631.50	213	344	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.47 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)

### 8.8.2 Relatório de cálculo da laje

<b>NÍVEL 01</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cofr = 3.50 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	bw = 100.0 cm h = 10.0 cm	Md = 1767 kgf.m/m As = 7.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm	Md = 475 kgf.m/m As = 1.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 7.72 cm <sup>2</sup> /m ø6.3 c/4 (7.79 cm <sup>2</sup> /m) fiss = 0.10 mm	A's = 1.83 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	vsd = 6.94 tf/m vrd1 = 5.87 tf/m Modelo I vrd2 = 28.94 tf/m vsw = 2.00 tf/m asw = 15.62 cm <sup>2</sup> /m
	Y	bw = 100.0 cm	Md = 754 kgf.m/m			bw = 100.0 cm	Md = 835 kgf.m/m			As = 3.36 cm <sup>2</sup> /m	A's = 3.76 cm <sup>2</sup> /m	vsd = 4.54 tf/m



		h = 10. 0 cm	As = 3.36 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			h = 10. 0 cm	As = 3.76 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			ø6.3 c/9 (3.46 cm <sup>2</sup> / m) fiss = 0.10 mm	ø6.3 c/8 (3.90 cm <sup>2</sup> / m)	vr <sub>d1</sub> = 4.50 tf/m vr <sub>d2</sub> = 25.74 tf/m vsw = 0.14 tf/m asw = 1.26 cm <sup>2</sup> /m
L 2	X	bw = 100 .0 cm h = 10. 0 cm	Md = 116 8 kgf. m/m As = 4.79 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm				As = 4.79 cm <sup>2</sup> / m ø6.3 c/6 (5.20 cm <sup>2</sup> / m) fiss = 0.09 mm		v <sub>s</sub> d = 1.74 tf/m vr <sub>d1</sub> = 5.29 tf/m Modelo I vr <sub>d2</sub> = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100 .0 cm h = 10. 0 cm	Md = 621 kgf. m/m As = 2.73 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm	Md = 250 kgf. m/m As = 1.06 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 2.73 cm <sup>2</sup> / m ø6.3 c/11 (2.83 cm <sup>2</sup> / m) fiss = 0.10 mm	A's = 0.01 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m)	v <sub>s</sub> d = 3.24 tf/m vr <sub>d1</sub> = 4.36 tf/m vr <sub>d2</sub> = 25.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 3	X	bw = 100 .0 cm h = 10. 0 cm	Md = 419 kgf. m/m As = 1.61 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm				As = 1.61 cm <sup>2</sup> / m ø6.3 c/19 (1.64 cm <sup>2</sup> / m) fiss = 0.11 mm		v <sub>s</sub> d = 1.16 tf/m vr <sub>d1</sub> = 4.50 tf/m Modelo I vr <sub>d2</sub> = 28.94 tf/m vsw = 0.00 tf/m



												asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100.0 cm h = 10.0 cm	Md = 430 kgf. m/m  As = 1.85 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100.0 cm h = 10.0 cm				As = 1.85 cm <sup>2</sup> / m ø6.3 c/16 (1.95 cm <sup>2</sup> / m) fiss = 0.10 mm		vsd = 1.22 tf/m vrd1 = 4.16 tf/m vrd2 = 25.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 4	X	bw = 100.0 cm h = 10.0 cm	Md = 336 kgf. m/m  As = 1.28 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100.0 cm h = 10.0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.03 mm		vsd = 1.10 tf/m vrd1 = 4.48 tf/m Modelo I vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100.0 cm h = 10.0 cm	Md = 344 kgf. m/m  As = 1.47 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100.0 cm h = 10.0 cm				As = 1.47 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.10 mm		vsd = 1.32 tf/m vrd1 = 4.08 tf/m vrd2 = 25.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 8.9 PILARES - PAVIMENTO NÍVEL 02

### 8.9.1 Relatório de resultados dos pilares

<b>NÍVEL 02</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
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Lance 2		cobr = 4.00 cm	
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Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:20	15.00 X 30.00	268.00 258.00	258.00 RR 258.00 RR	3.07 1.58	292 231	1342 980	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	59.51 29.76
P2 1:20	20.00 X 20.00	268.00 258.00	258.00 RR 258.00 RR	4.89 2.70	478 456	461 430	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	44.63 44.63
P3 1:20	15.00 X 30.00	268.00 258.00	258.00 RR 258.00 RR	4.95 2.75	449 472	470 492	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	59.51 29.76
P4 1:20	15.00 X 30.00	268.00 258.00	258.00 RR 258.00 RR	3.01 1.58	267 272	1287 1260	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	59.51 29.76
P5 1:20	20.00 X 30.00	292.00 282.00	282.00 RR 282.00 RR	3.27 1.63	348 304	1428 1241	1.57 2 ø 10.0 1.57 2 ø 10.0 0.5 4 ø 10.0	ø 5.0 c/12	48.79 32.52
P6 1:20	20.00 X 20.00	292.00 282.00	282.00 RR 282.00 RR	4.85 2.67	448 425	449 432	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	48.79 48.79
P7 1:20	15.00 X 30.00	292.00 282.00	282.00 RR 282.00 RR	4.95 2.75	435 457	466 440	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	65.05 32.52
P8 1:20	15.00 X 30.00	292.00 282.00	282.00 RR 282.00 RR	3.01 1.58	271 278	1281 1243	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	65.05 32.52

## 8.9.2 Relatório de cálculo dos pilares

<b>NÍVEL 02</b>	$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E = 268384 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
<b>Lance 2</b>		cobr = $4.00 \text{ cm}$	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	15.00 X 30.00	RR 59.51 RR 29.76	3.68 1.90	342 1636	395 1892	1.16	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P2	20.00 X 20.00	RR 44.63 RR 44.63	4.89 2.70	541 434	1053 844	1.95	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	15.00 X 30.00	RR 59.51 RR 29.76	5.94 3.30	642 560	881 767	1.37	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P4	15.00 X 30.00	RR 59.51 RR 29.76	3.61 1.89	305 1564	372 1904	1.22	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P5	20.00 X 30.00	RR 48.79 RR 32.52	3.27 1.63	279 1473	374 1973	1.34	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P6	20.00 X 20.00	RR 48.79 RR 48.79	4.85 2.67	448 489	905 989	2.02	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P7	15.00 X 30.00	RR 65.05 RR 32.52	5.94 3.30	628 478	890 678	1.42	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P8	15.00 X 30.00	RR 65.05 RR 32.52	3.61 1.89	310 1561	378 1899	1.22	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

## 8.10 VIGAS - PAVIMENTO NÍVEL 02

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	1118.36 571.20 1181.82	2 ø 10.0 2 ø 8.0 2 ø 10.0		-1259.40 -1360.10 -1201.60 -1192.36	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0		
V2	1103.04 572.01 1184.75	2 ø 10.0 2 ø 8.0 2 ø 10.0		-1338.14 -1339.94 -1202.50 -1187.41	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0		



V3	495.23	2 ø 8.0		-389.11 -292.65	2 ø 8.0 2 ø 8.0		
V4	720.89	2 ø 8.0		-521.24 -548.18	2 ø 8.0 2 ø 8.0		
V5	1037.41	2 ø 10.0		-442.56 -456.99	2 ø 10.0 2 ø 10.0		
V6	954.73	2 ø 8.0					
V7	388.30	2 ø 8.0		-266.20 -262.32	2 ø 8.0 2 ø 8.0		

### 8.10.1 Resultados Viga V1

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As eq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P1	30.00			2 ø 10.0 1.20					0.10
1	462.50	15.00 x 30.00	2 ø 10.0 1.06			ø 5.0 c/ 15			0.08
P2	20.00			2 ø 10.0 1.31					0.12
2	347.50	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 15			0.04
P3	30.00			2 ø 10.0 1.15					0.09
3	411.95	15.00 x 30.00	2 ø 10.0 1.13			ø 5.0 c/ 15			0.09
P4	30.00			2 ø 10.0 1.14					0.09

### 8.10.2 Resultados Viga V2

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As eq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P5	30.00			2 ø 10.0 1.28					0.11
1	462.50	15.00 x 30.00	2 ø 10.0 1.05			ø 5.0 c/ 15			0.08
P6	20.00			2 ø 10.0 1.29					0.11
2	347.50	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 15			0.04



P7	30.00			2 ø 10.0 1.15					0.09
3	411.95	15.00 x 30.00	2 ø 10.0 1.13			ø 5.0 c/ 15			0.09
P8	30.00			2 ø 10.0 1.13					0.09

### 8.10.3 Resultados Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P5	20.00			2 ø 8.0 0.68					0.01
1	275.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 15			0.03
P1	15.00			2 ø 8.0 0.68					0.01

### 8.10.4 Resultados Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P6	20.00			2 ø 8.0 0.68					0.03
1	270.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 15			0.06
P2	20.00			2 ø 8.0 0.68					0.03

### 8.10.5 Resultados Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P7	15.00			2 ø 10.0 1.35					0.01

1	280.00	30.00 x 30.00	2 ø 10.0 1.35			ø 5.0 c/ 11			0.07
P3	15.00			2 ø 10.0 1.35					0.01

#### 8.10.6 Resultados Viga V6

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V2	15.00								0.00
1	280.00	15.00 x 30.00	2 ø 8.0 0.90			ø 5.0 c/ 15			0.11
V1	15.00								0.00

#### 8.10.7 Resultados Viga V7

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 4.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P8	15.00			2 ø 8.0 0.68					0.01
1	280.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 15			0.02
P4	15.00			2 ø 8.0 0.68					0.01

### 8.11 LAJES – PAVIMENTO NÍVEL 02

#### 8.11.1 Relatório de resultado da laje

NÍVEL 02	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.50 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	10	430.00	461	331	As = 1.46 cm <sup>2</sup> /m (ø5.0 c/13 - 1.51 cm <sup>2</sup> /m)	As = 1.15 cm <sup>2</sup> /m (ø5.0 c/17 - 1.15 cm <sup>2</sup> /m)
L2	10	430.00	424	219	As = 1.34 cm <sup>2</sup> /m (ø5.0 c/14 - 1.40 cm <sup>2</sup> /m)	As = 1.15 cm <sup>2</sup> /m (ø5.0 c/17 - 1.15 cm <sup>2</sup> /m)
L3	10	430.00	270	288	As = 1.06 cm <sup>2</sup> /m	As = 1.15 cm <sup>2</sup> /m

					(ø5.0 c/18 - 1.09 cm²/m)	(ø5.0 c/17 - 1.15 cm²/m)
L4	10	430.00	141	225	As = 1.06 cm²/m (ø5.0 c/18 - 1.09 cm²/m)	As = 1.15 cm²/m (ø5.0 c/17 - 1.15 cm²/m)

### 8.11.2 Relatório de cálculo da laje

<b>NÍVEL 02</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 3.50 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	bw = 100.0 cm h = 10.0 cm	Md = 461 kgf.m/m As = 1.46 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 10.0 cm				As = 1.46 cm²/m ø5.0 c/13 (1.51 cm²/m) fiss = 0.19 mm		vsd = 0.90 tf/m vrd1 = 4.51 tf/m Modelo I vrd2 = 29.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m
	Y	bw = 100.0 cm h = 10.0 cm	Md = 336 kgf.m/m As = 1.15 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 10.0 cm				As = 1.15 cm²/m ø5.0 c/17 (1.15 cm²/m) fiss = 0.20 mm		vsd = 0.78 tf/m vrd1 = 4.11 tf/m vrd2 = 26.73 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m
L2	X	bw = 100.0 cm h = 10.0 cm	Md = 424 kgf.m/m As = 1.34			bw = 100.0 cm h = 10.0 cm				As = 1.34 cm²/m ø5.0 c/14		vsd = 0.82 tf/m vrd1 = 4.49 tf/m Modelo I



		0 cm	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			0 cm				(1.40 cm <sup>2</sup> / m) fiss = 0.19 mm		vr <sub>d2</sub> = 29.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100 .0 cm h = 10. 0 cm	Md = 336 kgf. m/m  As = 1.15 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm				As = 1.15 cm <sup>2</sup> / m ø5.0 c/17 (1.15 cm <sup>2</sup> / m) fiss = 0.09 mm		v <sub>sd</sub> = 0.63 tf/m vr <sub>d1</sub> = 4.11 tf/m vr <sub>d2</sub> = 26.73 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 3	X	bw = 100 .0 cm h = 10. 0 cm	Md = 336 kgf. m/m  As = 1.06 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm				As = 1.06 cm <sup>2</sup> / m ø5.0 c/18 (1.09 cm <sup>2</sup> / m) fiss = 0.12 mm		v <sub>sd</sub> = 0.81 tf/m vr <sub>d1</sub> = 4.42 tf/m Modelo I vr <sub>d2</sub> = 29.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100 .0 cm h = 10. 0 cm	Md = 336 kgf. m/m  As = 1.15 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm				As = 1.15 cm <sup>2</sup> / m ø5.0 c/17 (1.15 cm <sup>2</sup> / m) fiss = 0.15 mm		v <sub>sd</sub> = 0.79 tf/m vr <sub>d1</sub> = 4.11 tf/m vr <sub>d2</sub> = 26.73 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 4	X	bw = 100	Md = 336			bw = 100				As = 1.06 cm <sup>2</sup> / m		v <sub>sd</sub> = 0.65 tf/m

		.0 cm h = 10. 0 cm	kgf. m/m  As = 1.06 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			.0 cm h = 10. 0 cm				ø5.0 c/18 (1.09 cm <sup>2</sup> / m) fiss = 0.03 mm		vrđ1 = 4.42 tf/m Modelo I vrđ2 = 29.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 100 .0 cm h = 10. 0 cm	Md = 336 kgf. m/m  As = 1.15 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 100 .0 cm h = 10. 0 cm				As = 1.15 cm <sup>2</sup> / m ø5.0 c/17 (1.15 cm <sup>2</sup> / m) fiss = 0.09 mm		vsd = 0.77 tf/m vrđ1 = 4.11 tf/m vrđ2 = 26.73 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 9. ETA - LEITO DE SECAGEM

### 9.1 RESUMO DOS RESULTADOS

#### 9.1.1 Cargas verticais

- Peso próprio = 111.86 tf
- Adicional = 2.69 tf
- Solo = -0.02 tf
- Acidental = 2.96 tf
- Total = 117.50 tf
- Área aproximada = 19.80 m<sup>2</sup>
- Relação = 5934.29 kgf/m<sup>2</sup>

AVISO: Relação de carga por área não usual para edifícios

### 9.1.2 Deslocamento horizontal

- $X+ = 0.00$  cm (limite 0.09)
- $X- = 0.00$  cm (limite 0.09)
- $Y+ = 0.00$  cm (limite 0.09)
- $Y- = 0.00$  cm (limite 0.09)

AVISO: Os deslocamentos horizontais não foram verificados

### 9.1.3 Verificação de estabilidade (Gama-Z)

- $X+ = 1.00$  (limite 1.10)
- $X- = 1.00$  (limite 1.10)
- $Y+ = 1.00$  (limite 1.10)
- $Y- = 1.00$  (limite 1.10)

### 9.1.4 Análise de 2ª ordem

Processo P-Delta

Sem deslocamentos no topo da edificação

## 9.2 VERIFICAÇÃO DE ESTABILIDADE GLOBAL DA ESTRUTURA

### 9.2.1 Maior coeficiente Gama-Z

Combinação: 1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1							
Pavimento	Altura relativa (cm)	Carga vertical (tf)	Carga horizontal (tf)	Deslocamento horizontal (cm)	Momento 2a. ordem (kgf.m)	Momento tombamento (kgf.m)	Gama-Z
TOPO	159.00	0.00	0.00	0.00	0.00	0.00	1.00 (lim=1.10)
BASE	10.00	0.00	0.00	0.00	0.00	0.00	
TOTAL					0.00	0.00	

### 9.2.2 Limitações

Em estruturas com Gama-Z maior que 1.10 é necessário fazer a verificação dos efeitos de 2ª ordem com a análise P-Delta.

O Gama-Z é um parâmetro de estabilidade para avaliação de estruturas simétricas (tanto geometria quanto carregamento) e edificações com mais de 4 pavimentos. Nos demais casos, recomenda-se a verificação dos efeitos de 2ª ordem com a análise P-Delta.

### 9.3 RESERVATÓRIO - PAVIMENTO BASE

#### 9.3.1 Dados do reservatório

<b>BASE</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RES1)	15.00	0.00	25881.00	375.00 kgf/m <sup>2</sup>	150.00 136.50	0.00 0.00	661.50 kgf/m <sup>2</sup>				

#### 9.3.2 Resultados do reservatório

<b>BASE</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.00 cm	

##### 9.3.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	8.88 -5.59	16.15 -15.94	594	813	As = 1.13 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	As = 3.40 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 4.76 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)

#### 9.3.3 Cálculos do reservatório

<b>BASE</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.00 cm	

##### 9.3.3.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)						
		Momento positivo	Momento negativo			



Trecho	Direção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Armadura inferior	Armadura superior	Cisalhamento
L1	X	Md = 565 kgf.m/m As = 1.12 cm²/m A's = 0.00 cm²/m		Fd = 6.71 tf Situação: PE As = 0.77 cm²/m A's = 0.77 cm²/m	Md = 594 kgf.m/m As = 1.19 cm²/m A's = 0.00 cm²/m		Fd = 6.71 tf Situação: GE As = 2.18 cm²/m A's = 0.00 cm²/m	As = 1.13 cm²/m ø6.3 c/25 (1.25 cm²/m) fiss = 0.03 mm		vsd = 5.14 tf/m vrd1 = 7.80 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m
	Y	Md = 1130 kgf.m/m As = 2.43 cm²/m A's = 0.00 cm²/m		Fd = 19.13 tf Situação: PE As = 3.40 cm²/m A's = 1.14 cm²/m	Md = 813 kgf.m/m As = 1.76 cm²/m A's = 0.00 cm²/m		Fd = 19.13 tf Situação: GE As = 4.76 cm²/m A's = 0.00 cm²/m	As = 3.40 cm²/m ø8.0 c/14 (3.59 cm²/m) fiss = 0.07 mm	A's = 3.10 cm²/m ø6.3 c/10 (3.12 cm²/m)	vsd = 1.71 tf/m vrd1 = 7.88 tf/m vrd2 = 53.31 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m

ARMADURAS DAS ABAS							
Localização	Direção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Armadura inferior	Armadura superior	Cisalhamento
PAR2-Oinf	Pos	Md = 2711 kgf.m/m As = 1.13 cm²/m A's = 0.00 cm²/m	Fd = 6.84 tf Situação: GE As = 0.28 cm²/m A's = 0.00 cm²/m		As = 1.35 cm² 3 ø8.0 (1.51 cm²) fiss = 0.09 mm	A's = 2.10 cm² 4 ø8.0 (2.01 cm²)	vsd = 10.20 tf/m vrd1 = 4.03 tf/m asw = 4.65 cm²/m
	Neg	Md = 4964 kgf.m/m As = 2.10 cm²/m A's = 0.00 cm²/m	Fd = 6.84 tf Situação: GE As = 1.31 cm²/m A's = 0.00 cm²/m				





PAR2-Ninf	Pos	Md = 2711 kgf.m/m As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.13 mm	A's = 1.43 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 8.21 tf/m vrd1 = 4.03 tf/m asw = 3.74 cm <sup>2</sup> /m
	Neg	Md = 3408 kgf.m/m As = 1.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Minf	Pos	Md = 2711 kgf.m/m As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.07 mm	A's = 1.69 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 7.54 tf/m vrd1 = 4.03 tf/m asw = 3.44 cm <sup>2</sup> /m
	Neg	Md = 4034 kgf.m/m As = 1.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.34 tf Situação: GE As = 0.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Linf	Pos	Md = 2711 kgf.m/m As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.76 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 7.83 tf/m vrd1 = 4.03 tf/m asw = 3.57 cm <sup>2</sup> /m
	Neg	Md = 4190 kgf.m/m	Fd = 13.77 tf Situação: GE As = 0.18 cm <sup>2</sup> /m				



		As = 1.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m				
PAR2-Kinf	Pos	Md = 2912 kgf.m/m  As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 1.75 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 7.78 tf/m vrd1 = 4.03 tf/m asw = 3.55 cm <sup>2</sup> /m
	Neg	Md = 4171 kgf.m/m  As = 1.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.64 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Jinf	Pos	Md = 3258 kgf.m/m  As = 1.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.36 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.12 mm	A's = 1.68 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 8.19 tf/m vrd1 = 4.03 tf/m asw = 3.73 cm <sup>2</sup> /m
	Neg	Md = 4001 kgf.m/m  As = 1.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.82 tf Situação: GE As = 0.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-linf	Pos	Md = 3492 kgf.m/m  As = 1.46 cm <sup>2</sup> /m			As = 1.46 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.14 mm	A's = 1.59 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 8.75 tf/m vrd1 = 4.03 tf/m asw = 3.98 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 3791 kgf.m/ m  As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.54 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Hinf	Pos	Md = 3651 kgf.m/ m  As = 1.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.53 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.14 mm	A's = 1.53 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 8.65 tf/m vrd1 = 4.03 tf/m asw = 3.94 cm <sup>2</sup> /m
	Neg	Md = 3651 kgf.m/ m  As = 1.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Ginf	Pos	Md = 3737 kgf.m/ m  As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.40 tf Situação: GE As = 0.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.18 tf Situação: GE As = 1.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.94 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.86 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 9.18 tf/m vrd1 = 4.08 tf/m asw = 4.24 cm <sup>2</sup> /m
	Neg	Md = 3539 kgf.m/ m  As = 1.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.40 tf Situação: GE As = 0.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.18 tf Situação: GE As = 1.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Finf	Pos	Md = 3767	Fd = 3.13 tf Situação: GE	Fd = 6.53 tf	As = 2.36 cm <sup>2</sup>	A's = 2.23 cm <sup>2</sup>	vsd = 9.42 tf/m



		kgf.m/ m  As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 2.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	5 ø8.0 (2.51 cm <sup>2</sup> )	vr <sub>d1</sub> = 4.15 tf/m as <sub>w</sub> = 4.38 cm <sup>2</sup> /m
	Neg	Md = 3449 kgf.m/ m  As = 1.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.13 tf Situação: GE As = 1.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.53 tf Situação: GE As = 2.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Einf	Pos	Md = 3757 kgf.m/ m  As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situação: GE As = 1.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 2.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.66 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.50 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vs <sub>d</sub> = 9.47 tf/m vr <sub>d1</sub> = 4.15 tf/m as <sub>w</sub> = 4.43 cm <sup>2</sup> /m
	Neg	Md = 3367 kgf.m/ m  As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situação: GE As = 1.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 2.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Dinf	Pos	Md = 3749 kgf.m/ m  As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 10.33 tf Situação: GE As = 2.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.81 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.62 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vs <sub>d</sub> = 9.36 tf/m vr <sub>d1</sub> = 4.15 tf/m as <sub>w</sub> = 4.37 cm <sup>2</sup> /m
	Neg	Md = 3279 kgf.m/ m		Fd = 10.33 tf Situação: GE As = 2.62 cm <sup>2</sup> /m			



		As = 1.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m			
PAR2-Cinf	Pos	Md = 3913 kgf.m/m  As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 9.16 tf Situação: GE As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.74 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.42 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vsd = 9.10 tf/m vrd1 = 4.15 tf/m asw = 4.25 cm <sup>2</sup> /m
	Neg	Md = 3148 kgf.m/m  As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 9.16 tf Situação: GE As = 2.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Binf	Pos	Md = 4222 kgf.m/m  As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.49 tf Situação: GE As = 2.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.43 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.82 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 8.34 tf/m vrd1 = 4.08 tf/m asw = 3.88 cm <sup>2</sup> /m
	Neg	Md = 2776 kgf.m/m  As = 1.16 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.49 tf Situação: GE As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Ainf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m		Fd = 1.03 tf Situação: GE As = 0.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 5.59 tf/m vrd1 = 4.03 tf/m asw = 2.54 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.03 tf Situação: GE As = 1.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR3inf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.01 tf Situação: GE As = 0.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.21 tf Situação: GE As = 0.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.02 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 2.41 tf/m vrd1 = 4.03 tf/m asw = 1.10 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.21 tf Situação: PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m			
PAR1inf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 13.81 tf Situação: PE As = 1.98 cm <sup>2</sup> /m A's = 1.20 cm <sup>2</sup> /m	As = 1.98 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.07 mm	A's = 2.02 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 1.63 tf/m vrd1 = 4.08 tf/m asw = 0.75 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 13.81 tf Situação: PE As = 2.02 cm <sup>2</sup> /m A's = 1.15 cm <sup>2</sup> /m			

## 9.4 RESERVATÓRIO - PAVIMENTO TOPO

### 9.4.1 Dados do reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Parede das Outras	Total	Base	Topo		
L1 (RES2)	15.00	0.00	25996.00	375.00 kgf/m <sup>2</sup>	150.00 136.50	0.00 0.00	661.50 kgf/m <sup>2</sup>				
PAR1 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-A (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-B (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-C (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-D (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-E (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-F (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-G (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-H (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-I (Contenções)	15.00	0.00	26030.00	558.75	0.00 0.00	0.00 0.00	225.00	1192.00	0.00		



				kgf/ m			kgf/ m				
PAR2-J (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-K (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-L (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-M (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-N (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR2-O (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR3 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-A (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-B (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-C (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-D (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-E (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-F (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-G (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		





PAR4-H (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-I (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-J (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-K (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-L (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-M (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-N (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR4-O (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	225.00 kgf/m	1192.00	0.00		
PAR5 (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR6 (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1192.00	0.00		
PAR7 (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR8 (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR9 (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR10 (Convenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR11 (Convenções)	15.00	0.00	26030.00	558.75	0.00 0.00	0.00 0.00	150.00	1192.00	0.00		



				kgf/ m			kgf/ m				
PAR12 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR13 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR14 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR15 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR16 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR17 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR18 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR19 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR20 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR21 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	150.00 kgf/m	1192.00	0.00		
PAR22 (Contenções)	15.00	0.00	26030.00	558.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1192.00	0.00		
PAR23 (Contenções)	15.00	0.00	26030.00	127.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	272.00	0.00		
PAR24 (Contenções)	15.00	0.00	26030.00	127.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	272.00	0.00		
PAR25 (Contenções)	15.00	0.00	26030.00	127.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	272.00	0.00		

## 9.4.2 Resultados do reservatório

<b>TOPO</b>	$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E = 268384 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
<b>Lance 2</b>		cobr = $3.00 \text{ cm}$	

### 9.4.2.1 Reservatório contenções

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
PAR1	10.36 -12.84	1.69 -0.56	2590	1537	As = $7.67 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/10 ( $7.85 \text{ cm}^2/\text{m}$ )	As = $3.14 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/9 ( $3.46 \text{ cm}^2/\text{m}$ )	A's = $3.74 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/20 ( $3.93 \text{ cm}^2/\text{m}$ )	A's = $3.58 \text{ cm}^2/\text{m}$ $\varnothing 8.0$ c/14 ( $3.59 \text{ cm}^2/\text{m}$ )
PAR2-A	4.48 -1.07	6.34 -0.22	896	649	As = $1.98 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/15 ( $2.08 \text{ cm}^2/\text{m}$ )	As = $1.60 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/19 ( $1.64 \text{ cm}^2/\text{m}$ )	A's = $1.51 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/20 ( $1.56 \text{ cm}^2/\text{m}$ )	A's = $1.60 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/19 ( $1.64 \text{ cm}^2/\text{m}$ )
PAR2-B	5.17 -3.98	5.03 -0.15	1861	215	As = $3.65 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/20 ( $3.93 \text{ cm}^2/\text{m}$ )	As = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )	A's = $4.56 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/17 ( $4.62 \text{ cm}^2/\text{m}$ )	A's = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )
PAR2-C	5.75 -5.40	5.25 -0.14	1463	172	As = $3.84 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/20 ( $3.93 \text{ cm}^2/\text{m}$ )	As = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )	A's = $3.96 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/19 ( $4.13 \text{ cm}^2/\text{m}$ )	A's = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )
PAR2-D	5.93 -5.55	4.76 -0.14	1526	175	As = $3.95 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/19 ( $4.13 \text{ cm}^2/\text{m}$ )	As = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )	A's = $4.12 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/19 ( $4.13 \text{ cm}^2/\text{m}$ )	A's = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )
PAR2-E	5.86 -4.16	3.85 -0.13	1550	180	As = $3.80 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/20 ( $3.93 \text{ cm}^2/\text{m}$ )	As = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )	A's = $3.93 \text{ cm}^2/\text{m}$ $\varnothing 10.0$ c/19 ( $4.13 \text{ cm}^2/\text{m}$ )	A's = $1.23 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )
PAR2-F	5.69 -1.86	4.14 -0.13	1567	184	As = $3.45 \text{ cm}^2/\text{m}$ $\varnothing 8.0$ c/14 ( $3.59 \text{ cm}^2/\text{m}$ )	As = $1.21 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )	A's = $3.53 \text{ cm}^2/\text{m}$ $\varnothing 8.0$ c/14 ( $3.59 \text{ cm}^2/\text{m}$ )	A's = $1.21 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25 ( $1.25 \text{ cm}^2/\text{m}$ )
PAR2-G	6.32 0.00	4.77 -0.12	1574	186	As = $3.20 \text{ cm}^2/\text{m}$ $\varnothing 8.0$ c/15	As = $1.21 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25	A's = $3.23 \text{ cm}^2/\text{m}$ $\varnothing 8.0$ c/15	A's = $1.21 \text{ cm}^2/\text{m}$ $\varnothing 6.3$ c/25



					(3.35 cm <sup>2</sup> /m)	(1.25 cm <sup>2</sup> /m)	(3.35 cm <sup>2</sup> /m)	(1.25 cm <sup>2</sup> /m)
PAR2-H	7.45 0.00	5.04 -0.12	1585	185	As = 3.25 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 3.23 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-I	9.27 0.00	4.69 -0.11	1602	184	As = 3.29 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 3.18 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-J	12.44 0.00	5.48 -0.11	1609	181	As = 3.30 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 3.13 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-K	12.78 0.00	4.98 -0.10	1605	177	As = 3.29 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 3.07 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-L	14.23 0.00	4.05 -0.10	1582	178	As = 3.25 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.96 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-M	13.46 0.00	4.26 -0.10	1542	177	As = 3.14 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	As = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.84 cm <sup>2</sup> /m ø8.0 c/17 (2.96 cm <sup>2</sup> /m)	A's = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-N	11.27 -0.18	4.02 -0.10	1530	180	As = 3.14 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	As = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.71 cm <sup>2</sup> /m ø6.3 c/11 (2.83 cm <sup>2</sup> /m)	A's = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR2-O	7.99 -0.25	2.97 -0.16	1480	413	As = 3.07 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	As = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 2.37 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)
PAR3	1.33 -2.43	6.01 -0.53	1756	649	As = 2.31 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 4.07 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)
PAR4-A	11.14 -42.05	0.93 -25.60	1562	1044	As = 11.61 cm <sup>2</sup> /m ø16.0 c/17 (11.83 cm <sup>2</sup> /m)	As = 7.78 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	A's = 6.42 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	A's = 5.98 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)
PAR4-B	0.00 -6.72	0.73 -3.47	493	183	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19	A's = 2.16 cm <sup>2</sup> /m ø6.3 c/14	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19



					(1.56 cm <sup>2</sup> /m)	(1.64 cm <sup>2</sup> /m)	(2.23 cm <sup>2</sup> /m)	(1.64 cm <sup>2</sup> /m)
PAR4-C	0.07 -4.18	1.02 -3.77	389	83	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)
PAR4-D	2.77 -3.91	1.03 -3.89	401	69	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)
PAR4-E	6.67 -4.50	0.96 -3.72	421	73	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)
PAR4-F	10.35 -4.86	0.81 -3.36	425	76	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-G	13.53 -4.93	0.62 -2.91	411	78	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-H	15.98 -4.67	0.43 -2.43	401	80	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-I	17.59 -4.10	0.62 -2.83	437	80	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-J	18.72 -3.56	0.78 -3.24	458	79	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-K	19.03 -2.71	0.88 -3.56	464	87	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-L	18.09 -1.60	0.89 -3.71	452	113	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-M	16.32 -0.44	1.23 -3.59	417	121	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR4-N	13.00 0.00	1.27 -3.20	291	122	As = 1.51 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m	A's = 1.51 cm <sup>2</sup> /m	A's = 1.60 cm <sup>2</sup> /m



					ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	ø6.3 c/19 (1.64 cm <sup>2</sup> /m)
PAR4-O	21.24 -30.90	1.00 -27.39	2721	1194	As = 11.07 cm <sup>2</sup> /m ø10.0 c/7 (11.22 cm <sup>2</sup> /m)	As = 8.12 cm <sup>2</sup> /m ø12.5 c/15 (8.18 cm <sup>2</sup> /m)	A's = 5.22 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	A's = 7.56 cm <sup>2</sup> /m ø12.5 c/16 (7.67 cm <sup>2</sup> /m)
PAR5	116.46 -24.31	4.53 -11.26	3117	805	As = 10.91 cm <sup>2</sup> /m ø12.5 c/11 (11.16 cm <sup>2</sup> /m)	As = 4.09 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 12.50 cm <sup>2</sup> /m ø16.0 c/19 (10.58 cm <sup>2</sup> /m)	A's = 3.33 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)
PAR6	9.64 -24.90	1.87 -1.34	1717	413	As = 8.02 cm <sup>2</sup> /m ø12.5 c/15 (8.18 cm <sup>2</sup> /m)	As = 1.70 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 6.18 cm <sup>2</sup> /m ø12.5 c/19 (6.46 cm <sup>2</sup> /m)	A's = 1.70 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)
PAR7	8.66 -6.40	1.39 -1.26	3279	166	As = 8.23 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.65 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 3.81 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR8	8.94 -3.68	1.20 -1.00	3496	166	As = 8.30 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.66 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 3.48 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR9	9.12 -3.25	1.33 -0.95	3625	166	As = 8.53 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.71 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 3.62 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR10	9.17 -3.17	1.74 -0.91	3727	166	As = 9.99 cm <sup>2</sup> /m ø12.5 c/12 (10.23 cm <sup>2</sup> /m)	As = 2.00 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 3.76 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR11	9.17 -2.98	0.65 -1.01	3797	166	As = 8.91 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m)	As = 1.78 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	A's = 3.85 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR12	9.14 -2.77	1.82 -1.16	3838	167	As = 8.97 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m)	As = 1.79 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	A's = 3.89 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)



PAR13	9.12 -2.72	1.43 -1.27	3849	167	As = 8.99 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m)	As = 1.80 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	A's = 3.93 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR14	9.11 -2.60	1.22 -1.25	3835	167	As = 8.94 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m)	As = 1.79 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	A's = 3.92 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR15	9.13 -2.45	1.21 -1.12	3800	167	As = 8.71 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	As = 1.74 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	A's = 3.87 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)
PAR16	9.18 -2.28	1.20 -0.94	3746	167	As = 9.89 cm <sup>2</sup> /m ø12.5 c/12 (10.23 cm <sup>2</sup> /m)	As = 1.98 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 3.80 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR17	9.25 -2.04	1.19 -0.84	3676	167	As = 8.46 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.69 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 3.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR18	9.30 -1.78	1.19 -0.85	3595	167	As = 8.22 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 3.50 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR19	10.21 -2.43	1.66 -0.83	3551	166	As = 8.22 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 3.51 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR20	6.86 -7.51	2.27 -0.93	3216	169	As = 8.27 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	As = 1.65 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 4.30 cm <sup>2</sup> /m ø8.0 c/11 (4.57 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)
PAR21	113.94 -25.37	5.09 -10.67	2726	1194	As = 12.42 cm <sup>2</sup> /m ø16.0 c/16 (12.57 cm <sup>2</sup> /m)	As = 5.01 cm <sup>2</sup> /m ø8.0 c/10 (5.03 cm <sup>2</sup> /m)	A's = 7.59 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	A's = 4.28 cm <sup>2</sup> /m ø8.0 c/11 (4.57 cm <sup>2</sup> /m)
PAR22	9.95 -2.31	4.53 -2.19	2031	609	As = 4.64 cm <sup>2</sup> /m ø10.0 c/16	As = 1.23 cm <sup>2</sup> /m ø6.3 c/25	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.75 cm <sup>2</sup> /m ø6.3 c/17





					(4.91 cm <sup>2</sup> /m)	(1.25 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(1.83 cm <sup>2</sup> /m)
PAR23	114.23 -73.61	12.83 -30.04	4419	4471	As = 22.38 cm <sup>2</sup> /m ø12.5 c/5 (24.54 cm <sup>2</sup> /m)	As = 17.24 cm <sup>2</sup> /m ø12.5 c/7 (17.53 cm <sup>2</sup> /m)	A's = 22.52 cm <sup>2</sup> /m ø16.0 c/9 (22.34 cm <sup>2</sup> /m)	A's = 17.19 cm <sup>2</sup> /m ø12.5 c/7 (17.53 cm <sup>2</sup> /m)
PAR24	115.63 -107.20	11.68 -29.03	3834	4397	As = 26.71 cm <sup>2</sup> /m ø16.0 c/7 (28.72 cm <sup>2</sup> /m)	As = 17.62 cm <sup>2</sup> /m ø12.5 c/6 (20.45 cm <sup>2</sup> /m)	A's = 24.86 cm <sup>2</sup> /m ø16.0 c/8 (25.13 cm <sup>2</sup> /m)	A's = 16.46 cm <sup>2</sup> /m ø16.0 c/12 (16.76 cm <sup>2</sup> /m)
PAR25	36.04 -76.25	8.36 -4.65	726	1637	As = 12.61 cm <sup>2</sup> /m ø10.0 c/6 (13.09 cm <sup>2</sup> /m)	As = 4.63 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	A's = 11.87 cm <sup>2</sup> /m ø16.0 c/17 (11.83 cm <sup>2</sup> /m)	A's = 4.58 cm <sup>2</sup> /m ø10.0 c/17 (4.62 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	PAR21 PAR4-O			As = 6.24 cm <sup>2</sup> /m ø8.0 c/8 (6.28 cm <sup>2</sup> /m)	
Barra	PAR4-O PAR21	-2937		As = 14.20 cm <sup>2</sup> /m ø12.5 c/8 (15.34 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2-A	-1156		As = 2.33 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR21	-637		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR21 PAR3			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-O PAR6	-1107		As = 5.89 cm <sup>2</sup> /m ø10.0 c/13 (6.04 cm <sup>2</sup> /m)	
Barra	PAR6 PAR5	-2145		As = 7.95 cm <sup>2</sup> /m ø8.0 c/6 (8.38 cm <sup>2</sup> /m)	
Barra	PAR5 PAR2-O			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-A PAR5	-387		As = 6.02 cm <sup>2</sup> /m ø8.0 c/8 (6.28 cm <sup>2</sup> /m)	
Barra	PAR5 PAR4-A	-94		As = 5.19 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR2-A	-713		As = 2.28 cm <sup>2</sup> /m	





	PAR2-B			ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR20	-2094		As = 4.74 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	
Barra	PAR20 PAR2-A			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR2-C	-1198		As = 3.05 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR19	-2275		As = 5.38 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	
Barra	PAR19 PAR2-B			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR2-D	-1167		As = 3.00 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	
Barra	PAR2-D PAR18	-2301		As = 5.46 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	
Barra	PAR18 PAR2-C			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-D PAR2-E	-1204		As = 2.92 cm <sup>2</sup> /m ø8.0 c/17 (2.96 cm <sup>2</sup> /m)	
Barra	PAR2-E PAR17	-2347		As = 5.40 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	
Barra	PAR17 PAR2-D			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-E PAR2-F	-1238		As = 2.79 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-F PAR16	-2384		As = 5.14 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR16 PAR2-E			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-F PAR2-G	-1268		As = 2.59 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	
Barra	PAR2-G PAR15	-2411		As = 5.00 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR15 PAR2-F			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-G PAR2-H	-1294		As = 2.64 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	
Barra	PAR2-H PAR14	-2426		As = 5.03 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	



Barra	PAR14 PAR2-G			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-H PAR2-I	-1314		As = 2.68 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-I PAR13	-2427		As = 5.04 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR13 PAR2-H			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-I PAR2-J	-1326		As = 2.70 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-J PAR12	-2414		As = 5.01 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR12 PAR2-I			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-J PAR2-K	-1336		As = 2.72 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-K PAR11	-2381		As = 4.94 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR11 PAR2-J			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-K PAR2-L	-1332		As = 2.72 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-L PAR10	-2332		As = 4.83 cm <sup>2</sup> /m ø6.3 c/6 (5.20 cm <sup>2</sup> /m)	
Barra	PAR10 PAR2-K			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-L PAR2-M	-1316		As = 2.68 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-M PAR9	-2263		As = 4.76 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	
Barra	PAR9 PAR2-L			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-M PAR2-N	-1283		As = 2.61 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	
Barra	PAR2-N PAR8	-2182		As = 4.54 cm <sup>2</sup> /m ø8.0 c/11 (4.57 cm <sup>2</sup> /m)	
Barra	PAR8 PAR2-M			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR2-N PAR2-O	-1267		As = 2.58 cm <sup>2</sup> /m ø8.0 c/19	



				(2.65 cm <sup>2</sup> /m)	
Barra	PAR2-O PAR7	-2063		As = 4.52 cm <sup>2</sup> /m ø8.0 c/11 (4.57 cm <sup>2</sup> /m)	
Barra	PAR7 PAR2-N			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-B PAR7	-469		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR7 PAR4-A	-266		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-A PAR4-B	-79		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-C PAR8	-524		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR8 PAR4-B			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-B PAR4-C	-152		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-D PAR9	-599		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR9 PAR4-C			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-C PAR4-D	-199		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-E PAR10	-665		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR10 PAR4-D			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-D PAR4-E	-246		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-F PAR11	-718		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR11 PAR4-E			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-E PAR4-F	-295		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-G PAR12	-755		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR12 PAR4-F			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-F	-337		As = 2.28 cm <sup>2</sup> /m	



	PAR4-G			ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-H PAR13	-778		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR13 PAR4-G			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-G PAR4-H	-369		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-I PAR14	-787		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR14 PAR4-H			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-H PAR4-I	-395		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-J PAR15	-782		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR15 PAR4-I			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-I PAR4-J	-423		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-K PAR16	-764		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR16 PAR4-J			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-J PAR4-K	-447		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-L PAR17	-734		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR17 PAR4-K			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-K PAR4-L	-463		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-M PAR18	-695		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR18 PAR4-L			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-L PAR4-M	-467		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-N PAR19	-647		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	



Barra	PAR19 PAR4-M			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-M PAR4-N	-453		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-O PAR20	-612		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR20 PAR4-N			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR4-N PAR4-O	-305		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR22 PAR3			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR3 PAR22	-656		As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR1 PAR22			As = 2.28 cm <sup>2</sup> /m ø6.3 c/13 (2.40 cm <sup>2</sup> /m)	
Barra	PAR22 PAR1	-1291		As = 2.87 cm <sup>2</sup> /m ø8.0 c/17 (2.96 cm <sup>2</sup> /m)	
Barra	PAR1 PAR6	-1053		As = 3.41 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	
Barra	PAR6 PAR1	-584		As = 2.46 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR21 PAR4-O			As = 6.24 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR4-O PAR24	-2721		As = 22.87 cm <sup>2</sup> /m ø12.5 c/5 (24.54 cm <sup>2</sup> /m)	
Barra	PAR24 PAR21	-3942		As = 27.05 cm <sup>2</sup> /m ø16.0 c/7 (28.72 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2-A	-2014		As = 4.34 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR21	-1177		As = 2.44 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR21 PAR3			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-O PAR6	-1480		As = 3.09 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR6 PAR5	-3117		As = 6.91 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	



Barra	PAR5 PAR2-O			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-A PAR5	-2847		As = 13.29 cm <sup>2</sup> /m ø10.0 c/5 (15.71 cm <sup>2</sup> /m)	
Barra	PAR5 PAR23	-147		As = 10.62 cm <sup>2</sup> /m ø16.0 c/18 (11.17 cm <sup>2</sup> /m)	
Barra	PAR23 PAR4-A	-4314		As = 22.15 cm <sup>2</sup> /m ø12.5 c/5 (24.54 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR2-B	-786		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR20	-3216		As = 7.72 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR20 PAR2-A			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR2-C	-1435		As = 3.00 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR19	-3551		As = 7.97 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR19 PAR2-B			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR2-D	-1404		As = 2.93 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-D PAR18	-3595		As = 8.08 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR18 PAR2-C			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-D PAR2-E	-1446		As = 3.02 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-E PAR17	-3676		As = 8.28 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR17 PAR2-D			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-E PAR2-F	-1489		As = 3.11 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-F PAR16	-3746		As = 8.45 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR16 PAR2-E			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20	



				(6.14 cm <sup>2</sup> /m)	
Barra	PAR2-F PAR2-G	-1528		As = 3.20 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-G PAR15	-3800		As = 8.32 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	
Barra	PAR15 PAR2-F			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-G PAR2-H	-1560		As = 3.32 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-H PAR14	-3835		As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	
Barra	PAR14 PAR2-G			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-H PAR2-I	-1585		As = 3.38 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-I PAR13	-3849		As = 8.44 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	
Barra	PAR13 PAR2-H			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-I PAR2-J	-1602		As = 3.41 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-J PAR12	-3838		As = 8.41 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	
Barra	PAR12 PAR2-I			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-J PAR2-K	-1609		As = 3.43 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-K PAR11	-3797		As = 8.31 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	
Barra	PAR11 PAR2-J			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-K PAR2-L	-1605		As = 3.42 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-L PAR10	-3727		As = 8.41 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR10 PAR2-K			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-L PAR2-M	-1582		As = 3.37 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-M	-3625		As = 8.15 cm <sup>2</sup> /m	



	PAR9			ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR9 PAR2-L			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-M PAR2-N	-1542		As = 3.31 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-N PAR8	-3496		As = 7.86 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR8 PAR2-M			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR2-N PAR2-O	-1530		As = 3.30 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR2-O PAR7	-3279		As = 7.34 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR7 PAR2-N			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-B PAR7	-599		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR7 PAR4-A	-349		As = 2.46 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-A PAR4-B			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-C PAR8	-548		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR8 PAR4-B			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-B PAR4-C	-83		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-D PAR9	-664		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR9 PAR4-C			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-C PAR4-D	-152		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-E PAR10	-759		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR10 PAR4-D			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-D PAR4-E	-204		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	





Barra	PAR4-F PAR11	-829		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR11 PAR4-E			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-E PAR4-F	-256		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-G PAR12	-869		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR12 PAR4-F			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-F PAR4-G	-305		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-H PAR13	-882		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR13 PAR4-G			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-G PAR4-H	-341		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-I PAR14	-873		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR14 PAR4-H			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-H PAR4-I	-371		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-J PAR15	-841		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR15 PAR4-I			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-I PAR4-J	-390		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-K PAR16	-789		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR16 PAR4-J			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-J PAR4-K	-406		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-L PAR17	-722		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR17 PAR4-K			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20	



				(6.14 cm <sup>2</sup> /m)	
Barra	PAR4-K PAR4-L	-425		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-M PAR18	-641		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR18 PAR4-L			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-L PAR4-M	-435		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-N PAR19	-547		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR19 PAR4-M			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-M PAR4-N	-423		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-O PAR20	-428		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR20 PAR4-N			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR4-N PAR4-O	-122		As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR22 PAR3			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR3 PAR22	-1214		As = 2.95 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR1 PAR22			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR22 PAR1	-2590		As = 5.66 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR1 PAR6	-2234		As = 4.84 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR6 PAR1			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR24 PAR25	-342		As = 2.87 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	
Barra	PAR25 PAR24	-3707		As = 10.28 cm <sup>2</sup> /m ø10.0 c/7 (11.22 cm <sup>2</sup> /m)	
Barra	PAR25 PAR23			As = 2.34 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	

Barra	PAR23 PAR25	-4899		As = 12.87 cm <sup>2</sup> /m Ø12.5 c/9 (13.64 cm <sup>2</sup> /m)	
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#### 9.4.2.2 Reservatório RES2

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	1.71 -8.32	25.45 -17.32	4425	3236	As = 11.72 cm <sup>2</sup> /m Ø10.0 c/6 (13.09 cm <sup>2</sup> /m)	As = 10.19 cm <sup>2</sup> /m Ø10.0 c/7 (11.22 cm <sup>2</sup> /m)	A's = 16.22 cm <sup>2</sup> /m Ø12.5 c/9 (13.64 cm <sup>2</sup> /m)	A's = 17.34 cm <sup>2</sup> /m Ø16.0 c/17 (11.83 cm <sup>2</sup> /m)

#### 9.4.3 Cálculos do reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

#### 9.4.3.1 Reservatório contenções

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
PAR 1	X	Md = 2590 kgf.m/m  As = 5.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 10.36 tf Situação : GE As = 4.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 15.41 tf Situação : GE As = 7.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf.m/m  As = 1.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 15.41 tf Situação : GE As = 3.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 7.67 cm <sup>2</sup> /m Ø10.0 c/10 (7.85 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 3.74 cm <sup>2</sup> /m Ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 8.08 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1361 kgf.m/m  As = 3.03	Fd = 1.69 tf Situação : GE As = 2.77 cm <sup>2</sup> /m	Fd = 0.67 tf Situação : GE As = 3.14 cm <sup>2</sup> /m	Md = 1537 kgf.m/m  As = 3.47	Fd = 1.69 tf Situação : GE As = 3.21 cm <sup>2</sup> /m	Fd = 0.67 tf Situação : GE As = 3.58 cm <sup>2</sup> /m	As = 3.14 cm <sup>2</sup> /m Ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	A's = 3.58 cm <sup>2</sup> /m Ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	vsd = 1.30 tf/m vrd1 = 7.66 tf/m vrd2 = 51.86 tf/m



		cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	fiss = 0.09 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-A	X	Md = 896 kgf. m/m  As = 1.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.48 tf Situação : GE As = 1.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.29 tf Situação: GE As = 1.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.29 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.98 cm <sup>2</sup> /m ø6.3 c/15 (2.08 cm <sup>2</sup> /m) fiss = 0.10 mm	A's = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	vsd = 4.81 tf/m vrd1 = 7.86 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.26 tf Situação: GE As = 0.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.34 tf Situação : GE As = 0.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.26 tf Situação: GE As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	vsd = 1.72 tf/m vrd1 = 7.51 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-B	X	Md = 1435 kgf. m/m  As = 2.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.17 tf Situação : GE As = 2.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.78 tf Situação: GE As = 3.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1861 kgf. m/m  As = 3.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.17 tf Situação : GE As = 3.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.78 tf Situação: GE As = 4.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.65 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 4.56 cm <sup>2</sup> /m ø10.0 c/17 (4.62 cm <sup>2</sup> /m)	vsd = 5.40 tf/m vrd1 = 8.41 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.18 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.18 tf Situação: GE As = 0.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.65 tf/m vrd1 = 7.20 tf/m vrd2 = 51.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



PAR 2-C	X	Md = 1404 kgf. m/m As = 2.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.75 tf Situação : GE As = 2.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.48 tf Situação: GE As = 3.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1463 kgf. m/m As = 3.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.75 tf Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.48 tf Situação: GE As = 3.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.84 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 3.96 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	vsd = 5.62 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação: GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação: GE As = 0.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.17 tf/m vrd1 = 7.20 tf/m vrd2 = 51.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-D	X	Md = 1446 kgf. m/m As = 2.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.93 tf Situação : GE As = 2.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.66 tf Situação: GE As = 3.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1526 kgf. m/m As = 3.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.93 tf Situação : GE As = 2.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.66 tf Situação: GE As = 4.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.95 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 4.12 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	vsd = 5.72 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação: GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação: GE As = 0.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.23 tf/m vrd1 = 7.20 tf/m vrd2 = 51.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-E	X	Md = 1489 kgf. m/m As = 3.08	Fd = 5.86 tf Situação : GE As = 2.23 cm <sup>2</sup> /m	Fd = 4.99 tf Situação: GE As = 3.80 cm <sup>2</sup> /m	Md = 1550 kgf. m/m As = 3.21	Fd = 5.86 tf Situação : GE As = 2.36 cm <sup>2</sup> /m	Fd = 4.99 tf Situação: GE As = 3.93 cm <sup>2</sup> /m	As = 3.80 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 3.93 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	vsd = 5.72 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 56.01 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	fiss = 0.15 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.23 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.16 tf Situaç ão: GE As = 0.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.23 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.16 tf Situaç ão: GE As = 0.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsd = 2.27 tf/m vrd1 = 7.20 tf/m vrd2 = 51.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-F	X	Md = 1528 kgf. m/m  As = 3.13 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.69 tf Situação : GE As = 2.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.23 tf Situaç ão: GE As = 3.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1567 kgf. m/m  As = 3.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.69 tf Situação : GE As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.23 tf Situaç ão: GE As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.45 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m ) fiss = 0.13 mm	A's = 3.53 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m )	vsd = 5.67 tf/m vrd1 = 8.25 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.15 tf Situaç ão: GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.15 tf Situaç ão: GE As = 0.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsd = 2.29 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-G	X	Md = 1560 kgf. m/m  As = 3.20 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.32 tf Situação : GE As = 2.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1574 kgf. m/m  As = 3.23 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.32 tf Situação : GE As = 2.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.20 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m ) fiss = 0.13 mm	A's = 3.23 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m )	vsd = 5.56 tf/m vrd1 = 8.20 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situação: GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situação: GE As = 0.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.26 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-H	X	Md = 1585 kgf. m/m As = 3.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.45 tf Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1573 kgf. m/m As = 3.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.45 tf Situação : GE As = 2.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.25 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 3.23 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m)	vsd = 5.43 tf/m vrd1 = 8.20 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação: GE As = 0.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação: GE As = 0.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.21 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-I	X	Md = 1602 kgf. m/m As = 3.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.27 tf Situação : GE As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1562 kgf. m/m As = 3.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.27 tf Situação : GE As = 1.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.29 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 3.18 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	vsd = 5.29 tf/m vrd1 = 8.27 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.21		Fd = 0.13 tf Situação: GE As = 0.29 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21		Fd = 0.13 tf Situação: GE As = 0.41 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.18 tf/m vrd1 = 7.42 tf/m vrd2 = 52.87 tf/m





		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.01 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-J	X	Md = 1609 kgf. m/m  As = 3.30 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.44 tf Situação : GE As = 1.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1539 kgf. m/m  As = 3.13 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.44 tf Situação : GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.30 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m ) fiss = 0.14 mm	A's = 3.13 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m )	vsd = 5.25 tf/m vrd1 = 8.27 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.13 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.13 tf Situação: GE As = 0.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsd = 2.14 tf/m vrd1 = 7.42 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-K	X	Md = 1605 kgf. m/m  As = 3.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.78 tf Situação : GE As = 1.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1500 kgf. m/m  As = 3.07 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.78 tf Situação : GE As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.29 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m ) fiss = 0.14 mm	A's = 3.07 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m )	vsd = 5.05 tf/m vrd1 = 8.15 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.12 tf Situação: GE As = 0.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.12 tf Situação: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsd = 2.12 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m





PAR 2-L	X	Md = 1582 kgf. m/m As = 3.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 14.23 tf Situação : GE As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1449 kgf. m/m As = 2.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 14.23 tf Situação : GE As = 0.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.25 cm <sup>2</sup> /m ø8.0 c/15 (3.35 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 2.96 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m)	vsd = 4.90 tf/m vrd1 = 8.15 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.12 tf Situação: GE As = 0.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.12 tf Situação: GE As = 0.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.11 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-M	X	Md = 1542 kgf. m/m As = 3.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 13.46 tf Situação : GE As = 1.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 1389 kgf. m/m As = 2.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 13.46 tf Situação : GE As = 0.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.14 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m) fiss = 0.09 mm	A's = 2.84 cm <sup>2</sup> /m ø8.0 c/17 (2.96 cm <sup>2</sup> /m)	vsd = 4.64 tf/m vrd1 = 8.11 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.11 tf Situação: GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.11 tf Situação: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 2.10 tf/m vrd1 = 7.32 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-N	X	Md = 1530 kgf. m/m As = 3.11	Fd = 11.27 tf Situação : GE As = 1.52 cm <sup>2</sup> /m	Fd = 0.22 tf Situação: GE As = 3.14 cm <sup>2</sup> /m	Md = 1323 kgf. m/m As = 2.68	Fd = 11.27 tf Situação : GE As = 1.08 cm <sup>2</sup> /m	Fd = 0.22 tf Situação: GE As = 2.71 cm <sup>2</sup> /m	As = 3.14 cm <sup>2</sup> /m ø6.3 c/9 (3.46 cm <sup>2</sup> /m)	A's = 2.71 cm <sup>2</sup> /m ø6.3 c/11 (2.83 cm <sup>2</sup> /m)	vsd = 4.28 tf/m vrd1 = 8.14 tf/m Modelo I vrd2 = 56.95 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	fiss = 0.09 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.19 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.11 tf Situaç ão: GE As = 0.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.19 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.11 tf Situaç ão: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.19 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsd = 2.10 tf/m vrd1 = 7.42 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-O	X	Md = 1480 kgf. m/m  As = 3.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 7.99 tf Situação : GE As = 1.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.30 tf Situaç ão: GE As = 3.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1143 kgf. m/m  As = 2.32 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 7.99 tf Situação : GE As = 1.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.30 tf Situaç ão: GE As = 2.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.07 cm <sup>2</sup> /m ø8.0 c/16 (3.14 cm <sup>2</sup> /m ) fiss = 0.14 mm	A's = 2.37 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 4.99 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.63 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.97 tf Situação : GE As = 0.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situaç ão: GE As = 0.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.63 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.97 tf Situação : GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situaç ão: GE As = 0.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m ) fiss = 0.03 mm	A's = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m )	vsd = 2.20 tf/m vrd1 = 7.41 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 3	X	Md = 933 kgf. m/m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.33 tf Situação : GE As = 1.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situaç ão: GE As = 2.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1756 kgf. m/m  As = 3.65 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.33 tf Situação : GE As = 3.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situaç ão: GE As = 4.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.31 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.11 mm	A's = 4.07 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m )	vsd = 4.74 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 757 kgf. m/m As = 1.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.64 tf Situação: GE As = 0.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.01 tf Situação: GE As = 0.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.64 tf Situação: GE As = 1.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	vsd = 1.36 tf/m vrd1 = 7.29 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-A	X	Md = 1562 kgf. m/m As = 3.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.14 tf Situação: GE As = 1.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 50.46 tf Situação: GE As = 11.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 50.46 tf Situação: PE As = 6.42 cm <sup>2</sup> /m A's = 5.19 cm <sup>2</sup> /m	As = 11.61 cm <sup>2</sup> /m ø16.0 c/17 (11.83 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 6.42 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	vsd = 9.03 tf/m vrd1 = 8.83 tf/m Modelo I vrd2 = 54.48 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1044 kgf. m/m As = 2.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 30.72 tf Situação: GE As = 7.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 30.72 tf Situação: PE As = 5.98 cm <sup>2</sup> /m A's = 1.83 cm <sup>2</sup> /m	As = 7.78 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m) fiss = 0.09 mm	A's = 5.98 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	vsd = 4.70 tf/m vrd1 = 8.07 tf/m vrd2 = 47.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-B	X	Md = 757 kgf. m/m As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 8.06 tf Situação: PE As = 1.14 cm <sup>2</sup> /m A's = 0.71 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 8.06 tf Situação: GE As = 2.16 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.16 cm <sup>2</sup> /m ø6.3 c/14 (2.23 cm <sup>2</sup> /m)	vsd = 1.77 tf/m vrd1 = 8.01 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.60	Fd = 0.73 tf Situação: GE As = 0.27 cm <sup>2</sup> /m	Fd = 4.17 tf Situação: GE As = 1.03 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.60	Fd = 0.73 tf Situação: GE As = 0.04 cm <sup>2</sup> /m	Fd = 4.17 tf Situação: PE As = 0.71 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	vsd = 1.41 tf/m vrd1 = 7.51 tf/m vrd2 = 53.74 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.25 cm <sup>2</sup> /m	fiss = 0.03 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-C	X	Md = 757 kgf. m/m  As = 1.51 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.07 tf Situação : GE As = 0.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.01 tf Situação: PE As = 0.95 cm <sup>2</sup> /m A's = 0.30 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.51 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.07 tf Situação : GE As = 0.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.01 tf Situação: GE As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m ) fiss = 0.03 mm	A's = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m )	vsd = 1.82 tf/m vrd1 = 7.86 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.02 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.52 tf Situação: PE As = 0.79 cm <sup>2</sup> /m A's = 0.27 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.52 tf Situação: PE As = 0.72 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m )	vsd = 0.68 tf/m vrd1 = 7.51 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-D	X	Md = 757 kgf. m/m  As = 1.51 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.69 tf Situação: GE As = 1.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.51 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.77 tf Situação : GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.69 tf Situação: GE As = 1.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m ) fiss = 0.03 mm	A's = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m )	vsd = 1.99 tf/m vrd1 = 7.86 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.66 tf Situação: PE As = 0.76 cm <sup>2</sup> /m A's = 0.31 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.66 tf Situação: PE As = 0.75 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m )	vsd = 0.57 tf/m vrd1 = 7.51 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



PAR 4-E	X	Md = 757 kgf. m/m As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.40 tf Situação: GE As = 1.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.40 tf Situação: GE As = 1.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.05 mm	A's = 1.63 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	vsd = 2.15 tf/m vrd1 = 7.88 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.46 tf Situação: PE As = 0.72 cm <sup>2</sup> /m A's = 0.31 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.46 tf Situação: PE As = 0.75 cm <sup>2</sup> /m A's = 0.28 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	vsd = 0.63 tf/m vrd1 = 7.51 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-F	X	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.83 tf Situação: GE As = 1.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.83 tf Situação: GE As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.27 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.03 tf Situação: PE As = 0.66 cm <sup>2</sup> /m A's = 0.26 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.81 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.03 tf Situação: PE As = 0.72 cm <sup>2</sup> /m A's = 0.24 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 0.68 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-G	X	Md = 1130 kgf. m/m As = 2.29		Fd = 5.91 tf Situação: GE As = 1.59 cm <sup>2</sup> /m	Md = 1130 kgf. m/m As = 2.29		Fd = 5.91 tf Situação: GE As = 1.70 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.36 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.04 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.62 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.49 tf Situação: PE As = 0.60 cm <sup>2</sup> /m A's = 0.20 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.62 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.49 tf Situação: PE As = 0.67 cm <sup>2</sup> /m A's = 0.14 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsw = 0.71 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-H	X	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 5.61 tf Situação: GE As = 1.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 5.61 tf Situação: GE As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsw = 2.41 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.43 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situação: PE As = 0.55 cm <sup>2</sup> /m A's = 0.12 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.43 tf Situação : GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situação: PE As = 0.61 cm <sup>2</sup> /m A's = 0.06 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsw = 0.72 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-I	X	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.92 tf Situação: GE As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.92 tf Situação: GE As = 1.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsw = 2.43 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.62 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.40 tf Situação: PE As = 0.62 cm <sup>2</sup> /m A's = 0.16 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.62 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.40 tf Situação: PE As = 0.66 cm <sup>2</sup> /m A's = 0.12 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 0.72 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-J	X	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.27 tf Situação: GE As = 1.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.27 tf Situação: GE As = 1.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.42 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.78 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.89 tf Situação: PE As = 0.67 cm <sup>2</sup> /m A's = 0.23 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.78 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.89 tf Situação: PE As = 0.71 cm <sup>2</sup> /m A's = 0.23 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 0.71 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-K	X	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.25 tf Situação: GE As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.25 tf Situação: GE As = 1.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.38 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.21		Fd = 4.27 tf Situação: PE As = 0.72 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.21	Fd = 0.88 tf Situação : GE As = 0.05 cm <sup>2</sup> /m	Fd = 4.27 tf Situação: PE As = 0.79 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 0.79 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m





		cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.26 cm <sup>2</sup> /m	cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.25 cm <sup>2</sup> /m	fiss = 0.02 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-L	X	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.91 tf Situação: GE As = 1.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.91 tf Situação: GE As = 0.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.33 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.45 tf Situação: PE As = 0.73 cm <sup>2</sup> /m A's = 0.29 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.89 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.45 tf Situação: PE As = 0.89 cm <sup>2</sup> /m A's = 0.26 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 1.00 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-M	X	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.53 tf Situação: GE As = 0.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.53 tf Situação: GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.44 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.31 tf Situação: PE As = 0.72 cm <sup>2</sup> /m A's = 0.27 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.23 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.31 tf Situação: PE As = 0.91 cm <sup>2</sup> /m A's = 0.26 cm <sup>2</sup> /m	As = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.21 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m)	vsd = 1.04 tf/m vrd1 = 7.32 tf/m vrd2 = 52.87 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m





PAR 4-N	X	Md = 757 kgf. m/m As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Md = 757 kgf. m/m As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.51 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	vsd = 1.53 tf/m vrd1 = 7.86 tf/m Modelo I vrd2 = 56.95 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.27 tf Situação : GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.84 tf Situação: GE As = 0.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.84 tf Situação: PE As = 0.75 cm <sup>2</sup> /m A's = 0.14 cm <sup>2</sup> /m	As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m)	vsd = 0.66 tf/m vrd1 = 7.51 tf/m vrd2 = 53.74 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-O	X	Md = 2721 kgf. m/m As = 5.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 21.24 tf Situação : GE As = 2.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 37.08 tf Situação: GE As = 11.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 37.08 tf Situação: PE As = 5.22 cm <sup>2</sup> /m A's = 3.31 cm <sup>2</sup> /m	As = 11.07 cm <sup>2</sup> /m ø10.0 c/7 (11.22 cm <sup>2</sup> /m) fiss = 0.13 mm	A's = 5.22 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	vsd = 6.32 tf/m vrd1 = 8.55 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1194 kgf. m/m As = 2.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.00 tf Situação : GE As = 2.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 32.87 tf Situação: GE As = 8.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 893 kgf. m/m As = 2.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.00 tf Situação : GE As = 1.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 32.87 tf Situação: GE As = 7.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.12 cm <sup>2</sup> /m ø12.5 c/15 (8.18 cm <sup>2</sup> /m) fiss = 0.12 mm	A's = 7.56 cm <sup>2</sup> /m ø12.5 c/16 (7.67 cm <sup>2</sup> /m)	vsd = 3.31 tf/m vrd1 = 8.41 tf/m vrd2 = 50.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 5	X	Md = 3117 kgf. m/m As = 6.78	Fd = 116.46 tf Situação : GE As = 0.00 cm <sup>2</sup> /m	Fd = 29.18 tf Situação: GE As = 10.91 cm <sup>2</sup> /m	Md = 2847 kgf. m/m As = 6.27		Fd = 29.18 tf Situação: GE As = 10.49 cm <sup>2</sup> /m	As = 10.91 cm <sup>2</sup> /m ø12.5 c/11 (11.16 cm <sup>2</sup> /m)	A's = 12.50 cm <sup>2</sup> /m ø16.0 c/19 (10.58 cm <sup>2</sup> /m)	vsd = 2.87 tf/m vrd1 = 9.52 tf/m Modelo I vrd2 = 55.37 tf/m



		cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 1.96 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.17 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 805 kgf. m/m  As = 1.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 13.51 tf Situação: GE As = 4.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 13.51 tf Situação: GE As = 3.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 4.09 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m) fiss = 0.10 mm	A's = 3.33 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	vsd = 1.84 tf/m vrd1 = 7.30 tf/m vrd2 = 49.64 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 6	X	Md = 1717 kgf. m/m  As = 3.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.64 tf Situação : GE As = 2.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 29.87 tf Situação: GE As = 8.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 925 kgf. m/m  As = 1.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.64 tf Situação : GE As = 0.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 29.87 tf Situação: PE As = 6.18 cm <sup>2</sup> /m A's = 1.78 cm <sup>2</sup> /m	As = 8.02 cm <sup>2</sup> /m ø12.5 c/15 (8.18 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 6.18 cm <sup>2</sup> /m ø12.5 c/19 (6.46 cm <sup>2</sup> /m)	vsd = 8.46 tf/m vrd1 = 8.74 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.61 tf Situação: GE As = 1.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.61 tf Situação: GE As = 1.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.70 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 1.70 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	vsd = 4.29 tf/m vrd1 = 7.16 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 7	X	Md = 3279 kgf. m/m  As = 7.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.66 tf Situação : GE As = 5.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.68 tf Situação: GE As = 8.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1308 kgf. m/m  As = 2.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.66 tf Situação : GE As = 1.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.68 tf Situação: GE As = 3.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.23 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m) fiss = 0.18 mm	A's = 3.81 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 2.67 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.51 tf Situação: GE As = 0.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.51 tf Situação: GE As = 0.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.65 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.12 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 8	X	Md = 3496 kgf. m/m As = 7.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.94 tf Situação: GE As = 6.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.42 tf Situação: GE As = 8.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1392 kgf. m/m As = 2.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.94 tf Situação: GE As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.42 tf Situação: GE As = 3.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.30 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m) fiss = 0.19 mm	A's = 3.48 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	vsd = 2.74 tf/m vrd1 = 8.25 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.20 tf Situação: GE As = 0.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.20 tf Situação: GE As = 0.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.66 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.10 tf/m vrd1 = 7.33 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 9	X	Md = 3625 kgf. m/m As = 8.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.12 tf Situação: GE As = 6.77 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.90 tf Situação: GE As = 8.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1478 kgf. m/m As = 3.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.12 tf Situação: GE As = 1.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.90 tf Situação: GE As = 3.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.53 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m) fiss = 0.20 mm	A's = 3.62 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 2.78 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.26		Fd = 1.14 tf Situação: GE As = 0.34 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26		Fd = 1.14 tf Situação: GE As = 0.56 cm <sup>2</sup> /m	As = 1.71 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.14 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.00 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 10	X	Md = 3727 kgf. m/m  As = 8.25 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.17 tf Situação : GE As = 7.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.80 tf Situação: GE As = 8.77 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1551 kgf. m/m  As = 3.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.17 tf Situação : GE As = 1.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.80 tf Situação: GE As = 3.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 9.99 cm <sup>2</sup> /m Ø12.5 c/12 (10.23 cm <sup>2</sup> /m ) fiss = 0.16 mm	A's = 3.76 cm <sup>2</sup> /m Ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 2.81 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.27 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.09 tf Situação: GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.09 tf Situação: GE As = 0.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.00 cm <sup>2</sup> /m Ø8.0 c/25 (2.01 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m Ø6.3 c/24 (1.30 cm <sup>2</sup> /m )	vsd = 1.18 tf/m vrd1 = 7.21 tf/m vrd2 = 50.15 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 11	X	Md = 3797 kgf. m/m  As = 8.42 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.17 tf Situação : GE As = 7.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.57 tf Situação: GE As = 8.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1607 kgf. m/m  As = 3.33 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.17 tf Situação : GE As = 2.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.57 tf Situação: GE As = 3.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.91 cm <sup>2</sup> /m Ø12.5 c/13 (9.44 cm <sup>2</sup> /m ) fiss = 0.19 mm	A's = 3.85 cm <sup>2</sup> /m Ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 2.83 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.21 tf Situação: GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.21 tf Situação: GE As = 0.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.78 cm <sup>2</sup> /m Ø6.3 c/17 (1.83 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m Ø6.3 c/24 (1.30 cm <sup>2</sup> /m )	vsd = 1.20 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



PAR 12	X	Md = 3838 kgf. m/m As = 8.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.14 tf Situação : GE As = 7.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.33 tf Situação: GE As = 8.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1645 kgf. m/m As = 3.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.14 tf Situação : GE As = 2.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.33 tf Situação: GE As = 3.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.97 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m) fiss = 0.19 mm	A's = 3.89 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	vsd = 2.84 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.39 tf Situação: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.39 tf Situação: GE As = 0.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.79 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.24 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 13	X	Md = 3849 kgf. m/m As = 8.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.12 tf Situação : GE As = 7.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.26 tf Situação: GE As = 8.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1666 kgf. m/m As = 3.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.12 tf Situação : GE As = 2.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.26 tf Situação: GE As = 3.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.99 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m) fiss = 0.19 mm	A's = 3.93 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	vsd = 2.84 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.52 tf Situação: GE As = 0.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.52 tf Situação: GE As = 0.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.80 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.26 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 14	X	Md = 3835 kgf. m/m As = 8.52	Fd = 9.11 tf Situação : GE As = 7.30 cm <sup>2</sup> /m	Fd = 3.12 tf Situação: GE As = 8.94 cm <sup>2</sup> /m	Md = 1672 kgf. m/m As = 3.47	Fd = 9.11 tf Situação : GE As = 2.17 cm <sup>2</sup> /m	Fd = 3.12 tf Situação: GE As = 3.92 cm <sup>2</sup> /m	As = 8.94 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m)	A's = 3.92 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	vsd = 2.83 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 55.37 tf/m



		cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	fiss = 0.19 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.50 tf Situação: GE As = 0.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.50 tf Situação: GE As = 0.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.79 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m )	vsd = 1.29 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 15	X	Md = 3800 kgf. m/m  As = 8.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.13 tf Situação : GE As = 7.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.94 tf Situação: GE As = 8.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1663 kgf. m/m  As = 3.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.13 tf Situação : GE As = 2.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.94 tf Situação: GE As = 3.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.71 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m ) fiss = 0.17 mm	A's = 3.87 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 2.83 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.34 tf Situação: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.21 tf Situação : GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.34 tf Situação: GE As = 0.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.74 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m )	vsd = 1.31 tf/m vrd1 = 7.20 tf/m vrd2 = 51.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 16	X	Md = 3746 kgf. m/m  As = 8.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.18 tf Situação : GE As = 7.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.74 tf Situação: GE As = 8.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1641 kgf. m/m  As = 3.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.18 tf Situação : GE As = 2.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.74 tf Situação: GE As = 3.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 9.89 cm <sup>2</sup> /m ø12.5 c/12 (10.23 cm <sup>2</sup> /m ) fiss = 0.15 mm	A's = 3.80 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 2.82 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 565 kgf. m/m As = 1.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.13 tf Situação: GE As = 0.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.13 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.98 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.31 tf/m vrd1 = 7.21 tf/m vrd2 = 50.15 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 17	X	Md = 3676 kgf. m/m As = 8.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.25 tf Situação: GE As = 6.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.45 tf Situação: GE As = 8.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1606 kgf. m/m As = 3.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.25 tf Situação: GE As = 2.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.45 tf Situação: GE As = 3.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.46 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m) fiss = 0.20 mm	A's = 3.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 2.81 tf/m vrd1 = 8.26 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.01 tf Situação: GE As = 0.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.01 tf Situação: GE As = 0.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.69 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.31 tf/m vrd1 = 7.21 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 18	X	Md = 3595 kgf. m/m As = 7.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.30 tf Situação: GE As = 6.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.13 tf Situação: GE As = 8.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1560 kgf. m/m As = 3.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.30 tf Situação: GE As = 1.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.13 tf Situação: GE As = 3.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.22 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m) fiss = 0.19 mm	A's = 3.50 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m)	vsd = 2.80 tf/m vrd1 = 8.25 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.26		Fd = 1.02 tf Situação: GE As = 0.39 cm <sup>2</sup> /m	Md = 565 kgf. m/m As = 1.26		Fd = 1.02 tf Situação: GE As = 0.54 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m)	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m)	vsd = 1.29 tf/m vrd1 = 7.33 tf/m vrd2 = 50.58 tf/m





		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.00 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 19	X	Md = 3551 kgf. m/m  As = 7.82 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 10.21 tf Situação : GE As = 6.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situação: GE As = 8.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1510 kgf. m/m  As = 3.09 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 10.21 tf Situação : GE As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situação: GE As = 3.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.22 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m ) fiss = 0.19 mm	A's = 3.51 cm <sup>2</sup> /m ø8.0 c/14 (3.59 cm <sup>2</sup> /m )	vsd = 2.83 tf/m vrd1 = 8.25 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.99 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.99 tf Situação: GE As = 0.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m )	vsd = 1.20 tf/m vrd1 = 7.33 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 20	X	Md = 3216 kgf. m/m  As = 7.02 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.86 tf Situação : GE As = 6.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.02 tf Situação: GE As = 8.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1465 kgf. m/m  As = 3.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.86 tf Situação : GE As = 2.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.02 tf Situação: GE As = 4.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.27 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m ) fiss = 0.18 mm	A's = 4.30 cm <sup>2</sup> /m ø8.0 c/11 (4.57 cm <sup>2</sup> /m )	vsd = 2.61 tf/m vrd1 = 8.46 tf/m Modelo I vrd2 = 55.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.11 tf Situação: GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.26 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.11 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.65 cm <sup>2</sup> /m ø6.3 c/18 (1.73 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.26 cm <sup>2</sup> /m ø6.3 c/24 (1.30 cm <sup>2</sup> /m )	vsd = 1.40 tf/m vrd1 = 7.33 tf/m vrd2 = 50.58 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m





PAR 21	X	Md = 2726 kgf. m/m As = 5.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 30.44 tf Situação: GE As = 10.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1509 kgf. m/m As = 3.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 30.44 tf Situação: GE As = 7.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 12.42 cm <sup>2</sup> /m ø16.0 c/16 (12.57 cm <sup>2</sup> /m) fiss = 0.15 mm	A's = 7.59 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	vsd = 3.03 tf/m vrd1 = 9.11 tf/m Modelo I vrd2 = 54.48 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1194 kgf. m/m As = 2.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.80 tf Situação: GE As = 5.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 893 kgf. m/m As = 2.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.80 tf Situação: GE As = 4.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 5.01 cm <sup>2</sup> /m ø8.0 c/10 (5.03 cm <sup>2</sup> /m) fiss = 0.10 mm	A's = 4.28 cm <sup>2</sup> /m ø8.0 c/11 (4.57 cm <sup>2</sup> /m)	vsd = 1.56 tf/m vrd1 = 7.87 tf/m vrd2 = 48.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 22	X	Md = 2031 kgf. m/m As = 4.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.95 tf Situação: GE As = 2.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.78 tf Situação: GE As = 4.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.78 tf Situação: PE As = 0.36 cm <sup>2</sup> /m A's = 0.28 cm <sup>2</sup> /m	As = 4.64 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m) fiss = 0.15 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.12 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m As = 1.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.63 tf Situação: GE As = 0.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 609 kgf. m/m As = 1.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.53 tf Situação: GE As = 0.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.63 tf Situação: GE As = 1.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.23 cm <sup>2</sup> /m ø6.3 c/25 (1.25 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 1.75 cm <sup>2</sup> /m ø6.3 c/17 (1.83 cm <sup>2</sup> /m)	vsd = 2.07 tf/m vrd1 = 7.45 tf/m vrd2 = 51.86 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 23	X	Md = 4419 kgf. m/m As = 9.98	Fd = 114.23 tf Situação: GE As = 0.00 cm <sup>2</sup> /m	Fd = 88.33 tf Situação: GE As = 22.38 cm <sup>2</sup> /m	Md = 4314 kgf. m/m As = 9.91	Fd = 114.23 tf Situação: GE As = 0.00 cm <sup>2</sup> /m	Fd = 88.33 tf Situação: GE As = 22.52 cm <sup>2</sup> /m	As = 22.38 cm <sup>2</sup> /m ø12.5 c/5 (24.54 cm <sup>2</sup> /m)	A's = 22.52 cm <sup>2</sup> /m ø16.0 c/9 (22.34 cm <sup>2</sup> /m)	vsd = 50.83 tf/m vrd1 = 12.05 tf/m Modelo I



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 5.52 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 5.36 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	fiss = 0.11 mm		vr2 = 55.37 tf/m vsw = 37.88 tf/m asw = 154.82 cm <sup>2</sup> /m
	Y	Md = 4471 kgf. m/m  As = 11.80 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.83 tf Situação : GE As = 9.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 36.05 tf Situação: GE As = 17.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 4454 kgf. m/m  As = 11.74 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.83 tf Situação : GE As = 9.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 36.05 tf Situação: GE As = 17.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 17.24 cm <sup>2</sup> /m ø12.5 c/7 (17.53 cm <sup>2</sup> /m ) fiss = 0.16 mm	A's = 17.19 cm <sup>2</sup> /m ø12.5 c/7 (17.53 cm <sup>2</sup> /m )	v2d = 19.25 tf/m vr1d = 10.19 tf/m vr2d = 49.01 tf/m vsw = 15.70 tf/m asw = 72.51 cm <sup>2</sup> /m
PAR 24	X	Md = 3834 kgf. m/m  As = 8.67 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 115.63 tf Situação : GE As = 0.00 cm <sup>2</sup> /m A's = 4.08 cm <sup>2</sup> /m	Fd = 128.64 tf Situação: PE As = 26.71 cm <sup>2</sup> /m A's = 7.66 cm <sup>2</sup> /m	Md = 3239 kgf. m/m  As = 7.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 115.63 tf Situação : GE As = 0.00 cm <sup>2</sup> /m A's = 2.31 cm <sup>2</sup> /m	Fd = 128.64 tf Situação: PE As = 24.86 cm <sup>2</sup> /m A's = 7.66 cm <sup>2</sup> /m	As = 26.71 cm <sup>2</sup> /m ø16.0 c/7 (28.72 cm <sup>2</sup> /m ) fiss = 0.12 mm	A's = 24.86 cm <sup>2</sup> /m ø16.0 c/8 (25.13 cm <sup>2</sup> /m )	v2d = 51.97 tf/m vr1d = 12.07 tf/m Modelo I vr2d = 54.48 tf/m vsw = 51.68 tf/m asw = 214.67 cm <sup>2</sup> /m
	Y	Md = 4397 kgf. m/m  As = 12.15 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 11.68 tf Situação : GE As = 10.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 34.84 tf Situação: GE As = 17.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 3888 kgf. m/m  As = 10.75 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 11.68 tf Situação : GE As = 8.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 34.84 tf Situação: GE As = 16.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 17.62 cm <sup>2</sup> /m ø12.5 c/6 (20.45 cm <sup>2</sup> /m ) fiss = 0.12 mm	A's = 16.46 cm <sup>2</sup> /m ø16.0 c/12 (16.76 cm <sup>2</sup> /m )	v2d = 17.63 tf/m vr1d = 9.92 tf/m vr2d = 47.22 tf/m vsw = 11.76 tf/m asw = 56.34 cm <sup>2</sup> /m
PAR 25	X	Md = 757 kgf. m/m		Fd = 91.50 tf Situação: PE	Md = 757 kgf. m/m		Fd = 91.50 tf Situação: PE	As = 12.61 cm <sup>2</sup> /m ø10.0 c/6	A's = 11.87 cm <sup>2</sup> /m ø16.0 c/17	v2d = 10.17 tf/m vr1d = 9.79 tf/m Modelo I



		As = 1.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 12.61 cm <sup>2</sup> /m A's = 8.43 cm <sup>2</sup> /m	As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 11.87 cm <sup>2</sup> /m A's = 9.18 cm <sup>2</sup> /m	(13.09 cm <sup>2</sup> /m) fiss = 0.11 mm	(11.83 cm <sup>2</sup> /m)	vrd2 = 56.01 tf/m vsw = 0.61 tf/m asw = 2.45 cm <sup>2</sup> /m
	Y	Md = 1637 kgf.m/m As = 3.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.36 tf Situação : GE As = 2.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.58 tf Situação: GE As = 4.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1617 kgf.m/m As = 3.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.36 tf Situação : GE As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.58 tf Situação: GE As = 4.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 4.63 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m) fiss = 0.14 mm	A's = 4.58 cm <sup>2</sup> /m ø10.0 c/17 (4.62 cm <sup>2</sup> /m)	vsd = 5.18 tf/m vrd1 = 7.46 tf/m vrd2 = 50.91 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1 Laje 2	Momento negativo			Momento positivo			Armaduras finais
		Flexão	Flexo compressão	Flexo tração	Flexão	Flexo compressão	Flexo tração	
Barra	PAR21 PAR4-O	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 54.27 tf Situação: PE As = 6.24 cm <sup>2</sup> /m A's = 6.24 cm <sup>2</sup> /m				As = 6.24 cm <sup>2</sup> /m (ø8.0 c/8 - 6.28 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR4-O PAR21	Md = 2937 kgf.m/m As = 6.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 23.89 tf Situação: GE As = 3.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 54.27 tf Situação: GE As = 14.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 14.20 cm <sup>2</sup> /m (ø12.5 c/8 - 15.34 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR3 PAR2-A	Md = 1156 kgf.m/m As = 2.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.60 tf Situação: GE As = 2.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.33 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR2-A	Md = 1130 kgf.m/m	Fd = 4.03 tf Situação: GE					As = 2.28 cm <sup>2</sup> /m



	PAR21	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR21 PAR3	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-O PAR6	Md = 1130 kgf.m/m As = 2.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.17 tf Situação: GE As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 24.48 tf Situação: GE As = 5.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.89 cm <sup>2</sup> /m (ø10.0 c/13 - 6.04 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR6 PAR5	Md = 2145 kgf.m/m As = 4.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.89 tf Situação: GE As = 3.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 24.48 tf Situação: GE As = 7.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.95 cm <sup>2</sup> /m (ø8.0 c/6 - 8.38 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR5 PAR2-O	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 10.03 tf Situação: PE As = 1.15 cm <sup>2</sup> /m A's = 1.15 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-A PAR5	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 42.88 tf Situação: PE As = 6.02 cm <sup>2</sup> /m A's = 3.85 cm <sup>2</sup> /m				As = 6.02 cm <sup>2</sup> /m (ø8.0 c/8 - 6.28 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR5	Md = 1130 kgf.m/m		Fd = 42.88 tf				As = 5.19 cm <sup>2</sup> /m



	PAR4-A	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: PE As = 5.19 cm <sup>2</sup> /m A's = 4.67 cm <sup>2</sup> /m				(ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR2-A PAR2-B	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.57 tf Situação: GE As = 1.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.21 tf Situação: GE As = 1.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR2-B PAR20	Md = 2094 kgf.m/m  As = 4.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.79 tf Situação: GE As = 4.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.49 tf Situação: GE As = 4.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 4.74 cm <sup>2</sup> /m (ø10.0 c/16 - 4.91 cm <sup>2</sup> /m) fiss = 0.16 mm
Barra	PAR20 PAR2-A	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.49 tf Situação: PE As = 0.29 cm <sup>2</sup> /m A's = 0.29 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-B PAR2-C	Md = 1198 kgf.m/m  As = 2.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.82 tf Situação: GE As = 2.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.20 tf Situação: GE As = 3.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.05 cm <sup>2</sup> /m (ø8.0 c/16 - 3.14 cm <sup>2</sup> /m) fiss = 0.12 mm
Barra	PAR2-C PAR19	Md = 2275 kgf.m/m  As = 4.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.76 tf Situação: GE As = 4.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.20 tf Situação: GE As = 5.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.38 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.15 mm
Barra	PAR19	Md = 1130 kgf.m/m		Fd = 3.10 tf				As = 2.28 cm <sup>2</sup> /m



	PAR2-B	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: PE As = 0.36 cm <sup>2</sup> /m A's = 0.36 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-C PAR2-D	Md = 1167 kgf.m/m As = 2.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.99 tf Situação: GE As = 1.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.32 tf Situação: GE As = 3.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø8.0 c/16 - 3.14 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR2-D PAR18	Md = 2301 kgf.m/m As = 4.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.93 tf Situação: GE As = 4.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.32 tf Situação: GE As = 5.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.46 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.16 mm
Barra	PAR18 PAR2-C	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.74 tf Situação: PE As = 0.43 cm <sup>2</sup> /m A's = 0.43 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-D PAR2-E	Md = 1204 kgf.m/m As = 2.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.14 tf Situação: GE As = 2.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.24 tf Situação: GE As = 2.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.92 cm <sup>2</sup> /m (ø8.0 c/17 - 2.96 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR2-E PAR17	Md = 2347 kgf.m/m As = 4.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.17 tf Situação: GE As = 4.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.24 tf Situação: GE As = 5.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.40 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.16 mm
Barra	PAR17	Md = 1130 kgf.m/m		Fd = 3.21 tf				As = 2.28 cm <sup>2</sup> /m



	PAR2-D	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: PE As = 0.37 cm <sup>2</sup> /m A's = 0.37 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-E PAR2-F	Md = 1238 kgf.m/m As = 2.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.30 tf Situação: GE As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.90 tf Situação: GE As = 2.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.79 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR2-F PAR16	Md = 2384 kgf.m/m As = 4.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.50 tf Situação: GE As = 4.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.42 tf Situação: GE As = 5.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.14 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR16 PAR2-E	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.90 tf Situação: PE As = 0.22 cm <sup>2</sup> /m A's = 0.22 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-F PAR2-G	Md = 1268 kgf.m/m As = 2.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.69 tf Situação: GE As = 2.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situação: GE As = 2.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.59 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-G PAR15	Md = 2411 kgf.m/m As = 5.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.87 tf Situação: GE As = 4.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 5.00 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR15	Md = 1130 kgf.m/m						As = 2.28 cm <sup>2</sup> /m



	PAR2-F	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-G PAR2-H	Md = 1294 kgf.m/m As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.09 tf Situação: GE As = 2.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.64 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-H PAR14	Md = 2426 kgf.m/m As = 5.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.26 tf Situação: GE As = 4.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 5.03 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR14 PAR2-G	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-H PAR2-I	Md = 1314 kgf.m/m As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.00 tf Situação: GE As = 1.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.68 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR2-I PAR13	Md = 2427 kgf.m/m As = 5.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.00 tf Situação: GE As = 4.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 5.04 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR13	Md = 1130 kgf.m/m						As = 2.28 cm <sup>2</sup> /m





	PAR2-H	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-I PAR2-J	Md = 1326 kgf.m/m As = 2.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.16 tf Situação: GE As = 1.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.70 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-J PAR12	Md = 2414 kgf.m/m As = 5.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.16 tf Situação: GE As = 4.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 5.01 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR12 PAR2-I	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-J PAR2-K	Md = 1336 kgf.m/m As = 2.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.89 tf Situação: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.72 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-K PAR11	Md = 2381 kgf.m/m As = 4.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.55 tf Situação: GE As = 3.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 4.94 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR11	Md = 1130 kgf.m/m						As = 2.28 cm <sup>2</sup> /m



	PAR2-J	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-K PAR2-L	Md = 1332 kgf.m/m  As = 2.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.42 tf Situação: GE As = 1.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.72 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-L PAR10	Md = 2332 kgf.m/m  As = 4.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.42 tf Situação: GE As = 3.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 4.83 cm <sup>2</sup> /m (ø6.3 c/6 - 5.20 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR10 PAR2-K	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-L PAR2-M	Md = 1316 kgf.m/m  As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.21 tf Situação: GE As = 1.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.68 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR2-M PAR9	Md = 2263 kgf.m/m  As = 4.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.37 tf Situação: GE As = 3.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 4.76 cm <sup>2</sup> /m (ø10.0 c/16 - 4.91 cm <sup>2</sup> /m) fiss = 0.17 mm
Barra	PAR9	Md = 1130 kgf.m/m						As = 2.28 cm <sup>2</sup> /m



	PAR2-L	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-M PAR2-N	Md = 1283 kgf.m/m As = 2.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.63 tf Situação: GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.61 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-N PAR8	Md = 2182 kgf.m/m As = 4.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.30 tf Situação: GE As = 3.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 4.54 cm <sup>2</sup> /m (ø8.0 c/11 - 4.57 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR8 PAR2-M	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-N PAR2-O	Md = 1267 kgf.m/m As = 2.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.60 tf Situação: GE As = 1.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.58 cm <sup>2</sup> /m (ø8.0 c/19 - 2.65 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-O PAR7	Md = 2063 kgf.m/m As = 4.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.11 tf Situação: GE As = 3.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.72 tf Situação: GE As = 4.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 4.52 cm <sup>2</sup> /m (ø8.0 c/11 - 4.57 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR7	Md = 1130 kgf.m/m		Fd = 1.72 tf				As = 2.28 cm <sup>2</sup> /m



	PAR2-N	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: PE As = 0.20 cm <sup>2</sup> /m A's = 0.20 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-B PAR7	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.80 tf Situação: GE As = 1.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR7 PAR4-A	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação: GE As = 0.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.26 tf Situação: GE As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-A PAR4-B	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.26 tf Situação: PE As = 0.82 cm <sup>2</sup> /m A's = 0.39 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR4-C PAR8	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.87 tf Situação: GE As = 0.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.25 tf Situação: GE As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR8 PAR4-B	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.22 tf Situação: PE As = 0.60 cm <sup>2</sup> /m A's = 0.60 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-B	Md = 1130 kgf.m/m		Fd = 5.22 tf				As = 2.28 cm <sup>2</sup> /m



	PAR4-C	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: PE As = 1.02 cm <sup>2</sup> /m A's = 0.31 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR4-D PAR9	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.86 tf Situação: GE As = 1.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.78 tf Situação: GE As = 1.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR9 PAR4-C	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.53 tf Situação: PE As = 0.29 cm <sup>2</sup> /m A's = 0.29 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-C PAR4-D	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.20 tf Situação: GE As = 0.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.53 tf Situação: GE As = 0.77 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR4-E PAR10	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.15 tf Situação: GE As = 1.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.42 tf Situação: GE As = 1.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR10 PAR4-D	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.04 tf Situação: PE As = 0.35 cm <sup>2</sup> /m A's = 0.35 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-D	Md = 1130 kgf.m/m	Fd = 2.15 tf Situação: GE	Fd = 3.04 tf				As = 2.28 cm <sup>2</sup> /m



	PAR4-E	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 0.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR4-F PAR11	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.52 tf Situação: GE As = 0.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.92 tf Situação: GE As = 1.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR11 PAR4-E	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.50 tf Situação: PE As = 0.40 cm <sup>2</sup> /m A's = 0.40 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-E PAR4-F	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.50 tf Situação: GE As = 1.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-G PAR12	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.78 tf Situação: GE As = 0.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.24 tf Situação: GE As = 1.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR12 PAR4-F	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.78 tf Situação: PE As = 0.43 cm <sup>2</sup> /m A's = 0.43 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-F	Md = 1130 kgf.m/m		Fd = 3.78 tf				As = 2.28 cm <sup>2</sup> /m



	PAR4-G	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: GE As = 1.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-H PAR13	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.92 tf Situação: GE As = 0.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.34 tf Situação: GE As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR13 PAR4-G	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.83 tf Situação: PE As = 0.44 cm <sup>2</sup> /m A's = 0.44 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-G PAR4-H	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.83 tf Situação: GE As = 1.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-I PAR14	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 10.57 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.18 tf Situação: GE As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR14 PAR4-H	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.63 tf Situação: PE As = 0.42 cm <sup>2</sup> /m A's = 0.42 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-H	Md = 1130 kgf.m/m		Fd = 3.63 tf				As = 2.28 cm <sup>2</sup> /m



	PAR4-I	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: GE As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR4-J PAR15	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.77 tf Situação: GE As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR15 PAR4-I	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.18 tf Situação: PE As = 0.37 cm <sup>2</sup> /m A's = 0.37 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-I PAR4-J	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.18 tf Situação: GE As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR4-K PAR16	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.11 tf Situação: GE As = 1.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR16 PAR4-J	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.48 tf Situação: PE As = 0.29 cm <sup>2</sup> /m A's = 0.29 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-J	Md = 1130 kgf.m/m		Fd = 2.48 tf				As = 2.28 cm <sup>2</sup> /m





	PAR4-K	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: GE As = 1.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR4-L PAR17	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.24 tf Situação: GE As = 1.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR17 PAR4-K	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.58 tf Situação: PE As = 0.18 cm <sup>2</sup> /m A's = 0.18 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-K PAR4-L	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.58 tf Situação: GE As = 1.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-M PAR18	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.34 tf Situação: GE As = 1.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR18 PAR4-L	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.56 tf Situação: PE As = 0.06 cm <sup>2</sup> /m A's = 0.06 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-L	Md = 1130 kgf.m/m		Fd = 0.56 tf				As = 2.28 cm <sup>2</sup> /m



	PAR4-M	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: GE As = 1.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-N PAR19	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.83 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR19 PAR4-M	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-M PAR4-N	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-O PAR20	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.92 tf Situação: GE As = 0.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.46 tf Situação: GE As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR20 PAR4-N	Md = 1130 kgf.m/m As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.46 tf Situação: PE As = 0.28 cm <sup>2</sup> /m A's = 0.28 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-N	Md = 1130 kgf.m/m						As = 2.28 cm <sup>2</sup> /m



	PAR4-O	As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR22 PAR3	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.78 tf Situação: PE As = 0.32 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR3 PAR22	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.88 tf Situação: GE As = 1.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.78 tf Situação: GE As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR1 PAR22	Md = 1130 kgf.m/m  As = 2.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.67 tf Situação: PE As = 0.19 cm <sup>2</sup> /m A's = 0.19 cm <sup>2</sup> /m				As = 2.28 cm <sup>2</sup> /m (ø6.3 c/13 - 2.40 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR22 PAR1	Md = 1291 kgf.m/m  As = 2.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.10 tf Situação: GE As = 2.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.67 tf Situação: GE As = 2.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.87 cm <sup>2</sup> /m (ø8.0 c/17 - 2.96 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR1 PAR6	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.78 tf Situação: GE As = 2.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.72 tf Situação: GE As = 3.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.41 cm <sup>2</sup> /m (ø8.0 c/14 - 3.59 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR6 PAR1	Md = 1130 kgf.m/m	Fd = 0.78 tf Situação: GE	Fd = 8.72 tf				As = 2.46 cm <sup>2</sup> /m



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 2.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR21 PAR4-O	Md = 1130 kgf.m/m  As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 54.27 tf Situação: PE As = 6.24 cm <sup>2</sup> /m A's = 6.24 cm <sup>2</sup> /m				As = 6.24 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR4-O PAR24	Md = 2721 kgf.m/m  As = 5.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 128.64 tf Situação: PE As = 22.87 cm <sup>2</sup> /m A's = 7.66 cm <sup>2</sup> /m				As = 22.87 cm <sup>2</sup> /m (ø12.5 c/5 - 24.54 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR24 PAR21	Md = 3942 kgf.m/m  As = 8.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 115.63 tf Situação: GE As = 0.00 cm <sup>2</sup> /m A's = 4.41 cm <sup>2</sup> /m	Fd = 128.64 tf Situação: PE As = 27.05 cm <sup>2</sup> /m A's = 7.66 cm <sup>2</sup> /m				As = 27.05 cm <sup>2</sup> /m (ø16.0 c/7 - 28.72 cm <sup>2</sup> /m) fiss = 0.12 mm
Barra	PAR3 PAR2-A	Md = 2014 kgf.m/m  As = 4.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.55 tf Situação: GE As = 3.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 4.34 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR2-A PAR21	Md = 1177 kgf.m/m  As = 2.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.30 tf Situação: GE As = 0.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.44 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR21 PAR3	Md = 1130 kgf.m/m						As = 2.34 cm <sup>2</sup> /m



		As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-O PAR6	Md = 1480 kgf.m/m As = 3.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 10.75 tf Situação: GE As = 1.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.09 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR6 PAR5	Md = 3117 kgf.m/m As = 6.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 16.63 tf Situação: GE As = 4.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 6.91 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR5 PAR2-O	Md = 1130 kgf.m/m As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-A PAR5	Md = 2847 kgf.m/m As = 6.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 116.46 tf Situação: GE As = 0.00 cm <sup>2</sup> /m A's = 1.14 cm <sup>2</sup> /m	Fd = 50.46 tf Situação: GE As = 13.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 13.29 cm <sup>2</sup> /m (ø10.0 c/5 - 15.71 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR5 PAR23	Md = 1130 kgf.m/m As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 88.33 tf Situação: PE As = 10.62 cm <sup>2</sup> /m A's = 9.70 cm <sup>2</sup> /m				As = 10.62 cm <sup>2</sup> /m (ø16.0 c/18 - 11.17 cm <sup>2</sup> /m) fiss = 0.17 mm
Barra	PAR23	Md = 4314 kgf.m/m	Fd = 114.23 tf	Fd = 88.33 tf				As = 22.15 cm <sup>2</sup> /m



	PAR4-A	As = 9.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 0.00 cm <sup>2</sup> /m A's = 5.21 cm <sup>2</sup> /m	Situação: GE As = 22.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø12.5 c/5 - 24.54 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR2-A PAR2-B	Md = 1130 kgf.m/m As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.72 tf Situação: GE As = 0.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2-B PAR20	Md = 3216 kgf.m/m As = 7.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.32 tf Situação: GE As = 6.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.06 tf Situação: GE As = 7.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.72 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.16 mm
Barra	PAR20 PAR2-A	Md = 1130 kgf.m/m As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.06 tf Situação: PE As = 0.47 cm <sup>2</sup> /m A's = 0.47 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-B PAR2-C	Md = 1435 kgf.m/m As = 3.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.39 tf Situação: GE As = 2.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.00 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR2-C PAR19	Md = 3551 kgf.m/m As = 7.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.13 tf Situação: GE As = 7.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 7.97 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.18 mm



Barra	PAR19 PAR2-B	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-C PAR2-D	Md = 1404 kgf.m/m  As = 2.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.95 tf Situação: GE As = 2.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.93 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR2-D PAR18	Md = 3595 kgf.m/m  As = 8.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.50 tf Situação: GE As = 7.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.08 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.18 mm
Barra	PAR18 PAR2-C	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-D PAR2-E	Md = 1446 kgf.m/m  As = 3.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.13 tf Situação: GE As = 2.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.02 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR2-E PAR17	Md = 3676 kgf.m/m  As = 8.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.55 tf Situação: GE As = 7.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.28 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.19 mm



Barra	PAR17 PAR2-D	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-E PAR2-F	Md = 1489 kgf.m/m  As = 3.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.08 tf Situação: GE As = 2.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.11 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR2-F PAR16	Md = 3746 kgf.m/m  As = 8.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.37 tf Situação: GE As = 7.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.45 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.20 mm
Barra	PAR16 PAR2-E	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-F PAR2-G	Md = 1528 kgf.m/m  As = 3.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.88 tf Situação: GE As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.20 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR2-G PAR15	Md = 3800 kgf.m/m  As = 8.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.08 tf Situação: GE As = 7.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.32 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.16 mm





Barra	PAR15 PAR2-F	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-G PAR2-H	Md = 1560 kgf.m/m  As = 3.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.56 tf Situação: GE As = 2.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.32 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-H PAR14	Md = 3835 kgf.m/m  As = 8.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.70 tf Situação: GE As = 7.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.40 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.16 mm
Barra	PAR14 PAR2-G	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-H PAR2-I	Md = 1585 kgf.m/m  As = 3.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.35 tf Situação: GE As = 2.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.38 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR2-I PAR13	Md = 3849 kgf.m/m  As = 8.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.33 tf Situação: GE As = 8.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.44 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.16 mm



Barra	PAR13 PAR2-H	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-I PAR2-J	Md = 1602 kgf.m/m  As = 3.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.19 tf Situação: GE As = 2.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.41 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR2-J PAR12	Md = 3838 kgf.m/m  As = 8.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.17 tf Situação: GE As = 7.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.41 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.16 mm
Barra	PAR12 PAR2-I	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-J PAR2-K	Md = 1609 kgf.m/m  As = 3.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.24 tf Situação: GE As = 2.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.43 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR2-K PAR11	Md = 3797 kgf.m/m  As = 8.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.25 tf Situação: GE As = 7.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.31 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.16 mm



Barra	PAR11 PAR2-J	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-K PAR2-L	Md = 1605 kgf.m/m  As = 3.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.64 tf Situação: GE As = 2.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.42 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR2-L PAR10	Md = 3727 kgf.m/m  As = 8.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.68 tf Situação: GE As = 8.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.41 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.20 mm
Barra	PAR10 PAR2-K	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-L PAR2-M	Md = 1582 kgf.m/m  As = 3.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.06 tf Situação: GE As = 2.77 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 3.37 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR2-M PAR9	Md = 3625 kgf.m/m  As = 8.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.10 tf Situação: GE As = 7.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 8.15 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.18 mm



Barra	PAR9 PAR2-L	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-M PAR2-N	Md = 1542 kgf.m/m  As = 3.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.37 tf Situação: GE As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.22 tf Situação: GE As = 3.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.31 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-N PAR8	Md = 3496 kgf.m/m  As = 7.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.43 tf Situação: GE As = 7.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.22 tf Situação: GE As = 7.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.86 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.17 mm
Barra	PAR8 PAR2-M	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-N PAR2-O	Md = 1530 kgf.m/m  As = 3.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.68 tf Situação: GE As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.30 tf Situação: GE As = 3.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.30 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-O PAR7	Md = 3279 kgf.m/m  As = 7.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.07 tf Situação: GE As = 7.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.30 tf Situação: GE As = 7.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.34 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.15 mm



Barra	PAR7 PAR2-N	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-B PAR7	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.39 tf Situação: GE As = 1.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.37 tf Situação: GE As = 2.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR7 PAR4-A	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.39 tf Situação: GE As = 0.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 10.68 tf Situação: GE As = 2.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.46 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-A PAR4-B	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 10.68 tf Situação: PE As = 1.23 cm <sup>2</sup> /m A's = 1.23 cm <sup>2</sup> /m			As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR4-C PAR8	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.94 tf Situação: GE As = 0.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.13 tf Situação: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR8 PAR4-B	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.75 tf Situação: PE As = 0.55 cm <sup>2</sup> /m A's = 0.55 cm <sup>2</sup> /m			As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR4-B PAR4-C	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.75 tf Situação: PE As = 0.79 cm <sup>2</sup> /m A's = 0.30 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-D PAR9	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.18 tf Situação: GE As = 1.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.15 tf Situação: GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR9 PAR4-C	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.14 tf Situação: PE As = 0.13 cm <sup>2</sup> /m A's = 0.13 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-C PAR4-D	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.18 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.14 tf Situação: GE As = 0.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-E PAR10	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.79 tf Situação: GE As = 0.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR10 PAR4-D	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR4-D PAR4-E	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-F PAR11	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.66 tf Situação: GE As = 0.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR11 PAR4-E	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-E PAR4-F	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-G PAR12	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR12 PAR4-F	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR4-F PAR4-G	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-H PAR13	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR13 PAR4-G	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-G PAR4-H	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-I PAR14	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR14 PAR4-H	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm





Barra	PAR4-H PAR4-I	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-J PAR15	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR15 PAR4-I	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-I PAR4-J	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-K PAR16	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR16 PAR4-J	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR4-J PAR4-K	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-L PAR17	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR17 PAR4-K	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-K PAR4-L	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-M PAR18	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR18 PAR4-L	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR4-L PAR4-M	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR4-N PAR19	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR19 PAR4-M	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-M PAR4-N	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR4-O PAR20	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.86 tf Situação: GE As = 1.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR20 PAR4-N	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.86 tf Situação: PE As = 0.10 cm <sup>2</sup> /m A's = 0.10 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR4-N PAR4-O	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR22 PAR3	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.91 tf Situação: PE As = 0.33 cm <sup>2</sup> /m A's = 0.33 cm <sup>2</sup> /m				As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR3 PAR22	Md = 1214 kgf.m/m  As = 2.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.95 tf Situação: GE As = 1.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.91 tf Situação: GE As = 2.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.95 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR1 PAR22	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR22 PAR1	Md = 2590 kgf.m/m  As = 5.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.00 tf Situação: GE As = 4.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 5.66 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR1 PAR6	Md = 2234 kgf.m/m  As = 4.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.76 tf Situação: GE As = 3.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 4.84 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.07 mm



Barra	PAR6 PAR1	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR24 PAR25	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 16.14 tf Situação: PE As = 2.87 cm <sup>2</sup> /m A's = 0.96 cm <sup>2</sup> /m			As = 2.87 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR25 PAR24	Md = 3707 kgf.m/m  As = 8.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 15.40 tf Situação: GE As = 6.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 16.14 tf Situação: GE As = 10.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 10.28 cm <sup>2</sup> /m (ø10.0 c/7 - 11.22 cm <sup>2</sup> /m) fiss = 0.13 mm
Barra	PAR25 PAR23	Md = 1130 kgf.m/m  As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.71 tf Situação: PE As = 1.46 cm <sup>2</sup> /m A's = 1.46 cm <sup>2</sup> /m			As = 2.34 cm <sup>2</sup> /m (ø12.5 c/20 - 6.14 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR23 PAR25	Md = 4899 kgf.m/m  As = 11.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 23.41 tf Situação: GE As = 8.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.71 tf Situação: GE As = 12.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 12.87 cm <sup>2</sup> /m (ø12.5 c/9 - 13.64 cm <sup>2</sup> /m) fiss = 0.18 mm

ARMADURAS DAS ABAS							
Localização	Direção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Armadura inferior	Armadura superior	Cisalhamento
PAR21inf	Pos	Md = 2302	Fd = 5.71 tf Situação: GE	Fd = 0.85 tf	As = 1.62 cm <sup>2</sup>	A's = 4.35 cm <sup>2</sup>	vsd = 4.03 tf/m



		kgf.m/ m  As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 1.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.09 mm	9 ø8.0 (4.52 cm <sup>2</sup> )	vrđ1 = 3.24 tf/m asw = 2.91 cm <sup>2</sup> /m
	Neg	Md = 6059 kgf.m/ m  As = 4.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.71 tf Situação: GE As = 3.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.85 tf Situação: GE As = 4.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR5inf	Pos	Md = 1987 kgf.m/ m  As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.67 tf Situação: GE As = 2.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.25 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 4.56 cm <sup>2</sup> 9 ø8.0 (4.52 cm <sup>2</sup> )	vsd = 2.85 tf/m vrđ1 = 3.31 tf/m asw = 2.08 cm <sup>2</sup> /m
	Neg	Md = 5359 kgf.m/ m  As = 3.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.67 tf Situação: GE As = 4.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Ainf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.03 tf Situação: GE As = 0.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 5.59 tf/m vrđ1 = 4.03 tf/m asw = 2.54 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m		Fd = 1.03 tf Situação: GE As = 1.12 cm <sup>2</sup> /m			



		As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m			
PAR2-Binf	Pos	Md = 4222 kgf.m/m  As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.49 tf Situação: GE As = 2.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.43 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.82 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 8.34 tf/m vrd1 = 4.08 tf/m asw = 3.88 cm <sup>2</sup> /m
	Neg	Md = 2776 kgf.m/m  As = 1.16 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.49 tf Situação: GE As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Cinf	Pos	Md = 3913 kgf.m/m  As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 9.16 tf Situação: GE As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.74 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.42 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vsd = 9.10 tf/m vrd1 = 4.15 tf/m asw = 4.25 cm <sup>2</sup> /m
	Neg	Md = 3148 kgf.m/m  As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 9.16 tf Situação: GE As = 2.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Dinf	Pos	Md = 3749 kgf.m/m  As = 1.57 cm <sup>2</sup> /m		Fd = 10.33 tf Situação: GE As = 2.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.81 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.62 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vsd = 9.36 tf/m vrd1 = 4.15 tf/m asw = 4.37 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 3279 kgf.m/ m  As = 1.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 10.33 tf Situação: GE As = 2.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Einf	Pos	Md = 3757 kgf.m/ m  As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situação: GE As = 1.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 2.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.66 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.50 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vsd = 9.47 tf/m vrd1 = 4.15 tf/m asw = 4.43 cm <sup>2</sup> /m
	Neg	Md = 3367 kgf.m/ m  As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situação: GE As = 1.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 2.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Finf	Pos	Md = 3767 kgf.m/ m  As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.13 tf Situação: GE As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.53 tf Situação: GE As = 2.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.36 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.23 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> )	vsd = 9.42 tf/m vrd1 = 4.15 tf/m asw = 4.38 cm <sup>2</sup> /m
	Neg	Md = 3449 kgf.m/ m  As = 1.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.13 tf Situação: GE As = 1.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.53 tf Situação: GE As = 2.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Ginf	Pos	Md = 3737	Fd = 6.40 tf Situação: GE	Fd = 3.18 tf	As = 1.94 cm <sup>2</sup>	A's = 1.86 cm <sup>2</sup>	vsd = 9.18 tf/m





		kgf.m/ m  As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 1.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.08 mm	4 ø8.0 (2.01 cm <sup>2</sup> )	vr <sub>d1</sub> = 4.08 tf/m as <sub>w</sub> = 4.24 cm <sup>2</sup> /m
	Neg	Md = 3539 kgf.m/ m  As = 1.48 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.40 tf Situação: GE As = 0.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.18 tf Situação: GE As = 1.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR2-Hinf	Pos	Md = 3651 kgf.m/ m  As = 1.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.53 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.14 mm	A's = 1.53 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vs <sub>d</sub> = 8.65 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 3.94 cm <sup>2</sup> /m
	Neg	Md = 3651 kgf.m/ m  As = 1.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.06 tf Situação: GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-linf	Pos	Md = 3492 kgf.m/ m  As = 1.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.46 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.14 mm	A's = 1.59 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vs <sub>d</sub> = 8.75 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 3.98 cm <sup>2</sup> /m
	Neg	Md = 3791 kgf.m/ m  As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.54 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				



		As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					
PAR2-Jinf	Pos	Md = 3258 kgf.m/m  As = 1.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.36 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.12 mm	A's = 1.68 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 8.19 tf/m vrd1 = 4.03 tf/m asw = 3.73 cm <sup>2</sup> /m
	Neg	Md = 4001 kgf.m/m  As = 1.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.82 tf Situação: GE As = 0.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Kinf	Pos	Md = 2912 kgf.m/m  As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 1.75 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 7.78 tf/m vrd1 = 4.03 tf/m asw = 3.55 cm <sup>2</sup> /m
	Neg	Md = 4171 kgf.m/m  As = 1.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.64 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Linf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 1.76 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 7.83 tf/m vrd1 = 4.03 tf/m asw = 3.57 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 4190 kgf.m/ m  As = 1.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 13.77 tf Situação: GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Minf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.07 mm	A's = 1.69 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	vsd = 7.54 tf/m vrd1 = 4.03 tf/m asw = 3.44 cm <sup>2</sup> /m
	Neg	Md = 4034 kgf.m/ m  As = 1.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.34 tf Situação: GE As = 0.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Ninf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.13 mm	A's = 1.43 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 8.21 tf/m vrd1 = 4.03 tf/m asw = 3.74 cm <sup>2</sup> /m
	Neg	Md = 3408 kgf.m/ m  As = 1.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR2-Oinf	Pos	Md = 2711	Fd = 6.84 tf Situação: GE		As = 1.35 cm <sup>2</sup>	A's = 2.10 cm <sup>2</sup>	vsd = 10.20 tf/m



		kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.09 mm	4 ø8.0 (2.01 cm <sup>2</sup> )	vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 4.65 cm <sup>2</sup> /m
	Neg	M <sub>d</sub> = 4964 kgf.m/ m  As = 2.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	F <sub>d</sub> = 6.84 tf Situação: GE As = 1.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR4-Ainf	Pos	M <sub>d</sub> = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	F <sub>d</sub> = 0.66 tf Situação: GE As = 0.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.02 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vs <sub>d</sub> = 1.10 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 0.50 cm <sup>2</sup> /m
	Neg	M <sub>d</sub> = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					
PAR4-Binf	Pos	M <sub>d</sub> = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	F <sub>d</sub> = 0.04 tf Situação: GE As = 0.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	F <sub>d</sub> = 1.15 tf Situação: GE As = 0.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.05 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vs <sub>d</sub> = 2.10 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 0.95 cm <sup>2</sup> /m
	Neg	M <sub>d</sub> = 2711 kgf.m/ m		F <sub>d</sub> = 1.15 tf Situação: PE As = 0.13 cm <sup>2</sup> /m			



		As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.13 cm <sup>2</sup> /m			
PAR4-Cinf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.57 tf Situação: GE As = 1.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.07 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 2.49 tf/m vrd1 = 4.03 tf/m asw = 1.13 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.57 tf Situação: PE As = 0.41 cm <sup>2</sup> /m A's = 0.18 cm <sup>2</sup> /m			
PAR4-Dinf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.99 tf Situação: GE As = 1.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 2.74 tf/m vrd1 = 4.03 tf/m asw = 1.25 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.99 tf Situação: PE As = 0.69 cm <sup>2</sup> /m A's = 0.24 cm <sup>2</sup> /m			
PAR4-Einf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m		Fd = 5.26 tf Situação: GE As = 1.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.46 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.11 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 3.02 tf/m vrd1 = 4.03 tf/m asw = 1.38 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.26 tf Situação: PE As = 0.96 cm <sup>2</sup> /m A's = 0.31 cm <sup>2</sup> /m			
PAR4-Finf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.27 tf Situação: GE As = 1.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.54 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.12 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 3.21 tf/m vrd1 = 4.03 tf/m asw = 1.46 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.27 tf Situação: PE As = 1.20 cm <sup>2</sup> /m A's = 0.37 cm <sup>2</sup> /m			
PAR4-Ginf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.91 tf Situação: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.59 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 1.37 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 3.31 tf/m vrd1 = 4.03 tf/m asw = 1.52 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.91 tf Situação: PE As = 1.37 cm <sup>2</sup> /m A's = 0.41 cm <sup>2</sup> /m			
PAR4-Hinf	Pos	Md = 2711		Fd = 7.18 tf	As = 1.65 cm <sup>2</sup>	A's = 1.48 cm <sup>2</sup>	vsd = 3.37 tf/m



		kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: GE As = 1.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.11 mm	3 ø8.0 (1.51 cm <sup>2</sup> )	vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 1.56 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.18 tf Situação: PE As = 1.48 cm <sup>2</sup> /m A's = 0.43 cm <sup>2</sup> /m			
PAR4-linf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.28 tf Situação: PE As = 1.49 cm <sup>2</sup> /m A's = 0.43 cm <sup>2</sup> /m	As = 1.49 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.11 mm	A's = 1.67 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> )	v <sub>s</sub> d = 3.38 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 1.54 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.28 tf Situação: GE As = 1.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR4-Jinf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.88 tf Situação: PE As = 1.37 cm <sup>2</sup> /m A's = 0.41 cm <sup>2</sup> /m	As = 1.37 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.12 mm	A's = 1.58 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	v <sub>s</sub> d = 3.34 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 1.52 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m		Fd = 6.88 tf Situação: GE As = 1.58 cm <sup>2</sup> /m			



		As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m			
PAR4-Kinf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.98 tf Situação: PE As = 1.19 cm <sup>2</sup> /m A's = 0.36 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.11 mm	A's = 1.50 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 3.24 tf/m vrd1 = 4.03 tf/m asw = 1.48 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.98 tf Situação: GE As = 1.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR4-Linf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.62 tf Situação: PE As = 0.95 cm <sup>2</sup> /m A's = 0.28 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 3.06 tf/m vrd1 = 4.03 tf/m asw = 1.39 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.62 tf Situação: GE As = 1.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR4-Minf	Pos	Md = 2711 kgf.m/m  As = 1.13 cm <sup>2</sup> /m		Fd = 2.86 tf Situação: GE As = 0.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.06 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 2.75 tf/m vrd1 = 4.03 tf/m asw = 1.25 cm <sup>2</sup> /m





		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.86 tf Situação: GE As = 1.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR4-Ninf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.93 tf Situação: GE As = 0.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.74 tf Situação: GE As = 0.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.05 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vsd = 2.98 tf/m vrd1 = 4.03 tf/m asw = 1.36 cm <sup>2</sup> /m
	Neg	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.93 tf Situação: GE As = 0.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.74 tf Situação: GE As = 0.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR4-Oinf	Pos	Md = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 2.66 cm <sup>2</sup> 6 ø8.0 (3.02 cm <sup>2</sup> )	vsd = 7.22 tf/m vrd1 = 4.03 tf/m asw = 3.29 cm <sup>2</sup> /m
	Neg	Md = 6246 kgf.m/ m  As = 2.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.03 tf Situação: GE As = 2.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				
PAR1inf	Pos	Md = 2711		Fd = 13.81 tf	As = 1.98 cm <sup>2</sup>	A's = 2.02 cm <sup>2</sup>	vsd = 1.63 tf/m



		kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: PE As = 1.98 cm <sup>2</sup> /m A's = 1.20 cm <sup>2</sup> /m	4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.07 mm	4 ø8.0 (2.01 cm <sup>2</sup> )	vr <sub>d1</sub> = 4.08 tf/m as <sub>w</sub> = 0.75 cm <sup>2</sup> /m
	Neg	M <sub>d</sub> = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		F <sub>d</sub> = 13.81 tf Situação: PE As = 2.02 cm <sup>2</sup> /m A's = 1.15 cm <sup>2</sup> /m			
PAR3inf	Pos	M <sub>d</sub> = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	F <sub>d</sub> = 1.01 tf Situação: GE As = 0.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	F <sub>d</sub> = 0.21 tf Situação: GE As = 0.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> ) fiss = 0.02 mm	A's = 1.35 cm <sup>2</sup> 3 ø8.0 (1.51 cm <sup>2</sup> )	vs <sub>d</sub> = 2.41 tf/m vr <sub>d1</sub> = 4.03 tf/m as <sub>w</sub> = 1.10 cm <sup>2</sup> /m
	Neg	M <sub>d</sub> = 2711 kgf.m/ m  As = 1.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		F <sub>d</sub> = 0.21 tf Situação: PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m			
PAR20inf	Pos	M <sub>d</sub> = 2380 kgf.m/ m  As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		F <sub>d</sub> = 5.55 tf Situação: GE As = 2.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.24 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.07 mm	A's = 5.17 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vs <sub>d</sub> = 4.07 tf/m vr <sub>d1</sub> = 3.31 tf/m as <sub>w</sub> = 2.97 cm <sup>2</sup> /m
	Neg	M <sub>d</sub> = 6458 kgf.m/ m		F <sub>d</sub> = 5.55 tf Situação: GE As = 5.17 cm <sup>2</sup> /m			



		As = 4.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m			
PAR19inf	Pos	Md = 2497 kgf.m/m  As = 1.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.37 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.25 tf Situação: GE As = 1.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.92 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 4.90 cm <sup>2</sup> 6 ø10.0 (4.71 cm <sup>2</sup> )	vsd = 3.92 tf/m vrd1 = 3.24 tf/m asw = 2.83 cm <sup>2</sup> /m
	Neg	Md = 6560 kgf.m/m  As = 4.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.37 tf Situação: GE As = 4.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.25 tf Situação: GE As = 4.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR18inf	Pos	Md = 2623 kgf.m/m  As = 1.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.11 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.75 tf Situação: GE As = 1.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.95 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 5.01 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vsd = 4.05 tf/m vrd1 = 3.24 tf/m asw = 2.92 cm <sup>2</sup> /m
	Neg	Md = 6758 kgf.m/m  As = 4.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.11 tf Situação: GE As = 4.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.75 tf Situação: GE As = 5.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR17inf	Pos	Md = 2754 kgf.m/m  As = 1.83 cm <sup>2</sup> /m	Fd = 0.83 tf Situação: GE As = 1.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.92 tf Situação: GE As = 2.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.06 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 5.14 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vsd = 4.10 tf/m vrd1 = 3.24 tf/m asw = 2.96 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 6894 kgf.m/ m  As = 4.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.83 tf Situação: GE As = 4.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.92 tf Situação: GE As = 5.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR16inf	Pos	Md = 2851 kgf.m/ m  As = 1.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.58 tf Situação: GE As = 1.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.09 tf Situação: GE As = 2.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.14 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 5.23 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vsd = 4.14 tf/m vrd1 = 3.31 tf/m asw = 3.02 cm <sup>2</sup> /m
	Neg	Md = 6990 kgf.m/ m  As = 5.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.58 tf Situação: GE As = 4.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.09 tf Situação: GE As = 5.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR15inf	Pos	Md = 2905 kgf.m/ m  As = 1.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.38 tf Situação: GE As = 1.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.20 tf Situação: GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.19 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 5.28 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vsd = 4.15 tf/m vrd1 = 3.31 tf/m asw = 3.03 cm <sup>2</sup> /m
	Neg	Md = 7042 kgf.m/ m  As = 5.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.38 tf Situação: GE As = 5.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.20 tf Situação: GE As = 5.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR14inf	Pos	Md = 2914	Fd = 0.22 tf Situação: GE	Fd = 2.30 tf	As = 2.21 cm <sup>2</sup>	A's = 5.30 cm <sup>2</sup>	vsd = 4.13 tf/m



		kgf.m/ m  As = 1.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 2.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	7 ø10.0 (5.50 cm <sup>2</sup> )	vr <sub>d1</sub> = 3.31 tf/m as <sub>w</sub> = 3.02 cm <sup>2</sup> /m
	Neg	Md = 7046 kgf.m/ m  As = 5.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.22 tf Situação: GE As = 5.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.30 tf Situação: GE As = 5.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR13inf	Pos	Md = 2876 kgf.m/ m  As = 1.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação: GE As = 1.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.38 tf Situação: GE As = 2.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.20 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 5.27 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vs <sub>d</sub> = 4.10 tf/m vr <sub>d1</sub> = 3.31 tf/m as <sub>w</sub> = 3.00 cm <sup>2</sup> /m
	Neg	Md = 7003 kgf.m/ m  As = 5.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação: GE As = 5.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.38 tf Situação: GE As = 5.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR12inf	Pos	Md = 2789 kgf.m/ m  As = 1.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.01 tf Situação: GE As = 1.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.42 tf Situação: GE As = 2.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.14 cm <sup>2</sup> 5 ø8.0 (2.51 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 5.20 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vs <sub>d</sub> = 4.05 tf/m vr <sub>d1</sub> = 3.31 tf/m as <sub>w</sub> = 2.96 cm <sup>2</sup> /m
	Neg	Md = 6913 kgf.m/ m	Fd = 0.01 tf Situação: GE As = 4.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.42 tf Situação: GE As = 5.20 cm <sup>2</sup> /m			



		As = 4.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m			
PAR11inf	Pos	Md = 2655 kgf.m/m  As = 1.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.56 tf Situação: GE As = 2.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.07 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 5.11 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vsd = 3.98 tf/m vrd1 = 3.24 tf/m asw = 2.87 cm <sup>2</sup> /m
	Neg	Md = 6779 kgf.m/m  As = 4.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.56 tf Situação: GE As = 5.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR10inf	Pos	Md = 2524 kgf.m/m  As = 1.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.70 tf Situação: GE As = 1.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.99 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 4.97 cm <sup>2</sup> 7 ø10.0 (5.50 cm <sup>2</sup> )	vsd = 3.90 tf/m vrd1 = 3.24 tf/m asw = 2.81 cm <sup>2</sup> /m
	Neg	Md = 6591 kgf.m/m  As = 4.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.70 tf Situação: GE As = 4.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR9inf	Pos	Md = 2377 kgf.m/m  As = 1.57 cm <sup>2</sup> /m		Fd = 2.75 tf Situação: GE As = 1.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.90 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.08 mm	A's = 4.80 cm <sup>2</sup> 6 ø10.0 (4.71 cm <sup>2</sup> )	vsd = 3.80 tf/m vrd1 = 3.24 tf/m asw = 2.74 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> /m					
	Neg	Md = 6363 kgf.m/ m  As = 4.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 2.75 tf Situação: GE As = 4.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR8inf	Pos	Md = 2229 kgf.m/ m  As = 1.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.04 tf Situação: GE As = 1.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.84 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 4.62 cm <sup>2</sup> 9 ø8.0 (4.52 cm <sup>2</sup> )	vsd = 3.69 tf/m vrd1 = 3.24 tf/m asw = 2.66 cm <sup>2</sup> /m
	Neg	Md = 6108 kgf.m/ m  As = 4.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.04 tf Situação: GE As = 4.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR7inf	Pos	Md = 2064 kgf.m/ m  As = 1.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.91 tf Situação: GE As = 1.96 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.96 cm <sup>2</sup> 4 ø8.0 (2.01 cm <sup>2</sup> ) fiss = 0.09 mm	A's = 4.65 cm <sup>2</sup> 9 ø8.0 (4.52 cm <sup>2</sup> )	vsd = 3.64 tf/m vrd1 = 3.24 tf/m asw = 2.63 cm <sup>2</sup> /m
	Neg	Md = 5891 kgf.m/ m  As = 4.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.91 tf Situação: GE As = 4.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
PAR24inf	Pos	Md = 282	Fd = 0.18 tf Situação: GE	Fd = 14.61 tf	As = 2.28 cm <sup>2</sup>	A's = 3.36 cm <sup>2</sup>	vsd = 5.09 tf/m



		kgf.m/ m  As = 0.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: PE As = 2.28 cm <sup>2</sup> /m A's = 1.08 cm <sup>2</sup> /m	ø10.0 c/6 (2.36 cm <sup>2</sup> ) fiss = 0.10 mm	ø12.5 c/6 (3.68 cm <sup>2</sup> )	vrđ1 = 2.29 tf/m asw = 11.82 cm <sup>2</sup> /m
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#### 9.4.3.2 Reservatório RES2

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	Md = 4005 kgf.m/m  As = 8.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.71 tf Situação : GE As = 8.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.98 tf Situação: GE As = 10.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 4425 kgf.m/m  As = 9.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.71 tf Situação : GE As = 9.77 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.98 tf Situação: GE As = 11.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 11.72 cm <sup>2</sup> /m ø10.0 c/6 (13.09 cm <sup>2</sup> /m) fiss = 0.10 mm	A's = 13.24 cm <sup>2</sup> /m ø10.0 c/5 (15.71 cm <sup>2</sup> /m)	vsđ = 9.93 tf/m vrđ1 = 10.23 tf/m Modelo I vrđ2 = 56.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 2298 kgf.m/m  As = 5.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 25.45 tf Situação : GE As = 1.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 20.78 tf Situação: GE As = 8.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 3236 kgf.m/m  As = 8.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 25.45 tf Situação : GE As = 4.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 20.78 tf Situação: GE As = 11.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 10.19 cm <sup>2</sup> /m ø10.0 c/7 (11.22 cm <sup>2</sup> /m) fiss = 0.08 mm	A's = 10.87 cm <sup>2</sup> /m ø10.0 c/7 (11.22 cm <sup>2</sup> /m)	vsđ = 19.73 tf/m vrđ1 = 9.25 tf/m vrđ2 = 50.91 tf/m vsw = 19.35 tf/m asw = 86.02 cm <sup>2</sup> /m

ARMADURAS DAS ABAS							
Localização	Direção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Armadura inferior	Armadura superior	Cisalhamento
PAR24inf	Pos	Md = 282 kgf.m/m	Fd = 0.18 tf Situação: GE As = 0.36 cm <sup>2</sup> /m	Fd = 14.61 tf Situação: PE	As = 2.28 cm <sup>2</sup> ø10.0 c/6 (2.36 cm <sup>2</sup> )	A's = 3.36 cm <sup>2</sup> ø12.5 c/6 (3.68 cm <sup>2</sup> )	vsđ = 5.09 tf/m vrđ1 = 2.29 tf/m



		As = 0.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	As = 2.28 cm <sup>2</sup> /m A's = 1.08 cm <sup>2</sup> /m	fiss = 0.10 mm		asw = 11.82 cm <sup>2</sup> /m
	Neg	Md = 484 kgf.m/ m  As = 1.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.18 tf Situação: GE As = 1.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 14.61 tf Situação: GE As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			

## 10. ETA - TANQUE DE EQUALIZAÇÃO EFLUENTE DE LAVAGEM

### 10.1 RESUMO DOS RESULTADOS

#### 10.1.1 Cargas verticais:

- Peso próprio = 18.48 tf
- Adicional = 4.07 tf
- Acidental = 1.02 tf
- Água = 38.76 tf
- Total = 62.33 tf
- Área aproximada = 6.79 m<sup>2</sup>
- Relação = 9179.01 kgf/m<sup>2</sup>

#### 10.1.2 Deslocamento horizontal:

- X+ = 0.00 cm (limite 0.43)
- X- = 0.00 cm (limite 0.43)
- Y+ = 0.00 cm (limite 0.43)
- Y- = 0.00 cm (limite 0.43)

### 10.1.3 Verificação de estabilidade (Gama-Z):

- $X+ = 1.00$  (limite 1.10)
- $X- = 1.00$  (limite 1.10)
- $Y+ = 1.00$  (limite 1.10)
- $Y- = 1.00$  (limite 1.10)

### 10.1.4 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

## 10.2 DADOS

<b>TOPO</b>	$f_{ck} = 400.00 \text{ kgf/cm}^2$	$E = 318758 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
<b>Lance 2</b>		$c_{obr} = 4.00 \text{ cm}$	

Seção (cm)				Cargas Verticais (kgf/m²)				Cargas Horizontais (kgf/m²)		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RES1)	12.00	12.00	- 558.80	300.00 kgf/m²	150.00 100.00	0.00 500.00	6758.00 kgf/m²				
PAR1-A (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR1-B (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR1-C (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR1-D (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR1-E (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR2-A (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR2-B (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR2-C (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		
PAR2-D (RES1)	12.00	0.00	12.50	1749.90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166.65	0.00		

(RES1)				kgf/m							
PAR2-E (RES1)	12.0 0	0.00	12.5 0	1749. 90 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	166. 65	0.00		

### 10.3 RESULTADOS

<b>TOPO</b>	fck = 400.00 kgf/cm <sup>2</sup>	E = 318758 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 4.00 cm	

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	2.10 -0.36	2.07 -0.40	356	382	As = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.80 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.80 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1-A	9.15 -1.62	3.19 -0.02	214	67	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)
PAR1-B	9.23 -1.65	3.89 -0.02	212	95	As = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1-C	9.28 -1.55	2.34 -0.02	212	64	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)
PAR1-D	9.26 -1.63	3.95 -0.02	212	120	As = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1-E	9.24 -1.63	3.26 -0.02	214	67	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)
PAR2-A	9.26 -1.62	3.19 -0.02	214	67	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)
PAR2-B	9.25 -1.65	3.89 -0.02	212	95	As = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR2-C	9.27 -1.55	2.34 -0.02	212	64	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)



PAR2-D	9.26 -1.63	3.95 -0.02	212	119	As = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.81 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR2-E	9.27 -1.63	3.26 -0.01	214	66	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR2-C	-43		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-C L1	-373		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR2-D	-127		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-D L1	-705		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR2-E	-81		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-E L1	-432		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR1-A	-79		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR1-A L1	-433		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR1-B	-127		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR1-B L1	-706		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR1-C	-43		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR1-C L1	-373		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR1-D	-127		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR1-D L1	-705		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR1-E	-81		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR1-E L1	-433		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1	-79		As = 2.74 cm <sup>2</sup> /m	



	PAR2-A			ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-A L1	-432		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	L1 PAR2-B	-127		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR2-B L1	-706		As = 2.74 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	
Barra	PAR1-A PAR2-E	-72		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-E PAR1-A	-467		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR1-A	-87		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-A PAR1-B	-466		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-C PAR1-B	-75		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR1-C	-470		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-D PAR1-C	-76		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-C PAR1-D	-470		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-E PAR1-D	-87		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-D PAR1-E	-466		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR1-E	-72		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-E PAR2-A	-467		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR2-B	-466		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR2-A	-87		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR2-C	-470		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR2-B	-75		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR2-D	-469		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-D PAR2-C	-76		As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-D	-467		As = 2.78 cm <sup>2</sup> /m	



	PAR2-E			ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-E PAR2-D	-87		As = 2.78 cm²/m ø10.0 c/20 (3.93 cm²/m)	

## 10.4 CÁLCULOS

<b>TOPO</b>	fck = 400.00 kgf/cm²	E = 318758 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 4.00 cm	

ARMADURAS POSITIVAS (LAJE)										
Trec ho	Direç ão	Momento positivo			Momento negativo			Armada ura inferior	Armada ura superi or	Cisalhamento
		Flexã o	Verificaçã o axial (compres são)	Verifica ção axial (tração)	Flexã o	Verificaçã o axial (compres são)	Verifica ção axial (tração)			
L1	X	Md = 587 kgf.m /m As = 1.81 cm²/m A's = 0.00 cm²/m		Fd = 0.43 tf Situação : GE As = 1.17 cm²/m A's = 0.00 cm²/m	Md = 168 kgf.m /m As = 0.51 cm²/m A's = 0.00 cm²/m		Fd = 0.43 tf Situação : GE As = 0.59 cm²/m A's = 0.00 cm²/m	As = 1.81 cm²/m ø8.0 c/20 (2.51 cm²/m) fiss = 0.03 mm	A's = 0.94 cm²/m ø8.0 c/20 (2.51 cm²/m)	vsd = 1.55 tf/m vrd1 = 6.77 tf/m Modelo I vrd2 = 46.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m
	Y	Md = 587 kgf.m /m As = 2.04 cm²/m A's = 0.00 cm²/m		Fd = 0.48 tf Situação : GE As = 1.41 cm²/m A's = 0.00 cm²/m	Md = 171 kgf.m /m As = 0.58 cm²/m A's = 0.00 cm²/m		Fd = 0.48 tf Situação : GE As = 0.68 cm²/m A's = 0.00 cm²/m	As = 2.04 cm²/m ø8.0 c/20 (2.51 cm²/m) fiss = 0.04 mm	A's = 1.80 cm²/m ø8.0 c/20 (2.51 cm²/m)	vsd = 1.85 tf/m vrd1 = 6.16 tf/m vrd2 = 40.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m
PAR 1-A	X	Md = 876 kgf.m /m As = 2.78 cm²/m A's = 0.00 cm²/m		Fd = 1.94 tf Situação : GE As = 0.74 cm²/m A's = 0.00 cm²/m	Md = 876 kgf.m /m As = 2.78 cm²/m A's = 0.00 cm²/m		Fd = 1.94 tf Situação : GE As = 1.02 cm²/m A's = 0.00 cm²/m	As = 2.78 cm²/m ø10.0 c/20 (3.93 cm²/m) fiss = 0.00 mm	A's = 2.78 cm²/m ø10.0 c/20 (3.93 cm²/m)	vsd = 3.05 tf/m vrd1 = 7.07 tf/m Modelo I vrd2 = 45.36 tf/m vsw = 0.00 tf/m asw = 0.00 cm²/m
	Y	Md = 438 kgf.m /m		Fd = 0.02 tf Situação : GE	Md = 438 kgf.m /m		Fd = 0.02 tf Situação : GE	As = 1.56 cm²/m ø8.0 c/25	A's = 1.56 cm²/m ø8.0 c/25	vsd = 3.02 tf/m vrd1 = 5.87 tf/m vrd2 = 39.53 tf/m



		As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 0.24 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	(2.01 cm <sup>2</sup> / m) fiss = 0.00 mm	(2.01 cm <sup>2</sup> / m)	vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PAR 1-B	X	Md = 587 kgf.m /m  As = 1.81 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.97 tf Situação : GE As = 0.75 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 587 kgf.m /m  As = 1.81 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.97 tf Situação : GE As = 1.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.81 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.01 mm	A's = 1.81 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m)	vsd = 3.03 tf/m vrd1 = 6.77 tf/m Modelo I vrd2 = 46.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 587 kgf.m /m  As = 2.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.33 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 587 kgf.m /m  As = 2.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.24 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.04 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.00 mm	A's = 2.04 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m)	vsd = 4.12 tf/m vrd1 = 6.16 tf/m vrd2 = 40.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PAR 1-C	X	Md = 876 kgf.m /m  As = 2.78 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.86 tf Situação : GE As = 0.73 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 876 kgf.m /m  As = 2.78 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.86 tf Situação : GE As = 1.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.78 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m) fiss = 0.00 mm	A's = 2.78 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m)	vsd = 3.06 tf/m vrd1 = 7.07 tf/m Modelo I vrd2 = 45.36 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 438 kgf.m /m  As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 438 kgf.m /m  As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.23 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.56 cm <sup>2</sup> / m ø8.0 c/25 (2.01 cm <sup>2</sup> / m) fiss = 0.00 mm	A's = 1.56 cm <sup>2</sup> / m ø8.0 c/25 (2.01 cm <sup>2</sup> / m)	vsd = 2.22 tf/m vrd1 = 5.87 tf/m vrd2 = 39.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PAR 1-D	X	Md = 587 kgf.m /m		Fd = 1.96 tf Situação : GE	Md = 587 kgf.m /m		Fd = 1.96 tf Situação : GE	As = 1.81 cm <sup>2</sup> / m ø8.0 c/20	A's = 1.81 cm <sup>2</sup> / m ø8.0 c/20	vsd = 3.03 tf/m vrd1 = 6.77 tf/m Modelo I



		As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	(2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	(2.51 cm <sup>2</sup> /m)	vrđ2 = 46.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 587 kgf.m/m As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 587 kgf.m/m As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsđ = 4.12 tf/m vrđ1 = 6.16 tf/m vrđ2 = 40.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 1-E	X	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação : GE As = 0.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação : GE As = 1.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsđ = 3.05 tf/m vrđ1 = 7.07 tf/m Modelo I vrđ2 = 45.36 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 438 kgf.m/m As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 438 kgf.m/m As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	vsđ = 3.04 tf/m vrđ1 = 5.87 tf/m vrđ2 = 39.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-A	X	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.94 tf Situação : GE As = 0.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.94 tf Situação : GE As = 1.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsđ = 3.05 tf/m vrđ1 = 7.07 tf/m Modelo I vrđ2 = 45.36 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 438 kgf.m/m		Fd = 0.02 tf Situação : GE	Md = 438 kgf.m/m		Fd = 0.02 tf Situação : GE	As = 1.56 cm <sup>2</sup> /m ø8.0 c/25	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25	vsđ = 3.02 tf/m vrđ1 = 5.87 tf/m vrđ2 = 39.53 tf/m





		As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 0.24 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	(2.01 cm <sup>2</sup> / m) fiss = 0.00 mm	(2.01 cm <sup>2</sup> / m)	vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PAR 2-B	X	Md = 587 kgf.m /m  As = 1.81 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.97 tf Situação : GE As = 0.75 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 587 kgf.m /m  As = 1.81 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.97 tf Situação : GE As = 1.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.81 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.01 mm	A's = 1.81 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m)	vsd = 3.03 tf/m vrd1 = 6.77 tf/m Modelo I vrd2 = 46.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 587 kgf.m /m  As = 2.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.33 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 587 kgf.m /m  As = 2.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.24 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.04 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.00 mm	A's = 2.04 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m)	vsd = 4.12 tf/m vrd1 = 6.16 tf/m vrd2 = 40.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PAR 2-C	X	Md = 876 kgf.m /m  As = 2.78 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.86 tf Situação : GE As = 0.73 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 876 kgf.m /m  As = 2.78 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.86 tf Situação : GE As = 1.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.78 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m) fiss = 0.00 mm	A's = 2.78 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m)	vsd = 3.06 tf/m vrd1 = 7.07 tf/m Modelo I vrd2 = 45.36 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 438 kgf.m /m  As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 438 kgf.m /m  As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situação : GE As = 0.23 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.56 cm <sup>2</sup> / m ø8.0 c/25 (2.01 cm <sup>2</sup> / m) fiss = 0.00 mm	A's = 1.56 cm <sup>2</sup> / m ø8.0 c/25 (2.01 cm <sup>2</sup> / m)	vsd = 2.22 tf/m vrd1 = 5.87 tf/m vrd2 = 39.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PAR 2-D	X	Md = 587 kgf.m /m		Fd = 1.96 tf Situação : GE	Md = 587 kgf.m /m		Fd = 1.96 tf Situação : GE	As = 1.81 cm <sup>2</sup> / m ø8.0 c/20	A's = 1.81 cm <sup>2</sup> / m ø8.0 c/20	vsd = 3.03 tf/m vrd1 = 6.77 tf/m Modelo I



		As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	(2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	(2.51 cm <sup>2</sup> /m)	vrđ2 = 46.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 587 kgf.m/m As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 587 kgf.m/m As = 2.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.04 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vřd = 4.12 tf/m vrđ1 = 6.16 tf/m vrđ2 = 40.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-E	X	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação : GE As = 0.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação : GE As = 1.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.78 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vřd = 3.05 tf/m vrđ1 = 7.07 tf/m Modelo I vrđ2 = 45.36 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 438 kgf.m/m As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Md = 438 kgf.m/m As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.56 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	vřd = 3.04 tf/m vrđ1 = 5.87 tf/m vrđ2 = 39.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1 Laje 2	Momento negativo			Momento positivo			Armaduras finais
		Flexão	Flexo compressão	Flexo tração	Flexão	Flexo compressão	Flexo tração	
Barra	L1 PAR2-C	Md = 876 kgf.m/m As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.28 tf Situação: GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-C L1	Md = 876 kgf.m/m As = 2.74 cm <sup>2</sup> /m		Fd = 0.28 tf Situação: GE As = 1.19 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m)



		A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				fiss = 0.02 mm
Barra	L1 PAR2-D	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.95 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-D L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.95 tf Situação: GE As = 2.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	L1 PAR2-E	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.39 tf Situação: GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-E L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.39 tf Situação: GE As = 1.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1 PAR1-A	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.47 tf Situação: GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-A L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.47 tf Situação: GE As = 1.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1 PAR1-B	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.97 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-B L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m		Fd = 0.97 tf Situação: GE As = 2.37 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.08 mm



		A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				
Barra	L1 PAR1-C	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.28 tf Situação: GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-C L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.28 tf Situação: GE As = 1.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	L1 PAR1-D	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.95 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-D L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.95 tf Situação: GE As = 2.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	L1 PAR1-E	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.25 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-E L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.25 tf Situação: GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1 PAR2-A	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.47 tf Situação: GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-A L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.47 tf Situação: GE As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.03 mm



Barra	L1 PAR2-B	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.97 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-B L1	Md = 876 kgf.m/m  As = 2.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.97 tf Situação: GE As = 2.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.74 cm <sup>2</sup> /m (ø8.0 c/18 - 2.79 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR1-A PAR2-E	Md = 876 kgf.m/m  As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.85 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-E PAR1-A	Md = 876 kgf.m/m  As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.85 tf Situação: GE As = 1.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR1-B PAR1-A	Md = 876 kgf.m/m  As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.97 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-A PAR1-B	Md = 876 kgf.m/m  As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.97 tf Situação: GE As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR1-C PAR1-B	Md = 876 kgf.m/m  As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.94 tf Situação: GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-B PAR1-C	Md = 876 kgf.m/m  As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.94 tf Situação: GE As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR1-D	Md = 876 kgf.m/m		Fd = 1.92 tf				As = 2.78 cm <sup>2</sup> /m



	PAR1-C	As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação: GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-C PAR1-D	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.92 tf Situação: GE As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR1-E PAR1-D	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-D PAR1-E	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação: GE As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-A PAR1-E	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.85 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1-E PAR2-A	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.85 tf Situação: GE As = 1.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-A PAR2-B	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.97 tf Situação: GE As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-B PAR2-A	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.97 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-B	Md = 876 kgf.m/m		Fd = 1.94 tf Situação: GE				As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m)



	PAR2-C	As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			fiss = 0.03 mm
Barra	PAR2-C PAR2-B	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.94 tf Situação: GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-C PAR2-D	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.92 tf Situação: GE As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-D PAR2-C	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.92 tf Situação: GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR2-D PAR2-E	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação: GE As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	PAR2-E PAR2-D	Md = 876 kgf.m/m As = 2.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.95 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 2.78 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm

## 11. ETA – PASSARELA METÁLICA

### 11.1 – RESUMO DOS RESULTADOS

#### 11.1.1 Barras - Verificações E.L.U. (Resumido)

Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	N <sub>t</sub>	N <sub>c</sub>	M <sub>x</sub>	M <sub>y</sub>	V <sub>x</sub>	V <sub>y</sub>	M <sub>x</sub> V <sub>y</sub>	M <sub>y</sub> V <sub>x</sub>	N <sub>c</sub> M <sub>x</sub> M <sub>y</sub>	N <sub>t</sub> M <sub>x</sub> M <sub>y</sub>	M <sub>t</sub>	
N1/N29	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	N <sub>t,Sd</sub> = 0.00 N.P. <sup>(1)</sup>	x: 0 m η = 2.2	x: 0 m η = 19.6	M <sub>Sd</sub> = 0.00 N.P. <sup>(2)</sup>	η = 1.8	x: 0 m η = 6.7	x: 0 m η = 4.3	N.P. <sup>(3)</sup>	x: 0.045 m η = 23.4	N.P. <sup>(4)</sup>	M <sub>t,Sd</sub> = 0.00 N.P. <sup>(5)</sup>	<b>PASSA</b> η = 23.4
N29/N28	x: 0.321 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	N <sub>t,Sd</sub> = 0.00 N.P. <sup>(1)</sup>	x: 0 m η = 1.7	x: 0 m η = 18.5	M <sub>Sd</sub> = 0.00 N.P. <sup>(2)</sup>	η = 0.6	x: 0 m η = 5.5	x: 0 m η = 3.7	N.P. <sup>(3)</sup>	x: 0 m η = 22.4	N.P. <sup>(4)</sup>	M <sub>t,Sd</sub> = 0.00 N.P. <sup>(5)</sup>	<b>PASSA</b> η = 22.4



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N28/N27	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 1.2$	x: 0 m $\eta = 7.0$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0 m $\eta = 4.2$	x: 0 m $\eta = 0.7$	N.P.(3)	x: 0 m $\eta = 12.2$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 12.2$
N27/N291	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 0.7$	x: 0.257 m $\eta = 6.9$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0 m $\eta = 3.0$	x: 0.257 m $\eta = 0.6$	N.P.(3)	x: 0.257 m $\eta = 10.2$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 10.2$
N291/N26	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 0.4$	x: 0.064 m $\eta = 7.1$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0 m $\eta = 2.8$	x: 0.064 m $\eta = 0.6$	N.P.(3)	x: 0.064 m $\eta = 11.9$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 11.9$
N26/N25	x: 0 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.321 m $\eta = 0.1$	x: 0 m $\eta < 0.1$	x: 0.321 m $\eta = 9.9$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0 m $\eta = 1.6$	x: 0.321 m $\eta = 1.0$	N.P.(3)	x: 0 m $\eta = 2.6$	x: 0.321 m $\eta = 14.4$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 14.4$
N25/N24	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.321 m $\eta = 0.3$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0.321 m $\eta = 9.9$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0 m $\eta = 0.3$	x: 0.321 m $\eta = 1.0$	N.P.(3)	N.P.(7)	x: 0.321 m $\eta = 14.6$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 14.6$
N24/N295	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.193 m $\eta = 0.6$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0 m $\eta = 9.3$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0.193 m $\eta = 1.1$	x: 0 m $\eta = 0.9$	N.P.(3)	N.P.(7)	x: 0 m $\eta = 14.1$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 14.1$
N295/N23	x: 0.128 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.128 m $\eta = 0.5$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0 m $\eta = 8.5$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0.128 m $\eta = 1.0$	x: 0 m $\eta = 0.7$	N.P.(3)	N.P.(7)	x: 0.128 m $\eta = 12.6$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 12.6$
N23/N22	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.321 m $\eta = 0.8$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0 m $\eta = 7.1$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.7$	x: 0.321 m $\eta = 2.3$	x: 0 m $\eta = 0.5$	N.P.(3)	N.P.(7)	x: 0 m $\eta = 12.0$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 12.0$
N22/N21	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.321 m $\eta = 1.1$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0.321 m $\eta = 6.2$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 0.5$	x: 0.321 m $\eta = 3.6$	x: 0.321 m $\eta = 0.5$	N.P.(3)	N.P.(7)	x: 0.321 m $\eta = 10.3$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 10.3$
N21/N3	x: 0 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.16 m $\eta = 1.2$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0.16 m $\eta = 11.6$	x: 0 m $\eta = 16.1$	$\eta = 2.7$	x: 0.16 m $\eta = 4.6$	x: 0.16 m $\eta = 1.5$	x: 0 m $\eta = 2.7$	N.P.(7)	x: 0 m $\eta = 23.9$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 23.9$
N2/N38	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 4.2$	x: 0 m $\eta = 19.4$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 2.7$	x: 0 m $\eta = 6.7$	x: 0 m $\eta = 4.2$	N.P.(3)	x: 0 m $\eta = 26.0$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 26.0$
N38/N37	x: 0.321 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 3.6$	x: 0 m $\eta = 18.3$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.5$	x: 0 m $\eta = 5.6$	x: 0 m $\eta = 3.7$	N.P.(3)	x: 0 m $\eta = 30.4$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 30.4$
N37/N36	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 2.9$	x: 0 m $\eta = 7.0$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0 m $\eta = 4.3$	x: 0 m $\eta = 0.7$	N.P.(3)	x: 0 m $\eta = 19.9$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 19.9$
N36/N298	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 2.2$	x: 0.257 m $\eta = 6.7$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0 m $\eta = 3.0$	x: 0.257 m $\eta = 0.5$	N.P.(3)	x: 0.257 m $\eta = 15.2$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 15.2$
N298/N35	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 1.9$	x: 0.064 m $\eta = 7.1$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0 m $\eta = 2.9$	x: 0.064 m $\eta = 0.6$	N.P.(3)	x: 0.064 m $\eta = 19.6$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 19.6$
N35/N34	x: 0 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 1.3$	x: 0.321 m $\eta = 9.7$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0 m $\eta = 1.6$	x: 0.321 m $\eta = 1.0$	N.P.(3)	x: 0.321 m $\eta = 21.5$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 21.5$
N34/N33	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 0.6$	x: 0.321 m $\eta = 9.5$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0 m $\eta = 0.3$	x: 0.321 m $\eta = 0.9$	N.P.(3)	x: 0.321 m $\eta = 20.6$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 20.6$
N33/N300	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.193 m $\eta = 0.1$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0 m $\eta = 8.7$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0.193 m $\eta = 1.0$	x: 0 m $\eta = 0.8$	N.P.(3)	N.P.(7)	x: 0 m $\eta = 18.8$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 18.8$
N300/N32	x: 0.128 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.128 m $\eta = 0.1$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 8.0$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0.128 m $\eta = 1.0$	x: 0 m $\eta = 0.6$	N.P.(3)	x: 0.128 m $\eta = 17.2$	x: 0.128 m $\eta = 2.8$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 17.2$
N32/N31	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.321 m $\eta = 0.4$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0 m $\eta = 6.3$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.6$	x: 0.321 m $\eta = 2.3$	x: 0 m $\eta = 0.5$	N.P.(3)	N.P.(7)	x: 0 m $\eta = 16.8$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 16.8$
N31/N30	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.321 m $\eta = 0.8$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0.321 m $\eta = 7.2$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.4$	x: 0.321 m $\eta = 3.6$	x: 0.321 m $\eta = 0.6$	N.P.(3)	N.P.(7)	x: 0.321 m $\eta = 17.0$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 17.0$
N30/N4	x: 0 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.16 m $\eta = 1.1$	$N_{c,Sd} = 0.00$ N.P.(6)	x: 0.16 m $\eta = 13.0$	$M_{Sd} = 0.00$ N.P.(2)	$\eta = 1.7$	x: 0.16 m $\eta = 4.6$	x: 0.16 m $\eta = 1.9$	N.P.(3)	N.P.(7)	x: 0.16 m $\eta = 20.9$	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 20.9$
N5/N3	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 12.7$	$M_{Sd} = 0.00$ N.P.(2)	$M_{Sd} = 0.00$ N.P.(2)	$\eta < 0.1$	$\eta = 0.1$	N.P.(3)	N.P.(3)	N.P.(7)	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 12.7$
N6/N4	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0 m $\eta = 26.4$	$M_{Sd} = 0.00$ N.P.(2)	$M_{Sd} = 0.00$ N.P.(2)	$V_{Sd} = 0.00$ N.P.(8)	$\eta = 0.1$	N.P.(3)	N.P.(3)	N.P.(7)	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 26.4$
N7/N3	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P.(1)	x: 0.4 m $\eta = 3.4$	x: 0.8 m $\eta = 5.7$	$M_{Sd} = 0.00$ N.P.(2)	x: 0.4 m $\eta = 0.3$	x: 0.8 m $\eta = 0.8$	x: 0.8 m $\eta = 0.3$	N.P.(3)	x: 0.8 m $\eta = 15.1$	N.P.(4)	$M_{t,Sd} = 0.00$ N.P.(5)	<b>PASSA</b> $\eta = 15.1$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N8/N4	x: 0 m ( $b_w/t$ ) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.191 m $\eta = 0.5$	x: 0.591 m $\eta = 0.7$	x: 0.8 m $\eta = 8.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.591 m $\eta = 1.6$	x: 0.8 m $\eta = 1.2$	x: 0.8 m $\eta = 0.7$	N.P. <sup>(3)</sup>	x: 0.8 m $\eta = 20.5$	x: 0.591 m $\eta = 4.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 20.5$
N9/N7	( $b_w/t$ ) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 1.83 m $\eta = 0.3$	x: 0 m $\eta = 0.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.4$
N10/N8	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 13.7$	x: 1.83 m $\eta = 2.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	x: 1.83 m $\eta < 0.1$	N.P. <sup>(3)</sup>	x: 1.83 m $\eta = 15.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 15.5$
N3/N4	( $b_w/t$ ) ≤ 90 Passa	x: 0.235 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.5$	x: 0.705 m $\eta = 5.3$	x: 0.94 m $\eta = 6.8$	x: 0.47 m $\eta = 26.1$	x: 0.47 m $\eta = 2.5$	x: 0.94 m $\eta = 1.4$	x: 0.94 m $\eta = 0.5$	x: 0.47 m $\eta = 6.9$	x: 0.94 m $\eta = 29.1$	x: 0.47 m $\eta = 26.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 29.1$
N4/N11	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 4.2$	x: 0 m $\eta = 8.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 2.0$	x: 0 m $\eta = 0.8$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 18.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 18.5$
N12/N13	x: 0 m ( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$\eta = 0.5$	$\eta < 0.1$	x: 0.35 m $\eta = 14.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	x: 0.35 m $\eta = 5.8$	x: 0.35 m $\eta = 2.4$	N.P. <sup>(3)</sup>	x: 0.35 m $\eta = 3.2$	x: 0.35 m $\eta = 17.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 17.6$
N73/N225	x: 0.195 m ( $b_w/t$ ) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.39 m $\eta = 0.2$	x: 0 m $\eta = 0.6$	x: 0 m $\eta = 13.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 2.4$	x: 0 m $\eta = 1.9$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 19.9$	x: 0.78 m $\eta = 13.3$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 19.9$
N225/N228	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 0.6$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 13.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.39 m $\eta = 0.1$	x: 0.78 m $\eta = 0.3$	x: 0.195 m $\eta = 1.9$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 15.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 15.4$
N228/N63	x: 0 m ( $b_w/t$ ) ≤ 90 Passa	x: 0.395 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.3$	x: 0.395 m $\eta = 0.5$	x: 0.79 m $\eta = 16.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0.79 m $\eta = 2.7$	x: 0.79 m $\eta = 2.7$	N.P. <sup>(3)</sup>	x: 0.79 m $\eta = 16.6$	x: 0 m $\eta = 15.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 16.6$
N66/N64	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.907 m $\eta = 7.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta < 0.1$	x: 0.907 m $\eta = 0.5$	x: 0.907 m $\eta = 0.5$	N.P. <sup>(3)</sup>	x: 0.907 m $\eta = 7.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 7.6$
N71/N74	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0.907 m $\eta = 6.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0.907 m $\eta = 0.4$	x: 0.907 m $\eta = 0.4$	N.P. <sup>(3)</sup>	x: 0.907 m $\eta = 6.9$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 6.9$
N67/N65	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.454 m $\eta = 2.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0.454 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.454 m $\eta = 3.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.4$
N64/N74	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.475 m $\eta = 3.0$	x: 0.95 m $\eta = 4.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.475 m $\eta = 0.1$	x: 0.95 m $\eta = 0.2$	x: 0.95 m $\eta = 0.2$	N.P. <sup>(3)</sup>	x: 0.95 m $\eta = 8.9$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 8.9$
N82/N81	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.454 m $\eta = 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.454 m $\eta = 3.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 0.2$	x: 0.454 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.907 m $\eta = 5.9$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 5.9$
N15/N197	x: 0 m ( $b_w/t$ ) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.84 m $\eta = 1.1$	x: 0 m $\eta < 0.1$	x: 0.84 m $\eta = 20.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.56 m $\eta = 0.4$	x: 0 m $\eta = 1.5$	x: 0.98 m $\eta = 4.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.56 m $\eta = 24.2$	x: 0.28 m $\eta = 13.5$	<b>PASSA</b> $\eta = 24.2$
N197/N17	x: 0.372 m ( $b_w/t$ ) ≤ 90 Passa	x: 0.808 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 1.0$	x: 0.808 m $\eta = 0.3$	x: 0 m $\eta = 19.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.248 m $\eta = 0.4$	x: 1.12 m $\eta = 2.5$	x: 0 m $\eta = 3.9$	N.P. <sup>(3)</sup>	x: 1.12 m $\eta = 14.8$	x: 0 m $\eta = 21.6$	x: 0.495 m $\eta = 13.0$	<b>PASSA</b> $\eta = 21.6$
N16/N199	x: 0 m ( $b_w/t$ ) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.867 m $\eta = 0.9$	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 26.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.867 m $\eta = 0.3$	x: 0 m $\eta = 3.6$	x: 0 m $\eta = 7.0$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 27.8$	x: 1.12 m $\eta = 30.2$	x: 0.867 m $\eta = 13.6$	<b>PASSA</b> $\eta = 30.2$
N199/N18	x: 0.372 m ( $b_w/t$ ) ≤ 90 Passa	x: 0.808 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 1.0$	x: 0.808 m $\eta < 0.1$	x: 0 m $\eta = 25.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.495 m $\eta = 0.3$	x: 1.12 m $\eta = 2.6$	x: 0 m $\eta = 6.6$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 30.2$	x: 0 m $\eta = 13.4$	<b>PASSA</b> $\eta = 30.2$
N15/N16	( $b_w/t$ ) ≤ 90 Passa	x: 0.475 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.3$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 6.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.475 m $\eta = 0.1$	x: 0.95 m $\eta = 0.8$	x: 0 m $\eta = 0.5$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 7.8$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 7.8$
N17/N18	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 0.2$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 10.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.475 m $\eta = 0.1$	x: 0.95 m $\eta = 1.4$	x: 0 m $\eta = 1.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 11.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 11.6$
N19/N317	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.8$	x: 0 m $\eta = 9.5$	x: 0 m $\eta = 32.4$	$\eta = 0.8$	$\eta = 0.4$	x: 0 m $\eta = 0.9$	x: 0 m $\eta = 10.5$	x: 0 m $\eta = 42.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 42.7$
N317/N316	( $b_w/t$ ) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.7$	x: 1.66 m $\eta = 5.7$	x: 0 m $\eta = 30.8$	$\eta = 0.8$	$\eta = 0.4$	x: 1.66 m $\eta = 0.3$	x: 0 m $\eta = 9.5$	x: 1.66 m $\eta = 38.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 38.7$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N316/N17	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 4.5$	x: 1.66 m $\eta = 13.2$	x: 0 m $\eta = 30.1$	$\eta = 0.7$	$\eta = 0.4$	x: 1.66 m $\eta = 1.7$	x: 0 m $\eta = 9.1$	x: 1.66 m $\eta = 46.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 46.4$
N20/N315	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 11.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 31.5$	$\eta = 0.7$	$\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 9.9$	x: 0 m $\eta = 44.1$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 44.1$
N315/N314	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 18.6$	x: 1.66 m $\eta = 3.7$	x: 0 m $\eta = 30.8$	$\eta = 0.8$	$\eta = 0.1$	x: 1.66 m $\eta = 0.1$	x: 0 m $\eta = 9.5$	x: 1.66 m $\eta = 52.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 52.6$
N314/N18	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 8.3$	x: 1.66 m $\eta = 6.2$	x: 1.66 m $\eta = 32.4$	$\eta = 0.8$	$\eta = 0.1$	x: 1.66 m $\eta = 0.4$	x: 1.66 m $\eta = 10.5$	x: 1.66 m $\eta = 46.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 46.7$
N68/N96	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 9.2$	x: 0 m $\eta = 2.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.2$	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 12.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 12.0$
N96/N65	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 8.7$	x: 1.745 m $\eta = 4.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.2$	x: 1.745 m $\eta = 0.2$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 14.1$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 14.1$
N69/N95	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 9.3$	x: 0 m $\eta = 2.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.2$	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 12.2$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 12.2$
N95/N67	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 8.8$	x: 1.745 m $\eta = 4.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.2$	x: 1.745 m $\eta = 0.2$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 13.9$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.9$
N83/N106	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 17.3$	x: 0 m $\eta = 10.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.7$	x: 0 m $\eta = 1.0$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 30.3$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 30.3$
N106/N81	x: 0 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 16.6$	x: 1.745 m $\eta = 20.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta < 0.1$	$\eta = 0.7$	x: 1.745 m $\eta = 4.3$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 38.3$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 38.3$
N84/N105	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 18.4$	x: 0 m $\eta = 10.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.7$	x: 0 m $\eta = 1.0$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 31.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 31.4$
N105/N82	x: 0 m $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 17.2$	x: 1.745 m $\eta = 20.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.7$	x: 1.745 m $\eta = 4.4$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 42.2$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 42.2$
N70/N99	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 15.8$	x: 0 m $\eta = 3.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.3$	x: 0 m $\eta = 0.2$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 22.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 22.0$
N99/N66	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 14.8$	x: 1.745 m $\eta = 8.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.3$	x: 1.745 m $\eta = 0.8$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 24.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 24.6$
N72/N101	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 21.6$	x: 0 m $\eta = 5.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.4$	x: 0 m $\eta = 0.4$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 29.9$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 29.9$
N101/N71	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 20.0$	x: 1.745 m $\eta = 11.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.4$	x: 1.745 m $\eta = 1.2$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 32.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 32.4$
N79/N104	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 33.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 33.1$
N104/N75	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 31.9$	x: 1.745 m $\eta = 2.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	x: 1.745 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 35.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 35.0$
N80/N103	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 34.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 34.2$
N103/N76	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 32.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 32.6$
N21/N30	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 0.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.94 m $\eta = 0.7$	$\eta < 0.1$	x: 0 m $\eta < 0.1$	N.P. <sup>(3)</sup>	x: 0.235 m $\eta = 2.8$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 2.8$
N22/N31	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta < 0.1$	x: 0.94 m $\eta = 0.3$	x: 0.47 m $\eta = 3.6$	x: 0.94 m $\eta = 0.9$	$\eta < 0.1$	x: 0.94 m $\eta < 0.1$	x: 0.47 m $\eta = 0.1$	x: 0.47 m $\eta = 3.8$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.8$
N23/N32	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.94 m $\eta = 0.4$	x: 0.47 m $\eta = 3.6$	x: 0.94 m $\eta = 0.9$	$\eta < 0.1$	x: 0.94 m $\eta < 0.1$	x: 0.47 m $\eta = 0.1$	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.6$
N24/N33	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.94 m $\eta = 0.4$	x: 0.47 m $\eta = 3.6$	x: 0.94 m $\eta = 0.9$	$\eta < 0.1$	x: 0.94 m $\eta < 0.1$	x: 0.47 m $\eta = 0.1$	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.6$
N25/N34	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.94 m $\eta = 0.4$	x: 0.47 m $\eta = 3.6$	x: 0.94 m $\eta = 0.9$	$\eta < 0.1$	x: 0.94 m $\eta < 0.1$	x: 0.47 m $\eta = 0.1$	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.6$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N26/N35	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.94 \text{ m}$ $\eta = 0.4$	$x: 0.47 \text{ m}$ $\eta = 3.6$	$x: 0.94 \text{ m}$ $\eta = 0.9$	$\eta < 0.1$	$x: 0.94 \text{ m}$ $\eta < 0.1$	$x: 0.47 \text{ m}$ $\eta = 0.1$	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.6$
N27/N36	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.94 \text{ m}$ $\eta = 0.4$	$x: 0.47 \text{ m}$ $\eta = 3.6$	$x: 0.94 \text{ m}$ $\eta = 0.9$	$\eta < 0.1$	$x: 0.94 \text{ m}$ $\eta < 0.1$	$x: 0.47 \text{ m}$ $\eta = 0.1$	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.6$
N28/N37	$x: 0 \text{ m}$ $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$\eta < 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.94 \text{ m}$ $\eta = 0.4$	$x: 0.47 \text{ m}$ $\eta = 3.5$	$x: 0.94 \text{ m}$ $\eta = 0.9$	$\eta < 0.1$	$x: 0.94 \text{ m}$ $\eta < 0.1$	$x: 0.47 \text{ m}$ $\eta = 0.1$	N.P. <sup>(7)</sup>	$x: 0.47 \text{ m}$ $\eta = 3.8$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.8$
N29/N38	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta = 0.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0.94 \text{ m}$ $\eta = 0.5$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.5$
N40/N39	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.4 \text{ m}$ $\eta = 0.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.4 \text{ m}$ $\eta = 2.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0.4 \text{ m}$ $\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 0.3$	$x: 0.4 \text{ m}$ $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0.4 \text{ m}$ $\eta = 4.7$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 4.7$
N41/N14	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0.6 \text{ m}$ $\eta = 1.5$	$x: 0.2 \text{ m}$ $\eta = 3.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0 \text{ m}$ $\eta = 0.9$	$x: 0.8 \text{ m}$ $\eta = 0.2$	$x: 0.2 \text{ m}$ $\eta = 0.1$	N.P. <sup>(3)</sup>	$x: 0.4 \text{ m}$ $\eta = 4.2$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 4.2$
N42/N43	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta = 0.8$	$x: 0.35 \text{ m}$ $\eta = 11.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.3$	$x: 0.35 \text{ m}$ $\eta = 3.7$	$x: 0.35 \text{ m}$ $\eta = 1.4$	N.P. <sup>(3)</sup>	$x: 0.35 \text{ m}$ $\eta = 14.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 14.6$
N11/N45	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.4$	$x: 0.238 \text{ m}$ $\eta = 3.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.9$	$x: 0 \text{ m}$ $\eta = 3.4$	$x: 0.238 \text{ m}$ $\eta = 0.3$	N.P. <sup>(3)</sup>	$x: 0.238 \text{ m}$ $\eta = 10.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 10.7$
N45/N46	$x: 0 \text{ m}$ $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$x: 0.313 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.313 \text{ m}$ $\eta = 8.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.2$	$x: 0 \text{ m}$ $\eta = 2.4$	$x: 0.313 \text{ m}$ $\eta = 0.7$	N.P. <sup>(3)</sup>	$x: 0.313 \text{ m}$ $\eta = 3.1$	$x: 0.313 \text{ m}$ $\eta = 15.7$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 15.7$
N46/N47	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$x: 0.313 \text{ m}$ $\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.313 \text{ m}$ $\eta = 10.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.1$	$x: 0 \text{ m}$ $\eta = 1.3$	$x: 0.313 \text{ m}$ $\eta = 1.1$	N.P. <sup>(3)</sup>	$x: 0.313 \text{ m}$ $\eta = 3.8$	$x: 0.313 \text{ m}$ $\eta = 18.2$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 18.2$
N47/N304	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$x: 0.034 \text{ m}$ $\eta = 0.7$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.034 \text{ m}$ $\eta = 9.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.2$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.034 \text{ m}$ $\eta = 1.0$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0 \text{ m}$ $\eta = 17.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 17.5$
N304/N48	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.278 \text{ m}$ $\eta = 0.7$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.278 \text{ m}$ $\eta = 10.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.2$	$x: 0 \text{ m}$ $\eta = 0.3$	$x: 0.278 \text{ m}$ $\eta = 1.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0.278 \text{ m}$ $\eta = 18.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 18.5$
N48/N49	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.313 \text{ m}$ $\eta = 1.0$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0 \text{ m}$ $\eta = 9.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.2$	$x: 0.313 \text{ m}$ $\eta = 0.9$	$x: 0 \text{ m}$ $\eta = 0.9$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0 \text{ m}$ $\eta = 17.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 17.6$
N49/N50	$x: 0.156 \text{ m}$ $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.313 \text{ m}$ $\eta = 1.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0 \text{ m}$ $\eta = 7.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.2$	$x: 0.313 \text{ m}$ $\eta = 2.0$	$x: 0 \text{ m}$ $\eta = 0.6$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0 \text{ m}$ $\eta = 15.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 15.5$
N50/N51	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.313 \text{ m}$ $\eta = 1.3$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0 \text{ m}$ $\eta = 4.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.1$	$x: 0.313 \text{ m}$ $\eta = 2.5$	$x: 0 \text{ m}$ $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0 \text{ m}$ $\eta = 12.0$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 12.0$
N51/N12	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.156 \text{ m}$ $\eta = 1.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.156 \text{ m}$ $\eta = 3.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.0$	$x: 0.156 \text{ m}$ $\eta = 1.8$	$x: 0.156 \text{ m}$ $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0.156 \text{ m}$ $\eta = 7.2$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 7.2$
N7/N288	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$x: 0 \text{ m}$ $\eta = 0.3$	$x: 0.318 \text{ m}$ $\eta = 1.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0.318 \text{ m}$ $\eta = 0.3$	$x: 0.635 \text{ m}$ $\eta = 0.5$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 1.6$
N288/N8	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0.153 \text{ m}$ $\eta = 4.7$	$x: 0.305 \text{ m}$ $\eta = 8.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0 \text{ m}$ $\eta = 0.9$	$x: 0.305 \text{ m}$ $\eta = 1.8$	$x: 0.305 \text{ m}$ $\eta = 0.7$	N.P. <sup>(3)</sup>	$x: 0.305 \text{ m}$ $\eta = 20.1$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 20.1$
N8/N44	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 4.8$	$x: 0 \text{ m}$ $\eta = 9.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0.165 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 2.6$	$x: 0 \text{ m}$ $\eta = 1.1$	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 16.3$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 16.3$
N44/N52	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0.238 \text{ m}$ $\eta = 4.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 3.3$	$x: 0.238 \text{ m}$ $\eta = 0.3$	N.P. <sup>(3)</sup>	$x: 0.238 \text{ m}$ $\eta = 7.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 7.5$
N52/N53	$x: 0 \text{ m}$ $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.7$	$x: 0.313 \text{ m}$ $\eta = 9.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 2.3$	$x: 0.313 \text{ m}$ $\eta = 0.9$	N.P. <sup>(3)</sup>	$x: 0.313 \text{ m}$ $\eta = 12.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 12.6$
N53/N54	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.4$	$x: 0.313 \text{ m}$ $\eta = 11.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 1.2$	$x: 0.313 \text{ m}$ $\eta = 1.3$	N.P. <sup>(3)</sup>	$x: 0.313 \text{ m}$ $\eta = 14.2$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 14.2$
N54/N309	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.034 \text{ m}$ $\eta < 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.034 \text{ m}$ $\eta = 10.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.034 \text{ m}$ $\eta = 1.2$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0 \text{ m}$ $\eta = 13.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.6$
N309/N55	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.278 \text{ m}$ $\eta = 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0.278 \text{ m}$ $\eta = 11.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.278 \text{ m}$ $\eta = 1.2$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0.278 \text{ m}$ $\eta = 13.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.6$
N55/N56	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.313 \text{ m}$ $\eta = 0.2$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0 \text{ m}$ $\eta = 10.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	$x: 0.313 \text{ m}$ $\eta = 1.0$	$x: 0 \text{ m}$ $\eta = 1.1$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	$x: 0 \text{ m}$ $\eta = 13.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.4$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N56/N57	x: 0.313 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.313 m $\eta = 0.5$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 8.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	x: 0.313 m $\eta = 2.1$	x: 0 m $\eta = 0.7$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 11.1$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 11.1$
N57/N58	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.313 m $\eta = 0.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 5.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.3$	x: 0.313 m $\eta = 2.6$	x: 0 m $\eta = 0.3$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 7.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 7.6$
N58/N42	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.156 m $\eta = 0.5$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.156 m $\eta = 4.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.8$	x: 0.156 m $\eta = 3.5$	x: 0.156 m $\eta = 0.3$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.156 m $\eta = 7.0$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 7.0$
N44/N11	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.4 m $\eta = 0.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.4 m $\eta = 0.1$	x: 0.4 m $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.2$
N52/N45	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$\eta < 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.7$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.7$
N53/N46	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.7$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.7$
N54/N47	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.7$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.7$
N55/N48	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.7$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.7$
N56/N49	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.7$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.7$
N57/N50	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.7$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.7$
N58/N51	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$\eta < 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.6$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.6$
N42/N12	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta = 0.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.3$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.3$
N43/N13	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$\eta = 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.8 m $\eta = 0.1$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.1$
N86/N219	x: 0.195 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.39 m $\eta < 0.1$	x: 0 m $\eta = 0.9$	x: 0 m $\eta = 13.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 2.4$	x: 0 m $\eta = 1.8$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 18.0$	x: 0.78 m $\eta = 2.3$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 18.0$
N219/N222	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 0.5$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 14.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.39 m $\eta = 0.1$	x: 0.78 m $\eta = 0.4$	x: 0 m $\eta = 2.0$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 15.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 15.5$
N222/N85	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0.395 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.2$	x: 0.395 m $\eta = 0.6$	x: 0.79 m $\eta = 16.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0.79 m $\eta = 2.8$	x: 0.79 m $\eta = 2.9$	N.P. <sup>(3)</sup>	x: 0.79 m $\eta = 18.4$	x: 0 m $\eta = 15.3$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 18.4$
N61/N87	(b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.297 m $\eta = 0.1$	x: 0.706 m $\eta = 1.3$	x: 0 m $\eta = 12.6$	x: 0.8 m $\eta = 31.5$	x: 0.706 m $\eta = 7.3$	x: 0 m $\eta = 1.4$	x: 0 m $\eta = 1.6$	x: 0.8 m $\eta = 10.5$	x: 0.8 m $\eta = 34.9$	x: 0.148 m $\eta = 7.1$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 34.9$
N62/N88	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.699 m $\eta = 0.4$	x: 0 m $\eta = 0.9$	x: 0 m $\eta = 11.9$	x: 0.8 m $\eta = 16.0$	x: 0.699 m $\eta = 3.5$	x: 0 m $\eta = 1.6$	x: 0 m $\eta = 1.5$	x: 0.8 m $\eta = 2.7$	x: 0 m $\eta = 15.3$	x: 0.8 m $\eta = 19.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 19.4$
N63/N85	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 0.5$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.475 m $\eta = 0.2$	x: 0.95 m $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.5$
N73/N86	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 2.0$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 0.95 m $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 2.0$
N90/N89	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta = 0.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0.95 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.1$
N76/N75	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.454 m $\eta = 0.3$	x: 0 m $\eta = 0.2$	x: 0.454 m $\eta = 5.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.454 m $\eta = 0.1$	x: 0 m $\eta = 0.8$	x: 0.454 m $\eta = 0.3$	N.P. <sup>(3)</sup>	x: 0.68 m $\eta = 2.6$	x: 0.454 m $\eta = 6.2$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 6.2$
N92/N98	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 22.0$	x: 0 m $\eta = 3.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.2$	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 25.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 25.4$
N98/N91	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{xx} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 21.6$	x: 1.745 m $\eta = 6.2$	x: 1.745 m $\eta = 16.5$	$\eta = 0.3$	$\eta = 0.2$	x: 1.745 m $\eta = 0.4$	x: 1.745 m $\eta = 2.7$	x: 1.745 m $\eta = 43.9$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 43.9$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N94/N97	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 23.1$	x: 0 m $\eta = 4.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.3$	x: 0 m $\eta = 0.2$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 27.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 27.5$
N97/N93	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 22.6$	x: 1.745 m $\eta = 7.6$	x: 1.745 m $\eta = 16.1$	$\eta = 0.3$	$\eta = 0.3$	x: 1.745 m $\eta = 0.6$	x: 1.745 m $\eta = 2.6$	x: 1.745 m $\eta = 46.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 46.0$
N95/N96	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0.907 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.1$
N97/N98	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$\eta = 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.1$
N99/N100	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta < 0.1$	x: 0.907 m $\eta = 3.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.4$	x: 0.907 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0.907 m $\eta = 3.2$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.2$
N101/N102	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta < 0.1$	x: 0.907 m $\eta = 3.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.4$	x: 0.907 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0.907 m $\eta = 3.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.4$
N103/N104	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$\eta < 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.2$
N105/N106	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.2$
N108/N90	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 15.3$	x: 2.543 m $\eta = 6.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.4$	x: 2.543 m $\eta = 0.5$	N.P. <sup>(3)</sup>	x: 2.543 m $\eta = 21.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 21.7$
N90/N59	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 4.1$	x: 0.947 m $\eta = 11.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.2$	$\eta = 0.4$	x: 0.947 m $\eta = 1.4$	N.P. <sup>(3)</sup>	x: 0.947 m $\eta = 21.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 21.0$
N59/N264	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.7$	x: 0 m $\eta = 16.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.8$	$\eta = 1.4$	x: 0 m $\eta = 2.8$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 31.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 31.5$
N264/N261	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.6$	x: 0 m $\eta = 8.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.2$	$\eta = 1.5$	x: 0 m $\eta = 0.7$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 10.1$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 10.1$
N261/N15	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.4$	x: 0.453 m $\eta = 9.5$	x: 0.453 m $\eta = 17.7$	$\eta = 1.4$	$\eta = 1.6$	x: 0.453 m $\eta = 0.9$	x: 0.453 m $\eta = 3.2$	x: 0.453 m $\eta = 28.5$	N.P. <sup>(4)</sup>	$\eta = 8.3$	<b>PASSA</b> $\eta = 28.5$
N109/N89	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 23.2$	x: 2.543 m $\eta = 5.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.3$	x: 2.543 m $\eta = 0.3$	N.P. <sup>(3)</sup>	x: 2.543 m $\eta = 28.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 28.7$
N89/N60	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 6.2$	x: 0.947 m $\eta = 9.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.2$	$\eta = 0.3$	x: 0.947 m $\eta = 0.9$	N.P. <sup>(3)</sup>	x: 0.947 m $\eta = 21.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 21.0$
N60/N263	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 3.2$	x: 0 m $\eta = 11.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.4$	$\eta = 2.3$	x: 0 m $\eta = 1.5$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 20.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 20.5$
N263/N262	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 3.1$	x: 0.55 m $\eta = 17.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.3$	$\eta = 2.2$	x: 0.55 m $\eta = 3.1$	N.P. <sup>(3)</sup>	x: 0.55 m $\eta = 26.3$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 26.3$
N262/N16	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 3.0$	x: 0.453 m $\eta = 28.8$	x: 0.453 m $\eta = 15.7$	$\eta = 0.9$	$\eta = 2.1$	x: 0.453 m $\eta = 8.3$	x: 0.453 m $\eta = 2.5$	x: 0.453 m $\eta = 47.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 47.4$
N111/N112	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.1$
N113/N115	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 8.7$	x: 0 m $\eta = 3.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta < 0.1$	$\eta = 0.2$	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 13.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.6$
N115/N40	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 7.9$	x: 1.745 m $\eta = 6.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.1$	$\eta = 0.2$	x: 1.745 m $\eta = 0.4$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 16.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 16.4$
N114/N116	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 8.1$	x: 0 m $\eta = 3.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta < 0.1$	$\eta = 0.2$	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 13.3$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.3$
N116/N39	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 7.7$	x: 1.745 m $\eta = 6.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.2$	x: 1.745 m $\eta = 0.4$	N.P. <sup>(3)</sup>	x: 1.745 m $\eta = 14.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 14.4$
N115/N116	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.2$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.2$
N117/N118	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$\eta = 0.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.1$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N66/N71	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.7$	x: 0.95 m $\eta = 19.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.475 m $\eta = 0.2$	x: 0.95 m $\eta = 0.2$	x: 0.95 m $\eta = 3.7$	N.P. <sup>(3)</sup>	x: 0.95 m $\eta = 22.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 22.5$
N76/N148	x: 0.385 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 3.1$	x: 0.193 m $\eta = 49.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.193 m $\eta = 0.1$	x: 0.193 m $\eta = 8.6$	x: 0.193 m $\eta = 24.2$	N.P. <sup>(3)</sup>	x: 0.193 m $\eta = 53.5$	N.P. <sup>(4)</sup>	x: 0.193 m $\eta = 14.0$	<b>PASSA</b> $\eta = 53.5$
N148/N146	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.5 m $\eta = 0.9$	x: 0 m $\eta = 0.3$	x: 1 m $\eta = 24.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 2.9$	x: 1 m $\eta = 6.2$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 17.7$	x: 1 m $\eta = 28.7$	x: 0 m $\eta = 7.8$	<b>PASSA</b> $\eta = 28.7$
N146/N144	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 1.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 27.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 0.5$	x: 1 m $\eta = 7.6$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 30.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 30.6$
N144/N82	x: 0.5 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0.5 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 1.0$	x: 0.5 m $\eta = 0.3$	x: 0 m $\eta = 31.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 1 m $\eta = 4.1$	x: 0 m $\eta = 10.1$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 23.1$	x: 0 m $\eta = 35.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 35.5$
N71/N154	x: 0.385 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.385 m $\eta = 0.3$	x: 0 m $\eta = 0.8$	x: 0 m $\eta = 32.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.385 m $\eta = 0.3$	x: 0 m $\eta = 4.4$	x: 0 m $\eta = 10.7$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 33.4$	x: 0.77 m $\eta = 17.7$	x: 0.385 m $\eta = 7.3$	<b>PASSA</b> $\eta = 33.4$
N154/N152	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 1.2$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 24.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.2$	x: 0 m $\eta = 1.0$	x: 1 m $\eta = 5.8$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 28.8$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 28.8$
N152/N150	x: 0.5 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 1.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 24.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.2$	x: 1 m $\eta = 1.7$	x: 0 m $\eta = 6.0$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 25.5$	x: 0.5 m $\eta = 8.4$	<b>PASSA</b> $\eta = 25.5$
N150/N76	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.308 m $\eta = 2.7$	x: 0.615 m $\eta = 42.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0.308 m $\eta = 7.9$	x: 0.615 m $\eta = 18.1$	N.P. <sup>(3)</sup>	x: 0.461 m $\eta = 45.6$	N.P. <sup>(4)</sup>	x: 0 m $\eta = 9.9$	<b>PASSA</b> $\eta = 45.6$
N93/N158	x: 0.39 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.39 m $\eta = 0.4$	x: 0 m $\eta = 1.4$	x: 0 m $\eta = 37.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.39 m $\eta = 0.3$	x: 0 m $\eta = 5.3$	x: 0 m $\eta = 14.4$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 39.6$	x: 0.78 m $\eta = 23.8$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 39.6$
N158/N156	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 1.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 25.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.7$	x: 1 m $\eta = 6.3$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 26.8$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 26.8$
N156/N66	x: 0.25 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0.5 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.7$	x: 0.5 m $\eta = 0.7$	x: 1 m $\eta = 28.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 1 m $\eta = 4.2$	x: 1 m $\eta = 8.1$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 29.3$	x: 0 m $\eta = 30.4$	x: 0 m $\eta = 5.8$	<b>PASSA</b> $\eta = 30.4$
N67/N162	x: 0.16 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.32 m $\eta = 0.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.64 m $\eta = 11.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.32 m $\eta = 0.2$	x: 0 m $\eta = 1.6$	x: 0.64 m $\eta = 1.2$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.64 m $\eta = 13.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.6$
N162/N160	(b <sub>w</sub> /t) ≤ 90 Passa	x: 0.5 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.3$	x: 0.5 m $\eta = 0.6$	x: 1 m $\eta = 13.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.2$	x: 1 m $\eta = 2.0$	x: 1 m $\eta = 1.7$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 16.8$	x: 0 m $\eta = 13.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 16.8$
N160/N93	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.11 m $\eta = 1.2$	x: 0.22 m $\eta = 31.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.11 m $\eta = 0.5$	x: 0.22 m $\eta = 3.5$	x: 0.22 m $\eta = 10.1$	N.P. <sup>(3)</sup>	x: 0.22 m $\eta = 33.4$	N.P. <sup>(4)</sup>	x: 0 m $\eta = 8.6$	<b>PASSA</b> $\eta = 33.4$
N65/N141	x: 0.16 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.32 m $\eta = 0.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.64 m $\eta = 11.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.32 m $\eta = 0.2$	x: 0 m $\eta = 1.6$	x: 0.64 m $\eta = 1.3$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.64 m $\eta = 13.2$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.2$
N141/N139	(b <sub>w</sub> /t) ≤ 90 Passa	x: 0.5 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.3$	x: 0.5 m $\eta = 0.5$	x: 0 m $\eta = 12.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.1$	x: 1 m $\eta = 2.0$	x: 0 m $\eta = 1.7$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 14.8$	x: 0 m $\eta = 13.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 14.8$
N139/N91	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.11 m $\eta = 1.2$	x: 0.22 m $\eta = 29.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.11 m $\eta = 0.4$	x: 0.22 m $\eta = 3.3$	x: 0.22 m $\eta = 8.8$	N.P. <sup>(3)</sup>	x: 0.22 m $\eta = 31.2$	N.P. <sup>(4)</sup>	x: 0 m $\eta = 6.8$	<b>PASSA</b> $\eta = 31.2$
N91/N137	x: 0.39 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.39 m $\eta = 0.4$	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 34.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.39 m $\eta = 0.2$	x: 0 m $\eta = 4.9$	x: 0 m $\eta = 12.0$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 36.1$	x: 0.78 m $\eta = 21.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 36.1$
N137/N135	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 1.0$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 21.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.1$	x: 0 m $\eta = 0.4$	x: 1 m $\eta = 4.6$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 24.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 24.6$
N135/N64	x: 0.25 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0.5 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 0.5$	x: 0.5 m $\eta = 1.2$	x: 1 m $\eta = 37.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 1 m $\eta = 4.6$	x: 1 m $\eta = 14.0$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 39.4$	x: 0 m $\eta = 27.0$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 39.4$
N74/N131	x: 0.385 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.5$	x: 0 m $\eta = 39.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.385 m $\eta = 0.3$	x: 0 m $\eta = 4.7$	x: 0 m $\eta = 16.2$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 42.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 42.7$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N131/N129	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 0.9$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 21.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.2$	x: 0 m $\eta = 1.1$	x: 1 m $\eta = 4.7$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 26.9$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 26.9$
N129/N127	x: 0.5 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 0.8$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 21.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.2$	x: 1 m $\eta = 1.6$	x: 0 m $\eta = 4.6$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 24.7$	x: 0.5 m $\eta = 7.2$	<b>PASSA</b> $\eta = 24.7$
N127/N75	x: 0 m (b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.308 m $\eta = 2.4$	x: 0.615 m $\eta = 53.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0.615 m $\eta = 6.1$	x: 0.615 m $\eta = 29.1$	N.P. <sup>(3)</sup>	x: 0.615 m $\eta = 56.5$	N.P. <sup>(4)</sup>	x: 0 m $\eta = 7.7$	<b>PASSA</b> $\eta = 56.5$
N75/N125	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.6$	x: 0 m $\eta = 56.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 6.5$	x: 0 m $\eta = 32.5$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 59.6$	N.P. <sup>(4)</sup>	x: 0.193 m $\eta = 12.2$	<b>PASSA</b> $\eta = 59.6$
N125/N123	x: 0.25 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.5 m $\eta = 0.8$	x: 0 m $\eta = 0.5$	x: 1 m $\eta = 24.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 3.0$	x: 1 m $\eta = 5.9$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 19.4$	x: 1 m $\eta = 27.6$	x: 0 m $\eta = 7.0$	<b>PASSA</b> $\eta = 27.6$
N123/N121	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 1.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 27.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 0.6$	x: 1 m $\eta = 7.6$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 30.3$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 30.3$
N121/N81	x: 0.5 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0.5 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 1.0$	x: 0.5 m $\eta = 0.3$	x: 0 m $\eta = 31.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.1$	x: 1 m $\eta = 4.1$	x: 0 m $\eta = 9.9$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 22.4$	x: 0 m $\eta = 34.8$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 34.8$
N61/N62	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.71 m $\eta = 5.1$	x: 0.95 m $\eta = 3.7$	x: 0 m $\eta = 14.7$	x: 0.235 m $\eta = 1.2$	x: 0.95 m $\eta = 0.6$	x: 0.95 m $\eta = 0.1$	x: 0 m $\eta = 2.2$	x: 0.95 m $\eta = 21.5$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 21.5$
N62/N240	x: 0.061 m (b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.457 m $\eta = 0.6$	x: 0 m $\eta = 8.0$	x: 0 m $\eta = 13.5$	x: 0 m $\eta = 15.5$	x: 0 m $\eta = 1.6$	x: 0 m $\eta = 2.8$	x: 0 m $\eta = 1.9$	x: 0 m $\eta = 2.4$	x: 0 m $\eta = 37.0$	x: 0.671 m $\eta = 11.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 37.0$
N240/N237	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 5.8$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 8.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.5 m $\eta = 0.4$	x: 0 m $\eta = 0.7$	x: 1 m $\eta = 0.8$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 19.7$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 19.7$
N237/N40	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 5.2$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 9.3$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.4$	x: 1 m $\eta = 1.2$	x: 0 m $\eta = 0.9$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 22.4$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 22.4$
N59/N88	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.709 m $\eta = 5.6$	x: 0.83 m $\eta = 6.4$	x: 0 m $\eta = 23.1$	x: 0 m $\eta = 2.5$	x: 0.83 m $\eta = 0.6$	x: 0.83 m $\eta = 0.4$	x: 0 m $\eta = 5.4$	x: 0 m $\eta = 33.4$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 33.4$
N88/N60	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.06 m $\eta = 5.0$	x: 0.12 m $\eta = 7.7$	x: 0 m $\eta = 28.6$	x: 0 m $\eta = 5.8$	x: 0.12 m $\eta = 0.9$	x: 0.12 m $\eta = 0.6$	x: 0 m $\eta = 8.5$	x: 0 m $\eta = 40.1$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 40.1$
N60/N255	(b <sub>w</sub> /t) ≤ 90 Passa	x: 0 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0.276 m $\eta = 0.8$	x: 0 m $\eta = 4.4$	x: 0 m $\eta = 8.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.276 m $\eta = 0.5$	x: 0 m $\eta = 2.1$	x: 0 m $\eta = 0.8$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 17.6$	x: 0.551 m $\eta = 12.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 17.6$
N255/N258	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 5.8$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 8.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.5$	x: 0 m $\eta = 0.6$	x: 1 m $\eta = 0.7$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 19.7$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 19.7$
N258/N39	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0 m $\eta = 5.3$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0 m $\eta = 9.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.4$	x: 1 m $\eta = 1.2$	x: 0 m $\eta = 0.9$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0 m $\eta = 23.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 23.6$
N14/N249	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 3.4$	x: 0 m $\eta = 9.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.2 m $\eta = 1.3$	x: 0 m $\eta = 2.1$	x: 0 m $\eta = 0.9$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 24.1$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 24.1$
N249/N252	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 4.6$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 7.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.5$	x: 0 m $\eta = 0.6$	x: 1 m $\eta = 0.5$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 1 m $\eta = 13.6$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.6$
N252/N87	(b <sub>w</sub> /t) ≤ 90 Passa	x: 0.618 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 4.6$	x: 0.898 m $\eta = 3.0$	x: 0 m $\eta = 6.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.898 m $\eta = 1.2$	x: 1 m $\eta = 2.1$	x: 0 m $\eta = 0.5$	N.P. <sup>(3)</sup>	x: 1 m $\eta = 20.1$	x: 0.44 m $\eta = 19.3$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 20.1$
N87/N59	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0.06 m $\eta = 4.0$	x: 0.12 m $\eta = 7.9$	x: 0.12 m $\eta = 23.8$	x: 0.06 m $\eta = 7.5$	x: 0.06 m $\eta = 2.5$	x: 0.12 m $\eta = 0.7$	x: 0.12 m $\eta = 6.2$	x: 0.12 m $\eta = 35.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 35.6$
N41/N246	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	x: 0 m $\eta = 3.7$	x: 0 m $\eta = 8.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.2 m $\eta = 1.3$	x: 0 m $\eta = 1.9$	x: 0 m $\eta = 0.8$	N.P. <sup>(3)</sup>	x: 0 m $\eta = 24.2$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 24.2$
N246/N243	(b <sub>w</sub> /t) ≤ 90 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	x: 0.5 m $\eta = 3.4$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 1 m $\eta = 5.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0 m $\eta = 0.5$	x: 0 m $\eta = 0.5$	x: 1 m $\eta = 0.3$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	x: 0.5 m $\eta = 11.1$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 11.1$
N243/N61	(b <sub>w</sub> /t) ≤ 90 Passa	x: 0.62 m $\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	x: 0 m $\eta = 2.9$	x: 0.81 m $\eta = 6.3$	x: 1 m $\eta = 9.5$	x: 1 m $\eta = 22.2$	x: 0.62 m $\eta = 2.0$	x: 1 m $\eta = 2.0$	x: 1 m $\eta = 0.9$	x: 1 m $\eta = 5.0$	x: 1 m $\eta = 38.0$	x: 0.62 m $\eta = 15.9$	x: 0.62 m $\eta = 6.6$	<b>PASSA</b> $\eta = 38.0$
N316/N314	(b <sub>w</sub> /t) ≤ 200 Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	x: 0.95 m $\eta = 9.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	x: 0.95 m $\eta = 0.2$	x: 0.95 m $\eta = 1.7$	x: 0.95 m $\eta = 0.9$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 9.1$

Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	
N317/N315	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$x: 0 \text{ m}$ $\eta = 9.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0.95 \text{ m}$ $\eta = 0.2$	$x: 0.95 \text{ m}$ $\eta = 1.7$	$x: 0 \text{ m}$ $\eta = 0.8$	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 9.0$
N312/N112	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 13.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 13.2$
N112/N13	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 18.7$	$x: 1.745 \text{ m}$ $\eta = 2.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	$x: 1.745 \text{ m}$ $\eta < 0.1$	N.P. <sup>(3)</sup>	$x: 1.745 \text{ m}$ $\eta = 20.7$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 20.7$
N13/N14	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 19.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.8$	$\eta = 1.5$	$x: 0 \text{ m}$ $\eta = 3.9$	N.P. <sup>(3)</sup>	$x: 0.16 \text{ m}$ $\eta = 29.6$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 29.6$
N313/N111	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 10.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 10.5$
N111/N43	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 14.8$	$x: 1.745 \text{ m}$ $\eta = 2.5$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	$x: 1.745 \text{ m}$ $\eta = 0.1$	N.P. <sup>(3)</sup>	$x: 1.745 \text{ m}$ $\eta = 16.9$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 16.9$
N43/N41	$(b_w/t) \leq 200$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 2.1$	$x: 0.16 \text{ m}$ $\eta = 16.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.2$	$\eta = 1.2$	$x: 0.16 \text{ m}$ $\eta = 2.8$	N.P. <sup>(3)</sup>	$x: 0.16 \text{ m}$ $\eta = 26.8$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 26.8$
N318/N319	$x: 0.133 \text{ m}$ $(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.266 \text{ m}$ $\eta < 0.1$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta < 0.1$
N319/N12	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 300$ $\lambda_{yy} \leq 300$ Passa	$x: 0.094 \text{ m}$ $\eta = 0.6$	$N_{c,Sd} = 0.00$ N.P. <sup>(6)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.5$	$\eta = 0.3$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 0.6$
N51/N319	$(b_w/t) \leq 90$ Passa	$\lambda_{ox} \leq 200$ $\lambda_{yy} \leq 200$ Passa	$\eta = 0.1$	$\eta < 0.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.125 \text{ m}$ $\eta = 1.9$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 1.9$
N77/N100	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 5.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.2$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 5.2$
N100/N64	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 1.745 \text{ m}$ $\eta = 6.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.3$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 6.1$
N64/N73	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$x: 0 \text{ m}$ $\eta = 7.7$	$x: 0 \text{ m}$ $\eta = 10.5$	$x: 0 \text{ m}$ $\eta = 15.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.7$	$\eta = 7.2$	$x: 0 \text{ m}$ $\eta = 3.0$	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 35.0$	$x: 0 \text{ m}$ $\eta = 32.2$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 35.0$
N78/N102	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 5.7$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.2$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 5.7$
N102/N74	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 1.745 \text{ m}$ $\eta = 6.5$	$x: 1.745 \text{ m}$ $\eta = 3.0$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.3$	$\eta = 0.1$	$x: 1.745 \text{ m}$ $\eta = 0.1$	N.P. <sup>(3)</sup>	$x: 1.745 \text{ m}$ $\eta = 12.0$	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 12.0$
N74/N86	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$x: 0.15 \text{ m}$ $\eta = 7.0$	$x: 0.15 \text{ m}$ $\eta = 10.4$	$x: 0 \text{ m}$ $\eta = 15.6$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.2$	$\eta = 7.0$	$x: 0 \text{ m}$ $\eta = 2.9$	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 33.9$	$x: 0 \text{ m}$ $\eta = 30.5$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 33.9$
N107/N117	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 1.745 \text{ m}$ $\eta = 3.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta < 0.1$	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.2$
N117/N61	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 1.745 \text{ m}$ $\eta = 3.4$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta < 0.1$	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.4$
N61/N63	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$x: 0.15 \text{ m}$ $\eta = 6.9$	$x: 0.15 \text{ m}$ $\eta = 9.6$	$x: 0 \text{ m}$ $\eta = 5.1$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 0.3$	$\eta = 1.8$	$x: 0 \text{ m}$ $\eta = 0.3$	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 22.0$	$x: 0 \text{ m}$ $\eta = 19.3$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 22.0$
N110/N118	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0.873 \text{ m}$ $\eta = 3.9$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta < 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.9$
N118/N62	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$N_{t,Sd} = 0.00$ N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 3.8$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$V_{Sd} = 0.00$ N.P. <sup>(8)</sup>	$\eta = 0.1$	N.P. <sup>(3)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(7)</sup>	N.P. <sup>(4)</sup>	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 3.8$
N62/N85	$(b_w/t) \leq 90$ Passa	$\lambda_{ox,c} \leq 200$ $\lambda_{yy,c} \leq 200$ Passa	$x: 0.15 \text{ m}$ $\eta = 6.6$	$x: 0.15 \text{ m}$ $\eta = 9.6$	$x: 0 \text{ m}$ $\eta = 6.2$	$M_{Sd} = 0.00$ N.P. <sup>(2)</sup>	$\eta = 1.0$	$\eta = 2.0$	$x: 0 \text{ m}$ $\eta = 0.4$	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 21.6$	$x: 0 \text{ m}$ $\eta = 18.7$	$M_{t,Sd} = 0.00$ N.P. <sup>(5)</sup>	<b>PASSA</b> $\eta = 21.6$



Barras	VERIFICAÇÕES													Estado
	b/t	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$M_x V_y$	$M_y V_x$	$N_c M_x M_y$	$N_t M_x M_y$	$M_t$	

**Notação:**  
*b/t:* Valores máximos da relação comprimento-espessura  
 *$\lambda$ :* Limitação de esbeltez  
 *$N_t$ :* Resistência à tração  
 *$N_c$ :* Resistência à compressão  
 *$M_x$ :* Resistência à flexão eixo X  
 *$M_y$ :* Resistência à flexão eixo Y  
 *$V_x$ :* Resistência ao esforço cortante X  
 *$V_y$ :* Resistência ao esforço cortante Y  
 *$M_x V_y$ :* Resistência ao momento fletor X e esforço cortante Y combinados  
 *$M_y V_x$ :* Resistência ao momento fletor Y e esforço cortante X combinados  
 *$N_c M_x M_y$ :* Resistência à flexo-compressão  
 *$N_t M_x M_y$ :* Resistência à flexo-tração  
 *$M_t$ :* Resistência à torção  
*x:* Distância à origem da barra  
 *$\eta$ :* Coeficiente de aproveitamento (%)  
*N.P.:* Não procede

**Verificações desnecessárias para o tipo de perfil (N.P.):**  
 (1) A verificação não será executada, já que não existe esforço axial de tração.  
 (2) A verificação não será executada, já que não existe momento fletor.  
 (3) Não há interação entre o momento fletor e o esforço cortante para nenhuma combinação. Assim a verificação não será executada.  
 (4) Não há interação entre o esforço axial de tração e o momento fletor para nenhuma combinação. Assim a verificação não será executada.  
 (5) A verificação não é necessária, já que não existe momento torsor.  
 (6) A verificação não será executada, já que não existe esforço axial de compressão.  
 (7) Não há interação entre o esforço axial de compressão e o momento fletor para nenhuma combinação. Assim a verificação não será executada.  
 (8) A verificação não será executada, já que não existe esforço cortante.

Barras	VERIFICAÇÕES												Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	T	NMVT	$\sigma \tau f$		
N82/N177	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.2$	x: 0 m $\eta = 29.7$	x: 0.55 m $\eta = 1.8$	$\eta = 0.1$	$\eta = 2.3$	x: 0 m $\eta = 31.3$	$\eta = 2.7$	$\eta < 0.1$	x: 0 m $\eta = 46.4$	PASSA $\eta = 46.4$	
N177/N119	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.6$	x: 0.55 m $\eta = 30.9$	x: 0.55 m $\eta = 8.0$	$\eta = 0.7$	$\eta = 2.4$	x: 0.55 m $\eta = 39.6$	$\eta = 6.8$	$\eta < 0.1$	x: 0.55 m $\eta = 49.1$	PASSA $\eta = 49.1$	
N81/N176	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.2$	x: 0 m $\eta = 28.2$	x: 0 m $\eta = 2.7$	$\eta = 0.1$	$\eta = 2.2$	x: 0 m $\eta = 31.9$	$\eta = 2.5$	$\eta < 0.1$	x: 0 m $\eta = 44.2$	PASSA $\eta = 44.2$	
N176/N120	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.6$	x: 0.55 m $\eta = 31.0$	x: 0.55 m $\eta = 4.4$	$\eta = 0.4$	$\eta = 2.4$	x: 0.55 m $\eta = 36.0$	$\eta = 6.5$	$\eta < 0.1$	x: 0.55 m $\eta = 48.1$	PASSA $\eta = 48.1$	
N121/N175	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.7$	x: 0 m $\eta = 22.2$	x: 0 m $\eta = 29.1$	$\eta = 1.0$	$\eta = 2.1$	x: 0 m $\eta = 51.5$	$\eta = 3.1$	$\eta < 0.1$	x: 0 m $\eta = 55.3$	PASSA $\eta = 55.3$	
N175/N122	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.1$	x: 0 m $\eta = 5.0$	x: 0 m $\eta = 13.8$	$\eta = 0.9$	$\eta = 0.4$	x: 0 m $\eta = 19.4$	$\eta = 3.9$	$\eta < 0.1$	x: 0 m $\eta = 23.0$	PASSA $\eta = 23.0$	
N123/N174	x: 0 m $\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.7$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 20.8$	x: 0 m $\eta = 29.7$	$\eta = 0.9$	$\eta = 1.7$	x: 0 m $\eta = 50.8$	$\eta = 5.3$	$\eta < 0.1$	x: 0 m $\eta = 55.0$	PASSA $\eta = 55.0$	
N174/N124	x: 0 m $\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.4$	x: 0 m $\eta < 0.1$	x: 0.55 m $\eta = 11.4$	x: 0 m $\eta = 10.8$	$\eta = 0.5$	$\eta = 1.1$	x: 0 m $\eta = 19.4$	$\eta = 4.6$	$\eta < 0.1$	x: 0 m $\eta = 20.9$	PASSA $\eta = 20.9$	
N125/N173	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.3$	x: 0 m $\eta = 28.1$	x: 0 m $\eta = 24.6$	$\eta = 0.7$	$\eta = 2.3$	x: 0 m $\eta = 53.8$	$\eta = 4.2$	$\eta < 0.1$	x: 0 m $\eta = 57.8$	PASSA $\eta = 57.8$	
N173/N126	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.8$	x: 0 m $\eta = 2.9$	x: 0 m $\eta = 15.8$	$\eta = 1.2$	$\eta = 0.1$	x: 0 m $\eta = 19.6$	$\eta = 5.3$	$\eta < 0.1$	x: 0 m $\eta = 25.6$	PASSA $\eta = 25.6$	
N127/N172	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.8$	x: 0 m $\eta = 20.3$	x: 0 m $\eta = 31.3$	$\eta = 1.1$	$\eta = 1.8$	x: 0 m $\eta = 52.6$	$\eta = 4.4$	$\eta < 0.1$	x: 0 m $\eta = 57.5$	PASSA $\eta = 57.5$	
N172/N128	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.5$	x: 0.55 m $\eta = 3.4$	x: 0 m $\eta = 16.5$	$\eta = 1.2$	$\eta = 0.2$	x: 0 m $\eta = 18.1$	$\eta = 5.2$	$\eta < 0.1$	x: 0 m $\eta = 26.1$	PASSA $\eta = 26.1$	
N129/N171	x: 0 m $\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.6$	x: 0 m $\eta < 0.1$	x: 0.55 m $\eta = 2.4$	x: 0 m $\eta = 30.4$	$\eta = 1.0$	$\eta = 0.2$	x: 0 m $\eta = 31.5$	$\eta = 4.8$	$\eta < 0.1$	x: 0 m $\eta = 46.1$	PASSA $\eta = 46.1$	



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N171/N130	$x: 0 \text{ m}$ $\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.3$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 2.6$	$x: 0 \text{ m}$ $\eta = 11.1$	$\eta = 0.6$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 12.1$	$\eta = 4.8$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 16.9$	<b>PASSA</b> $\eta = 16.9$
N131/N170	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.8$	$x: 0 \text{ m}$ $\eta = 25.3$	$x: 0 \text{ m}$ $\eta = 21.6$	$\eta = 0.6$	$\eta = 2.1$	$x: 0 \text{ m}$ $\eta = 47.2$	$\eta = 2.7$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 50.4$	<b>PASSA</b> $\eta = 50.4$
N170/N132	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.0$	$x: 0 \text{ m}$ $\eta = 7.7$	$x: 0 \text{ m}$ $\eta = 10.0$	$\eta = 0.7$	$\eta = 0.8$	$x: 0 \text{ m}$ $\eta = 18.1$	$\eta = 4.2$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 19.7$	<b>PASSA</b> $\eta = 19.7$
N86/N169	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.6$	$x: 0.4 \text{ m}$ $\eta = 6.0$	$x: 0.4 \text{ m}$ $\eta = 5.5$	$\eta = 0.1$	$\eta = 0.8$	$x: 0.4 \text{ m}$ $\eta = 12.2$	$\eta = 4.8$	$\eta < 0.1$	$x: 0.4 \text{ m}$ $\eta = 13.5$	<b>PASSA</b> $\eta = 13.5$
N169/N166	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.3$	$x: 0.55 \text{ m}$ $\eta = 16.5$	$x: 0.55 \text{ m}$ $\eta = 1.0$	$\eta < 0.1$	$\eta = 1.4$	$x: 0.55 \text{ m}$ $\eta = 17.9$	$\eta = 7.2$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 25.8$	<b>PASSA</b> $\eta = 25.8$
N166/N133	$\lambda \leq 200.0$ Passa	$x: 0.15 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 2.6$	$x: 0 \text{ m}$ $\eta = 8.7$	$\eta = 1.7$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 11.2$	$\eta = 2.0$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 13.6$	<b>PASSA</b> $\eta = 13.6$
N73/N196	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.5$	$x: 0.4 \text{ m}$ $\eta = 7.9$	$x: 0.4 \text{ m}$ $\eta = 3.7$	$\eta = 0.3$	$\eta = 1.1$	$x: 0.4 \text{ m}$ $\eta = 11.8$	$\eta = 7.0$	$\eta < 0.1$	$x: 0.4 \text{ m}$ $\eta = 14.1$	<b>PASSA</b> $\eta = 14.1$
N196/N165	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.55 \text{ m}$ $\eta = 6.8$	$x: 0.55 \text{ m}$ $\eta = 4.0$	$\eta = 0.4$	$\eta = 0.7$	$x: 0.55 \text{ m}$ $\eta = 10.9$	$\eta = 6.9$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 12.8$	<b>PASSA</b> $\eta = 12.8$
N165/N134	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 3.9$	$\eta = 1.0$	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 6.3$	$\eta = 3.2$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 7.3$	<b>PASSA</b> $\eta = 7.3$
N135/N195	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.9$	$x: 0 \text{ m}$ $\eta = 12.6$	$x: 0 \text{ m}$ $\eta = 30.1$	$\eta = 1.2$	$\eta = 1.0$	$x: 0 \text{ m}$ $\eta = 43.1$	$\eta = 4.3$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 49.7$	<b>PASSA</b> $\eta = 49.7$
N195/N136	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.2$	$x: 0.55 \text{ m}$ $\eta = 17.9$	$x: 0 \text{ m}$ $\eta = 14.5$	$\eta = 1.2$	$\eta = 1.4$	$x: 0.55 \text{ m}$ $\eta = 27.0$	$\eta = 7.6$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 30.7$	<b>PASSA</b> $\eta = 30.7$
N137/N194	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0 \text{ m}$ $\eta = 17.2$	$x: 0 \text{ m}$ $\eta = 29.0$	$\eta = 1.0$	$\eta = 1.2$	$x: 0 \text{ m}$ $\eta = 46.8$	$\eta = 2.4$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 51.5$	<b>PASSA</b> $\eta = 51.5$
N194/N138	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.3$	$x: 0.55 \text{ m}$ $\eta = 17.2$	$x: 0 \text{ m}$ $\eta = 15.5$	$\eta = 1.2$	$\eta = 1.3$	$x: 0.55 \text{ m}$ $\eta = 23.9$	$\eta = 4.3$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 28.4$	<b>PASSA</b> $\eta = 28.4$
N139/N193	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.6$	$x: 0.55 \text{ m}$ $\eta = 1.7$	$x: 0 \text{ m}$ $\eta = 20.4$	$\eta = 0.6$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 22.3$	$\eta = 4.0$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 31.2$	<b>PASSA</b> $\eta = 31.2$
N193/N140	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 3.5$	$x: 0 \text{ m}$ $\eta = 8.3$	$\eta = 0.4$	$\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 11.9$	$\eta = 4.0$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 13.7$	<b>PASSA</b> $\eta = 13.7$
N141/N192	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.6$	$x: 0 \text{ m}$ $\eta = 2.0$	$x: 0 \text{ m}$ $\eta = 20.9$	$\eta = 0.8$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 23.2$	$\eta = 1.4$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 31.9$	<b>PASSA</b> $\eta = 31.9$
N192/N142	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.7$	$x: 0.55 \text{ m}$ $\eta = 4.6$	$x: 0 \text{ m}$ $\eta = 6.9$	$\eta = 0.5$	$\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 8.7$	$\eta = 3.8$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 11.2$	<b>PASSA</b> $\eta = 11.2$
N65/N191	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0 \text{ m}$ $\eta = 4.4$	$x: 0.55 \text{ m}$ $\eta = 0.7$	$\eta < 0.1$	$\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 5.2$	$\eta = 0.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 7.5$	<b>PASSA</b> $\eta = 7.5$
N191/N143	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.9$	$x: 0.55 \text{ m}$ $\eta = 7.3$	$x: 0.55 \text{ m}$ $\eta = 5.0$	$\eta = 0.5$	$\eta = 0.5$	$x: 0.55 \text{ m}$ $\eta = 12.6$	$\eta = 4.2$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 13.9$	<b>PASSA</b> $\eta = 13.9$
N144/N178	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.7$	$x: 0 \text{ m}$ $\eta = 27.2$	$x: 0 \text{ m}$ $\eta = 26.3$	$\eta = 0.7$	$\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 53.8$	$\eta = 3.5$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 57.2$	<b>PASSA</b> $\eta = 57.2$
N178/N145	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0 \text{ m}$ $\eta = 7.4$	$x: 0 \text{ m}$ $\eta = 13.3$	$\eta = 0.9$	$\eta = 0.6$	$x: 0 \text{ m}$ $\eta = 21.3$	$\eta = 4.5$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 23.8$	<b>PASSA</b> $\eta = 23.8$
N146/N179	$x: 0 \text{ m}$ $\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.7$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 16.1$	$x: 0 \text{ m}$ $\eta = 32.6$	$\eta = 1.1$	$\eta = 1.5$	$x: 0 \text{ m}$ $\eta = 49.0$	$\eta = 6.0$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 55.1$	<b>PASSA</b> $\eta = 55.1$

Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N179/N147	$x: 0 \text{ m}$ $\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.4$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 11.2$	$x: 0 \text{ m}$ $\eta = 12.3$	$\eta = 0.7$	$\eta = 1.0$	$x: 0 \text{ m}$ $\eta = 19.4$	$\eta = 5.4$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 21.4$	<b>PASSA</b> $\eta = 21.4$
N148/N180	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 25.6$	$x: 0 \text{ m}$ $\eta = 29.7$	$\eta = 1.0$	$\eta = 2.2$	$x: 0 \text{ m}$ $\eta = 56.5$	$\eta = 5.2$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 60.7$	<b>PASSA</b> $\eta = 60.7$
N180/N149	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.8$	$x: 0.55 \text{ m}$ $\eta = 2.3$	$x: 0 \text{ m}$ $\eta = 17.0$	$\eta = 1.2$	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 18.2$	$\eta = 6.5$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 27.0$	<b>PASSA</b> $\eta = 27.0$
N150/N181	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.8$	$x: 0 \text{ m}$ $\eta = 29.8$	$x: 0 \text{ m}$ $\eta = 31.1$	$\eta = 0.9$	$\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 61.8$	$\eta = 2.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 66.1$	<b>PASSA</b> $\eta = 66.1$
N181/N151	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.5$	$x: 0 \text{ m}$ $\eta = 3.1$	$x: 0 \text{ m}$ $\eta = 17.9$	$\eta = 1.2$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 21.7$	$\eta = 3.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 28.5$	<b>PASSA</b> $\eta = 28.5$
N152/N182	$x: 0 \text{ m}$ $\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.7$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 6.9$	$x: 0 \text{ m}$ $\eta = 34.1$	$\eta = 1.0$	$\eta = 0.5$	$x: 0 \text{ m}$ $\eta = 41.3$	$\eta = 2.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 52.8$	<b>PASSA</b> $\eta = 52.8$
N182/N153	$x: 0 \text{ m}$ $\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.4$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 4.1$	$x: 0 \text{ m}$ $\eta = 13.0$	$\eta = 0.6$	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 16.7$	$\eta = 2.3$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 20.5$	<b>PASSA</b> $\eta = 20.5$
N154/N183	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.5$	$x: 0 \text{ m}$ $\eta = 25.5$	$x: 0 \text{ m}$ $\eta = 30.5$	$\eta = 0.7$	$\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 56.3$	$\eta = 1.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 59.9$	<b>PASSA</b> $\eta = 59.9$
N183/N155	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.8$	$x: 0.55 \text{ m}$ $\eta = 10.4$	$x: 0 \text{ m}$ $\eta = 18.4$	$\eta = 1.0$	$\eta = 1.0$	$x: 0 \text{ m}$ $\eta = 27.3$	$\eta = 0.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 31.1$	<b>PASSA</b> $\eta = 31.1$
N156/N186	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.8$	$x: 0 \text{ m}$ $\eta = 16.2$	$x: 0 \text{ m}$ $\eta = 32.8$	$\eta = 0.9$	$\eta = 1.2$	$x: 0 \text{ m}$ $\eta = 49.3$	$\eta = 2.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 55.4$	<b>PASSA</b> $\eta = 55.4$
N186/N157	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0.55 \text{ m}$ $\eta = 18.4$	$x: 0 \text{ m}$ $\eta = 18.6$	$\eta = 1.2$	$\eta = 1.5$	$x: 0 \text{ m}$ $\eta = 28.6$	$\eta = 3.2$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 32.2$	<b>PASSA</b> $\eta = 32.2$
N158/N187	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0 \text{ m}$ $\eta = 17.2$	$x: 0 \text{ m}$ $\eta = 34.2$	$\eta = 1.2$	$\eta = 1.4$	$x: 0 \text{ m}$ $\eta = 52.0$	$\eta = 4.4$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 58.3$	<b>PASSA</b> $\eta = 58.3$
N187/N159	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.3$	$x: 0.55 \text{ m}$ $\eta = 19.0$	$x: 0 \text{ m}$ $\eta = 18.2$	$\eta = 1.3$	$\eta = 1.4$	$x: 0.55 \text{ m}$ $\eta = 26.1$	$\eta = 6.4$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 31.1$	<b>PASSA</b> $\eta = 31.1$
N160/N188	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.7$	$x: 0.55 \text{ m}$ $\eta = 4.1$	$x: 0 \text{ m}$ $\eta = 22.1$	$\eta = 0.6$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 22.9$	$\eta = 5.3$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 33.7$	<b>PASSA</b> $\eta = 33.7$
N188/N161	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.55 \text{ m}$ $\eta = 4.1$	$x: 0 \text{ m}$ $\eta = 9.7$	$\eta = 0.5$	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 13.4$	$\eta = 5.5$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 15.7$	<b>PASSA</b> $\eta = 15.7$
N162/N189	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.6$	$x: 0.55 \text{ m}$ $\eta = 1.7$	$x: 0 \text{ m}$ $\eta = 21.4$	$\eta = 0.8$	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 22.2$	$\eta = 2.2$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 32.6$	<b>PASSA</b> $\eta = 32.6$
N189/N163	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.7$	$x: 0.55 \text{ m}$ $\eta = 4.2$	$x: 0 \text{ m}$ $\eta = 7.0$	$\eta = 0.4$	$\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 9.2$	$\eta = 4.7$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 11.4$	<b>PASSA</b> $\eta = 11.4$
N67/N190	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 1.2$	$x: 0 \text{ m}$ $\eta = 4.2$	$x: 0 \text{ m}$ $\eta = 1.6$	$\eta = 0.1$	$\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 6.4$	$\eta = 0.8$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 7.7$	<b>PASSA</b> $\eta = 7.7$
N190/N164	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.9$	$x: 0.55 \text{ m}$ $\eta = 8.2$	$x: 0.55 \text{ m}$ $\eta = 3.7$	$\eta = 0.3$	$\eta = 0.6$	$x: 0.55 \text{ m}$ $\eta = 12.2$	$\eta = 4.6$	$\eta < 0.1$	$x: 0.55 \text{ m}$ $\eta = 14.1$	<b>PASSA</b> $\eta = 14.1$
N119/N120	$\lambda \leq 200.0$ Passa	$\eta = 0.9$	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 3.3$	$x: 0 \text{ m}$ $\eta = 13.9$	$x: 0.454 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 17.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 0.1$	<b>PASSA</b> $\eta = 17.7$
N164/N143	$\lambda \leq 200.0$ Passa	$\eta = 0.6$	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 1.7$	$x: 0 \text{ m}$ $\eta = 8.4$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 10.4$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$x: 0 \text{ m}$ $\eta = 0.1$	<b>PASSA</b> $\eta = 10.4$
N166/N132	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 18.4$	$x: 0 \text{ m}$ $\eta = 9.5$	$x: 0 \text{ m}$ $\eta = 2.0$	$x: 0 \text{ m}$ $\eta = 3.3$	$x: 0 \text{ m}$ $\eta = 27.7$	$\eta = 8.2$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 31.0$	<b>PASSA</b> $\eta = 31.0$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N132/N130	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.9$	x: 1 m $\eta = 9.3$	x: 1 m $\eta = 3.3$	x: 1 m $\eta = 0.1$	x: 0 m $\eta = 0.6$	x: 1 m $\eta = 13.0$	$\eta = 5.3$	$\eta < 0.1$	x: 1 m $\eta = 15.3$	<b>PASSA</b> $\eta = 15.3$
N130/N128	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.8$	x: 1 m $\eta = 14.6$	x: 0 m $\eta = 7.4$	x: 0 m $\eta = 0.4$	x: 1 m $\eta = 0.9$	x: 1 m $\eta = 22.1$	$\eta = 5.7$	$\eta < 0.1$	x: 1 m $\eta = 24.8$	<b>PASSA</b> $\eta = 24.8$
N128/N126	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.9$	x: 1 m $\eta = 22.0$	x: 0.5 m $\eta = 18.4$	x: 0 m $\eta = 1.9$	x: 1 m $\eta = 3.6$	x: 0.5 m $\eta = 28.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 1 m $\eta = 3.9$	<b>PASSA</b> $\eta = 28.7$
N126/N124	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.9$	x: 0 m $\eta = 21.6$	x: 0 m $\eta = 7.5$	x: 0.75 m $\eta = 0.4$	x: 0 m $\eta = 1.2$	x: 0 m $\eta = 29.5$	$\eta = 5.5$	$\eta < 0.1$	x: 0 m $\eta = 34.8$	<b>PASSA</b> $\eta = 34.8$
N124/N122	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.5$	x: 0 m $\eta = 6.2$	x: 0 m $\eta = 3.5$	x: 0 m $\eta = 0.1$	x: 1 m $\eta = 0.4$	x: 0 m $\eta = 10.5$	$\eta = 4.9$	$\eta < 0.1$	x: 0 m $\eta = 11.6$	<b>PASSA</b> $\eta = 11.6$
N122/N120	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.2$	x: 1 m $\eta = 28.1$	x: 1 m $\eta = 21.2$	x: 1 m $\eta = 2.6$	x: 1 m $\eta = 4.2$	x: 1 m $\eta = 49.5$	$\eta = 8.2$	$\eta < 0.1$	x: 1 m $\eta = 53.1$	<b>PASSA</b> $\eta = 53.1$
N71/N184	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.1$	x: 0 m $\eta = 12.6$	x: 0 m $\eta = 45.1$	$\eta = 1.4$	$\eta = 1.3$	x: 0 m $\eta = 58.3$	$\eta = 2.8$	$\eta < 0.1$	x: 0 m $\eta = 71.7$	<b>PASSA</b> $\eta = 71.7$
N184/N167	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.5$	x: 0.55 m $\eta = 17.0$	x: 0 m $\eta = 20.7$	$\eta = 1.2$	$\eta = 1.4$	x: 0 m $\eta = 30.6$	$\eta = 2.6$	$\eta < 0.1$	x: 0 m $\eta = 35.1$	<b>PASSA</b> $\eta = 35.1$
N66/N185	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.6$	x: 0 m $\eta = 17.5$	x: 0 m $\eta = 38.3$	$\eta = 1.0$	$\eta = 1.4$	x: 0 m $\eta = 55.7$	$\eta = 1.6$	$\eta < 0.1$	x: 0 m $\eta = 63.3$	<b>PASSA</b> $\eta = 63.3$
N185/N168	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 9.1$	x: 0 m $\eta = 15.2$	$\eta = 0.6$	$\eta = 0.9$	x: 0 m $\eta = 22.8$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 25.5$	<b>PASSA</b> $\eta = 25.5$
N164/N163	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 8.3$	x: 0 m $\eta = 12.1$	x: 0 m $\eta = 1.6$	x: 0 m $\eta = 2.6$	x: 0 m $\eta = 20.4$	$\eta = 6.5$	$\eta < 0.1$	x: 0 m $\eta = 22.0$	<b>PASSA</b> $\eta = 22.0$
N163/N161	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 1 m $\eta = 3.8$	x: 0 m $\eta = 2.8$	x: 0 m $\eta < 0.1$	x: 1 m $\eta = 0.2$	x: 1 m $\eta = 6.4$	$\eta = 5.7$	$\eta < 0.1$	x: 1 m $\eta = 8.1$	<b>PASSA</b> $\eta = 8.1$
N161/N159	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	x: 0 m $\eta = 7.9$	x: 1 m $\eta = 7.6$	x: 1 m $\eta = 0.4$	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 15.3$	$\eta = 7.1$	$\eta < 0.1$	x: 0 m $\eta = 16.2$	<b>PASSA</b> $\eta = 16.2$
N159/N157	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.1$	x: 0 m $\eta = 16.8$	x: 0.5 m $\eta = 15.0$	x: 1 m $\eta = 1.5$	x: 0 m $\eta = 3.8$	x: 0.5 m $\eta = 32.1$	$\eta = 2.0$	$\eta < 0.1$	x: 0.5 m $\eta = 34.1$	<b>PASSA</b> $\eta = 34.1$
N157/N168	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	x: 1 m $\eta = 9.7$	x: 1 m $\eta = 9.4$	x: 0 m $\eta = 0.4$	x: 1 m $\eta = 0.5$	x: 1 m $\eta = 19.1$	$\eta = 1.6$	$\eta < 0.1$	x: 1 m $\eta = 20.2$	<b>PASSA</b> $\eta = 20.2$
N168/N167	N.P. <sup>(4)</sup>	$\eta < 0.1$	N.P. <sup>(5)</sup>	x: 0.95 m $\eta = 7.6$	x: 0 m $\eta = 9.5$	x: 0.237 m $\eta = 0.3$	x: 0.95 m $\eta = 0.3$	x: 0 m $\eta = 10.3$	$\eta = 1.6$	$\eta < 0.1$	x: 0 m $\eta = 14.4$	<b>PASSA</b> $\eta = 14.4$
N167/N155	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.6$	x: 0 m $\eta = 24.0$	x: 0.385 m $\eta = 6.3$	x: 0 m $\eta = 1.2$	x: 0 m $\eta = 3.8$	x: 0 m $\eta = 26.0$	$\eta = 0.7$	$\eta < 0.1$	x: 0 m $\eta = 36.4$	<b>PASSA</b> $\eta = 36.4$
N155/N153	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.3$	x: 1 m $\eta = 8.9$	x: 1 m $\eta = 6.5$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 0.5$	x: 1 m $\eta = 16.1$	$\eta = 0.8$	$\eta < 0.1$	x: 1 m $\eta = 17.3$	<b>PASSA</b> $\eta = 17.3$
N153/N151	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.1$	x: 1 m $\eta = 15.1$	x: 0 m $\eta = 8.9$	x: 1 m $\eta = 0.5$	x: 1 m $\eta = 0.9$	x: 1 m $\eta = 22.8$	$\eta = 3.1$	$\eta < 0.1$	x: 1 m $\eta = 25.7$	<b>PASSA</b> $\eta = 25.7$
N151/N149	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.0$	x: 1 m $\eta = 23.2$	x: 0.5 m $\eta = 16.3$	x: 0 m $\eta = 1.5$	x: 1 m $\eta = 3.9$	x: 0.5 m $\eta = 28.6$	$\eta = 1.9$	$\eta < 0.1$	x: 1 m $\eta = 35.8$	<b>PASSA</b> $\eta = 35.8$
N149/N147	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.0$	x: 0 m $\eta = 21.1$	x: 1 m $\eta = 9.9$	x: 0 m $\eta = 0.6$	x: 0 m $\eta = 1.2$	x: 0 m $\eta = 31.4$	$\eta = 6.7$	$\eta < 0.1$	x: 0 m $\eta = 35.5$	<b>PASSA</b> $\eta = 35.5$
N147/N145	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.5$	x: 0 m $\eta = 6.4$	x: 0 m $\eta = 4.3$	x: 1 m $\eta = 0.1$	x: 1 m $\eta = 0.4$	x: 0 m $\eta = 11.5$	$\eta = 5.6$	$\eta < 0.1$	x: 0 m $\eta = 12.5$	<b>PASSA</b> $\eta = 12.5$
N145/N119	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 1.2$	x: 1 m $\eta = 31.1$	x: 1 m $\eta = 18.4$	x: 1 m $\eta = 2.1$	x: 1 m $\eta = 4.5$	x: 1 m $\eta = 49.7$	$\eta = 8.8$	$\eta < 0.1$	x: 1 m $\eta = 54.5$	<b>PASSA</b> $\eta = 54.5$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N143/N142	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0.32 m $\eta = 7.0$	x: 0 m $\eta = 11.3$	x: 0 m $\eta = 1.8$	x: 0 m $\eta = 2.4$	x: 0 m $\eta = 18.0$	$\eta = 5.5$	$\eta < 0.1$	x: 0 m $\eta = 19.8$	<b>PASSA</b> $\eta = 19.8$
N142/N140	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 1 m $\eta = 3.5$	x: 1 m $\eta = 2.7$	x: 1 m $\eta < 0.1$	x: 1 m $\eta = 0.2$	x: 1 m $\eta = 6.3$	$\eta = 4.2$	$\eta < 0.1$	x: 1 m $\eta = 7.2$	<b>PASSA</b> $\eta = 7.2$
N140/N138	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.3$	x: 0 m $\eta = 5.6$	x: 1 m $\eta = 7.8$	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 12.3$	$\eta = 4.8$	$\eta < 0.1$	x: 0 m $\eta = 13.0$	<b>PASSA</b> $\eta = 13.0$
N138/N136	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.9$	x: 0 m $\eta = 15.9$	x: 0.5 m $\eta = 18.3$	x: 1 m $\eta = 1.9$	x: 0 m $\eta = 3.5$	x: 0.5 m $\eta = 32.9$	$\eta = 2.0$	$\eta < 0.1$	x: 0.5 m $\eta = 35.2$	<b>PASSA</b> $\eta = 35.2$
N136/N165	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 1 m $\eta = 7.8$	x: 1 m $\eta = 9.9$	x: 1 m $\eta = 0.6$	x: 1 m $\eta = 0.4$	x: 1 m $\eta = 17.6$	$\eta = 9.3$	$\eta < 0.1$	x: 1 m $\eta = 19.0$	<b>PASSA</b> $\eta = 19.0$
N169/N170	$\lambda \leq 200.0$ Passa	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 16.5$	x: 0 m $\eta = 1.5$	x: 0.77 m $\eta = 0.1$	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 18.0$	$\eta = 5.5$	$\eta < 0.1$	x: 0 m $\eta = 24.9$	<b>PASSA</b> $\eta = 24.9$
N170/N171	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	x: 1 m $\eta = 8.2$	x: 1 m $\eta = 3.3$	x: 1 m $\eta = 0.1$	x: 0 m $\eta = 0.5$	x: 1 m $\eta = 11.7$	$\eta = 4.4$	$\eta < 0.1$	x: 1 m $\eta = 13.5$	<b>PASSA</b> $\eta = 13.5$
N171/N172	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	x: 1 m $\eta = 11.7$	x: 1 m $\eta = 3.8$	x: 0 m $\eta = 0.2$	x: 1 m $\eta = 0.7$	x: 1 m $\eta = 15.7$	$\eta = 5.8$	$\eta < 0.1$	x: 1 m $\eta = 18.6$	<b>PASSA</b> $\eta = 18.6$
N172/N173	N.P. <sup>(4)</sup>	$\eta = 0.4$	N.P. <sup>(5)</sup>	x: 1 m $\eta = 3.7$	x: 1 m $\eta = 6.4$	x: 0 m $\eta < 0.1$	x: 1 m $\eta = 0.2$	x: 1 m $\eta = 10.3$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 1 m $\eta = 0.2$	<b>PASSA</b> $\eta = 10.3$
N173/N174	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.5$	x: 0 m $\eta = 20.7$	x: 0 m $\eta = 4.5$	x: 1 m $\eta = 0.2$	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 25.4$	$\eta = 5.8$	$\eta < 0.1$	x: 0 m $\eta = 32.1$	<b>PASSA</b> $\eta = 32.1$
N174/N175	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.8$	x: 1 m $\eta = 1.7$	x: 0 m $\eta = 3.4$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 4.1$	$\eta = 4.5$	$\eta < 0.1$	x: 0 m $\eta = 6.5$	<b>PASSA</b> $\eta = 6.5$
N175/N176	$\lambda \leq 200.0$ Passa	$\eta = 0.1$	$\eta = 0.1$	x: 1 m $\eta = 26.6$	x: 1 m $\eta = 1.7$	x: 1 m $\eta = 0.1$	x: 1 m $\eta = 1.6$	x: 1 m $\eta = 28.1$	$\eta = 6.4$	$\eta < 0.1$	x: 1 m $\eta = 39.9$	<b>PASSA</b> $\eta = 39.9$
N177/N176	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.3$	x: 0 m $\eta = 1.5$	x: 0 m $\eta = 4.1$	x: 0.907 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 5.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 5.7$
N190/N189	$\lambda \leq 200.0$ Passa	$\eta = 0.1$	$\eta < 0.1$	x: 0 m $\eta = 4.9$	x: 0.64 m $\eta = 5.2$	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 0.4$	x: 0.64 m $\eta = 8.9$	$\eta = 4.8$	$\eta < 0.1$	x: 0.64 m $\eta = 9.8$	<b>PASSA</b> $\eta = 9.8$
N189/N188	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 1 m $\eta = 5.6$	x: 0 m $\eta = 2.7$	x: 1 m $\eta < 0.1$	x: 1 m $\eta = 0.4$	x: 1 m $\eta = 7.1$	$\eta = 4.7$	$\eta < 0.1$	x: 1 m $\eta = 9.0$	<b>PASSA</b> $\eta = 9.0$
N188/N187	N.P. <sup>(4)</sup>	$\eta < 0.1$	N.P. <sup>(5)</sup>	x: 1 m $\eta = 13.6$	x: 1 m $\eta = 2.2$	x: 1 m $\eta = 0.1$	x: 0 m $\eta = 0.9$	x: 1 m $\eta = 15.7$	$\eta = 6.7$	$\eta < 0.1$	x: 1 m $\eta = 20.7$	<b>PASSA</b> $\eta = 20.7$
N187/N186	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta = 0.1$	x: 0 m $\eta = 3.5$	x: 0 m $\eta = 5.2$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 8.6$	$\eta = 1.4$	$\eta < 0.1$	x: 0 m $\eta = 9.3$	<b>PASSA</b> $\eta = 9.3$
N186/N185	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 0 m $\eta = 17.7$	x: 1 m $\eta = 4.6$	x: 0 m $\eta = 0.2$	x: 1 m $\eta = 1.1$	x: 1 m $\eta = 22.1$	$\eta = 2.5$	$\eta < 0.1$	x: 1 m $\eta = 27.4$	<b>PASSA</b> $\eta = 27.4$
N185/N184	N.P. <sup>(4)</sup>	$\eta = 0.1$	N.P. <sup>(5)</sup>	x: 0.95 m $\eta = 1.7$	x: 0 m $\eta = 4.5$	x: 0.95 m $\eta = 0.1$	x: 0.95 m $\eta = 0.1$	x: 0 m $\eta = 5.7$	$\eta = 1.5$	$\eta < 0.1$	x: 0 m $\eta = 7.0$	<b>PASSA</b> $\eta = 7.0$
N184/N183	$\lambda \leq 200.0$ Passa	$\eta = 0.1$	$\eta < 0.1$	x: 0 m $\eta = 22.2$	x: 0.77 m $\eta = 3.0$	x: 0.77 m $\eta = 0.1$	x: 0 m $\eta = 1.7$	x: 0.77 m $\eta = 23.8$	$\eta = 1.1$	$\eta < 0.1$	x: 0 m $\eta = 33.4$	<b>PASSA</b> $\eta = 33.4$
N183/N182	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.5$	x: 1 m $\eta = 7.9$	x: 1 m $\eta = 4.4$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 0.5$	x: 1 m $\eta = 12.5$	$\eta = 1.4$	$\eta < 0.1$	x: 1 m $\eta = 13.8$	<b>PASSA</b> $\eta = 13.8$
N182/N181	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.5$	x: 1 m $\eta = 14.0$	x: 0 m $\eta = 5.0$	x: 1 m $\eta = 0.3$	x: 1 m $\eta = 0.9$	x: 1 m $\eta = 19.1$	$\eta = 3.5$	$\eta < 0.1$	x: 1 m $\eta = 22.4$	<b>PASSA</b> $\eta = 22.4$
N181/N180	N.P. <sup>(4)</sup>	$\eta = 0.4$	N.P. <sup>(5)</sup>	x: 1 m $\eta = 4.9$	x: 1 m $\eta = 6.7$	x: 1 m $\eta = 0.1$	x: 1 m $\eta = 0.3$	x: 1 m $\eta = 11.8$	$\eta = 1.7$	$\eta < 0.1$	x: 1 m $\eta = 12.8$	<b>PASSA</b> $\eta = 12.8$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N180/N179	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.6$	x: 0 m $\eta = 20.6$	x: 0 m $\eta = 6.5$	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 27.4$	$\eta = 6.8$	$\eta < 0.1$	x: 0 m $\eta = 32.7$	<b>PASSA</b> $\eta = 32.7$
N179/N178	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.9$	x: 0.5 m $\eta = 1.4$	x: 0 m $\eta = 3.6$	x: 1 m $\eta = 0.1$	x: 1 m $\eta = 0.1$	x: 0 m $\eta = 5.0$	$\eta = 5.2$	$\eta < 0.1$	x: 0 m $\eta = 7.2$	<b>PASSA</b> $\eta = 7.2$
N178/N177	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta = 0.1$	x: 1 m $\eta = 27.6$	x: 0 m $\eta = 2.6$	x: 1 m $\eta = 0.1$	x: 1 m $\eta = 1.6$	x: 1 m $\eta = 29.1$	$\eta = 6.9$	$\eta < 0.1$	x: 1 m $\eta = 41.5$	<b>PASSA</b> $\eta = 41.5$
N190/N191	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.3$	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 1.5$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 2.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 2.9$
N191/N192	$\lambda \leq 200.0$ Passa	$\eta = 0.1$	$\eta < 0.1$	x: 0 m $\eta = 5.0$	x: 0.64 m $\eta = 4.2$	x: 0.64 m $\eta = 0.3$	x: 0 m $\eta = 0.5$	x: 0.64 m $\eta = 8.4$	$\eta = 4.2$	$\eta < 0.1$	x: 0.64 m $\eta = 9.1$	<b>PASSA</b> $\eta = 9.1$
N192/N193	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 1 m $\eta = 5.7$	x: 1 m $\eta = 1.9$	x: 1 m $\eta < 0.1$	x: 1 m $\eta = 0.4$	x: 1 m $\eta = 7.6$	$\eta = 3.5$	$\eta < 0.1$	x: 1 m $\eta = 9.0$	<b>PASSA</b> $\eta = 9.0$
N193/N194	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta = 0.1$	x: 1 m $\eta = 11.2$	x: 1 m $\eta = 4.3$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 0.7$	x: 1 m $\eta = 15.4$	$\eta = 4.8$	$\eta < 0.1$	x: 1 m $\eta = 18.0$	<b>PASSA</b> $\eta = 18.0$
N194/N195	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 0 m $\eta = 2.0$	x: 0 m $\eta = 5.1$	x: 0.5 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 7.0$	$\eta = 1.5$	$\eta < 0.1$	x: 0 m $\eta = 8.2$	<b>PASSA</b> $\eta = 8.2$
N195/N196	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 14.5$	x: 0 m $\eta = 2.2$	x: 1 m $\eta = 0.1$	x: 1 m $\eta = 0.9$	x: 0 m $\eta = 16.7$	$\eta = 8.1$	$\eta < 0.1$	x: 0 m $\eta = 22.1$	<b>PASSA</b> $\eta = 22.1$
N197/N209	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.5$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 18.2$	x: 0.55 m $\eta = 0.7$	$\eta < 0.1$	$\eta = 0.7$	x: 0 m $\eta = 18.6$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 27.8$	<b>PASSA</b> $\eta = 27.8$
N209/N198	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.2$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 3.9$	x: 0 m $\eta = 3.5$	$\eta = 0.4$	$\eta = 0.2$	x: 0 m $\eta = 7.5$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 8.0$	<b>PASSA</b> $\eta = 8.0$
N199/N206	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.0$	x: 0 m $\eta = 26.6$	x: 0.55 m $\eta = 2.5$	$\eta = 0.2$	$\eta = 1.0$	x: 0 m $\eta = 29.0$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 40.7$	<b>PASSA</b> $\eta = 40.7$
N206/N200	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.3$	x: 0 m $\eta = 13.6$	x: 0.55 m $\eta = 12.8$	$\eta = 0.8$	$\eta = 1.2$	x: 0.55 m $\eta = 21.7$	$\eta = 1.4$	$\eta < 0.1$	x: 0.55 m $\eta = 23.9$	<b>PASSA</b> $\eta = 23.9$
N18/N207	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 2.7$	x: 0 m $\eta = 19.8$	x: 0 m $\eta = 19.2$	$\eta = 1.3$	$\eta = 1.5$	x: 0 m $\eta = 40.3$	$\eta = 1.4$	$\eta < 0.1$	x: 0 m $\eta = 43.6$	<b>PASSA</b> $\eta = 43.6$
N207/N201	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.9$	x: 0.55 m $\eta = 10.2$	x: 0.55 m $\eta = 26.0$	$\eta = 1.9$	$\eta = 1.0$	x: 0.55 m $\eta = 37.2$	$\eta = 4.9$	$\eta < 0.1$	x: 0.55 m $\eta = 43.5$	<b>PASSA</b> $\eta = 43.5$
N17/N208	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.4$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 16.7$	x: 0 m $\eta = 14.1$	$\eta = 1.1$	$\eta = 1.3$	x: 0 m $\eta = 30.9$	$\eta = 0.8$	$\eta < 0.1$	x: 0 m $\eta = 32.9$	<b>PASSA</b> $\eta = 32.9$
N208/N202	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.2$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 15.1$	x: 0.55 m $\eta = 7.6$	$\eta = 0.5$	$\eta = 1.5$	x: 0.55 m $\eta = 22.7$	$\eta = 1.1$	$\eta < 0.1$	x: 0.55 m $\eta = 25.4$	<b>PASSA</b> $\eta = 25.4$
N16/N205	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 12.3$	x: 0 m $\eta = 6.4$	$\eta = 0.7$	$\eta = 0.3$	x: 0 m $\eta = 18.8$	$\eta = 1.9$	$\eta < 0.1$	x: 0 m $\eta = 20.9$	<b>PASSA</b> $\eta = 20.9$
N205/N203	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 5.7$	x: 0.55 m $\eta = 4.1$	$\eta = 0.4$	$\eta = 0.2$	x: 0 m $\eta = 9.0$	$\eta = 2.3$	$\eta < 0.1$	x: 0 m $\eta = 9.9$	<b>PASSA</b> $\eta = 9.9$
N15/N210	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.5$	x: 0 m $\eta = 8.8$	x: 0 m $\eta = 24.9$	$\eta = 1.9$	$\eta = 0.4$	x: 0 m $\eta = 33.9$	$\eta = 2.9$	$\eta < 0.1$	x: 0 m $\eta = 39.9$	<b>PASSA</b> $\eta = 39.9$
N210/N204	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.4$	x: 0.55 m $\eta = 8.6$	$\eta = 0.6$	$\eta = 0.1$	x: 0.55 m $\eta = 9.7$	$\eta = 0.3$	$\eta < 0.1$	x: 0.55 m $\eta = 13.1$	<b>PASSA</b> $\eta = 13.1$
N204/N198	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	x: 1.12 m $\eta = 9.3$	x: 1.12 m $\eta = 2.9$	x: 1.12 m $\eta = 0.1$	x: 0 m $\eta = 0.5$	x: 1.12 m $\eta = 12.4$	$\eta = 0.6$	$\eta < 0.1$	x: 1.12 m $\eta = 14.7$	<b>PASSA</b> $\eta = 14.7$
N198/N202	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.6$	x: 0 m $\eta = 6.3$	x: 0 m $\eta = 2.9$	x: 0 m $\eta = 0.2$	x: 1.12 m $\eta = 0.4$	x: 0 m $\eta = 9.5$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 1.12 m $\eta = 0.4$	<b>PASSA</b> $\eta = 9.5$





Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N202/N201	$\lambda \leq 200.0$ Passa	$\eta = 0.4$	$\eta < 0.1$	x: 0.95 m $\eta = 15.4$	x: 0.95 m $\eta = 14.2$	x: 0.95 m $\eta = 0.6$	x: 0.95 m $\eta = 1.0$	x: 0.95 m $\eta = 29.8$	$\eta = 1.9$	$\eta < 0.1$	x: 0.95 m $\eta = 31.8$	<b>PASSA</b> $\eta = 31.8$
N203/N200	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 3.9$	x: 1.12 m $\eta = 5.2$	x: 1.12 m $\eta = 0.2$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 6.0$	$\eta = 2.1$	$\eta < 0.1$	x: 1.12 m $\eta = 8.0$	<b>PASSA</b> $\eta = 8.0$
N200/N201	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.8$	x: 1.12 m $\eta = 27.1$	x: 1.12 m $\eta = 16.2$	x: 1.12 m $\eta = 2.2$	x: 1.12 m $\eta = 4.5$	x: 1.12 m $\eta = 43.6$	$\eta = 5.3$	$\eta < 0.1$	x: 1.12 m $\eta = 47.6$	<b>PASSA</b> $\eta = 47.6$
N205/N206	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 1.12 m $\eta = 9.8$	x: 1.12 m $\eta = 1.1$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.6$	x: 1.12 m $\eta = 10.8$	$\eta = 2.3$	$\eta < 0.1$	x: 1.12 m $\eta = 14.8$	<b>PASSA</b> $\eta = 14.8$
N206/N207	$\lambda \leq 200.0$ Passa	$\eta = 0.2$	$\eta = 0.1$	x: 1.12 m $\eta = 12.8$	x: 0 m $\eta = 2.2$	x: 0 m $\eta = 0.1$	x: 1.12 m $\eta = 0.7$	x: 1.12 m $\eta = 13.3$	$\eta = 3.7$	$\eta < 0.1$	x: 1.12 m $\eta = 19.4$	<b>PASSA</b> $\eta = 19.4$
N208/N207	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0.95 m $\eta = 21.0$	x: 0.95 m $\eta = 5.1$	x: 0.95 m $\eta = 0.3$	x: 0.95 m $\eta = 1.3$	x: 0.95 m $\eta = 26.1$	$\eta = 1.0$	$\eta < 0.1$	x: 0.95 m $\eta = 32.4$	<b>PASSA</b> $\eta = 32.4$
N210/N209	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.7$	x: 0 m $\eta = 13.4$	x: 1.12 m $\eta = 5.0$	x: 1.12 m $\eta = 0.2$	x: 0 m $\eta = 0.7$	x: 1.12 m $\eta = 17.2$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 20.7$	<b>PASSA</b> $\eta = 20.7$
N209/N208	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.5$	x: 1.12 m $\eta = 9.8$	x: 0 m $\eta = 5.2$	x: 0 m $\eta = 0.2$	x: 1.12 m $\eta = 0.6$	x: 0 m $\eta = 14.4$	$\eta = 0.2$	$\eta < 0.1$	x: 1.12 m $\eta = 16.0$	<b>PASSA</b> $\eta = 16.0$
N85/N213	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.7$	x: 0 m $\eta = 4.8$	x: 0 m $\eta = 18.2$	$\eta = 1.2$	$\eta = 0.6$	x: 0 m $\eta = 23.4$	$\eta = 2.5$	$\eta < 0.1$	x: 0 m $\eta = 28.9$	<b>PASSA</b> $\eta = 28.9$
N213/N211	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.5$	x: 0.55 m $\eta = 3.1$	x: 0.55 m $\eta = 10.0$	$\eta = 0.7$	$\eta = 0.3$	x: 0.55 m $\eta = 13.4$	$\eta = 3.3$	$\eta < 0.1$	x: 0.55 m $\eta = 16.1$	<b>PASSA</b> $\eta = 16.1$
N211/N212	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 2.0$	x: 0.15 m $\eta = 11.5$	$\eta = 0.4$	$\eta = 0.7$	x: 0.15 m $\eta = 13.0$	$\eta = 9.9$	$\eta < 0.1$	x: 0.15 m $\eta = 18.6$	<b>PASSA</b> $\eta = 18.6$
N63/N216	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.4$	x: 0.4 m $\eta = 3.0$	x: 0 m $\eta = 13.2$	$\eta = 0.8$	$\eta = 0.4$	x: 0 m $\eta = 15.6$	$\eta = 1.7$	$\eta < 0.1$	x: 0 m $\eta = 20.5$	<b>PASSA</b> $\eta = 20.5$
N216/N214	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.4$	x: 0.55 m $\eta = 0.6$	x: 0.55 m $\eta = 7.8$	$\eta = 0.6$	$\eta < 0.1$	x: 0.55 m $\eta = 8.4$	$\eta = 2.9$	$\eta < 0.1$	x: 0.55 m $\eta = 12.0$	<b>PASSA</b> $\eta = 12.0$
N214/N215	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 3.4$	x: 0.15 m $\eta = 8.7$	$\eta = 0.3$	$\eta = 0.7$	x: 0 m $\eta = 10.7$	$\eta = 10.6$	$\eta < 0.1$	x: 0.15 m $\eta = 15.7$	<b>PASSA</b> $\eta = 15.7$
N219/N218	$\lambda \leq 200.0$ Passa	x: 0.4 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 18.0$	x: 0 m $\eta = 7.9$	$\eta = 0.4$	$\eta = 0.4$	x: 0 m $\eta = 25.6$	$\eta = 1.8$	$\eta < 0.1$	x: 0 m $\eta = 29.2$	<b>PASSA</b> $\eta = 29.2$
N218/N217	$\lambda \leq 200.0$ Passa	x: 0.7 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 12.0$	x: 0.7 m $\eta = 6.4$	$\eta = 0.4$	$\eta = 0.4$	x: 0 m $\eta = 14.6$	$\eta = 1.8$	$\eta < 0.1$	x: 0 m $\eta = 18.4$	<b>PASSA</b> $\eta = 18.4$
N222/N221	$\lambda \leq 200.0$ Passa	x: 0.4 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 18.0$	x: 0 m $\eta = 17.7$	$\eta = 0.9$	$\eta = 0.5$	x: 0 m $\eta = 35.7$	$\eta = 2.3$	$\eta < 0.1$	x: 0 m $\eta = 37.9$	<b>PASSA</b> $\eta = 37.9$
N221/N220	$\lambda \leq 200.0$ Passa	x: 0.7 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 11.6$	x: 0.7 m $\eta = 14.7$	$\eta = 0.9$	$\eta = 0.5$	x: 0 m $\eta = 17.6$	$\eta = 2.3$	$\eta < 0.1$	x: 0.7 m $\eta = 22.1$	<b>PASSA</b> $\eta = 22.1$
N225/N224	$\lambda \leq 200.0$ Passa	x: 0.4 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 18.0$	x: 0 m $\eta = 1.4$	$\eta = 0.1$	$\eta = 0.5$	x: 0 m $\eta = 18.6$	$\eta = 1.6$	$\eta < 0.1$	x: 0 m $\eta = 27.1$	<b>PASSA</b> $\eta = 27.1$
N224/N223	$\lambda \leq 200.0$ Passa	x: 0.7 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 11.7$	x: 0.7 m $\eta = 2.3$	$\eta = 0.1$	$\eta = 0.5$	x: 0 m $\eta = 12.2$	$\eta = 1.6$	$\eta < 0.1$	x: 0 m $\eta = 17.6$	<b>PASSA</b> $\eta = 17.6$
N228/N227	$\lambda \leq 200.0$ Passa	x: 0.4 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 19.5$	x: 0 m $\eta = 10.7$	$\eta = 0.6$	$\eta = 0.6$	x: 0 m $\eta = 30.2$	$\eta = 2.6$	$\eta < 0.1$	x: 0 m $\eta = 33.3$	<b>PASSA</b> $\eta = 33.3$
N227/N226	$\lambda \leq 200.0$ Passa	x: 0.7 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 11.9$	x: 0.7 m $\eta = 10.3$	$\eta = 0.6$	$\eta = 0.6$	x: 0 m $\eta = 15.0$	$\eta = 2.6$	$\eta < 0.1$	x: 0 m $\eta = 18.5$	<b>PASSA</b> $\eta = 18.5$
N133/N217	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta = 0.7$	x: 0 m $\eta = 1.0$	x: 0.78 m $\eta = 10.3$	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 0.1$	x: 0.78 m $\eta = 11.3$	$\eta = 1.7$	$\eta < 0.1$	x: 0.78 m $\eta = 16.0$	<b>PASSA</b> $\eta = 16.0$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N217/N220	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.5$	x: 0 m $\eta = 5.7$	x: 0 m $\eta = 9.1$	x: 0.78 m $\eta = 0.1$	x: 0.78 m $\eta = 0.4$	x: 0 m $\eta = 15.0$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0.78 m $\eta = 0.4$	<b>PASSA</b> $\eta = 15.0$
N220/N212	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta = 0.2$	x: 0.79 m $\eta = 10.7$	x: 0.79 m $\eta = 9.9$	x: 0.79 m $\eta = 0.7$	x: 0.79 m $\eta = 0.8$	x: 0.79 m $\eta = 20.7$	$\eta = 0.2$	$\eta < 0.1$	x: 0.79 m $\eta = 22.0$	<b>PASSA</b> $\eta = 22.0$
N134/N223	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta = 0.4$	x: 0.78 m $\eta = 2.8$	x: 0.78 m $\eta = 10.9$	x: 0.78 m $\eta = 0.3$	x: 0 m $\eta = 0.2$	x: 0.78 m $\eta = 13.9$	$\eta = 0.8$	$\eta < 0.1$	x: 0.78 m $\eta = 17.2$	<b>PASSA</b> $\eta = 17.2$
N223/N226	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	x: 0 m $\eta = 4.7$	x: 0 m $\eta = 9.3$	x: 0 m $\eta = 0.1$	x: 0.78 m $\eta = 0.3$	x: 0 m $\eta = 14.2$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 15.8$	<b>PASSA</b> $\eta = 15.8$
N226/N215	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 0.79 m $\eta = 9.2$	x: 0.79 m $\eta = 9.3$	x: 0 m $\eta = 0.6$	x: 0.79 m $\eta = 0.7$	x: 0.79 m $\eta = 18.5$	$\eta = 0.1$	$\eta < 0.1$	x: 0.79 m $\eta = 19.6$	<b>PASSA</b> $\eta = 19.6$
N40/N229	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 7.6$	x: 0 m $\eta = 1.8$	$\eta = 0.2$	$\eta = 0.6$	x: 0 m $\eta = 9.6$	$\eta = 2.5$	$\eta < 0.1$	x: 0 m $\eta = 12.0$	<b>PASSA</b> $\eta = 12.0$
N229/N230	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.55 m $\eta = 3.0$	x: 0.55 m $\eta = 0.6$	$\eta = 0.1$	$\eta = 0.2$	x: 0.55 m $\eta = 3.6$	$\eta = 0.9$	$\eta < 0.1$	x: 0.55 m $\eta = 4.6$	<b>PASSA</b> $\eta = 4.6$
N39/N231	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 11.1$	x: 0 m $\eta = 1.5$	$\eta = 0.1$	$\eta = 0.9$	x: 0 m $\eta = 12.8$	$\eta = 1.8$	$\eta < 0.1$	x: 0 m $\eta = 17.1$	<b>PASSA</b> $\eta = 17.1$
N231/N232	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.55 m $\eta = 6.2$	x: 0.55 m $\eta = 0.2$	$\eta < 0.1$	$\eta = 0.5$	x: 0.55 m $\eta = 6.5$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.5$	<b>PASSA</b> $\eta = 6.5$
N14/N233	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.3$	x: 0.55 m $\eta = 1.4$	x: 0 m $\eta = 9.1$	$\eta = 0.7$	$\eta = 0.1$	x: 0 m $\eta = 10.7$	$\eta = 2.1$	$\eta < 0.1$	x: 0 m $\eta = 14.8$	<b>PASSA</b> $\eta = 14.8$
N233/N275	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 2.2$	x: 0 m $\eta = 1.5$	$\eta = 0.1$	$\eta = 0.3$	x: 0 m $\eta = 4.0$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 4.4$	<b>PASSA</b> $\eta = 4.4$
N275/N234	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 7.0$	x: 0 m $\eta = 0.8$	$\eta < 0.1$	$\eta = 1.5$	x: 0 m $\eta = 7.8$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 10.5$	<b>PASSA</b> $\eta = 10.5$
N41/N235	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 1.1$	x: 0.55 m $\eta = 1.3$	x: 0 m $\eta = 9.0$	$\eta = 0.6$	$\eta = 0.1$	x: 0 m $\eta = 9.8$	$\eta = 2.3$	$\eta < 0.1$	x: 0 m $\eta = 14.4$	<b>PASSA</b> $\eta = 14.4$
N235/N274	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.4$	x: 0.39 m $\eta = 1.1$	x: 0 m $\eta = 1.2$	$\eta = 0.1$	$\eta = 0.2$	x: 0 m $\eta = 2.5$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 2.5$
N274/N236	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 4.8$	x: 0.16 m $\eta = 0.5$	$\eta = 0.1$	$\eta = 0.8$	x: 0 m $\eta = 4.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.7$	<b>PASSA</b> $\eta = 4.9$
N237/N238	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 3.2$	x: 0 m $\eta = 17.6$	$\eta = 0.6$	$\eta = 0.2$	x: 0 m $\eta = 20.9$	$\eta = 1.9$	$\eta < 0.1$	x: 0 m $\eta = 27.0$	<b>PASSA</b> $\eta = 27.0$
N238/N239	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 0.9$	x: 0 m $\eta = 5.1$	$\eta = 0.3$	$\eta = 0.1$	x: 0 m $\eta = 5.9$	$\eta = 0.5$	$\eta < 0.1$	x: 0 m $\eta = 7.7$	<b>PASSA</b> $\eta = 7.7$
N240/N241	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 7.0$	x: 0 m $\eta = 14.4$	$\eta = 0.7$	$\eta = 0.6$	x: 0 m $\eta = 21.5$	$\eta = 2.4$	$\eta < 0.1$	x: 0 m $\eta = 24.1$	<b>PASSA</b> $\eta = 24.1$
N241/N242	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 5.3$	x: 0 m $\eta = 4.1$	$\eta = 0.3$	$\eta = 0.5$	x: 0 m $\eta = 7.7$	$\eta = 0.8$	$\eta < 0.1$	x: 0 m $\eta = 8.2$	<b>PASSA</b> $\eta = 8.2$
N243/N244	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 3.9$	x: 0 m $\eta = 15.3$	$\eta = 0.6$	$\eta = 0.3$	x: 0 m $\eta = 19.2$	$\eta = 0.9$	$\eta < 0.1$	x: 0 m $\eta = 23.7$	<b>PASSA</b> $\eta = 23.7$
N244/N245	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 1.3$	x: 0 m $\eta = 4.7$	$\eta = 0.3$	$\eta = 0.1$	x: 0 m $\eta = 5.6$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 7.1$	<b>PASSA</b> $\eta = 7.1$
N246/N247	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 2.3$	x: 0 m $\eta = 12.3$	$\eta = 0.6$	$\eta = 0.2$	x: 0 m $\eta = 14.7$	$\eta = 2.5$	$\eta < 0.1$	x: 0 m $\eta = 18.9$	<b>PASSA</b> $\eta = 18.9$
N247/N248	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 2.2$	x: 0 m $\eta = 1.3$	$\eta = 0.1$	$\eta = 0.2$	x: 0 m $\eta = 3.4$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 3.6$	<b>PASSA</b> $\eta = 3.6$





Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N249/N250	$\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 4.7$	$x: 0 \text{ m}$ $\eta = 11.7$	$\eta = 0.5$	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 16.4$	$\eta = 2.3$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 18.9$	<b>PASSA</b> $\eta = 18.9$
N250/N251	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.55 \text{ m}$ $\eta = 1.4$	$x: 0 \text{ m}$ $\eta = 1.1$	$\eta < 0.1$	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 2.5$	$\eta = 0.8$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 2.7$	<b>PASSA</b> $\eta = 2.7$
N252/N253	$\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 2.4$	$x: 0 \text{ m}$ $\eta = 15.2$	$\eta = 0.5$	$\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 17.6$	$\eta = 1.3$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 23.0$	<b>PASSA</b> $\eta = 23.0$
N253/N254	$\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.55 \text{ m}$ $\eta = 3.2$	$x: 0 \text{ m}$ $\eta = 5.0$	$\eta = 0.3$	$\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 7.0$	$\eta = 1.6$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 8.2$	<b>PASSA</b> $\eta = 8.2$
N255/N256	$\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 5.2$	$x: 0 \text{ m}$ $\eta = 11.9$	$\eta = 0.4$	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 17.1$	$\eta = 1.9$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 19.5$	<b>PASSA</b> $\eta = 19.5$
N256/N257	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.55 \text{ m}$ $\eta = 1.0$	$x: 0 \text{ m}$ $\eta = 3.8$	$\eta = 0.2$	$\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 4.3$	$\eta = 0.4$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 5.8$	<b>PASSA</b> $\eta = 5.8$
N258/N259	$\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 5.3$	$x: 0 \text{ m}$ $\eta = 17.7$	$\eta = 0.7$	$\eta = 0.5$	$x: 0 \text{ m}$ $\eta = 23.0$	$\eta = 2.4$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 27.7$	<b>PASSA</b> $\eta = 27.7$
N259/N260	$\lambda \leq 200.0$ Passa	$x: 0.55 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.55 \text{ m}$ $\eta = 5.1$	$x: 0 \text{ m}$ $\eta = 5.3$	$\eta = 0.3$	$\eta = 0.5$	$x: 0 \text{ m}$ $\eta = 9.1$	$\eta = 1.0$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 9.8$	<b>PASSA</b> $\eta = 9.8$
N211/N242	$\lambda \leq 200.0$ Passa	$\eta = 0.1$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 4.9$	$x: 0 \text{ m}$ $\eta = 6.5$	$x: 0 \text{ m}$ $\eta = 0.3$	$x: 0 \text{ m}$ $\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 11.4$	$\eta = 0.9$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 12.3$	<b>PASSA</b> $\eta = 12.3$
N242/N239	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	$x: 1 \text{ m}$ $\eta = 1.9$	$x: 1 \text{ m}$ $\eta = 4.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 1 \text{ m}$ $\eta = 6.1$	$\eta = 0.7$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 6.9$	<b>PASSA</b> $\eta = 6.9$
N239/N230	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 3.0$	$x: 0 \text{ m}$ $\eta = 4.7$	$x: 1 \text{ m}$ $\eta = 0.2$	$x: 1 \text{ m}$ $\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 7.4$	$\eta = 0.3$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 8.1$	<b>PASSA</b> $\eta = 8.1$
N236/N248	N.P. <sup>(4)</sup>	$\eta = 0.2$	N.P. <sup>(5)</sup>	$x: 0.399 \text{ m}$ $\eta = 1.1$	$x: 0.399 \text{ m}$ $\eta = 1.3$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 0.399 \text{ m}$ $\eta = 2.6$	$\eta = 0.5$	$\eta < 0.1$	$x: 0.399 \text{ m}$ $\eta = 2.9$	<b>PASSA</b> $\eta = 2.9$
N248/N245	N.P. <sup>(4)</sup>	$\eta = 0.2$	N.P. <sup>(5)</sup>	$x: 0 \text{ m}$ $\eta = 1.0$	$x: 1 \text{ m}$ $\eta = 2.5$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 1 \text{ m}$ $\eta = 3.3$	$\eta = 0.7$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 4.1$	<b>PASSA</b> $\eta = 4.1$
N245/N214	N.P. <sup>(4)</sup>	$\eta = 0.2$	N.P. <sup>(5)</sup>	$x: 1 \text{ m}$ $\eta = 2.9$	$x: 1 \text{ m}$ $\eta = 7.3$	$x: 1 \text{ m}$ $\eta = 0.3$	$x: 1 \text{ m}$ $\eta = 0.2$	$x: 1 \text{ m}$ $\eta = 10.3$	$\eta = 0.4$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 12.0$	<b>PASSA</b> $\eta = 12.0$
N230/N232	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	$x: 0.8 \text{ m}$ $\eta = 0.8$	$x: 0.8 \text{ m}$ $\eta = 6.5$	$x: 0.8 \text{ m}$ $\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.8 \text{ m}$ $\eta = 7.4$	$\eta = 0.4$	$\eta < 0.1$	$x: 0.8 \text{ m}$ $\eta = 9.9$	<b>PASSA</b> $\eta = 9.9$
N262/N257	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 1.1$	$x: 0.551 \text{ m}$ $\eta = 3.5$	$x: 0.551 \text{ m}$ $\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.551 \text{ m}$ $\eta = 4.7$	$\eta = 0.1$	$\eta < 0.1$	$x: 0.551 \text{ m}$ $\eta = 5.8$	<b>PASSA</b> $\eta = 5.8$
N257/N260	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.6$	$x: 0.5 \text{ m}$ $\eta = 1.1$	$x: 0 \text{ m}$ $\eta = 3.8$	$x: 0 \text{ m}$ $\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.5 \text{ m}$ $\eta = 4.9$	$\eta = 0.8$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 6.0$	<b>PASSA</b> $\eta = 6.0$
N260/N232	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.4$	$x: 1 \text{ m}$ $\eta = 5.9$	$x: 1 \text{ m}$ $\eta = 6.2$	$x: 0 \text{ m}$ $\eta = 0.3$	$x: 1 \text{ m}$ $\eta = 0.4$	$x: 1 \text{ m}$ $\eta = 12.3$	$\eta = 0.4$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 13.1$	<b>PASSA</b> $\eta = 13.1$
N234/N251	N.P. <sup>(4)</sup>	$\eta = 0.4$	N.P. <sup>(5)</sup>	$x: 0.399 \text{ m}$ $\eta = 0.6$	$x: 0.399 \text{ m}$ $\eta = 1.5$	$x: 0.399 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 0.399 \text{ m}$ $\eta = 2.3$	$\eta = 0.9$	$\eta < 0.1$	$x: 0.399 \text{ m}$ $\eta = 2.8$	<b>PASSA</b> $\eta = 2.8$
N251/N254	$\lambda \leq 200.0$ Passa	$\eta = 0.4$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 1.4$	$x: 1 \text{ m}$ $\eta = 4.1$	$x: 1 \text{ m}$ $\eta = 0.1$	$x: 0 \text{ m}$ $\eta = 0.1$	$x: 1 \text{ m}$ $\eta = 5.6$	$\eta = 1.5$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 6.8$	<b>PASSA</b> $\eta = 6.8$
N254/N261	$\lambda \leq 200.0$ Passa	$\eta = 0.5$	$\eta < 0.1$	$x: 1.12 \text{ m}$ $\eta = 6.9$	$x: 0 \text{ m}$ $\eta = 5.4$	$x: 0 \text{ m}$ $\eta = 0.2$	$x: 1.12 \text{ m}$ $\eta = 0.4$	$x: 0 \text{ m}$ $\eta = 10.2$	$\eta = 2.1$	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 11.0$	<b>PASSA</b> $\eta = 11.0$
N263/N256	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta < 0.1$	$x: 0 \text{ m}$ $\eta = 4.0$	$x: 0.551 \text{ m}$ $\eta = 4.3$	$x: 0.551 \text{ m}$ $\eta = 0.2$	$x: 0 \text{ m}$ $\eta = 0.5$	$x: 0.551 \text{ m}$ $\eta = 8.2$	$\eta = 0.2$	$\eta < 0.1$	$x: 0.551 \text{ m}$ $\eta = 8.8$	<b>PASSA</b> $\eta = 8.8$
N256/N259	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	$x: 0.25 \text{ m}$ $\eta = 0.7$	$x: 1 \text{ m}$ $\eta = 3.4$	$x: 1 \text{ m}$ $\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 0.1$	$x: 1 \text{ m}$ $\eta = 3.7$	$\eta = 0.8$	$\eta < 0.1$	$x: 1 \text{ m}$ $\eta = 5.2$	<b>PASSA</b> $\eta = 5.2$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N259/N23 1	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 1 m $\eta = 9.1$	x: 1 m $\eta = 5.2$	x: 0 m $\eta = 0.3$	x: 1 m $\eta = 0.6$	x: 1 m $\eta = 14.4$	$\eta = 1.2$	$\eta < 0.1$	x: 1 m $\eta = 15.8$	<b>PASSA</b> $\eta = 15.8$
N229/N23 1	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0.8 m $\eta = 0.9$	x: 0.8 m $\eta = 4.1$	x: 0.8 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.8 m $\eta = 5.1$	$\eta = 0.5$	$\eta < 0.1$	x: 0.8 m $\eta = 6.5$	<b>PASSA</b> $\eta = 6.5$
N213/N24 1	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 0 m $\eta = 6.0$	x: 0 m $\eta = 5.7$	x: 0 m $\eta = 0.5$	x: 0 m $\eta = 0.6$	x: 0 m $\eta = 11.8$	$\eta = 1.8$	$\eta < 0.1$	x: 0 m $\eta = 12.5$	<b>PASSA</b> $\eta = 12.5$
N241/N23 8	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 2.9$	x: 1 m $\eta = 3.9$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.2$	x: 1 m $\eta = 6.3$	$\eta = 0.5$	$\eta < 0.1$	x: 1 m $\eta = 6.9$	<b>PASSA</b> $\eta = 6.9$
N238/N22 9	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 1 m $\eta = 5.2$	x: 0 m $\eta = 5.3$	x: 1 m $\eta = 0.3$	x: 1 m $\eta = 0.3$	x: 1 m $\eta = 9.9$	$\eta = 1.2$	$\eta < 0.1$	x: 1 m $\eta = 10.5$	<b>PASSA</b> $\eta = 10.5$
N235/N24 7	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 4.9$	x: 0 m $\eta = 4.6$	x: 0 m $\eta = 0.7$	x: 0 m $\eta = 0.6$	x: 0 m $\eta = 9.6$	$\eta = 0.6$	$\eta < 0.1$	x: 0 m $\eta = 10.3$	<b>PASSA</b> $\eta = 10.3$
N247/N24 4	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.3$	x: 0 m $\eta = 0.7$	x: 1 m $\eta = 3.4$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 1 m $\eta = 3.6$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 3.6$
N244/N21 6	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 1 m $\eta = 3.0$	x: 1 m $\eta = 4.4$	x: 1 m $\eta = 0.3$	x: 1 m $\eta = 0.2$	x: 1 m $\eta = 7.5$	$\eta = 0.7$	$\eta < 0.1$	x: 1 m $\eta = 8.1$	<b>PASSA</b> $\eta = 8.1$
N233/N25 0	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.2$	x: 0 m $\eta = 6.2$	x: 0 m $\eta = 4.0$	x: 0.399 m $\eta = 0.6$	x: 0 m $\eta = 0.8$	x: 0 m $\eta = 10.3$	$\eta = 0.9$	$\eta < 0.1$	x: 0 m $\eta = 11.3$	<b>PASSA</b> $\eta = 11.3$
N250/N25 3	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.5$	x: 0 m $\eta = 0.6$	x: 1 m $\eta = 4.1$	x: 1 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 1 m $\eta = 4.7$	$\eta = 0.9$	$\eta < 0.1$	x: 1 m $\eta = 6.4$	<b>PASSA</b> $\eta = 6.4$
N253/N26 4	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.6$	x: 1.12 m $\eta = 4.9$	x: 0 m $\eta = 3.6$	x: 0 m $\eta = 0.1$	x: 1.12 m $\eta = 0.3$	x: 0 m $\eta = 8.1$	$\eta = 2.8$	$\eta < 0.1$	x: 0 m $\eta = 8.6$	<b>PASSA</b> $\eta = 8.6$
N29/N276	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	N.P. <sup>(6)</sup>	x: 0 m $\eta = 1.9$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 2.1$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 2.1$
N276/N26 5	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 2.0$	$\eta = 0.2$	$\eta < 0.1$	x: 0.55 m $\eta = 2.1$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 2.1$
N38/N279	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0.55 m $\eta = 0.2$	x: 0.55 m $\eta = 1.5$	$\eta = 0.2$	N.P. <sup>(7)</sup>	x: 0.55 m $\eta = 1.8$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(8)</sup>	<b>PASSA</b> $\eta = 1.8$
N279/N26 6	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 1.8$	$\eta = 0.2$	$\eta < 0.1$	x: 0.55 m $\eta = 1.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 1.9$
N7/N280	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 1.2$	N.P. <sup>(6)</sup>	$\eta < 0.1$	$\eta = 0.1$	x: 0 m $\eta = 1.2$	$\eta = 0.6$	$\eta < 0.1$	$\eta = 0.7$	<b>PASSA</b> $\eta = 1.2$
N280/N26 7	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.5$	x: 0.55 m $\eta = 0.2$	$\eta < 0.1$	$\eta < 0.1$	x: 0 m $\eta = 0.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta < 0.1$	<b>PASSA</b> $\eta = 0.7$
N3/N277	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.4$	x: 0 m $\eta = 2.7$	$\eta = 0.2$	$\eta = 0.1$	x: 0 m $\eta = 4.2$	$\eta = 0.6$	$\eta < 0.1$	x: 0 m $\eta = 4.7$	<b>PASSA</b> $\eta = 4.7$
N277/N26 8	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 1.7$	$\eta = 0.2$	N.P. <sup>(7)</sup>	x: 0.55 m $\eta = 1.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(8)</sup>	<b>PASSA</b> $\eta = 1.7$
N4/N278	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.5$	x: 0.55 m $\eta = 2.2$	x: 0 m $\eta = 2.9$	$\eta = 0.3$	$\eta = 0.2$	x: 0 m $\eta = 5.2$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 5.8$	<b>PASSA</b> $\eta = 5.8$
N278/N26 9	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.55 m $\eta = 1.5$	x: 0.55 m $\eta = 2.0$	$\eta = 0.2$	$\eta = 0.1$	x: 0.55 m $\eta = 3.6$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 3.6$
N266/N29 6	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.7$	N.P. <sup>(6)</sup>	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 1.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.7$
N296/N30 1	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.898 m $\eta = 0.8$	N.P. <sup>(6)</sup>	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.898 m $\eta = 0.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 0.9$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N301/N269	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0.93 m $\eta = 2.2$	x: 0.93 m $\eta = 0.4$	x: 0.93 m $\eta < 0.1$	x: 0.93 m $\eta = 0.2$	x: 0.93 m $\eta = 2.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0.93 m $\eta = 0.2$	<b>PASSA</b> $\eta = 2.7$
N265/N290	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.8$	N.P. <sup>(6)</sup>	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.9$
N290/N293	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.898 m $\eta = 0.9$	N.P. <sup>(6)</sup>	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.898 m $\eta = 1.0$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.0$
N293/N268	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0.93 m $\eta = 2.5$	x: 0 m $\eta = 0.2$	x: 0.93 m $\eta < 0.1$	x: 0.93 m $\eta = 0.2$	x: 0.93 m $\eta = 2.5$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0.93 m $\eta = 0.2$	<b>PASSA</b> $\eta = 2.5$
N267/N268	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta < 0.1$	x: 0.8 m $\eta = 0.8$	x: 0 m $\eta = 0.4$	x: 0.8 m $\eta < 0.1$	x: 0.8 m $\eta = 0.1$	x: 0.8 m $\eta = 0.8$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0.8 m $\eta = 0.1$	<b>PASSA</b> $\eta = 0.8$
N11/N282	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 5.1$	x: 0.55 m $\eta = 0.3$	$\eta < 0.1$	$\eta = 0.5$	x: 0 m $\eta = 5.3$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 7.7$	<b>PASSA</b> $\eta = 7.7$
N282/N270	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 2.5$	x: 0.55 m $\eta = 0.4$	$\eta < 0.1$	$\eta = 0.2$	x: 0.55 m $\eta = 2.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 2.9$
N44/N281	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 7.4$	x: 0 m $\eta = 0.8$	$\eta = 0.1$	$\eta = 0.7$	x: 0 m $\eta = 8.4$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 11.5$	<b>PASSA</b> $\eta = 11.5$
N281/N271	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.55 m $\eta = 3.5$	x: 0 m $\eta = 0.5$	$\eta < 0.1$	$\eta = 0.3$	x: 0.55 m $\eta = 3.6$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 3.5$	<b>PASSA</b> $\eta = 3.6$
N42/N284	N.P. <sup>(4)</sup>	x: 0.55 m $\eta = 0.2$	N.P. <sup>(5)</sup>	x: 0 m $\eta = 6.9$	x: 0 m $\eta = 3.6$	$\eta = 0.2$	$\eta = 0.7$	x: 0 m $\eta = 10.6$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 11.8$	<b>PASSA</b> $\eta = 11.8$
N284/N285	N.P. <sup>(4)</sup>	x: 0.16 m $\eta = 0.5$	N.P. <sup>(5)</sup>	x: 0.16 m $\eta = 1.4$	x: 0 m $\eta = 2.1$	$\eta = 0.1$	$\eta = 0.4$	x: 0.16 m $\eta = 3.5$	$\eta = 1.9$	$\eta < 0.1$	x: 0.16 m $\eta = 4.1$	<b>PASSA</b> $\eta = 4.1$
N285/N272	N.P. <sup>(4)</sup>	x: 0.39 m $\eta = 0.1$	N.P. <sup>(5)</sup>	x: 0.39 m $\eta = 6.3$	x: 0 m $\eta = 1.2$	$\eta = 0.2$	$\eta = 0.9$	x: 0.39 m $\eta = 7.5$	$\eta = 0.6$	$\eta < 0.1$	x: 0.39 m $\eta = 9.8$	<b>PASSA</b> $\eta = 9.8$
N12/N283	N.P. <sup>(4)</sup>	x: 0.55 m $\eta = 0.3$	N.P. <sup>(5)</sup>	x: 0 m $\eta = 7.7$	x: 0 m $\eta = 2.6$	$\eta = 0.1$	$\eta = 0.7$	x: 0 m $\eta = 10.4$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 12.4$	<b>PASSA</b> $\eta = 12.4$
N283/N286	N.P. <sup>(4)</sup>	x: 0.16 m $\eta = 0.6$	N.P. <sup>(5)</sup>	x: 0 m $\eta = 1.8$	x: 0.16 m $\eta = 2.0$	$\eta < 0.1$	$\eta = 0.6$	x: 0.16 m $\eta = 4.0$	$\eta = 1.8$	$\eta < 0.1$	x: 0.16 m $\eta = 4.7$	<b>PASSA</b> $\eta = 4.7$
N286/N273	N.P. <sup>(4)</sup>	x: 0.39 m $\eta = 0.2$	N.P. <sup>(5)</sup>	x: 0.39 m $\eta = 8.4$	x: 0 m $\eta = 0.4$	$\eta < 0.1$	$\eta = 1.1$	x: 0.39 m $\eta = 8.7$	$\eta = 0.6$	$\eta < 0.1$	x: 0.39 m $\eta = 12.7$	<b>PASSA</b> $\eta = 12.7$
N269/N270	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta = 0.1$	x: 0 m $\eta = 1.8$	x: 0 m $\eta = 0.3$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 2.2$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 2.9$	<b>PASSA</b> $\eta = 2.9$
N270/N302	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0.898 m $\eta = 1.4$	x: 0.898 m $\eta = 0.3$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.898 m $\eta = 1.8$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.8$
N302/N305	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.4$	x: 0.904 m $\eta = 1.0$	x: 0 m $\eta < 0.1$	x: 0.904 m $\eta = 0.1$	x: 0 m $\eta = 2.1$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 2.5$	<b>PASSA</b> $\eta = 2.5$
N305/N273	$\lambda \leq 200.0$ Passa	x: 0.469 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0.469 m $\eta = 3.3$	x: 0 m $\eta = 1.9$	x: 0.469 m $\eta = 0.1$	x: 0.469 m $\eta = 0.4$	x: 0 m $\eta = 5.3$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0.469 m $\eta = 0.4$	<b>PASSA</b> $\eta = 5.3$
N267/N287	$\lambda \leq 200.0$ Passa	$\eta < 0.1$	$\eta < 0.1$	x: 0.635 m $\eta = 0.9$	x: 0.635 m $\eta = 0.5$	x: 0 m $\eta < 0.1$	x: 0.635 m $\eta = 0.1$	x: 0.635 m $\eta = 1.4$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0.635 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.4$
N287/N271	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	$\eta < 0.1$	x: 0 m $\eta = 2.2$	x: 0.635 m $\eta = 0.4$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 2.6$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 3.4$	<b>PASSA</b> $\eta = 3.4$
N271/N307	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0.898 m $\eta = 2.4$	x: 0.898 m $\eta = 0.2$	x: 0.225 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0.898 m $\eta = 2.7$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	x: 0 m $\eta = 0.2$	<b>PASSA</b> $\eta = 2.7$
N307/N311	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 1.1$	x: 0.904 m $\eta = 1.2$	x: 0.904 m $\eta < 0.1$	x: 0.904 m $\eta = 0.1$	x: 0.226 m $\eta = 1.8$	$\eta = 0.2$	$\eta < 0.1$	x: 0.226 m $\eta = 2.0$	<b>PASSA</b> $\eta = 2.0$
N311/N272	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 3.0$	x: 0 m $\eta = 1.6$	$\eta < 0.1$	x: 0.469 m $\eta = 0.4$	x: 0 m $\eta = 4.6$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 5.1$	<b>PASSA</b> $\eta = 5.1$

Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N272/N274	N.P.(4)	$\eta = 0.2$	N.P.(5)	x: 0.35 m $\eta = 6.0$	x: 0 m $\eta = 1.4$	x: 0 m $\eta = 0.1$	x: 0.35 m $\eta = 0.8$	x: 0.35 m $\eta = 6.2$	$\eta = 0.3$	$\eta < 0.1$	x: 0.35 m $\eta = 9.2$	<b>PASSA</b> $\eta = 9.2$
N273/N275	N.P.(4)	$\eta = 0.4$	N.P.(5)	x: 0.35 m $\eta = 8.7$	x: 0 m $\eta = 1.9$	x: 0.35 m $\eta = 0.2$	x: 0.35 m $\eta = 1.2$	x: 0.35 m $\eta = 9.6$	N.P.(2)	N.P.(3)	x: 0.35 m $\eta = 1.2$	<b>PASSA</b> $\eta = 9.6$
N276/N292	$\lambda \leq 200.0$ Passa	x: 0.898 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 3.2$	x: 0 m $\eta = 0.2$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 3.4$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.2$	<b>PASSA</b> $\eta = 3.4$
N292/N294	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.3$	N.P.(6)	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 1.4$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.4$
N294/N277	$\lambda \leq 200.0$ Passa	x: 0.93 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.93 m $\eta = 3.3$	x: 0.93 m $\eta = 0.2$	N.P.(7)	x: 0.93 m $\eta = 0.2$	x: 0.93 m $\eta = 3.5$	N.P.(2)	N.P.(3)	N.P.(8)	<b>PASSA</b> $\eta = 3.5$
N279/N297	$\lambda \leq 200.0$ Passa	x: 0.898 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 2.8$	x: 0 m $\eta = 0.2$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 3.1$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.2$	<b>PASSA</b> $\eta = 3.1$
N297/N299	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 1.0$	N.P.(6)	N.P.(7)	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 1.1$	N.P.(2)	N.P.(3)	N.P.(8)	<b>PASSA</b> $\eta = 1.1$
N299/N278	x: 0 m $\lambda \leq 200.0$ Passa	x: 0.93 m $\eta < 0.1$	x: 0 m $\eta < 0.1$	x: 0.93 m $\eta = 3.3$	x: 0.93 m $\eta = 0.3$	x: 0.93 m $\eta < 0.1$	x: 0.93 m $\eta = 0.2$	x: 0.93 m $\eta = 3.6$	$\eta = 0.2$	$\eta < 0.1$	x: 0.93 m $\eta = 5.0$	<b>PASSA</b> $\eta = 5.0$
N280/N277	$\lambda \leq 200.0$ Passa	N.P.(1)	$\eta = 0.1$	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 1.3$	x: 0.8 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 1.6$	N.P.(2)	N.P.(3)	x: 0.8 m $\eta = 0.1$	<b>PASSA</b> $\eta = 1.6$
N280/N289	$\lambda \leq 200.0$ Passa	N.P.(1)	$\eta = 0.1$	x: 0.635 m $\eta = 0.5$	x: 0.635 m $\eta = 2.0$	x: 0 m $\eta = 0.2$	x: 0.635 m $\eta = 0.1$	x: 0.635 m $\eta = 2.6$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.2$	<b>PASSA</b> $\eta = 2.6$
N289/N281	$\lambda \leq 200.0$ Passa	N.P.(1)	$\eta = 0.1$	x: 0 m $\eta = 3.7$	x: 0 m $\eta = 1.9$	x: 0.635 m $\eta = 0.1$	x: 0 m $\eta = 0.4$	x: 0 m $\eta = 5.6$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 6.3$	<b>PASSA</b> $\eta = 6.3$
N278/N282	$\lambda \leq 200.0$ Passa	N.P.(1)	$\eta < 0.1$	x: 0 m $\eta = 3.9$	x: 0 m $\eta = 0.4$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.7$	x: 0 m $\eta = 4.3$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.7$	<b>PASSA</b> $\eta = 4.3$
N282/N303	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 2.1$	x: 0.898 m $\eta = 0.3$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 2.4$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.2$	<b>PASSA</b> $\eta = 2.4$
N303/N306	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 2.0$	x: 0.904 m $\eta = 0.4$	x: 0 m $\eta < 0.1$	x: 0.904 m $\eta = 0.2$	x: 0.904 m $\eta = 2.5$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 3.2$	<b>PASSA</b> $\eta = 3.2$
N306/N283	N.P.(4)	x: 0.469 m $\eta = 0.2$	N.P.(5)	x: 0.469 m $\eta = 7.4$	x: 0.469 m $\eta = 1.7$	x: 0 m $\eta = 0.1$	x: 0.469 m $\eta = 0.9$	x: 0.469 m $\eta = 9.2$	$\eta = 0.4$	$\eta < 0.1$	x: 0.469 m $\eta = 11.6$	<b>PASSA</b> $\eta = 11.6$
N281/N308	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.5$	x: 0 m $\eta = 3.9$	x: 0 m $\eta = 0.2$	x: 0 m $\eta < 0.1$	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 4.3$	N.P.(2)	N.P.(3)	x: 0 m $\eta = 0.3$	<b>PASSA</b> $\eta = 4.3$
N308/N310	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 1.3$	x: 0.904 m $\eta = 0.6$	x: 0.904 m $\eta < 0.1$	x: 0.904 m $\eta = 0.1$	x: 0.904 m $\eta = 1.9$	$\eta = 0.2$	$\eta < 0.1$	x: 0.904 m $\eta = 2.2$	<b>PASSA</b> $\eta = 2.2$
N310/N284	N.P.(4)	x: 0.469 m $\eta = 0.1$	N.P.(5)	x: 0 m $\eta = 6.4$	x: 0.469 m $\eta = 2.4$	x: 0.469 m $\eta = 0.2$	x: 0.469 m $\eta = 0.8$	x: 0.469 m $\eta = 8.7$	$\eta = 0.5$	$\eta < 0.1$	x: 0.469 m $\eta = 10.1$	<b>PASSA</b> $\eta = 10.1$
N285/N235	$\lambda \leq 200.0$ Passa	N.P.(1)	$\eta = 0.2$	x: 0.35 m $\eta = 7.6$	x: 0.35 m $\eta = 2.6$	x: 0.35 m $\eta = 0.2$	x: 0.35 m $\eta = 1.2$	x: 0.35 m $\eta = 10.3$	$\eta = 1.1$	$\eta < 0.1$	x: 0.35 m $\eta = 12.1$	<b>PASSA</b> $\eta = 12.1$
N286/N233	$\lambda \leq 200.0$ Passa	N.P.(1)	$\eta = 0.2$	x: 0.35 m $\eta = 9.6$	x: 0.35 m $\eta = 1.8$	x: 0 m $\eta < 0.1$	x: 0.35 m $\eta = 1.5$	x: 0.35 m $\eta = 11.4$	$\eta = 1.1$	$\eta < 0.1$	x: 0.35 m $\eta = 14.7$	<b>PASSA</b> $\eta = 14.7$
N288/N289	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.3$	x: 0.55 m $\eta = 1.9$	x: 0 m $\eta = 7.0$	$\eta = 0.4$	$\eta = 0.2$	x: 0 m $\eta = 8.5$	N.P.(2)	N.P.(3)	$\eta = 0.4$	<b>PASSA</b> $\eta = 8.5$
N289/N287	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 1.4$	x: 0 m $\eta = 0.5$	$\eta = 0.1$	$\eta = 0.1$	x: 0.55 m $\eta = 1.8$	N.P.(2)	N.P.(3)	$\eta = 0.1$	<b>PASSA</b> $\eta = 1.8$
N291/N292	$\lambda \leq 200.0$ Passa	N.P.(1)	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 0.3$	x: 0 m $\eta = 5.0$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 5.3$	N.P.(2)	N.P.(3)	$\eta = 0.4$	<b>PASSA</b> $\eta = 5.3$



Barras	VERIFICAÇÕES											Estado
	$\lambda$	$N_t$	$N_c$	$M_x$	$M_y$	$V_x$	$V_y$	$NM_xM_y$	$T$	$NMVT$	$\sigma \tau f$	
N292/N290	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 1.8$	$\eta = 0.1$	$\eta < 0.1$	x: 0.55 m $\eta = 1.9$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.1$	<b>PASSA</b> $\eta = 1.9$
N295/N294	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 0.2$	x: 0 m $\eta = 2.4$	$\eta = 0.2$	$\eta < 0.1$	x: 0 m $\eta = 2.4$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.2$	<b>PASSA</b> $\eta = 2.4$
N294/N293	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta < 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 1.2$	$\eta = 0.1$	N.P. <sup>(7)</sup>	x: 0.55 m $\eta = 1.3$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(8)</sup>	<b>PASSA</b> $\eta = 1.3$
N298/N297	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.2$	x: 0.55 m $\eta = 0.2$	x: 0 m $\eta = 4.1$	$\eta = 0.4$	$\eta < 0.1$	x: 0 m $\eta = 4.2$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.3$	<b>PASSA</b> $\eta = 4.2$
N297/N296	$\lambda \leq 200.0$ Passa	N.P. <sup>(1)</sup>	x: 0 m $\eta = 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 1.6$	$\eta = 0.1$	$\eta < 0.1$	x: 0.55 m $\eta = 1.6$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.1$	<b>PASSA</b> $\eta = 1.6$
N300/N299	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.2$	x: 0 m $\eta = 3.1$	$\eta = 0.3$	$\eta < 0.1$	x: 0 m $\eta = 3.3$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.3$	<b>PASSA</b> $\eta = 3.3$
N299/N301	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	N.P. <sup>(6)</sup>	x: 0.55 m $\eta = 1.2$	$\eta = 0.1$	N.P. <sup>(7)</sup>	x: 0.55 m $\eta = 1.3$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	N.P. <sup>(8)</sup>	<b>PASSA</b> $\eta = 1.3$
N304/N303	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 0.5$	N.P. <sup>(6)</sup>	$\eta < 0.1$	$\eta < 0.1$	x: 0 m $\eta = 0.6$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta < 0.1$	<b>PASSA</b> $\eta = 0.6$
N303/N302	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 0.4$	x: 0.55 m $\eta = 0.3$	$\eta < 0.1$	$\eta < 0.1$	x: 0.55 m $\eta = 0.5$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta < 0.1$	<b>PASSA</b> $\eta = 0.5$
N50/N306	N.P. <sup>(4)</sup>	x: 0.55 m $\eta = 0.5$	N.P. <sup>(5)</sup>	x: 0 m $\eta = 7.5$	x: 0.55 m $\eta = 1.4$	$\eta = 0.1$	$\eta = 0.7$	x: 0 m $\eta = 8.2$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.7$	<b>PASSA</b> $\eta = 8.2$
N306/N305	x: 0 m $\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.2$	x: 0 m $\eta < 0.1$	x: 0.55 m $\eta = 4.6$	x: 0 m $\eta = 0.9$	$\eta < 0.1$	$\eta = 0.4$	x: 0.55 m $\eta = 5.1$	$\eta = 0.5$	$\eta < 0.1$	x: 0.55 m $\eta = 7.1$	<b>PASSA</b> $\eta = 7.1$
N309/N308	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.1$	x: 0 m $\eta = 0.1$	x: 0 m $\eta = 1.4$	x: 0.55 m $\eta = 0.3$	$\eta < 0.1$	$\eta = 0.1$	x: 0 m $\eta = 1.4$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.1$	<b>PASSA</b> $\eta = 1.4$
N308/N307	$\lambda \leq 200.0$ Passa	x: 0.55 m $\eta < 0.1$	x: 0 m $\eta = 0.1$	x: 0.55 m $\eta = 1.4$	x: 0.55 m $\eta = 0.2$	$\eta < 0.1$	$\eta = 0.1$	x: 0.55 m $\eta = 1.6$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.1$	<b>PASSA</b> $\eta = 1.6$
N57/N310	N.P. <sup>(4)</sup>	x: 0.55 m $\eta = 0.5$	N.P. <sup>(5)</sup>	x: 0 m $\eta = 6.7$	x: 0.55 m $\eta = 0.8$	$\eta < 0.1$	$\eta = 0.6$	x: 0 m $\eta = 7.5$	N.P. <sup>(2)</sup>	N.P. <sup>(3)</sup>	$\eta = 0.6$	<b>PASSA</b> $\eta = 7.5$
N310/N311	x: 0 m $\lambda \leq 200.0$ Passa	x: 0.55 m $\eta = 0.2$	x: 0 m $\eta < 0.1$	x: 0.55 m $\eta = 3.4$	x: 0 m $\eta = 1.3$	$\eta = 0.1$	$\eta = 0.3$	x: 0 m $\eta = 3.7$	$\eta = 0.5$	$\eta < 0.1$	x: 0 m $\eta = 4.2$	<b>PASSA</b> $\eta = 4.2$
<p>Notação:</p> <p><math>\lambda</math>: Limitação do índice de esbeltez</p> <p><math>N_t</math>: Resistência à tração</p> <p><math>N_c</math>: Resistência à compressão</p> <p><math>M_x</math>: Resistência à flexão eixo X</p> <p><math>M_y</math>: Resistência à flexão eixo Y</p> <p><math>V_x</math>: Resistência ao esforço cortante X</p> <p><math>V_y</math>: Resistência ao esforço cortante Y</p> <p><math>NM_xM_y</math>: Resistência ao esforço axial e flexão combinados</p> <p><math>T</math>: Resistência à torção</p> <p><math>NMVT</math>: Resistência ao momento de torção, força axial, momento fletor e cortante</p> <p><math>\sigma \tau f</math>: Resistência a interações de esforços e momento de torção</p> <p><math>x</math>: Distância à origem da barra</p> <p><math>\eta</math>: Coeficiente de aproveitamento (%)</p> <p>N.P.: Não procede</p> <p>Verificações desnecessárias para o tipo de perfil (N.P.):</p> <p>(1) A verificação não será executada, já que não existe esforço axial de tração.</p> <p>(2) A verificação não é necessária, já que não existe momento torsor.</p> <p>(3) Não há interação entre a esforço axial, momento fletor, esforço cortante e momento torsor. Portanto, a verificação não é necessária.</p> <p>(4) A verificação não procede, já que não há força axial de compressão.</p> <p>(5) A verificação não será executada, já que não existe esforço axial de compressão.</p> <p>(6) A verificação não será executada, já que não existe momento fletor.</p> <p>(7) A verificação não será executada, já que não existe esforço cortante.</p> <p>(8) Não há interação entre o momento torsor, os dois momentos fletores e os dois esforços cortantes. Portanto, a verificação não é necessária.</p>												

## **12. ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA 1 – EEAT-01**

### **12.1 RESUMO DOS RESULTADOS**

#### **12.1.1 Cargas Verticais**

- Peso próprio = 100.34 tf
- Adicional = 43.85 tf
- Acidental = 17.26 tf
- Água = 141.10 tf
- Total = 302.55 tf
- Área aproximada = 164.65 m<sup>2</sup>
- Relação = 1837.56 kgf/m<sup>2</sup>

#### **AVISO: Relação de carga por área não usual para edifícios**

#### **12.1.2 Deslocamento horizontal:**

- X+ = 0.25 cm (limite 0.33)
- X- = 0.25 cm (limite 0.33)
- Y+ = 0.15 cm (limite 0.33)
- Y- = 0.15 cm (limite 0.33)

#### **12.1.3 Verificação de estabilidade (Gama-Z):**

- X+ = 1.06 (limite 1.10)
- X- = 1.09 (limite 1.10)
- Y+ = 1.04 (limite 1.10)
- Y- = 1.03 (limite 1.10)

#### **12.1.4 Análise de 2ª ordem:**

Processo P-Delta

Deslocamentos no topo da edificação:

- Acidental: 0.02 »» 0.02 (+15.98%)
- Água: 0.04 »» 0.05 (+16.26%)
- Vento X+: 1.09 »» 1.31 (+19.89%)
- Vento X-: 1.09 »» 1.31 (+19.89%)
- Vento Y+: 0.65 »» 0.72 (+10.66%)
- Vento Y-: 0.65 »» 0.72 (+10.66%)
- Desaprumo X+: 0.13 »» 0.15 (+19.81%)
- Desaprumo X-: 0.13 »» 0.15 (+19.81%)
- Desaprumo Y+: 0.06 »» 0.07 (+10.24%)
- Desaprumo Y-: 0.06 »» 0.07 (+10.24%)

## 12.2 VERIFICAÇÃO DA ESTABILIDADE GLOBAL DA ESTRUTURA

### 12.2.1 Maior coeficiente Gama-Z

Combinação: 1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V2+0.84D2							
Paviment o	Altura relativ a (cm)	Carga vertica l (tf)	Carga horizonta l (tf)	Deslocament o horizontal (cm)	Moment o 2a. ordem (kgf.m)	Momento tombament o (kgf.m)	Gama-Z
cobertura	560.00	65.83	0.46	1.13	745.60	2598.11	1.09 (lim=1.10 )
tampa do poço	425.00	8.70	1.07	0.87	75.76	4534.33	
térreo	210.00	33.42	1.19	0.02	7.09	2501.48	
TOTAL					828.45	9633.92	

### 12.2.2 Limitações

Em estruturas com Gama-Z maior que 1.10 é necessário fazer a verificação dos efeitos de 2ª ordem com a análise P-Delta.

O Gama-Z é um parâmetro de estabilidade para avaliação de estruturas simétricas (tanto geometria quanto carregamento) e edificações com mais de 4 pavimentos. Nos demais casos, recomenda-se a verificação dos efeitos de 2ª ordem com a análise P-Delta.



### 12.2.3 Coeficiente Gama-Z por combinação

Combinação	Moment o 2a. ordem (kgf.m)	Momento tombament o (kgf.m)	Gama -Z
1.3G1+1.4G2+1.3S+0.9P+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+0.9P+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V4+0.84D4	566.10	20000.83	1.03
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09





1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.4V4+0.84D4	566.10	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+1.2P+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V4+0.84D4	566.10	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04

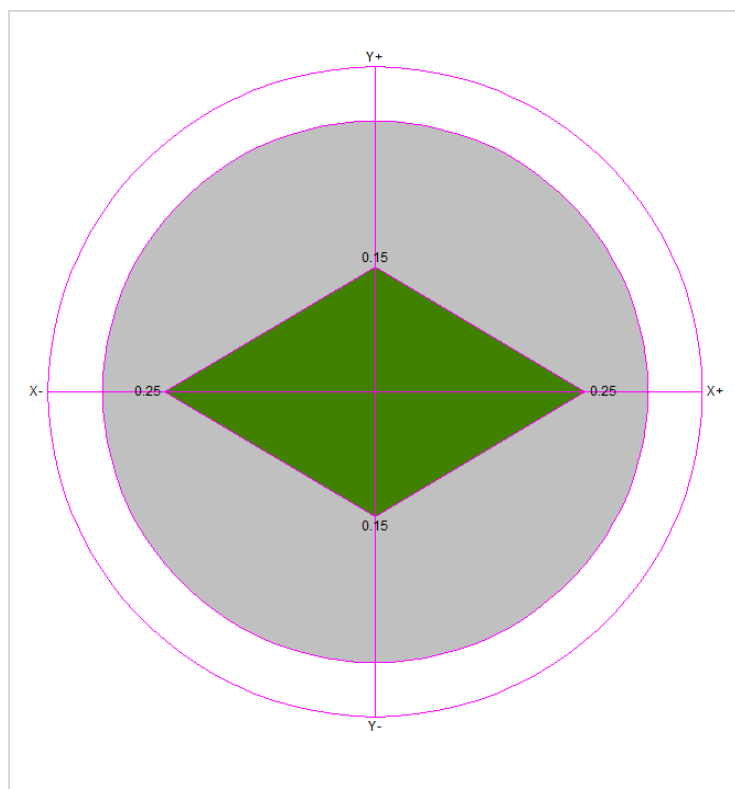


1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.4V4+0.84D4	566.10	20000.83	1.03
G1+G2+S+0.9P+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+0.9P+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+0.9P+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+0.9P+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+0.9P+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+0.9P+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+0.9P+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+0.9P+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+0.9P+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+0.9P+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+0.9P+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+0.9P+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+0.9P+1.2R+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+0.9P+1.2R+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+0.9P+1.2R+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+0.9P+1.2R+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+0.9P+1.2R+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+0.9P+1.2R+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+0.9P+1.2R+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+0.9P+1.2R+1.4V4+0.84D4	434.68	20000.83	1.02
G1+G2+S+0.9P+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+0.9P+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+0.9P+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+0.9P+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+0.9P+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+0.9P+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+0.9P+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+0.9P+1.4V4+0.84D4	434.68	20000.83	1.02
G1+G2+S+1.2P+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+1.2P+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+1.2P+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+1.2P+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+1.2P+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+1.2P+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+1.2P+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03



G1+G2+S+1.2P+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+1.2P+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+1.2P+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+1.2P+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+1.2P+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+1.2P+1.2R+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+1.2P+1.2R+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+1.2P+1.2R+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+1.2P+1.2R+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+1.2P+1.2R+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+1.2P+1.2R+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+1.2P+1.2R+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+1.2P+1.2R+1.4V4+0.84D4	434.68	20000.83	1.02
G1+G2+S+1.2P+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+1.2P+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+1.2P+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+1.2P+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+1.2P+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+1.2P+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+1.2P+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+1.2P+1.4V4+0.84D4	434.68	20000.83	1.02

### 12.3 DESLOCAMENTOS HORIZONTAIS DEVIDO À AÇÃO DO VENTO



Verificações	X+	X-	Y+	Y-
Altura total da edificação (cm)	560.00			
Deslocamento limite (cm)	0.33			
Deslocamento característico (cm)	0.85	-0.85	0.51	-0.51
gf2	0.30	0.30	0.30	0.30
Deslocamento combinações frequentes (cm)	0.25	-0.25	0.15	-0.15

Pavimento	Altura (cm)	Deslocamento combinações frequentes (cm)				Diferença (cm)				Limite (cm)
		X+	X-	Y+	Y-	X+	X-	Y+	Y-	
cobertura	135.00	0.25	-0.25	0.15	-0.15	0.05	-0.05	0.03	-0.03	0.16
tampa do poço	215.00	0.21	-0.21	0.13	-0.13	0.20	-0.20	0.12	-0.12	0.25
térreo	210.00	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.25

### 12.3.1 Análise da Não Linearidade Geométrica pelo Processo P-Delta

Acidental								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.02	0.01	-0.02	0.01	0.00	0.00	0.00	0.00
tampa do poço	-0.01	0.01	-0.01	0.01	0.00	0.00	0.00	0.00
térreo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Variação no deslocamento do topo da edificação: 15.98%

Água								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.04	0.00	-0.05	0.00	0.00	0.00	-0.01	0.00
tampa do poço	-0.02	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
térreo	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00

Variação no deslocamento do topo da edificação: 16.26%

Vento X+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	1.09	0.02	1.31	0.02	0.55	0.00	0.68	0.00
tampa do poço	0.88	0.01	1.06	0.02	1.27	0.00	1.51	0.00
térreo	0.03	0.00	0.03	0.00	1.42	0.00	1.09	0.00

Variação no deslocamento do topo da edificação: 19.89%

Vento X-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-1.09	-0.02	-1.31	-0.02	-0.55	0.00	-0.68	0.00
tampa do poço	-0.88	-0.01	-1.06	-0.02	-1.27	0.00	-1.51	0.00
térreo	-0.03	0.00	-0.03	0.00	-1.42	0.00	-1.09	0.00

Variação no deslocamento do topo da edificação: 19.89%

Vento Y+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.02	0.65	0.02	0.72	0.00	0.65	0.00	0.71
tampa do poço	0.01	0.54	0.02	0.59	0.00	1.43	0.00	1.56
térreo	0.00	0.03	0.00	0.03	0.00	2.18	-0.01	2.04

Variação no deslocamento do topo da edificação: 10.66%

Vento Y-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.02	-0.65	-0.02	-0.72	0.00	-0.65	0.00	-0.71
tampa do poço	-0.01	-0.54	-0.02	-0.59	0.00	-1.43	0.00	-1.56
térreo	0.00	-0.03	0.00	-0.03	0.00	-2.18	0.01	-2.04

Variação no deslocamento do topo da edificação: 10.66%

Desaprumo X+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.13	0.00	0.15	0.00	0.16	0.00	0.18	0.00
tampa do poço	0.10	0.00	0.12	0.00	0.02	0.00	0.05	0.00
térreo	0.00	0.00	0.00	0.00	0.08	0.00	0.04	0.00

Variação no deslocamento do topo da edificação: 19.81%

Desaprumo X-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.13	0.00	-0.15	0.00	-0.16	0.00	-0.18	0.00
tampa do poço	-0.10	0.00	-0.12	0.00	-0.02	0.00	-0.05	0.00
térreo	0.00	0.00	0.00	0.00	-0.08	0.00	-0.04	0.00

Variação no deslocamento do topo da edificação: 19.81%

Desaprumo Y+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.00	0.06	0.00	0.07	0.00	0.16	0.00	0.17
tampa do poço	0.00	0.05	0.00	0.05	0.00	0.02	0.00	0.03
térreo	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.07

Variação no deslocamento do topo da edificação: 10.24%

Desaprumo Y-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.00	-0.06	0.00	-0.07	0.00	-0.16	0.00	-0.17
tampa do poço	0.00	-0.05	0.00	-0.05	0.00	-0.02	0.00	-0.03
térreo	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	-0.07

Variação no deslocamento do topo da edificação: 10.24%

## 12.4 IMPERFEIÇÕES GEOMÉTRICAS GLOBAIS

Parâmetros	
Altura total da edificação (cm)	560.00
Nº de pilares contínuos	4
Combinação vertical	G1+G2+Q+A
Tipo de estrutura	Estruturas usuais
Ângulo adotado	1/299

Pavimento	Carga vertical (tf)	Carga aplicada (tf)		Deslocamento (cm)	
		X	Y	X	Y
cobertura	49.10	0.16	0.16	0.13	0.06
tampa do poço	6.69	0.02	0.02	0.10	0.05
térreo	24.60	0.08	0.08	0.00	0.00



## 12.5 RELATÓRIO DE ESFORÇOS NAS FUNDAÇÕES POR ELEMENTOS

Fundação S2						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	9.52	-7.53	0.97	0.00	0.01	0.06
Adicional (G2)	7.38	-3.54	0.70	0.00	0.00	0.04
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.44	-1.32	-0.12	0.00	0.00	-0.02
Água (A)	0.44	-1.09	-1.08	0.00	0.00	-0.07
Vento X+ (V1)	-0.22	28.06	393.60	0.48	-0.03	-1.68
Vento X- (V2)	0.22	-28.06	-393.60	-0.48	0.03	1.68
Vento Y+ (V3)	0.30	-830.34	112.82	0.14	1.03	4.44
Vento Y- (V4)	-0.30	830.34	-112.82	-0.14	-1.03	-4.44
Desaprumo X+ (D1)	-0.03	2.54	32.27	0.04	0.00	-0.16
Desaprumo X- (D2)	0.03	-2.54	-32.27	-0.04	0.00	0.16
Desaprumo Y+ (D3)	0.03	-50.21	4.26	0.01	0.06	0.13
Desaprumo Y- (D4)	-0.03	50.21	-4.26	-0.01	-0.06	-0.13
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	16.90	-11.07	1.66	0.00	0.01	0.10
G1+G2+0.6V1+D1	16.74	8.31	270.09	0.33	-0.01	-1.06
G1+G2+0.6V2+D2	17.07	-30.44	-266.77	-0.33	0.04	1.26
G1+G2+0.6V3+D3	17.12	-559.48	73.61	0.09	0.69	2.90
G1+G2+0.6V4+D4	16.69	537.35	-70.29	-0.09	-0.66	-2.70
G1+G2+0.8Q+0.6V1+D1	18.69	7.25	270.00	0.33	-0.01	-1.08
G1+G2+0.8Q+0.6V2+D2	19.02	-31.49	-266.87	-0.33	0.04	1.25
G1+G2+0.8Q+0.6V3+D3	19.07	-560.53	73.51	0.09	0.69	2.88
G1+G2+0.8Q+0.6V4+D4	18.64	536.29	-70.38	-0.09	-0.66	-2.71
G1+G2+0.8Q+A	19.29	-13.21	0.49	0.00	0.02	0.01
G1+G2+0.8Q+A+0.6V1+0.6D1	19.14	5.14	256.02	0.31	-0.01	-1.08
G1+G2+0.8Q+A+0.6V1+D1	19.13	6.16	268.92	0.33	-0.01	-1.15
G1+G2+0.8Q+A+0.6V2+0.6D2	19.44	-31.57	-255.03	-0.31	0.04	1.11
G1+G2+0.8Q+A+0.6V2+D2	19.45	-32.59	-267.94	-0.33	0.04	1.18
G1+G2+0.8Q+A+0.6V3+0.6D3	19.49	-541.54	70.74	0.09	0.67	2.76
G1+G2+0.8Q+A+0.6V3+D3	19.50	-561.62	72.44	0.09	0.69	2.81
G1+G2+0.8Q+A+0.6V4+0.6D4	19.09	515.11	-69.75	-0.09	-0.64	-2.73
G1+G2+0.8Q+A+0.6V4+D4	19.08	535.20	-71.46	-0.09	-0.66	-2.78
G1+G2+0.8Q+A+D1	19.26	-10.67	32.76	0.04	0.01	-0.14
G1+G2+0.8Q+A+D2	19.32	-15.75	-31.78	-0.04	0.02	0.17
G1+G2+0.8Q+A+D3	19.32	-63.42	4.75	0.01	0.08	0.15
G1+G2+0.8Q+A+D4	19.26	37.00	-3.76	0.00	-0.05	-0.12
G1+G2+0.8Q+A+V1+0.6D1	19.05	16.37	413.46	0.51	-0.02	-1.75
G1+G2+0.8Q+A+V2+0.6D2	19.53	-42.79	-412.47	-0.51	0.05	1.78
G1+G2+0.8Q+A+V3+0.6D3	19.61	-873.67	115.87	0.14	1.08	4.54
G1+G2+0.8Q+A+V4+0.6D4	18.97	847.25	-114.88	-0.14	-1.05	-4.51
G1+G2+0.8Q+V1+0.6D1	18.61	17.46	414.53	0.51	-0.02	-1.69
G1+G2+0.8Q+V2+0.6D2	19.09	-41.70	-411.40	-0.51	0.05	1.85
G1+G2+0.8Q+V3+0.6D3	19.17	-872.58	116.94	0.14	1.08	4.61
G1+G2+0.8Q+V4+0.6D4	18.53	848.34	-113.81	-0.14	-1.05	-4.44
G1+G2+A	17.34	-12.16	0.59	0.00	0.02	0.03
G1+G2+A+0.6V1+0.6D1	17.19	6.20	256.11	0.31	-0.01	-1.07





G1+G2+A+0.6V1+D1	17.18	7.22	269.02	0.33	-0.01	-1.13
G1+G2+A+0.6V2+0.6D2	17.49	-30.51	-254.94	-0.31	0.04	1.13
G1+G2+A+0.6V2+D2	17.50	-31.53	-267.85	-0.33	0.04	1.19
G1+G2+A+0.6V3+0.6D3	17.54	-540.48	70.83	0.09	0.67	2.77
G1+G2+A+0.6V3+D3	17.55	-560.57	72.54	0.09	0.69	2.83
G1+G2+A+0.6V4+0.6D4	17.14	516.17	-69.66	-0.09	-0.64	-2.71
G1+G2+A+0.6V4+D4	17.13	536.25	-71.36	-0.09	-0.66	-2.77
G1+G2+A+D1	17.31	-9.62	32.86	0.04	0.01	-0.13
G1+G2+A+D2	17.37	-14.69	-31.68	-0.04	0.02	0.19
G1+G2+A+D3	17.37	-62.37	4.84	0.01	0.08	0.16
G1+G2+A+D4	17.31	38.05	-3.67	0.00	-0.05	-0.10
G1+G2+A+V1+0.6D1	17.10	17.42	413.55	0.51	-0.02	-1.74
G1+G2+A+V2+0.6D2	17.58	-41.74	-412.38	-0.51	0.05	1.80
G1+G2+A+V3+0.6D3	17.66	-872.62	115.96	0.14	1.08	4.55
G1+G2+A+V4+0.6D4	17.02	848.30	-114.79	-0.14	-1.05	-4.49
G1+G2+D1	16.88	-8.53	33.93	0.04	0.01	-0.06
G1+G2+D2	16.93	-13.60	-30.61	-0.04	0.02	0.25
G1+G2+D3	16.94	-61.27	5.92	0.01	0.08	0.23
G1+G2+D4	16.87	39.14	-2.59	0.00	-0.05	-0.03
G1+G2+Q	19.34	-12.39	1.54	0.00	0.02	0.08
G1+G2+Q+0.6V1+0.6D1	19.19	5.97	257.07	0.32	-0.01	-1.02
G1+G2+Q+0.6V2+0.6D2	19.49	-30.74	-253.98	-0.31	0.04	1.18
G1+G2+Q+0.6V3+0.6D3	19.54	-540.71	71.79	0.09	0.67	2.82
G1+G2+Q+0.6V4+0.6D4	19.14	515.94	-68.70	-0.08	-0.64	-2.66
G1+G2+Q+A	19.78	-13.48	0.47	0.00	0.02	0.01
G1+G2+Q+A+0.6V1+0.6D1	19.63	4.88	255.99	0.31	-0.01	-1.09
G1+G2+Q+A+0.6V2+0.6D2	19.93	-31.83	-255.06	-0.31	0.04	1.11
G1+G2+Q+A+0.6V3+0.6D3	19.98	-541.80	70.71	0.09	0.67	2.76
G1+G2+Q+A+0.6V4+0.6D4	19.58	514.85	-69.78	-0.09	-0.64	-2.73
G1+G2+Q+A+D1	19.75	-10.94	32.74	0.04	0.01	-0.14
G1+G2+Q+A+D2	19.80	-16.02	-31.80	-0.04	0.02	0.17
G1+G2+Q+A+D3	19.81	-63.69	4.72	0.01	0.08	0.14
G1+G2+Q+A+D4	19.74	36.73	-3.79	0.00	-0.05	-0.12
G1+G2+Q+D1	19.31	-9.85	33.81	0.04	0.01	-0.08
G1+G2+Q+D2	19.37	-14.92	-30.73	-0.04	0.02	0.24
G1+G2+Q+D3	19.37	-62.60	5.80	0.01	0.08	0.21
G1+G2+Q+D4	19.31	37.82	-2.71	0.00	-0.05	-0.05
G1+G2+V1+0.6D1	16.66	18.52	414.63	0.51	-0.02	-1.67
G1+G2+V2+0.6D2	17.14	-40.65	-411.30	-0.51	0.05	1.87
G1+G2+V3+0.6D3	17.22	-871.53	117.04	0.14	1.08	4.62
G1+G2+V4+0.6D4	16.58	849.40	-113.71	-0.14	-1.05	-4.42

Fundação S3						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	4.95	-4.17	-0.98	0.00	0.01	-0.50
Adicional (G2)	2.90	-1.83	-0.48	0.00	0.00	-0.24
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.95	-0.80	-0.22	0.00	0.00	-0.09
Água (A)	-0.16	-0.80	-0.58	0.00	0.00	-0.07
Vento X+ (V1)	0.54	-20.30	611.32	0.76	0.03	-1.88
Vento X- (V2)	-0.54	20.30	-611.32	-0.76	-0.03	1.88

Vento Y+ (V3)	0.09	-405.79	168.61	0.21	0.50	2.74
Vento Y- (V4)	-0.09	405.79	-168.61	-0.21	-0.50	-2.74
Desaprumo X+ (D1)	0.07	-1.91	50.13	0.06	0.00	-0.18
Desaprumo X- (D2)	-0.07	1.91	-50.13	-0.06	0.00	0.18
Desaprumo Y+ (D3)	0.01	-27.07	6.39	0.01	0.03	0.05
Desaprumo Y- (D4)	-0.01	27.07	-6.39	-0.01	-0.03	-0.05
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	7.85	-5.99	-1.47	0.00	0.01	-0.74
G1+G2+0.6V1+D1	8.24	-20.08	415.45	0.52	0.02	-2.05
G1+G2+0.6V2+D2	7.46	8.10	-418.39	-0.52	-0.01	0.57
G1+G2+0.6V3+D3	7.92	-276.54	106.09	0.13	0.34	0.95
G1+G2+0.6V4+D4	7.78	264.55	-109.02	-0.14	-0.33	-2.43
G1+G2+0.8Q+0.6V1+D1	9.00	-20.72	415.28	0.52	0.03	-2.12
G1+G2+0.8Q+0.6V2+D2	8.21	7.46	-418.56	-0.52	-0.01	0.49
G1+G2+0.8Q+0.6V3+D3	8.67	-277.17	105.91	0.13	0.34	0.87
G1+G2+0.8Q+0.6V4+D4	8.54	263.92	-109.20	-0.14	-0.33	-2.51
G1+G2+0.8Q+A	8.44	-7.42	-2.22	0.00	0.01	-0.88
G1+G2+0.8Q+A+0.6V1+0.6D1	8.81	-20.75	394.65	0.49	0.03	-2.12
G1+G2+0.8Q+A+0.6V1+D1	8.84	-21.51	414.70	0.52	0.03	-2.19
G1+G2+0.8Q+A+0.6V2+0.6D2	8.08	5.90	-399.09	-0.50	-0.01	0.35
G1+G2+0.8Q+A+0.6V2+D2	8.05	6.66	-419.14	-0.52	-0.01	0.43
G1+G2+0.8Q+A+0.6V3+0.6D3	8.51	-267.14	102.78	0.13	0.33	0.79
G1+G2+0.8Q+A+0.6V3+D3	8.51	-277.97	105.33	0.13	0.34	0.81
G1+G2+0.8Q+A+0.6V4+0.6D4	8.38	252.29	-107.22	-0.13	-0.31	-2.56
G1+G2+0.8Q+A+0.6V4+D4	8.38	263.12	-109.78	-0.14	-0.33	-2.57
G1+G2+0.8Q+A+D1	8.51	-9.33	47.90	0.06	0.01	-1.06
G1+G2+0.8Q+A+D2	8.37	-5.51	-52.35	-0.07	0.01	-0.70
G1+G2+0.8Q+A+D3	8.46	-34.49	4.17	0.01	0.04	-0.84
G1+G2+0.8Q+A+D4	8.43	19.64	-8.61	-0.01	-0.02	-0.93
G1+G2+0.8Q+A+V1+0.6D1	9.03	-28.87	639.18	0.80	0.04	-2.87
G1+G2+0.8Q+A+V2+0.6D2	7.86	14.02	-643.62	-0.80	-0.02	1.10
G1+G2+0.8Q+A+V3+0.6D3	8.54	-429.46	170.23	0.21	0.53	1.88
G1+G2+0.8Q+A+V4+0.6D4	8.35	414.61	-174.67	-0.22	-0.51	-3.65
G1+G2+0.8Q+V1+0.6D1	9.19	-28.07	639.75	0.80	0.03	-2.80
G1+G2+0.8Q+V2+0.6D2	8.02	14.82	-643.04	-0.80	-0.02	1.17
G1+G2+0.8Q+V3+0.6D3	8.70	-428.66	170.80	0.21	0.53	1.95
G1+G2+0.8Q+V4+0.6D4	8.51	415.41	-174.09	-0.22	-0.52	-3.58
G1+G2+A	7.69	-6.79	-2.05	0.00	0.01	-0.81
G1+G2+A+0.6V1+0.6D1	8.05	-20.11	394.82	0.49	0.03	-2.05
G1+G2+A+0.6V1+D1	8.08	-20.87	414.87	0.52	0.03	-2.12
G1+G2+A+0.6V2+0.6D2	7.32	6.54	-398.91	-0.50	-0.01	0.43
G1+G2+A+0.6V2+D2	7.29	7.30	-418.96	-0.52	-0.01	0.50
G1+G2+A+0.6V3+0.6D3	7.75	-266.50	102.96	0.13	0.33	0.86
G1+G2+A+0.6V3+D3	7.75	-277.33	105.51	0.13	0.34	0.88
G1+G2+A+0.6V4+0.6D4	7.63	252.93	-107.05	-0.13	-0.31	-2.48
G1+G2+A+0.6V4+D4	7.62	263.76	-109.60	-0.14	-0.33	-2.50
G1+G2+A+D1	7.76	-8.70	48.08	0.06	0.01	-0.99
G1+G2+A+D2	7.62	-4.88	-52.17	-0.06	0.01	-0.63
G1+G2+A+D3	7.70	-33.85	4.34	0.01	0.04	-0.76
G1+G2+A+D4	7.68	20.28	-8.43	-0.01	-0.03	-0.85
G1+G2+A+V1+0.6D1	8.27	-28.23	639.35	0.80	0.04	-2.80



G1+G2+A+V2+0.6D2	7.11	14.66	-643.44	-0.80	-0.02	1.18
G1+G2+A+V3+0.6D3	7.79	-428.82	170.40	0.21	0.53	1.96
G1+G2+A+V4+0.6D4	7.59	415.25	-174.49	-0.22	-0.52	-3.58
G1+G2+D1	7.92	-7.90	48.66	0.06	0.01	-0.92
G1+G2+D2	7.78	-4.08	-51.59	-0.06	0.01	-0.56
G1+G2+D3	7.86	-33.06	4.92	0.01	0.04	-0.69
G1+G2+D4	7.84	21.08	-7.86	-0.01	-0.03	-0.79
G1+G2+Q	8.80	-6.79	-1.69	0.00	0.01	-0.83
G1+G2+Q+0.6V1+0.6D1	9.16	-20.11	395.18	0.49	0.03	-2.07
G1+G2+Q+0.6V2+0.6D2	8.43	6.54	-398.56	-0.50	-0.01	0.40
G1+G2+Q+0.6V3+0.6D3	8.86	-266.50	103.31	0.13	0.33	0.84
G1+G2+Q+0.6V4+0.6D4	8.73	252.93	-106.69	-0.13	-0.31	-2.51
G1+G2+Q+A	8.63	-7.58	-2.27	0.00	0.01	-0.90
G1+G2+Q+A+0.6V1+0.6D1	9.00	-20.91	394.60	0.49	0.03	-2.14
G1+G2+Q+A+0.6V2+0.6D2	8.27	5.74	-399.14	-0.50	-0.01	0.33
G1+G2+Q+A+0.6V3+0.6D3	8.70	-267.30	102.74	0.13	0.33	0.77
G1+G2+Q+A+0.6V4+0.6D4	8.57	252.13	-107.27	-0.13	-0.31	-2.57
G1+G2+Q+A+D1	8.70	-9.49	47.86	0.06	0.01	-1.08
G1+G2+Q+A+D2	8.56	-5.67	-52.39	-0.07	0.01	-0.72
G1+G2+Q+A+D3	8.65	-34.65	4.12	0.01	0.04	-0.86
G1+G2+Q+A+D4	8.62	19.49	-8.65	-0.01	-0.02	-0.95
G1+G2+Q+D1	8.87	-8.70	48.44	0.06	0.01	-1.01
G1+G2+Q+D2	8.73	-4.88	-51.81	-0.06	0.01	-0.65
G1+G2+Q+D3	8.81	-33.85	4.70	0.01	0.04	-0.79
G1+G2+Q+D4	8.78	20.28	-8.08	-0.01	-0.03	-0.88
G1+G2+V1+0.6D1	8.43	-27.43	639.93	0.80	0.03	-2.73
G1+G2+V2+0.6D2	7.27	15.45	-642.87	-0.80	-0.02	1.25
G1+G2+V3+0.6D3	7.95	-428.03	170.98	0.21	0.53	2.03
G1+G2+V4+0.6D4	7.75	416.04	-173.91	-0.22	-0.52	-3.51

Fundação S4						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	6.70	-0.52	-1.24	0.00	0.00	-0.01
Adicional (G2)	3.13	-0.25	-0.88	0.00	0.00	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	4.19	-0.08	0.24	0.00	0.00	0.00
Água (A)	-0.01	-0.02	2.02	0.00	0.00	0.00
Vento X+ (V1)	0.00	14.26	342.39	0.42	-0.02	-1.05
Vento X- (V2)	0.00	-14.26	-342.39	-0.42	0.02	1.05
Vento Y+ (V3)	0.00	-426.52	-8.46	-0.01	0.53	3.56
Vento Y- (V4)	0.00	426.52	8.46	0.01	-0.53	-3.56
Desaprumo X+ (D1)	0.00	1.31	28.53	0.04	0.00	-0.10
Desaprumo X- (D2)	0.00	-1.31	-28.53	-0.04	0.00	0.10
Desaprumo Y+ (D3)	0.00	-25.81	-0.32	0.00	0.03	0.14
Desaprumo Y- (D4)	0.00	25.81	0.32	0.00	-0.03	-0.14
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	9.83	-0.78	-2.12	0.00	0.00	-0.01
G1+G2+0.6V1+D1	9.83	9.08	231.85	0.29	-0.01	-0.73
G1+G2+0.6V2+D2	9.83	-10.64	-236.08	-0.29	0.01	0.71
G1+G2+0.6V3+D3	9.83	-282.50	-7.51	-0.01	0.35	2.26



G1+G2+0.6V4+D4	9.83	280.94	3.28	0.00	-0.35	-2.28
G1+G2+0.8Q+0.6V1+D1	13.18	9.02	232.04	0.29	-0.01	-0.73
G1+G2+0.8Q+0.6V2+D2	13.18	-10.71	-235.89	-0.29	0.01	0.71
G1+G2+0.8Q+0.6V3+D3	13.18	-282.56	-7.32	-0.01	0.35	2.26
G1+G2+0.8Q+0.6V4+D4	13.18	280.87	3.47	0.00	-0.35	-2.28
G1+G2+0.8Q+A	13.17	-0.87	0.10	0.00	0.00	-0.01
G1+G2+0.8Q+A+0.6V1+0.6D1	13.17	8.47	222.65	0.27	-0.01	-0.70
G1+G2+0.8Q+A+0.6V1+D1	13.17	9.00	234.06	0.29	-0.01	-0.74
G1+G2+0.8Q+A+0.6V2+0.6D2	13.17	-10.20	-222.45	-0.27	0.01	0.67
G1+G2+0.8Q+A+0.6V2+D2	13.17	-10.73	-233.87	-0.29	0.01	0.71
G1+G2+0.8Q+A+0.6V3+0.6D3	13.17	-272.26	-5.17	-0.01	0.34	2.20
G1+G2+0.8Q+A+0.6V3+D3	13.17	-282.58	-5.30	-0.01	0.35	2.26
G1+G2+0.8Q+A+0.6V4+0.6D4	13.17	270.53	5.37	0.01	-0.33	-2.23
G1+G2+0.8Q+A+0.6V4+D4	13.17	280.85	5.49	0.01	-0.35	-2.29
G1+G2+0.8Q+A+D1	13.17	0.44	28.63	0.04	0.00	-0.11
G1+G2+0.8Q+A+D2	13.17	-2.17	-28.43	-0.04	0.00	0.08
G1+G2+0.8Q+A+D3	13.17	-26.67	-0.22	0.00	0.03	0.13
G1+G2+0.8Q+A+D4	13.17	24.94	0.42	0.00	-0.03	-0.15
G1+G2+0.8Q+A+V1+0.6D1	13.17	14.18	359.61	0.44	-0.02	-1.12
G1+G2+0.8Q+A+V2+0.6D2	13.17	-15.91	-359.41	-0.44	0.02	1.09
G1+G2+0.8Q+A+V3+0.6D3	13.18	-442.87	-8.55	-0.01	0.55	3.63
G1+G2+0.8Q+A+V4+0.6D4	13.17	441.14	8.75	0.01	-0.54	-3.65
G1+G2+0.8Q+V1+0.6D1	13.18	14.20	357.58	0.44	-0.02	-1.11
G1+G2+0.8Q+V2+0.6D2	13.18	-15.89	-361.43	-0.45	0.02	1.09
G1+G2+0.8Q+V3+0.6D3	13.18	-442.85	-10.58	-0.01	0.55	3.63
G1+G2+0.8Q+V4+0.6D4	13.18	441.16	6.73	0.01	-0.54	-3.65
G1+G2+A	9.82	-0.80	-0.10	0.00	0.00	-0.01
G1+G2+A+0.6V1+0.6D1	9.82	8.54	222.46	0.27	-0.01	-0.70
G1+G2+A+0.6V1+D1	9.82	9.06	233.87	0.29	-0.01	-0.74
G1+G2+A+0.6V2+0.6D2	9.82	-10.14	-222.65	-0.27	0.01	0.67
G1+G2+A+0.6V2+D2	9.82	-10.66	-234.06	-0.29	0.01	0.71
G1+G2+A+0.6V3+0.6D3	9.82	-272.19	-5.36	-0.01	0.34	2.21
G1+G2+A+0.6V3+D3	9.82	-282.52	-5.49	-0.01	0.35	2.26
G1+G2+A+0.6V4+0.6D4	9.82	270.60	5.17	0.01	-0.33	-2.23
G1+G2+A+0.6V4+D4	9.82	280.92	5.30	0.01	-0.35	-2.28
G1+G2+A+D1	9.82	0.51	28.43	0.03	0.00	-0.11
G1+G2+A+D2	9.82	-2.11	-28.62	-0.04	0.00	0.08
G1+G2+A+D3	9.82	-26.61	-0.41	0.00	0.03	0.13
G1+G2+A+D4	9.82	25.01	0.22	0.00	-0.03	-0.15
G1+G2+A+V1+0.6D1	9.82	14.24	359.41	0.44	-0.02	-1.11
G1+G2+A+V2+0.6D2	9.82	-15.84	-359.60	-0.44	0.02	1.09
G1+G2+A+V3+0.6D3	9.82	-442.80	-8.75	-0.01	0.55	3.63
G1+G2+A+V4+0.6D4	9.82	441.20	8.56	0.01	-0.54	-3.65
G1+G2+D1	9.83	0.53	26.41	0.03	0.00	-0.10
G1+G2+D2	9.83	-2.09	-30.65	-0.04	0.00	0.09
G1+G2+D3	9.83	-26.59	-2.44	0.00	0.03	0.13
G1+G2+D4	9.83	25.03	-1.80	0.00	-0.03	-0.15
G1+G2+Q	14.02	-0.86	-1.88	0.00	0.00	-0.01
G1+G2+Q+0.6V1+0.6D1	14.02	8.48	220.68	0.27	-0.01	-0.70
G1+G2+Q+0.6V2+0.6D2	14.02	-10.20	-224.43	-0.28	0.01	0.67
G1+G2+Q+0.6V3+0.6D3	14.02	-272.26	-7.14	-0.01	0.34	2.21
G1+G2+Q+0.6V4+0.6D4	14.02	270.53	3.39	0.00	-0.33	-2.23



G1+G2+Q+A	14.01	-0.88	0.15	0.00	0.00	-0.01
G1+G2+Q+A+0.6V1+0.6D1	14.01	8.46	222.70	0.27	-0.01	-0.70
G1+G2+Q+A+0.6V2+0.6D2	14.01	-10.22	-222.41	-0.27	0.01	0.67
G1+G2+Q+A+0.6V3+0.6D3	14.01	-272.28	-5.12	-0.01	0.34	2.20
G1+G2+Q+A+0.6V4+0.6D4	14.01	270.51	5.41	0.01	-0.33	-2.23
G1+G2+Q+A+D1	14.01	0.43	28.68	0.04	0.00	-0.11
G1+G2+Q+A+D2	14.01	-2.19	-28.38	-0.03	0.00	0.08
G1+G2+Q+A+D3	14.01	-26.69	-0.17	0.00	0.03	0.13
G1+G2+Q+A+D4	14.01	24.92	0.46	0.00	-0.03	-0.15
G1+G2+Q+D1	14.02	0.45	26.65	0.03	0.00	-0.11
G1+G2+Q+D2	14.02	-2.17	-30.40	-0.04	0.00	0.09
G1+G2+Q+D3	14.02	-26.67	-2.19	0.00	0.03	0.13
G1+G2+Q+D4	14.02	24.95	-1.56	0.00	-0.03	-0.15
G1+G2+V1+0.6D1	9.83	14.26	357.39	0.44	-0.02	-1.11
G1+G2+V2+0.6D2	9.83	-15.82	-361.63	-0.45	0.02	1.09
G1+G2+V3+0.6D3	9.83	-442.78	-10.77	-0.01	0.55	3.63
G1+G2+V4+0.6D4	9.83	441.22	6.53	0.01	-0.54	-3.65

Fundação S5						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	3.53	-0.24	-0.55	0.00	0.00	0.00
Adicional (G2)	3.25	-0.09	-0.46	0.00	0.00	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.01	-0.06	0.20	0.00	0.00	0.00
Água (A)	0.00	-0.13	1.33	0.00	0.00	0.00
Vento X+ (V1)	0.00	-16.55	341.42	0.42	0.02	-1.04
Vento X- (V2)	0.00	16.55	-341.42	-0.42	-0.02	1.04
Vento Y+ (V3)	0.00	-321.65	-8.34	-0.01	0.40	3.53
Vento Y- (V4)	0.00	321.65	8.34	0.01	-0.40	-3.53
Desaprumo X+ (D1)	0.00	-1.52	28.44	0.04	0.00	-0.10
Desaprumo X- (D2)	0.00	1.52	-28.44	-0.04	0.00	0.10
Desaprumo Y+ (D3)	0.00	-21.61	-0.31	0.00	0.03	0.13
Desaprumo Y- (D4)	0.00	21.61	0.31	0.00	-0.03	-0.13
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	6.78	-0.32	-1.02	0.00	0.00	0.00
G1+G2+0.6V1+D1	6.78	-11.78	232.28	0.29	0.01	-0.73
G1+G2+0.6V2+D2	6.78	11.13	-234.31	-0.29	-0.01	0.72
G1+G2+0.6V3+D3	6.78	-214.93	-6.33	-0.01	0.27	2.25
G1+G2+0.6V4+D4	6.78	214.28	4.30	0.01	-0.27	-2.25
G1+G2+0.8Q+0.6V1+D1	8.39	-11.83	232.44	0.29	0.01	-0.73
G1+G2+0.8Q+0.6V2+D2	8.39	11.08	-234.15	-0.29	-0.01	0.72
G1+G2+0.8Q+0.6V3+D3	8.39	-214.98	-6.17	-0.01	0.27	2.24
G1+G2+0.8Q+0.6V4+D4	8.39	214.23	4.46	0.01	-0.27	-2.25
G1+G2+0.8Q+A	8.39	-0.50	0.48	0.00	0.00	-0.01
G1+G2+0.8Q+A+0.6V1+0.6D1	8.39	-11.35	222.39	0.28	0.01	-0.69
G1+G2+0.8Q+A+0.6V1+D1	8.39	-11.96	233.77	0.29	0.01	-0.73
G1+G2+0.8Q+A+0.6V2+0.6D2	8.39	10.34	-221.44	-0.27	-0.01	0.67
G1+G2+0.8Q+A+0.6V2+D2	8.39	10.95	-232.82	-0.29	-0.01	0.71
G1+G2+0.8Q+A+0.6V3+0.6D3	8.39	-206.46	-4.71	-0.01	0.26	2.19
G1+G2+0.8Q+A+0.6V3+D3	8.39	-215.11	-4.84	-0.01	0.27	2.24





G1+G2+0.8Q+A+0.6V4+0.6D4	8.39	205.46	5.67	0.01	-0.25	-2.20
G1+G2+0.8Q+A+0.6V4+D4	8.39	214.10	5.79	0.01	-0.27	-2.26
G1+G2+0.8Q+A+D1	8.39	-2.03	28.92	0.04	0.00	-0.10
G1+G2+0.8Q+A+D2	8.39	1.02	-27.97	-0.03	0.00	0.09
G1+G2+0.8Q+A+D3	8.39	-22.12	0.16	0.00	0.03	0.12
G1+G2+0.8Q+A+D4	8.39	21.11	0.79	0.00	-0.03	-0.14
G1+G2+0.8Q+A+V1+0.6D1	8.39	-17.97	358.96	0.44	0.02	-1.11
G1+G2+0.8Q+A+V2+0.6D2	8.39	16.96	-358.01	-0.44	-0.02	1.09
G1+G2+0.8Q+A+V3+0.6D3	8.39	-335.13	-8.05	-0.01	0.42	3.60
G1+G2+0.8Q+A+V4+0.6D4	8.39	334.12	9.00	0.01	-0.41	-3.62
G1+G2+0.8Q+V1+0.6D1	8.39	-17.84	357.63	0.44	0.02	-1.11
G1+G2+0.8Q+V2+0.6D2	8.39	17.09	-359.34	-0.45	-0.02	1.10
G1+G2+0.8Q+V3+0.6D3	8.39	-335.00	-9.38	-0.01	0.41	3.60
G1+G2+0.8Q+V4+0.6D4	8.39	334.25	7.67	0.01	-0.41	-3.61
G1+G2+A	6.78	-0.45	0.32	0.00	0.00	-0.01
G1+G2+A+0.6V1+0.6D1	6.78	-11.30	222.23	0.28	0.01	-0.69
G1+G2+A+0.6V1+D1	6.78	-11.91	233.61	0.29	0.01	-0.73
G1+G2+A+0.6V2+0.6D2	6.78	10.39	-221.60	-0.27	-0.01	0.68
G1+G2+A+0.6V2+D2	6.78	11.00	-232.98	-0.29	-0.01	0.71
G1+G2+A+0.6V3+0.6D3	6.78	-206.41	-4.87	-0.01	0.26	2.19
G1+G2+A+0.6V3+D3	6.78	-215.06	-5.00	-0.01	0.27	2.24
G1+G2+A+0.6V4+0.6D4	6.78	205.51	5.51	0.01	-0.25	-2.20
G1+G2+A+0.6V4+D4	6.78	214.15	5.63	0.01	-0.27	-2.26
G1+G2+A+D1	6.78	-1.98	28.76	0.04	0.00	-0.10
G1+G2+A+D2	6.78	1.07	-28.13	-0.03	0.00	0.09
G1+G2+A+D3	6.78	-22.07	0.00	0.00	0.03	0.13
G1+G2+A+D4	6.78	21.16	0.63	0.00	-0.03	-0.14
G1+G2+A+V1+0.6D1	6.78	-17.92	358.80	0.44	0.02	-1.11
G1+G2+A+V2+0.6D2	6.78	17.01	-358.17	-0.44	-0.02	1.09
G1+G2+A+V3+0.6D3	6.78	-335.08	-8.21	-0.01	0.42	3.60
G1+G2+A+V4+0.6D4	6.78	334.17	8.84	0.01	-0.41	-3.61
G1+G2+D1	6.78	-1.85	27.43	0.03	0.00	-0.10
G1+G2+D2	6.78	1.20	-29.46	-0.04	0.00	0.09
G1+G2+D3	6.78	-21.94	-1.33	0.00	0.03	0.13
G1+G2+D4	6.78	21.29	-0.71	0.00	-0.03	-0.14
G1+G2+Q	8.79	-0.39	-0.82	0.00	0.00	-0.01
G1+G2+Q+0.6V1+0.6D1	8.79	-11.23	221.10	0.27	0.01	-0.69
G1+G2+Q+0.6V2+0.6D2	8.79	10.46	-222.74	-0.28	-0.01	0.68
G1+G2+Q+0.6V3+0.6D3	8.79	-206.35	-6.01	-0.01	0.26	2.19
G1+G2+Q+0.6V4+0.6D4	8.79	205.57	4.37	0.01	-0.25	-2.20
G1+G2+Q+A	8.79	-0.52	0.52	0.00	0.00	-0.01
G1+G2+Q+A+0.6V1+0.6D1	8.79	-11.36	222.43	0.28	0.01	-0.69
G1+G2+Q+A+0.6V2+0.6D2	8.79	10.33	-221.40	-0.27	-0.01	0.67
G1+G2+Q+A+0.6V3+0.6D3	8.79	-206.48	-4.67	-0.01	0.26	2.19
G1+G2+Q+A+0.6V4+0.6D4	8.79	205.44	5.71	0.01	-0.25	-2.20
G1+G2+Q+A+D1	8.79	-2.04	28.96	0.04	0.00	-0.10
G1+G2+Q+A+D2	8.79	1.01	-27.93	-0.03	0.00	0.09
G1+G2+Q+A+D3	8.79	-22.13	0.20	0.00	0.03	0.12
G1+G2+Q+A+D4	8.79	21.10	0.83	0.00	-0.03	-0.14
G1+G2+Q+D1	8.79	-1.91	27.63	0.03	0.00	-0.10
G1+G2+Q+D2	8.79	1.14	-29.26	-0.04	0.00	0.09
G1+G2+Q+D3	8.79	-22.00	-1.13	0.00	0.03	0.13



G1+G2+Q+D4	8.79	21.23	-0.51	0.00	-0.03	-0.14
G1+G2+V1+0.6D1	6.78	-17.79	357.47	0.44	0.02	-1.10
G1+G2+V2+0.6D2	6.78	17.14	-359.50	-0.45	-0.02	1.10
G1+G2+V3+0.6D3	6.78	-334.95	-9.54	-0.01	0.41	3.60
G1+G2+V4+0.6D4	6.78	334.30	7.51	0.01	-0.41	-3.61

Fundação S7						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	9.70	6.12	1.70	0.00	-0.01	-0.35
Adicional (G2)	7.61	2.86	1.07	0.00	0.00	-0.18
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.39	1.14	-0.04	0.00	0.00	-0.04
Água (A)	0.43	1.20	-1.26	0.00	0.00	0.05
Vento X+ (V1)	-0.07	27.29	466.74	0.57	-0.03	-1.68
Vento X- (V2)	0.07	-27.29	-466.74	-0.57	0.03	1.68
Vento Y+ (V3)	-0.26	-829.56	-134.70	-0.17	1.03	4.44
Vento Y- (V4)	0.26	829.56	134.70	0.17	-1.03	-4.44
Desaprumo X+ (D1)	-0.01	2.54	38.99	0.05	0.00	-0.16
Desaprumo X- (D2)	0.01	-2.54	-38.99	-0.05	0.00	0.16
Desaprumo Y+ (D3)	-0.03	-50.20	-5.07	-0.01	0.06	0.13
Desaprumo Y- (D4)	0.03	50.20	5.07	0.01	-0.06	-0.13
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	17.31	8.97	2.77	0.00	-0.01	-0.54
G1+G2+0.6V1+D1	17.26	27.89	321.80	0.40	-0.03	-1.70
G1+G2+0.6V2+D2	17.36	-9.94	-316.26	-0.39	0.01	0.63
G1+G2+0.6V3+D3	17.13	-538.96	-83.12	-0.10	0.67	2.26
G1+G2+0.6V4+D4	17.50	556.91	88.67	0.11	-0.69	-3.33
G1+G2+0.8Q+0.6V1+D1	19.18	28.80	321.77	0.40	-0.04	-1.74
G1+G2+0.8Q+0.6V2+D2	19.28	-9.03	-316.29	-0.39	0.01	0.60
G1+G2+0.8Q+0.6V3+D3	19.04	-538.05	-83.16	-0.10	0.67	2.23
G1+G2+0.8Q+0.6V4+D4	19.41	557.82	88.63	0.11	-0.69	-3.37
G1+G2+0.8Q+A	19.66	11.09	1.48	0.00	-0.01	-0.52
G1+G2+0.8Q+A+0.6V1+0.6D1	19.61	28.98	304.91	0.37	-0.04	-1.62
G1+G2+0.8Q+A+0.6V1+D1	19.61	30.00	320.51	0.39	-0.04	-1.69
G1+G2+0.8Q+A+0.6V2+0.6D2	19.70	-6.81	-301.96	-0.37	0.01	0.58
G1+G2+0.8Q+A+0.6V2+D2	19.71	-7.83	-317.55	-0.39	0.01	0.65
G1+G2+0.8Q+A+0.6V3+0.6D3	19.48	-516.77	-82.39	-0.10	0.64	2.22
G1+G2+0.8Q+A+0.6V3+D3	19.47	-536.85	-84.42	-0.10	0.66	2.28
G1+G2+0.8Q+A+0.6V4+0.6D4	19.83	538.94	85.34	0.10	-0.67	-3.27
G1+G2+0.8Q+A+0.6V4+D4	19.84	559.02	87.37	0.11	-0.69	-3.32
G1+G2+0.8Q+A+D1	19.65	13.62	40.46	0.05	-0.02	-0.68
G1+G2+0.8Q+A+D2	19.67	8.55	-37.51	-0.05	-0.01	-0.36
G1+G2+0.8Q+A+D3	19.63	-39.12	-3.60	0.00	0.05	-0.39
G1+G2+0.8Q+A+D4	19.68	61.29	6.55	0.01	-0.08	-0.66
G1+G2+0.8Q+A+V1+0.6D1	19.58	39.90	491.61	0.60	-0.05	-2.30
G1+G2+0.8Q+A+V2+0.6D2	19.73	-17.73	-488.65	-0.60	0.02	1.25
G1+G2+0.8Q+A+V3+0.6D3	19.38	-848.59	-136.27	-0.17	1.05	4.00
G1+G2+0.8Q+A+V4+0.6D4	19.93	870.76	139.22	0.17	-1.08	-5.04
G1+G2+0.8Q+V1+0.6D1	19.15	38.70	492.87	0.61	-0.05	-2.34
G1+G2+0.8Q+V2+0.6D2	19.30	-18.93	-487.39	-0.60	0.02	1.21



G1+G2+0.8Q+V3+0.6D3	18.95	-849.79	-135.01	-0.17	1.05	3.95
G1+G2+0.8Q+V4+0.6D4	19.50	869.56	140.48	0.17	-1.08	-5.09
G1+G2+A	17.74	10.18	1.51	0.00	-0.01	-0.49
G1+G2+A+0.6V1+0.6D1	17.70	28.07	304.95	0.37	-0.03	-1.59
G1+G2+A+0.6V1+D1	17.69	29.09	320.54	0.39	-0.04	-1.66
G1+G2+A+0.6V2+0.6D2	17.79	-7.72	-301.93	-0.37	0.01	0.61
G1+G2+A+0.6V2+D2	17.79	-8.74	-317.52	-0.39	0.01	0.68
G1+G2+A+0.6V3+0.6D3	17.57	-517.68	-82.35	-0.10	0.64	2.26
G1+G2+A+0.6V3+D3	17.56	-537.76	-84.38	-0.10	0.66	2.31
G1+G2+A+0.6V4+0.6D4	17.92	538.03	85.38	0.10	-0.67	-3.23
G1+G2+A+0.6V4+D4	17.93	558.11	87.41	0.11	-0.69	-3.29
G1+G2+A+D1	17.73	12.71	40.50	0.05	-0.02	-0.65
G1+G2+A+D2	17.75	7.64	-37.48	-0.05	-0.01	-0.33
G1+G2+A+D3	17.71	-40.03	-3.56	0.00	0.05	-0.36
G1+G2+A+D4	17.77	60.38	6.59	0.01	-0.07	-0.62
G1+G2+A+V1+0.6D1	17.67	38.99	491.64	0.60	-0.05	-2.26
G1+G2+A+V2+0.6D2	17.82	-18.64	-488.62	-0.60	0.02	1.28
G1+G2+A+V3+0.6D3	17.47	-849.50	-136.23	-0.17	1.05	4.03
G1+G2+A+V4+0.6D4	18.02	869.85	139.26	0.17	-1.08	-5.01
G1+G2+D1	17.30	11.51	41.76	0.05	-0.01	-0.70
G1+G2+D2	17.32	6.44	-36.22	-0.04	-0.01	-0.38
G1+G2+D3	17.29	-41.23	-2.30	0.00	0.05	-0.40
G1+G2+D4	17.34	59.18	7.85	0.01	-0.07	-0.67
G1+G2+Q	19.70	10.11	2.73	0.00	-0.01	-0.58
G1+G2+Q+0.6V1+0.6D1	19.66	28.01	306.17	0.38	-0.03	-1.68
G1+G2+Q+0.6V2+0.6D2	19.75	-7.79	-300.71	-0.37	0.01	0.53
G1+G2+Q+0.6V3+0.6D3	19.53	-517.74	-81.14	-0.10	0.64	2.17
G1+G2+Q+0.6V4+0.6D4	19.88	537.97	86.59	0.11	-0.67	-3.32
G1+G2+Q+A	20.13	11.31	1.47	0.00	-0.01	-0.53
G1+G2+Q+A+0.6V1+0.6D1	20.09	29.21	304.90	0.37	-0.04	-1.63
G1+G2+Q+A+0.6V2+0.6D2	20.18	-6.58	-301.97	-0.37	0.01	0.57
G1+G2+Q+A+0.6V3+0.6D3	19.96	-516.54	-82.40	-0.10	0.64	2.22
G1+G2+Q+A+0.6V4+0.6D4	20.31	539.17	85.33	0.10	-0.67	-3.27
G1+G2+Q+A+D1	20.12	13.85	40.46	0.05	-0.02	-0.69
G1+G2+Q+A+D2	20.14	8.77	-37.52	-0.05	-0.01	-0.37
G1+G2+Q+A+D3	20.10	-38.89	-3.61	0.00	0.05	-0.40
G1+G2+Q+A+D4	20.16	61.51	6.54	0.01	-0.08	-0.66
G1+G2+Q+D1	19.69	12.65	41.72	0.05	-0.02	-0.74
G1+G2+Q+D2	19.71	7.57	-36.26	-0.04	-0.01	-0.42
G1+G2+Q+D3	19.68	-40.09	-2.34	0.00	0.05	-0.44
G1+G2+Q+D4	19.73	60.31	7.80	0.01	-0.07	-0.71
G1+G2+V1+0.6D1	17.24	37.79	492.90	0.61	-0.05	-2.31
G1+G2+V2+0.6D2	17.39	-19.84	-487.36	-0.60	0.02	1.24
G1+G2+V3+0.6D3	17.04	-850.70	-134.97	-0.17	1.05	3.98
G1+G2+V4+0.6D4	17.59	868.65	140.52	0.17	-1.07	-5.06

Fundação S8						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	5.29	6.33	0.22	0.00	-0.01	0.19
Adicional (G2)	2.92	2.86	0.12	0.00	0.00	0.08
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00

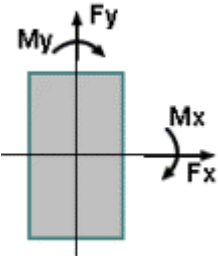




Acidental (Q)	0.98	1.12	-0.04	0.00	0.00	0.04
Água (A)	-0.16	0.83	-0.44	0.00	0.00	0.10
Vento X+ (V1)	0.39	-32.43	465.61	0.58	0.04	-1.71
Vento X- (V2)	-0.39	32.43	-465.61	-0.58	-0.04	1.71
Vento Y+ (V3)	-0.11	-627.62	-130.74	-0.16	0.78	3.24
Vento Y- (V4)	0.11	627.62	130.74	0.16	-0.78	-3.24
Desaprumo X+ (D1)	0.05	-2.92	38.84	0.05	0.00	-0.15
Desaprumo X- (D2)	-0.05	2.92	-38.84	-0.05	0.00	0.15
Desaprumo Y+ (D3)	-0.01	-41.95	-4.97	-0.01	0.05	0.08
Desaprumo Y- (D4)	0.01	41.95	4.97	0.01	-0.05	-0.08
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	8.21	9.19	0.34	0.00	-0.01	0.27
G1+G2+0.6V1+D1	8.49	-13.19	318.54	0.40	0.02	-0.91
G1+G2+0.6V2+D2	7.92	31.57	-317.87	-0.39	-0.04	1.45
G1+G2+0.6V3+D3	8.13	-409.33	-83.08	-0.10	0.51	2.29
G1+G2+0.6V4+D4	8.29	427.72	83.75	0.10	-0.53	-1.75
G1+G2+0.8Q+0.6V1+D1	9.27	-12.29	318.51	0.40	0.02	-0.88
G1+G2+0.8Q+0.6V2+D2	8.71	32.47	-317.90	-0.39	-0.04	1.48
G1+G2+0.8Q+0.6V3+D3	8.91	-408.43	-83.11	-0.10	0.51	2.32
G1+G2+0.8Q+0.6V4+D4	9.07	428.61	83.72	0.10	-0.53	-1.72
G1+G2+0.8Q+A	8.83	10.92	-0.13	0.00	-0.01	0.40
G1+G2+0.8Q+A+0.6V1+0.6D1	9.10	-10.29	302.54	0.38	0.01	-0.71
G1+G2+0.8Q+A+0.6V1+D1	9.12	-11.46	318.07	0.39	0.01	-0.78
G1+G2+0.8Q+A+0.6V2+0.6D2	8.57	32.14	-302.80	-0.38	-0.04	1.52
G1+G2+0.8Q+A+0.6V2+D2	8.55	33.31	-318.34	-0.39	-0.04	1.58
G1+G2+0.8Q+A+0.6V3+0.6D3	8.76	-390.82	-81.56	-0.10	0.49	2.39
G1+G2+0.8Q+A+0.6V3+D3	8.76	-407.60	-83.55	-0.10	0.51	2.42
G1+G2+0.8Q+A+0.6V4+0.6D4	8.91	412.67	81.29	0.10	-0.51	-1.59
G1+G2+0.8Q+A+0.6V4+D4	8.91	429.45	83.28	0.10	-0.53	-1.62
G1+G2+0.8Q+A+D1	8.89	8.00	38.71	0.05	-0.01	0.25
G1+G2+0.8Q+A+D2	8.78	13.85	-38.97	-0.05	-0.02	0.56
G1+G2+0.8Q+A+D3	8.82	-31.03	-5.10	-0.01	0.04	0.48
G1+G2+0.8Q+A+D4	8.85	52.88	4.84	0.01	-0.07	0.32
G1+G2+0.8Q+A+V1+0.6D1	9.25	-23.26	488.78	0.61	0.03	-1.40
G1+G2+0.8Q+A+V2+0.6D2	8.42	45.11	-489.04	-0.61	-0.06	2.20
G1+G2+0.8Q+A+V3+0.6D3	8.72	-641.86	-133.86	-0.17	0.80	3.69
G1+G2+0.8Q+A+V4+0.6D4	8.95	663.71	133.59	0.17	-0.83	-2.88
G1+G2+0.8Q+V1+0.6D1	9.41	-24.09	489.22	0.61	0.03	-1.50
G1+G2+0.8Q+V2+0.6D2	8.57	44.28	-488.60	-0.61	-0.06	2.10
G1+G2+0.8Q+V3+0.6D3	8.87	-642.70	-133.42	-0.17	0.80	3.59
G1+G2+0.8Q+V4+0.6D4	9.11	662.88	134.03	0.17	-0.82	-2.98
G1+G2+A	8.05	10.03	-0.10	0.00	-0.01	0.37
G1+G2+A+0.6V1+0.6D1	8.32	-11.19	302.56	0.38	0.01	-0.75
G1+G2+A+0.6V1+D1	8.34	-12.35	318.10	0.39	0.02	-0.81
G1+G2+A+0.6V2+0.6D2	7.79	31.24	-302.77	-0.38	-0.04	1.49
G1+G2+A+0.6V2+D2	7.77	32.41	-318.31	-0.39	-0.04	1.55
G1+G2+A+0.6V3+0.6D3	7.98	-391.71	-81.53	-0.10	0.49	2.36
G1+G2+A+0.6V3+D3	7.97	-408.50	-83.52	-0.10	0.51	2.39
G1+G2+A+0.6V4+0.6D4	8.13	411.77	81.32	0.10	-0.51	-1.62
G1+G2+A+0.6V4+D4	8.13	428.55	83.31	0.10	-0.53	-1.65
G1+G2+A+D1	8.10	7.10	38.74	0.05	-0.01	0.22



G1+G2+A+D2	8.00	12.95	-38.95	-0.05	-0.02	0.52
G1+G2+A+D3	8.04	-31.93	-5.07	-0.01	0.04	0.45
G1+G2+A+D4	8.07	51.98	4.87	0.01	-0.06	0.29
G1+G2+A+V1+0.6D1	8.47	-24.16	488.81	0.61	0.03	-1.43
G1+G2+A+V2+0.6D2	7.64	44.21	-489.02	-0.61	-0.06	2.17
G1+G2+A+V3+0.6D3	7.94	-642.76	-133.83	-0.17	0.80	3.66
G1+G2+A+V4+0.6D4	8.17	662.81	133.62	0.17	-0.82	-2.91
G1+G2+D1	8.26	6.27	39.18	0.05	-0.01	0.12
G1+G2+D2	8.16	12.12	-38.51	-0.05	-0.02	0.42
G1+G2+D3	8.19	-32.76	-4.63	-0.01	0.04	0.35
G1+G2+D4	8.22	51.15	5.31	0.01	-0.06	0.19
G1+G2+Q	9.19	10.31	0.30	0.00	-0.01	0.31
G1+G2+Q+0.6V1+0.6D1	9.45	-10.90	302.97	0.38	0.01	-0.81
G1+G2+Q+0.6V2+0.6D2	8.92	31.53	-302.37	-0.38	-0.04	1.43
G1+G2+Q+0.6V3+0.6D3	9.11	-391.43	-81.13	-0.10	0.49	2.30
G1+G2+Q+0.6V4+0.6D4	9.26	412.06	81.73	0.10	-0.51	-1.68
G1+G2+Q+A	9.03	11.15	-0.14	0.00	-0.01	0.41
G1+G2+Q+A+0.6V1+0.6D1	9.29	-10.06	302.53	0.38	0.01	-0.71
G1+G2+Q+A+0.6V2+0.6D2	8.77	32.36	-302.81	-0.38	-0.04	1.53
G1+G2+Q+A+0.6V3+0.6D3	8.96	-390.59	-81.57	-0.10	0.49	2.40
G1+G2+Q+A+0.6V4+0.6D4	9.10	412.89	81.29	0.10	-0.51	-1.58
G1+G2+Q+A+D1	9.08	8.23	38.70	0.05	-0.01	0.26
G1+G2+Q+A+D2	8.98	14.07	-38.98	-0.05	-0.02	0.56
G1+G2+Q+A+D3	9.02	-30.80	-5.11	-0.01	0.04	0.49
G1+G2+Q+A+D4	9.04	53.10	4.83	0.01	-0.07	0.33
G1+G2+Q+D1	9.24	7.39	39.14	0.05	-0.01	0.16
G1+G2+Q+D2	9.13	13.24	-38.54	-0.05	-0.02	0.46
G1+G2+Q+D3	9.17	-31.64	-4.67	-0.01	0.04	0.39
G1+G2+Q+D4	9.20	52.27	5.27	0.01	-0.07	0.23
G1+G2+V1+0.6D1	8.62	-24.99	489.25	0.61	0.03	-1.53
G1+G2+V2+0.6D2	7.79	43.38	-488.58	-0.61	-0.05	2.07
G1+G2+V3+0.6D3	8.09	-643.59	-133.39	-0.17	0.80	3.56
G1+G2+V4+0.6D4	8.32	661.98	134.06	0.17	-0.82	-3.02

Legenda	
	- Caso: indica o caso de carregamento no qual serão apresentados os esforços atuantes;
	- Elemento: nome da fundação;
	- N: esforço axial na fundação;
	- Mx: momento fletor na fundação, atuante em torno do eixo X global;
	- My: momento fletor na fundação, atuante em torno do eixo Y global;
	- Fx: esforço cortante na fundação, atuante no plano paralelo à direção X global;
	- Fy: esforço cortante na fundação, atuante no plano paralelo à direção Y global;
	- Mt: momento de torção atuante.

## 12.6 QUADRO DE CARGAS DOS PILARES

	térreo		tampa do poço		cobertura	
Pilares	NPos (tf)	NNeg	NPos (tf)	NNeg	NPos (tf)	NNeg
P1			11.89	0.00	8.83	0.00
P2	19.98	0.00	11.02	0.00	10.75	0.00
P3	9.19	0.00	6.21	0.00	5.94	0.00
P4	14.02	0.00				
P5	8.79	0.00				
P6			11.82	0.00	8.80	0.00
P7	20.31	0.00	10.95	0.00	10.68	0.00
P8	9.45	0.00	6.21	0.00	5.94	0.00

## 12.7 SAPATAS - PAVIMENTO TÉRREO

### 12.7.1 Relatório de Resultados das Sapatas

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S2	110.00 115.00	20.00 35.00	11 ø 8.0 c/10 (5.53 cm <sup>2</sup> )	9 ø 8.0 c/12 (4.52 cm <sup>2</sup> )		
S3	80.00 85.00	20.00 35.00	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )		
S4	90.00 90.00	20.00 35.00	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )		
S5	75.00 75.00	20.00 35.00	8 ø 8.0 c/8 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/8 (4.02 cm <sup>2</sup> )		
S7	110.00 115.00	20.00 35.00	11 ø 8.0 c/10 (5.53 cm <sup>2</sup> )	9 ø 8.0 c/12 (4.52 cm <sup>2</sup> )		
S8	85.00 90.00	20.00 35.00	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )		

### 12.7.2 Relatório de Cálculos das Sapatas

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	

### 12.7.3 Esforços e pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm²)	Pressão Sig2 (kgf/cm²)	Pressão Sig3 (kgf/cm²)	Pressão Sig4 (kgf/cm²)
S2	414.63 873.67	0.51 1.08	19.98 21.99	2.01 (lim = 2.00)	2.13 (lim = 2.00)	1.41 (lim = 2.00)	1.29 (lim = 2.00)
S3	429.46 643.62	0.53 0.80	9.19 10.31	2.25 (lim = 2.00)	2.11 (lim = 2.00)	0.78 (lim = 2.00)	0.92 (lim = 2.00)
S4	361.63 442.87	0.45 0.55	14.02 15.30	2.22 (lim = 2.00)	2.08 (lim = 2.00)	1.35 (lim = 2.00)	1.49 (lim = 2.00)
S5	359.50 335.13	0.45 0.42	8.79 9.68	1.22 (lim = 2.00)	2.24 (lim = 2.00)	2.08 (lim = 2.00)	1.06 (lim = 2.00)
S7	492.90 870.76	0.61 1.08	20.31 22.46	1.33 (lim = 2.00)	1.45 (lim = 2.00)	2.17 (lim = 2.00)	2.05 (lim = 2.00)
S8	489.25 663.71	0.61 0.83	9.45 10.78	2.07 (lim = 2.00)	1.82 (lim = 2.00)	0.66 (lim = 2.00)	0.91 (lim = 2.00)

### 12.7.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S2	10272.57 414.63	24.78 (lim = 1.50)	10693.44 849.40	12.59 (lim = 1.50)	7.56 1.06	7.13 lim = (1.50)		
S3	3563.32 428.82	8.31 (lim = 1.50)	3496.80 643.44	5.43 (lim = 1.50)	3.34 0.80	4.17 lim = (1.50)		
S4	5000.77 361.63	13.83 (lim = 1.50)	4997.96 442.80	11.29 (lim = 1.50)	4.51 0.55	8.27 lim = (1.50)		
S5	2873.51 359.50	7.99 (lim = 1.50)	2872.85 335.08	8.57 (lim = 1.50)	3.11 0.45	6.98 lim = (1.50)		
S7	10669.09 492.90	21.65 (lim = 1.50)	11035.66 850.70	12.97 (lim = 1.50)	7.80 1.06	7.32 lim = (1.50)		
S8	3809.63 489.02	7.79 (lim = 1.50)	4273.97 662.81	6.45 (lim = 1.50)	3.86 0.84	4.59 lim = (1.50)		

### 12.7.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) A's (cm²/m)	Md (kgf.m/m) A's (cm²/m)
S2	3443.55 4.47	3382.88 4.39	0.00 0.00	0.00 0.00

S3	1675.41 2.18	2194.43 2.85	0.00 0.00	0.00 0.00
S4	2733.18 3.55	3065.40 3.98	0.00 0.00	0.00 0.00
S5	1867.02 2.42	1557.18 2.02	0.00 0.00	0.00 0.00
S7	3443.55 4.47	3382.88 4.39	0.00 0.00	0.00 0.00
S8	1797.11 2.33	2258.22 2.93	0.00 0.00	0.00 0.00

## 12.8 PILARES – PAVIMENTO TÉRREO

### 12.8.1 Resultados dos Pilares

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P2 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	26.88 16.36	0 580	0 1222	1.57 2 ø 10.0 1.57 2 ø 10.0 0.6 4 ø 10.0	ø 5.0 c/12	13.84 11.07
P3 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	12.19 6.93	0 601	0 901	2.45 2 ø 12.5 4.91 4 ø 12.5 2.0 8 ø 12.5	ø 5.0 c/15	13.84 11.07
P4 1:25	20.00 X 20.00	28829.00 80.00	80.00 RR 80.00 RR	18.95 9.75	0 506	0 620	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	13.84 13.84
P5 1:25	20.00 X 20.00	28829.00 80.00	80.00 RR 80.00 RR	11.96 6.70	0 503	0 469	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	13.84 13.84
P7 1:25	20.00 X	28829.00 80.00	80.00 RR	27.33 16.83	0 690	0 1218	6.03 3 ø 16.0	ø 5.0 c/16	13.84 11.07

	25.00		80.00 RR				4.02 2 ø 16.0 2.4 6 ø 16.0		
P8 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	12.53 7.52	0 685	0 928	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	13.84 11.07

## 12.8.2 Cálculo do Pilar P2

### 12.8.2.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 12.8.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 580 kgf.m	Ndmax = 26.88 tf Ndmin = 16.36 tf
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 1222 kgf.m	ni = 0.25

### 12.8.2.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 98 Msdbase = 163	Madtopo = 364 Madcentro = 266 Madbase = 201 M2d = 12 Mcd = 1	Td = 6 kgf.m  Asl = 0.02 cm <sup>2</sup>	2 ø 10.0 2 ø 10.0  4ø10.0 3.14 cm <sup>2</sup> 0.6 %	G1+G2+1.4V3+0.84D3 Msdx = 364 kgf.m Msdy = 1216 kgf.m Mrdx = 775 kgf.m Mrdy = 2587 kgf.m Mrd/Msd=2.13

H	$Ms_{dtopo} = 0$ $Ms_{dcentro} = 729$ $Ms_{dbase} = 1216$	$Mad_{topo} = 390$ $Mad_{centro} = 35$ $Mad_{base} = 69$ $M_{2d} = 13$ $M_{cd} = 2$			
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#### 12.8.2.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	$VB_{d\ topo} = 0.71\ tf$ $VB_{d\ base} = 0.71\ tf$ $VH_{d\ topo} = 1.51\ tf$ $VH_{d\ base} = 1.51\ tf$	$T_d = 6\ kgf.m$

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	$V_d = 0.71\ tf$ $VR_{d2} = 19.73\ tf$	$T_d = 6\ kgf.m$ $TR_{d2} = 922\ kgf.m$	$V_d/VR_{d2} + T_d/TR_{d2} = 0.04$
H	$V_d = 1.51\ tf$ $VR_{d2} = 20.87\ tf$	$T_d = 6\ kgf.m$ $TR_{d2} = 922\ kgf.m$	$V_d/VR_{d2} + T_d/TR_{d2} = 0.08$

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	$d = 15.50\ cm$ $V_{c0} = 3.37\ tf$ $k = 2.00$ $V_c = 6.73\ tf$	$V_{min} = 1.41\ tf$ $As_{wmin} = 2.32\ cm^2/m$	$V_{sw} = 0.00\ tf$ $As_w = 0.00\ cm^2/m$
H	$d = 20.50\ cm$ $V_{c0} = 3.56\ tf$ $k = 2.00$ $V_c = 7.13\ tf$	$V_{min} = 1.86\ tf$ $As_{wmin} = 2.32\ cm^2/m$	$V_{sw} = 0.00\ tf$ $As_w = 0.00\ cm^2/m$

Armatura de torção		Armatura de fretagem		Armatura final
Dados	Armatura torção	Topo	Base	
he = 5.56 cm Ae = 176.00 cm <sup>2</sup>	A90 = 0.04 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/12

### 12.8.3 Cálculo do Pilar P3

#### 12.8.3.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

#### 12.8.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 601 kgf.m	Ndmax = 12.19 tf Ndmin = 6.93 tf ni = 0.11
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 901 kgf.m	

#### 12.8.3.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armatura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 12 Msdbase = 20	Madtopo = 222 Madcentro = 210 Madbase = 201 M2d = 7 Mcd = 0	Td = 5 kgf.m  Asl = 0.02 cm <sup>2</sup>	2 ø 12.5 4 ø 12.5	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V2+0.84D 2 Msd(x) = 222 kgf.m Msd(y) = 901 kgf.m Mrd(x) = 889 kgf.m Mrd(y) = 3613 kgf.m Mrd/Msd=4.01
H	Msdtopo = 0	Madtopo = 238		8ø12.5 9.82 cm <sup>2</sup> 2.0 %	



	Msdcentr o = 540 Msdbase = 901	Madcentr o = 21 Madbase = 42 M2d = 9 Mcd = 1			
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(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 12.8.3.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.75 tf VBd base = 0.75 tf VHd topo = 1.12 tf VHd base = 1.12 tf	Td = 5 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.75 tf VRd2 = 19.57 tf	Td = 5 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.04
H	Vd = 1.12 tf VRd2 = 20.75 tf	Td = 5 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.06

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 3.34 tf k = 2.00 Vc = 6.68 tf	Vmin = 1.39 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.38 cm Vc0 = 3.54 tf k = 2.00 Vc = 7.08 tf	Vmin = 1.85 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	

he = 5.56 cm Ae = 169.31 cm <sup>2</sup>	A90 = 0.03 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/15
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## 12.8.4 Cálculo do Pilar P4

### 12.8.4.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 20.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.63

### 12.8.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 506 kgf.m	Ndmax = 18.95 tf Ndmin = 9.75 tf ni = 0.22
H	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 620 kgf.m	

### 12.8.4.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 9 Msdbase = 14	Madtopo = 206 Madcentro = 198 Madbase = 192 M2d = 7 Mcd = 0	Td = 5 kgf.m	2 ø 10.0 2 ø 10.0	G1+G2+1.4V3+0.84D3 Msdx) = 14 kgf.m Msdy) = 659 kgf.m Mrdx) = 36 kgf.m Mrdy) = 1647 kgf.m Mrd/Msd=2.50
H	Msdtopo = 0 Msdcentro = 372 Msdbase = 620	Madtopo = 206 Madcentro = 20 Madbase = 39 M2d = 10 Mcd = 1	Asl = 0.02 cm <sup>2</sup>	4ø10.0 3.14 cm <sup>2</sup> 0.8 %	

#### 12.8.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.62 tf VBd base = 0.62 tf VHd topo = 0.76 tf VHd base = 0.76 tf	Td = 5 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.62 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 0.76 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.06

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.00 cm Ae = 121.00 cm²	A90 = 0.05 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/12

## 12.8.5 Cálculo do Pilar P5

### 12.8.5.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 20.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.63

### 12.8.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 503 kgf.m	Ndmax = 11.96 tf Ndmin = 6.70 tf ni = 0.14
H	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 469 kgf.m	

### 12.8.5.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 302 Msdbase = 503	Madtopo = 142 Madcentro = 14 Madbase = 27 M2d = 7 Mcd = 1	Td = 5 kgf.m  Asl = 0.02 cm <sup>2</sup>	2 ø 10.0 2 ø 10.0	G1+G2+1.4V2+0.84D2 Msdx = 530 kgf.m Msdy = 24 kgf.m Mrdx = 1467 kgf.m Mrdy = 67 kgf.m Mrd/Msd=2.77
H	Msdtopo = 0 Msdcentro = 14 Msdbase = 24	Madtopo = 142 Madcentro = 128 Madbase = 118 M2d = 5 Mcd = 0		4ø10.0 3.14 cm <sup>2</sup> 0.8 %	

### 12.8.5.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção

I	VBd topo = 0.62 tf VBd base = 0.62 tf VHd topo = 0.58 tf VHd base = 0.58 tf	Td = 5 kgf.m
45		

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.62 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 0.58 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.00 cm Ae = 121.00 cm²	A90 = 0.05 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/12

## 12.8.6 Cálculo do Pilar P7

### 12.8.6.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm²

Cobrimento = 3.50 cm	Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61
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#### 12.8.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 690 kgf.m	Ndmax = 27.33 tf Ndmin = 16.83 tf ni = 0.26
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 1218 kgf.m	

#### 12.8.6.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 117 Msdbase = 195	Madtopo = 563 Madcentro = 446 Madbase = 368 M2d = 19 Mcd = 1	Td = 7 kgf.m  Asl = 0.03 cm <sup>2</sup>	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V4+0.84D 4 Msd(x) = 563 kgf.m Msd(y) = 1218 kgf.m Mrd(x) = 1897 kgf.m Mrd(y) = 4105 kgf.m Mrd/Msd=3.37
H	Msdtopo = 0 Msdcentro = 731 Msdbase = 1218	Madtopo = 603 Madcentro = 54 Madbase = 107 M2d = 16 Mcd = 3		6ø16. 0 12.06 cm <sup>2</sup> 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 12.8.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.85 tf VBd base = 0.85 tf VHd topo = 1.51 tf	Td = 7 kgf.m

	VHd base = 1.51 tf	
--	--------------------	--

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.85 tf VRd2 = 19.35 tf	Td = 7 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 1.51 tf VRd2 = 20.57 tf	Td = 7 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.08

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.05 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/16

## 12.8.7 Cálculo do Pilar P8

### 12.8.7.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.61

### 12.8.7.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 685 kgf.m	Ndmax = 12.53 tf
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 928 kgf.m	Ndmin = 7.52 tf ni = 0.12

### 12.8.7.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 411 Msdbase = 684	Madtopo = 262 Madcentro = 25 Madbase = 50 M2d = 12 Mcd = 1	Td = 5 kgf.m	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msd(x) = 684 kgf.m Msd(y) = 281 kgf.m Mrd(x) = 3108 kgf.m Mrd(y) = 1274 kgf.m Mrd/Msd=4.54
H	Msdtopo = 0 Msdcentro = 20 Msdbase = 33	Madtopo = 281 Madcentro = 261 Madbase = 247 M2d = 6 Mcd = 0	Asl = 0.02 cm²	6ø16. 0 12.06 cm² 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 12.8.7.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.85 tf VBd base = 0.85 tf VHd topo = 1.15 tf VHd base = 1.15 tf	Td = 5 kgf.m



Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.85 tf VRd2 = 19.35 tf	Td = 5 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 1.15 tf VRd2 = 20.57 tf	Td = 5 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.06

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.04 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/16

### 12.8.8 Cálculo dos Pilares

<b>térreo</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 1</b>		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P2	20.00 X 25.00	RR 13.84 RR 11.07	26.88 16.36	364 1216	775 2587	2.13	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	20.00 X 25.00	RR 13.84 RR	12.19 6.93	222 901	889 3613	(*) 4.01	2.45 (2 ø 12.5) 4.91

		11.07					(4 ø 12.5)
P4	20.00 X 20.00	RR 13.84 RR 13.84	18.95 9.75	14 659	36 1647	2.50	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P5	20.00 X 20.00	RR 13.84 RR 13.84	11.96 6.70	530 24	1467 67	2.77	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P7	20.00 X 25.00	RR 13.84 RR 11.07	27.33 16.83	563 1218	1897 4105	(*) 3.37	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P8	20.00 X 25.00	RR 13.84 RR 11.07	12.53 7.52	684 281	3108 1274	(*) 4.54	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)

(\*) Quantidade de barras alterada pelo usuário (para mais)

## 12.9 VIGAS - PAVIMENTO TERREO

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	1559.44 2607.31 1686.23	2 ø 10.0 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	-1224.52 -0.04 -5164.71 -0.04	2 ø 10.0 2 ø 10.0 2 ø 16.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0 2 ø 8.0	Avisos 02, 04, 101
V2	1801.42	2 ø 10.0		-433.66 -190.87	2 ø 8.0 2 ø 8.0		
V3	2135.64	2 ø 10.0	2 ø 8.0	-39.26	2 ø 10.0	2 ø 8.0	
V4	1387.91 2854.18 1245.57	2 ø 10.0 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	-1624.52 -0.04 -5164.01 -444.37 -0.04	2 ø 10.0 2 ø 10.0 2 ø 16.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0 2 ø 8.0 2 ø 8.0	Avisos 02, 04, 101
V5	774.81	2 ø 8.0	2 ø 8.0				
V6	2043.92 2333.96 2070.85	2 ø 12.5 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	-242.95 -0.04 -5283.89 -302.28	2 ø 8.0 2 ø 8.0 3 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0 2 ø 8.0	Aviso 38
V7	534.44	2 ø 10.0		-175.24	2 ø 10.0		
V8	2557.37 1619.46	2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0	-2.21 -3397.85 -24.82	2 ø 10.0 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	
V9	642.53	2 ø 12.5	2 ø 12.5	-286.67	2 ø 12.5		
V10	774.17	2 ø 12.5	2 ø 12.5	-294.65	2 ø 12.5		
V11	0.11	2 ø 12.5	2 ø 12.5	-202.03 -194.73	2 ø 12.5 2 ø 12.5		Aviso 08

### 12.9.1 Esforços da Viga V1

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			Nd (tf)	Rd (tf)					
P1		20.0 0								3.2 5			
1	32.5 0 15.0 0	15.0 0	833. 00	0.00			0. 37	- 1. 06	9. 83			1559 .44	- 1224 .52
V5		15.0 0								0.0 0			
2	336. 25 318. 75	318. 75	758. 00	0.00			0. 67	- 0. 75	6. 36		2607 .31	1560 .21	- 5164 .71
P2		20.0 0								8.2 4			
3	343. 25 321. 25	321. 25	758. 00	0.00			0. 61	- 0. 47	5. 39		1686 .23	64.9 6	- 4899 .41
P3		25.0 0								1.3 6			

### 12.9.2 Esforços da Viga V2

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
P4		20.0 0								1.2 8			

1	343.25 325.25	325.25	150.00	0.00			0.18	-0.19	2.16		1801.42		-433.66 -190.87
P5		20.00								1.06			

### 12.9.3 Esforços da Viga V3

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V6		20.00								1.96			
1	345.25 325.25	80.25	180.00	0.00			0.04	-0.08	2.91			1726.69	
		18.00											
2		227.00	180.00	0.00			0.03	-0.09	2.74		2135.64	1682.16	-39.26
V8		20.00								1.85			

### 12.9.4 Esforços da Viga V4

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					

P6		20.0 0							3.6 4			
1	32.5 0 15.0 0	15.0 0	833. 00	0.00			0.51	- 1.03	10.55		1387 .91	- 1624 .52
V5		15.0 0							0.0 0			
2	336. 25 318. 75	318. 75	758. 00	0.00			0.65	- 0.75	6.8 4	2854 .18	1386 .71	- 5164 .01
P7		20.0 0							8.5 5			
3	346. 25 326. 25	81.2 5	758. 00	0.00			0.34	- 0.12	5.5 6			- 4969 .49
		18.0 0										- 444. 37
4		227. 00	758. 00	0.00			0.46	- 0.45	2.2 8	1245 .57	141. 85	- 402. 64
P8		20.0 0							1.1 7			

### 12.9.5 Esforços da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V4		20.0 0								2.4 6			
1	649. 95 629. 95	629. 95	131. 25	0.00			0. 00	- 2. 03	3. 53		774. 81		

V1		20.0 0								2.3 6	
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### 12.9.6 Esforços da Viga V6

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
P7		25.0 0								0.2 0			
1	138. 00 120. 00	120. 00	150. 00	0.00			0. 00	- 0. 96	2. 22			2043 .92	- 242. 95
V3		18.0 0								0.0 0			
2	180. 97 161. 97	161. 97	250. 00	0.00			0. 00	- 0. 53	7. 50			2333 .96	- 5283 .89
P4		20.0 0								9.9 2			
3	322. 44 299. 94	299. 94	250. 00	0.00			0. 00	- 1. 21	7. 24		2070 .85		- 5264 .05  - 302. 28
P2		25.0 0								0.1 0			

### 12.9.7 Esforços da Viga V7

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2	Retra ção (‰)	Esforço axial		Vd (tf)	Rm ax (tf)	Mdm ax (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m.	Acid .			Nd (tf)	Rd (tf)					



	(cm)		(kgf/m)	(kgf/m)	(°C)								
V4		20.0 0								0.7 9			
1	144. 00 125. 00	125. 00	180. 00	0.00			0. 00	- 0. 04	1. 17		534. 44	385. 22	- 175. 24
V3		18.0 0								0.3 9			

### 12.9.8 Esforços da Viga V8

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm ax (tf)	Mdm ax (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
P8		25.0 0								1.7 9			
1		120. 00	758. 00	0.00			0. 00	- 0. 63	2. 58			24.9 9 2463 .95	-2.21
		18.0 0											
2		161. 97	758. 00	0.00			0. 00	- 0. 41	5. 35			2557 .37	- 3395 .75
P5		20.0 0								7.0 5			
3	324. 98 304. 98	304. 98	758. 00	0.00			0. 00	- 0. 83	4. 90		1619 .46		- 3397 .85 - 24.8 2
P3		20.0 0								1.3 9			

### 12.9.9 Esforços da Viga V9

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V11		20.00								0.72			
1	147.96 127.96	127.96	350.00	0.00			1.63	0.00	3.86			642.53	-286.67
		20.00											

### 12.9.10 Esforços da Viga V10

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V11		20.00								0.75			
1	147.96 127.96	127.96	350.00	0.00			1.72	0.00	4.13			774.17	-294.65
		20.00											

### 12.9.11 Esforços da Viga V11

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>



Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/m)	Acid . (kgf/m)			Nd (tf)	Rd (tf)					
V10		20.00								0.00			
1	480.00 460.00	460.00	350.00	0.00			1.99	0.00	1.20				- 202.03 - 194.73
V9		20.00								0.00			

### 12.9.12 Resultados da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P1	20.00		2 ø 8.0 0.29	2 ø 10.0 1.65					0.03
1	15.00	20.00 x 55.00	2 ø 10.0 1.65	2 ø 8.0 0.29		ø 5.0 c/ 17	ø 5.0 c/ 5 100.00		0.05
V5	15.00		2 ø 8.0 0.21	2 ø 10.0 1.20					0.00
2	318.75	20.00 x 40.00	2 ø 12.5 1.78	2 ø 8.0 0.21		ø 5.0 c/ 17			0.11
P2	20.00		2 ø 8.0 0.17	2 ø 16.0 3.51					0.20
3	321.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.13		ø 5.0 c/ 17			0.07
P3	25.00		2 ø 8.0 0.13	2 ø 10.0 1.20					0.00

### 12.9.13 Resultados da Viga V2

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P4	20.00			2 ø 8.0 0.90					0.02
1	325.25	20.00 x 30.00	2 ø 10.0 1.59			ø 5.0 c/ 16			0.16
P5	20.00			2 ø 8.0 0.90					0.00

### 12.9.14 Resultados da Viga V3

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V6	20.00								0.00
1	325.25	18.00 x 40.00	2 ø 10.0 1.36	2 ø 8.0 0.33		ø 5.0 c/ 15		2x3 ø 6.3	0.12
V8	20.00		2 ø 8.0 0.33	2 ø 10.0 1.24					0.00

### 12.9.15 Resultados da Viga V4

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P6	20.00		2 ø 8.0 0.28	2 ø 10.0 1.65					0.04
1	15.00	20.00 x 55.00	2 ø 10.0 1.65	2 ø 8.0 0.28		ø 5.0 c/ 17	ø 5.0 c/ 5 100.00		0.04

V5	15.00		2 ø 8.0 0.21	2 ø 10.0 1.20					0.00
2	318.75	20.00 x 40.00	2 ø 12.5 1.94	2 ø 8.0 0.21		ø 5.0 c/ 17			0.13
P7	20.00		2 ø 8.0 0.18	2 ø 16.0 3.52					0.21
3	326.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.12		ø 5.0 c/ 17			0.04
P8	20.00		2 ø 8.0 0.12	2 ø 10.0 1.20					0.00

### 12.9.16 Resultados da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V4	20.00								0.00
1	629.95	15.00 x 35.00	2 ø 8.0 0.86	2 ø 8.0 0.56		ø 5.0 c/ 19			0.08
V1	20.00								0.00

### 12.9.17 Resultados da Viga V6

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P7	25.00		2 ø 8.0 0.53	2 ø 8.0 1.04					0.01
1	120.00	20.00 x 30.00	2 ø 12.5 2.21	2 ø 8.0 0.52		ø 5.0 c/ 12			0.12
V3	18.00		2 ø 8.0 0.41	2 ø 8.0 1.04					0.00
2	161.97	20.00 x	2 ø 10.0	2 ø 8.0 0.15		ø 5.0 c/ 17			0.10

		50.00	1.50						
P4	20.00		2 ø 8.0 0.13	3 ø 12.5 2.75					0.11
3	299.94	20.00 x 50.00	2 ø 10.0 1.50	2 ø 8.0 0.33		ø 5.0 c/ 17			0.08
P2	25.00		2 ø 8.0 0.33	2 ø 10.0 1.50					0.00

### 12.9.18 Resultados da Viga V7

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V4	20.00			2 ø 10.0 1.08					0.00
1	125.00	18.00 x 40.00	2 ø 10.0 1.08			ø 5.0 c/ 19			0.01
V3	18.00								0.00

### 12.9.19 Resultados da Viga V8

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P8	25.00		2 ø 8.0 0.17	2 ø 10.0 1.20					0.00
1	299.97	20.00 x 40.00	2 ø 12.5 1.73	2 ø 8.0 0.17		ø 5.0 c/ 17			0.10
P5	20.00		2 ø 8.0 0.11	2 ø 12.5 2.25					0.17
2	304.98	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.23		ø 5.0 c/ 17			0.08

P3	20.00		2 ø 8.0 0.23	2 ø 10.0 1.20					0.00
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### 12.9.20 Resultados da Viga V9

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V11	20.00			2 ø 12.5 2.10					0.00
1	127.96	20.00 x 70.00	2 ø 12.5 2.10	2 ø 12.5 1.72		ø 5.0 c/ 17		2x5 ø 6.3	0.01
	20.00								0.00

### 12.9.21 Resultados da Viga V10

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V11	20.00			2 ø 12.5 2.10					0.00
1	127.96	20.00 x 70.00	2 ø 12.5 2.10	2 ø 12.5 1.72		ø 5.0 c/ 17		2x5 ø 6.3	0.01
	20.00								0.00

### 12.9.22 Resultados da Viga V11

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
V10	20.00			2 ø 12.5 2.10					0.00
1	460.00	20.00 x 70.00	2 ø 12.5 2.10	2 ø 12.5 1.72		ø 5.0 c/ 17		2x5 ø 6.3	0.01
V9	20.00			2 ø 12.5 2.10					0.00

## 12.10 LAJES – PAVIMENTO TÉRREO

### 12.10.1 Dados das Lajes

térreo	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 3.50 cm	

Seção (cm)						Cargas (kgf/m²)				Temperatura Caso T1 Caso T2 (°C)	Retração o Deform. X Deform. Y (‰)
Laje	Tipo	H	ee c	en x en y	ee x ee y	Peso Próprio	Acidental Revestimen to	Parede s Outras	Total		
L1	Maciça	15				375.00	10.00 80.00	0.00 0.00	465.00		
L2	Maciça	16				400.00	300.00 154.50	136.86 0.00	991.36		
L3	Maciça	13				325.00	300.00 154.50	0.00 0.00	779.50		
L4	Maciça	13				325.00	300.00 154.50	0.00 0.00	779.50		
L5	Maciça	13				325.00	300.00 154.50	0.00 0.00	779.50		
L6	Maciça	13				325.00	300.00 154.50	0.00 0.00	779.50		

### 12.10.2 Resultados da Laje

térreo	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 3.50 cm	

Nome	Espessura (cm)	Carga (kgf/m²)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	15	465.00	3468	3655	As = 8.93 cm²/m	As = 11.12 cm²/m

					( $\varnothing 12.5$ c/13 - 9.44 cm <sup>2</sup> /m)	( $\varnothing 12.5$ c/11 - 11.16 cm <sup>2</sup> /m)
L2	16	991.36	1772	933	As = 3.93 cm <sup>2</sup> /m ( $\varnothing 10.0$ c/19 - 4.13 cm <sup>2</sup> /m)	As = 2.40 cm <sup>2</sup> /m ( $\varnothing 8.0$ c/20 - 2.51 cm <sup>2</sup> /m)
L3	13	779.50	655	463	As = 1.76 cm <sup>2</sup> /m ( $\varnothing 8.0$ c/20 - 2.51 cm <sup>2</sup> /m)	As = 1.60 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/19 - 1.64 cm <sup>2</sup> /m)
L4	13	779.50	566	263	As = 1.48 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/19 - 1.64 cm <sup>2</sup> /m)
L5	13	779.50	135	483	As = 1.45 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/19 - 1.64 cm <sup>2</sup> /m)
L6	13	779.50	247	323	As = 1.45 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m ( $\varnothing 6.3$ c/19 - 1.64 cm <sup>2</sup> /m)

### 12.10.3 Cálculos das Lajes

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.50 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	bw = 100.0 cm h = 15.0 cm	Md = 3468 kgf.m/m As = 8.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.04 tf Situação: GE As = 7.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.13 tf Situação: GE As = 8.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 15.0 cm	Md = 3413 kgf.m/m As = 7.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.04 tf Situação: GE As = 7.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.13 tf Situação: GE As = 8.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.93 cm <sup>2</sup> /m $\varnothing 12.5$ c/13 (9.44 cm <sup>2</sup> /m) fiss = 0.18 mm	A's = 8.51 cm <sup>2</sup> /m $\varnothing 12.5$ c/14 (8.77 cm <sup>2</sup> /m)	vsd = 23.06 tf/m vrd1 = 9.08 tf/m Modelo I vrd2 = 52.82 tf/m vsw = erro asw = erro
	Y	bw = 100.0 cm	Md = 3655	Fd = 1.92 tf Situação: GE	Fd = 7.08 tf	bw = 100.0 cm	Md = 4504	Fd = 1.92 tf Situação: GE	Fd = 7.08 tf	As = 11.12 cm <sup>2</sup> /m	A's = 13.73 cm <sup>2</sup> /m	vsd = 52.41 tf/m



		h = 15.0 cm	kgf. m/m As = 9.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 9.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 11.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	h = 15.0 cm	kgf. m/m As = 12.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 12.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 13.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	ø12.5 c/11 (11.16 cm <sup>2</sup> /m) fiss = 0.19 mm	ø12.5 c/8 (15.34 cm <sup>2</sup> /m)	vrđ1 = 8.72 tf/m vrđ2 = 46.46 tf/m vsw = erro asw = erro
L2	X	bw = 10.0 cm h = 16.0 cm	Md = 177.2 kgf. m/m As = 3.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.82 tf Situação: GE As = 3.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.79 tf Situação: GE As = 3.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 16.0 cm				As = 3.93 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m) fiss = 0.15 mm		vsd = 4.38 tf/m vrđ1 = 8.60 tf/m Modelo I vrđ2 = 58.55 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10.0 cm h = 16.0 cm	Md = 933 kgf. m/m As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.58 tf Situação: GE As = 1.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.64 tf Situação: GE As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 16.0 cm				As = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.11 mm		vsd = 3.33 tf/m vrđ1 = 7.72 tf/m vrđ2 = 53.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L3	X	bw = 10.0 cm h = 13.0 cm	Md = 655 kgf. m/m	Fd = 0.48 tf Situação: GE As = 1.61 cm <sup>2</sup> /m	Fd = 0.39 tf Situação: GE	bw = 10.0 cm h = 13.0 cm				As = 1.76 cm <sup>2</sup> /m ø8.0 c/20		vsd = 2.41 tf/m vrđ1 = 6.52 tf/m





L4		0 cm	As = 1.69 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	As = 1.76 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	0 cm				(2.51 cm <sup>2</sup> / m) fiss = 0.07 mm		Modelo I vrd2 = 43.79 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.53 tf Situa ção: GE As = 1.39 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.60 cm <sup>2</sup> / m ø6.3 c/19 (1.64 cm <sup>2</sup> / m) fiss = 0.08 mm		vsd = 2.22 tf/m vrd1 = 5.88 tf/m vrd2 = 40.15 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	X	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.12 tf Situa ção: GE As = 1.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.22 tf Situa ção: GE As = 1.48 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.48 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.10 mm		vsd = 1.66 tf/m vrd1 = 6.36 tf/m Modelo I vrd2 = 44.22 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.56		Fd = 0.38 tf Situa ção: GE As = 0.78 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.56 cm <sup>2</sup> / m ø6.3 c/19 (1.64 cm <sup>2</sup> / m)		vsd = 1.10 tf/m vrd1 = 5.99 tf/m vrd2 = 41.01 tf/m



			cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> / m					fiss = 0.02 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L5	X	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.45 tf Situa ção: GE As = 0.41 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.45 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.01 mm		vsd = 1.74 tf/m vrd1 = 6.36 tf/m Modelo I vrd2 = 44.22 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.93 tf Situa ção: GE As = 1.49 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.56 cm <sup>2</sup> / m ø6.3 c/19 (1.64 cm <sup>2</sup> / m) fiss = 0.08 mm		vsd = 4.69 tf/m vrd1 = 5.99 tf/m vrd2 = 41.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L6	X	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.45 cm <sup>2</sup> / m A's = 0.00	Fd = 0.15 tf Situa ção: GE As = 0.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.59 tf Situa ção: GE As = 0.72 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.45 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.02 mm		vsd = 1.45 tf/m vrd1 = 6.36 tf/m Modelo I vrd2 = 44.22 tf/m vsw = 0.00 tf/m

			cm <sup>2</sup> /m									asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10.0 cm h = 13.0 cm	Md = 568 kgf.m/m As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.34 tf Situação: GE As = 0.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 13.0 cm				As = 1.56 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.04 mm		vsd = 0.99 tf/m vrd1 = 5.99 tf/m vrd2 = 41.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 12.11 PILARES - PAVIMENTO TAMPA DO POÇO

### 12.11.1 Resultados dos Pilares

<b>tampa do poço</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 215.00 RR	15.77 9.65	1126 0	1791 0	6.03    3 ø 16.0 8.04    4 ø 16.0 4.0    10 ø 16.0	ø 5.0 c/16	60.55 29.76
P2 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	14.80 9.26	1193 0	2997 0	4.02    2 ø 16.0 4.02    2 ø 16.0 1.6    4 ø 16.0	ø 5.0 c/16	60.55 48.44
P3 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR	8.21 4.18	2139 0	1582 0	2.45    2 ø 12.5	ø 5.0 c/15	60.55 48.44

			350.00 RR				4.91 4 ø 12.5 2.0 8 ø 12.5		
P6 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 215.00 RR	15.69 9.53	1166 0	1802 0	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/16	60.55 29.76
P7 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	14.70 9.29	1319 0	2815 0	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44
P8 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	8.21 4.57	1104 0	2651 0	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44

## 12.11.2 Cálculo do Pilar P1

### 12.11.2.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 12.11.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1126 kgf.m Msdbase = 0 kgf.m	Ndmax = 15.77 tf Ndmin = 9.65 tf ni = 0.15
H	Vínculo = RR li = 215.00 cm Esbeltez = 29.76	Msdtopo = 1791 kgf.m Msdbase = 0 kgf.m	

### 12.11.2.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 372 Msdcentro = 223 Msdbase = 0	Madtopo = 162 Madcentro = 93 Madbase = 316 M2d = 288 Mcd = 23	Td = 123 kgf.m  Asl = 0.45 cm <sup>2</sup>	3 ø 16.0 4 ø 16.0  10ø16.0	(*) 1.3G1+1.4G2+1.4V3+0.84D3 Msdx) = 372 kgf.m Msdy) = 1949 kgf.m Mrdx) = 1116 kgf.m Mrdy) = 5851 kgf.m Mrd/Msd=3.00
H	Msdtopo = 1787 Msdcentro = 1072 Msdbase = 0	Madtopo = 162 Madcentro = 81 Madbase = 339 M2d = 109 Mcd = 20		20.11 cm <sup>2</sup> 4.0 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 12.11.2.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.42 tf VBd base = 0.42 tf VHd topo = 0.80 tf VHd base = 0.80 tf	Td = 123 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.42 tf VRd2 = 19.35 tf	Td = 123 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.17
H	Vd = 0.80 tf VRd2 = 20.57 tf	Td = 123 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.19

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm	Vmin = 1.38 tf	Vsw = 0.00 tf

	Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Aswmin = 2.32 cm <sup>2</sup> /m	Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.88 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16

### 12.11.3 Cálculo do Pilar P2

#### 12.11.3.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

#### 12.11.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1193 kgf.m Msdbase = 0 kgf.m	Ndmax = 14.80 tf
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 2997 kgf.m Msdbase = 0 kgf.m	Ndmin = 9.26 tf ni = 0.14

#### 12.11.3.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 202	Madtopo = 158		2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D3



	Msdcentro = 121 Msdbase = 0	Madcentro = 188 Madbase = 309 M2d = 281 Mcd = 15	Td = 89 kgf.m	2 ø 16.0 4ø16.0 8.04 cm² 1.6 %	Msd(x) = 202 kgf.m Msdy = 3155 kgf.m Mrd(x) = 262 kgf.m Mrd(y) = 4078 kgf.m Mrd/Msd=1.29
H	Msdtopo = 2997 Msdcentro = 1798 Msdbase = 0	Madtopo = 158 Madcentro = 79 Madbase = 331 M2d = 337 Mcd = 86	Asl = 0.33 cm²		

#### 12.11.3.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.45 tf VBd base = 0.45 tf VHd topo = 1.33 tf VHd base = 1.33 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.45 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 1.33 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.17

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.25 Vc = 4.40 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.64 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16

#### 12.11.4 Cálculo do Pilar P3

##### 12.11.4.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

##### 12.11.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 2139 kgf.m Msdbase = 0 kgf.m	Ndmax = 8.21 tf Ndmin = 4.18 tf ni = 0.08
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 1582 kgf.m Msdbase = 0 kgf.m	

##### 12.11.4.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 2139 Msdcentro = 1283 Msdbase = 0	Madtopo = 81 Madcentro = 41 Madbase = 158 M2d = 242 Mcd = 46	Td = 88 kgf.m  Asl = 0.32 cm <sup>2</sup>	2 ø 12.5 4 ø 12.5	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D3 Msd(x) = 2220 kgf.m Msd(y) = 439 kgf.m Mrd(x) = 3058 kgf.m Mrd(y) = 605 kgf.m Mrd/Msd=1.38
H	Msdtopo = 439 Msdcentro = 264	Madtopo = 81 Madcentro = 41		8ø12.5 9.82 cm <sup>2</sup> 2.0 %	



	Msdbase = 0	Madbase = 170 M2d = 122 Mcd = 7			
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(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 12.11.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.95 tf VBd base = 0.95 tf VHd topo = 0.68 tf VHd base = 0.68 tf	Td = 88 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.95 tf VRd2 = 19.57 tf	Td = 88 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.15
H	Vd = 0.68 tf VRd2 = 20.75 tf	Td = 88 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 3.34 tf k = 1.17 Vc = 3.89 tf	Vmin = 1.39 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.38 cm Vc0 = 3.54 tf k = 1.54 Vc = 5.44 tf	Vmin = 1.85 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 169.31 cm²	A90 = 0.60 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.01 cm²	Asw = 2.32 cm²/m ø 5.0 c/15

## 12.11.5 Cálculo do Pilar P6

### 12.11.5.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 12.11.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1166 kgf.m Msdbase = 0 kgf.m	Ndmax = 15.69 tf
H	Vínculo = RR li = 215.00 cm Esbeltez = 29.76	Msdtopo = 1802 kgf.m Msdbase = 0 kgf.m	Ndmin = 9.53 tf ni = 0.15

### 12.11.5.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 376 Msdcentro = 226 Msdbase = 0	Madtopo = 150 Madcentro = 75 Madbase = 294 M2d = 270 Mcd = 21	Td = 97 kgf.m  Asl = 0.36 cm <sup>2</sup>	3 ø 16.0 4 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D3 Msd(x) = 376 kgf.m Msd(y) = 1953 kgf.m Mrd(x) = 1127 kgf.m Mrd(y) = 5845 kgf.m Mrd/Msd=2.99
H	Msdtopo = 1802 Msdcentro = 1081 Msdbase = 0	Madtopo = 150 Madcentro = 75 Madbase = 314 M2d = 104 Mcd = 19		10ø16. 0 20.11 cm <sup>2</sup> 4.0 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 12.11.5.4 Dimensionamento da armadura transversal

Modelo cálculo	Esforços
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Inclinação bielas	Cisalhamento	Torção
I  45	VBd topo = 0.43 tf VBd base = 0.43 tf VHd topo = 0.80 tf VHd base = 0.80 tf	Td = 97 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.43 tf VRd2 = 19.35 tf	Td = 97 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.14
H	Vd = 0.80 tf VRd2 = 20.57 tf	Td = 97 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.16

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.70 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/16

## 12.11.6 Cálculo do Pilar P7

### 12.11.6.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm²

Cobrimento = 3.50 cm	Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61
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#### 12.11.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1319 kgf.m Msdbase = 0 kgf.m	Ndmax = 14.70 tf Ndmin = 9.29 tf ni = 0.14
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 2815 kgf.m Msdbase = 0 kgf.m	

#### 12.11.6.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1314 Msdcentro = 788 Msdbase = 0	Madtopo = 153 Madcentro = 76 Madbase = 298 M2d = 372 Mcd = 61	Td = 89 kgf.m	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msdx = 1466 kgf.m Msdy = 1949 kgf.m Mrdx = 2255 kgf.m Mrdy = 2998 kgf.m Mrd/Msd=1.54
H	Msdtopo = 1949 Msdcentro = 1170 Msdbase = 0	Madtopo = 153 Madcentro = 76 Madbase = 320 M2d = 297 Mcd = 55	Asl = 0.33 cm <sup>2</sup>	6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 12.11.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.50 tf VBd base = 0.50 tf VHd topo = 1.25 tf	Td = 89 kgf.m

	VHd base = 1.25 tf	
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Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.50 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 1.25 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.17

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.27 Vc = 4.46 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.64 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm²	Asw = 2.32 cm²/m ø 5.0 c/16

## 12.12 CÁLCULO DO PILAR P8

### 12.12.1.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.61

### 12.12.1.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1104 kgf.m Msdbase = 0 kgf.m	Ndmax = 8.21 tf Ndmin = 4.57 tf ni = 0.08
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 2651 kgf.m Msdbase = 0 kgf.m	

### 12.12.1.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 233 Msdcentro = 140 Msdbase = 0	Madtopo = 84 Madcentro = 42 Madbase = 164 M2d = 155 Mcd = 7	Td = 89 kgf.m  Asl = 0.33 cm²	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V4+0.84D 4 Msd(x) = 233 kgf.m Msd(y) = 2735 kgf.m Mrd(x) = 416 kgf.m Mrd(y) = 4879 kgf.m Mrd/Msd=1.78
H	Msdtopo = 2651 Msdcentro = 1590 Msdbase = 0	Madtopo = 84 Madcentro = 42 Madbase = 176 M2d = 197 Mcd = 38		6ø16. 0 12.06 cm² 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 12.12.1.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.46 tf VBd base = 0.46 tf VHd topo = 1.19 tf VHd base = 1.19 tf	Td = 89 kgf.m

**Verificação de esforços limites**

Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.46 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 1.19 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.16

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.77 Vc = 5.86 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.17 Vc = 4.12 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.64 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.02 cm²	Asw = 2.32 cm²/m ø 5.0 c/16

## 12.12.2 Cálculo dos Pilares

tampa do poço	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	20.00 X 25.00	RR 60.55 RR 29.76	15.77 9.65	372 1949	1116 5851	(*) 3.00	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P2	20.00 X 25.00	RR 60.55 RR 48.44	14.80 9.26	202 3155	262 4078	1.29	4.02 (2 ø 16.0) 4.02 (2 ø 16.0)
P3	20.00	RR	8.21	2220	3058	(*)	2.45

	X 25.00	60.55 RR 48.44	4.18	439	605	1.38	(2 ø 12.5) 4.91 (4 ø 12.5)
P6	20.00 X 25.00	RR 60.55 RR 29.76	15.69 9.53	376 1953	1127 5845	(*) 2.99	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P7	20.00 X 25.00	RR 60.55 RR 48.44	14.70 9.29	1466 1949	2255 2998	(*) 1.54	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P8	20.00 X 25.00	RR 60.55 RR 48.44	8.21 4.57	233 2735	416 4879	(*) 1.78	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 12.13 VIGAS - PAVIMENTO TAMPA DO POÇO

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
NÃO EXISTE 1	2994.10	3 ø 16.0	2 ø 12.5	-4773.57 -4944.38	3 ø 16.0 3 ø 16.0	2 ø 12.5 2 ø 12.5	Aviso 26

### 12.14 PILARES - PAVIMENTO COBERTURA

#### 12.14.1 Resultados dos Pilares

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 135.00 RR	11.77 7.28	1309 1113	5891 3154	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/8	60.55 18.68
P2 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	14.45 9.09	1446 1193	4371 2997	6.03 3 ø 16.0 4.02 2 ø 16.0	ø 5.0 c/16	60.55 48.44



							2.4 6 ø 16.0		
P3 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	7.86 4.01	2987 2139	2132 1582	2.45 2 ø 12.5 4.91 4 ø 12.5 2.0 8 ø 12.5	ø 5.0 c/15	60.55 48.44
P6 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 135.00 RR	11.74 7.17	1340 1122	5854 3102	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/9	60.55 18.68
P7 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	14.35 9.12	1649 1319	4077 2815	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44
P8 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	7.86 4.40	1349 1104	3827 2651	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44

## 12.14.2 Cálculo do Pilar P1

### 12.14.2.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 12.14.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1309 kgf.m Msdbase = 1113 kgf.m	Ndmax = 11.77 tf Ndmin = 7.28 tf ni = 0.11
H	Vínculo = RR li = 135.00 cm Esbeltez = 18.68	Msdtopo = 5891 kgf.m Msdbase = 3154 kgf.m	

### 12.14.2.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1256 Msdcentro = 1185 Msdbase = 1078	Madtopo = 79 Madcentro = 40 Madbase = 79 M2d = 345 Mcd = 71	Td = 62 kgf.m	3 ø 16.0 4 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V2+0.84 D2 Msd(x) = 1256 kgf.m Msd(y) = 5729 kgf.m Mrd(x) = 1263 kgf.m Mrd(y) = 5762 kgf.m Mrd/Msd=1.01
H	Msdtopo = 5649 Msdcentro = 2262 Msdbase = 2819	Madtopo = 79 Madcentro = 40 Madbase = 79 M2d = 43 Mcd = 12	Asl = 0.23 cm²	10ø16.0 20.11 cm² 4.0 %	

### 12.14.2.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.17 tf VBd base = 0.17 tf VHd topo = 6.67 tf VHd base = 6.67 tf	Td = 62 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.17 tf VRd2 = 19.35 tf	Td = 62 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.08
H	Vd = 6.67 tf VRd2 = 20.57 tf	Td = 62 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.40

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf	Vmin = 1.38 tf	Vsw = 0.00 tf

	k = 1.83 Vc = 6.03 tf	Aswmin = 2.32 cm <sup>2</sup> /m	Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.08 Vc = 3.80 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 2.87 tf Asw = 3.63 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.45 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.02 cm <sup>2</sup>	Asw = 4.52 cm <sup>2</sup> /m ø 5.0 c/8

### 12.14.3 Cálculo do Pilar P2

#### 12.14.3.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

#### 12.14.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1446 kgf.m Msdbase = 1193 kgf.m	Ndmax = 14.45 tf Nadmin = 9.09 tf ni = 0.13
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 4371 kgf.m Msdbase = 2997 kgf.m	

#### 12.14.3.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1425 Msdcentro = 1327	Madtopo = 92 Madcentro = 46	Td = 89 kgf.m	3 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msd(x) = 1864 kgf.m Msd(y) = 2959 kgf.m



	Msdbase = 1179	Madbase = 92 M2d = 399 Mcd = 92	Asl = 0.33 cm <sup>2</sup>	6ø16. 0 12.06 cm <sup>2</sup> 2.4 %	Mrd(x) = 2080 kgf.m Mrd(y) = 3302 kgf.m Mrd/Msd=1.12
H	Msdtopo = 3496 Msdcentro = 2959 Msdbase = 2155	Madtopo = 92 Madcentro = 46 Madbase = 92 M2d = 347 Mcd = 127			

#### 12.14.3.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.15 tf VBd base = 0.15 tf VHd topo = 1.03 tf VHd base = 1.03 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.15 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.11
H	Vd = 1.03 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.16

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.16 Vc = 4.07 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção	Armadura de fretagem	Armadura final
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Dados	Armadura torção	Topo	Base	
$h_e = 5.56 \text{ cm}$ $A_e = 160.16 \text{ cm}^2$	$A_{90} = 0.64 \text{ cm}^2$	$Z_r = 0.00 \text{ tf}$ $Z_s = 0.00 \text{ tf}$	$Z_r = 0.00 \text{ tf}$ $Z_s = 0.00 \text{ tf}$ $A_{sw} = 0.03 \text{ cm}^2$	$A_{sw} = 2.32 \text{ cm}^2/\text{m}$ $\varnothing 5.0 \text{ c}/16$

#### 12.14.4 Cálculo do Pilar P3

##### 12.14.4.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular $b = 20.00 \text{ cm}$ $h = 25.00 \text{ cm}$ Cobrimento = 3.50 cm	$f_{ck} = 300.00 \text{ kgf/cm}^2$ $E_{cs} = 268384 \text{ kgf/cm}^2$ Peso específico = $2500.00 \text{ kgf/m}^3$ $F_i = 2.61$

##### 12.14.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR $l_i = 350.00 \text{ cm}$ Esbeltez = 60.55	$M_{sd\text{topo}} = 2987 \text{ kgf.m}$ $M_{sd\text{base}} = 2139 \text{ kgf.m}$	$N_{d\text{max}} = 7.86 \text{ tf}$ $N_{d\text{min}} = 4.01 \text{ tf}$ $n_i = 0.07$
H	Vínculo = RR $l_i = 350.00 \text{ cm}$ Esbeltez = 48.44	$M_{sd\text{topo}} = 2132 \text{ kgf.m}$ $M_{sd\text{base}} = 1582 \text{ kgf.m}$	

##### 12.14.4.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	$M_{sd\text{topo}} = 2987$ $M_{sd\text{centro}} = 2648$ $M_{sd\text{base}} = 2139$	$M_{ad\text{topo}} = 49$ $M_{ad\text{centro}} = 24$ $M_{ad\text{base}} = 49$ $M_{2d} = 250$ $M_{cd} = 87$	$T_d = 88 \text{ kgf.m}$	$2 \varnothing 12.5$ $4 \varnothing 12.5$	$1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D3$ $M_{sd}(x) = 3036 \text{ kgf.m}$ $M_{sd}(y) = 705 \text{ kgf.m}$ $M_{rd}(x) = 3023 \text{ kgf.m}$ $M_{rd}(y) = 702 \text{ kgf.m}$ $M_{rd}/M_{sd}=1.00$
H	$M_{sd\text{topo}} = 705$ $M_{sd\text{centro}} = 599$ $M_{sd\text{base}} = 439$	$M_{ad\text{topo}} = 49$ $M_{ad\text{centro}} = 24$ $M_{ad\text{base}} = 49$	$A_{sl} = 0.32 \text{ cm}^2$	$8 \varnothing 12.5$ $9.82 \text{ cm}^2$ $2.0 \%$	

		M2d = 150 Mcd = 13			
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#### 12.14.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.62 tf VBd base = 0.62 tf VHd topo = 0.38 tf VHd base = 0.38 tf	Td = 88 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.62 tf VRd2 = 19.57 tf	Td = 88 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 0.38 tf VRd2 = 20.75 tf	Td = 88 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.12

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 3.34 tf k = 1.10 Vc = 3.68 tf	Vmin = 1.39 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.38 cm Vc0 = 3.54 tf k = 1.37 Vc = 4.83 tf	Vmin = 1.85 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 169.31 cm²	A90 = 0.60 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.01 cm²	Asw = 2.32 cm²/m ø 5.0 c/15

## 12.14.5 Cálculo do Pilar P6

### 12.14.5.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 12.14.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1340 kgf.m Msdbase = 1122 kgf.m	Ndmax = 11.74 tf Ndmin = 7.17 tf ni = 0.11
H	Vínculo = RR li = 135.00 cm Esbeltez = 18.68	Msdtopo = 5854 kgf.m Msdbase = 3102 kgf.m	

### 12.14.5.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1335 Msdcentro = 1247 Msdbase = 1115	Madtopo = 72 Madcentro = 36 Madbase = 72 M2d = 322 Mcd = 67	Td = 52 kgf.m  Asl = 0.19 cm <sup>2</sup>	3 ø 16.0 4 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84 D1 Msdx = 1335 kgf.m Msdy = 5679 kgf.m Mrdx = 1334 kgf.m Mrdy = 5676 kgf.m Mrd/Msd=1.00
H	Msdtopo = 5607 Msdcentro = 2258 Msdbase = 2767	Madtopo = 72 Madcentro = 36 Madbase = 72 M2d = 40 Mcd = 11		10ø16.0 20.11 cm <sup>2</sup> 4.0 %	

### 12.14.5.4 Dimensionamento da armadura transversal

Modelo cálculo	Esforços	
	Cisalhamento	Torção

Inclinação bielas		
I  45	VBd topo = 0.17 tf VBd base = 0.17 tf VHd topo = 6.60 tf VHd base = 6.60 tf	Td = 52 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.17 tf VRd2 = 19.35 tf	Td = 52 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.07
H	Vd = 6.60 tf VRd2 = 20.57 tf	Td = 52 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.38

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.86 Vc = 6.13 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.08 Vc = 3.80 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 2.80 tf Asw = 3.55 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.38 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.02 cm²	Asw = 4.30 cm²/m ø 5.0 c/9

## 12.14.6 Cálculo do Pilar P7

### 12.14.6.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm²



Cobrimento = 3.50 cm	Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61
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#### 12.14.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1649 kgf.m Msdbase = 1319 kgf.m	Ndmax = 14.35 tf Ndmin = 9.12 tf ni = 0.13
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 4077 kgf.m Msdbase = 2815 kgf.m	

#### 12.14.6.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1641 Msdcentro = 1510 Msdbase = 1314	Madtopo = 94 Madcentro = 47 Madbase = 94 M2d = 413 Mcd = 107	Td = 89 kgf.m	3 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msd(x) = 2076 kgf.m Msd(y) = 2679 kgf.m Mrd(x) = 2279 kgf.m Mrd(y) = 2941 kgf.m Mrd/Msd=1.10
H	Msdtopo = 3165 Msdcentro = 2679 Msdbase = 1949	Madtopo = 94 Madcentro = 47 Madbase = 94 M2d = 345 Mcd = 117	Asl = 0.33 cm <sup>2</sup>	6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

#### 12.14.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.21 tf VBd base = 0.21 tf VHd topo = 0.96 tf VHd base = 0.96 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.21 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.12
H	Vd = 0.96 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.15

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.75 Vc = 5.77 tf	Vmin = 1.38 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.17 Vc = 4.11 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.64 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16

## 12.14.7 Cálculo do Pilar P8

### 12.14.7.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 12.14.7.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm	Msdtopo = 1349 kgf.m	Ndmax = 7.86 tf



	Esbeltez = 60.55	Msdbase = 1104 kgf.m	Ndmin = 4.40 tf ni = 0.07
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 3827 kgf.m Msdbase = 2651 kgf.m	

#### 12.14.7.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 368 Msdcentro = 314 Msdbase = 233	Madtopo = 50 Madcentro = 25 Madbase = 50 M2d = 181 Mcd = 12	Td = 89 kgf.m  Asl = 0.33 cm²	3 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V4+0.84D4 Msd(x) = 368 kgf.m Msd(y) = 3877 kgf.m Mrd(x) = 460 kgf.m Mrd(y) = 4855 kgf.m Mrd/Msd=1.25
H	Msdtopo = 3827 Msdcentro = 3356 Msdbase = 2651	Madtopo = 50 Madcentro = 25 Madbase = 50 M2d = 206 Mcd = 75		6ø16.0 12.06 cm² 2.4 %	

#### 12.14.7.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.16 tf VBd base = 0.16 tf VHd topo = 0.85 tf VHd base = 0.85 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.16 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.11
H	Vd = 0.85 tf	Td = 89 kgf.m	Vd/VRd2 + Td/TRd2 = 0.15

	VRd2 = 20.57 tf	TRd2 = 839 kgf.m	
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Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.60 Vc = 5.28 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.11 Vc = 3.89 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.64 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.01 cm²	Asw = 2.32 cm²/m ø 5.0 c/16

#### 12.14.8 Cálculo dos Pilares

<b>cobertura</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 3</b>		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	20.00 X 25.00	RR 60.55 RR 18.68	11.77 7.28	1256 5729	1263 5762	1.01	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P2	20.00 X 25.00	RR 60.55 RR 48.44	14.45 9.09	1864 2959	2080 3302	1.12	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P3	20.00 X 25.00	RR 60.55 RR 48.44	7.86 4.01	3036 705	3023 702	1.00	2.45 (2 ø 12.5) 4.91 (4 ø 12.5)
P6	20.00 X 25.00	RR 60.55 RR 18.68	11.74 7.17	1335 5679	1334 5676	1.00	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)

P7	20.00 X 25.00	RR 60.55 RR 48.44	14.35 9.12	2076 2679	2279 2941	1.10	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P8	20.00 X 25.00	RR 60.55 RR 48.44	7.86 4.40	368 3877	460 4855	1.25	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)

## 12.15 VIGAS - PAVIMENTO COBERTURA

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	0.11 2026.12 1750.19 0.11	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	-26.65 -2681.17 -4152.68 -1955.26 -17.01	2 ø 10.0 2 ø 12.5 2 ø 16.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	Aviso 101
V2	0.11 1982.56 1368.72 0.11	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	-26.91 -2631.92 -4188.03 -1504.32 -16.09	2 ø 10.0 2 ø 12.5 2 ø 16.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	Aviso 101
V3	0.11 5183.96 0.11	2 ø 10.0 2 ø 16.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	-13.41 -5957.87 -5986.41 -12.22	2 ø 10.0 2 ø 16.0 2 ø 16.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	
V4	6561.06	4 ø 12.5		-4134.32 -4379.29	3 ø 12.5 3 ø 12.5		
V5	0.11 5501.54 0.11	2 ø 10.0 2 ø 16.0 2 ø 10.0	2 ø 8.0	-27.00 -3975.60 -3193.22 -26.65	2 ø 10.0 3 ø 12.5 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0	Aviso 101

### 12.15.1 Esforços da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 1o (cm )	Lar g Bar ra (cm )	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		V d (tf )	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			N d (tf )	R d (tf )					
		0.00											
1	157. 76 147. 76	147. 76	200. 00	0.00			0. 43	- 0. 01	1. 40				- 26.6 5

													- 1693 .45
P1		20.0 0								2.3 3			
2		213. 49	200. 00	0.00			0. 82	- 0. 16	2. 67		2026 .12	2012 .29	- 2681 .17
		0.00											
3		135. 26	200. 00	0.00			0. 13	- 0. 21	4. 90			2012 .29	- 3940 .69
P2		20.0 0								5.7 5			
4	343. 25 321. 25	321. 25	200. 00	0.00			0. 09	- 0. 19	4. 24		1750 .19	1574 .58	- 4152 .68 - 1955 .26
P3		25.0 0								1.5 9			
5	86.9 9 74.9 9	74.9 9	200. 00	0.00			0. 05	0. 00	0. 88				- 643. 19 - 17.0 1
		0.00											

## 12.15.2 Esforços da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 10 (cm )	Lar g Bar ra (cm )	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		V d (tf )	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			N d (tf )	R d (tf )					
		0.00											

1	157. 76 147. 76	147. 76	200. 00	0.00			0. 45	- 0. 01	1. 40				- 26.9 1 - 1705 .20
P6		20.0 0								2.3 0			
2		213. 49	200. 00	0.00			0. 77	- 0. 14	2. 67		1982 .56	43.2 2 1956 .05	- 2631 .92
		0.00											
3		135. 26	200. 00	0.00			0. 16	- 0. 20	5. 10			1956 .05	- 4188 .03
P7		20.0 0								5.8 2			
4	346. 25 326. 25	326. 25	200. 00	0.00			0. 12	- 0. 15	4. 07		1368 .72	997. 73	- 3993 .37 - 1504 .32
P8		20.0 0								1.4 6			
5	84.9 9 74.9 9	74.9 9	200. 00	0.00			0. 04	- 0. 01	0. 84				- 601. 50 - 16.0 9
		0.00											

### 12.15.3 Esforços da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados						Envoltória							
Pilar Trec ho	Apo io 1 e 1o	Lar g Bar ra	Carga distribuída		Temper atura Caso T1 Caso T2	Retra ção (‰)	Esforç o axial		Vd (tf )	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m.	Acid .			N d	R d					

	(cm)	(cm)	(kgf/m)	(kgf/m)	(°C)		(tf)	(tf)					
		0.00											
1	87.0 4 75.0 4	75.0 4	200.00	0.00			0.00	-0.89	0.91				-13.41 -602.64
P6		25.00								5.90			
2	643.95 619.95	619.95	200.00	0.00			4.30	0.00	7.48		5183.96		-5957.87 -5986.41
P1		25.00								5.91			
3	86.96 74.96	74.96	200.00	0.00			0.00	-0.91	0.91				-593.61 -12.22
		0.00											

#### 12.15.4 Esforços da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barra (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf.m)	Md+ (kgf.m)	Md- (kgf.m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
P7		25.00								4.37			
1	643.91 619.91	619.91	200.00	0.00			0.84	0.00	6.53		6561.06		-4134.32 -4379.29



P2		25.0 0							4.5 2	
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### 12.15.5 Esforços da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 1o (cm)	Largura (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (%)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
		0.00											
1	87.04 75.04	75.04	200.00	0.00			0.00	-0.09	0.87				-27.00 -678.01
P8		25.00								3.95			
2	646.95 624.95	624.95	200.00	0.00			0.47	0.00	5.08		5501.54		-3975.60 -3193.22
P3		20.00								3.69			
3	84.96 74.96	74.96	200.00	0.00			0.00	-0.07	0.88				-662.37 -26.65
		0.00											

### 12.15.6 Resultados da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup	As esq trecho	Asw min	As dir trecho	Asw Pele	Fissura (mm)



	(cm)			(cm <sup>2</sup> )	(cm <sup>2</sup> )	(cm <sup>2</sup> )	(cm <sup>2</sup> )	(cm <sup>2</sup> )	
				2 ø 10.0 1.20					0.00
1	147.76	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
P1	20.00		2 ø 8.0 0.36	2 ø 12.5 2.08					0.06
2	348.75	20.00 x 40.00	2 ø 10.0 1.29	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.12
P2	20.00		2 ø 8.0 0.36	2 ø 16.0 3.08					0.11
3	321.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.03
P3	25.00		2 ø 8.0 0.36	2 ø 10.0 1.60					0.02
4	74.99	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

### 12.15.7 Resultados da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
				2 ø 10.0 1.20					0.00
1	147.76	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
P6	20.00		2 ø 8.0 0.36	2 ø 12.5 2.05					0.05
2	348.75	20.00 x 40.00	2 ø 10.0 1.26	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.11
P7	20.00		2 ø 8.0 0.36	2 ø 16.0 3.11					0.11

3	326.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.03
P8	20.00		2 ø 8.0 0.36	2 ø 10.0 1.38					0.01
4	74.99	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

### 12.15.8 Resultados da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
				2 ø 10.0 1.20					0.00
1	75.04	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.25		ø 5.0 c/ 17			0.00
P6	25.00		2 ø 8.0 0.25	2 ø 16.0 4.11					0.29
2	619.95	20.00 x 40.00	2 ø 16.0 3.44			ø 5.0 c/ 17			0.22
P1	25.00		2 ø 8.0 0.25	2 ø 16.0 4.13					0.29
3	74.96	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.25		ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

### 12.15.9 Resultados da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados	Resultados
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Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P7	25.00			3 ø 12.5 2.70					0.09
1	619.91	20.00 x 40.00	4 ø 12.5 4.41			ø 5.0 c/ 17			0.14
P2	25.00			3 ø 12.5 2.86					0.11

#### 12.15.10 Resultados da Viga V5

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
				2 ø 10.0 1.20					0.00
1	75.04	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
P8	25.00		2 ø 8.0 0.36	3 ø 12.5 2.95					0.07
2	624.95	20.00 x 40.00	2 ø 16.0 3.67	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.24
P3	20.00		2 ø 8.0 0.36	2 ø 12.5 2.42					0.11
3	74.96	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

## 12.16 LAJES – PAVIMENTO COBERTURA

### 12.16.1 Dados das Lajes

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.00 cm	

Seção (cm)						Cargas (kgf/m <sup>2</sup> )				Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Laje	Tipo	H	ee ec	en ey	ee xy	Peso Próprio	Acidental Revestimento	Paredes Outras	Total		
L1	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L2	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L3	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L4	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L5	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L6	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L7	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L8	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L9	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L10	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		

### 12.16.2 Resultados da Laje

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.00 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	10	454.50	10	16	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)



L2	10	454.50	20	128	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L3	10	454.50	20	19	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L4	10	454.50	20	327	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.86 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
L5	10	454.50	286	401	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.55 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L6	10	454.50	293	419	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.62 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)
L7	10	454.50	12	337	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.91 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
L8	10	454.50	10	16	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L9	10	454.50	19	136	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L10	10	454.50	20	20	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)

ARMADURA NEGATIVA							
Dados				Resultados			
Viga	Trecho	Laje 1	Laje 2	Reação 1 (kgf/m)	Reação 2 (kgf/m)	Md (kgf.m/m)	As (cm <sup>2</sup> )
V4	1	L6	L5	591	575	-485	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V2	4	L6	L9	417	349	-337	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V5	2	L6	L7	493	309	-264	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V1	4	L6	L2	442	344	-328	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)



V5	1	L9	L10	246	170	-295	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V2	3	L9	L5	374	381	-279	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V2	2	L9	L5	250	164	-296	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V3	1	L9	L8	196	218	-284	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V1	3	L2	L5	367	358	-278	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V5	3	L2	L3	292	179	-320	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V3	3	L2	L1	195	221	-283	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V1	2	L2	L5	252	167	-296	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V1	1	L1	L4	257	49	-337	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V1	5	L3	L7	195	285	-301	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V2	1	L4	L8	54	260	-339	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V3	2	L4	L5	681	789	-620	As = 3.53 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m)
V2	5	L7	L10	244	205	-320	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)

### 12.16.3 Cálculos das Lajes

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.00 cm	

ARMADURAS POSITIVAS (LAJE)												
L a j e	Dire ção	Momento positivo				Momento negativo				Arm adur a inferi or	Arm adur a supe rior	Cisalh ament o
		Se ção o	Fle xão	Verific ação axial	Verifi cação o axial	Se ção o	Fle xão	Verific ação axial	Verifi cação o axial			



				(compr essão)	(traçã o)			(compr essão)	(traçã o)			
L 1	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			bw = 10 0.0 cm h = 10. 0 cm	Md = 393 kgf. m/ m As = 1.3 9 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 1.25 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.06 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 0.68 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 2	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m		Fd = 0.15 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 1.23 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m





L 3			A's = 0.0 0 cm <sup>2</sup> /m								asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.31 tf Situaç ão: GE As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm	Md = 464 kgf. m/ m As = 1.8 1 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.31 tf Situaç ão: GE As = 1.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.03 mm	vsd = 2.00 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.13 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm	vsd = 0.70 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2		Fd = 0.14 tf Situaç ão: GE As = 0.13 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m)	vsd = 0.71 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m



			8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m					fiss = 0.00 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 4	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.81 tf Situaç ão: GE As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm	Md = 853 kgf. m/ m As = 3.2 1 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.81 tf Situaç ão: GE As = 3.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 2.48 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 474 kgf. m/ m As = 1.8 6 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			bw = 10 0.0 cm h = 10. 0 cm	Md = 492 kgf. m/ m As = 1.9 3 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			As = 1.86 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.08 mm		vsd = 1.75 tf/m vrd1 = 4.64 tf/m vrd2 = 28.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 5	X	bw = 10 0.0 cm h = 10.	Md = 336 kgf. m/ m		Fd = 0.78 tf Situaç ão: GE	bw = 10 0.0 cm h = 10.	Md = 620 kgf. m/ m		Fd = 0.78 tf Situaç ão: GE	As = 1.01 cm <sup>2</sup> / m ø5.0 c/19		vsd = 1.65 tf/m vrd1 = 4.72 tf/m



		0 cm	As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		As = 0.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	0 cm	As = 2.2 5 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	(1.03 cm <sup>2</sup> / m) fiss = 0.15 mm		Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 401 kgf. m/ m As = 1.5 4 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.07 tf Situaç ão: GE As = 1.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm	Md = 296 kgf. m/ m As = 1.1 3 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.07 tf Situaç ão: GE As = 1.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.55 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.11 mm		vsd = 0.91 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 6	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.34 tf Situaç ão: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm	Md = 485 kgf. m/ m As = 1.7 2 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.34 tf Situaç ão: GE As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.15 mm		vsd = 0.93 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10	Md = 419 kgf.		Fd = 0.07 tf	bw = 10	Md = 337 kgf.		Fd = 0.07 tf	As = 1.62 cm <sup>2</sup> / m		vsd = 0.91 tf/m



		0.0 cm h = 10.0 cm	m/ m As = 1.61 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: GE As = 1.62 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	0.0 cm h = 10.0 cm	m/ m As = 1.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: GE As = 1.30 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	ø6.3 c/19 (1.64 cm <sup>2</sup> / m) fiss = 0.11 mm		vrdd1 = 4.50 tf/m vrdd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
L 7	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/ m As = 0.98 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.17 tf Situaç ão: GE As = 0.07 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10.0 cm h = 10.0 cm				As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 0.78 tf/m vrdd1 = 4.72 tf/m Modelo I vrdd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	bw = 10.0 cm h = 10.0 cm	Md = 488 kgf. m/ m As = 1.91 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			bw = 10.0 cm h = 10.0 cm	Md = 464 kgf. m/ m As = 1.81 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.91 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.08 mm		vsd = 1.72 tf/m vrdd1 = 4.64 tf/m vrdd2 = 28.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m



L 8	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 10.0 cm h = 10.0 cm	Md = 394 kgf. m/m As = 1.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 1.25 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 1.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.06 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm				As = 1.28 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 0.68 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 9	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.98 cm <sup>2</sup> /m A's = 0.00		Fd = 0.12 tf Situação: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm				As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 1.22 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m



			0 cm <sup>2</sup> /m									asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.32 tf Situaç ão: GE As = 0.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm	Md = 428 kgf. m/ m As = 1.6 7 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.32 tf Situaç ão: GE As = 1.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.03 mm		vsd = 2.01 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 1 0	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.14 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 0.69 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m		Fd = 0.17 tf Situaç ão: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 0.72 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m



			A's = 0.0 0 cm <sup>2</sup> /m								asw = 0.00 cm <sup>2</sup> /m
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ARMADURAS NEGATIVAS (NA CONTINUIDADE)										
Viga Trec ho	Laj e 1 Laj e 2	Momento negativo				Momento positivo				Armadu ras finais
		Seç ão	Flexã o	Flexo compres são	Flexo tração	Seç ão	Flex ão	Flexo compres são	Flex o traç ão	
V4 1	L6 L5	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.34 tf Situaç ão: GE As = 1.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V2 4	L6 L9	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.11 tf Situaç ão: GE As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V5 2	L6 L7	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.26 tf Situaç ão: GE As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V1 4	L6 L2	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m		Fd = 0.15 tf Situaç ão: GE As = 1.73 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)



			As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m					fiss = 0.07 mm
V5 1	L9 L10	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situação: GE As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V2 3	L9 L5	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.12 tf Situação: GE As = 1.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V2 2	L9 L5	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.12 tf Situação: GE As = 1.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V3 1	L9 L8	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V1 3	L2 L5	bw = 100.0 cm	Md = 502 kgf.m/m			bw = 100.0 cm				As = 1.81 cm <sup>2</sup> /m





		h = 10.0 cm	As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			h = 10.0 cm				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V5 3	L2 L3	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.25 tf Situaç ão: GE As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V3 3	L2 L1	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V1 2	L2 L5	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V1 1	L1 L4	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm



V1 5	L3 L7	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V2 1	L4 L8	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V3 2	L4 L5	bw = 100.0 cm h = 10.0 cm	Md = 899 kgf.m/m  As = 3.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.81 tf Situação: GE As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 3.53 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.14 mm
V2 5	L7 L10	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação: GE As = 1.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm

## 12.17 RESERVATÓRIO - PAVIMENTO TAMPA DO POÇO

### 12.17.1 Dados dos Reservatórios

tampa do poço	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Parades Outras	Total	Base	Topo		
L1 (RES 1)	18.00	0.00	2904.4.00	450.00 kgf/m <sup>2</sup>	150.00 154.50	0.00 0.00	754.50 kgf/m <sup>2</sup>				
L1 (RES 1)	20.00	0.00	2863.9.00	500.00 kgf/m <sup>2</sup>	150.00 154.50	0.00 0.00	4854.50 kgf/m <sup>2</sup>				
L2 (RES 1)	20.00	0.00	2868.9.00	500.00 kgf/m <sup>2</sup>	150.00 154.50	0.00 0.00	4354.50 kgf/m <sup>2</sup>				
PAR1 -A (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		
PAR1 -B (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		
PAR2 (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		
PAR3 -A (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		
PAR3 -B (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		
PAR3 -C (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		



PAR4 (RES 1)	20. 00	0.00	2904 4.00	1775 .00 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/ m	2974 .00	0.00		
PAR5 (RES 1)	20. 00	0.00	2904 4.00	2025 .00 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/ m	3234 .00	0.00		
PAR6 (RES 1)	20. 00	0.00	2904 4.00	1775 .00 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/ m	2974 .00	0.00		
PAR7 (RES 1)	20. 00	0.00	2868 9.00	250. 00 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/ m	4050 .00	3550 .00		
PAR8 (RES 1)	20. 00	0.00	2868 9.00	250. 00 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/ m	4050 .00	3550 .00		
PAR9 (RES 1)	20. 00	0.00	2868 9.00	250. 00 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/ m	4050 .00	3550 .00		

## 12.17.2 Resultados do Reservatório

<b>tampa do poço</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

### 12.17.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	3.58 -2.73	3.46 -2.57	1165	987	As = 2.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.92 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
L1	6.17 -4.91	29.35 -6.21	1711	1126	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.79 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.02 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)



L2	6.01 - 11.60	8.67 -9.64	3520	2264	As = 4.69 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	As = 6.69 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	A's = 8.52 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	A's = 6.67 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)
PAR1-A	10.11 - 10.16	9.81 - 32.02	1232	1531	As = 3.42 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	A's = 2.14 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.26 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR1-B	2.60 -5.83	4.92 -3.70	1794	895	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.29 cm <sup>2</sup> /m ø10.0 c/18 (4.36 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2	6.35 - 10.31	9.96 - 31.62	668	1557	As = 2.61 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	A's = 2.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.18 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR3-A	2.65 -5.87	4.80 -3.70	1541	1350	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 3.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR3-B	0.82 -5.60	3.22 0.00	465	1459	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.20 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR3-C	2.53 -6.03	4.85 -3.55	687	1345	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.65 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR4	12.40 -9.54	18.10 - 32.50	708	491	As = 2.38 cm <sup>2</sup> /m ø10.0 c/20	As = 6.20 cm <sup>2</sup> /m ø10.0 c/12	A's = 2.63 cm <sup>2</sup> /m ø10.0 c/20	A's = 6.30 cm <sup>2</sup> /m ø10.0 c/12



					(3.93 cm <sup>2</sup> /m)	(6.54 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)	(6.54 cm <sup>2</sup> /m)
PAR5	5.34 - 15.01	17.97 -1.08	1295	2086	As = 5.10 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	As = 4.93 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	A's = 3.06 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR6	12.65 -9.54	20.81 - 32.48	695	506	As = 2.40 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 6.21 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	A's = 2.63 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.33 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR7	8.94 - 21.96	9.62 -1.05	1032	1323	As = 3.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.86 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	A's = 2.18 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR8	8.77 - 22.29	9.73 -1.08	1090	1328	As = 3.39 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 5.00 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	A's = 2.19 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR9	30.45 - 11.17	4.24 -0.81	581	958	As = 2.42 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.57 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR5	-1047		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR5 L1	-1321		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR7	-210		As = 3.00 cm <sup>2</sup> /m	



				ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 L1	-1124		As = 4.86 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	
Barra	L1 PAR9	-212		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 L1	-290		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR8	-212		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR8 L1	-1126		As = 5.02 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	
Barra	PAR5 PAR8	-2290		As = 6.64 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	
Barra	PAR8 PAR5	-128		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 PAR5	-2252		As = 7.24 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR5 PAR7	-137		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR9	-345		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 L2	-1379		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 PAR9	-788		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 PAR7	-246		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	



Barra	PAR8 PAR9	-247		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 PAR8	-804		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR8	-392		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR8 L2	-1328		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR7	-395		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 L2	-1323		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR3-B	-832		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B L2	-890		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR3-C	-512		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C L2	-876		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR2	-764		As = 6.50 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	PAR2 L2	-2264		As = 9.51 cm <sup>2</sup> /m ø10.0 c/8 (9.82 cm <sup>2</sup> /m)	
Barra	L2 PAR4	-1090		As = 7.17 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR4 L2	-2356		As = 8.92 cm <sup>2</sup> /m	





				ø10.0 c/8 (9.82 cm²/m)	
Barra	L2 PAR6	-1032		As = 7.07 cm²/m ø10.0 c/11 (7.14 cm²/m)	
Barra	PAR6 L2	-2465		As = 8.91 cm²/m ø10.0 c/8 (9.82 cm²/m)	
Barra	L2 PAR1-A	-684		As = 6.41 cm²/m ø10.0 c/12 (6.54 cm²/m)	
Barra	PAR1-A L2	-2181		As = 8.84 cm²/m ø10.0 c/8 (9.82 cm²/m)	
Barra	L2 PAR1-B	-135		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR1-B L2	-756		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L2 PAR3-A	-530		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR3-A L2	-827		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR1-A	-962		As = 7.22 cm²/m ø10.0 c/10 (7.85 cm²/m)	
Barra	PAR1-A L1	-581		As = 6.42 cm²/m ø10.0 c/12 (6.54 cm²/m)	
Barra	PAR1-A PAR6	-3175		As = 7.39 cm²/m ø10.0 c/10 (7.85 cm²/m)	
Barra	PAR6 PAR1-A			As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR1-A PAR1-B	-519		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	



Barra	PAR1-B PAR1-A			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR1-B	-840		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B L1	-146		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR3-A			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A PAR1-B	-2711		As = 6.37 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	L1 PAR3-A	-906		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A L1	-435		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A PAR3-B	-494		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B PAR3-A	-6		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR3-B	-1165		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B L1	-490		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B PAR3-C	-489		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C PAR3-B	-10		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR3-C	-892		As = 2.70 cm <sup>2</sup> /m	



				$\varnothing 10.0$ c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C L1	-490		As = 2.70 cm <sup>2</sup> /m $\varnothing 10.0$ c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3-C	-2716		As = 6.38 cm <sup>2</sup> /m $\varnothing 10.0$ c/12 (6.54 cm <sup>2</sup> /m)	
Barra	PAR3-C PAR2			As = 3.00 cm <sup>2</sup> /m $\varnothing 10.0$ c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-987		As = 7.21 cm <sup>2</sup> /m $\varnothing 10.0$ c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-155		As = 5.47 cm <sup>2</sup> /m $\varnothing 10.0$ c/14 (5.61 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2	-3187		As = 7.42 cm <sup>2</sup> /m $\varnothing 10.0$ c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4			As = 3.00 cm <sup>2</sup> /m $\varnothing 10.0$ c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR6	-1533		As = 8.41 cm <sup>2</sup> /m $\varnothing 10.0$ c/9 (8.73 cm <sup>2</sup> /m)	
Barra	PAR6 L1	-137		As = 5.49 cm <sup>2</sup> /m $\varnothing 10.0$ c/14 (5.61 cm <sup>2</sup> /m)	
Barra	PAR6 PAR5	-1136		As = 3.18 cm <sup>2</sup> /m $\varnothing 10.0$ c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR5 PAR6	-331		As = 3.00 cm <sup>2</sup> /m $\varnothing 10.0$ c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR4	-1896		As = 9.51 cm <sup>2</sup> /m $\varnothing 10.0$ c/8 (9.82 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-143		As = 5.45 cm <sup>2</sup> /m $\varnothing 10.0$ c/14 (5.61 cm <sup>2</sup> /m)	

Barra	PAR5 PAR4	-1057		As = 3.07 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4 PAR5	-345		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR5	-1896		As = 5.11 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	
Barra	PAR5 L1	-459		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	

### 12.17.3 Cálculos do Reservatório

<b>tampa do poço</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

#### 12.17.3.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	Md = 1090 kgf. m/m As = 1.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.58 tf Situação : GE As = 1.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.27 tf Situação : GE As = 2.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1165 kgf. m/m As = 1.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.58 tf Situação : GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.27 tf Situação : GE As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.04 mm		vsd = 2.64 tf/m vrd1 = 9.99 tf/m Modelo I vrd2 = 71.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 109	Fd = 3.46 tf	Fd = 3.09 tf	Md = 987	Fd = 3.46 tf	Fd = 3.09 tf	As = 1.92 cm <sup>2</sup> /m		vsd = 2.29 tf/m



		0 kgf. m/m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Situação : GE As = 0.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situaç ão: GE As = 1.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	kgf. m/m  As = 1.71 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Situação : GE As = 1.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situaç ão: GE As = 2.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.04 mm		vrđ1 = 9.43 tf/m vrđ2 = 66.19 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.17 tf Situação : GE As = 1.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situaç ão: GE As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 171 1 kgf. m/m  As = 2.43 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.17 tf Situação : GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situaç ão: GE As = 3.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 3.09 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 6.50 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 7.46 tf Situaç ão: GE As = 2.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 348 kgf. m/m  As = 0.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 7.46 tf Situaç ão: GE As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.79 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 4.91 tf/m vrđ1 = 10.55 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L2	X	Md = 140 8 kgf. m/m  As = 1.99	Fd = 6.01 tf Situação : GE As = 1.17 cm <sup>2</sup> /m	Fd = 13.92 tf Situaç ão: GE As = 3.91 cm <sup>2</sup> /m	Md = 352 0 kgf. m/m  As = 5.09	Fd = 6.01 tf Situação : GE As = 4.30 cm <sup>2</sup> /m	Fd = 13.92 tf Situaç ão: GE As = 6.95 cm <sup>2</sup> /m	As = 4.69 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m )	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 7.02 tf/m vrđ1 = 11.31 tf/m Modelo I vrđ2 = 81.46 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	fiss = 0.08 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 226 4 kgf. m/m  As = 3.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 8.67 tf Situação : GE As = 2.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.57 tf Situaç ão: GE As = 5.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 224 8 kgf. m/m  As = 3.43 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 8.67 tf Situação : GE As = 2.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.57 tf Situaç ão: GE As = 5.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 6.69 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 3.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 12.95 tf/m vrd1 = 11.23 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1- A	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 10.11 tf Situação : GE As = 0.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.19 tf Situaç ão: GE As = 3.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.19 tf Situaç ão: PE As = 2.14 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 3.42 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.10 mm	A's = 2.14 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 6.94 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 153 1 kgf. m/m  As = 2.31 cm <sup>2</sup> / m A's = 0.00	Fd = 9.81 tf Situação : GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situaç ão: PE As = 7.62 cm <sup>2</sup> /m A's = 2.29 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00		Fd = 38.42 tf Situaç ão: PE As = 5.48 cm <sup>2</sup> /m A's = 3.36 cm <sup>2</sup> /m	As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m ) fiss = 0.08 mm	A's = 6.26 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m )	vsd = 5.02 tf/m vrd1 = 11.56 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					
PA R1- B	X	Md = 134 6 kgf. m/m	Fd = 2.60 tf Situação : GE	Fd = 6.99 tf Situação: GE	Md = 179 4 kgf. m/m	Fd = 2.60 tf Situação : GE	Fd = 6.99 tf Situação: GE	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.02 mm	A's = 4.29 cm <sup>2</sup> /m ø10.0 c/18 (4.36 cm <sup>2</sup> /m )	vsd = 5.32 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
		As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.55 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			
	Y	Md = 134 6 kgf. m/m	Fd = 4.92 tf Situação : GE	Fd = 4.43 tf Situação: GE	Md = 134 6 kgf. m/m		Fd = 4.43 tf Situação: PE	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 3.65 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
		As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 0.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 0.74 cm <sup>2</sup> /m A's = 0.28 cm <sup>2</sup> /m			
PA R2	X	Md = 134 6 kgf. m/m	Fd = 6.35 tf Situação : GE	Fd = 12.38 tf Situação: PE	Md = 134 6 kgf. m/m		Fd = 12.38 tf Situação: PE	As = 2.61 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.05 mm	A's = 2.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 7.01 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 155 7	Fd = 9.96 tf Situação : GE	Fd = 37.94 tf	Md = 134 6		Fd = 37.94 tf	As = 8.40 cm <sup>2</sup> /m	A's = 6.18 cm <sup>2</sup> /m	vsd = 4.86 tf/m



		kgf. m/m  As = 2.35 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 0.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situaç ão: PE As = 7.62 cm <sup>2</sup> /m A's = 2.26 cm <sup>2</sup> /m	kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: PE As = 5.39 cm <sup>2</sup> /m A's = 3.34 cm <sup>2</sup> /m	ø10.0 c/9 (8.73 cm <sup>2</sup> /m ) fiss = 0.08 mm	ø10.0 c/12 (6.54 cm <sup>2</sup> /m )	vrđ1 = 11.56 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3- A	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.65 tf Situação : GE As = 0.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.04 tf Situaç ão: GE As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 154 1 kgf. m/m  As = 2.18 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.65 tf Situação : GE As = 1.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.04 tf Situaç ão: GE As = 3.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.03 mm	A's = 3.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 5.22 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 135 0 kgf. m/m  As = 2.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 4.80 tf Situação : GE As = 1.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situaç ão: GE As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 4.43 tf Situaç ão: GE As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 3.63 tf/m vrđ1 = 10.55 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3- B	X	Md = 134 6 kgf. m/m  As = 1.90	Fd = 0.82 tf Situação : GE As = 0.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.72 tf Situaç ão: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90	Fd = 0.82 tf Situação : GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.72 tf Situaç ão: PE As = 1.11 cm <sup>2</sup> /m A's = 0.43 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 0.48 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m





		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			fiss = 0.02 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 145 9 kgf. m/m  As = 2.20 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 3.22 tf Situação : GE  As = 1.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 3.22 tf Situação : GE  As = 0.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 2.20 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.06 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 4.07 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3- C	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.53 tf Situação : GE  As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.23 tf Situação: GE  As = 1.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.53 tf Situação : GE  As = 0.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.23 tf Situação: GE  As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.03 mm	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 5.22 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00	Fd = 4.85 tf Situação : GE  As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação: GE  As = 2.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00	Fd = 4.85 tf Situação : GE  As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação: GE  As = 1.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.65 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 3.61 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					
PA R4	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.44 tf Situaç ão: PE As = 2.38 cm <sup>2</sup> / m A's = 0.68 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.44 tf Situaç ão: GE As = 2.63 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.38 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m ) fiss = 0.04 mm	A's = 2.63 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 6.34 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 39.00 tf Situaç ão: PE As = 5.42 cm <sup>2</sup> / m A's = 3.55 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 39.00 tf Situaç ão: PE As = 5.51 cm <sup>2</sup> / m A's = 3.46 cm <sup>2</sup> / m	As = 6.20 cm <sup>2</sup> / m ø10.0 c/12 (6.54 cm <sup>2</sup> / m ) fiss = 0.08 mm	A's = 6.30 cm <sup>2</sup> / m ø10.0 c/12 (6.54 cm <sup>2</sup> / m )	vsd = 6.28 tf/m vrd1 = 11.10 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PA R5	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.34 tf Situação : GE As = 1.10 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 18.01 tf Situaç ão: GE As = 4.32 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.34 tf Situação : GE As = 0.05 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 18.01 tf Situaç ão: PE As = 3.06 cm <sup>2</sup> / m A's = 1.08 cm <sup>2</sup> / m	As = 5.10 cm <sup>2</sup> / m ø10.0 c/15 (5.24 cm <sup>2</sup> / m ) fiss = 0.08 mm	A's = 3.06 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 5.07 tf/m vrd1 = 11.38 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 208 6	Fd = 17.97 tf Situação : GE	Fd = 1.30 tf Situaç ão: GE	Md = 134 6		Fd = 1.30 tf Situaç ão: GE	As = 4.93 cm <sup>2</sup> / m	A's = 2.03 cm <sup>2</sup> / m	vsd = 4.91 tf/m



		kgf. m/m  As = 3.17 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 0.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 0.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	ø10.0 c/15 (5.24 cm <sup>2</sup> /m ) fiss = 0.07 mm	ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vrđ1 = 10.83 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R6	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.45 tf Situaç ão: PE As = 2.40 cm <sup>2</sup> /m A's = 0.68 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.45 tf Situaç ão: GE As = 2.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.40 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.63 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 6.28 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 38.98 tf Situaç ão: PE As = 5.42 cm <sup>2</sup> /m A's = 3.54 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 38.98 tf Situaç ão: PE As = 5.54 cm <sup>2</sup> /m A's = 3.43 cm <sup>2</sup> /m	As = 6.21 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m ) fiss = 0.08 mm	A's = 6.33 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m )	vsd = 6.79 tf/m vrđ1 = 11.10 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R7	X	Md = 134 6 kgf. m/m  As = 1.90		Fd = 26.36 tf Situaç ão: PE As = 3.34 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90	Fd = 8.94 tf Situação : GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 26.36 tf Situaç ão: PE As = 4.86 cm <sup>2</sup> /m	As = 3.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	A's = 4.86 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m )	vsd = 11.86 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 2.72 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 1.57 cm <sup>2</sup> /m	fiss = 0.09 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.26 tf Situação: GE As = 0.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.62 tf Situação: GE As = 0.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.26 tf Situação: GE As = 2.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.18 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 8.83 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R8	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 26.75 tf Situação: PE As = 3.39 cm <sup>2</sup> /m A's = 2.76 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 8.77 tf Situação: GE As = 0.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 26.75 tf Situação: PE As = 5.00 cm <sup>2</sup> /m A's = 1.59 cm <sup>2</sup> /m	As = 3.39 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.09 mm	A's = 5.00 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m )	vsd = 11.96 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00		Fd = 1.30 tf Situação: GE As = 0.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00	Fd = 9.73 tf Situação: GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.30 tf Situação: GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.19 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 8.85 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					
PA R9	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 13.41 tf Situaç ão: PE As = 2.42 cm <sup>2</sup> / m A's = 0.80 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 13.41 tf Situaç ão: PE As = 2.57 cm <sup>2</sup> / m A's = 0.80 cm <sup>2</sup> / m	As = 2.42 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m ) fiss = 0.04 mm	A's = 2.57 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 2.67 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.97 tf Situaç ão: PE As = 0.11 cm <sup>2</sup> / m A's = 0.11 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 4.24 tf Situaç ão: GE As = 0.82 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.97 tf Situaç ão: GE As = 1.58 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.03 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m ) fiss = 0.00 mm	A's = 2.03 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 3.07 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1 Laje 2	Momento negativo			Momento positivo			Armadura s finais
		Flexão	Flexo compressã o	Flexo tração	Flexã o	Flexo compressã o	Flexo traçã o	
Barra	L1 PAR5	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 7.60 tf Situação: GE As = 0.43 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.89 tf Situação : GE As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m				As = 3.00 cm <sup>2</sup> / m (ø10.0 c/20 - 3.93 cm <sup>2</sup> / m) fiss = 0.05 mm



Barra	PAR5 L1	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.60 tf Situação: GE As = 0.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situação: GE As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	L1 PAR7	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 17.73 tf Situação: PE As = 2.41 cm <sup>2</sup> /m A's = 1.67 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR7 L1	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 17.73 tf Situação: GE As = 4.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 4.86 cm <sup>2</sup> /m (ø10.0 c/16 - 4.91 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	L1 PAR9	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.48 tf Situação: GE As = 0.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR9 L1	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m		Fd = 0.48 tf Situação: GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	L1 PAR8	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 18.40 tf Situação : PE As = 2.49 cm <sup>2</sup> /m A's = 1.74 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR8 L1	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 18.40 tf Situação : GE As = 4.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.02 cm <sup>2</sup> /m (ø10.0 c/15 - 5.24 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR5 PAR8	Md = 2290 kgf.m/ m  As = 3.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.66 tf Situação: GE As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 19.00 tf Situação : GE As = 5.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 6.64 cm <sup>2</sup> /m (ø10.0 c/11 - 7.14 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR8 PAR5	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 19.00 tf Situação : PE As = 2.41 cm <sup>2</sup> /m A's = 1.96 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR7 PAR5	Md = 2252 kgf.m/ m	Fd = 13.50 tf Situação: GE As = 1.40 cm <sup>2</sup> /m	Fd = 18.03 tf Situação : GE As = 5.67 cm <sup>2</sup> /m				As = 7.24 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.07 mm



		As = 3.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m				
Barra	PAR5 PAR7	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 18.03 tf Situação : PE As = 2.32 cm <sup>2</sup> /m A's = 1.83 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	L2 PAR9	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.76 tf Situação : GE As = 1.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR9 L2	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.24 tf Situação: GE As = 1.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.76 tf Situação : GE As = 2.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR7 PAR9	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.59 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.71 tf Situação : GE As = 2.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR9 PAR7	Md = 2008 kgf.m/m		Fd = 7.71 tf Situação : PE				As = 3.00 cm <sup>2</sup> /m





		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.32 cm <sup>2</sup> /m A's = 0.46 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR8 PAR9	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.70 tf Situação : PE As = 1.32 cm <sup>2</sup> /m A's = 0.46 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR9 PAR8	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.71 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.70 tf Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	L2 PAR8	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.34 tf Situação : GE As = 1.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR8 L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.55 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.34 tf Situação : GE As = 2.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	L2 PAR7	Md = 2008		Fd = 4.04 tf				As = 3.00 cm <sup>2</sup> /m



		kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação : GE As = 1.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR7 L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.75 tf Situação: GE As = 0.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.04 tf Situação : GE As = 2.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	L2 PAR3 -B	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.00 tf Situação: GE As = 0.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.78 tf Situação : GE As = 2.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR3 -B L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.00 tf Situação: GE As = 0.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.78 tf Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	L2 PAR3 -C	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.85 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.52 tf Situação : GE As = 1.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm



Barra	PAR3 -C L2	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m	Fd = 4.85 tf Situação: GE As = 0.56 cm²/m A's = 0.00 cm²/m	Fd = 4.52 tf Situação : GE As = 1.86 cm²/m A's = 0.00 cm²/m				As = 3.00 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.03 mm
Barra	L2 PAR2	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m		Fd = 37.94 tf Situação : PE As = 5.71 cm²/m A's = 3.01 cm²/m				As = 6.50 cm²/m (ø10.0 c/12 - 6.54 cm²/m) fiss = 0.09 mm
Barra	PAR2 L2	Md = 2264 kgf.m/ m  As = 3.23 cm²/m A's = 0.00 cm²/m	Fd = 9.96 tf Situação: GE As = 1.89 cm²/m A's = 0.00 cm²/m	Fd = 37.94 tf Situação : GE As = 8.73 cm²/m A's = 0.00 cm²/m				As = 9.51 cm²/m (ø10.0 c/8 - 9.82 cm²/m) fiss = 0.09 mm
Barra	L2 PAR4	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m		Fd = 38.76 tf Situação : PE As = 6.39 cm²/m A's = 2.53 cm²/m				As = 7.17 cm²/m (ø10.0 c/10 - 7.85 cm²/m) fiss = 0.08 mm
Barra	PAR4 L2	Md = 2356 kgf.m/ m  As = 3.37 cm²/m	Fd = 18.10 tf Situação: GE As = 0.95 cm²/m A's = 0.00 cm²/m	Fd = 38.76 tf Situação : GE As = 8.92 cm²/m A's = 0.00 cm²/m				As = 8.92 cm²/m (ø10.0 c/8 - 9.82 cm²/m) fiss = 0.09 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	L2 PAR6	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.74 tf Situação : PE As = 6.28 cm <sup>2</sup> /m A's = 2.63 cm <sup>2</sup> /m				As = 7.07 cm <sup>2</sup> /m (ø10.0 c/11 - 7.14 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR6 L2	Md = 2465 kgf.m/ m  As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 20.81 tf Situação: GE As = 0.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.74 tf Situação : GE As = 8.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 8.91 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	L2 PAR1 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.42 tf Situação : PE As = 5.63 cm <sup>2</sup> /m A's = 3.21 cm <sup>2</sup> /m				As = 6.41 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR1 -A L2	Md = 2181 kgf.m/ m  As = 3.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.81 tf Situação: GE As = 1.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação : GE As = 8.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 8.84 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	L2 PAR1 -B	Md = 2008 kgf.m/ m		Fd = 4.43 tf Situação : PE As = 0.75 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm



		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.27 cm <sup>2</sup> /m				
Barra	PAR1-B L2	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.92 tf Situação: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação: GE As = 1.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L2 PAR3-A	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.80 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.56 tf Situação: GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3-A L2	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.80 tf Situação: GE As = 0.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.56 tf Situação: GE As = 1.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1 PAR1-A	Md = 1627 kgf.m/m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.33 tf Situação: GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação: PE As = 6.43 cm <sup>2</sup> /m A's = 2.41 cm <sup>2</sup> /m				As = 7.22 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR1-A L1	Md = 1627 kgf.m/m		Fd = 38.42 tf Situação: PE				As = 6.42 cm <sup>2</sup> /m



		As = 2.64 cm²/m A's = 0.00 cm²/m		As = 5.63 cm²/m A's = 3.20 cm²/m				(ø10.0 c/12 - 6.54 cm²/m) fiss = 0.09 mm
Barra	PAR1 -A  PAR6	Md = 3175 kgf.m/ m  As = 4.58 cm²/m A's = 0.00 cm²/m	Fd = 5.41 tf Situação: GE As = 3.86 cm²/m A's = 0.00 cm²/m	Fd = 9.29 tf Situação : GE As = 5.82 cm²/m A's = 0.00 cm²/m				As = 7.39 cm²/m (ø10.0 c/10 - 7.85 cm²/m) fiss = 0.09 mm
Barra	PAR6  PAR1 -A	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m		Fd = 9.29 tf Situação : PE As = 1.07 cm²/m A's = 1.07 cm²/m				As = 3.00 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.01 mm
Barra	PAR1 -A  PAR1 -B	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m	Fd = 1.11 tf Situação: GE As = 0.57 cm²/m A's = 0.00 cm²/m	Fd = 6.60 tf Situação : GE As = 1.64 cm²/m A's = 0.00 cm²/m				As = 3.00 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.02 mm
Barra	PAR1 -B  PAR1 -A	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m		Fd = 6.60 tf Situação : PE As = 0.76 cm²/m A's = 0.76 cm²/m				As = 3.00 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.00 mm
Barra	L1	Md = 1627	Fd = 2.50 tf Situação: GE	Fd = 4.43 tf				As = 2.70 cm²/m



	PAR1 -B	kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR1 -B  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.43 tf Situação : PE As = 0.81 cm <sup>2</sup> /m A's = 0.21 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1 -B  PAR3 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.77 tf Situação : PE As = 0.78 cm <sup>2</sup> /m A's = 0.78 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR3 -A  PAR1 -B	Md = 2711 kgf.m/ m  As = 3.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.65 tf Situação: GE As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.77 tf Situação : GE As = 4.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 6.37 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	L1  PAR3 -A	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.41 tf Situação: GE As = 1.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação : GE As = 2.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm



Barra	PAR3 -A  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.41 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação : GE As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR3 -A  PAR3 -B	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.91 tf Situação: GE As = 0.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.34 tf Situação : GE As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3 -B  PAR3 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.34 tf Situação : PE As = 0.74 cm <sup>2</sup> /m A's = 0.72 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  PAR3 -B	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.03 tf Situação: GE As = 1.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.00 tf Situação : GE As = 2.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR3 -B  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m	Fd = 3.03 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.00 tf Situação : GE As = 1.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm





		A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR3 -B  PAR3 -C	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.89 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.41 tf Situação : GE As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3 -C  PAR3 -B	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.41 tf Situação : PE As = 0.76 cm <sup>2</sup> /m A's = 0.72 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  PAR3 -C	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.35 tf Situação: GE As = 1.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação : GE As = 2.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR3 -C  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.35 tf Situação: GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação : GE As = 1.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2  PAR3 -C	Md = 2716 kgf.m/ m	Fd = 2.17 tf Situação: GE As = 3.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.82 tf Situação : GE As = 4.81 cm <sup>2</sup> /m				As = 6.38 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm



		As = 3.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				
Barra	PAR3 -C PAR2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.82 tf Situação : PE As = 0.78 cm <sup>2</sup> /m A's = 0.78 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR2	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.29 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 37.94 tf Situação : PE As = 6.43 cm <sup>2</sup> /m A's = 2.30 cm <sup>2</sup> /m				As = 7.21 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR2 L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 37.94 tf Situação : PE As = 4.69 cm <sup>2</sup> /m A's = 4.04 cm <sup>2</sup> /m				As = 5.47 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR4 PAR2	Md = 3187 kgf.m/ m  As = 4.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.51 tf Situação: GE As = 3.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.36 tf Situação : GE As = 5.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.42 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR2 PAR4	Md = 2008 kgf.m/ m		Fd = 9.36 tf Situação : PE				As = 3.00 cm <sup>2</sup> /m



		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.08 cm <sup>2</sup> /m A's = 1.08 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	L1 PAR6	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 14.72 tf Situação: GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação : PE As = 7.62 cm <sup>2</sup> /m A's = 2.29 cm <sup>2</sup> /m				As = 8.41 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR6 L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.42 tf Situação : PE As = 4.71 cm <sup>2</sup> /m A's = 4.13 cm <sup>2</sup> /m				As = 5.49 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR6 PAR5	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.45 tf Situação : GE As = 3.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.18 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR5 PAR6	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.45 tf Situação : PE As = 1.90 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1 PAR4	Md = 1896	Fd = 17.97 tf	Fd = 37.94 tf				As = 9.51 cm <sup>2</sup> /m



		kgf.m/ m  As = 3.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 8.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR4  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 37.94 tf Situação : PE As = 4.66 cm <sup>2</sup> /m A's = 4.07 cm <sup>2</sup> /m				As = 5.45 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR5  PAR4	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.44 tf Situação : GE As = 3.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.07 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR4  PAR5	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.44 tf Situação : PE As = 1.93 cm <sup>2</sup> /m A's = 0.71 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1  PAR5	Md = 1896 kgf.m/ m  As = 3.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 17.97 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.27 tf Situação : GE As = 3.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.11 cm <sup>2</sup> /m (ø10.0 c/15 - 5.24 cm <sup>2</sup> /m) fiss = 0.08 mm



Barra	PAR5 L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.27 tf Situação : GE As = 1.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
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## **13. EEAT-01 - CAIXA DE DRENAGEM**

### **13.1 RESUMO DOS RESULTADOS**

#### **13.1.1 Cargas verticais:**

- Peso próprio = 0.92 tf
- Adicional = 0.19 tf
- Acidental = 0.43 tf
- Total = 1.55 tf
- Área aproximada = 1.43 m<sup>2</sup>
- Relação = 1084.95 kgf/m<sup>2</sup>

#### **13.1.2 Deslocamento horizontal:**

- X+ = 0.00 cm (limite 0.03)
- X- = 0.00 cm (limite 0.03)
- Y+ = 0.00 cm (limite 0.03)
- Y- = 0.00 cm (limite 0.03)

#### **13.1.3 Aceleração horizontal:**

- X+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- X- = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y- = 0.000 m/s<sup>2</sup> (limite 0.147)

#### **13.1.4 Verificação de estabilidade (Gama-Z):**

- X+ = 1.00 (limite 1.10)
- X- = 1.00 (limite 1.10)
- Y+ = 1.00 (limite 1.10)
- Y- = 1.00 (limite 1.10)

### 13.1.5 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

### 13.1.6 Análise dinâmica:

Frequência natural: 10.88 Hz

## 13.2 RESERVATÓRIO – PAVIMENTO TOPO

### 13.2.1 Dados dos Reservatórios

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RES1)	15.00	0.00	292.40	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
L1 (RES1)	15.00	0.00	292.40	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
L1 (RES1)	15.00	0.00	292.40	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
PAR1 (RES1)	15.00	0.00	332.40	150.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	600.00	280.00		
PAR2 (RES1)	15.00	0.00	332.40	150.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	600.00	280.00		
PAR3 (RES1)	15.00	0.00	332.40	150.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	600.00	280.00		

PAR4 (RES1)	15.00	0.00	332.40	150.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	600.00	280.00		
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### 13.2.2 Resultados do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

#### 13.2.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	0.11 - 0.04	0.10 - 0.14	3	4	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.02 - 0.01	0.03 - 0.06	37	31	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.00 0.00	0.01 - 0.05	7	8	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1	0.21 - 0.05	0.46 - 0.01	8	40	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR2	0.21 - 0.05	0.46 - 0.01	8	40	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR3	0.22 - 0.02	0.13 - 0.01	6	4	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20





					(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)
PAR4	0.35 - 0.29	0.46 - 0.06	6	40	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR3	-3		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 L1	-2		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-40		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-14		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR4	-40		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-12		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR1	-40		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 L1	-14		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2	-15		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20	

				(2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2	-4		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4	-17		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR4	-4		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR1	-17		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR3	-15		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR1			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	

### 13.2.3 Cálculos do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

#### 13.2.3.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	Md = 757 kgf.m/m  As = 1.52 cm <sup>2</sup> /m		Fd = 0.05 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Fd = 0.05 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) ) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) )	vsd = 0.02 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m



		A's = 0.00 cm <sup>2</sup> /m								asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação: PE As = 0.03 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m			Fd = 0.17 tf Situação: PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.04 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.02 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.01 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Fd = 0.01 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.09 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.03 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.07 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 31 kgf. m/m As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.03 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.07 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.40 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757						As = 1.52 cm <sup>2</sup> /m	A's = 2.25 cm <sup>2</sup> /m	vsd = 0.13 tf/m vrd1 = 8.02 tf/m



PA R1		kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m						ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.06 tf Situaç ão: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 8 kgf. m/m  As = 0.02 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.06 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.14 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.06 tf Situaç ão: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.22 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.46 tf Situação : GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.01 tf Situaç ão: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.12 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		0.00 cm <sup>2</sup> / m			0.00 cm <sup>2</sup> / m					
PA R2	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.06 tf Situaç ão: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.22 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.46 tf Situação : GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.01 tf Situaç ão: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.12 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situaç ão: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.15 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m			Md = 757 kgf. m/m			As = 1.64 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20	vsd = 0.10 tf/m vrd1 = 7.54 tf/m



		As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			(2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	(2.51 cm <sup>2</sup> /m)	vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R4	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação: PE As = 0.04 cm <sup>2</sup> /m A's = 0.04 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação: PE As = 0.06 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.18 tf/m vr1 = 8.02 tf/m Modelo I vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.07 tf Situação: PE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.46 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.07 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.12 tf/m vr1 = 7.54 tf/m vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1	Momento negativo			Momento positivo			Armaduras finais
	Laje 2	Flexão	Flexo compressão	Flexo tração	Flexão	Flexo compressão	Flexo tração	
Barra	L1 PAR 3	Md = 1130 kgf.m/m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR 3 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.46 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.35 tf Situação : GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação : GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 4	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.46 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.06 tf Situação : GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 L1	Md = 1130 kgf.m/m		Fd = 0.06 tf Situação : GE				As = 2.29 cm <sup>2</sup> /m



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.46 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.35 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 PAR 3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4	Md = 1130		Fd = 0.35 tf				As = 2.29 cm <sup>2</sup> /m





	PAR 2	kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação : PE As = 0.05 cm <sup>2</sup> /m A's = 0.03 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2  PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação : GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1  PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação : PE As = 0.05 cm <sup>2</sup> /m A's = 0.03 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.35 tf Situação : GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1  PAR 3	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

Barra	PAR 3  PAR 1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
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## 14. TAU

### 14.1 CAIXA DE REGISTRO

#### 14.1.1 Resumo dos Resultados

##### 14.1.1.1 Cargas verticais:

- Peso próprio = 7.64 tf
- Adicional = 1.09 tf
- Acidental = 2.40 tf
- Água = 10.06 tf
- Total = 21.19 tf
- Área aproximada = 7.99 m<sup>2</sup>
- Relação = 2653.21 kgf/m<sup>2</sup>

AVISO: Relação de carga por área não usual para edifícios

##### 14.1.1.2 Deslocamento horizontal:

- X+ = 0.00 cm (limite 0.08)
- X- = 0.00 cm (limite 0.08)
- Y+ = 0.00 cm (limite 0.08)
- Y- = 0.00 cm (limite 0.08)

#### 14.1.1.3 Aceleração horizontal:

- $X+ = 0.000 \text{ m/s}^2$  (limite 0.147)
- $X- = 0.000 \text{ m/s}^2$  (limite 0.147)
- $Y+ = 0.000 \text{ m/s}^2$  (limite 0.147)
- $Y- = 0.000 \text{ m/s}^2$  (limite 0.147)

#### 14.1.1.4 Verificação de estabilidade (Gama-Z):

- $X+ = 1.00$  (limite 1.10)
- $X- = 1.00$  (limite 1.10)
- $Y+ = 1.00$  (limite 1.10)
- $Y- = 1.00$  (limite 1.10)

#### 14.1.1.5 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

#### 14.1.1.6 Análise dinâmica:

Frequência natural: 6.84 Hz

### 14.1.2 Blocos - Pavimento Topo

#### 14.1.2.1 Resultados dos Blocos

TOPO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.50 cm	

Dados				Resultados					
Bloco	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
BA1 1:20	15.00 X 30.00	-104.00 22.00	44.00 EL	0.03 0.00	0 0	0 0	1.57 2 ø 10.0	ø 5.0 c/12	10.15 5.07

			44.00 EL				1.57 2 ø 10.0 0.7 4 ø 10.0		
BA2 1:20	15.00 X 30.00	-104.00 22.00	44.00 EL 44.00 EL	0.03 0.00	0 0	0 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	10.15 5.07
BA3 1:20	15.00 X 30.00	-104.00 22.00	44.00 EL 44.00 EL	0.03 0.00	0 0	0 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	10.15 5.07
BA4 1:20	15.00 X 30.00	-104.00 22.00	44.00 EL 44.00 EL	0.03 0.00	0 0	0 0	1.57 2 ø 10.0 1.57 2 ø 10.0 0.7 4 ø 10.0	ø 5.0 c/12	10.15 5.07

#### 14.1.2.2 Cálculo dos Blocos

TOPO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.50 cm	

Bloco	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
BA1	15.00 X 30.00	EL 10.15 EL 5.07	0.04 0.00	1 0	798 48	1042.81	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
BA2	15.00 X 30.00	EL 10.15 EL 5.07	0.04 0.00	1 0	798 48	1042.81	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
BA3	15.00 X 30.00	EL 10.15 EL 5.07	0.04 0.00	1 0	798 48	1042.81	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
BA4	15.00 X 30.00	EL 10.15 EL 5.07	0.04 0.00	1 0	798 48	1042.81	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

### 14.1.3 Reservatório – Pavimento Topo

#### 14.1.3.1 Dados dos Reservatórios

TOPO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Parades Outras	Total	Base	Topo		
L1 (RES 1)	16.00	0.00	- 126.00	400.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	2096.50 kgf/m <sup>2</sup>				
L1 (RES 1)	16.00	0.00	- 126.00	400.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	2096.50 kgf/m <sup>2</sup>				
LF1 (RES 1)	16.00	0.00	- 126.00	400.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	2096.50 kgf/m <sup>2</sup>				
PAR1 (RES 1)	15.00	0.00	0.00	472.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1968.00	960.00		
PAR2 (RES 1)	15.00	0.00	0.00	472.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1968.00	960.00		
PAR3 (RES 1)	15.00	0.00	0.00	472.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1968.00	960.00		
PAR4 (RES 1)	15.00	0.00	0.00	472.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1968.00	960.00		

#### 14.1.3.2 Resultados do Reservatório

TOPO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

○ Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	3.82 - 0.57	2.12 - 0.34	1128	353	As = 2.70 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m)	As = 1.71 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	1.37 - 1.61	1.56 - 1.30	176	157	As = 1.61 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.71 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.86 - 1.01	1.63 - 0.47	371	110	As = 1.61 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.71 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1	3.23 - 1.54	0.52 - 0.04	286	103	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)
PAR2	3.23 - 1.54	0.51 - 0.04	286	103	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m)
PAR3	2.66 - 0.57	0.82 - 0.04	501	169	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR4	2.70 - 0.92	0.79 - 0.04	520	177	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR3	-130		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 L1	-392		As = 2.29 cm <sup>2</sup> /m	



				ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-1128		As = 2.90 cm <sup>2</sup> /m ø8.0 c/17 (2.96 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-33		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-140		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-353		As = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR4	-128		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-401		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-1060		As = 2.90 cm <sup>2</sup> /m ø8.0 c/17 (2.96 cm <sup>2</sup> /m)	
Barra	L1 PAR1	-39		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 L1	-115		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-349		As = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3	-12		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2	-178		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2	-4		As = 2.38 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	



Barra	PAR2 PAR4	-180		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR4	-4		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR1	-181		As = 2.38 cm <sup>2</sup> /m ø16.0 c/20 (10.05 cm <sup>2</sup> /m)	
Barra	PAR1 PAR3	-179		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR1	-12		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2	-501		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4	-499		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR4			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR1	-499		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR3	-502		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR1			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	



### 14.1.3.3 Cálculos do Reservatório

TOPO	$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E = 268384 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
Lance 2		cobr = $3.00 \text{ cm}$	

- Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trec ho	Dire ção	Momento positivo			Momento negativo			Arma dura inferio r	Arma dura superi or	Cisalha mento
		Flex ão	Verificaç ão axial (compre ssão)	Verific ação axial (tração )	Flex ão	Verificaç ão axial (compre ssão)	Verific ação axial (tração )			
L1	X	Md = 1128 kgf. m/m  As = 2.10 cm <sup>2</sup> / m  A's = 0.00 cm <sup>2</sup> / m	Fd = 3.82 tf Situação : GE  As = 1.56 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	Fd = 0.68 tf Situaç ão: GE  As = 2.20 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	Md = 23 kgf. m/m  As = 0.04 cm <sup>2</sup> / m  A's = 0.00 cm <sup>2</sup> / m		Fd = 0.68 tf Situaç ão: PE  As = 0.13 cm <sup>2</sup> /m  A's = 0.02 cm <sup>2</sup> /m	As = 2.70 cm <sup>2</sup> /m ø8.0 c/18 (2.79 cm <sup>2</sup> /m ) fiss = 0.09 mm	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 11.67 tf/m vrd1 = 8.67 tf/m Modelo I vrd2 = 61.61 tf/m vsw = 0.21 tf/m asw = 0.75 cm <sup>2</sup> /m
	Y	Md = 861 kgf. m/m  As = 1.71 cm <sup>2</sup> / m  A's = 0.00 cm <sup>2</sup> / m	Fd = 2.12 tf Situação : GE  As = 0.37 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	Fd = 0.40 tf Situaç ão: GE  As = 0.76 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	Md = 80 kgf. m/m  As = 0.16 cm <sup>2</sup> / m  A's = 0.00 cm <sup>2</sup> / m		Fd = 0.40 tf Situaç ão: GE  As = 0.22 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	As = 1.71 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 3.83 tf/m vrd1 = 8.14 tf/m vrd2 = 57.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 861 kgf. m/m  As = 1.60 cm <sup>2</sup> / m  A's = 0.00	Fd = 1.37 tf Situação : GE  As = 0.12 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	Fd = 1.93 tf Situaç ão: GE  As = 0.60 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	Md = 80 kgf. m/m  As = 0.15 cm <sup>2</sup> / m  A's = 0.00		Fd = 1.93 tf Situaç ão: GE  As = 0.44 cm <sup>2</sup> /m  A's = 0.00 cm <sup>2</sup> /m	As = 1.61 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.01 mm		vsd = 3.62 tf/m vrd1 = 8.61 tf/m Modelo I vrd2 = 61.61 tf/m vsw = 0.00 tf/m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 861 kgf. m/m  As = 1.71 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.56 tf Situação : GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.56 tf Situação: GE As = 0.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 116 kgf. m/m  As = 0.23 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.56 tf Situação: GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.71 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 1.53 tf/m vrd1 = 8.14 tf/m vrd2 = 57.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 861 kgf. m/m  As = 1.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.86 tf Situação : GE As = 0.26 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.21 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 371 kgf. m/m  As = 0.68 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.86 tf Situação : GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.21 tf Situação: GE As = 0.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.61 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.01 mm		vsd = 4.52 tf/m vrd1 = 8.61 tf/m Modelo I vrd2 = 61.61 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 861 kgf. m/m  As = 1.71 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.56 tf Situação: GE As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 110 kgf. m/m  As = 0.21 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.56 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.71 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 1.03 tf/m vrd1 = 8.14 tf/m vrd2 = 57.53 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1	X	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00	Fd = 3.23 tf Situação : GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.85 tf Situação: GE As = 0.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00		Fd = 1.85 tf Situação: GE As = 0.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 2.64 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.22 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.05 tf Situaç ão: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.22 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.52 tf Situação : GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situaç ão: GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m )	vsd = 1.25 tf/m vrd1 = 7.44 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R2	X	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 3.23 tf Situação : GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.85 tf Situaç ão: GE As = 0.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1130 kgf. m/m  As = 2.29 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.85 tf Situaç ão: GE As = 0.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 2.64 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 565 kgf. m/m  As = 1.22 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.05 tf Situaç ão: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 565 kgf. m/m  As = 1.22 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.51 tf Situação : GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situaç ão: GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.22 cm <sup>2</sup> /m ø8.0 c/25 (2.01 cm <sup>2</sup> /m )	vsd = 1.25 tf/m vrd1 = 7.44 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00	Fd = 2.66 tf Situação : GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.68 tf Situaç ão: GE As = 0.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00	Fd = 2.66 tf Situação : GE As = 0.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.68 tf Situaç ão: GE As = 1.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 2.70 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m



		cm <sup>2</sup> /m			cm <sup>2</sup> /m					asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.82 tf Situação : GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situação : GE As = 0.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.82 tf Situação : GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situação : GE As = 0.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.02 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R4	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.70 tf Situação : GE As = 0.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.10 tf Situação : GE As = 0.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.70 tf Situação : GE As = 0.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.10 tf Situação : GE As = 1.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.69 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.79 tf Situação : GE As = 0.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situação : GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.79 tf Situação : GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situação : GE As = 0.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.02 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga	Laje 1 Laje 2	Momento negativo			Momento positivo			Armaduras finais
		Flexão	Flexo compressão	Flexo tração	Flexão	Flexo compressão	Flexo tração	
Barra	L1 PAR 3	Md = 1130 kgf.m/m		Fd = 1.85 tf Situação : GE				As = 2.29 cm <sup>2</sup> /m



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.37 tf Situação: GE As = 0.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.93 tf Situação: GE As = 1.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	L1 L1	Md = 1285 kgf.m/m  As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.82 tf Situação: GE As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.93 tf Situação: GE As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.90 cm <sup>2</sup> /m (ø8.0 c/17 - 2.96 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	L1 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.04 tf Situação: PE As = 0.21 cm <sup>2</sup> /m A's = 0.03 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.85 tf Situação: GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.56 tf Situação: GE As = 0.51 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1285	Fd = 2.12 tf Situação: GE	Fd = 1.56 tf				As = 2.40 cm <sup>2</sup> /m



		kgf.m/ m  As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 0.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	L1 PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.61 tf Situação : GE As = 0.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.86 tf Situação: GE As = 0.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.21 tf Situação : GE As = 0.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	L1 L1	Md = 1285 kgf.m/ m  As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.76 tf Situação: GE As = 1.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.61 tf Situação : GE As = 2.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.90 cm <sup>2</sup> /m (ø8.0 c/17 - 2.96 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	L1 PAR 1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.06 tf Situação : GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	PAR 1 L1	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.86 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.56 tf Situação: GE As = 0.46 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1285 kgf.m/m As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.12 tf Situação: GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.56 tf Situação: GE As = 0.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.40 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR 2 PAR 3	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.85 tf Situação: PE As = 0.25 cm <sup>2</sup> /m A's = 0.18 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 PAR 2	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.89 tf Situação: GE As = 0.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.85 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR 4 PAR 2	Md = 1130 kgf.m/m As = 2.38 cm <sup>2</sup> /m		Fd = 1.59 tf Situação: PE As = 0.20 cm <sup>2</sup> /m A's = 0.17 cm <sup>2</sup> /m				As = 2.38 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.00 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR 2  PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.91 tf Situação: GE As = 0.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.59 tf Situação : GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR 1  PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 1.61 tf Situação : PE As = 0.20 cm <sup>2</sup> /m A's = 0.17 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 1	Md = 1130 kgf.m/ m  As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.91 tf Situação: GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.61 tf Situação : GE As = 0.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.38 cm <sup>2</sup> /m (ø16.0 c/20 - 10.05 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1  PAR 3	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.90 tf Situação: GE As = 0.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.85 tf Situação : GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR 3  PAR 1	Md = 1130 kgf.m/ m		Fd = 1.85 tf Situação : PE As = 0.25 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm





		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.18 cm <sup>2</sup> /m				
Barra	PAR 2 PAR 3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.73 tf Situação: GE As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR 4 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 PAR 4	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.72 tf Situação: GE As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR 1	Md = 1130 kgf.m/m						As = 2.29 cm <sup>2</sup> /m



	PAR 4	As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.73 tf Situação: GE  As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR 1  PAR 3	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.74 tf Situação: GE  As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR 3  PAR 1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

## 14.2 CAIXA DO EXTRAVASOR

### 14.2.1 Resumo de resultados

#### 14.2.1.1 Cargas verticais:

- Peso próprio = 2.04 tf
- Adicional = 0.35 tf
- Acidental = 0.78 tf
- Água = 1.68 tf
- Total = 4.85 tf
- Área aproximada = 2.59 m<sup>2</sup>
- Relação = 1876.20 kgf/m<sup>2</sup>

AVISO: Relação de carga por área não usual para edifícios

#### 14.2.1.2 Deslocamento horizontal:

- X+ = 0.00 cm (limite 0.04)
- X- = 0.00 cm (limite 0.04)
- Y+ = 0.00 cm (limite 0.04)
- Y- = 0.00 cm (limite 0.04)

#### 14.2.1.3 Aceleração horizontal:

- X+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- X- = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y- = 0.000 m/s<sup>2</sup> (limite 0.147)

#### 14.2.1.4 Verificação de estabilidade (Gama-Z):

- X+ = 1.00 (limite 1.10)
- X- = 1.00 (limite 1.10)

- $Y+ = 1.00$  (limite 1.10)
- $Y- = 1.00$  (limite 1.10)

#### 14.2.1.5 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

#### 14.2.1.6 Análise dinâmica:

Frequência natural: 7.36 Hz

### 14.2.2 Reservatório - Pavimento Topo

#### 14.2.2.1 Dados dos Reservatórios

TOPO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RES 1)	15.00	0.00	- 65.00	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	1461.50 kgf/m <sup>2</sup>				
L1 (RES 1)	15.00	0.00	- 65.00	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	1461.50 kgf/m <sup>2</sup>				
L1 (RES 1)	15.00	0.00	- 65.00	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	1461.50 kgf/m <sup>2</sup>				
PAR1 (RES 1)	15.00	0.00	0.00	243.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000.00	480.00		
PAR2 (RES 1)	15.00	0.00	0.00	243.75 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000.00	480.00		

PAR3 (RES 1)	15. 00	0.00	0.0 0	243. 75 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000 .00	480. 00		
PAR4 (RES 1)	15. 00	0.00	0.0 0	243. 75 kgf/ m	0.00 0.00	0.00 0.00	0.00 kgf/m	1000 .00	480. 00		

#### 14.2.2.2 Resultados do Reservatório

TOPO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 2		cobr = 3.00 cm	

- Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	0.00 0.00	0.03 - 0.09	8	144	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.08 - 0.08	0.02 - 0.10	28	36	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.46 0.00	0.08 - 0.19	11	18	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1	0.57 - 0.12	0.70 - 0.02	7	15	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR2	0.57 - 0.12	0.70 - 0.02	7	15	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR3	0.55 - 0.04	0.28 - 0.04	51	28	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR4	0.63 - 0.12	0.46 - 0.05	50	27	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20

					(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)
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ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR4	-14		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-20		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-75		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-23		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-9		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-41		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR3	-6		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 L1	-29		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-10		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR1	-23		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 L1	-9		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-41		As = 2.29 cm <sup>2</sup> /m	



				ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR2 PAR3			As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR3 PAR2	-73		As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR4 PAR2			As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR2 PAR4	-72		As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR1 PAR4			As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR4 PAR1	-72		As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR1 PAR3	-74		As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	
Barra	PAR3 PAR1			As = 2.29 cm²/m ø8.0 c/20 (2.51 cm²/m)	

#### 14.2.2.3 Cálculos do Reservatório

TOPO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 3.00 cm	

- Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	Md = 757 kgf.m/m						As = 1.52 cm²/m ø8.0 c/20	A's = 2.25 cm²/m ø8.0 c/20	vsd = 0.15 tf/m vrd1 = 8.02 tf/m Modelo I



		As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						(2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	(2.51 cm <sup>2</sup> /m)	vr <sub>d2</sub> = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.03 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.10 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 144 kgf. m/m  As = 0.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.03 tf Situação : GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.10 tf Situação : GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	v <sub>sd</sub> = 0.62 tf/m vr <sub>d1</sub> = 7.54 tf/m vr <sub>d2</sub> = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.08 tf Situação : GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 28 kgf. m/m  As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.08 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	v <sub>sd</sub> = 0.77 tf/m vr <sub>d1</sub> = 8.02 tf/m Modelo I vr <sub>d2</sub> = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.02 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.13 tf Situação : GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Fd = 0.13 tf Situação : PE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	v <sub>sd</sub> = 0.12 tf/m vr <sub>d1</sub> = 7.54 tf/m vr <sub>d2</sub> = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m  As = 1.52						As = 1.52 cm <sup>2</sup> /m ø8.0 c/20		v <sub>sd</sub> = 0.08 tf/m vr <sub>d1</sub> = 8.02 tf/m Modelo I





		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m						(2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm		vr <sub>d2</sub> = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.23 tf Situaç ão: PE As = 0.04 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m	Md = 18 kgf. m/m  As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.08 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.23 tf Situaç ão: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm		v <sub>sd</sub> = 0.30 tf/m vr <sub>d1</sub> = 7.54 tf/m vr <sub>d2</sub> = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.14 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.14 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	v <sub>sd</sub> = 0.44 tf/m vr <sub>d1</sub> = 8.02 tf/m Modelo I vr <sub>d2</sub> = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situaç ão: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situaç ão: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	v <sub>sd</sub> = 0.15 tf/m vr <sub>d1</sub> = 7.54 tf/m vr <sub>d2</sub> = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R2	X	Md = 757 kgf. m/m  As = 1.52		Fd = 0.14 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52		Fd = 0.14 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20	v <sub>sd</sub> = 0.44 tf/m vr <sub>d1</sub> = 8.02 tf/m Modelo I



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	(2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	(2.51 cm <sup>2</sup> /m )	vr <sub>d2</sub> = 56.51 tf/m vs <sub>w</sub> = 0.00 tf/m as <sub>w</sub> = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situaç ão: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.02 tf Situaç ão: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vs <sub>d</sub> = 0.15 tf/m vr <sub>d1</sub> = 7.54 tf/m vr <sub>d2</sub> = 52.44 tf/m vs <sub>w</sub> = 0.00 tf/m as <sub>w</sub> = 0.00 cm <sup>2</sup> /m
PA R3	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.05 tf Situaç ão: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.55 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situaç ão: GE As = 0.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vs <sub>d</sub> = 0.49 tf/m vr <sub>d1</sub> = 8.02 tf/m Modelo I vr <sub>d2</sub> = 56.51 tf/m vs <sub>w</sub> = 0.00 tf/m as <sub>w</sub> = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.05 tf Situaç ão: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.28 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.05 tf Situaç ão: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vs <sub>d</sub> = 0.43 tf/m vr <sub>d1</sub> = 7.54 tf/m vr <sub>d2</sub> = 52.44 tf/m vs <sub>w</sub> = 0.00 tf/m as <sub>w</sub> = 0.00 cm <sup>2</sup> /m
PA R4	X	Md = 757 kgf. m/m  As = 1.52		Fd = 0.15 tf Situaç ão: GE As = 0.07 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52		Fd = 0.15 tf Situaç ão: GE As = 0.12 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20	vs <sub>d</sub> = 0.49 tf/m vr <sub>d1</sub> = 8.02 tf/m Modelo I



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	(2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	(2.51 cm <sup>2</sup> /m )	vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.06 tf Situaç ão: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.43 tf/m vr1 = 7.54 tf/m vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1	Momento negativo			Momento positivo			Armaduras finais
	Laje 2	Flexão	Flexo compressã o	Flexo tração	Flexã o	Flexo compressã o	Flexo traçã o	
Barra	L1 PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.08 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m		Fd = 0.02 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	L1 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.46 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.08 tf Situação : GE As = 0.16 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 2	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação : GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.08 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.15 tf Situação : GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 3	Md = 1130 kgf.m/ m		Fd = 0.09 tf Situação : GE As = 0.02 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				
Barra	PAR 3 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.28 tf Situação: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/m	Fd = 0.08 tf Situação: GE	Fd = 0.15 tf Situação: GE				As = 2.29 cm <sup>2</sup> /m



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 PAR 3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação : PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.55 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação : GE As = 0.16 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 PAR 2	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situação : PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 PAR 4	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.55 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.15 tf Situação : GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1	Md = 1130		Fd = 0.15 tf				As = 2.29 cm <sup>2</sup> /m



	PAR 4	kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação : PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.55 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.15 tf Situação : GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1  PAR 3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.55 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.09 tf Situação : GE As = 0.16 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3  PAR 1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação : PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

## 14.3 BLOCO DE APOIO

### 14.3.1 Resumo de resultados

#### 14.3.1.1 Cargas verticais:

- Peso próprio = 3.73 tf
- Adicional = 0.79 tf
- Acidental = 1.74 tf
- Total = 6.27 tf
- Área aproximada = 5.81 m<sup>2</sup>
- Relação = 1078.39 kgf/m<sup>2</sup>

#### 14.3.1.2 Deslocamento horizontal:

- X+ = 0.00 cm (limite 0.06)
- X- = 0.00 cm (limite 0.06)
- Y+ = 0.00 cm (limite 0.06)
- Y- = 0.00 cm (limite 0.06)

#### 14.3.1.3 Aceleração horizontal:

- X+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- X- = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y+ = 0.000 m/s<sup>2</sup> (limite 0.147)
- Y- = 0.000 m/s<sup>2</sup> (limite 0.147)

#### 14.3.1.4 Verificação de estabilidade (Gama-Z):

- X+ = 1.00 (limite 1.10)
- X- = 1.00 (limite 1.10)
- Y+ = 1.00 (limite 1.10)
- Y- = 1.00 (limite 1.10)



#### 14.3.1.5 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

#### 14.3.1.6 Análise dinâmica:

Frequência natural: 10.50 Hz

### 14.3.2 Blocos – Pavimento Topo

#### 14.3.2.1 Resultados dos Blocos

TOPO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 3.50 cm	

Dados				Resultados					
Bloco	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
BA1 1:20	75.00 X 75.00	50.00 100.00	200.00	1.83 0.00	0 10	0 10	9.42 3 ø	ø 5.0 c/20	9.23 9.23
			EL				20.0		
			200.00				9.42 3 ø		
			EL				20.0		
							0.4 8 ø		
							20.0		

#### 14.3.2.2 Cálculo dos Blocos

TOPO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 3.50 cm	

Bloco	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
BA1	75.00 X 75.00	EL	1.83 0.00	10 70	5113 36251	519.44	9.42
		9.23					(3 ø 20.0)
		EL					9.42
		9.23					(3 ø 20.0)

## **15. RESERVATÓRIO ELEVADO – 50 M<sup>3</sup>**

### **15.1 RESUMO DOS RESULTADOS**

#### **15.1.1 Cargas verticais:**

Peso próprio = 85.88 tf

Adicional = 5.12 tf

Acidental = 4.23 tf

Água = 48.70 tf

Total = 143.94 tf

Área aproximada = 28.23 m<sup>2</sup>

Relação = 5098.50 kgf/m<sup>2</sup>

#### **AVISO: Relação de carga por área não usual para edifícios**

#### **15.1.2 Deslocamento horizontal:**

X+ = 0.03 cm (limite 1.02)

X- = 0.03 cm (limite 1.02)

Y+ = 0.03 cm (limite 1.02)

Y- = 0.03 cm (limite 1.02)

#### **15.1.3 Aceleração horizontal:**

X+ = 4.951 m/s<sup>2</sup> (limite 0.147)

X- = 4.951 m/s<sup>2</sup> (limite 0.147)

Y+ = 4.387 m/s<sup>2</sup> (limite 0.147)

Y- = 4.387 m/s<sup>2</sup> (limite 0.147)

AVISO: Acelerações excessivas

#### 15.1.4 Verificação de estabilidade (Gama-Z):

$X+ = 1.01$  (limite 1.10)

$X- = 1.01$  (limite 1.10)

$Y+ = 1.01$  (limite 1.10)

$Y- = 1.01$  (limite 1.10)

#### 15.1.5 Análise de 2ª ordem:

Processo P-Delta

#### 15.1.6 Deslocamentos no topo da edificação:

Vento X+: 0.21 »» 0.21 (+0.00%)

Vento X-: 0.21 »» 0.21 (+0.00%)

Vento Y+: 0.21 »» 0.21 (+0.00%)

Vento Y-: 0.21 »» 0.21 (+0.00%)

Desaprumo X+: 0.04 »» 0.04 (+0.00%)

Desaprumo X-: 0.04 »» 0.04 (+0.00%)

Desaprumo Y+: 0.04 »» 0.04 (+0.00%)

Desaprumo Y-: 0.04 »» 0.04 (+0.00%)

#### 15.1.7 Análise dinâmica:

Frequência natural: 2.09 Hz

### 15.2 VERIFICAÇÃO DA ESTABILIDADE GLOBAL DA ESTRUTURA

#### 15.2.1 Maior coeficiente gama-Z

Combinação: 1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D1							
Pavimento	Altura	Carga	Carga	Deslocamento	Momento	Momento	Gama-Z

	relativa (cm)	vertical (tf)	horizontal (tf)	horizontal (cm)	2a. ordem (kgf.m)	tombamento (kgf.m)	
TAMPA DO RES.	1730.00	0.00	0.68	0.00	0.00	11722.70	1.01 (lim=1.10)
FUNDO DO RES.	1280.00	135.64	0.99	0.19	254.39	12615.28	
TRAVAMENTO 4	1020.00	10.57	0.61	0.16	16.45	6256.84	
TRAVAMENTO 3	790.00	10.57	0.55	0.12	12.47	4321.22	
TRAVAMENTO 2	560.00	10.57	0.51	0.07	7.92	2854.60	
TRAVAMENTO 1	330.00	10.57	0.45	0.03	3.49	1487.78	
CINTAMENTO	100.00	5.27	0.07	0.00	0.20	69.87	
TOTAL					294.93	39328.28	

### 15.2.2 Limitações

Em estruturas com Gama-Z maior que 1.10 é necessário fazer a verificação dos efeitos de 2ª ordem com a análise P-Delta.

O Gama-Z é um parâmetro de estabilidade para avaliação de estruturas simétricas (tanto geometria quanto carregamento) e edificações com mais de 4 pavimentos. Nos demais casos, recomenda-se a verificação dos efeitos de 2ª ordem com a análise P-Delta.

### 15.2.3 Coeficiente Gama-Z por combinação

Combinação	Momento 2a. ordem (kgf.m)	Momento tombamento (kgf.m)	Gama -Z
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.01D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.61D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.01D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.61D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.01D3	271.01	37952.81	1.01

1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.61D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.01D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.61D1	477.13	65547.14	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.61D2	450.90	65547.14	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.61D3	453.25	63254.69	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.61D4	459.00	63254.69	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.61D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.01D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.61D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.01D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.61D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.01D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.61D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.01D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.61D1	477.13	65547.14	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.61D2	450.90	65547.14	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.61D3	453.25	63254.69	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.61D4	459.00	63254.69	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.01D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.61D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.01D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.61D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.01D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.61D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.01D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.61D1	477.13	65547.14	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.61D2	450.90	65547.14	1.01



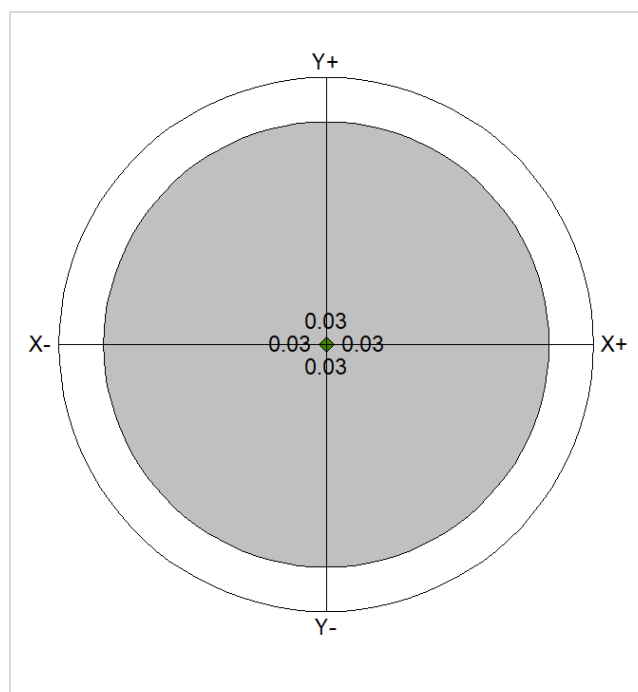
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.61D 3	453.25	63254.69	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.61D 4	459.00	63254.69	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.61 D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.01 D1	291.53	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.61 D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.01 D2	265.30	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.61 D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.01 D3	271.01	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.61 D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.01 D4	276.75	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.61D 1	477.13	65547.14	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.61D 2	450.90	65547.14	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.61D 3	453.25	63254.69	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.61D 4	459.00	63254.69	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D 1	294.93	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.61D 2	268.27	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.61D 3	274.06	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.61D 4	279.96	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.61D 1	294.93	39328.28	1.01



1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.61D 2	268.27	39328.28	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.61D 3	274.06	37952.81	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.61D 4	279.96	37952.81	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D1	294.93	39328.28	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.61D2	268.27	39328.28	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.61D3	274.06	37952.81	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.61D4	279.96	37952.81	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.61D1	294.93	39328.28	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.61D2	268.27	39328.28	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.61D3	274.06	37952.81	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.61D4	279.96	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D1	250.20	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.01D1	250.20	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.61D2	228.36	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.01D2	228.36	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.61D3	233.12	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.01D3	233.12	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.61D4	237.61	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.01D4	237.61	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.61D1	409.71	65547.14	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.61D2	387.86	65547.14	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.61D3	389.75	63254.69	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.61D4	394.25	63254.69	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.61D1	250.20	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.01D1	250.20	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.61D2	228.36	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.01D2	228.36	39328.28	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.61D3	233.12	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.01D3	233.12	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.61D4	237.61	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.01D4	237.61	37952.81	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.61D1	409.71	65547.14	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.61D2	387.86	65547.14	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.61D3	389.75	63254.69	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.61D4	394.25	63254.69	1.01
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.61D1	253.58	39328.28	1.01

$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.61D2$	231.34	39328.28	1.01
$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.61D3$	236.18	37952.81	1.01
$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.61D4$	240.81	37952.81	1.01
$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.61D1$	253.58	39328.28	1.01
$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.61D2$	231.34	39328.28	1.01
$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.61D3$	236.18	37952.81	1.01
$G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.61D4$	240.81	37952.81	1.01

### 15.3 DESLOCAMENTOS HORIZONTAIS DEVIDO À AÇÃO DO VENTO



Verificações	X+	X-	Y+	Y-
Altura total da edificação (cm)	1730.00			
Deslocamento limite (cm)	1.02			
Deslocamento característico (cm)	0.12	-0.12	0.11	-0.11
gf2	0.30	0.30	0.30	0.30
Deslocamento combinações frequentes (cm)	0.03	-0.03	0.03	-0.03

Pavimento	Altura (cm)	Deslocamento combinações frequentes (cm)	Diferença (cm)	Limite (cm)
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		X+	X-	Y+	Y-	X+	X-	Y+	Y-	
FUNDO DO RES.	260.00	0.03	-0.03	0.03	-0.03	0.01	-0.01	0.01	-0.01	0.31
TRAVAMENTO 4	230.00	0.03	-0.03	0.03	-0.03	0.01	-0.01	0.01	-0.01	0.27
TRAVAMENTO 3	230.00	0.02	-0.02	0.02	-0.02	0.01	-0.01	0.01	-0.01	0.27
TRAVAMENTO 2	230.00	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.27
TRAVAMENTO 1	230.00	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.27
CINTAMENTO	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

#### 15.4 IMPERFEIÇÕES GEOMÉTRICAS GLOBAIS

Parâmetros	
Altura total da edificação (cm)	1730.00
Nº de pilares contínuos	1
Combinação vertical	G1+G2+Q+A
Tipo de estrutura	Estruturas usuais
Ângulo adotado	1/300

Pavimento	Carga vertical (tf)	Carga aplicada (tf)		Deslocamento (cm)	
		X	Y	X	Y
TAMPA DO RES.	0.00	0.00	0.00	0.00	0.00
FUNDO DO RES.	107.36	0.36	0.36	0.04	0.04
TRAVAMENTO 4	8.13	0.03	0.03	0.03	0.03
TRAVAMENTO 3	8.13	0.03	0.03	0.02	0.02
TRAVAMENTO 2	8.13	0.03	0.03	0.01	0.01
TRAVAMENTO 1	8.13	0.03	0.03	0.01	0.01
CINTAMENTO	4.05	0.01	0.01	0.00	0.00

## 15.5 RELATÓRIO DE ESFORÇOS NAS FUNDAÇÕES POR ELEMENTOS

Fundação S1						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	14.29	-2.51	1.14	0.00	0.01	0.17
Adicional (G2)	0.85	0.15	-0.25	0.00	0.00	0.02
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.70	0.12	-0.21	0.00	0.00	0.02
Água (A)	8.06	-8.34	44.70	0.01	0.00	0.22
Vento X+ (V1)	0.05	-731.70	3267.25	1.06	0.17	1.83
Vento X- (V2)	-0.05	731.70	-3267.25	-1.06	-0.17	-1.83
Vento Y+ (V3)	3.31	-642.21	714.25	0.17	0.20	1.36
Vento Y- (V4)	-3.31	642.21	-714.25	-0.17	-0.20	-1.36
Desaprumo X+ (D1)	0.01	-100.17	447.74	0.13	0.02	0.11
Desaprumo X- (D2)	-0.01	100.17	-447.74	-0.13	-0.02	-0.11
Desaprumo Y+ (D3)	0.59	-88.79	98.78	0.02	0.03	0.18
Desaprumo Y- (D4)	-0.59	88.79	-98.78	-0.02	-0.03	-0.18
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+0.72D1	15.67	-513.54	2284.03	0.73	0.13	1.38
G1+G2+0.7Q+0.6V2+0.72D2	15.60	509.00	-2282.55	-0.73	-0.11	-0.97
G1+G2+0.7Q+0.6V3+0.72D3	18.04	-451.64	500.53	0.12	0.15	1.15
G1+G2+0.7Q+0.6V4+0.72D4	13.22	447.10	-499.05	-0.12	-0.13	-0.74
G1+G2+0.7Q+A+0.6V1+0.43D1	23.72	-492.98	2199.55	0.70	0.13	1.57
G1+G2+0.7Q+A+0.6V1+0.72D1	23.72	-521.88	2328.72	0.74	0.13	1.60
G1+G2+0.7Q+A+0.6V2+0.43D2	23.66	471.76	-2108.68	-0.68	-0.10	-0.72
G1+G2+0.7Q+A+0.6V2+0.72D2	23.66	500.66	-2237.85	-0.72	-0.11	-0.75
G1+G2+0.7Q+A+0.6V3+0.43D3	25.93	-434.36	516.73	0.12	0.14	1.32
G1+G2+0.7Q+A+0.6V3+0.72D3	26.10	-459.98	545.23	0.13	0.15	1.37
G1+G2+0.7Q+A+0.6V4+0.43D4	21.45	413.14	-425.86	-0.10	-0.12	-0.47
G1+G2+0.7Q+A+0.6V4+0.72D4	21.28	438.76	-454.36	-0.11	-0.13	-0.52
G1+G2+0.7Q+A+D1	23.70	-110.78	493.17	0.14	0.03	0.53
G1+G2+0.7Q+A+D2	23.68	89.56	-402.30	-0.12	-0.01	0.32
G1+G2+0.7Q+A+D3	24.28	-99.40	144.22	0.03	0.04	0.60
G1+G2+0.7Q+A+D4	23.10	78.18	-53.34	-0.01	-0.01	0.24
G1+G2+0.7Q+A+V1+0.43D1	23.74	-785.66	3506.45	1.13	0.19	2.30

G1+G2+0.7Q+A+V2+0.43D2	23.64	764.44	-3415.58	-1.11	-0.17	-1.46
G1+G2+0.7Q+A+V3+0.43D3	27.26	-691.24	802.43	0.19	0.22	1.86
G1+G2+0.7Q+A+V4+0.43D4	20.12	670.02	-711.56	-0.17	-0.20	-1.02
G1+G2+0.7Q+V1+0.43D1	15.68	-777.32	3461.75	1.12	0.19	2.08
G1+G2+0.7Q+V2+0.43D2	15.58	772.78	-3460.27	-1.12	-0.17	-1.67
G1+G2+0.7Q+V3+0.43D3	19.20	-682.90	757.73	0.18	0.22	1.64
G1+G2+0.7Q+V4+0.43D4	12.07	678.36	-756.25	-0.18	-0.20	-1.23
G1+G2+A+0.6V1+0.43D1	23.23	-493.07	2199.69	0.70	0.13	1.55
G1+G2+A+0.6V1+0.72D1	23.23	-521.97	2328.87	0.74	0.13	1.58
G1+G2+A+0.6V2+0.43D2	23.17	471.67	-2108.53	-0.68	-0.10	-0.74
G1+G2+A+0.6V2+0.72D2	23.16	500.57	-2237.71	-0.72	-0.11	-0.77
G1+G2+A+0.6V3+0.43D3	25.44	-434.45	516.88	0.12	0.14	1.30
G1+G2+A+0.6V3+0.72D3	25.61	-460.06	545.38	0.13	0.15	1.36
G1+G2+A+0.6V4+0.43D4	20.96	413.05	-425.71	-0.10	-0.12	-0.48
G1+G2+A+0.6V4+0.72D4	20.78	438.67	-454.21	-0.11	-0.13	-0.54
G1+G2+A+D1	23.21	-110.87	493.32	0.14	0.03	0.52
G1+G2+A+D2	23.19	89.47	-402.15	-0.12	-0.01	0.30
G1+G2+A+D3	23.79	-99.49	144.36	0.03	0.04	0.59
G1+G2+A+D4	22.61	78.09	-53.20	-0.01	-0.01	0.23
G1+G2+A+V1+0.43D1	23.25	-785.74	3506.59	1.13	0.19	2.29
G1+G2+A+V2+0.43D2	23.15	764.35	-3415.43	-1.11	-0.17	-1.47
G1+G2+A+V3+0.43D3	26.76	-691.33	802.57	0.19	0.22	1.85
G1+G2+A+V4+0.43D4	19.63	669.93	-711.41	-0.17	-0.20	-1.03
G1+G2+D1	15.15	-102.53	448.62	0.13	0.03	0.30
G1+G2+D2	15.13	97.81	-446.85	-0.14	-0.01	0.09
G1+G2+D3	15.73	-91.15	99.67	0.02	0.04	0.37
G1+G2+D4	14.55	86.43	-97.89	-0.02	-0.02	0.01
G1+G2+Q+0.6V1+0.43D1	15.87	-484.60	2154.79	0.69	0.12	1.36
G1+G2+Q+0.6V2+0.43D2	15.81	480.13	-2153.43	-0.70	-0.10	-0.93
G1+G2+Q+0.6V3+0.43D3	18.08	-425.98	471.97	0.11	0.14	1.10
G1+G2+Q+0.6V4+0.43D4	13.60	421.52	-470.62	-0.11	-0.12	-0.68
G1+G2+Q+A+0.6V1+0.43D1	23.93	-492.94	2199.49	0.70	0.13	1.57
G1+G2+Q+A+0.6V2+0.43D2	23.87	471.79	-2108.74	-0.68	-0.10	-0.72
G1+G2+Q+A+0.6V3+0.43D3	26.14	-434.32	516.67	0.12	0.14	1.32
G1+G2+Q+A+0.6V4+0.43D4	21.66	413.18	-425.92	-0.10	-0.12	-0.47
G1+G2+Q+A+D1	23.91	-110.75	493.11	0.14	0.03	0.53
G1+G2+Q+A+D2	23.89	89.60	-402.36	-0.12	-0.01	0.32
G1+G2+Q+A+D3	24.49	-99.37	144.15	0.03	0.04	0.61
G1+G2+Q+A+D4	23.31	78.22	-53.41	-0.01	-0.01	0.25

G1+G2+Q+D1	15.85	-102.41	448.41	0.13	0.03	0.32
G1+G2+Q+D2	15.83	97.94	-447.06	-0.14	-0.01	0.10
G1+G2+Q+D3	16.43	-91.03	99.46	0.02	0.04	0.39
G1+G2+Q+D4	15.25	86.56	-98.10	-0.02	-0.02	0.03

Fundação S2						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	14.31	-4.59	-1.13	-0.01	0.01	0.06
Adicional (G2)	0.86	-0.44	0.04	0.00	0.00	0.01
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.71	-0.36	0.03	0.00	0.00	0.01
Água (A)	8.07	-11.92	9.37	0.00	0.00	0.05
Vento X+ (V1)	-2.94	-766.09	681.99	0.27	0.29	-0.60
Vento X- (V2)	2.94	766.09	-681.99	-0.27	-0.29	0.60
Vento Y+ (V3)	1.62	-3187.87	767.72	0.29	0.98	2.31
Vento Y- (V4)	-1.62	3187.87	-767.72	-0.29	-0.98	-2.31
Desaprumo X+ (D1)	-0.52	-105.73	93.30	0.03	0.04	-0.17
Desaprumo X- (D2)	0.52	105.73	-93.30	-0.03	-0.04	0.17
Desaprumo Y+ (D3)	0.29	-441.62	106.74	0.04	0.12	0.18
Desaprumo Y- (D4)	-0.29	441.62	-106.74	-0.04	-0.12	-0.18
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+0.72D1	13.52	-541.20	475.41	0.18	0.20	-0.42
G1+G2+0.7Q+0.6V2+0.72D2	17.79	530.64	-477.57	-0.20	-0.19	0.56
G1+G2+0.7Q+0.6V3+0.72D3	16.84	-2236.53	536.55	0.19	0.68	1.59
G1+G2+0.7Q+0.6V4+0.72D4	14.48	2225.97	-538.70	-0.21	-0.67	-1.45
G1+G2+0.7Q+A+0.6V1+0.43D1	21.74	-522.61	457.86	0.17	0.20	-0.32
G1+G2+0.7Q+A+0.6V1+0.72D1	21.59	-553.12	484.78	0.18	0.21	-0.37
G1+G2+0.7Q+A+0.6V2+0.43D2	25.71	488.21	-441.27	-0.18	-0.18	0.55
G1+G2+0.7Q+A+0.6V2+0.72D2	25.86	518.72	-468.19	-0.19	-0.19	0.60
G1+G2+0.7Q+A+0.6V3+0.43D3	24.83	-2121.04	515.12	0.18	0.65	1.58
G1+G2+0.7Q+A+0.6V3+0.72D3	24.91	-2248.45	545.92	0.19	0.69	1.63
G1+G2+0.7Q+A+0.6V4+0.43D4	22.63	2086.64	-498.53	-0.19	-0.63	-1.35
G1+G2+0.7Q+A+0.6V4+0.72D4	22.55	2214.05	-529.33	-0.20	-0.67	-1.40



G1+G2+0.7Q+A+D1	23.21	-122.94	101.60	0.03	0.05	-0.06
G1+G2+0.7Q+A+D2	24.25	88.53	-85.01	-0.04	-0.03	0.29
G1+G2+0.7Q+A+D3	24.02	-458.82	115.04	0.03	0.13	0.30
G1+G2+0.7Q+A+D4	23.44	424.42	-98.45	-0.04	-0.12	-0.07
G1+G2+0.7Q+A+V1+0.43D1	20.57	-829.05	730.66	0.28	0.31	-0.56
G1+G2+0.7Q+A+V2+0.43D2	26.89	794.65	-714.07	-0.29	-0.29	0.79
G1+G2+0.7Q+A+V3+0.43D3	25.48	-3396.19	822.21	0.30	1.04	2.50
G1+G2+0.7Q+A+V4+0.43D4	21.98	3361.78	-805.62	-0.31	-1.02	-2.27
G1+G2+0.7Q+V1+0.43D1	12.50	-817.13	721.29	0.28	0.31	-0.61
G1+G2+0.7Q+V2+0.43D2	18.82	806.57	-723.44	-0.29	-0.30	0.75
G1+G2+0.7Q+V3+0.43D3	17.41	-3384.26	812.84	0.30	1.04	2.46
G1+G2+0.7Q+V4+0.43D4	13.91	3373.71	-815.00	-0.31	-1.03	-2.32
G1+G2+A+0.6V1+0.43D1	21.25	-522.36	457.84	0.17	0.20	-0.33
G1+G2+A+0.6V1+0.72D1	21.10	-552.87	484.76	0.18	0.21	-0.38
G1+G2+A+0.6V2+0.43D2	25.22	488.46	-441.30	-0.18	-0.18	0.55
G1+G2+A+0.6V2+0.72D2	25.37	518.97	-468.21	-0.19	-0.19	0.60
G1+G2+A+0.6V3+0.43D3	24.33	-2120.79	515.10	0.18	0.65	1.58
G1+G2+A+0.6V3+0.72D3	24.42	-2248.20	545.90	0.19	0.69	1.63
G1+G2+A+0.6V4+0.43D4	22.13	2086.89	-498.55	-0.19	-0.63	-1.35
G1+G2+A+0.6V4+0.72D4	22.05	2214.30	-529.35	-0.20	-0.67	-1.41
G1+G2+A+D1	22.72	-122.68	101.58	0.03	0.05	-0.06
G1+G2+A+D2	23.75	88.78	-85.03	-0.04	-0.03	0.29
G1+G2+A+D3	23.52	-458.57	115.01	0.03	0.13	0.29
G1+G2+A+D4	22.94	424.67	-98.47	-0.04	-0.12	-0.07
G1+G2+A+V1+0.43D1	20.07	-828.80	730.64	0.28	0.31	-0.57
G1+G2+A+V2+0.43D2	26.39	794.90	-714.09	-0.29	-0.29	0.79
G1+G2+A+V3+0.43D3	24.98	-3395.94	822.19	0.30	1.04	2.50
G1+G2+A+V4+0.43D4	21.49	3362.04	-805.64	-0.31	-1.02	-2.28
G1+G2+D1	14.65	-110.76	92.20	0.03	0.04	-0.11
G1+G2+D2	15.68	100.71	-94.40	-0.04	-0.03	0.24
G1+G2+D3	15.45	-446.65	105.64	0.03	0.13	0.25
G1+G2+D4	14.87	436.59	-107.84	-0.05	-0.12	-0.12
G1+G2+Q+0.6V1+0.43D1	13.89	-510.80	448.50	0.17	0.19	-0.37
G1+G2+Q+0.6V2+0.43D2	17.86	500.03	-450.64	-0.19	-0.18	0.51
G1+G2+Q+0.6V3+0.43D3	16.97	-2109.22	505.76	0.18	0.65	1.54
G1+G2+Q+0.6V4+0.43D4	14.77	2098.45	-507.90	-0.20	-0.64	-1.39
G1+G2+Q+A+0.6V1+0.43D1	21.96	-522.72	457.87	0.17	0.20	-0.32
G1+G2+Q+A+0.6V2+0.43D2	25.93	488.10	-441.27	-0.18	-0.18	0.55
G1+G2+Q+A+0.6V3+0.43D3	25.04	-2121.15	515.13	0.18	0.65	1.58



G1+G2+Q+A+0.6V4+0.43D4	22.84	2086.53	-498.52	-0.19	-0.63	-1.35
G1+G2+Q+A+D1	23.42	-123.04	101.61	0.03	0.05	-0.06
G1+G2+Q+A+D2	24.46	88.42	-85.00	-0.04	-0.03	0.29
G1+G2+Q+A+D3	24.23	-458.93	115.05	0.03	0.13	0.30
G1+G2+Q+A+D4	23.65	424.31	-98.44	-0.04	-0.12	-0.06
G1+G2+Q+D1	15.35	-111.12	92.23	0.03	0.04	-0.10
G1+G2+Q+D2	16.39	100.35	-94.37	-0.04	-0.03	0.25
G1+G2+Q+D3	16.16	-447.01	105.67	0.03	0.13	0.25
G1+G2+Q+D4	15.58	436.23	-107.81	-0.05	-0.12	-0.11

Fundação S3						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	14.33	3.67	6.10	0.01	0.00	-0.02
Adicional (G2)	0.86	0.88	0.71	0.00	0.00	-0.01
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.71	0.73	0.59	0.00	0.00	-0.01
Água (A)	8.22	34.37	39.64	0.01	-0.01	-0.26
Vento X+ (V1)	2.88	1497.49	1942.28	0.56	-0.46	2.24
Vento X- (V2)	-2.88	-1497.49	-1942.28	-0.56	0.46	-2.24
Vento Y+ (V3)	1.66	-1952.78	-1481.98	-0.46	0.69	-0.36
Vento Y- (V4)	-1.66	1952.78	1481.98	0.46	-0.69	0.36
Desaprumo X+ (D1)	0.51	205.39	265.81	0.07	-0.06	0.22
Desaprumo X- (D2)	-0.51	-205.39	-265.81	-0.07	0.06	-0.22
Desaprumo Y+ (D3)	0.30	-272.14	-206.64	-0.06	0.09	0.07
Desaprumo Y- (D4)	-0.30	272.14	206.64	0.06	-0.09	-0.07
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+0.72D1	17.78	1051.70	1364.31	0.40	-0.31	1.46
G1+G2+0.7Q+0.6V2+0.72D2	13.59	-1041.58	-1349.86	-0.38	0.32	-1.54
G1+G2+0.7Q+0.6V3+0.72D3	16.89	-1362.89	-1031.00	-0.31	0.48	-0.21
G1+G2+0.7Q+0.6V4+0.72D4	14.47	1373.02	1045.45	0.32	-0.47	0.13
G1+G2+0.7Q+A+0.6V1+0.43D1	25.85	1026.82	1327.27	0.39	-0.30	1.14
G1+G2+0.7Q+A+0.6V1+0.72D1	26.00	1086.07	1403.95	0.41	-0.32	1.20
G1+G2+0.7Q+A+0.6V2+0.43D2	21.96	-947.95	-1233.53	-0.35	0.29	-1.73



G1+G2+0.7Q+A+0.6V2+0.72D2	21.81	-1007.20	-1310.22	-0.37	0.31	-1.80
G1+G2+0.7Q+A+0.6V3+0.43D3	25.03	-1250.01	-931.74	-0.28	0.45	-0.49
G1+G2+0.7Q+A+0.6V3+0.72D3	25.11	-1328.52	-991.36	-0.30	0.47	-0.47
G1+G2+0.7Q+A+0.6V4+0.43D4	22.78	1328.88	1025.48	0.32	-0.46	-0.11
G1+G2+0.7Q+A+0.6V4+0.72D4	22.69	1407.39	1085.09	0.33	-0.48	-0.13
G1+G2+0.7Q+A+D1	24.41	244.83	312.68	0.09	-0.06	-0.08
G1+G2+0.7Q+A+D2	23.40	-165.95	-218.94	-0.05	0.05	-0.52
G1+G2+0.7Q+A+D3	24.20	-232.71	-159.77	-0.04	0.08	-0.23
G1+G2+0.7Q+A+D4	23.61	311.58	253.50	0.08	-0.09	-0.37
G1+G2+0.7Q+A+V1+0.43D1	27.00	1625.81	2104.18	0.61	-0.49	2.03
G1+G2+0.7Q+A+V2+0.43D2	20.80	-1546.94	-2010.44	-0.58	0.48	-2.63
G1+G2+0.7Q+A+V3+0.43D3	25.69	-2031.12	-1524.53	-0.46	0.72	-0.63
G1+G2+0.7Q+A+V4+0.43D4	22.12	2109.99	1618.27	0.50	-0.73	0.03
G1+G2+0.7Q+V1+0.43D1	18.78	1591.44	2064.54	0.60	-0.48	2.29
G1+G2+0.7Q+V2+0.43D2	12.58	-1581.32	-2050.09	-0.58	0.49	-2.37
G1+G2+0.7Q+V3+0.43D3	17.47	-2065.49	-1564.18	-0.47	0.73	-0.37
G1+G2+0.7Q+V4+0.43D4	13.90	2075.61	1578.63	0.49	-0.72	0.29
G1+G2+A+0.6V1+0.43D1	25.36	1026.31	1326.86	0.39	-0.30	1.14
G1+G2+A+0.6V1+0.72D1	25.50	1085.56	1403.54	0.41	-0.32	1.21
G1+G2+A+0.6V2+0.43D2	21.46	-948.46	-1233.94	-0.35	0.29	-1.73
G1+G2+A+0.6V2+0.72D2	21.31	-1007.71	-1310.63	-0.37	0.31	-1.79
G1+G2+A+0.6V3+0.43D3	24.53	-1250.52	-932.15	-0.28	0.45	-0.48
G1+G2+A+0.6V3+0.72D3	24.62	-1329.03	-991.77	-0.30	0.47	-0.46
G1+G2+A+0.6V4+0.43D4	22.28	1328.37	1025.07	0.32	-0.46	-0.10
G1+G2+A+0.6V4+0.72D4	22.20	1406.88	1084.68	0.33	-0.48	-0.12
G1+G2+A+D1	23.91	244.32	312.27	0.09	-0.06	-0.07
G1+G2+A+D2	22.90	-166.46	-219.35	-0.05	0.05	-0.51
G1+G2+A+D3	23.70	-233.22	-160.18	-0.04	0.08	-0.22
G1+G2+A+D4	23.11	311.07	253.09	0.08	-0.09	-0.36
G1+G2+A+V1+0.43D1	26.51	1625.30	2103.77	0.61	-0.49	2.04
G1+G2+A+V2+0.43D2	20.31	-1547.45	-2010.85	-0.58	0.48	-2.62
G1+G2+A+V3+0.43D3	25.19	-2031.63	-1524.95	-0.46	0.72	-0.62
G1+G2+A+V4+0.43D4	21.62	2109.48	1617.86	0.50	-0.73	0.04
G1+G2+D1	15.69	209.94	272.62	0.08	-0.05	0.19
G1+G2+D2	14.68	-200.84	-258.99	-0.06	0.06	-0.25
G1+G2+D3	15.48	-267.59	-199.82	-0.05	0.09	0.04
G1+G2+D4	14.89	276.69	213.45	0.07	-0.09	-0.10
G1+G2+Q+0.6V1+0.43D1	17.84	992.66	1287.80	0.38	-0.30	1.39
G1+G2+Q+0.6V2+0.43D2	13.95	-982.10	-1273.00	-0.36	0.30	-1.48



G1+G2+Q+0.6V3+0.43D3	17.02	-1284.16	-971.21	-0.29	0.46	-0.23
G1+G2+Q+0.6V4+0.43D4	14.77	1294.72	986.01	0.31	-0.45	0.14
G1+G2+Q+A+0.6V1+0.43D1	26.06	1027.04	1327.44	0.39	-0.30	1.13
G1+G2+Q+A+0.6V2+0.43D2	22.17	-947.73	-1233.36	-0.35	0.29	-1.74
G1+G2+Q+A+0.6V3+0.43D3	25.24	-1249.79	-931.57	-0.28	0.45	-0.49
G1+G2+Q+A+0.6V4+0.43D4	22.99	1329.10	1025.65	0.32	-0.46	-0.11
G1+G2+Q+A+D1	24.62	245.04	312.85	0.09	-0.06	-0.08
G1+G2+Q+A+D2	23.61	-165.74	-218.76	-0.05	0.05	-0.52
G1+G2+Q+A+D3	24.41	-232.49	-159.59	-0.04	0.08	-0.23
G1+G2+Q+A+D4	23.82	311.80	253.68	0.08	-0.09	-0.37
G1+G2+Q+D1	16.40	210.67	273.21	0.08	-0.05	0.17
G1+G2+Q+D2	15.39	-200.11	-258.41	-0.06	0.06	-0.26
G1+G2+Q+D3	16.19	-266.86	-199.23	-0.05	0.09	0.02
G1+G2+Q+D4	15.60	277.42	214.04	0.07	-0.09	-0.11

Fundação S4						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	14.27	-0.74	-3.09	-0.01	0.00	-0.05
Adicional (G2)	0.85	-0.57	-0.42	0.00	0.00	-0.02
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.70	-0.47	-0.35	0.00	0.00	-0.01
Água (A)	8.00	20.88	29.53	0.01	-0.01	-0.32
Vento X+ (V1)	-2.90	1508.69	1953.11	0.56	-0.46	-2.04
Vento X- (V2)	2.90	-1508.69	-1953.11	-0.56	0.46	2.04
Vento Y+ (V3)	-1.62	-1952.81	-1480.97	-0.45	0.69	0.35
Vento Y- (V4)	1.62	1952.81	1480.97	0.45	-0.69	-0.35
Desaprumo X+ (D1)	-0.51	207.28	267.64	0.07	-0.06	-0.19
Desaprumo X- (D2)	0.51	-207.28	-267.64	-0.07	0.06	0.19
Desaprumo Y+ (D3)	-0.29	-270.82	-205.64	-0.06	0.09	-0.07
Desaprumo Y- (D4)	0.29	270.82	205.64	0.06	-0.09	0.07
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+0.72D1	13.50	1053.09	1361.15	0.38	-0.32	-1.43
G1+G2+0.7Q+0.6V2+0.72D2	17.72	-1056.36	-1368.66	-0.40	0.31	1.29





G1+G2+0.7Q+0.6V3+0.72D3	14.43	-1368.66	-1040.66	-0.32	0.47	0.09
G1+G2+0.7Q+0.6V4+0.72D4	16.79	1365.38	1033.15	0.30	-0.48	-0.23
G1+G2+0.7Q+A+0.6V1+0.43D1	21.65	1014.17	1313.46	0.37	-0.31	-1.69
G1+G2+0.7Q+A+0.6V1+0.72D1	21.50	1073.97	1390.68	0.39	-0.33	-1.75
G1+G2+0.7Q+A+0.6V2+0.43D2	25.57	-975.68	-1261.92	-0.37	0.29	0.92
G1+G2+0.7Q+A+0.6V2+0.72D2	25.72	-1035.48	-1339.13	-0.39	0.31	0.97
G1+G2+0.7Q+A+0.6V3+0.43D3	22.51	-1269.64	-951.81	-0.30	0.44	-0.21
G1+G2+0.7Q+A+0.6V3+0.72D3	22.43	-1347.77	-1011.13	-0.32	0.47	-0.23
G1+G2+0.7Q+A+0.6V4+0.43D4	24.71	1308.13	1003.35	0.29	-0.46	-0.57
G1+G2+0.7Q+A+0.6V4+0.72D4	24.80	1386.26	1062.68	0.31	-0.49	-0.55
G1+G2+0.7Q+A+D1	23.10	226.53	293.41	0.07	-0.07	-0.58
G1+G2+0.7Q+A+D2	24.12	-188.04	-241.86	-0.07	0.05	-0.20
G1+G2+0.7Q+A+D3	23.32	-251.57	-179.87	-0.06	0.08	-0.46
G1+G2+0.7Q+A+D4	23.90	290.06	231.41	0.06	-0.10	-0.32
G1+G2+0.7Q+A+V1+0.43D1	20.49	1617.64	2094.70	0.59	-0.49	-2.51
G1+G2+0.7Q+A+V2+0.43D2	26.73	-1579.15	-2043.16	-0.60	0.48	1.73
G1+G2+0.7Q+A+V3+0.43D3	21.87	-2050.76	-1544.19	-0.48	0.72	-0.07
G1+G2+0.7Q+A+V4+0.43D4	25.36	2089.25	1595.74	0.48	-0.73	-0.71
G1+G2+0.7Q+V1+0.43D1	12.49	1596.76	2065.17	0.59	-0.49	-2.20
G1+G2+0.7Q+V2+0.43D2	18.73	-1600.04	-2072.69	-0.60	0.48	2.05
G1+G2+0.7Q+V3+0.43D3	13.86	-2071.65	-1573.73	-0.49	0.72	0.25
G1+G2+0.7Q+V4+0.43D4	17.36	2068.37	1566.21	0.47	-0.73	-0.39
G1+G2+A+0.6V1+0.43D1	21.16	1014.50	1313.70	0.37	-0.31	-1.68
G1+G2+A+0.6V1+0.72D1	21.01	1074.30	1390.92	0.39	-0.33	-1.74
G1+G2+A+0.6V2+0.43D2	25.08	-975.35	-1261.67	-0.37	0.29	0.93
G1+G2+A+0.6V2+0.72D2	25.23	-1035.15	-1338.89	-0.39	0.31	0.98
G1+G2+A+0.6V3+0.43D3	22.02	-1269.31	-951.56	-0.30	0.44	-0.20
G1+G2+A+0.6V3+0.72D3	21.94	-1347.44	-1010.89	-0.32	0.47	-0.22
G1+G2+A+0.6V4+0.43D4	24.22	1308.46	1003.59	0.29	-0.46	-0.56
G1+G2+A+0.6V4+0.72D4	24.30	1386.59	1062.92	0.31	-0.49	-0.54
G1+G2+A+D1	22.61	226.86	293.65	0.07	-0.07	-0.57
G1+G2+A+D2	23.63	-187.71	-241.62	-0.07	0.05	-0.19
G1+G2+A+D3	22.83	-251.24	-179.62	-0.06	0.08	-0.45
G1+G2+A+D4	23.41	290.39	231.66	0.06	-0.10	-0.31
G1+G2+A+V1+0.43D1	20.00	1617.97	2094.95	0.59	-0.49	-2.50
G1+G2+A+V2+0.43D2	26.24	-1578.82	-2042.92	-0.60	0.48	1.74
G1+G2+A+V3+0.43D3	21.37	-2050.43	-1543.95	-0.48	0.72	-0.06
G1+G2+A+V4+0.43D4	24.87	2089.58	1595.98	0.48	-0.74	-0.70
G1+G2+D1	14.61	205.98	264.12	0.06	-0.06	-0.25

G1+G2+D2	15.63	-208.59	-271.15	-0.08	0.05	0.12
G1+G2+D3	14.83	-272.13	-209.15	-0.07	0.08	-0.13
G1+G2+D4	15.41	269.51	202.13	0.05	-0.09	0.01
G1+G2+Q+0.6V1+0.43D1	13.86	993.14	1283.83	0.36	-0.31	-1.38
G1+G2+Q+0.6V2+0.43D2	17.78	-996.70	-1291.55	-0.38	0.30	1.23
G1+G2+Q+0.6V3+0.43D3	14.72	-1290.67	-981.44	-0.31	0.45	0.10
G1+G2+Q+0.6V4+0.43D4	16.92	1287.11	973.72	0.29	-0.45	-0.26
G1+G2+Q+A+0.6V1+0.43D1	21.86	1014.02	1313.36	0.37	-0.31	-1.70
G1+G2+Q+A+0.6V2+0.43D2	25.79	-975.82	-1262.02	-0.37	0.29	0.91
G1+G2+Q+A+0.6V3+0.43D3	22.73	-1269.78	-951.91	-0.30	0.44	-0.21
G1+G2+Q+A+0.6V4+0.43D4	24.92	1307.99	1003.25	0.29	-0.46	-0.57
G1+G2+Q+A+D1	23.31	226.39	293.30	0.07	-0.07	-0.58
G1+G2+Q+A+D2	24.33	-188.18	-241.97	-0.07	0.05	-0.21
G1+G2+Q+A+D3	23.53	-251.72	-179.97	-0.06	0.08	-0.46
G1+G2+Q+A+D4	24.11	289.92	231.31	0.06	-0.10	-0.32
G1+G2+Q+D1	15.31	205.50	263.77	0.06	-0.06	-0.26
G1+G2+Q+D2	16.33	-209.06	-271.50	-0.08	0.05	0.11
G1+G2+Q+D3	15.53	-272.60	-209.50	-0.07	0.08	-0.15
G1+G2+Q+D4	16.11	269.04	201.78	0.05	-0.09	-0.01

Fundação S5						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	14.35	6.33	1.69	0.01	-0.01	0.02
Adicional (G2)	0.86	0.72	-0.01	0.00	0.00	0.01
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.71	0.59	-0.01	0.00	0.00	0.00
Água (A)	8.24	-9.02	12.98	0.00	0.00	0.08
Vento X+ (V1)	2.90	-766.71	681.35	0.27	0.28	0.48
Vento X- (V2)	-2.90	766.71	-681.35	-0.27	-0.28	-0.48
Vento Y+ (V3)	-1.66	-3193.19	768.90	0.29	0.98	-2.21
Vento Y- (V4)	1.66	3193.19	-768.90	-0.29	-0.98	2.21
Desaprumo X+ (D1)	0.51	-105.74	93.16	0.03	0.04	0.14
Desaprumo X- (D2)	-0.51	105.74	-93.16	-0.03	-0.04	-0.14
Desaprumo Y+ (D3)	-0.30	-444.72	107.45	0.04	0.13	-0.17
Desaprumo Y- (D4)	0.30	444.72	-107.45	-0.04	-0.13	0.17
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00



Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+0.72D1	17.82	-528.82	477.68	0.19	0.19	0.42
G1+G2+0.7Q+0.6V2+0.72D2	13.60	543.76	-474.33	-0.18	-0.20	-0.36
G1+G2+0.7Q+0.6V3+0.72D3	14.50	-2229.21	540.52	0.21	0.67	-1.41
G1+G2+0.7Q+0.6V4+0.72D4	16.91	2244.14	-537.17	-0.19	-0.68	1.48
G1+G2+0.7Q+A+0.6V1+0.43D1	25.91	-507.34	463.78	0.19	0.19	0.46
G1+G2+0.7Q+A+0.6V1+0.72D1	26.06	-537.84	490.65	0.20	0.20	0.50
G1+G2+0.7Q+A+0.6V2+0.43D2	21.99	504.23	-434.47	-0.16	-0.19	-0.24
G1+G2+0.7Q+A+0.6V2+0.72D2	21.84	534.73	-461.35	-0.17	-0.20	-0.28
G1+G2+0.7Q+A+0.6V3+0.43D3	22.83	-2109.93	522.49	0.20	0.64	-1.29
G1+G2+0.7Q+A+0.6V3+0.72D3	22.74	-2238.23	553.49	0.21	0.68	-1.33
G1+G2+0.7Q+A+0.6V4+0.43D4	25.07	2106.82	-493.19	-0.17	-0.64	1.51
G1+G2+0.7Q+A+0.6V4+0.72D4	25.16	2235.12	-524.19	-0.19	-0.68	1.56
G1+G2+0.7Q+A+D1	24.46	-107.29	107.81	0.05	0.04	0.25
G1+G2+0.7Q+A+D2	23.44	104.18	-78.50	-0.02	-0.04	-0.03
G1+G2+0.7Q+A+D3	23.65	-446.27	122.10	0.05	0.12	-0.06
G1+G2+0.7Q+A+D4	24.24	443.16	-92.80	-0.02	-0.13	0.28
G1+G2+0.7Q+A+V1+0.43D1	27.07	-814.02	736.32	0.30	0.30	0.65
G1+G2+0.7Q+A+V2+0.43D2	20.83	810.91	-707.01	-0.27	-0.30	-0.43
G1+G2+0.7Q+A+V3+0.43D3	22.16	-3387.20	830.05	0.32	1.03	-2.17
G1+G2+0.7Q+A+V4+0.43D4	25.73	3384.09	-800.75	-0.29	-1.03	2.39
G1+G2+0.7Q+V1+0.43D1	18.83	-805.00	723.34	0.29	0.29	0.57
G1+G2+0.7Q+V2+0.43D2	12.58	819.93	-719.99	-0.27	-0.31	-0.51
G1+G2+0.7Q+V3+0.43D3	13.92	-3378.18	817.08	0.31	1.03	-2.25
G1+G2+0.7Q+V4+0.43D4	17.49	3393.11	-813.73	-0.29	-1.04	2.31
G1+G2+A+0.6V1+0.43D1	25.41	-507.75	463.78	0.19	0.19	0.46
G1+G2+A+0.6V1+0.72D1	25.56	-538.26	490.66	0.20	0.20	0.50
G1+G2+A+0.6V2+0.43D2	21.49	503.81	-434.47	-0.16	-0.19	-0.24
G1+G2+A+0.6V2+0.72D2	21.34	534.32	-461.34	-0.17	-0.20	-0.28
G1+G2+A+0.6V3+0.43D3	22.33	-2110.34	522.50	0.20	0.64	-1.29
G1+G2+A+0.6V3+0.72D3	22.24	-2238.65	553.50	0.21	0.68	-1.34
G1+G2+A+0.6V4+0.43D4	24.57	2106.40	-493.18	-0.17	-0.64	1.50
G1+G2+A+0.6V4+0.72D4	24.66	2234.71	-524.18	-0.19	-0.68	1.55
G1+G2+A+D1	23.96	-107.71	107.81	0.05	0.04	0.25
G1+G2+A+D2	22.94	103.77	-78.50	-0.02	-0.04	-0.03
G1+G2+A+D3	23.16	-446.69	122.11	0.05	0.12	-0.06
G1+G2+A+D4	23.75	442.75	-92.79	-0.02	-0.13	0.27



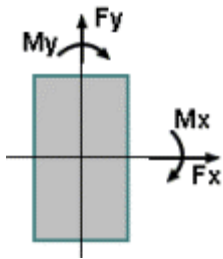
G1+G2+A+V1+0.43D1	26.57	-814.44	736.32	0.30	0.30	0.65
G1+G2+A+V2+0.43D2	20.33	810.50	-707.01	-0.27	-0.30	-0.43
G1+G2+A+V3+0.43D3	21.67	-3387.62	830.06	0.32	1.03	-2.17
G1+G2+A+V4+0.43D4	25.24	3383.68	-800.74	-0.29	-1.03	2.39
G1+G2+D1	15.72	-98.69	94.84	0.04	0.03	0.17
G1+G2+D2	14.70	112.79	-91.47	-0.03	-0.04	-0.11
G1+G2+D3	14.91	-437.67	109.13	0.05	0.12	-0.14
G1+G2+D4	15.51	451.77	-105.77	-0.03	-0.13	0.20
G1+G2+Q+0.6V1+0.43D1	17.88	-498.14	450.80	0.18	0.18	0.38
G1+G2+Q+0.6V2+0.43D2	13.96	513.43	-447.45	-0.17	-0.19	-0.31
G1+G2+Q+0.6V3+0.43D3	14.80	-2100.73	509.51	0.20	0.64	-1.36
G1+G2+Q+0.6V4+0.43D4	17.04	2116.02	-506.17	-0.18	-0.65	1.43
G1+G2+Q+A+0.6V1+0.43D1	26.12	-507.16	463.77	0.19	0.19	0.46
G1+G2+Q+A+0.6V2+0.43D2	22.20	504.41	-434.48	-0.16	-0.19	-0.24
G1+G2+Q+A+0.6V3+0.43D3	23.04	-2109.75	522.49	0.20	0.64	-1.28
G1+G2+Q+A+0.6V4+0.43D4	25.28	2107.00	-493.19	-0.17	-0.64	1.51
G1+G2+Q+A+D1	24.67	-107.11	107.80	0.05	0.04	0.25
G1+G2+Q+A+D2	23.65	104.36	-78.51	-0.02	-0.04	-0.03
G1+G2+Q+A+D3	23.87	-446.09	122.10	0.05	0.12	-0.05
G1+G2+Q+A+D4	24.46	443.34	-92.80	-0.02	-0.13	0.28
G1+G2+Q+D1	16.43	-98.09	94.83	0.04	0.03	0.17
G1+G2+Q+D2	15.41	113.38	-91.48	-0.03	-0.04	-0.10
G1+G2+Q+D3	15.62	-437.07	109.12	0.05	0.12	-0.13
G1+G2+Q+D4	16.21	452.36	-105.78	-0.03	-0.13	0.20

Fundação S6						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	14.33	1.38	4.09	0.00	-0.01	0.19
Adicional (G2)	0.85	-0.25	0.74	0.00	0.00	0.02
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.71	-0.21	0.61	0.00	0.00	0.02
Água (A)	8.11	-16.51	69.06	0.02	0.00	0.23
Vento X+ (V1)	0.01	-722.05	3273.29	1.06	0.17	-1.86
Vento X- (V2)	-0.01	722.05	-3273.29	-1.06	-0.17	1.86
Vento Y+ (V3)	-3.31	-637.62	704.30	0.17	0.20	-1.52
Vento Y- (V4)	3.31	637.62	-704.30	-0.17	-0.20	1.52



Desaprumo X+ (D1)	0.00	-98.82	448.89	0.13	0.02	-0.11
Desaprumo X- (D2)	0.00	98.82	-448.89	-0.13	-0.02	0.11
Desaprumo Y+ (D3)	-0.59	-88.28	97.76	0.02	0.03	-0.23
Desaprumo Y- (D4)	0.59	88.28	-97.76	-0.02	-0.03	0.23
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+0.72D1	15.68	-503.52	2293.00	0.73	0.11	-0.96
G1+G2+0.7Q+0.6V2+0.72D2	15.67	505.48	-2282.49	-0.73	-0.13	1.43
G1+G2+0.7Q+0.6V3+0.72D3	13.26	-445.27	498.35	0.12	0.13	-0.85
G1+G2+0.7Q+0.6V4+0.72D4	18.09	447.23	-487.83	-0.11	-0.15	1.31
G1+G2+0.7Q+A+0.6V1+0.43D1	23.79	-491.52	2232.56	0.71	0.11	-0.70
G1+G2+0.7Q+A+0.6V1+0.72D1	23.79	-520.03	2362.06	0.75	0.11	-0.73
G1+G2+0.7Q+A+0.6V2+0.43D2	23.78	460.46	-2083.92	-0.67	-0.12	1.63
G1+G2+0.7Q+A+0.6V2+0.72D2	23.78	488.97	-2213.42	-0.71	-0.12	1.66
G1+G2+0.7Q+A+0.6V3+0.43D3	21.54	-436.31	539.21	0.13	0.12	-0.55
G1+G2+0.7Q+A+0.6V3+0.72D3	21.37	-461.78	567.41	0.14	0.13	-0.61
G1+G2+0.7Q+A+0.6V4+0.43D4	26.03	405.25	-390.57	-0.09	-0.14	1.48
G1+G2+0.7Q+A+0.6V4+0.72D4	26.20	430.72	-418.77	-0.09	-0.14	1.54
G1+G2+0.7Q+A+D1	23.79	-114.35	523.21	0.16	0.01	0.36
G1+G2+0.7Q+A+D2	23.78	83.29	-374.57	-0.11	-0.03	0.57
G1+G2+0.7Q+A+D3	23.19	-103.81	172.08	0.04	0.02	0.23
G1+G2+0.7Q+A+D4	24.38	72.76	-23.44	0.00	-0.03	0.70
G1+G2+0.7Q+A+V1+0.43D1	23.79	-780.34	3541.87	1.14	0.17	-1.44
G1+G2+0.7Q+A+V2+0.43D2	23.78	749.28	-3393.23	-1.09	-0.19	2.37
G1+G2+0.7Q+A+V3+0.43D3	20.22	-691.36	820.93	0.20	0.20	-1.15
G1+G2+0.7Q+A+V4+0.43D4	27.35	660.30	-672.28	-0.15	-0.21	2.08
G1+G2+0.7Q+V1+0.43D1	15.69	-763.83	3472.81	1.12	0.17	-1.68
G1+G2+0.7Q+V2+0.43D2	15.67	765.79	-3462.29	-1.11	-0.19	2.14
G1+G2+0.7Q+V3+0.43D3	12.11	-674.85	751.86	0.18	0.20	-1.39
G1+G2+0.7Q+V4+0.43D4	19.25	676.81	-741.35	-0.17	-0.22	1.85
G1+G2+A+0.6V1+0.43D1	23.30	-491.38	2232.13	0.71	0.11	-0.71
G1+G2+A+0.6V1+0.72D1	23.30	-519.89	2361.64	0.75	0.11	-0.74
G1+G2+A+0.6V2+0.43D2	23.28	460.61	-2084.34	-0.67	-0.12	1.62
G1+G2+A+0.6V2+0.72D2	23.28	489.12	-2213.85	-0.71	-0.12	1.65
G1+G2+A+0.6V3+0.43D3	21.05	-436.16	538.78	0.13	0.12	-0.56
G1+G2+A+0.6V3+0.72D3	20.88	-461.64	566.98	0.14	0.13	-0.63
G1+G2+A+0.6V4+0.43D4	25.54	405.40	-390.99	-0.09	-0.14	1.46

G1+G2+A+0.6V4+0.72D4	25.71	430.87	-419.20	-0.09	-0.14	1.53
G1+G2+A+D1	23.29	-114.21	522.78	0.16	0.01	0.34
G1+G2+A+D2	23.29	83.44	-375.00	-0.11	-0.03	0.56
G1+G2+A+D3	22.70	-103.67	171.65	0.04	0.02	0.22
G1+G2+A+D4	23.88	72.90	-23.87	0.00	-0.03	0.69
G1+G2+A+V1+0.43D1	23.30	-780.20	3541.44	1.14	0.17	-1.46
G1+G2+A+V2+0.43D2	23.28	749.43	-3393.66	-1.09	-0.19	2.36
G1+G2+A+V3+0.43D3	19.72	-691.21	820.50	0.20	0.20	-1.17
G1+G2+A+V4+0.43D4	26.86	660.44	-672.71	-0.15	-0.21	2.07
G1+G2+D1	15.19	-97.70	453.72	0.14	0.01	0.11
G1+G2+D2	15.18	99.95	-444.06	-0.13	-0.03	0.32
G1+G2+D3	14.59	-87.16	102.59	0.02	0.02	-0.02
G1+G2+D4	15.78	89.41	-92.93	-0.02	-0.04	0.45
G1+G2+Q+0.6V1+0.43D1	15.90	-475.08	2163.68	0.69	0.10	-0.93
G1+G2+Q+0.6V2+0.43D2	15.88	476.91	-2152.79	-0.69	-0.12	1.40
G1+G2+Q+0.6V3+0.43D3	13.65	-419.86	470.33	0.11	0.12	-0.77
G1+G2+Q+0.6V4+0.43D4	18.13	421.70	-459.44	-0.11	-0.14	1.25
G1+G2+Q+A+0.6V1+0.43D1	24.00	-491.59	2232.74	0.71	0.11	-0.69
G1+G2+Q+A+0.6V2+0.43D2	23.99	460.40	-2083.73	-0.67	-0.12	1.63
G1+G2+Q+A+0.6V3+0.43D3	21.75	-436.37	539.39	0.13	0.12	-0.54
G1+G2+Q+A+0.6V4+0.43D4	26.24	405.19	-390.38	-0.09	-0.14	1.48
G1+G2+Q+A+D1	24.00	-114.41	523.39	0.16	0.01	0.36
G1+G2+Q+A+D2	23.99	83.23	-374.39	-0.11	-0.03	0.58
G1+G2+Q+A+D3	23.40	-103.88	172.26	0.04	0.02	0.24
G1+G2+Q+A+D4	24.59	72.69	-23.26	0.00	-0.03	0.71
G1+G2+Q+D1	15.89	-97.90	454.33	0.14	0.01	0.13
G1+G2+Q+D2	15.89	99.74	-443.45	-0.13	-0.03	0.34
G1+G2+Q+D3	15.30	-87.37	103.20	0.02	0.02	0.00
G1+G2+Q+D4	16.48	89.20	-92.32	-0.02	-0.03	0.47

Legenda	
	- Caso: indica o caso de carregamento no qual serão apresentados os esforços atuantes;
	- Elemento: nome da fundação;
	- N: esforço axial na fundação;
	- Mx: momento fletor na fundação, atuante em torno do eixo X global;

	- My: momento fletor na fundação, atuante em torno do eixo Y global;
	- Fx: esforço cortante na fundação, atuante no plano paralelo à direção X global;
	- Fy: esforço cortante na fundação, atuante no plano paralelo à direção Y global;
	- Mt: momento de torção atuante.

## 15.6 QUADRO DE CARGAS DOS PILARES

Pilares	CINTAMENTO		TRAVAMENTO 1		TRAVAMENTO 2		TRAVAMENTO 3		TRAVAMENTO 4	
	NPos (tf)	NNeg	NPos (tf)	NNeg	NPos (tf)	NNeg	NPos (tf)	NNeg	NPos (tf)	NNeg
P1	27.26	0.00	26.29	0.00	24.29	0.00	22.20	0.00	20.18	0.00
P2	26.89	0.00	25.96	0.00	24.04	0.00	22.06	0.00	20.13	0.00
P3	27.00	0.00	26.07	0.00	24.16	0.00	22.16	0.00	20.21	0.00
P4	26.73	0.00	25.81	0.00	23.91	0.00	21.94	0.00	20.02	0.00
P5	27.07	0.00	26.14	0.00	24.20	0.00	22.19	0.00	20.24	0.00
P6	27.35	0.00	26.39	0.00	24.39	0.00	22.32	0.00	20.30	0.00

Pilares	FUNDO DO RES.		TAMPA DO RES.	
	NPos (tf)	NNeg	NPos (tf)	NNeg
P1	18.30	0.00		
P2	18.36	0.00		
P3	18.38	0.00		
P4	18.22	0.00		
P5	18.41	0.00		
P6	18.42	0.00		

## 15.7 SAPATAS - PAVIMENTO CINTAMENTO

### 15.7.1 Relatório de Resultados das Sapatas





CINTAMENTO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 3.50 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	160.00 110.00	40.00 55.00	13 ø 10.0 c/8 (10.21 cm <sup>2</sup> )	13 ø 12.5 c/12 (15.95 cm <sup>2</sup> )		
S2	160.00 115.00	40.00 55.00	14 ø 10.0 c/8 (11.00 cm <sup>2</sup> )	12 ø 12.5 c/13 (14.73 cm <sup>2</sup> )		
S3	160.00 110.00	40.00 55.00	13 ø 10.0 c/8 (10.21 cm <sup>2</sup> )	13 ø 12.5 c/12 (15.95 cm <sup>2</sup> )		
S4	155.00 110.00	40.00 55.00	9 ø 12.5 c/12 (11.04 cm <sup>2</sup> )	13 ø 12.5 c/12 (15.95 cm <sup>2</sup> )		
S5	160.00 115.00	40.00 55.00	14 ø 10.0 c/8 (11.00 cm <sup>2</sup> )	12 ø 12.5 c/13 (14.73 cm <sup>2</sup> )		
S6	160.00 110.00	40.00 55.00	13 ø 10.0 c/8 (10.21 cm <sup>2</sup> )	13 ø 12.5 c/12 (15.95 cm <sup>2</sup> )		

### 15.7.2 Relatório de Cálculos das Sapatas

CINTAMENTO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 3.50 cm	

### 15.7.3 Esforços e pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm <sup>2</sup> )	Pressão Sig2 (kgf/cm <sup>2</sup> )	Pressão Sig3 (kgf/cm <sup>2</sup> )	Pressão Sig4 (kgf/cm <sup>2</sup> )
S1	3590.21 516.87	1.14 0.17	27.26 30.43	2.43 (lim = 2.50)	0.90 (lim = 2.50)	0.62 (lim = 2.50)	2.15 (lim = 2.50)
S2	3492.95	1.08	26.89	2.14	0.72	0.99	2.41



	509.90	0.20	30.23	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)
S3	2638.67	0.87	27.00	2.12	0.99	1.31	2.44
	512.07	0.19	30.18	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)
S4	2626.59	0.86	26.73	2.17	1.00	1.33	2.49
	506.99	0.19	29.80	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)
S5	3487.76	1.08	27.07	2.15	0.73	1.01	2.43
	513.37	0.21	30.41	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)
S6	3623.43	1.14	27.35	0.62	2.16	2.44	0.90
	518.74	0.17	30.53	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)	(lim = 2.50)

#### 15.7.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	15006.63	4.24	8382.45	18.30	6.86	6.06		
	3542.11	(lim = 1.50)	457.93	(lim = 1.50)	1.13	lim = (1.50)		
S2	13797.24	3.98	9105.81	18.90	6.31	5.88		
	3469.37	(lim = 1.50)	481.81	(lim = 1.50)	1.07	lim = (1.50)		
S3	12606.98	4.91	9389.33	26.05	6.25	7.16		
	2568.93	(lim = 1.50)	360.44	(lim = 1.50)	0.87	lim = (1.50)		
S4	12054.77	4.65	9310.81	25.79	6.20	7.11		
	2590.52	(lim = 1.50)	361.08	(lim = 1.50)	0.87	lim = (1.50)		
S5	13806.34	3.97	9154.21	19.08	6.32	5.88		
	3474.23	(lim = 1.50)	479.82	(lim = 1.50)	1.07	lim = (1.50)		
S6	15090.10	4.25	8405.92	18.32	6.90	6.11		
	3552.45	(lim = 1.50)	458.83	(lim = 1.50)	1.13	lim = (1.50)		

#### 15.7.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m)	Md (kgf.m/m)	Md (kgf.m/m)	Md (kgf.m/m)
	As (cm <sup>2</sup> /m)	As (cm <sup>2</sup> /m)	A's (cm <sup>2</sup> /m)	A's (cm <sup>2</sup> /m)
S1	9844.91	10146.97	0.00	0.00
	9.44	10.25	0.00	0.00
S2	9791.63	10146.97	0.00	0.00
	9.39	9.37	0.00	0.00
S3	9844.91	10146.97	0.00	0.00

	9.44	10.25	0.00	0.00
S4	9844.91	10192.66	0.00	0.00
	10.37	10.30	0.00	0.00
S5	9791.63	10146.97	0.00	0.00
	9.39	9.37	0.00	0.00
S6	9844.91	10146.97	0.00	0.00
	9.44	10.25	0.00	0.00

## 15.8 PILARES – PAVIMENTO CINTAMENTO

### 15.8.1 Resultados dos Pilares

CINTAMENTO	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 1		cobr = 2.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	40.00 100.00	100.00 RR	35.12 13.79	3424 5017	439 646	9.42 12 ø 10.0 0.5	ø 5.0 c/12	14.33
P2 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	40.00 100.00	100.00 RR	34.60 13.92	3373 4887	418 683	9.42 12 ø 10.0 0.5	ø 5.0 c/12	14.33
P3 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	40.00 100.00	100.00 RR	34.73 13.95	2599 3683	353 513	9.42 12 ø 10.0 0.5	ø 5.0 c/12	14.33
P4 1:50	seção L aberto 55.00 55.00	40.00 100.00	100.00 RR	34.40 13.88	2594 3671	364 513	9.42 12 ø 10.0	ø 5.0 c/12	14.33

	20.00 20.00 Abertura=150°						0.5		
P5 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	40.00 100.00	100.00 RR	34.82 13.97	3370 4881	407 694	9.42 12 ø 10.0 0.5	ø 5.0 c/12	14.33
P6 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	40.00 100.00	100.00 RR	35.24 13.83	3462 5058	437 651	9.42 12 ø 10.0 0.5	ø 5.0 c/12	14.33

### 15.8.2 Cálculo dos Pilares

CINTAMENTO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 2.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 14.33 -	35.12 13.79	-5133 -652	-14026 -1781	2.73	9.42 (12 ø 10.0) -
P2	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 14.33 -	34.60 13.92	-4961 -587	-13817 -1635	2.79	9.42 (12 ø 10.0) -
P3	seção L aberto 55.00	RR 14.33	34.73 13.95	-3799 -891	-12978 -3045	3.42	9.42 (12 ø 10.0)



	55.00 20.00 20.00 150°	-					-
P4	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 14.33 -	34.40 13.88	-3698 -560	-12659 -1918	3.42	9.42 (12 ø 10.0) -
P5	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 14.33 -	34.82 13.97	-5006 -592	-13856 -1637	2.77	9.42 (12 ø 10.0) -
P6	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 14.33 -	35.24 13.83	-5173 -653	-14055 -1775	2.72	9.42 (12 ø 10.0) -

## 15.9 VIGAS - PAVIMENTO CINTAMENTO

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	253.34	2 ø 8.0		-293.77 -295.80	2 ø 8.0 2 ø 8.0		
V2	256.87	2 ø 8.0		-299.13 -295.24	2 ø 8.0 2 ø 8.0		
V3	221.65	2 ø 8.0		-255.93 -265.05	2 ø 8.0 2 ø 8.0		
V4	227.40	2 ø 8.0		-261.40 -268.51	2 ø 8.0 2 ø 8.0		
V5	219.98	2 ø 8.0		-256.37 -260.93	2 ø 8.0 2 ø 8.0		
V6	224.91	2 ø 8.0		-259.38	2 ø 8.0		

				-266.44	2 ø 8.0		
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### 15.9.1 Esforços da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		69.1 8								0.16			
1	134. 95 116. 97	116. 97	112. 50	0.00			0.0 2	- 0.0 2	0.5 0			253. 34 252. 66	- 293. 77 - 295. 80
P2		70.5 4								0.16			

### 15.9.2 Esforços da Viga V2

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados						Envoltória							
Pilar Trec ho	Apoi o 1 e 1o	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m.	Acid.			Nd (tf)	Rd (tf)					

	(cm)		(kgf/m)	(kgf/m)	(°C)								
P5		67.98								0.16			
1	135.14 117.12	117.12	112.50	0.00			0.02	-0.02	0.51			254.73 256.87	-299.13 -295.24
P3		61.98								0.16			

### 15.9.3 Esforços da Viga V3

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm ax (tf)	Mdm ax (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P1		74.80								0.14			
1	135.08 117.10	117.10	112.50	0.00			0.02	-0.01	0.45			221.65 214.77	-255.93 -265.05
P3		69.92								0.15			

### 15.9.4 Esforços da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P2		71.1 4								0.14			
1	134. 42 116. 41	116. 41	112. 50	0.00			0.0 2	- 0.0 2	0.4 6			227. 40  220. 65	- 261. 40  - 268. 51
P1		60.8 1								0.15			

### 15.9.5 Esforços da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados						Envoltória					
Pilar	Apoi o	Larg	Carga distribuída	Temperat ura	Retraç ão	Esforço axial	Vd (tf)	Rm áx	Mdm áx	Md+	Md-

Trecho	1 e 1o (cm)	Barr a (cm)	Per m. (kgf/m)	Acid. (kgf/m)	Caso T1 Caso T2 (°C)	(‰)	Nd (tf)	Rd (tf)		(tf)	(kgf. m)	(kgf. m)	(kgf. m)
P4		77.59								0.14			
1	134.71 116.75	116.75	112.50	0.00			0.02	- 0.01	0.45			219.98 213.20	- 256.37 - 260.93
P6		76.44								0.15			

### 15.9.6 Esforços da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
P6		61.08								0.14			
1	135.72 117.70	117.70	112.50	0.00			0.02	- 0.02	0.46			224.91 217.50	- 259.38



													- 266. 44
P5		70.8 2								0.15			

### 15.9.7 Resultados da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P4	69.18			2 ø 8.0 0.68					0.00
1	116.97	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P2	70.54			2 ø 8.0 0.68					0.00

### 15.9.8 Resultados da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)

P5	67.98			2 ø 8.0 0.68					0.00
1	117.12	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	61.98			2 ø 8.0 0.68					0.00

### 15.9.9 Resultados da Viga V3

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P1	74.80			2 ø 8.0 0.68					0.00
1	117.10	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	69.92			2 ø 8.0 0.68					0.00

### 15.9.10 Resultados da Viga V4

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados	Resultados
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Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P2	71.14			2 ø 8.0 0.68					0.00
1	116.41	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P1	60.81			2 ø 8.0 0.68					0.00

### 15.9.11 Resultados da Viga V5

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P4	77.59			2 ø 8.0 0.68					0.00
1	116.75	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P6	76.44			2 ø 8.0 0.68					0.00

### 15.9.12 Resultados da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
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Cobrimento	=	Peso específico = 2500.00
2.00 cm		kgf/m³

Dados			Resultados						
Pilar	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P6	61.08			2 ø 8.0 0.68					0.00
1	117.70	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P5	70.82			2 ø 8.0 0.68					0.00

## 15.10 PILARES - PAVIMENTO TRAVAMENTO 1

### 15.10.1 Resultados dos Pilares

TRAVAMENTO 1	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 2.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vinc lih vinc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	270.00 230.00	230.00 RR	33.83 12.49	572 4163	155 537	9.42 12 ø 10.0  0.5	ø 5.0 c/12	32.97
P2 1:50	seção L aberto 55.00 55.00 20.00 20.00	270.00 230.00	230.00 RR	33.37 12.61	624 4019	167 597	9.42 12 ø 10.0	ø 5.0 c/12	32.97

	Abertura=150°						0.5		
P3 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	270.00 230.00	230.00 RR	33.50 12.64	589 3084	128 489	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P4 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	270.00 230.00	230.00 RR	33.18 12.57	575 3045	137 481	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P5 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	270.00 230.00	230.00 RR	33.58 12.66	629 4003	161 615	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P6 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	270.00 230.00	230.00 RR	33.96 12.53	583 4181	156 546	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97

### 15.10.2 Cálculo dos Pilares

TRAVAMENTO 1	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 2.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	seção L aberto 55.00 55.00 20.00	RR 32.97 -	33.83 12.49	-4266 -636	-13359 -1990	3.13	9.42 (12 ø 10.0) -



	20.00 150°						
P2	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	33.37 12.61	-4184 -686	-13387 -2194	3.20	9.42 (12 ø 10.0) -
P3	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	33.50 12.64	-3149 -723	-11378 -2611	3.61	9.42 (12 ø 10.0) -
P4	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	33.18 12.57	-3047 -728	-11176 -2670	3.67	9.42 (12 ø 10.0) -
P5	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	33.58 12.66	-4147 -577	-13249 -1842	3.20	9.42 (12 ø 10.0) -
P6	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	33.96 12.53	-4284 -638	-13373 -1990	3.12	9.42 (12 ø 10.0) -

## 15.11 VIGAS - PAVIMENTO TRAVAMENTO 1

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	



V1	587.80	2 ø 8.0		-622.18 -632.35	2 ø 8.0 2 ø 8.0		
V2	590.99	2 ø 8.0		-640.02 -624.06	2 ø 8.0 2 ø 8.0		
V3	515.74	2 ø 8.0		-537.72 -565.39	2 ø 8.0 2 ø 8.0		
V4	525.77	2 ø 8.0		-548.72 -572.30	2 ø 8.0 2 ø 8.0		
V5	523.21	2 ø 8.0		-551.47 -558.06	2 ø 8.0 2 ø 8.0		
V6	526.05	2 ø 8.0		-550.39 -561.89	2 ø 8.0 2 ø 8.0		

### 15.11.1 Esforços da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm âx (tf)	Mdm âx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		68.8 7								0.25			
1	134. 98 117. 00	117. 00	112. 50	0.00			0.1 1	- 0.1 1	1.0 0			583. 61  587. 80	- 622. 18  - 632. 35
P2		68.8 2								0.26			

### 15.11.2 Esforços da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm âx (tf)	Mdm âx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P5		67.9 8								0.26			
1	135. 14 117. 12	117. 12	112. 50	0.00			0.1 1	- 0.1 1	1.0 1			590. 44  590. 99	- 640. 02  - 624. 06
P3		61.9 8								0.25			

### 15.11.3 Esforços da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m.	Acid.			Nd (tf)	Rd (tf)					



	(cm)		(kgf/m)	(kgf/m)	(°C)								
P1		74.80								0.22			
1	135.08 117.10	117.10	112.50	0.00			0.12	-0.11	0.89			515.74 502.36	-537.72 -565.39
P3		69.92								0.25			

#### 15.11.4 Esforços da Viga V4

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P2		70.84								0.23			
1	134.48 116.46	116.46	112.50	0.00			0.13	-0.13	0.91			525.77 513.56	-548.72 -572.30

P1		59.4 1								0.25	
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### 15.11.5 Esforços da Viga V5

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		72.9 9								0.23			
1	134. 70 116. 74	116. 74	112. 50	0.00			0.1 1	- 0.1 1	0.9 0			523. 21  502. 12	- 551. 47  - 558. 06
P6		72.6 6								0.24			

### 15.11.6 Esforços da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (%)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
P6		59.08								0.22			
1	135.81 117.77	117.77	112.50	0.00			0.13	- 0.13	0.90			526.05 503.45	- 550.39 - 561.89
P5		70.38								0.24			

#### 15.11.7 Resultados da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P4	68.87			2 ø 8.0 0.68					0.00
1	117.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P2	68.82			2 ø 8.0 0.68					0.00

### 15.11.8 Resultados da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P5	67.98			2 ø 8.0 0.68					0.00
1	117.12	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	61.98			2 ø 8.0 0.68					0.00

### 15.11.9 Resultados da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P1	74.80			2 ø 8.0 0.68					0.00
1	117.10	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	69.92			2 ø 8.0 0.68					0.00

### 15.11.10 Resultados da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P2	70.84			2 ø 8.0 0.68					0.00
1	116.46	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P1	59.41			2 ø 8.0 0.68					0.00

### 15.11.11 Resultados da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P4	72.99			2 ø 8.0 0.68					0.00
1	116.74	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P6	72.66			2 ø 8.0					0.00

				0.68					
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### 15.11.12 Resultados da Viga V6

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P6	59.08			2 ø 8.0 0.68					0.00
1	117.77	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P5	70.38			2 ø 8.0 0.68					0.00

## 15.12 PILARES - PAVIMENTO TRAVAMENTO 2

### 15.12.1 Resultados dos Pilares

TRAVAMENTO 2	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 3		cobr = 2.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h

P1 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	500.00 230.00	230.00 RR	31.17 11.26	916 2215	246 286	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P2 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	500.00 230.00	230.00 RR	30.82 11.36	797 2057	242 390	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P3 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	500.00 230.00	230.00 RR	30.95 11.40	778 1718	277 391	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P4 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	500.00 230.00	230.00 RR	30.64 11.32	747 1676	287 385	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P5 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	500.00 230.00	230.00 RR	31.01 11.41	807 2041	245 404	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P6 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	500.00 230.00	230.00 RR	31.30 11.30	901 2205	245 301	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97

### 15.12.2 Cálculo dos Pilares

TRAVAMENTO 2	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 3		cobr = 2.50 cm	

Pilar	Seção	vínc	Nd máx	Msd(x)	Mrd(x)	Mrd/Msd	As b
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	(cm)	esb B vínc esb H	Nd mín (tf)	Msd(y) (kgf.m)	Mrd(y) (kgf.m)		As h (cm²)
P1	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	31.17 11.26	-2329 -703	-10846 -3275	4.66	9.42 (12 ø 10.0) -
P2	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	30.82 11.36	-2231 -744	-10619 -3539	4.76	9.42 (12 ø 10.0) -
P3	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	30.95 11.40	-1778 -619	-9506 -3308	5.35	9.42 (12 ø 10.0) -
P4	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	30.64 11.32	-1771 -750	-9450 -3999	5.33	9.42 (12 ø 10.0) -
P5	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	31.01 11.41	-2223 -749	-10589 -3569	4.76	9.42 (12 ø 10.0) -
P6	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	31.30 11.30	-2314 -706	-10805 -3298	4.67	9.42 (12 ø 10.0) -



## 15.13 VIGAS - PAVIMENTO TRAVAMENTO 2

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	666.62	2 ø 8.0		-699.80 -713.88	2 ø 8.0 2 ø 8.0		
V2	673.96	2 ø 8.0		-724.34 -700.74	2 ø 8.0 2 ø 8.0		
V3	591.71	2 ø 8.0		-602.54 -642.42	2 ø 8.0 2 ø 8.0		
V4	600.22	2 ø 8.0		-613.06 -648.00	2 ø 8.0 2 ø 8.0		
V5	588.30	2 ø 8.0		-614.82 -622.99	2 ø 8.0 2 ø 8.0		
V6	596.59	2 ø 8.0		-620.23 -631.43	2 ø 8.0 2 ø 8.0		

### 15.13.1 Esforços da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm ax (tf)	Mdm ax (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		68.8 7								0.28			
1	134. 98	117. 00	112. 50	0.00			0.1 0	- 0.0 9	1.1 2			664. 05	- 699. 80

	117.00										666.62	-713.88
P2		68.82								0.28		

### 15.13.2 Esforços da Viga V2

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o e lo (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P5		67.9 8								0.29			
1	135. 14 117. 12	117. 12	112. 50	0.00			0.1 0	- 0.0 9	1.1 3			668. 30  673. 96	- 724. 34  - 700. 74
P3		61.9 8								0.27			

### 15.13.3 Esforços da Viga V3

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm âx (tf)	Mdm âx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P1		74.8 0								0.23			
1	135. 08 117. 10	117. 10	112. 50	0.00			0.1 1	- 0.1 1	1.0 1			591. 71  568. 16	- 602. 54  - 642. 42
P3		69.9 2								0.27			

#### 15.13.4 Esforços da Viga V4

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados						Envoltória							
Pilar Trec ho	Apoi o 1 e 1o	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m.	Acid.			Nd (tf)	Rd (tf)					

	(cm)		(kgf/m)	(kgf/m)	(°C)								
P2		71.14								0.24			
1	134.42 116.41	116.41	112.50	0.00			0.10	-0.10	1.02			600.22 578.92	-613.06 -648.00
P1		60.81								0.27			

### 15.13.5 Esforços da Viga V5

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio (cm)	Larg. Barra (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (%)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf.m)	Md+ (kgf.m)	Md- (kgf.m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
P4		77.59								0.24			
1	134.71 116.75	116.75	112.50	0.00			0.11	-0.11	0.99			588.30 565.13	-614.82 -622.99

P6		76.4 4								0.26	
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### 15.13.6 Esforços da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P6		61.0 8								0.24			
1	135. 72 117. 70	117. 70	112. 50	0.00			0.1 0	- 0.1 0	1.0 0			596. 59 572. 20	- 620. 23 - 631. 43
P5		70.8 2								0.27			

### 15.13.7 Resultados da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P4	68.87			2 ø 8.0 0.68					0.01
1	117.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P2	68.82			2 ø 8.0 0.68					0.01

### 15.13.8 Resultados da Viga V2

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P5	67.98			2 ø 8.0 0.68					0.01
1	117.12	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	61.98			2 ø 8.0 0.68					0.00

### 15.13.9 Resultados da Viga V3

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
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Cobrimento	=	Peso específico = 2500.00
2.00 cm		kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P1	74.80			2 ø 8.0 0.68					0.00
1	117.10	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	69.92			2 ø 8.0 0.68					0.01

#### 15.13.10 Resultados da Viga V4

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P2	71.14			2 ø 8.0 0.68					0.00
1	116.41	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P1	60.81			2 ø 8.0 0.68					0.01

#### 15.13.11 Resultados da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P4	77.59			2 ø 8.0 0.68					0.00
1	116.75	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P6	76.44			2 ø 8.0 0.68					0.00

#### 15.13.12 Resultados da Viga V6

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P6	61.08			2 ø 8.0 0.68					0.00
1	117.70	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P5	70.82			2 ø 8.0 0.68					0.00



## 15.14 PILARES - PAVIMENTO TRAVAMENTO 3

### 15.14.1 Resultados dos Pilares

TRAVAMENTO 3	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 4		cobr = 2.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	730.00 230.00	230.00 RR	28.38 10.06	1604 997	261 244	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P2 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	730.00 230.00	230.00 RR	28.17 10.14	1456 851	320 238	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P3 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	730.00 230.00	230.00 RR	28.29 10.17	1254 840	331 284	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P4 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	730.00 230.00	230.00 RR	28.02 10.10	1237 773	337 281	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P5 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	730.00 230.00	230.00 RR	28.33 10.18	1491 842	325 250	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97

P6	seção L aberto						9.42	12 ø	ø 5.0	
1:50	55.00 55.00	730.00	230.00	28.53	1614	262	10.0		c/12	32.97
	20.00 20.00	230.00	RR	10.09	931	253				
	Abertura=150°						0.5			

### 15.14.2 Cálculo dos Pilares

TRAVAMENTO 3	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 4		cobr = 2.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	28.38 10.06	-1710 -657	-9536 -3664	5.58	9.42 (12 ø 10.0) -
P2	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	28.17 10.14	-1575 -688	-9102 -3973	5.78	9.42 (12 ø 10.0) -
P3	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	28.29 10.17	-1354 -699	-8330 -4303	6.15	9.42 (12 ø 10.0) -
P4	seção L aberto 55.00 55.00	RR 32.97 -	28.02 10.10	-1332 -691	-8277 -4297	6.22	9.42 (12 ø 10.0) -

	20.00 20.00 150°						
P5	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	28.33 10.18	-1626 -626	-9408 -3622	5.79	9.42 (12 ø 10.0) -
P6	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	28.53 10.09	-1721 -661	-9555 -3669	5.55	9.42 (12 ø 10.0) -

### 15.15 VIGAS - PAVIMENTO TRAVAMENTO 3

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	605.78	2 ø 8.0		-637.23 -655.51	2 ø 8.0 2 ø 8.0		
V2	617.05	2 ø 8.0		-667.94 -635.54	2 ø 8.0 2 ø 8.0		
V3	547.01	2 ø 8.0		-542.53 -597.68	2 ø 8.0 2 ø 8.0		
V4	553.40	2 ø 8.0		-552.13 -601.76	2 ø 8.0 2 ø 8.0		
V5	533.30	2 ø 8.0		-563.23 -568.22	2 ø 8.0 2 ø 8.0		
V6	538.89	2 ø 8.0		-571.94 -573.97	2 ø 8.0 2 ø 8.0		

#### 15.15.1 Esforços da Viga V1

$f_{ck} = 300.00$ $\text{kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
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Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³
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Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (%)	Esforço axial		Vd (tf)	Rm âx (tf)	Mdm âx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		68.8 7								0.25			
1	134. 98 117. 00	117. 00	112. 50	0.00			0.1 1	- 0.1 1	1.0 3			605. 78  603. 41	- 637. 23  - 655. 51
P2		68.8 2								0.27			

### 15.15.2 Esforços da Viga V2

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados						Envoltória							
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (%)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					

P5		67.9 8								0.28			
1	135. 14 117. 12	117. 12	112. 50	0.00			0.1 0	- 0.1 3	1.0 5			602. 14 617. 05	- 667. 94 - 635. 54
P3		61.9 8								0.25			

### 15.15.3 Esforços da Viga V3

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P1		74.8 0								0.21			
1	135. 08 117. 10	117. 10	112. 50	0.00			0.0 9	- 0.1 2	0.9 4			547. 01 508. 61	- 542. 53 - 597. 68
P3		69.9 2								0.27			

### 15.15.4 Esforços da Viga V4

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P2		71.1 4								0.21			
1	134. 42 116. 41	116. 41	112. 50	0.00			0.0 9	- 0.0 9	0.9 5			553. 40  517. 78	- 552. 13  - 601. 76
P1		60.8 1								0.27			

### 15.15.5 Esforços da Viga V5

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados	Envoltória
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Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		77.5 9								0.23			
1	134. 71 116. 75	116. 75	112. 50	0.00			0.0 9	- 0.1 2	0.9 1			533. 30  513. 84	- 563. 23  - 568. 22
P6		76.4 4								0.24			

#### 15.15.6 Esforços da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P6		61.0 8								0.23			
1	135. 72	117. 70	112. 50	0.00			0.0 8	- 0.1 0	0.9 1			538. 89	- 571. 94

	117. 70											523. 80	- 573. 97
P5		70.8 2								0.24			

### 15.15.7 Resultados da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P4	68.87			2 ø 8.0 0.68					0.00
1	117.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P2	68.82			2 ø 8.0 0.68					0.00

### 15.15.8 Resultados da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho	Asw min (cm <sup>2</sup> )	As dir trecho	Asw Pele	Fissura (mm)



	(cm)				(cm <sup>2</sup> )		(cm <sup>2</sup> )	(cm <sup>2</sup> )	
P5	67.98			2 ø 8.0 0.68					0.01
1	117.12	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	61.98			2 ø 8.0 0.68					0.00

### 15.15.9 Resultados da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P1	74.80			2 ø 8.0 0.68					0.00
1	117.10	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	69.92			2 ø 8.0 0.68					0.00

### 15.15.10 Resultados da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados	Resultados
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Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P2	71.14			2 ø 8.0 0.68					0.00
1	116.41	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P1	60.81			2 ø 8.0 0.68					0.00

#### 15.15.11 Resultados da Viga V5

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P4	77.59			2 ø 8.0 0.68					0.00
1	116.75	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P6	76.44			2 ø 8.0 0.68					0.00

#### 15.15.12 Resultados da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P6	61.08			2 ø 8.0 0.68					0.00
1	117.70	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P5	70.82			2 ø 8.0 0.68					0.00

## 15.16 PILARES - PAVIMENTO TRAVAMENTO 4

### 15.16.1 Resultados dos Pilares

TRAVAMENTO 4	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 5		cobr = 2.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	960.00 230.00	230.00 RR	25.69 8.86	1901 265	269 192	9.42 12 ø 10.0  0.5	ø 5.0 c/12	32.97
P2 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	960.00 230.00	230.00 RR	25.61 8.92	1718 259	336 154	9.42 12 ø 10.0  0.5	ø 5.0 c/12	32.97

P3 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	960.00 230.00	230.00 RR	25.70 8.95	1387 252	323 182	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P4 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	960.00 230.00	230.00 RR	25.47 8.88	1375 165	312 180	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P5 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	960.00 230.00	230.00 RR	25.74 8.96	1784 253	353 154	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97
P6 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	960.00 230.00	230.00 RR	25.84 8.89	1896 189	290 193	9.42 12 ø 10.0 0.5	ø 5.0 c/12	32.97

### 15.16.2 Cálculo dos Pilares

TRAVAMENTO 4	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 5		cobr = 2.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 -	25.69 8.86	-2004 -612	-10382 -3169	5.18	9.42 (12 ø 10.0) -
P2	seção L aberto	RR	25.61	-1851	-10107	5.46	9.42

	55.00 55.00 20.00 20.00 150°	32.97 - - - -	8.92 - - - -	-588 - - - -	-3211 - - - -		(12 ø 10.0) - - - -
P3	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 - - -	25.70 8.95 - - -	-1473 -643 - - -	-8903 -3884 - - -	6.05	9.42 (12 ø 10.0) - - -
P4	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 - - -	25.47 8.88 - - -	-1445 -635 - - -	-8840 -3884 - - -	6.12	9.42 (12 ø 10.0) - - -
P5	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 - - -	25.74 8.96 - - -	-1915 -592 - - -	-10246 -3167 - - -	5.35	9.42 (12 ø 10.0) - - -
P6	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 32.97 - - -	25.84 8.89 - - -	-1995 -616 - - -	-10350 -3196 - - -	5.19	9.42 (12 ø 10.0) - - -

#### 15.17 VIGAS - PAVIMENTO TRAVAMENTO 4

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	478.42	2 ø 8.0		-499.71 -526.72	2 ø 8.0 2 ø 8.0		
V2	499.19	2 ø 8.0		-545.35 -489.30	2 ø 8.0 2 ø 8.0		



V3	452.89	2 ø 8.0		-410.27 -497.98	2 ø 8.0 2 ø 8.0		
V4	456.01	2 ø 8.0		-417.81 -501.72	2 ø 8.0 2 ø 8.0		
V5	407.24	2 ø 8.0		-452.32 -437.91	2 ø 8.0 2 ø 8.0		
V6	426.65	2 ø 8.0		-471.04 -440.35	2 ø 8.0 2 ø 8.0		

### 15.17.1 Esforços da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		68.8 7								0.21			
1	134. 98 117. 00	117. 00	112. 50	0.00			0.2 4	- 0.0 9	0.8 4			478. 42 465. 20	- 499. 71 - 526. 72
P2		68.8 2								0.23			

### 15.17.2 Esforços da Viga V2

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm âx (tf)	Mdm âx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P5		67.98								0.25			
1	135. 14 117. 12	117. 12	112. 50	0.00			0.29	- 0.04	0.87			455. 59 499. 19	- 545. 35 - 489. 30
P3		61.98								0.19			

### 15.17.3 Esforços da Viga V3

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m.	Acid.			Nd (tf)	Rd (tf)					

	(cm)		(kgf/m)	(kgf/m)	(°C)								
P1		74.80								0.15			
1	135.08 117.10	117.10	112.50	0.00			0.38	-0.04	0.80			452.89 378.70	-410.27 -497.98
P3		69.92								0.25			

#### 15.17.4 Esforços da Viga V4

$f_{ck} = 300.00$ kgf/cm <sup>2</sup>	$E_{cs} = 268384$ kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P2		71.14								0.15			
1	134.42 116.41	116.41	112.50	0.00			0.31	-0.11	0.81			456.01 383.45	-417.81 -501.72



P1		60.8 1								0.25	
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### 15.17.5 Esforços da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P4		77.5 9								0.21			
1	134. 71 116. 75	116. 75	112. 50	0.00			0.3 3	- 0.0 5	0.7 4			405. 62 407. 24	- 452. 32 - 437. 91
P6		76.4 4								0.19			

### 15.17.6 Esforços da Viga V6

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
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Cobrimento	=	Peso específico = 2500.00
2.00 cm		kgf/m³

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperat ura Caso T1 Caso T2 (°C)	Retraç ão (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid. (kgf/ m)			Nd (tf)	Rd (tf)					
P6		61.08								0.22			
1	135. 72 117. 70	117. 70	112. 50	0.00			0.37	- 0.05	0.76			407. 37  426. 65	- 471. 04  - 440. 35
P5		70.82								0.19			

### 15.17.7 Resultados da Viga V1

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P4	68.87			2 ø 8.0 0.68					0.00

1	117.00	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P2	68.82			2 ø 8.0 0.68					0.00

### 15.17.8 Resultados da Viga V2

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P5	67.98			2 ø 8.0 0.68					0.00
1	117.12	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	61.98			2 ø 8.0 0.68					0.00

### 15.17.9 Resultados da Viga V3

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)

P1	74.80			2 ø 8.0 0.68					0.00
1	117.10	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P3	69.92			2 ø 8.0 0.68					0.00

#### 15.17.10 Resultados da Viga V4

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P2	71.14			2 ø 8.0 0.68					0.00
1	116.41	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P1	60.81			2 ø 8.0 0.68					0.00

#### 15.17.11 Resultados da Viga V5

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados	Resultados
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Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P4	77.59			2 ø 8.0 0.68					0.00
1	116.75	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P6	76.44			2 ø 8.0 0.68					0.00

### 15.17.12 Resultados da Viga V6

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P6	61.08			2 ø 8.0 0.68					0.00
1	117.70	15.00 x 30.00	2 ø 8.0 0.68			ø 5.0 c/ 16			0.00
P5	70.82			2 ø 8.0 0.68					0.00

## 15.18 PILARES - PAVIMENTO FUNDO DO RES.

### 15.18.1 Resultados dos Pilares

FUNDO DO RES.	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 6		cobr = 2.50 cm	

Dados				Resultados						
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As Armaduras As h % total	b 12 ø armad	Estribo Topo Base cota	Esb b Esb h
P1 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	1220.00 260.00	260.00 RR	23.19 7.49	1951 724	790 216	9.42 12 ø 10.0 0.5	ø 5.0 c/12		37.27
P2 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	1220.00 260.00	260.00 RR	23.25 7.54	1713 656	599 204	9.42 12 ø 10.0 0.5	ø 5.0 c/12		37.27
P3 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	1220.00 260.00	260.00 RR	23.28 7.55	1708 638	781 166	9.42 12 ø 10.0 0.5	ø 5.0 c/12		37.27
P4 1:50	seção L aberto 55.00 55.00 20.00 20.00 Abertura=150°	1220.00 260.00	260.00 RR	23.08 7.48	1679 580	660 129	9.42 12 ø 10.0 0.5	ø 5.0 c/12		37.27
P5 1:50	seção L aberto 55.00 55.00 20.00 20.00	1220.00 260.00	260.00 RR	23.32 7.56	1774 708	758 204	9.42 12 ø 10.0	ø 5.0 c/12		37.27

	Abertura=150°						0.5		
P6	seção L aberto						9.42 12 ø	ø 5.0	
	55.00 55.00	1220.00	260.00	23.34	2121	714	10.0	c/12	37.27
1:50	20.00 20.00	260.00	RR	7.51	640	184			
	Abertura=150°						0.5		

### 15.18.2 Cálculo dos Pilares

FUNDO DO RES.	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 6		cobr = 2.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 37.27 -	23.19 7.49	-1616 -1069	-6803 -4502	4.21	9.42 (12 ø 10.0) -
P2	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 37.27 -	23.25 7.54	-1476 -746	-7922 -4001	5.37	9.42 (12 ø 10.0) -
P3	seção L aberto 55.00 55.00 20.00 20.00 150°	RR 37.27 -	23.28 7.55	-1177 -1055	-5565 -4990	4.73	9.42 (12 ø 10.0) -
P4	seção L aberto	RR	23.08	-1245	-6256	5.03	9.42

	55.00	37.27	7.48	-932	-4683		(12 ø 10.0)
	55.00	-					-
	20.00						
	20.00						
	150°						
P5	seção L aberto						
	55.00	RR					9.42
	55.00	37.27	23.32	-1516	-8013	5.29	(12 ø 10.0)
	20.00	-	7.56	-751	-3972		-
	20.00						
	150°						
P6	seção L aberto						
	55.00	RR					9.42
	55.00	37.27	23.34	-1409	-6546	4.65	(12 ø 10.0)
	20.00	-	7.51	-993	-4615		-
	20.00						
	150°						

## 15.19 RESERVATÓRIO - PAVIMENTO TAMPA DO RES.

### 15.19.1 Dados dos Reservatórios

TAMPA DO RES.	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 7		cobr = 2.50 cm	

Seção (cm)				Cargas Verticais (kgf/m²)				Cargas Horizontais (kgf/m²)		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RES1)	10.00	0.00	1670.00	250.00 kgf/m²	150.00 181.50	0.00 0.00	581.50 kgf/m²				





L1 (RES1 )	20. 00	0.00	1220. 00	500.0 0 kgf/m <sup>2</sup>	150.00 181.50	0.00 0.00	4281. 50 kgf/m <sup>2</sup>				
PAR2- A (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- B (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- C (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- D (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- E (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- F (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- G (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- H (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- I	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		

(RES1 )											
PAR2- J (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- K (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		
PAR2- L (RES1 )	20. 00	0.00	1670. 00	2250. 00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	3450. 00	0.0 0		

## 15.19.2 Resultados do Reservatório

TAMPA DO RES.	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
Lance 7		cobr = 2.50 cm	

### 15.19.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	0.60 0.00	0.64 0.00	419	496	As = 1.13 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.32 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.41 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 1.98 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
L1	1.25 -5.84	2.00 -5.78	2078	3044	As = 4.01 cm <sup>2</sup> /m ø10.0 c/19	As = 4.22 cm <sup>2</sup> /m ø10.0 c/18	A's = 5.36 cm <sup>2</sup> /m ø10.0 c/14	A's = 7.06 cm <sup>2</sup> /m ø10.0 c/11



					(4.13 cm <sup>2</sup> /m)	(4.36 cm <sup>2</sup> /m)	(5.61 cm <sup>2</sup> /m)	(7.14 cm <sup>2</sup> /m)
PAR2-A	4.64 -7.84	21.46 -4.75	419	967	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.22 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-B	5.81 -6.11	24.06 -8.46	339	2143	As = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	As = 5.36 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	A's = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-C	3.45 -4.73	25.03 -8.52	325	879	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.73 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-D	6.54 -7.30	22.17 -5.19	394	1003	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-E	5.11 -4.27	23.90 -7.80	257	2622	As = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	As = 7.32 cm <sup>2</sup> /m ø12.5 c/16 (7.67 cm <sup>2</sup> /m)	A's = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	A's = 6.75 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)
PAR2-F	7.21 -6.75	22.02 -8.25	220	2622	As = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	As = 7.38 cm <sup>2</sup> /m ø12.5 c/16 (7.67 cm <sup>2</sup> /m)	A's = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	A's = 6.83 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)
PAR2-G	4.62 -4.83	22.82 -4.82	395	931	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-H	5.61 -6.05	23.76 -8.55	325	888	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20	A's = 2.75 cm <sup>2</sup> /m ø10.0 c/20

					(3.93 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)
PAR2-I	3.75 -4.74	25.22 -8.43	338	2198	As = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	As = 7.15 cm <sup>2</sup> /m ø12.5 c/17 (7.22 cm <sup>2</sup> /m)	A's = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-J	5.51 -6.08	21.65 -5.00	423	946	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.23 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-K	5.66 -4.57	24.12 -8.02	218	2580	As = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	As = 5.28 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	A's = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	A's = 6.73 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)
PAR2-L	4.68 -4.26	23.27 -8.38	255	2580	As = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	As = 5.26 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	A's = 1.50 cm <sup>2</sup> /m ø10.0 c/25 (3.14 cm <sup>2</sup> /m)	A's = 6.79 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1	Momentos fletores (kgf.m/m)		Armaduras	
	Laje 2	Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR2-F	-3019		As = 7.05 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	
Barra	PAR2-F L1	-2372		As = 6.14 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	L1 PAR2-G	-3230		As = 6.81 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	
Barra	PAR2-G L1	-2372		As = 5.59 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	
Barra	L1	-2929		As = 6.96 cm <sup>2</sup> /m	

	PAR2-H			ø10.0 c/11 (7.14 cm²/m)	
Barra	PAR2-H L1	-2198		As = 5.94 cm²/m ø10.0 c/13 (6.04 cm²/m)	
Barra	L1 PAR2-I	-2967		As = 7.00 cm²/m ø10.0 c/11 (7.14 cm²/m)	
Barra	PAR2-I L1	-2198		As = 5.92 cm²/m ø10.0 c/13 (6.04 cm²/m)	
Barra	L1 PAR2-J	-3396		As = 9.37 cm²/m ø12.5 c/13 (9.44 cm²/m)	
Barra	PAR2-J L1	-2139		As = 4.65 cm²/m ø10.0 c/16 (4.91 cm²/m)	
Barra	L1 PAR2-K	-2981		As = 6.96 cm²/m ø10.0 c/11 (7.14 cm²/m)	
Barra	PAR2-K L1	-2139		As = 4.99 cm²/m ø10.0 c/15 (5.24 cm²/m)	
Barra	L1 PAR2-L	-2997		As = 7.96 cm²/m ø12.5 c/15 (8.18 cm²/m)	
Barra	PAR2-L L1	-2082		As = 4.96 cm²/m ø10.0 c/15 (5.24 cm²/m)	
Barra	L1 PAR2-A	-3361		As = 7.35 cm²/m ø10.0 c/10 (7.85 cm²/m)	
Barra	PAR2-A L1	-2082		As = 5.54 cm²/m ø10.0 c/14 (5.61 cm²/m)	
Barra	L1 PAR2-B	-2988		As = 7.03 cm²/m ø10.0 c/11 (7.14 cm²/m)	
Barra	PAR2-B	-2143		As = 5.85 cm²/m	

	L1			ø10.0 c/13 (6.04 cm²/m)	
Barra	L1 PAR2-C	-2196		As = 5.53 cm²/m ø10.0 c/14 (5.61 cm²/m)	
Barra	PAR2-C L1	-2143		As = 4.68 cm²/m ø10.0 c/16 (4.91 cm²/m)	
Barra	L1 PAR2-D	-3234		As = 8.06 cm²/m ø12.5 c/15 (8.18 cm²/m)	
Barra	PAR2-D L1	-2384		As = 5.93 cm²/m ø10.0 c/13 (6.04 cm²/m)	
Barra	L1 PAR2-E	-3010		As = 6.96 cm²/m ø10.0 c/11 (7.14 cm²/m)	
Barra	PAR2-E L1	-2384		As = 6.08 cm²/m ø10.0 c/12 (6.54 cm²/m)	
Barra	L1 PAR2-A	-600		As = 2.25 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-A L1	-967		As = 5.14 cm²/m ø10.0 c/15 (5.24 cm²/m)	
Barra	PAR2-L PAR2-A	-488		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-A PAR2-L	-519		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-A PAR2-B	-271		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-B PAR2-A	-32		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1	-533		As = 2.05 cm²/m	

	PAR2-B			ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-B L1	-879		As = 4.86 cm²/m ø10.0 c/16 (4.91 cm²/m)	
Barra	PAR2-C PAR2-B	-581		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-B PAR2-C	-573		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-C	-511		As = 1.88 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-C L1	-879		As = 4.76 cm²/m ø10.0 c/16 (4.91 cm²/m)	
Barra	PAR2-D PAR2-C	-31		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-C PAR2-D	-271		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-D	-573		As = 2.14 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-D L1	-1003		As = 5.26 cm²/m ø10.0 c/14 (5.61 cm²/m)	
Barra	PAR2-E PAR2-D	-496		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-D PAR2-E	-495		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-E	-498		As = 2.24 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-E	-2622		As = 16.16 cm²/m	



	L1			Ø12.5 c/7 (17.53 cm²/m)	
Barra	PAR2-F PAR2-E	-249		As = 3.00 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-E PAR2-F	-76		As = 3.00 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-F	-499		As = 2.51 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-F L1	-2622		As = 16.37 cm²/m Ø12.5 c/7 (17.53 cm²/m)	
Barra	PAR2-G PAR2-F	-521		As = 3.00 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-F PAR2-G	-495		As = 3.00 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-G	-572		As = 2.13 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-G L1	-931		As = 4.99 cm²/m Ø10.0 c/15 (5.24 cm²/m)	
Barra	PAR2-H PAR2-G	-31		As = 3.00 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-G PAR2-H	-267		As = 3.00 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-H	-511		As = 1.94 cm²/m Ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-H L1	-888		As = 4.85 cm²/m Ø10.0 c/16 (4.91 cm²/m)	
Barra	PAR2-I	-589		As = 3.00 cm²/m	





	PAR2-H			ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-H PAR2-I	-572		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-I	-531		As = 1.95 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-I L1	-888		As = 4.79 cm²/m ø10.0 c/16 (4.91 cm²/m)	
Barra	PAR2-I PAR2-J	-274		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-J PAR2-I	-34		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-J	-606		As = 2.27 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-J L1	-946		As = 5.07 cm²/m ø10.0 c/15 (5.24 cm²/m)	
Barra	PAR2-J PAR2-K	-464		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-K PAR2-J	-466		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR2-K	-505		As = 2.27 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-K L1	-2580		As = 14.71 cm²/m ø12.5 c/8 (15.34 cm²/m)	
Barra	PAR2-K PAR2-L	-61		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR2-L	-234		As = 3.00 cm²/m	

	PAR2-K			ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR2-L	-493		As = 2.49 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-L L1	-2580		As = 16.15 cm <sup>2</sup> /m ø12.5 c/7 (17.53 cm <sup>2</sup> /m)	

## 16. ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA 1

### 16.1 RESUMO DOS RESULTADOS

#### 16.1.1 Cargas Verticais

- Peso próprio = 100.34 tf
- Adicional = 43.85 tf
- Acidental = 17.26 tf
- Água = 141.10 tf
- Total = 302.55 tf
- Área aproximada = 164.65 m<sup>2</sup>
- Relação = 1837.56 kgf/m<sup>2</sup>

**AVISO: Relação de carga por área não usual para edifícios**

#### 16.1.2 Deslocamento horizontal:

- X+ = 0.25 cm (limite 0.33)
- X- = 0.25 cm (limite 0.33)
- Y+ = 0.15 cm (limite 0.33)
- Y- = 0.15 cm (limite 0.33)

### 16.1.3 Verificação de estabilidade (Gama-Z):

- $X+ = 1.06$  (limite 1.10)
- $X- = 1.09$  (limite 1.10)
- $Y+ = 1.04$  (limite 1.10)
- $Y- = 1.03$  (limite 1.10)

### 16.1.4 Análise de 2ª ordem:

Processo P-Delta

### 16.1.5 Deslocamentos no topo da edificação:

- Acidental: 0.02 »» 0.02 (+15.98%)
- Água: 0.04 »» 0.05 (+16.26%)
- Vento X+: 1.09 »» 1.31 (+19.89%)
- Vento X-: 1.09 »» 1.31 (+19.89%)
- Vento Y+: 0.65 »» 0.72 (+10.66%)
- Vento Y-: 0.65 »» 0.72 (+10.66%)
- Desaprumo X+: 0.13 »» 0.15 (+19.81%)
- Desaprumo X-: 0.13 »» 0.15 (+19.81%)
- Desaprumo Y+: 0.06 »» 0.07 (+10.24%)
- Desaprumo Y-: 0.06 »» 0.07 (+10.24%)

## 16.2 VERIFICAÇÃO DA ESTABILIDADE GLOBAL DA ESTRUTURA

### 16.2.1 Maior coeficiente Gama-Z

Combinação: 1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V2+0.84D2							
Paviment o	Altura relativ a (cm)	Carga vertica l (tf)	Carga horizonta l (tf)	Deslocament o horizontal (cm)	Moment o 2a. ordem (kgf.m)	Momento tombament o (kgf.m)	Gama-Z
cobertura	560.00	65.83	0.46	1.13	745.60	2598.11	1.09

tampa do poço	425.00	8.70	1.07	0.87	75.76	4534.33	(lim=1.10)
térreo	210.00	33.42	1.19	0.02	7.09	2501.48	
TOTAL					828.45	9633.92	

### 16.2.2 Limitações

Em estruturas com Gama-Z maior que 1.10 é necessário fazer a verificação dos efeitos de 2ª ordem com a análise P-Delta.

O Gama-Z é um parâmetro de estabilidade para avaliação de estruturas simétricas (tanto geometria quanto carregamento) e edificações com mais de 4 pavimentos. Nos demais casos, recomenda-se a verificação dos efeitos de 2ª ordem com a análise P-Delta.

### 16.2.3 Coeficiente Gama-Z por combinação

Combinação	Momento o 2a. ordem (kgf.m)	Momento tombament o (kgf.m)	Gama -Z
1.3G1+1.4G2+1.3S+0.9P+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+0.9P+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08



1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V3+0.84D 3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.12Q+1.1A+1.4V4+0.84D 4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V1+0.84D 1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V2+0.84D 2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V3+0.84D 3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4Q+1.1A+0.84V4+0.84D 4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.2R+1.4V4+0.84D4	566.10	20000.83	1.03
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+0.9P+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+0.9P+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+0.9P+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+0.9P+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+0.9P+1.4V4+0.84D4	566.10	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+1.2P+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V1+1.4D1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V2+1.4D2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V3+1.4D3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+0.84V4+1.4D4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V1+0.84D1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V2+0.84D2	1254.32	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V1+1.4D1	533.15	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V2+1.4D2	720.90	9633.92	1.08
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V3+1.4D3	453.55	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+0.84V4+1.4D4	322.81	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V1+1.4D 1	529.40	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V2+1.4D 2	812.36	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V3+1.4D 3	500.83	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+0.84V4+1.4D 4	356.91	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V1+0.84D 1	970.19	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V2+0.84D 2	1254.32	16056.53	1.08

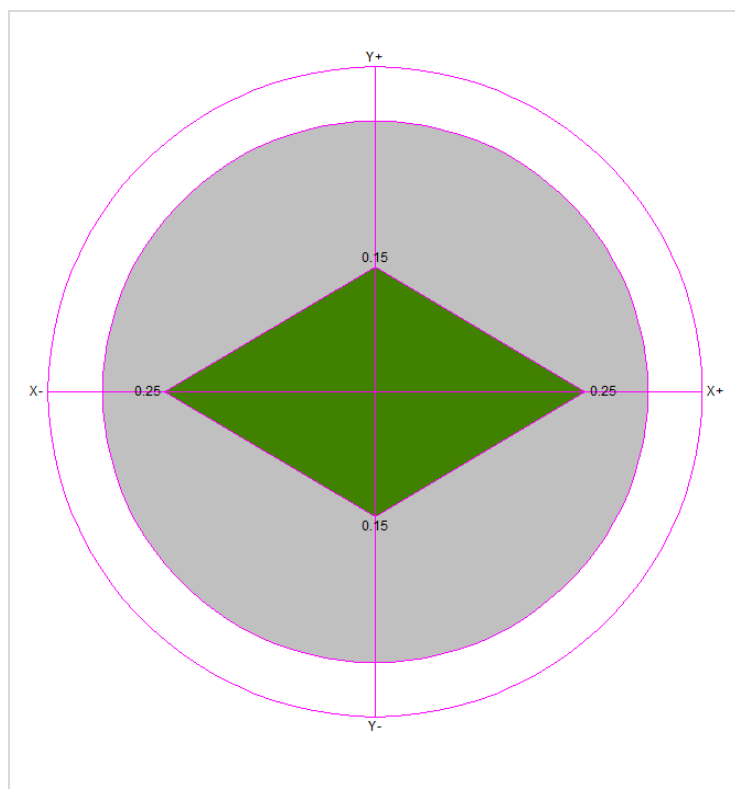


1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	760.87	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	610.78	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.2R+1.4V4+0.84D4	566.10	20000.83	1.03
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V1+0.84D1	535.21	9633.92	1.06
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V2+0.84D2	828.45	9633.92	1.09
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V3+0.84D3	511.44	12000.50	1.04
1.3G1+1.4G2+1.3S+1.2P+1.4Q+1.1A+0.84V4+0.84D4	362.70	12000.50	1.03
1.3G1+1.4G2+1.3S+1.2P+1.4V1+0.84D1	946.39	16056.53	1.06
1.3G1+1.4G2+1.3S+1.2P+1.4V2+0.84D2	1134.62	16056.53	1.08
1.3G1+1.4G2+1.3S+1.2P+1.4V3+0.84D3	699.78	20000.83	1.04
1.3G1+1.4G2+1.3S+1.2P+1.4V4+0.84D4	566.10	20000.83	1.03
G1+G2+S+0.9P+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+0.9P+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+0.9P+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+0.9P+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+0.9P+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+0.9P+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+0.9P+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+0.9P+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+0.9P+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+0.9P+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+0.9P+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+0.9P+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+0.9P+1.2R+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+0.9P+1.2R+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+0.9P+1.2R+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+0.9P+1.2R+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+0.9P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+0.9P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+0.9P+1.2R+1.4V1+0.84D1	726.33	16056.53	1.05



G1+G2+S+0.9P+1.2R+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+0.9P+1.2R+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+0.9P+1.2R+1.4V4+0.84D4	434.68	20000.83	1.02
G1+G2+S+0.9P+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+0.9P+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+0.9P+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+0.9P+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+0.9P+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+0.9P+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+0.9P+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+0.9P+1.4V4+0.84D4	434.68	20000.83	1.02
G1+G2+S+1.2P+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+1.2P+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+1.2P+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+1.2P+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+1.2P+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+1.2P+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+1.2P+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+1.2P+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+1.2P+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+1.2P+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+1.2P+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+1.2P+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+1.2P+1.2R+0.84V1+1.4D1	415.34	9633.92	1.05
G1+G2+S+1.2P+1.2R+0.84V2+1.4D2	523.22	9633.92	1.06
G1+G2+S+1.2P+1.2R+0.84V3+1.4D3	324.65	12000.50	1.03
G1+G2+S+1.2P+1.2R+0.84V4+1.4D4	249.78	12000.50	1.02
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V1+1.4D1	422.04	9633.92	1.05
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V2+1.4D2	603.16	9633.92	1.07
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V3+1.4D3	365.65	12000.50	1.03
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+0.84V4+1.4D4	279.34	12000.50	1.02
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V1+0.84D1	761.02	16056.53	1.05
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V2+0.84D2	942.37	16056.53	1.06
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V3+0.84D3	566.65	20000.83	1.03
G1+G2+S+1.2P+1.2R+1.12Q+1.1A+1.4V4+0.84D4	477.75	20000.83	1.02
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+1.2P+1.2R+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+1.2P+1.2R+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+1.2P+1.2R+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+1.2P+1.2R+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+1.2P+1.2R+1.4V4+0.84D4	434.68	20000.83	1.02
G1+G2+S+1.2P+1.4Q+1.1A+0.84V1+0.84D1	428.73	9633.92	1.05
G1+G2+S+1.2P+1.4Q+1.1A+0.84V2+0.84D2	618.11	9633.92	1.07
G1+G2+S+1.2P+1.4Q+1.1A+0.84V3+0.84D3	375.25	12000.50	1.03
G1+G2+S+1.2P+1.4Q+1.1A+0.84V4+0.84D4	285.04	12000.50	1.02
G1+G2+S+1.2P+1.4V1+0.84D1	726.33	16056.53	1.05
G1+G2+S+1.2P+1.4V2+0.84D2	834.13	16056.53	1.05
G1+G2+S+1.2P+1.4V3+0.84D3	510.54	20000.83	1.03
G1+G2+S+1.2P+1.4V4+0.84D4	434.68	20000.83	1.02

### 16.3 DESLOCAMENTOS HORIZONTAIS DEVIDO À AÇÃO DO VENTO



Verificações	X+	X-	Y+	Y-
Altura total da edificação (cm)	560.00			
Deslocamento limite (cm)	0.33			
Deslocamento característico (cm)	0.85	-0.85	0.51	-0.51
gf2	0.30	0.30	0.30	0.30
Deslocamento combinações frequentes (cm)	0.25	-0.25	0.15	-0.15

Pavimento	Altura (cm)	Deslocamento combinações frequentes (cm)				Diferença (cm)				Limite (cm)
		X+	X-	Y+	Y-	X+	X-	Y+	Y-	
cobertura	135.00	0.25	-0.25	0.15	-0.15	0.05	-0.05	0.03	-0.03	0.16
tampa do poço	215.00	0.21	-0.21	0.13	-0.13	0.20	-0.20	0.12	-0.12	0.25
térreo	210.00	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.25



## 16.4 ANÁLISE DA NÃO LINEARIDADE GEOMÉTRICA PELO PROCESSO P-DELTA

Acidental								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.02	0.01	-0.02	0.01	0.00	0.00	0.00	0.00
tampa do poço	-0.01	0.01	-0.01	0.01	0.00	0.00	0.00	0.00
térreo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Variação no deslocamento do topo da edificação: 15.98%

Água								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.04	0.00	-0.05	0.00	0.00	0.00	-0.01	0.00
tampa do poço	-0.02	0.00	-0.03	0.00	0.00	0.00	0.00	0.00
térreo	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00

Variação no deslocamento do topo da edificação: 16.26%

Vento X+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	1.09	0.02	1.31	0.02	0.55	0.00	0.68	0.00
tampa do poço	0.88	0.01	1.06	0.02	1.27	0.00	1.51	0.00
térreo	0.03	0.00	0.03	0.00	1.42	0.00	1.09	0.00

Variação no deslocamento do topo da edificação: 19.89%

Vento X-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-1.09	-0.02	-1.31	-0.02	-0.55	0.00	-0.68	0.00
tampa do poço	-0.88	-0.01	-1.06	-0.02	-1.27	0.00	-1.51	0.00
térreo	-0.03	0.00	-0.03	0.00	-1.42	0.00	-1.09	0.00

Variação no deslocamento do topo da edificação: 19.89%

Vento Y+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.02	0.65	0.02	0.72	0.00	0.65	0.00	0.71
tampa do poço	0.01	0.54	0.02	0.59	0.00	1.43	0.00	1.56
térreo	0.00	0.03	0.00	0.03	0.00	2.18	-0.01	2.04

Variação no deslocamento do topo da edificação: 10.66%

Vento Y-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.02	-0.65	-0.02	-0.72	0.00	-0.65	0.00	-0.71
tampa do poço	-0.01	-0.54	-0.02	-0.59	0.00	-1.43	0.00	-1.56
térreo	0.00	-0.03	0.00	-0.03	0.00	-2.18	0.01	-2.04

Variação no deslocamento do topo da edificação: 10.66%

Desaprumo X+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.13	0.00	0.15	0.00	0.16	0.00	0.18	0.00
tampa do poço	0.10	0.00	0.12	0.00	0.02	0.00	0.05	0.00
térreo	0.00	0.00	0.00	0.00	0.08	0.00	0.04	0.00

Variação no deslocamento do topo da edificação: 19.81%

Desaprumo X-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	-0.13	0.00	-0.15	0.00	-0.16	0.00	-0.18	0.00
tampa do poço	-0.10	0.00	-0.12	0.00	-0.02	0.00	-0.05	0.00
térreo	0.00	0.00	0.00	0.00	-0.08	0.00	-0.04	0.00

Variação no deslocamento do topo da edificação: 19.81%

Desaprumo Y+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.00	0.06	0.00	0.07	0.00	0.16	0.00	0.17
tampa do poço	0.00	0.05	0.00	0.05	0.00	0.02	0.00	0.03
térreo	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.07

Variação no deslocamento do topo da edificação: 10.24%

Desaprumo Y-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
cobertura	0.00	-0.06	0.00	-0.07	0.00	-0.16	0.00	-0.17
tampa do poço	0.00	-0.05	0.00	-0.05	0.00	-0.02	0.00	-0.03
térreo	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	-0.07

Variação no deslocamento do topo da edificação: 10.24%

## 16.5 IMPERFEIÇÕES GEOMÉTRICAS GLOBAIS

Parâmetros	
Altura total da edificação (cm)	560.00
Nº de pilares contínuos	4
Combinação vertical	G1+G2+Q+A
Tipo de estrutura	Estruturas usuais
Ângulo adotado	1/299

Pavimento	Carga vertical (tf)	Carga aplicada (tf)		Deslocamento (cm)	
		X	Y	X	Y
cobertura	49.10	0.16	0.16	0.13	0.06
tampa do poço	6.69	0.02	0.02	0.10	0.05
térreo	24.60	0.08	0.08	0.00	0.00

## 16.6 RELATÓRIO DE ESFORÇOS NAS FUNDAÇÕES POR ELEMENTOS

Fundação S2						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	9.52	-7.53	0.97	0.00	0.01	0.06
Adicional (G2)	7.38	-3.54	0.70	0.00	0.00	0.04
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.44	-1.32	-0.12	0.00	0.00	-0.02
Água (A)	0.44	-1.09	-1.08	0.00	0.00	-0.07
Vento X+ (V1)	-0.22	28.06	393.60	0.48	-0.03	-1.68
Vento X- (V2)	0.22	-28.06	-393.60	-0.48	0.03	1.68
Vento Y+ (V3)	0.30	-830.34	112.82	0.14	1.03	4.44
Vento Y- (V4)	-0.30	830.34	-112.82	-0.14	-1.03	-4.44
Desaprumo X+ (D1)	-0.03	2.54	32.27	0.04	0.00	-0.16
Desaprumo X- (D2)	0.03	-2.54	-32.27	-0.04	0.00	0.16
Desaprumo Y+ (D3)	0.03	-50.21	4.26	0.01	0.06	0.13
Desaprumo Y- (D4)	-0.03	50.21	-4.26	-0.01	-0.06	-0.13
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	16.90	-11.07	1.66	0.00	0.01	0.10
G1+G2+0.6V1+D1	16.74	8.31	270.09	0.33	-0.01	-1.06
G1+G2+0.6V2+D2	17.07	-30.44	-266.77	-0.33	0.04	1.26
G1+G2+0.6V3+D3	17.12	-559.48	73.61	0.09	0.69	2.90
G1+G2+0.6V4+D4	16.69	537.35	-70.29	-0.09	-0.66	-2.70
G1+G2+0.8Q+0.6V1+D1	18.69	7.25	270.00	0.33	-0.01	-1.08
G1+G2+0.8Q+0.6V2+D2	19.02	-31.49	-266.87	-0.33	0.04	1.25
G1+G2+0.8Q+0.6V3+D3	19.07	-560.53	73.51	0.09	0.69	2.88
G1+G2+0.8Q+0.6V4+D4	18.64	536.29	-70.38	-0.09	-0.66	-2.71
G1+G2+0.8Q+A	19.29	-13.21	0.49	0.00	0.02	0.01
G1+G2+0.8Q+A+0.6V1+0.6D1	19.14	5.14	256.02	0.31	-0.01	-1.08
G1+G2+0.8Q+A+0.6V1+D1	19.13	6.16	268.92	0.33	-0.01	-1.15
G1+G2+0.8Q+A+0.6V2+0.6D2	19.44	-31.57	-255.03	-0.31	0.04	1.11
G1+G2+0.8Q+A+0.6V2+D2	19.45	-32.59	-267.94	-0.33	0.04	1.18
G1+G2+0.8Q+A+0.6V3+0.6D3	19.49	-541.54	70.74	0.09	0.67	2.76
G1+G2+0.8Q+A+0.6V3+D3	19.50	-561.62	72.44	0.09	0.69	2.81
G1+G2+0.8Q+A+0.6V4+0.6D4	19.09	515.11	-69.75	-0.09	-0.64	-2.73
G1+G2+0.8Q+A+0.6V4+D4	19.08	535.20	-71.46	-0.09	-0.66	-2.78
G1+G2+0.8Q+A+D1	19.26	-10.67	32.76	0.04	0.01	-0.14
G1+G2+0.8Q+A+D2	19.32	-15.75	-31.78	-0.04	0.02	0.17
G1+G2+0.8Q+A+D3	19.32	-63.42	4.75	0.01	0.08	0.15
G1+G2+0.8Q+A+D4	19.26	37.00	-3.76	0.00	-0.05	-0.12
G1+G2+0.8Q+A+V1+0.6D1	19.05	16.37	413.46	0.51	-0.02	-1.75
G1+G2+0.8Q+A+V2+0.6D2	19.53	-42.79	-412.47	-0.51	0.05	1.78
G1+G2+0.8Q+A+V3+0.6D3	19.61	-873.67	115.87	0.14	1.08	4.54
G1+G2+0.8Q+A+V4+0.6D4	18.97	847.25	-114.88	-0.14	-1.05	-4.51
G1+G2+0.8Q+V1+0.6D1	18.61	17.46	414.53	0.51	-0.02	-1.69
G1+G2+0.8Q+V2+0.6D2	19.09	-41.70	-411.40	-0.51	0.05	1.85
G1+G2+0.8Q+V3+0.6D3	19.17	-872.58	116.94	0.14	1.08	4.61
G1+G2+0.8Q+V4+0.6D4	18.53	848.34	-113.81	-0.14	-1.05	-4.44
G1+G2+A	17.34	-12.16	0.59	0.00	0.02	0.03
G1+G2+A+0.6V1+0.6D1	17.19	6.20	256.11	0.31	-0.01	-1.07



G1+G2+A+0.6V1+D1	17.18	7.22	269.02	0.33	-0.01	-1.13
G1+G2+A+0.6V2+0.6D2	17.49	-30.51	-254.94	-0.31	0.04	1.13
G1+G2+A+0.6V2+D2	17.50	-31.53	-267.85	-0.33	0.04	1.19
G1+G2+A+0.6V3+0.6D3	17.54	-540.48	70.83	0.09	0.67	2.77
G1+G2+A+0.6V3+D3	17.55	-560.57	72.54	0.09	0.69	2.83
G1+G2+A+0.6V4+0.6D4	17.14	516.17	-69.66	-0.09	-0.64	-2.71
G1+G2+A+0.6V4+D4	17.13	536.25	-71.36	-0.09	-0.66	-2.77
G1+G2+A+D1	17.31	-9.62	32.86	0.04	0.01	-0.13
G1+G2+A+D2	17.37	-14.69	-31.68	-0.04	0.02	0.19
G1+G2+A+D3	17.37	-62.37	4.84	0.01	0.08	0.16
G1+G2+A+D4	17.31	38.05	-3.67	0.00	-0.05	-0.10
G1+G2+A+V1+0.6D1	17.10	17.42	413.55	0.51	-0.02	-1.74
G1+G2+A+V2+0.6D2	17.58	-41.74	-412.38	-0.51	0.05	1.80
G1+G2+A+V3+0.6D3	17.66	-872.62	115.96	0.14	1.08	4.55
G1+G2+A+V4+0.6D4	17.02	848.30	-114.79	-0.14	-1.05	-4.49
G1+G2+D1	16.88	-8.53	33.93	0.04	0.01	-0.06
G1+G2+D2	16.93	-13.60	-30.61	-0.04	0.02	0.25
G1+G2+D3	16.94	-61.27	5.92	0.01	0.08	0.23
G1+G2+D4	16.87	39.14	-2.59	0.00	-0.05	-0.03
G1+G2+Q	19.34	-12.39	1.54	0.00	0.02	0.08
G1+G2+Q+0.6V1+0.6D1	19.19	5.97	257.07	0.32	-0.01	-1.02
G1+G2+Q+0.6V2+0.6D2	19.49	-30.74	-253.98	-0.31	0.04	1.18
G1+G2+Q+0.6V3+0.6D3	19.54	-540.71	71.79	0.09	0.67	2.82
G1+G2+Q+0.6V4+0.6D4	19.14	515.94	-68.70	-0.08	-0.64	-2.66
G1+G2+Q+A	19.78	-13.48	0.47	0.00	0.02	0.01
G1+G2+Q+A+0.6V1+0.6D1	19.63	4.88	255.99	0.31	-0.01	-1.09
G1+G2+Q+A+0.6V2+0.6D2	19.93	-31.83	-255.06	-0.31	0.04	1.11
G1+G2+Q+A+0.6V3+0.6D3	19.98	-541.80	70.71	0.09	0.67	2.76
G1+G2+Q+A+0.6V4+0.6D4	19.58	514.85	-69.78	-0.09	-0.64	-2.73
G1+G2+Q+A+D1	19.75	-10.94	32.74	0.04	0.01	-0.14
G1+G2+Q+A+D2	19.80	-16.02	-31.80	-0.04	0.02	0.17
G1+G2+Q+A+D3	19.81	-63.69	4.72	0.01	0.08	0.14
G1+G2+Q+A+D4	19.74	36.73	-3.79	0.00	-0.05	-0.12
G1+G2+Q+D1	19.31	-9.85	33.81	0.04	0.01	-0.08
G1+G2+Q+D2	19.37	-14.92	-30.73	-0.04	0.02	0.24
G1+G2+Q+D3	19.37	-62.60	5.80	0.01	0.08	0.21
G1+G2+Q+D4	19.31	37.82	-2.71	0.00	-0.05	-0.05
G1+G2+V1+0.6D1	16.66	18.52	414.63	0.51	-0.02	-1.67
G1+G2+V2+0.6D2	17.14	-40.65	-411.30	-0.51	0.05	1.87
G1+G2+V3+0.6D3	17.22	-871.53	117.04	0.14	1.08	4.62
G1+G2+V4+0.6D4	16.58	849.40	-113.71	-0.14	-1.05	-4.42

Fundação S3						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	4.95	-4.17	-0.98	0.00	0.01	-0.50
Adicional (G2)	2.90	-1.83	-0.48	0.00	0.00	-0.24
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	0.95	-0.80	-0.22	0.00	0.00	-0.09
Água (A)	-0.16	-0.80	-0.58	0.00	0.00	-0.07
Vento X+ (V1)	0.54	-20.30	611.32	0.76	0.03	-1.88
Vento X- (V2)	-0.54	20.30	-611.32	-0.76	-0.03	1.88



Vento Y+ (V3)	0.09	-405.79	168.61	0.21	0.50	2.74
Vento Y- (V4)	-0.09	405.79	-168.61	-0.21	-0.50	-2.74
Desaprumo X+ (D1)	0.07	-1.91	50.13	0.06	0.00	-0.18
Desaprumo X- (D2)	-0.07	1.91	-50.13	-0.06	0.00	0.18
Desaprumo Y+ (D3)	0.01	-27.07	6.39	0.01	0.03	0.05
Desaprumo Y- (D4)	-0.01	27.07	-6.39	-0.01	-0.03	-0.05
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	7.85	-5.99	-1.47	0.00	0.01	-0.74
G1+G2+0.6V1+D1	8.24	-20.08	415.45	0.52	0.02	-2.05
G1+G2+0.6V2+D2	7.46	8.10	-418.39	-0.52	-0.01	0.57
G1+G2+0.6V3+D3	7.92	-276.54	106.09	0.13	0.34	0.95
G1+G2+0.6V4+D4	7.78	264.55	-109.02	-0.14	-0.33	-2.43
G1+G2+0.8Q+0.6V1+D1	9.00	-20.72	415.28	0.52	0.03	-2.12
G1+G2+0.8Q+0.6V2+D2	8.21	7.46	-418.56	-0.52	-0.01	0.49
G1+G2+0.8Q+0.6V3+D3	8.67	-277.17	105.91	0.13	0.34	0.87
G1+G2+0.8Q+0.6V4+D4	8.54	263.92	-109.20	-0.14	-0.33	-2.51
G1+G2+0.8Q+A	8.44	-7.42	-2.22	0.00	0.01	-0.88
G1+G2+0.8Q+A+0.6V1+0.6D1	8.81	-20.75	394.65	0.49	0.03	-2.12
G1+G2+0.8Q+A+0.6V1+D1	8.84	-21.51	414.70	0.52	0.03	-2.19
G1+G2+0.8Q+A+0.6V2+0.6D2	8.08	5.90	-399.09	-0.50	-0.01	0.35
G1+G2+0.8Q+A+0.6V2+D2	8.05	6.66	-419.14	-0.52	-0.01	0.43
G1+G2+0.8Q+A+0.6V3+0.6D3	8.51	-267.14	102.78	0.13	0.33	0.79
G1+G2+0.8Q+A+0.6V3+D3	8.51	-277.97	105.33	0.13	0.34	0.81
G1+G2+0.8Q+A+0.6V4+0.6D4	8.38	252.29	-107.22	-0.13	-0.31	-2.56
G1+G2+0.8Q+A+0.6V4+D4	8.38	263.12	-109.78	-0.14	-0.33	-2.57
G1+G2+0.8Q+A+D1	8.51	-9.33	47.90	0.06	0.01	-1.06
G1+G2+0.8Q+A+D2	8.37	-5.51	-52.35	-0.07	0.01	-0.70
G1+G2+0.8Q+A+D3	8.46	-34.49	4.17	0.01	0.04	-0.84
G1+G2+0.8Q+A+D4	8.43	19.64	-8.61	-0.01	-0.02	-0.93
G1+G2+0.8Q+A+V1+0.6D1	9.03	-28.87	639.18	0.80	0.04	-2.87
G1+G2+0.8Q+A+V2+0.6D2	7.86	14.02	-643.62	-0.80	-0.02	1.10
G1+G2+0.8Q+A+V3+0.6D3	8.54	-429.46	170.23	0.21	0.53	1.88
G1+G2+0.8Q+A+V4+0.6D4	8.35	414.61	-174.67	-0.22	-0.51	-3.65
G1+G2+0.8Q+V1+0.6D1	9.19	-28.07	639.75	0.80	0.03	-2.80
G1+G2+0.8Q+V2+0.6D2	8.02	14.82	-643.04	-0.80	-0.02	1.17
G1+G2+0.8Q+V3+0.6D3	8.70	-428.66	170.80	0.21	0.53	1.95
G1+G2+0.8Q+V4+0.6D4	8.51	415.41	-174.09	-0.22	-0.52	-3.58
G1+G2+A	7.69	-6.79	-2.05	0.00	0.01	-0.81
G1+G2+A+0.6V1+0.6D1	8.05	-20.11	394.82	0.49	0.03	-2.05
G1+G2+A+0.6V1+D1	8.08	-20.87	414.87	0.52	0.03	-2.12
G1+G2+A+0.6V2+0.6D2	7.32	6.54	-398.91	-0.50	-0.01	0.43
G1+G2+A+0.6V2+D2	7.29	7.30	-418.96	-0.52	-0.01	0.50
G1+G2+A+0.6V3+0.6D3	7.75	-266.50	102.96	0.13	0.33	0.86
G1+G2+A+0.6V3+D3	7.75	-277.33	105.51	0.13	0.34	0.88
G1+G2+A+0.6V4+0.6D4	7.63	252.93	-107.05	-0.13	-0.31	-2.48
G1+G2+A+0.6V4+D4	7.62	263.76	-109.60	-0.14	-0.33	-2.50
G1+G2+A+D1	7.76	-8.70	48.08	0.06	0.01	-0.99
G1+G2+A+D2	7.62	-4.88	-52.17	-0.06	0.01	-0.63
G1+G2+A+D3	7.70	-33.85	4.34	0.01	0.04	-0.76
G1+G2+A+D4	7.68	20.28	-8.43	-0.01	-0.03	-0.85
G1+G2+A+V1+0.6D1	8.27	-28.23	639.35	0.80	0.04	-2.80



G1+G2+A+V2+0.6D2	7.11	14.66	-643.44	-0.80	-0.02	1.18
G1+G2+A+V3+0.6D3	7.79	-428.82	170.40	0.21	0.53	1.96
G1+G2+A+V4+0.6D4	7.59	415.25	-174.49	-0.22	-0.52	-3.58
G1+G2+D1	7.92	-7.90	48.66	0.06	0.01	-0.92
G1+G2+D2	7.78	-4.08	-51.59	-0.06	0.01	-0.56
G1+G2+D3	7.86	-33.06	4.92	0.01	0.04	-0.69
G1+G2+D4	7.84	21.08	-7.86	-0.01	-0.03	-0.79
G1+G2+Q	8.80	-6.79	-1.69	0.00	0.01	-0.83
G1+G2+Q+0.6V1+0.6D1	9.16	-20.11	395.18	0.49	0.03	-2.07
G1+G2+Q+0.6V2+0.6D2	8.43	6.54	-398.56	-0.50	-0.01	0.40
G1+G2+Q+0.6V3+0.6D3	8.86	-266.50	103.31	0.13	0.33	0.84
G1+G2+Q+0.6V4+0.6D4	8.73	252.93	-106.69	-0.13	-0.31	-2.51
G1+G2+Q+A	8.63	-7.58	-2.27	0.00	0.01	-0.90
G1+G2+Q+A+0.6V1+0.6D1	9.00	-20.91	394.60	0.49	0.03	-2.14
G1+G2+Q+A+0.6V2+0.6D2	8.27	5.74	-399.14	-0.50	-0.01	0.33
G1+G2+Q+A+0.6V3+0.6D3	8.70	-267.30	102.74	0.13	0.33	0.77
G1+G2+Q+A+0.6V4+0.6D4	8.57	252.13	-107.27	-0.13	-0.31	-2.57
G1+G2+Q+A+D1	8.70	-9.49	47.86	0.06	0.01	-1.08
G1+G2+Q+A+D2	8.56	-5.67	-52.39	-0.07	0.01	-0.72
G1+G2+Q+A+D3	8.65	-34.65	4.12	0.01	0.04	-0.86
G1+G2+Q+A+D4	8.62	19.49	-8.65	-0.01	-0.02	-0.95
G1+G2+Q+D1	8.87	-8.70	48.44	0.06	0.01	-1.01
G1+G2+Q+D2	8.73	-4.88	-51.81	-0.06	0.01	-0.65
G1+G2+Q+D3	8.81	-33.85	4.70	0.01	0.04	-0.79
G1+G2+Q+D4	8.78	20.28	-8.08	-0.01	-0.03	-0.88
G1+G2+V1+0.6D1	8.43	-27.43	639.93	0.80	0.03	-2.73
G1+G2+V2+0.6D2	7.27	15.45	-642.87	-0.80	-0.02	1.25
G1+G2+V3+0.6D3	7.95	-428.03	170.98	0.21	0.53	2.03
G1+G2+V4+0.6D4	7.75	416.04	-173.91	-0.22	-0.52	-3.51

Fundação S4						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	6.70	-0.52	-1.24	0.00	0.00	-0.01
Adicional (G2)	3.13	-0.25	-0.88	0.00	0.00	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	4.19	-0.08	0.24	0.00	0.00	0.00
Água (A)	-0.01	-0.02	2.02	0.00	0.00	0.00
Vento X+ (V1)	0.00	14.26	342.39	0.42	-0.02	-1.05
Vento X- (V2)	0.00	-14.26	-342.39	-0.42	0.02	1.05
Vento Y+ (V3)	0.00	-426.52	-8.46	-0.01	0.53	3.56
Vento Y- (V4)	0.00	426.52	8.46	0.01	-0.53	-3.56
Desaprumo X+ (D1)	0.00	1.31	28.53	0.04	0.00	-0.10
Desaprumo X- (D2)	0.00	-1.31	-28.53	-0.04	0.00	0.10
Desaprumo Y+ (D3)	0.00	-25.81	-0.32	0.00	0.03	0.14
Desaprumo Y- (D4)	0.00	25.81	0.32	0.00	-0.03	-0.14
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	9.83	-0.78	-2.12	0.00	0.00	-0.01
G1+G2+0.6V1+D1	9.83	9.08	231.85	0.29	-0.01	-0.73
G1+G2+0.6V2+D2	9.83	-10.64	-236.08	-0.29	0.01	0.71
G1+G2+0.6V3+D3	9.83	-282.50	-7.51	-0.01	0.35	2.26





G1+G2+0.6V4+D4	9.83	280.94	3.28	0.00	-0.35	-2.28
G1+G2+0.8Q+0.6V1+D1	13.18	9.02	232.04	0.29	-0.01	-0.73
G1+G2+0.8Q+0.6V2+D2	13.18	-10.71	-235.89	-0.29	0.01	0.71
G1+G2+0.8Q+0.6V3+D3	13.18	-282.56	-7.32	-0.01	0.35	2.26
G1+G2+0.8Q+0.6V4+D4	13.18	280.87	3.47	0.00	-0.35	-2.28
G1+G2+0.8Q+A	13.17	-0.87	0.10	0.00	0.00	-0.01
G1+G2+0.8Q+A+0.6V1+0.6D1	13.17	8.47	222.65	0.27	-0.01	-0.70
G1+G2+0.8Q+A+0.6V1+D1	13.17	9.00	234.06	0.29	-0.01	-0.74
G1+G2+0.8Q+A+0.6V2+0.6D2	13.17	-10.20	-222.45	-0.27	0.01	0.67
G1+G2+0.8Q+A+0.6V2+D2	13.17	-10.73	-233.87	-0.29	0.01	0.71
G1+G2+0.8Q+A+0.6V3+0.6D3	13.17	-272.26	-5.17	-0.01	0.34	2.20
G1+G2+0.8Q+A+0.6V3+D3	13.17	-282.58	-5.30	-0.01	0.35	2.26
G1+G2+0.8Q+A+0.6V4+0.6D4	13.17	270.53	5.37	0.01	-0.33	-2.23
G1+G2+0.8Q+A+0.6V4+D4	13.17	280.85	5.49	0.01	-0.35	-2.29
G1+G2+0.8Q+A+D1	13.17	0.44	28.63	0.04	0.00	-0.11
G1+G2+0.8Q+A+D2	13.17	-2.17	-28.43	-0.04	0.00	0.08
G1+G2+0.8Q+A+D3	13.17	-26.67	-0.22	0.00	0.03	0.13
G1+G2+0.8Q+A+D4	13.17	24.94	0.42	0.00	-0.03	-0.15
G1+G2+0.8Q+A+V1+0.6D1	13.17	14.18	359.61	0.44	-0.02	-1.12
G1+G2+0.8Q+A+V2+0.6D2	13.17	-15.91	-359.41	-0.44	0.02	1.09
G1+G2+0.8Q+A+V3+0.6D3	13.18	-442.87	-8.55	-0.01	0.55	3.63
G1+G2+0.8Q+A+V4+0.6D4	13.17	441.14	8.75	0.01	-0.54	-3.65
G1+G2+0.8Q+V1+0.6D1	13.18	14.20	357.58	0.44	-0.02	-1.11
G1+G2+0.8Q+V2+0.6D2	13.18	-15.89	-361.43	-0.45	0.02	1.09
G1+G2+0.8Q+V3+0.6D3	13.18	-442.85	-10.58	-0.01	0.55	3.63
G1+G2+0.8Q+V4+0.6D4	13.18	441.16	6.73	0.01	-0.54	-3.65
G1+G2+A	9.82	-0.80	-0.10	0.00	0.00	-0.01
G1+G2+A+0.6V1+0.6D1	9.82	8.54	222.46	0.27	-0.01	-0.70
G1+G2+A+0.6V1+D1	9.82	9.06	233.87	0.29	-0.01	-0.74
G1+G2+A+0.6V2+0.6D2	9.82	-10.14	-222.65	-0.27	0.01	0.67
G1+G2+A+0.6V2+D2	9.82	-10.66	-234.06	-0.29	0.01	0.71
G1+G2+A+0.6V3+0.6D3	9.82	-272.19	-5.36	-0.01	0.34	2.21
G1+G2+A+0.6V3+D3	9.82	-282.52	-5.49	-0.01	0.35	2.26
G1+G2+A+0.6V4+0.6D4	9.82	270.60	5.17	0.01	-0.33	-2.23
G1+G2+A+0.6V4+D4	9.82	280.92	5.30	0.01	-0.35	-2.28
G1+G2+A+D1	9.82	0.51	28.43	0.03	0.00	-0.11
G1+G2+A+D2	9.82	-2.11	-28.62	-0.04	0.00	0.08
G1+G2+A+D3	9.82	-26.61	-0.41	0.00	0.03	0.13
G1+G2+A+D4	9.82	25.01	0.22	0.00	-0.03	-0.15
G1+G2+A+V1+0.6D1	9.82	14.24	359.41	0.44	-0.02	-1.11
G1+G2+A+V2+0.6D2	9.82	-15.84	-359.60	-0.44	0.02	1.09
G1+G2+A+V3+0.6D3	9.82	-442.80	-8.75	-0.01	0.55	3.63
G1+G2+A+V4+0.6D4	9.82	441.20	8.56	0.01	-0.54	-3.65
G1+G2+D1	9.83	0.53	26.41	0.03	0.00	-0.10
G1+G2+D2	9.83	-2.09	-30.65	-0.04	0.00	0.09
G1+G2+D3	9.83	-26.59	-2.44	0.00	0.03	0.13
G1+G2+D4	9.83	25.03	-1.80	0.00	-0.03	-0.15
G1+G2+Q	14.02	-0.86	-1.88	0.00	0.00	-0.01
G1+G2+Q+0.6V1+0.6D1	14.02	8.48	220.68	0.27	-0.01	-0.70
G1+G2+Q+0.6V2+0.6D2	14.02	-10.20	-224.43	-0.28	0.01	0.67
G1+G2+Q+0.6V3+0.6D3	14.02	-272.26	-7.14	-0.01	0.34	2.21
G1+G2+Q+0.6V4+0.6D4	14.02	270.53	3.39	0.00	-0.33	-2.23





G1+G2+Q+A	14.01	-0.88	0.15	0.00	0.00	-0.01
G1+G2+Q+A+0.6V1+0.6D1	14.01	8.46	222.70	0.27	-0.01	-0.70
G1+G2+Q+A+0.6V2+0.6D2	14.01	-10.22	-222.41	-0.27	0.01	0.67
G1+G2+Q+A+0.6V3+0.6D3	14.01	-272.28	-5.12	-0.01	0.34	2.20
G1+G2+Q+A+0.6V4+0.6D4	14.01	270.51	5.41	0.01	-0.33	-2.23
G1+G2+Q+A+D1	14.01	0.43	28.68	0.04	0.00	-0.11
G1+G2+Q+A+D2	14.01	-2.19	-28.38	-0.03	0.00	0.08
G1+G2+Q+A+D3	14.01	-26.69	-0.17	0.00	0.03	0.13
G1+G2+Q+A+D4	14.01	24.92	0.46	0.00	-0.03	-0.15
G1+G2+Q+D1	14.02	0.45	26.65	0.03	0.00	-0.11
G1+G2+Q+D2	14.02	-2.17	-30.40	-0.04	0.00	0.09
G1+G2+Q+D3	14.02	-26.67	-2.19	0.00	0.03	0.13
G1+G2+Q+D4	14.02	24.95	-1.56	0.00	-0.03	-0.15
G1+G2+V1+0.6D1	9.83	14.26	357.39	0.44	-0.02	-1.11
G1+G2+V2+0.6D2	9.83	-15.82	-361.63	-0.45	0.02	1.09
G1+G2+V3+0.6D3	9.83	-442.78	-10.77	-0.01	0.55	3.63
G1+G2+V4+0.6D4	9.83	441.22	6.53	0.01	-0.54	-3.65

Fundação S5						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	3.53	-0.24	-0.55	0.00	0.00	0.00
Adicional (G2)	3.25	-0.09	-0.46	0.00	0.00	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.01	-0.06	0.20	0.00	0.00	0.00
Água (A)	0.00	-0.13	1.33	0.00	0.00	0.00
Vento X+ (V1)	0.00	-16.55	341.42	0.42	0.02	-1.04
Vento X- (V2)	0.00	16.55	-341.42	-0.42	-0.02	1.04
Vento Y+ (V3)	0.00	-321.65	-8.34	-0.01	0.40	3.53
Vento Y- (V4)	0.00	321.65	8.34	0.01	-0.40	-3.53
Desaprumo X+ (D1)	0.00	-1.52	28.44	0.04	0.00	-0.10
Desaprumo X- (D2)	0.00	1.52	-28.44	-0.04	0.00	0.10
Desaprumo Y+ (D3)	0.00	-21.61	-0.31	0.00	0.03	0.13
Desaprumo Y- (D4)	0.00	21.61	0.31	0.00	-0.03	-0.13
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	6.78	-0.32	-1.02	0.00	0.00	0.00
G1+G2+0.6V1+D1	6.78	-11.78	232.28	0.29	0.01	-0.73
G1+G2+0.6V2+D2	6.78	11.13	-234.31	-0.29	-0.01	0.72
G1+G2+0.6V3+D3	6.78	-214.93	-6.33	-0.01	0.27	2.25
G1+G2+0.6V4+D4	6.78	214.28	4.30	0.01	-0.27	-2.25
G1+G2+0.8Q+0.6V1+D1	8.39	-11.83	232.44	0.29	0.01	-0.73
G1+G2+0.8Q+0.6V2+D2	8.39	11.08	-234.15	-0.29	-0.01	0.72
G1+G2+0.8Q+0.6V3+D3	8.39	-214.98	-6.17	-0.01	0.27	2.24
G1+G2+0.8Q+0.6V4+D4	8.39	214.23	4.46	0.01	-0.27	-2.25
G1+G2+0.8Q+A	8.39	-0.50	0.48	0.00	0.00	-0.01
G1+G2+0.8Q+A+0.6V1+0.6D1	8.39	-11.35	222.39	0.28	0.01	-0.69
G1+G2+0.8Q+A+0.6V1+D1	8.39	-11.96	233.77	0.29	0.01	-0.73
G1+G2+0.8Q+A+0.6V2+0.6D2	8.39	10.34	-221.44	-0.27	-0.01	0.67
G1+G2+0.8Q+A+0.6V2+D2	8.39	10.95	-232.82	-0.29	-0.01	0.71
G1+G2+0.8Q+A+0.6V3+0.6D3	8.39	-206.46	-4.71	-0.01	0.26	2.19
G1+G2+0.8Q+A+0.6V3+D3	8.39	-215.11	-4.84	-0.01	0.27	2.24



G1+G2+0.8Q+A+0.6V4+0.6D4	8.39	205.46	5.67	0.01	-0.25	-2.20
G1+G2+0.8Q+A+0.6V4+D4	8.39	214.10	5.79	0.01	-0.27	-2.26
G1+G2+0.8Q+A+D1	8.39	-2.03	28.92	0.04	0.00	-0.10
G1+G2+0.8Q+A+D2	8.39	1.02	-27.97	-0.03	0.00	0.09
G1+G2+0.8Q+A+D3	8.39	-22.12	0.16	0.00	0.03	0.12
G1+G2+0.8Q+A+D4	8.39	21.11	0.79	0.00	-0.03	-0.14
G1+G2+0.8Q+A+V1+0.6D1	8.39	-17.97	358.96	0.44	0.02	-1.11
G1+G2+0.8Q+A+V2+0.6D2	8.39	16.96	-358.01	-0.44	-0.02	1.09
G1+G2+0.8Q+A+V3+0.6D3	8.39	-335.13	-8.05	-0.01	0.42	3.60
G1+G2+0.8Q+A+V4+0.6D4	8.39	334.12	9.00	0.01	-0.41	-3.62
G1+G2+0.8Q+V1+0.6D1	8.39	-17.84	357.63	0.44	0.02	-1.11
G1+G2+0.8Q+V2+0.6D2	8.39	17.09	-359.34	-0.45	-0.02	1.10
G1+G2+0.8Q+V3+0.6D3	8.39	-335.00	-9.38	-0.01	0.41	3.60
G1+G2+0.8Q+V4+0.6D4	8.39	334.25	7.67	0.01	-0.41	-3.61
G1+G2+A	6.78	-0.45	0.32	0.00	0.00	-0.01
G1+G2+A+0.6V1+0.6D1	6.78	-11.30	222.23	0.28	0.01	-0.69
G1+G2+A+0.6V1+D1	6.78	-11.91	233.61	0.29	0.01	-0.73
G1+G2+A+0.6V2+0.6D2	6.78	10.39	-221.60	-0.27	-0.01	0.68
G1+G2+A+0.6V2+D2	6.78	11.00	-232.98	-0.29	-0.01	0.71
G1+G2+A+0.6V3+0.6D3	6.78	-206.41	-4.87	-0.01	0.26	2.19
G1+G2+A+0.6V3+D3	6.78	-215.06	-5.00	-0.01	0.27	2.24
G1+G2+A+0.6V4+0.6D4	6.78	205.51	5.51	0.01	-0.25	-2.20
G1+G2+A+0.6V4+D4	6.78	214.15	5.63	0.01	-0.27	-2.26
G1+G2+A+D1	6.78	-1.98	28.76	0.04	0.00	-0.10
G1+G2+A+D2	6.78	1.07	-28.13	-0.03	0.00	0.09
G1+G2+A+D3	6.78	-22.07	0.00	0.00	0.03	0.13
G1+G2+A+D4	6.78	21.16	0.63	0.00	-0.03	-0.14
G1+G2+A+V1+0.6D1	6.78	-17.92	358.80	0.44	0.02	-1.11
G1+G2+A+V2+0.6D2	6.78	17.01	-358.17	-0.44	-0.02	1.09
G1+G2+A+V3+0.6D3	6.78	-335.08	-8.21	-0.01	0.42	3.60
G1+G2+A+V4+0.6D4	6.78	334.17	8.84	0.01	-0.41	-3.61
G1+G2+D1	6.78	-1.85	27.43	0.03	0.00	-0.10
G1+G2+D2	6.78	1.20	-29.46	-0.04	0.00	0.09
G1+G2+D3	6.78	-21.94	-1.33	0.00	0.03	0.13
G1+G2+D4	6.78	21.29	-0.71	0.00	-0.03	-0.14
G1+G2+Q	8.79	-0.39	-0.82	0.00	0.00	-0.01
G1+G2+Q+0.6V1+0.6D1	8.79	-11.23	221.10	0.27	0.01	-0.69
G1+G2+Q+0.6V2+0.6D2	8.79	10.46	-222.74	-0.28	-0.01	0.68
G1+G2+Q+0.6V3+0.6D3	8.79	-206.35	-6.01	-0.01	0.26	2.19
G1+G2+Q+0.6V4+0.6D4	8.79	205.57	4.37	0.01	-0.25	-2.20
G1+G2+Q+A	8.79	-0.52	0.52	0.00	0.00	-0.01
G1+G2+Q+A+0.6V1+0.6D1	8.79	-11.36	222.43	0.28	0.01	-0.69
G1+G2+Q+A+0.6V2+0.6D2	8.79	10.33	-221.40	-0.27	-0.01	0.67
G1+G2+Q+A+0.6V3+0.6D3	8.79	-206.48	-4.67	-0.01	0.26	2.19
G1+G2+Q+A+0.6V4+0.6D4	8.79	205.44	5.71	0.01	-0.25	-2.20
G1+G2+Q+A+D1	8.79	-2.04	28.96	0.04	0.00	-0.10
G1+G2+Q+A+D2	8.79	1.01	-27.93	-0.03	0.00	0.09
G1+G2+Q+A+D3	8.79	-22.13	0.20	0.00	0.03	0.12
G1+G2+Q+A+D4	8.79	21.10	0.83	0.00	-0.03	-0.14
G1+G2+Q+D1	8.79	-1.91	27.63	0.03	0.00	-0.10
G1+G2+Q+D2	8.79	1.14	-29.26	-0.04	0.00	0.09
G1+G2+Q+D3	8.79	-22.00	-1.13	0.00	0.03	0.13



G1+G2+Q+D4	8.79	21.23	-0.51	0.00	-0.03	-0.14
G1+G2+V1+0.6D1	6.78	-17.79	357.47	0.44	0.02	-1.10
G1+G2+V2+0.6D2	6.78	17.14	-359.50	-0.45	-0.02	1.10
G1+G2+V3+0.6D3	6.78	-334.95	-9.54	-0.01	0.41	3.60
G1+G2+V4+0.6D4	6.78	334.30	7.51	0.01	-0.41	-3.61

Fundação S7						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	9.70	6.12	1.70	0.00	-0.01	-0.35
Adicional (G2)	7.61	2.86	1.07	0.00	0.00	-0.18
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	2.39	1.14	-0.04	0.00	0.00	-0.04
Água (A)	0.43	1.20	-1.26	0.00	0.00	0.05
Vento X+ (V1)	-0.07	27.29	466.74	0.57	-0.03	-1.68
Vento X- (V2)	0.07	-27.29	-466.74	-0.57	0.03	1.68
Vento Y+ (V3)	-0.26	-829.56	-134.70	-0.17	1.03	4.44
Vento Y- (V4)	0.26	829.56	134.70	0.17	-1.03	-4.44
Desaprumo X+ (D1)	-0.01	2.54	38.99	0.05	0.00	-0.16
Desaprumo X- (D2)	0.01	-2.54	-38.99	-0.05	0.00	0.16
Desaprumo Y+ (D3)	-0.03	-50.20	-5.07	-0.01	0.06	0.13
Desaprumo Y- (D4)	0.03	50.20	5.07	0.01	-0.06	-0.13
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	17.31	8.97	2.77	0.00	-0.01	-0.54
G1+G2+0.6V1+D1	17.26	27.89	321.80	0.40	-0.03	-1.70
G1+G2+0.6V2+D2	17.36	-9.94	-316.26	-0.39	0.01	0.63
G1+G2+0.6V3+D3	17.13	-538.96	-83.12	-0.10	0.67	2.26
G1+G2+0.6V4+D4	17.50	556.91	88.67	0.11	-0.69	-3.33
G1+G2+0.8Q+0.6V1+D1	19.18	28.80	321.77	0.40	-0.04	-1.74
G1+G2+0.8Q+0.6V2+D2	19.28	-9.03	-316.29	-0.39	0.01	0.60
G1+G2+0.8Q+0.6V3+D3	19.04	-538.05	-83.16	-0.10	0.67	2.23
G1+G2+0.8Q+0.6V4+D4	19.41	557.82	88.63	0.11	-0.69	-3.37
G1+G2+0.8Q+A	19.66	11.09	1.48	0.00	-0.01	-0.52
G1+G2+0.8Q+A+0.6V1+0.6D1	19.61	28.98	304.91	0.37	-0.04	-1.62
G1+G2+0.8Q+A+0.6V1+D1	19.61	30.00	320.51	0.39	-0.04	-1.69
G1+G2+0.8Q+A+0.6V2+0.6D2	19.70	-6.81	-301.96	-0.37	0.01	0.58
G1+G2+0.8Q+A+0.6V2+D2	19.71	-7.83	-317.55	-0.39	0.01	0.65
G1+G2+0.8Q+A+0.6V3+0.6D3	19.48	-516.77	-82.39	-0.10	0.64	2.22
G1+G2+0.8Q+A+0.6V3+D3	19.47	-536.85	-84.42	-0.10	0.66	2.28
G1+G2+0.8Q+A+0.6V4+0.6D4	19.83	538.94	85.34	0.10	-0.67	-3.27
G1+G2+0.8Q+A+0.6V4+D4	19.84	559.02	87.37	0.11	-0.69	-3.32
G1+G2+0.8Q+A+D1	19.65	13.62	40.46	0.05	-0.02	-0.68
G1+G2+0.8Q+A+D2	19.67	8.55	-37.51	-0.05	-0.01	-0.36
G1+G2+0.8Q+A+D3	19.63	-39.12	-3.60	0.00	0.05	-0.39
G1+G2+0.8Q+A+D4	19.68	61.29	6.55	0.01	-0.08	-0.66
G1+G2+0.8Q+A+V1+0.6D1	19.58	39.90	491.61	0.60	-0.05	-2.30
G1+G2+0.8Q+A+V2+0.6D2	19.73	-17.73	-488.65	-0.60	0.02	1.25
G1+G2+0.8Q+A+V3+0.6D3	19.38	-848.59	-136.27	-0.17	1.05	4.00
G1+G2+0.8Q+A+V4+0.6D4	19.93	870.76	139.22	0.17	-1.08	-5.04
G1+G2+0.8Q+V1+0.6D1	19.15	38.70	492.87	0.61	-0.05	-2.34
G1+G2+0.8Q+V2+0.6D2	19.30	-18.93	-487.39	-0.60	0.02	1.21



G1+G2+0.8Q+V3+0.6D3	18.95	-849.79	-135.01	-0.17	1.05	3.95
G1+G2+0.8Q+V4+0.6D4	19.50	869.56	140.48	0.17	-1.08	-5.09
G1+G2+A	17.74	10.18	1.51	0.00	-0.01	-0.49
G1+G2+A+0.6V1+0.6D1	17.70	28.07	304.95	0.37	-0.03	-1.59
G1+G2+A+0.6V1+D1	17.69	29.09	320.54	0.39	-0.04	-1.66
G1+G2+A+0.6V2+0.6D2	17.79	-7.72	-301.93	-0.37	0.01	0.61
G1+G2+A+0.6V2+D2	17.79	-8.74	-317.52	-0.39	0.01	0.68
G1+G2+A+0.6V3+0.6D3	17.57	-517.68	-82.35	-0.10	0.64	2.26
G1+G2+A+0.6V3+D3	17.56	-537.76	-84.38	-0.10	0.66	2.31
G1+G2+A+0.6V4+0.6D4	17.92	538.03	85.38	0.10	-0.67	-3.23
G1+G2+A+0.6V4+D4	17.93	558.11	87.41	0.11	-0.69	-3.29
G1+G2+A+D1	17.73	12.71	40.50	0.05	-0.02	-0.65
G1+G2+A+D2	17.75	7.64	-37.48	-0.05	-0.01	-0.33
G1+G2+A+D3	17.71	-40.03	-3.56	0.00	0.05	-0.36
G1+G2+A+D4	17.77	60.38	6.59	0.01	-0.07	-0.62
G1+G2+A+V1+0.6D1	17.67	38.99	491.64	0.60	-0.05	-2.26
G1+G2+A+V2+0.6D2	17.82	-18.64	-488.62	-0.60	0.02	1.28
G1+G2+A+V3+0.6D3	17.47	-849.50	-136.23	-0.17	1.05	4.03
G1+G2+A+V4+0.6D4	18.02	869.85	139.26	0.17	-1.08	-5.01
G1+G2+D1	17.30	11.51	41.76	0.05	-0.01	-0.70
G1+G2+D2	17.32	6.44	-36.22	-0.04	-0.01	-0.38
G1+G2+D3	17.29	-41.23	-2.30	0.00	0.05	-0.40
G1+G2+D4	17.34	59.18	7.85	0.01	-0.07	-0.67
G1+G2+Q	19.70	10.11	2.73	0.00	-0.01	-0.58
G1+G2+Q+0.6V1+0.6D1	19.66	28.01	306.17	0.38	-0.03	-1.68
G1+G2+Q+0.6V2+0.6D2	19.75	-7.79	-300.71	-0.37	0.01	0.53
G1+G2+Q+0.6V3+0.6D3	19.53	-517.74	-81.14	-0.10	0.64	2.17
G1+G2+Q+0.6V4+0.6D4	19.88	537.97	86.59	0.11	-0.67	-3.32
G1+G2+Q+A	20.13	11.31	1.47	0.00	-0.01	-0.53
G1+G2+Q+A+0.6V1+0.6D1	20.09	29.21	304.90	0.37	-0.04	-1.63
G1+G2+Q+A+0.6V2+0.6D2	20.18	-6.58	-301.97	-0.37	0.01	0.57
G1+G2+Q+A+0.6V3+0.6D3	19.96	-516.54	-82.40	-0.10	0.64	2.22
G1+G2+Q+A+0.6V4+0.6D4	20.31	539.17	85.33	0.10	-0.67	-3.27
G1+G2+Q+A+D1	20.12	13.85	40.46	0.05	-0.02	-0.69
G1+G2+Q+A+D2	20.14	8.77	-37.52	-0.05	-0.01	-0.37
G1+G2+Q+A+D3	20.10	-38.89	-3.61	0.00	0.05	-0.40
G1+G2+Q+A+D4	20.16	61.51	6.54	0.01	-0.08	-0.66
G1+G2+Q+D1	19.69	12.65	41.72	0.05	-0.02	-0.74
G1+G2+Q+D2	19.71	7.57	-36.26	-0.04	-0.01	-0.42
G1+G2+Q+D3	19.68	-40.09	-2.34	0.00	0.05	-0.44
G1+G2+Q+D4	19.73	60.31	7.80	0.01	-0.07	-0.71
G1+G2+V1+0.6D1	17.24	37.79	492.90	0.61	-0.05	-2.31
G1+G2+V2+0.6D2	17.39	-19.84	-487.36	-0.60	0.02	1.24
G1+G2+V3+0.6D3	17.04	-850.70	-134.97	-0.17	1.05	3.98
G1+G2+V4+0.6D4	17.59	868.65	140.52	0.17	-1.07	-5.06

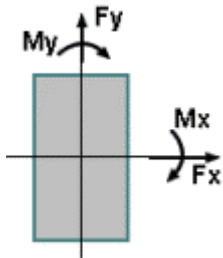
Fundação S8						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	5.29	6.33	0.22	0.00	-0.01	0.19
Adicional (G2)	2.92	2.86	0.12	0.00	0.00	0.08
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00



Acidental (Q)	0.98	1.12	-0.04	0.00	0.00	0.04
Água (A)	-0.16	0.83	-0.44	0.00	0.00	0.10
Vento X+ (V1)	0.39	-32.43	465.61	0.58	0.04	-1.71
Vento X- (V2)	-0.39	32.43	-465.61	-0.58	-0.04	1.71
Vento Y+ (V3)	-0.11	-627.62	-130.74	-0.16	0.78	3.24
Vento Y- (V4)	0.11	627.62	130.74	0.16	-0.78	-3.24
Desaprumo X+ (D1)	0.05	-2.92	38.84	0.05	0.00	-0.15
Desaprumo X- (D2)	-0.05	2.92	-38.84	-0.05	0.00	0.15
Desaprumo Y+ (D3)	-0.01	-41.95	-4.97	-0.01	0.05	0.08
Desaprumo Y- (D4)	0.01	41.95	4.97	0.01	-0.05	-0.08
Protensão (P)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2	8.21	9.19	0.34	0.00	-0.01	0.27
G1+G2+0.6V1+D1	8.49	-13.19	318.54	0.40	0.02	-0.91
G1+G2+0.6V2+D2	7.92	31.57	-317.87	-0.39	-0.04	1.45
G1+G2+0.6V3+D3	8.13	-409.33	-83.08	-0.10	0.51	2.29
G1+G2+0.6V4+D4	8.29	427.72	83.75	0.10	-0.53	-1.75
G1+G2+0.8Q+0.6V1+D1	9.27	-12.29	318.51	0.40	0.02	-0.88
G1+G2+0.8Q+0.6V2+D2	8.71	32.47	-317.90	-0.39	-0.04	1.48
G1+G2+0.8Q+0.6V3+D3	8.91	-408.43	-83.11	-0.10	0.51	2.32
G1+G2+0.8Q+0.6V4+D4	9.07	428.61	83.72	0.10	-0.53	-1.72
G1+G2+0.8Q+A	8.83	10.92	-0.13	0.00	-0.01	0.40
G1+G2+0.8Q+A+0.6V1+0.6D1	9.10	-10.29	302.54	0.38	0.01	-0.71
G1+G2+0.8Q+A+0.6V1+D1	9.12	-11.46	318.07	0.39	0.01	-0.78
G1+G2+0.8Q+A+0.6V2+0.6D2	8.57	32.14	-302.80	-0.38	-0.04	1.52
G1+G2+0.8Q+A+0.6V2+D2	8.55	33.31	-318.34	-0.39	-0.04	1.58
G1+G2+0.8Q+A+0.6V3+0.6D3	8.76	-390.82	-81.56	-0.10	0.49	2.39
G1+G2+0.8Q+A+0.6V3+D3	8.76	-407.60	-83.55	-0.10	0.51	2.42
G1+G2+0.8Q+A+0.6V4+0.6D4	8.91	412.67	81.29	0.10	-0.51	-1.59
G1+G2+0.8Q+A+0.6V4+D4	8.91	429.45	83.28	0.10	-0.53	-1.62
G1+G2+0.8Q+A+D1	8.89	8.00	38.71	0.05	-0.01	0.25
G1+G2+0.8Q+A+D2	8.78	13.85	-38.97	-0.05	-0.02	0.56
G1+G2+0.8Q+A+D3	8.82	-31.03	-5.10	-0.01	0.04	0.48
G1+G2+0.8Q+A+D4	8.85	52.88	4.84	0.01	-0.07	0.32
G1+G2+0.8Q+A+V1+0.6D1	9.25	-23.26	488.78	0.61	0.03	-1.40
G1+G2+0.8Q+A+V2+0.6D2	8.42	45.11	-489.04	-0.61	-0.06	2.20
G1+G2+0.8Q+A+V3+0.6D3	8.72	-641.86	-133.86	-0.17	0.80	3.69
G1+G2+0.8Q+A+V4+0.6D4	8.95	663.71	133.59	0.17	-0.83	-2.88
G1+G2+0.8Q+V1+0.6D1	9.41	-24.09	489.22	0.61	0.03	-1.50
G1+G2+0.8Q+V2+0.6D2	8.57	44.28	-488.60	-0.61	-0.06	2.10
G1+G2+0.8Q+V3+0.6D3	8.87	-642.70	-133.42	-0.17	0.80	3.59
G1+G2+0.8Q+V4+0.6D4	9.11	662.88	134.03	0.17	-0.82	-2.98
G1+G2+A	8.05	10.03	-0.10	0.00	-0.01	0.37
G1+G2+A+0.6V1+0.6D1	8.32	-11.19	302.56	0.38	0.01	-0.75
G1+G2+A+0.6V1+D1	8.34	-12.35	318.10	0.39	0.02	-0.81
G1+G2+A+0.6V2+0.6D2	7.79	31.24	-302.77	-0.38	-0.04	1.49
G1+G2+A+0.6V2+D2	7.77	32.41	-318.31	-0.39	-0.04	1.55
G1+G2+A+0.6V3+0.6D3	7.98	-391.71	-81.53	-0.10	0.49	2.36
G1+G2+A+0.6V3+D3	7.97	-408.50	-83.52	-0.10	0.51	2.39
G1+G2+A+0.6V4+0.6D4	8.13	411.77	81.32	0.10	-0.51	-1.62
G1+G2+A+0.6V4+D4	8.13	428.55	83.31	0.10	-0.53	-1.65
G1+G2+A+D1	8.10	7.10	38.74	0.05	-0.01	0.22



G1+G2+A+D2	8.00	12.95	-38.95	-0.05	-0.02	0.52
G1+G2+A+D3	8.04	-31.93	-5.07	-0.01	0.04	0.45
G1+G2+A+D4	8.07	51.98	4.87	0.01	-0.06	0.29
G1+G2+A+V1+0.6D1	8.47	-24.16	488.81	0.61	0.03	-1.43
G1+G2+A+V2+0.6D2	7.64	44.21	-489.02	-0.61	-0.06	2.17
G1+G2+A+V3+0.6D3	7.94	-642.76	-133.83	-0.17	0.80	3.66
G1+G2+A+V4+0.6D4	8.17	662.81	133.62	0.17	-0.82	-2.91
G1+G2+D1	8.26	6.27	39.18	0.05	-0.01	0.12
G1+G2+D2	8.16	12.12	-38.51	-0.05	-0.02	0.42
G1+G2+D3	8.19	-32.76	-4.63	-0.01	0.04	0.35
G1+G2+D4	8.22	51.15	5.31	0.01	-0.06	0.19
G1+G2+Q	9.19	10.31	0.30	0.00	-0.01	0.31
G1+G2+Q+0.6V1+0.6D1	9.45	-10.90	302.97	0.38	0.01	-0.81
G1+G2+Q+0.6V2+0.6D2	8.92	31.53	-302.37	-0.38	-0.04	1.43
G1+G2+Q+0.6V3+0.6D3	9.11	-391.43	-81.13	-0.10	0.49	2.30
G1+G2+Q+0.6V4+0.6D4	9.26	412.06	81.73	0.10	-0.51	-1.68
G1+G2+Q+A	9.03	11.15	-0.14	0.00	-0.01	0.41
G1+G2+Q+A+0.6V1+0.6D1	9.29	-10.06	302.53	0.38	0.01	-0.71
G1+G2+Q+A+0.6V2+0.6D2	8.77	32.36	-302.81	-0.38	-0.04	1.53
G1+G2+Q+A+0.6V3+0.6D3	8.96	-390.59	-81.57	-0.10	0.49	2.40
G1+G2+Q+A+0.6V4+0.6D4	9.10	412.89	81.29	0.10	-0.51	-1.58
G1+G2+Q+A+D1	9.08	8.23	38.70	0.05	-0.01	0.26
G1+G2+Q+A+D2	8.98	14.07	-38.98	-0.05	-0.02	0.56
G1+G2+Q+A+D3	9.02	-30.80	-5.11	-0.01	0.04	0.49
G1+G2+Q+A+D4	9.04	53.10	4.83	0.01	-0.07	0.33
G1+G2+Q+D1	9.24	7.39	39.14	0.05	-0.01	0.16
G1+G2+Q+D2	9.13	13.24	-38.54	-0.05	-0.02	0.46
G1+G2+Q+D3	9.17	-31.64	-4.67	-0.01	0.04	0.39
G1+G2+Q+D4	9.20	52.27	5.27	0.01	-0.07	0.23
G1+G2+V1+0.6D1	8.62	-24.99	489.25	0.61	0.03	-1.53
G1+G2+V2+0.6D2	7.79	43.38	-488.58	-0.61	-0.05	2.07
G1+G2+V3+0.6D3	8.09	-643.59	-133.39	-0.17	0.80	3.56
G1+G2+V4+0.6D4	8.32	661.98	134.06	0.17	-0.82	-3.02

Legenda	
	- Caso: indica o caso de carregamento no qual serão apresentados os esforços atuantes;
	- Elemento: nome da fundação;
	- N: esforço axial na fundação;
	- Mx: momento fletor na fundação, atuante em torno do eixo X global;
	- My: momento fletor na fundação, atuante em torno do eixo Y global;
	- Fx: esforço cortante na fundação, atuante no plano paralelo à direção X global;
	- Fy: esforço cortante na fundação, atuante no plano paralelo à direção Y global;
	- Mt: momento de torção atuante.

## 16.7 QUADRO DE CARGAS DOS PILARES

	térreo		tampa do poço		cobertura	
Pilares	NPos (tf)	NNeg	NPos (tf)	NNeg	NPos (tf)	NNeg
P1			11.89	0.00	8.83	0.00
P2	19.98	0.00	11.02	0.00	10.75	0.00
P3	9.19	0.00	6.21	0.00	5.94	0.00
P4	14.02	0.00				
P5	8.79	0.00				
P6			11.82	0.00	8.80	0.00
P7	20.31	0.00	10.95	0.00	10.68	0.00
P8	9.45	0.00	6.21	0.00	5.94	0.00

## 16.8 SAPATAS - PAVIMENTO TÉRREO

### 16.8.1 Relatório de Resultados das Sapatas

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S2	110.00 115.00	20.00 35.00	11 ø 8.0 c/10 (5.53 cm <sup>2</sup> )	9 ø 8.0 c/12 (4.52 cm <sup>2</sup> )		
S3	80.00 85.00	20.00 35.00	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )		
S4	90.00 90.00	20.00 35.00	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )		
S5	75.00 75.00	20.00 35.00	8 ø 8.0 c/8 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/8 (4.02 cm <sup>2</sup> )		
S7	110.00 115.00	20.00 35.00	11 ø 8.0 c/10 (5.53 cm <sup>2</sup> )	9 ø 8.0 c/12 (4.52 cm <sup>2</sup> )		
S8	85.00 90.00	20.00 35.00	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )	8 ø 8.0 c/10 (4.02 cm <sup>2</sup> )		

### 16.8.2 Relatório de Cálculos das Sapatas

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	

### 16.8.3 Esforços e pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm²)	Pressão Sig2 (kgf/cm²)	Pressão Sig3 (kgf/cm²)	Pressão Sig4 (kgf/cm²)
S2	414.63 873.67	0.51 1.08	19.98 21.99	2.01 (lim = 2.00)	2.13 (lim = 2.00)	1.41 (lim = 2.00)	1.29 (lim = 2.00)
S3	429.46 643.62	0.53 0.80	9.19 10.31	2.25 (lim = 2.00)	2.11 (lim = 2.00)	0.78 (lim = 2.00)	0.92 (lim = 2.00)
S4	361.63 442.87	0.45 0.55	14.02 15.30	2.22 (lim = 2.00)	2.08 (lim = 2.00)	1.35 (lim = 2.00)	1.49 (lim = 2.00)
S5	359.50 335.13	0.45 0.42	8.79 9.68	1.22 (lim = 2.00)	2.24 (lim = 2.00)	2.08 (lim = 2.00)	1.06 (lim = 2.00)
S7	492.90 870.76	0.61 1.08	20.31 22.46	1.33 (lim = 2.00)	1.45 (lim = 2.00)	2.17 (lim = 2.00)	2.05 (lim = 2.00)
S8	489.25 663.71	0.61 0.83	9.45 10.78	2.07 (lim = 2.00)	1.82 (lim = 2.00)	0.66 (lim = 2.00)	0.91 (lim = 2.00)

### 16.8.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S2	10272.57 414.63	24.78 (lim = 1.50)	10693.44 849.40	12.59 (lim = 1.50)	7.56 1.06	7.13 lim = (1.50)		
S3	3563.32 428.82	8.31 (lim = 1.50)	3496.80 643.44	5.43 (lim = 1.50)	3.34 0.80	4.17 lim = (1.50)		
S4	5000.77 361.63	13.83 (lim = 1.50)	4997.96 442.80	11.29 (lim = 1.50)	4.51 0.55	8.27 lim = (1.50)		
S5	2873.51 359.50	7.99 (lim = 1.50)	2872.85 335.08	8.57 (lim = 1.50)	3.11 0.45	6.98 lim = (1.50)		
S7	10669.09 492.90	21.65 (lim = 1.50)	11035.66 850.70	12.97 (lim = 1.50)	7.80 1.06	7.32 lim = (1.50)		
S8	3809.63 489.02	7.79 (lim = 1.50)	4273.97 662.81	6.45 (lim = 1.50)	3.86 0.84	4.59 lim = (1.50)		

### 16.8.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) A's (cm²/m)	Md (kgf.m/m) A's (cm²/m)
S2	3443.55 4.47	3382.88 4.39	0.00 0.00	0.00 0.00



S3	1675.41 2.18	2194.43 2.85	0.00 0.00	0.00 0.00
S4	2733.18 3.55	3065.40 3.98	0.00 0.00	0.00 0.00
S5	1867.02 2.42	1557.18 2.02	0.00 0.00	0.00 0.00
S7	3443.55 4.47	3382.88 4.39	0.00 0.00	0.00 0.00
S8	1797.11 2.33	2258.22 2.93	0.00 0.00	0.00 0.00

## 16.9 PILARES – PAVIMENTO TÉRREO

### 16.9.1 Resultados dos Pilares

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P2 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	26.88 16.36	0 580	0 1222	1.57 2 ø 10.0 1.57 2 ø 10.0 0.6 4 ø 10.0	ø 5.0 c/12	13.84 11.07
P3 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	12.19 6.93	0 601	0 901	2.45 2 ø 12.5 4.91 4 ø 12.5 2.0 8 ø 12.5	ø 5.0 c/15	13.84 11.07
P4 1:25	20.00 X 20.00	28829.00 80.00	80.00 RR 80.00 RR	18.95 9.75	0 506	0 620	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	13.84 13.84
P5 1:25	20.00 X 20.00	28829.00 80.00	80.00 RR 80.00 RR	11.96 6.70	0 503	0 469	1.57 2 ø 10.0 1.57 2 ø 10.0 0.8 4 ø 10.0	ø 5.0 c/12	13.84 13.84

P7 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	27.33 16.83	0 690	0 1218	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	13.84 11.07
P8 1:25	20.00 X 25.00	28829.00 80.00	80.00 RR 80.00 RR	12.53 7.52	0 685	0 928	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	13.84 11.07

## 16.9.2 Cálculo do Pilar P2

### 16.9.2.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.9.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 580 kgf.m	Ndmax = 26.88 tf Ndmin = 16.36 tf
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 1222 kgf.m	ni = 0.25

### 16.9.2.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 98 Msdbase = 163	Madtopo = 364 Madcentro = 266 Madbase = 201 M2d = 12 Mcd = 1	Td = 6 kgf.m  Asl = 0.02 cm <sup>2</sup>	2 ø 10.0 2 ø 10.0  4ø10.0 3.14 cm <sup>2</sup> 0.6 %	G1+G2+1.4V3+0.84D3 Msdx = 364 kgf.m Msdy = 1216 kgf.m Mrdx = 775 kgf.m Mrdy = 2587 kgf.m Mrd/Msd=2.13



H	Msdtopo = 0 Msdcentro = 729 Msdbase = 1216	Madtopo = 390 Madcentro = 35 Madbase = 69 M2d = 13 Mcd = 2			
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#### 16.9.2.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.71 tf VBd base = 0.71 tf VHd topo = 1.51 tf VHd base = 1.51 tf	Td = 6 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.71 tf VRd2 = 19.73 tf	Td = 6 kgf.m TRd2 = 922 kgf.m	Vd/VRd2 + Td/TRd2 = 0.04
H	Vd = 1.51 tf VRd2 = 20.87 tf	Td = 6 kgf.m TRd2 = 922 kgf.m	Vd/VRd2 + Td/TRd2 = 0.08

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.50 cm Vc0 = 3.37 tf k = 2.00 Vc = 6.73 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.50 cm Vc0 = 3.56 tf k = 2.00 Vc = 7.13 tf	Vmin = 1.86 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armatura de torção		Armatura de fretagem		Armatura final
Dados	Armatura torção	Topo	Base	
$h_e = 5.56 \text{ cm}$ $A_e = 176.00 \text{ cm}^2$	$A_{90} = 0.04 \text{ cm}^2$	$Z_r = 0.00 \text{ tf}$ $Z_s = 0.00 \text{ tf}$ $A_{sw} = 0.00 \text{ cm}^2$	$Z_r = 0.00 \text{ tf}$ $Z_s = 0.00 \text{ tf}$	$A_{sw} = 2.32 \text{ cm}^2/\text{m}$ $\varnothing 5.0 \text{ c}/12$

### 16.9.3 Cálculo do Pilar P3

#### 16.9.3.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular $b = 20.00 \text{ cm}$ $h = 25.00 \text{ cm}$ Cobrimento = 3.50 cm	$f_{ck} = 300.00 \text{ kgf/cm}^2$ $E_{cs} = 268384 \text{ kgf/cm}^2$ Peso específico = $2500.00 \text{ kgf/m}^3$ $F_i = 2.61$

#### 16.9.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR $l_i = 80.00 \text{ cm}$ Esbeltez = 13.84	$M_{sd\text{topo}} = 0 \text{ kgf.m}$ $M_{sd\text{base}} = 601 \text{ kgf.m}$	$N_{d\text{max}} = 12.19 \text{ tf}$ $N_{d\text{min}} = 6.93 \text{ tf}$ $n_i = 0.11$
H	Vínculo = RR $l_i = 80.00 \text{ cm}$ Esbeltez = 11.07	$M_{sd\text{topo}} = 0 \text{ kgf.m}$ $M_{sd\text{base}} = 901 \text{ kgf.m}$	

#### 16.9.3.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armatura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	$M_{sd\text{topo}} = 0$ $M_{sd\text{centro}} = 12$ $M_{sd\text{base}} = 20$	$M_{ad\text{topo}} = 222$ $M_{ad\text{centro}} = 210$ $M_{ad\text{base}} = 201$ $M_{2d} = 7$ $M_{cd} = 0$	$T_d = 5 \text{ kgf.m}$  $A_{sl} = 0.02 \text{ cm}^2$	$2 \varnothing 12.5$ $4 \varnothing 12.5$ $8 \varnothing 12.5$ $9.82 \text{ cm}^2$ $2.0 \%$	(*) $1.3G_1 + 1.4G_2 + 1.12Q + 1.1A + 1.4V_2 + 0.84D$ $M_{sd}(x) = 222 \text{ kgf.m}$ $M_{sd}(y) = 901 \text{ kgf.m}$ $M_{rd}(x) = 889 \text{ kgf.m}$ $M_{rd}(y) = 3613 \text{ kgf.m}$ $M_{rd}/M_{sd} = 4.01$
H	$M_{sd\text{topo}} = 0$	$M_{ad\text{topo}} = 238$			

	Msdcentr o = 540 Msdbase = 901	Madcentr o = 21 Madbase = 42 M2d = 9 Mcd = 1			
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(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.9.3.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.75 tf VBd base = 0.75 tf VHd topo = 1.12 tf VHd base = 1.12 tf	Td = 5 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.75 tf VRd2 = 19.57 tf	Td = 5 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.04
H	Vd = 1.12 tf VRd2 = 20.75 tf	Td = 5 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.06

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 3.34 tf k = 2.00 Vc = 6.68 tf	Vmin = 1.39 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.38 cm Vc0 = 3.54 tf k = 2.00 Vc = 7.08 tf	Vmin = 1.85 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	

he = 5.56 cm Ae = 169.31 cm <sup>2</sup>	A90 = 0.03 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/15
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#### 16.9.4 Cálculo do Pilar P4

##### 16.9.4.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 20.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.63

##### 16.9.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 506 kgf.m	Ndmax = 18.95 tf Ndmin = 9.75 tf ni = 0.22
H	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 620 kgf.m	

##### 16.9.4.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 9 Msdbase = 14	Madtopo = 206 Madcentro = 198 Madbase = 192 M2d = 7 Mcd = 0	Td = 5 kgf.m	2 ø 10.0 2 ø 10.0	G1+G2+1.4V3+0.84D3 Msdx) = 14 kgf.m Msdy) = 659 kgf.m Mrdx) = 36 kgf.m Mrdy) = 1647 kgf.m Mrd/Msd=2.50
H	Msdtopo = 0 Msdcentro = 372 Msdbase = 620	Madtopo = 206 Madcentro = 20 Madbase = 39 M2d = 10 Mcd = 1	Asl = 0.02 cm <sup>2</sup>	4ø10.0 3.14 cm <sup>2</sup> 0.8 %	

#### 16.9.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.62 tf VBd base = 0.62 tf VHd topo = 0.76 tf VHd base = 0.76 tf	Td = 5 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.62 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 0.76 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.06

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.00 cm Ae = 121.00 cm²	A90 = 0.05 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/12

## 16.9.5 Cálculo do Pilar P5

### 16.9.5.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 20.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.63

### 16.9.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 503 kgf.m	Ndmax = 11.96 tf Ndmin = 6.70 tf ni = 0.14
H	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 469 kgf.m	

### 16.9.5.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 302 Msdbase = 503	Madtopo = 142 Madcentro = 14 Madbase = 27 M2d = 7 Mcd = 1	Td = 5 kgf.m  Asl = 0.02 cm <sup>2</sup>	2 ø 10.0 2 ø 10.0	G1+G2+1.4V2+0.84D2 Msdx = 530 kgf.m Msdy = 24 kgf.m Mrdx = 1467 kgf.m Mrdy = 67 kgf.m Mrd/Msd=2.77
H	Msdtopo = 0 Msdcentro = 14 Msdbase = 24	Madtopo = 142 Madcentro = 128 Madbase = 118 M2d = 5 Mcd = 0		4ø10.0 3.14 cm <sup>2</sup> 0.8 %	



#### 16.9.5.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.62 tf VBd base = 0.62 tf VHd topo = 0.58 tf VHd base = 0.58 tf	Td = 5 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.62 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 0.58 tf VRd2 = 15.78 tf	Td = 5 kgf.m TRd2 = 570 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 15.50 cm Vc0 = 2.69 tf k = 2.00 Vc = 5.39 tf	Vmin = 1.41 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.00 cm Ae = 121.00 cm²	A90 = 0.05 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/12

## 16.9.6 Cálculo do Pilar P7

### 16.9.6.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.9.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 690 kgf.m	Ndmax = 27.33 tf Ndmin = 16.83 tf ni = 0.26
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 1218 kgf.m	

### 16.9.6.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 117 Msdbase = 195	Madtopo = 563 Madcentro = 446 Madbase = 368 M2d = 19 Mcd = 1	Td = 7 kgf.m	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V4+0.84D 4 Msd(x) = 563 kgf.m Msd(y) = 1218 kgf.m Mrd(x) = 1897 kgf.m Mrd(y) = 4105 kgf.m Mrd/Msd=3.37
H	Msdtopo = 0 Msdcentro = 731 Msdbase = 1218	Madtopo = 603 Madcentro = 54 Madbase = 107 M2d = 16 Mcd = 3		6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.9.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.85 tf VBd base = 0.85 tf VHd topo = 1.51 tf VHd base = 1.51 tf	Td = 7 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.85 tf VRd2 = 19.35 tf	Td = 7 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 1.51 tf VRd2 = 20.57 tf	Td = 7 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.08

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.05 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/16

## 16.9.7 Cálculo do Pilar P8

### 16.9.7.1 Pavimento térreo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.9.7.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 80.00 cm Esbeltez = 13.84	Msdtopo = 0 kgf.m Msdbase = 685 kgf.m	Ndmax = 12.53 tf Ndmin = 7.52 tf ni = 0.12
H	Vínculo = RR li = 80.00 cm Esbeltez = 11.07	Msdtopo = 0 kgf.m Msdbase = 928 kgf.m	

### 16.9.7.3 Seção crítica do pilar: BASE

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 411 Msdbase = 684	Madtopo = 262 Madcentro = 25 Madbase = 50 M2d = 12 Mcd = 1	Td = 5 kgf.m	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msd(x) = 684 kgf.m Msd(y) = 281 kgf.m Mrd(x) = 3108 kgf.m Mrd(y) = 1274 kgf.m Mrd/Msd=4.54
H	Msdtopo = 0 Msdcentro = 20 Msdbase = 33	Madtopo = 281 Madcentro = 261 Madbase = 247 M2d = 6 Mcd = 0	Asl = 0.02 cm <sup>2</sup>	6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.9.7.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.85 tf VBd base = 0.85 tf VHd topo = 1.15 tf VHd base = 1.15 tf	Td = 5 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.85 tf VRd2 = 19.35 tf	Td = 5 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05
H	Vd = 1.15 tf VRd2 = 20.57 tf	Td = 5 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.06

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.04 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/16

### 16.9.8 Cálculo dos Pilares

<b>térreo</b>	$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E = 268384 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
<b>Lance 1</b>		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P2	20.00 X 25.00	RR 13.84 RR 11.07	26.88 16.36	364 1216	775 2587	2.13	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P3	20.00 X 25.00	RR 13.84 RR 11.07	12.19 6.93	222 901	889 3613	(*) 4.01	2.45 (2 ø 12.5) 4.91 (4 ø 12.5)
P4	20.00 X 20.00	RR 13.84 RR 13.84	18.95 9.75	14 659	36 1647	2.50	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P5	20.00 X 20.00	RR 13.84 RR 13.84	11.96 6.70	530 24	1467 67	2.77	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)
P7	20.00 X 25.00	RR 13.84 RR 11.07	27.33 16.83	563 1218	1897 4105	(*) 3.37	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P8	20.00 X 25.00	RR 13.84 RR 11.07	12.53 7.52	684 281	3108 1274	(*) 4.54	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 16.10 VIGAS - PAVIMENTO TÉRREO

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	1559.44 2607.31 1686.23	2 ø 10.0 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	-1224.52 -0.04 -5164.71 -0.04	2 ø 10.0 2 ø 10.0 2 ø 16.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0 2 ø 8.0	Avisos 02, 04, 101
V2	1801.42	2 ø 10.0		-433.66 -190.87	2 ø 8.0 2 ø 8.0		
V3	2135.64	2 ø 10.0	2 ø 8.0	-39.26	2 ø 10.0	2 ø 8.0	
V4	1387.91 2854.18	2 ø 10.0 2 ø 12.5	2 ø 8.0 2 ø 8.0	-1624.52 -0.04	2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	Avisos 02, 04, 101



	1245.57	2 ø 10.0	2 ø 8.0	-5164.01 -444.37 -0.04	2 ø 16.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	
V5	774.81	2 ø 8.0	2 ø 8.0				
V6	2043.92 2333.96 2070.85	2 ø 12.5 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	-242.95 -0.04 -5283.89 -302.28	2 ø 8.0 2 ø 8.0 3 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0 2 ø 8.0	Aviso 38
V7	534.44	2 ø 10.0		-175.24	2 ø 10.0		
V8	2557.37 1619.46	2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0	-2.21 -3397.85 -24.82	2 ø 10.0 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	
V9	642.53	2 ø 12.5	2 ø 12.5	-286.67	2 ø 12.5		
V10	774.17	2 ø 12.5	2 ø 12.5	-294.65	2 ø 12.5		
V11	0.11	2 ø 12.5	2 ø 12.5	-202.03 -194.73	2 ø 12.5 2 ø 12.5		Aviso 08

### 16.10.1 Esforços da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			Nd (tf)	Rd (tf)					
P1		20.0 0								3.2 5			
1	32.5 0 15.0 0	15.0 0	833. 00	0.00			0. 37	- 1. 06	9. 83			1559 .44	- 1224 .52
V5		15.0 0								0.0 0			
2	336. 25 318. 75	318. 75	758. 00	0.00			0. 67	- 0. 75	6. 36		2607 .31	1560 .21	- 5164 .71
P2		20.0 0								8.2 4			
3	343. 25 321. 25	321. 25	758. 00	0.00			0. 61	- 0. 47	5. 39		1686 .23	64.9 6	- 4899 .41
P3		25.0 0								1.3 6			

### 16.10.2 Esforços da Viga V2

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
P4		20.00								1.28			
1	343.25 325.25	325.25	150.00	0.00			0.18	-0.19	2.16		1801.42		-433.66 -190.87
P5		20.00								1.06			

### 16.10.3 Esforços da Viga V3

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V6		20.00								1.96			
1	345.25 325.25	80.25	180.00	0.00			0.04	-0.08	2.91			1726.69	
		18.00											
2		227.00	180.00	0.00			0.03	-0.09	2.74		2135.64	1682.16	-39.26



V8		20.0 0							1.8 5	
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#### 16.10.4 Esforços da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
P6		20.0 0								3.6 4			
1	32.5 0 15.0 0	15.0 0	833. 00	0.00			0. 51	- 1. 03	10. 55			1387 .91	- 1624 .52
V5		15.0 0								0.0 0			
2	336. 25 318. 75	318. 75	758. 00	0.00			0. 65	- 0. 75	6.8 4		2854 .18	1386 .71	- 5164 .01
P7		20.0 0								8.5 5			
3	346. 25 326. 25	81.2 5	758. 00	0.00			0. 34	- 0. 12	5.5 6				- 4969 .49
		18.0 0											- 444. 37
4		227. 00	758. 00	0.00			0. 46	- 0. 45	2.2 8		1245 .57	141. 85	- 402. 64
P8		20.0 0								1.1 7			

### 16.10.5 Esforços da Viga V5

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm ax (tf)	Mdm ax (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			Nd (tf)	Rd (tf)					
V4		20.0 0								2.4 6			
1	649. 95 629. 95	629. 95	131. 25	0.00			0. 00	- 2. 03	3. 53		774. 81		
V1		20.0 0								2.3 6			

### 16.10.6 Esforços da Viga V6

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 1o (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm ax (tf)	Mdm ax (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			Nd (tf)	Rd (tf)					
P7		25.0 0								0.2 0			
1	138. 00 120. 00	120. 00	150. 00	0.00			0. 00	- 0. 96	2. 22			2043 .92	- 242. 95
V3		18.0 0								0.0 0			
2	180. 97 161. 97	161. 97	250. 00	0.00			0. 00	- 0. 53	7. 50			2333 .96	- 5283 .89
P4		20.0 0								9.9 2			

3	322.44 299.94	299.94	250.00	0.00			0.00	-1.21	7.24		2070.85		-5264.05 -302.28
P2		25.00								0.10			

### 16.10.7 Esforços da Viga V7

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (%)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
V4		20.00								0.79			
1	144.00 125.00	125.00	180.00	0.00			0.00	-0.04	1.17		534.44	385.22	-175.24
V3		18.00								0.39			

### 16.10.8 Esforços da Viga V8

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temperatura Caso T1 Caso T2 (°C)	Retração (%)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/m)	Acid. (kgf/m)			Nd (tf)	Rd (tf)					
P8		25.00								1.79			
1		120.00	758.00	0.00			0.00	-0.63	2.58			24.99	-2.21

												2463 .95	
		18.0 0											
2		161. 97	758. 00	0.00			0. 00	- 0. 41	5. 35			2557 .37	- 3395 .75
P5		20.0 0								7.0 5			
3	324. 98 304. 98	304. 98	758. 00	0.00			0. 00	- 0. 83	4. 90		1619 .46		- 3397 .85  - 24.8 2
P3		20.0 0								1.3 9			

#### 16.10.9 Esforços da Viga V9

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apoi o 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V11		20.0 0								0.7 2			
1	147. 96 127. 96	127. 96	350. 00	0.00			1. 63	0. 00	3. 86			642. 53	- 286. 67
		20.0 0											

#### 16.10.10 Esforços da Viga V10

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados	Envoltória
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Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V11		20.00								0.75			
1	147.96 127.96	127.96	350.00	0.00			1.72	0.00	4.13			774.17	- 294.65
		20.00											

#### 16.10.11 Esforços da Viga V11

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trecho	Apoio 1 e 10 (cm)	Larg Barr a (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforço axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			Nd (tf)	Rd (tf)					
V10		20.00								0.00			
1	480.00 460.00	460.00	350.00	0.00			1.99	0.00	1.20				- 202.03 - 194.73
V9		20.00								0.00			

#### 16.10.12 Resultados da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P1	20.00		2 ø 8.0 0.29	2 ø 10.0					0.03

				1.65					
1	15.00	20.00 x 55.00	2 ø 10.0 1.65	2 ø 8.0 0.29		ø 5.0 c/ 17	ø 5.0 c/ 5 100.00		0.05
V5	15.00		2 ø 8.0 0.21	2 ø 10.0 1.20					0.00
2	318.75	20.00 x 40.00	2 ø 12.5 1.78	2 ø 8.0 0.21		ø 5.0 c/ 17			0.11
P2	20.00		2 ø 8.0 0.17	2 ø 16.0 3.51					0.20
3	321.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.13		ø 5.0 c/ 17			0.07
P3	25.00		2 ø 8.0 0.13	2 ø 10.0 1.20					0.00

#### 16.10.13 Resultados da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P4	20.00			2 ø 8.0 0.90					0.02
1	325.25	20.00 x 30.00	2 ø 10.0 1.59			ø 5.0 c/ 16			0.16
P5	20.00			2 ø 8.0 0.90					0.00

#### 16.10.14 Resultados da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V6	20.00								0.00
1	325.25	18.00 x 40.00	2 ø 10.0 1.36	2 ø 8.0 0.33		ø 5.0 c/ 15		2x3 ø 6.3	0.12

V8	20.00		2 ø 8.0 0.33	2 ø 10.0 1.24					0.00
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#### 16.10.15 Resultados da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P6	20.00		2 ø 8.0 0.28	2 ø 10.0 1.65					0.04
1	15.00	20.00 x 55.00	2 ø 10.0 1.65	2 ø 8.0 0.28		ø 5.0 c/ 17	ø 5.0 c/ 5 100.00		0.04
V5	15.00		2 ø 8.0 0.21	2 ø 10.0 1.20					0.00
2	318.75	20.00 x 40.00	2 ø 12.5 1.94	2 ø 8.0 0.21		ø 5.0 c/ 17			0.13
P7	20.00		2 ø 8.0 0.18	2 ø 16.0 3.52					0.21
3	326.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.12		ø 5.0 c/ 17			0.04
P8	20.00		2 ø 8.0 0.12	2 ø 10.0 1.20					0.00

#### 16.10.16 Resultados da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V4	20.00								0.00
1	629.95	15.00 x 35.00	2 ø 8.0 0.86	2 ø 8.0 0.56		ø 5.0 c/ 19			0.08
V1	20.00								0.00

**16.10.17 Resultados da Viga V6**

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P7	25.00		2 ø 8.0 0.53	2 ø 8.0 1.04					0.01
1	120.00	20.00 x 30.00	2 ø 12.5 2.21	2 ø 8.0 0.52		ø 5.0 c/ 12			0.12
V3	18.00		2 ø 8.0 0.41	2 ø 8.0 1.04					0.00
2	161.97	20.00 x 50.00	2 ø 10.0 1.50	2 ø 8.0 0.15		ø 5.0 c/ 17			0.10
P4	20.00		2 ø 8.0 0.13	3 ø 12.5 2.75					0.11
3	299.94	20.00 x 50.00	2 ø 10.0 1.50	2 ø 8.0 0.33		ø 5.0 c/ 17			0.08
P2	25.00		2 ø 8.0 0.33	2 ø 10.0 1.50					0.00

**16.10.18 Resultados da Viga V7**

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
V4	20.00			2 ø 10.0 1.08					0.00
1	125.00	18.00 x 40.00	2 ø 10.0 1.08			ø 5.0 c/ 19			0.01
V3	18.00								0.00

**16.10.19 Resultados da Viga V8**

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>





Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
P8	25.00		2 ø 8.0 0.17	2 ø 10.0 1.20					0.00
1	299.97	20.00 x 40.00	2 ø 12.5 1.73	2 ø 8.0 0.17		ø 5.0 c/ 17			0.10
P5	20.00		2 ø 8.0 0.11	2 ø 12.5 2.25					0.17
2	304.98	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.23		ø 5.0 c/ 17			0.08
P3	20.00		2 ø 8.0 0.23	2 ø 10.0 1.20					0.00

#### 16.10.20 Resultados da Viga V9

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
V11	20.00			2 ø 12.5 2.10					0.00
1	127.96	20.00 x 70.00	2 ø 12.5 2.10	2 ø 12.5 1.72		ø 5.0 c/ 17		2x5 ø 6.3	0.01
	20.00								0.00

#### 16.10.21 Resultados da Viga V10

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
V11	20.00			2 ø 12.5					0.00

				2.10					
1	127.96	20.00 x 70.00	2 ø 12.5 2.10	2 ø 12.5 1.72		ø 5.0 c/ 17		2x5 ø 6.3	0.01
	20.00								0.00

### 16.10.22 Resultados da Viga V11

fck = 300.00 kgf/cm²	Ecs = 268384 kgf/cm²
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m³

Dados			Resultados						
Pilar Trecho	Apoio 1 e 10 (cm)	Seção (cm)	As Inf (cm²)	As Sup (cm²)	As esq trecho (cm²)	Asw min (cm²)	As dir trecho (cm²)	Asw Pele (cm²)	Fissura (mm)
V10	20.00			2 ø 12.5 2.10					0.00
1	460.00	20.00 x 70.00	2 ø 12.5 2.10	2 ø 12.5 1.72		ø 5.0 c/ 17		2x5 ø 6.3	0.01
V9	20.00			2 ø 12.5 2.10					0.00

## 16.11 LAJES – PAVIMENTO TÉRREO

### 16.11.1 Dados das Lajes

térreo	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 3.50 cm	

Seção (cm)						Cargas (kgf/m²)				Temperatura Caso T1 Caso T2 (°C)	Retração o Deform. X Deform. Y (%)
Laje	Tipo	H	ee c	en x en y	ee x ee y	Peso Próprio	Acidental Revestimen to	Paredes Outras	Total		
L1	Maciça	15				375.00	10.00 80.00	0.00 0.00	465.00		
L2	Maciça	16				400.00	300.00 154.50	136.86 0.00	991.36		

L3	Maciça	13				325.00	300.00	0.00	779.50		
L4	Maciça	13				325.00	300.00	0.00	779.50		
L5	Maciça	13				325.00	300.00	0.00	779.50		
L6	Maciça	13				325.00	300.00	0.00	779.50		

### 16.11.2 Resultados da Laje

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.50 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	15	465.00	3468	3655	As = 8.93 cm <sup>2</sup> /m (ø12.5 c/13 - 9.44 cm <sup>2</sup> /m)	As = 11.12 cm <sup>2</sup> /m (ø12.5 c/11 - 11.16 cm <sup>2</sup> /m)
L2	16	991.36	1772	933	As = 3.93 cm <sup>2</sup> /m (ø10.0 c/19 - 4.13 cm <sup>2</sup> /m)	As = 2.40 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
L3	13	779.50	655	463	As = 1.76 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)	As = 1.60 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)
L4	13	779.50	566	263	As = 1.48 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)
L5	13	779.50	135	483	As = 1.45 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)
L6	13	779.50	247	323	As = 1.45 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)	As = 1.56 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)

### 16.11.3 Cálculos das Lajes

<b>térreo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 3.50 cm	

ARMADURAS POSITIVAS (LAJE)												
Laje	Direção	Momento positivo				Momento negativo				Armadura inferior	Armadura superior	Cisalhamento
		Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)	Seção	Flexão	Verificação axial (compressão)	Verificação axial (tração)			



L1	X	bw = 10 0.0 cm h = 15.0 cm	Md = 346 8 kgf. m/m As = 8.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.04 tf Situação: GE As = 7.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.13 tf Situação: GE As = 8.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 15.0 cm	Md = 341 3 kgf. m/m As = 7.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.04 tf Situação: GE As = 7.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.13 tf Situação: GE As = 8.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 8.93 cm <sup>2</sup> /m ø12.5 c/13 (9.44 cm <sup>2</sup> /m) fiss = 0.18 mm	A's = 8.51 cm <sup>2</sup> /m ø12.5 c/14 (8.77 cm <sup>2</sup> /m)	vsd = 23.06 tf/m vrd1 = 9.08 tf/m Modelo I vrd2 = 52.82 tf/m vsw = erro asw = erro
	Y	bw = 10 0.0 cm h = 15.0 cm	Md = 365 5 kgf. m/m As = 9.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.92 tf Situação: GE As = 9.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.08 tf Situação: GE As = 11.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 15.0 cm	Md = 450 4 kgf. m/m As = 12.7 9 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.92 tf Situação: GE As = 12.49 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.08 tf Situação: GE As = 13.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 11.1 2 cm <sup>2</sup> /m ø12.5 c/11 (11.1 6 cm <sup>2</sup> /m) fiss = 0.19 mm	A's = 13.7 3 cm <sup>2</sup> /m ø12.5 c/8 (15.3 4 cm <sup>2</sup> /m)	vsd = 52.41 tf/m vrd1 = 8.72 tf/m vrd2 = 46.46 tf/m vsw = erro asw = erro
L2	X	bw = 10 0.0 cm h = 16.0 cm	Md = 177 2 kgf. m/m As = 3.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.82 tf Situação: GE As = 3.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.79 tf Situação: GE As = 3.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 16.0 cm				As = 3.93 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m) fiss = 0.15 mm		vsd = 4.38 tf/m vrd1 = 8.60 tf/m Modelo I vrd2 = 58.55 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	bw = 10 0.0 cm h = 16.0 cm	Md = 933 kgf. m/m As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.58 tf Situação: GE As = 1.72 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.64 tf Situação: GE As = 2.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 16.0 cm				As = 2.40 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.11 mm		vsd = 3.33 tf/m vrd1 = 7.72 tf/m vrd2 = 53.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L3	X	bw = 10 0.0 cm h = 13.0 cm	Md = 655 kgf. m/m As = 1.69 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.48 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.39 tf Situação: GE As = 1.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 13.0 cm				As = 1.76 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.07 mm		vsd = 2.41 tf/m vrd1 = 6.52 tf/m Modelo I vrd2 = 43.79 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13.0 cm	Md = 568 kgf. m/m As = 1.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.53 tf Situação: GE As = 1.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 13.0 cm				As = 1.60 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.08 mm		vsd = 2.22 tf/m vrd1 = 5.88 tf/m vrd2 = 40.15 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L4	X	bw = 10 0.0 cm	Md = 568 kgf. m/m	Fd = 0.12 tf Situação: GE	Fd = 0.22 tf	bw = 10 0.0 cm				As = 1.48 cm <sup>2</sup> /m		vsd = 1.66 tf/m



		h = 13. 0 cm	As = 1.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situa ção: GE As = 1.48 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	h = 13. 0 cm				ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.10 mm		vrd1 = 6.36 tf/m Modelo I vrd2 = 44.22 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.38 tf Situa ção: GE As = 0.78 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.56 cm <sup>2</sup> / m ø6.3 c/19 (1.64 cm <sup>2</sup> / m) fiss = 0.02 mm		vsd = 1.10 tf/m vrd1 = 5.99 tf/m vrd2 = 41.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L5	X	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.45 tf Situa ção: GE As = 0.41 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.45 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.01 mm		vsd = 1.74 tf/m vrd1 = 6.36 tf/m Modelo I vrd2 = 44.22 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13.	Md = 568 kgf. m/m		Fd = 0.93 tf Situa ção: GE	bw = 10 0.0 cm h = 13.				As = 1.56 cm <sup>2</sup> / m ø6.3 c/19		vsd = 4.69 tf/m vrd1 = 5.99 tf/m



		0 cm	As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 1.49 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	0 cm				(1.64 cm <sup>2</sup> / m) fiss = 0.08 mm		vr2 = 41.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L6	X	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.15 tf Situa ção: GE As = 0.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.59 tf Situa ção: GE As = 0.72 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.45 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.02 mm		v2d = 1.45 tf/m vr1 = 6.36 tf/m Modelo I vr2 = 44.22 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 13. 0 cm	Md = 568 kgf. m/m As = 1.56 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.34 tf Situa ção: GE As = 0.94 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	bw = 10 0.0 cm h = 13. 0 cm				As = 1.56 cm <sup>2</sup> / m ø6.3 c/19 (1.64 cm <sup>2</sup> / m) fiss = 0.04 mm		v2d = 0.99 tf/m vr1 = 5.99 tf/m vr2 = 41.01 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

## 16.12 PILARES - PAVIMENTO TAMPA DO POÇO

### 16.12.1 Resultados dos Pilares

tampa do poço	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
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<b>Lance 2</b>		cobr = 3.50 cm	
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Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 215.00 RR	15.77 9.65	1126 0	1791 0	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/16	60.55 29.76
P2 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	14.80 9.26	1193 0	2997 0	4.02 2 ø 16.0 4.02 2 ø 16.0 1.6 4 ø 16.0	ø 5.0 c/16	60.55 48.44
P3 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	8.21 4.18	2139 0	1582 0	2.45 2 ø 12.5 4.91 4 ø 12.5 2.0 8 ø 12.5	ø 5.0 c/15	60.55 48.44
P6 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 215.00 RR	15.69 9.53	1166 0	1802 0	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/16	60.55 29.76
P7 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	14.70 9.29	1319 0	2815 0	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44
P8 1:25	20.00 X 25.00	29044.00 215.00	350.00 RR 350.00 RR	8.21 4.57	1104 0	2651 0	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44

## 16.12.2 Cálculo do Pilar P1

### 16.12.2.1 Pavimento tampa do poço - Lance 2

<b>Dados da seção transversal</b>	<b>Dados do concreto</b>
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Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61
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#### 16.12.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1126 kgf.m Msdbase = 0 kgf.m	Ndmax = 15.77 tf Ndmin = 9.65 tf ni = 0.15
H	Vínculo = RR li = 215.00 cm Esbeltez = 29.76	Msdtopo = 1791 kgf.m Msdbase = 0 kgf.m	

#### 16.12.2.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 372 Msdcentro = 223 Msdbase = 0	Madtopo = 162 Madcentro = 93 Madbase = 316 M2d = 288 Mcd = 23	Td = 123 kgf.m	3 ø 16.0 4 ø 16.0	(*) 1.3G1+1.4G2+1.4V3+0.84D3 Msd(x) = 372 kgf.m Msd(y) = 1949 kgf.m Mrd(x) = 1116 kgf.m Mrd(y) = 5851 kgf.m Mrd/Msd=3.00
H	Msdtopo = 1787 Msdcentro = 1072 Msdbase = 0	Madtopo = 162 Madcentro = 81 Madbase = 339 M2d = 109 Mcd = 20	Asl = 0.45 cm <sup>2</sup>	10ø16.0 20.11 cm <sup>2</sup> 4.0 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.12.2.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.42 tf VBd base = 0.42 tf	Td = 123 kgf.m

	VHd topo = 0.80 tf VHd base = 0.80 tf	
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Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.42 tf VRd2 = 19.35 tf	Td = 123 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.17
H	Vd = 0.80 tf VRd2 = 20.57 tf	Td = 123 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.19

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00 Vc = 7.02 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.88 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm²/m ø 5.0 c/16

### 16.12.3 Cálculo do Pilar P2

#### 16.12.3.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.61

### 16.12.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1193 kgf.m Msdbase = 0 kgf.m	Ndmax = 14.80 tf
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 2997 kgf.m Msdbase = 0 kgf.m	Ndmin = 9.26 tf ni = 0.14

### 16.12.3.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 202 Msdcentro = 121 Msdbase = 0	Madtopo = 158 Madcentro = 188 Madbase = 309 M2d = 281 Mcd = 15	Td = 89 kgf.m	2 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D3 Msd(x) = 202 kgf.m Msd(y) = 3155 kgf.m Mrd(x) = 262 kgf.m Mrd(y) = 4078 kgf.m Mrd/Msd=1.29
H	Msdtopo = 2997 Msdcentro = 1798 Msdbase = 0	Madtopo = 158 Madcentro = 79 Madbase = 331 M2d = 337 Mcd = 86	Asl = 0.33 cm²	4ø16.0 8.04 cm² 1.6 %	

### 16.12.3.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.45 tf VBd base = 0.45 tf VHd topo = 1.33 tf VHd base = 1.33 tf	Td = 89 kgf.m

### Verificação de esforços limites

Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.45 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 1.33 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.17

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.25 Vc = 4.40 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.64 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm²	Asw = 2.32 cm²/m ø 5.0 c/16

## 16.12.4 Cálculo do Pilar P3

### 16.12.4.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.61

### 16.12.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 2139 kgf.m Msdbase = 0 kgf.m	Ndmax = 8.21 tf Ndmin = 4.18 tf
H	Vínculo = RR li = 350.00 cm	Msdtopo = 1582 kgf.m	ni = 0.08

	Esbeltez = 48.44	Msdbase = 0 kgf.m	
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#### 16.12.4.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 2139 Msdcentro = 1283 Msdbase = 0	Madtopo = 81 Madcentro = 41 Madbase = 158 M2d = 242 Mcd = 46	Td = 88 kgf.m	2 ø 12.5 4 ø 12.5	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D 3 Msd(x) = 2220 kgf.m Msd(y) = 439 kgf.m Mrd(x) = 3058 kgf.m Mrd(y) = 605 kgf.m Mrd/Msd=1.38
H	Msdtopo = 439 Msdcentro = 264 Msdbase = 0	Madtopo = 81 Madcentro = 41 Madbase = 170 M2d = 122 Mcd = 7	Asl = 0.32 cm²	8ø12.5 9.82 cm² 2.0 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.12.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.95 tf VBd base = 0.95 tf VHd topo = 0.68 tf VHd base = 0.68 tf	Td = 88 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.95 tf VRd2 = 19.57 tf	Td = 88 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.15
H	Vd = 0.68 tf VRd2 = 20.75 tf	Td = 88 kgf.m TRd2 = 887 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13

Direção	Armadura de cisalhamento
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	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 3.34 tf k = 1.17 Vc = 3.89 tf	Vmin = 1.39 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.38 cm Vc0 = 3.54 tf k = 1.54 Vc = 5.44 tf	Vmin = 1.85 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 169.31 cm <sup>2</sup>	A90 = 0.60 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.01 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/15

## 16.12.5 Cálculo do Pilar P6

### 16.12.5.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.12.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1166 kgf.m Msdbase = 0 kgf.m	Ndmax = 15.69 tf Ndmin = 9.53 tf ni = 0.15
H	Vínculo = RR li = 215.00 cm Esbeltez = 29.76	Msdtopo = 1802 kgf.m Msdbase = 0 kgf.m	

### 16.12.5.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	



B	Msdtopo = 376 Msdcentro = 226 Msdbase = 0	Madtopo = 150 Madcentro = 75 Madbase = 294 M2d = 270 Mcd = 21	Td = 97 kgf.m	3 ø 16.0 4 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84 D3 Msdx) = 376 kgf.m Msdy) = 1953 kgf.m Mrdx) = 1127 kgf.m Mrdy) = 5845 kgf.m Mrd/Msd=2.99
H	Msdtopo = 1802 Msdcentro = 1081 Msdbase = 0	Madtopo = 150 Madcentro = 75 Madbase = 314 M2d = 104 Mcd = 19	Asl = 0.36 cm <sup>2</sup>	10ø16. 0 20.11 cm <sup>2</sup> 4.0 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.12.5.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.43 tf VBd base = 0.43 tf VHd topo = 0.80 tf VHd base = 0.80 tf	Td = 97 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.43 tf VRd2 = 19.35 tf	Td = 97 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.14
H	Vd = 0.80 tf VRd2 = 20.57 tf	Td = 97 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.16

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 2.00	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

	Vc = 7.02 tf		
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Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.70 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16

## 16.12.6 Cálculo do Pilar P7

### 16.12.6.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.12.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1319 kgf.m Msdbase = 0 kgf.m	Ndmax = 14.70 tf Ndmin = 9.29 tf ni = 0.14
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 2815 kgf.m Msdbase = 0 kgf.m	

### 16.12.6.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1314 Msdcentro = 788 Msdbase = 0	Madtopo = 153 Madcentro = 76 Madbase = 298 M2d = 372 Mcd = 61	Td = 89 kgf.m  Asl = 0.33 cm <sup>2</sup>	3 ø 16.0 2 ø 16.0  6ø16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msd(x) = 1466 kgf.m Msd(y) = 1949 kgf.m Mrd(x) = 2255 kgf.m Mrd(y) = 2998 kgf.m Mrd/Msd=1.54



H	Msdtopo = 1949 Msdcentro = 1170 Msdbase = 0	Madtopo = 153 Madcentro = 76 Madbase = 320 M2d = 297 Mcd = 55		12.06 cm <sup>2</sup> 2.4 %	
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(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.12.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.50 tf VBd base = 0.50 tf VHd topo = 1.25 tf VHd base = 1.25 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.50 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 1.25 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.17

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.27 Vc = 4.46 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	

he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.64 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16
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## 16.12.7 Cálculo do Pilar P8

### 16.12.7.1 Pavimento tampa do poço - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.12.7.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1104 kgf.m Msdbase = 0 kgf.m	Ndmax = 8.21 tf Ndmin = 4.57 tf ni = 0.08
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 2651 kgf.m Msdbase = 0 kgf.m	

### 16.12.7.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 233 Msdcentro = 140 Msdbase = 0	Madtopo = 84 Madcentro = 42 Madbase = 164 M2d = 155 Mcd = 7	Td = 89 kgf.m  Asl = 0.33 cm <sup>2</sup>	3 ø 16.0 2 ø 16.0	(*) 1.3G1+1.4G2+1.12Q+1.1A+1.4V4+0.84D4 Msd(x) = 233 kgf.m Msd(y) = 2735 kgf.m Mrd(x) = 416 kgf.m Mrd(y) = 4879 kgf.m Mrd/Msd=1.78
H	Msdtopo = 2651 Msdcentro = 1590 Msdbase = 0	Madtopo = 84 Madcentro = 42 Madbase = 176 M2d = 197 Mcd = 38		6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

(\*) Quantidade de barras alterada pelo usuário (para mais)

#### 16.12.7.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.46 tf VBd base = 0.46 tf VHd topo = 1.19 tf VHd base = 1.19 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.46 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.13
H	Vd = 1.19 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.16

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.77 Vc = 5.86 tf	Vmin = 1.38 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.17 Vc = 4.12 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.64 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.02 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16

### 16.12.8 Cálculo dos Pilares

tampa do poço	$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E = 268384 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
Lance 2		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	20.00 X 25.00	RR 60.55 RR 29.76	15.77 9.65	372 1949	1116 5851	(*) 3.00	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P2	20.00 X 25.00	RR 60.55 RR 48.44	14.80 9.26	202 3155	262 4078	1.29	4.02 (2 ø 16.0) 4.02 (2 ø 16.0)
P3	20.00 X 25.00	RR 60.55 RR 48.44	8.21 4.18	2220 439	3058 605	(*) 1.38	2.45 (2 ø 12.5) 4.91 (4 ø 12.5)
P6	20.00 X 25.00	RR 60.55 RR 29.76	15.69 9.53	376 1953	1127 5845	(*) 2.99	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P7	20.00 X 25.00	RR 60.55 RR 48.44	14.70 9.29	1466 1949	2255 2998	(*) 1.54	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P8	20.00 X 25.00	RR 60.55 RR 48.44	8.21 4.57	233 2735	416 4879	(*) 1.78	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)

(\*) Quantidade de barras alterada pelo usuário (para mais)

### 16.13 VIGAS - PAVIMENTO TAMPA DO POÇO

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
NÃO EXISTE 1	2994.10	3 ø 16.0	2 ø 12.5	-4773.57 -4944.38	3 ø 16.0 3 ø 16.0	2 ø 12.5 2 ø 12.5	Aviso 26

## 16.14 PILARES - PAVIMENTO COBERTURA

### 16.14.1 Resultados dos Pilares

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 135.00 RR	11.77 7.28	1309 1113	5891 3154	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/8	60.55 18.68
P2 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	14.45 9.09	1446 1193	4371 2997	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44
P3 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	7.86 4.01	2987 2139	2132 1582	2.45 2 ø 12.5 4.91 4 ø 12.5 2.0 8 ø 12.5	ø 5.0 c/15	60.55 48.44
P6 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 135.00 RR	11.74 7.17	1340 1122	5854 3102	6.03 3 ø 16.0 8.04 4 ø 16.0 4.0 10 ø 16.0	ø 5.0 c/9	60.55 18.68
P7 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	14.35 9.12	1649 1319	4077 2815	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44
P8 1:25	20.00 X 25.00	29179.00 135.00	350.00 RR 350.00 RR	7.86 4.40	1349 1104	3827 2651	6.03 3 ø 16.0 4.02 2 ø 16.0 2.4 6 ø 16.0	ø 5.0 c/16	60.55 48.44

## 16.14.2 Cálculo do Pilar P1

### 16.14.2.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

### 16.14.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1309 kgf.m Msdbase = 1113 kgf.m	Ndmax = 11.77 tf
H	Vínculo = RR li = 135.00 cm Esbeltez = 18.68	Msdtopo = 5891 kgf.m Msdbase = 3154 kgf.m	Ndmin = 7.28 tf ni = 0.11

### 16.14.2.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1256 Msdcentro = 1185 Msdbase = 1078	Madtopo = 79 Madcentro = 40 Madbase = 79 M2d = 345 Mcd = 71	Td = 62 kgf.m  Asl = 0.23 cm <sup>2</sup>	3 ø 16.0 4 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V2+0.84 D2 Msdx = 1256 kgf.m Msdy = 5729 kgf.m Mrdx = 1263 kgf.m Mrdy = 5762 kgf.m Mrd/Msd=1.01
H	Msdtopo = 5649 Msdcentro = 2262 Msdbase = 2819	Madtopo = 79 Madcentro = 40 Madbase = 79 M2d = 43 Mcd = 12		10ø16.0 20.11 cm <sup>2</sup> 4.0 %	

### 16.14.2.4 Dimensionamento da armadura transversal

Modelo cálculo	Esforços	
	Cisalhamento	Torção

Inclinação bielas		
I  45	VBd topo = 0.17 tf VBd base = 0.17 tf VHd topo = 6.67 tf VHd base = 6.67 tf	Td = 62 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.17 tf VRd2 = 19.35 tf	Td = 62 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.08
H	Vd = 6.67 tf VRd2 = 20.57 tf	Td = 62 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.40

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.83 Vc = 6.03 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.08 Vc = 3.80 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 2.87 tf Asw = 3.63 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.45 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.02 cm²	Asw = 4.52 cm²/m ø 5.0 c/8

### 16.14.3 Cálculo do Pilar P2

#### 16.14.3.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm²



Cobrimento = 3.50 cm	Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61
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#### 16.14.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1446 kgf.m Msdbase = 1193 kgf.m	Ndmax = 14.45 tf Ndmin = 9.09 tf ni = 0.13
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 4371 kgf.m Msdbase = 2997 kgf.m	

#### 16.14.3.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1425 Msdcentro = 1327 Msdbase = 1179	Madtopo = 92 Madcentro = 46 Madbase = 92 M2d = 399 Mcd = 92	Td = 89 kgf.m  Asl = 0.33 cm <sup>2</sup>	3 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D 1 Msd(x) = 1864 kgf.m Msd(y) = 2959 kgf.m Mrd(x) = 2080 kgf.m Mrd(y) = 3302 kgf.m Mrd/Msd=1.12
H	Msdtopo = 3496 Msdcentro = 2959 Msdbase = 2155	Madtopo = 92 Madcentro = 46 Madbase = 92 M2d = 347 Mcd = 127		6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

#### 16.14.3.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.15 tf VBd base = 0.15 tf VHd topo = 1.03 tf VHd base = 1.03 tf	Td = 89 kgf.m



Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.15 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.11
H	Vd = 1.03 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.16

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 2.00 Vc = 6.60 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.16 Vc = 4.07 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.64 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm²	Asw = 2.32 cm²/m ø 5.0 c/16

#### 16.14.4 Cálculo do Pilar P3

##### 16.14.4.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.61

##### 16.14.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm	Msdtopo = 2987 kgf.m	Ndmax = 7.86 tf



	Esbeltez = 60.55	Msdbase = 2139 kgf.m	N <sub>dmin</sub> = 4.01 t <sub>f</sub> n <sub>i</sub> = 0.07
H	Vínculo = RR l <sub>i</sub> = 350.00 cm Esbeltez = 48.44	Msdtopo = 2132 kgf.m Msdbase = 1582 kgf.m	

#### 16.14.4.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 2987 Msdcentro = 2648 Msdbase = 2139	Madtopo = 49 Madcentro = 24 Madbase = 49 M2d = 250 Mcd = 87	T <sub>d</sub> = 88 kgf.m  A <sub>sl</sub> = 0.32 cm <sup>2</sup>	2 ø 12.5 4 ø 12.5	1.3G1+1.4G2+1.12Q+1.1A+1.4V3+0.84D3 Msd(x) = 3036 kgf.m Msd(y) = 705 kgf.m Mrd(x) = 3023 kgf.m Mrd(y) = 702 kgf.m Mrd/Msd=1.00
H	Msdtopo = 705 Msdcentro = 599 Msdbase = 439	Madtopo = 49 Madcentro = 24 Madbase = 49 M2d = 150 Mcd = 13		8ø12.5 9.82 cm <sup>2</sup> 2.0 %	

#### 16.14.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.62 t <sub>f</sub> VBd base = 0.62 t <sub>f</sub> VHd topo = 0.38 t <sub>f</sub> VHd base = 0.38 t <sub>f</sub>	T <sub>d</sub> = 88 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	V <sub>d</sub> = 0.62 t <sub>f</sub> V <sub>Rd2</sub> = 19.57 t <sub>f</sub>	T <sub>d</sub> = 88 kgf.m T <sub>Rd2</sub> = 887 kgf.m	V <sub>d</sub> /V <sub>Rd2</sub> + T <sub>d</sub> /T <sub>Rd2</sub> = 0.13
H	V <sub>d</sub> = 0.38 t <sub>f</sub>	T <sub>d</sub> = 88 kgf.m	V <sub>d</sub> /V <sub>Rd2</sub> + T <sub>d</sub> /T <sub>Rd2</sub> = 0.12

	VRd2 = 20.75 tf	TRd2 = 887 kgf.m	
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Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 3.34 tf k = 1.10 Vc = 3.68 tf	Vmin = 1.39 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.38 cm Vc0 = 3.54 tf k = 1.37 Vc = 4.83 tf	Vmin = 1.85 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 169.31 cm <sup>2</sup>	A90 = 0.60 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.01 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/15

#### 16.14.5 Cálculo do Pilar P6

##### 16.14.5.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

##### 16.14.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1340 kgf.m Msdbase = 1122 kgf.m	Ndmax = 11.74 tf Ndmin = 7.17 tf ni = 0.11
H	Vínculo = RR li = 135.00 cm Esbeltez = 18.68	Msdtopo = 5854 kgf.m Msdbase = 3102 kgf.m	

### 16.14.5.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1335 Msdcentro = 1247 Msdbase = 1115	Madtopo = 72 Madcentro = 36 Madbase = 72 M2d = 322 Mcd = 67	Td = 52 kgf.m  Asl = 0.19 cm²	3 ø 16.0 4 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84 D1 Msdx) = 1335 kgf.m Msdy) = 5679 kgf.m Mrdx) = 1334 kgf.m Mrdy) = 5676 kgf.m Mrd/Msd=1.00
H	Msdtopo = 5607 Msdcentro = 2258 Msdbase = 2767	Madtopo = 72 Madcentro = 36 Madbase = 72 M2d = 40 Mcd = 11		10ø16.0 20.11 cm² 4.0 %	

### 16.14.5.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.17 tf VBd base = 0.17 tf VHd topo = 6.60 tf VHd base = 6.60 tf	Td = 52 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.17 tf VRd2 = 19.35 tf	Td = 52 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.07
H	Vd = 6.60 tf VRd2 = 20.57 tf	Td = 52 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.38

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf	Vmin = 1.38 tf	Vsw = 0.00 tf

	k = 1.86 Vc = 6.13 tf	Aswmin = 2.32 cm <sup>2</sup> /m	Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.08 Vc = 3.80 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 2.80 tf Asw = 3.55 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.38 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.02 cm <sup>2</sup>	Asw = 4.30 cm <sup>2</sup> /m ø 5.0 c/9

### 16.14.6 Cálculo do Pilar P7

#### 16.14.6.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

#### 16.14.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1649 kgf.m Msdbase = 1319 kgf.m	Ndmax = 14.35 tf Ndmin = 9.12 tf ni = 0.13
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 4077 kgf.m Msdbase = 2815 kgf.m	

#### 16.14.6.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1641 Msdcentro = 1510	Madtopo = 94 Madcentro = 47	Td = 89 kgf.m	3 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V1+0.84D1 Msd(x) = 2076 kgf.m Msd(y) = 2679 kgf.m



	Msdbase = 1314	Madbase = 94 M2d = 413 Mcd = 107	Asl = 0.33 cm <sup>2</sup>	6ø16. 0 12.06 cm <sup>2</sup> 2.4 %	Mrd(x) = 2279 kgf.m Mrd(y) = 2941 kgf.m Mrd/Msd=1.10
H	Msdtopo = 3165 Msdcentro = 2679 Msdbase = 1949	Madtopo = 94 Madcentro = 47 Madbase = 94 M2d = 345 Mcd = 117			

#### 16.14.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.21 tf VBd base = 0.21 tf VHd topo = 0.96 tf VHd base = 0.96 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.21 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.12
H	Vd = 0.96 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.15

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.75 Vc = 5.77 tf	Vmin = 1.38 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.17 Vc = 4.11 tf	Vmin = 1.83 tf Aswmin = 2.32 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção	Armadura de fretagem	Armadura final
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Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm <sup>2</sup>	A90 = 0.64 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.03 cm <sup>2</sup>	Asw = 2.32 cm <sup>2</sup> /m ø 5.0 c/16

### 16.14.7 Cálculo do Pilar P8

#### 16.14.7.1 Pavimento cobertura - Lance 3

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 25.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.61

#### 16.14.7.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 350.00 cm Esbeltez = 60.55	Msdtopo = 1349 kgf.m Msdbase = 1104 kgf.m	Ndmax = 7.86 tf Ndmin = 4.40 tf ni = 0.07
H	Vínculo = RR li = 350.00 cm Esbeltez = 48.44	Msdtopo = 3827 kgf.m Msdbase = 2651 kgf.m	

#### 16.14.7.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 368 Msdcentro = 314 Msdbase = 233	Madtopo = 50 Madcentro = 25 Madbase = 50 M2d = 181 Mcd = 12	Td = 89 kgf.m	3 ø 16.0 2 ø 16.0	1.3G1+1.4G2+1.12Q+1.1A+1.4V4+0.84D4 Msd(x) = 368 kgf.m Msd(y) = 3877 kgf.m Mrd(x) = 460 kgf.m Mrd(y) = 4855 kgf.m Mrd/Msd=1.25
H	Msdtopo = 3827 Msdcentro = 3356 Msdbase = 2651	Madtopo = 50 Madcentro = 25 Madbase = 50 M2d = 206	Asl = 0.33 cm <sup>2</sup>	6ø16.0 12.06 cm <sup>2</sup> 2.4 %	

		Mcd = 75			
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#### 16.14.7.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.16 tf VBd base = 0.16 tf VHd topo = 0.85 tf VHd base = 0.85 tf	Td = 89 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.16 tf VRd2 = 19.35 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.11
H	Vd = 0.85 tf VRd2 = 20.57 tf	Td = 89 kgf.m TRd2 = 839 kgf.m	Vd/VRd2 + Td/TRd2 = 0.15

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.20 cm Vc0 = 3.30 tf k = 1.60 Vc = 5.28 tf	Vmin = 1.38 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 20.20 cm Vc0 = 3.51 tf k = 1.11 Vc = 3.89 tf	Vmin = 1.83 tf Aswmin = 2.32 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 5.56 cm Ae = 160.16 cm²	A90 = 0.64 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf Asw = 0.01 cm²	Asw = 2.32 cm²/m ø 5.0 c/16



### 16.14.8 Cálculo dos Pilares

<b>cobertura</b>	$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E = 268384 \text{ kgf/cm}^2$	Peso Espec = $2500.00 \text{ kgf/m}^3$
<b>Lance 3</b>		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	20.00 X 25.00	RR 60.55 RR 18.68	11.77 7.28	1256 5729	1263 5762	1.01	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P2	20.00 X 25.00	RR 60.55 RR 48.44	14.45 9.09	1864 2959	2080 3302	1.12	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P3	20.00 X 25.00	RR 60.55 RR 48.44	7.86 4.01	3036 705	3023 702	1.00	2.45 (2 ø 12.5) 4.91 (4 ø 12.5)
P6	20.00 X 25.00	RR 60.55 RR 18.68	11.74 7.17	1335 5679	1334 5676	1.00	6.03 (3 ø 16.0) 8.04 (4 ø 16.0)
P7	20.00 X 25.00	RR 60.55 RR 48.44	14.35 9.12	2076 2679	2279 2941	1.10	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)
P8	20.00 X 25.00	RR 60.55 RR 48.44	7.86 4.40	368 3877	460 4855	1.25	6.03 (3 ø 16.0) 4.02 (2 ø 16.0)

### 16.15 VIGAS - PAVIMENTO COBERTURA

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V1	0.11 2026.12 1750.19 0.11	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	-26.65 -2681.17 -4152.68 -1955.26 -17.01	2 ø 10.0 2 ø 12.5 2 ø 16.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	Aviso 101
V2	0.11 1982.56 1368.72 0.11	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	-26.91 -2631.92 -4188.03 -1504.32 -16.09	2 ø 10.0 2 ø 12.5 2 ø 16.0 2 ø 10.0 2 ø 10.0	2 ø 8.0 2 ø 8.0 2 ø 8.0	Aviso 101
V3	0.11	2 ø 10.0	2 ø 8.0	-13.41	2 ø 10.0		



	5183.96 0.11	2 ø 16.0 2 ø 10.0	2 ø 8.0	-5957.87 -5986.41 -12.22	2 ø 16.0 2 ø 16.0 2 ø 10.0	2 ø 8.0 2 ø 8.0	
V4	6561.06	4 ø 12.5		-4134.32 -4379.29	3 ø 12.5 3 ø 12.5		
V5	0.11 5501.54 0.11	2 ø 10.0 2 ø 16.0 2 ø 10.0	2 ø 8.0	-27.00 -3975.60 -3193.22 -26.65	2 ø 10.0 3 ø 12.5 2 ø 12.5 2 ø 10.0	2 ø 8.0 2 ø 8.0	Aviso 101

### 16.15.1 Esforços da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 1o (cm )	Lar g Bar ra (cm )	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		V d (tf )	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			N d (tf )	R d (tf )					
		0.00											
1	157. 76 147. 76	147. 76	200. 00	0.00			0. 43	- 0. 01	1. 40				- 26.6 5  - 1693 .45
P1		20.0 0								2.3 3			
2		213. 49	200. 00	0.00			0. 82	- 0. 16	2. 67		2026 .12	2012 .29	- 2681 .17
		0.00											
3		135. 26	200. 00	0.00			0. 13	- 0. 21	4. 90			2012 .29	- 3940 .69
P2		20.0 0								5.7 5			
4	343. 25 321. 25	321. 25	200. 00	0.00			0. 09	- 0. 19	4. 24		1750 .19	1574 .58	- 4152 .68

												- 1955 .26
P3		25.0 0							1.5 9			
5	86.9 9 74.9 9	74.9 9	200. 00	0.00			0. 05	0. 00	0. 88			- 643. 19  - 17.0 1
		0.00										

### 16.15.2 Esforços da Viga V2

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 10 (cm )	Lar g Bar ra (cm )	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		V d (tf )	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid · (kgf/ m)			N d (tf )	R d (tf )					
		0.00											
1	157. 76 147. 76	147. 76	200. 00	0.00			0. 45	- 0. 01	1. 40				- 26.9 1  - 1705 .20
P6		20.0 0								2.3 0			
2		213. 49	200. 00	0.00			0. 77	- 0. 14	2. 67		1982 .56	43.2 2 1956 .05	- 2631 .92
		0.00											
3		135. 26	200. 00	0.00			0. 16	- 0. 20	5. 10			1956 .05	- 4188 .03
P7		20.0 0								5.8 2			



4	346. 25 326. 25	326. 25	200. 00	0.00			0. 12	- 0. 15	4. 07		1368 .72	997. 73	- 3993 .37 - 1504 .32
P8		20.0 0								1.4 6			
5	84.9 9 74.9 9	74.9 9	200. 00	0.00			0. 04	- 0. 01	0. 84				- 601. 50 - 16.0 9
		0.00											

### 16.15.3 Esforços da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 10 (cm )	Lar g Bar ra (cm )	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		Vd (tf )	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid - (kgf/ m)			N d (tf )	R d (tf )					
		0.00											
1	87.0 4 75.0 4	75.0 4	200. 00	0.00			0. 00	- 0. 89	0. 91				- 13.4 1 - 602. 64
P6		25.0 0								5.9 0			
2	643. 95 619. 95	619. 95	200. 00	0.00			4. 30	0. 00	7. 48		5183 .96		- 5957 .87 - 5986 .41
P1		25.0 0								5.9 1			
3	86.9 6 74.9 6	74.9 6	200. 00	0.00			0. 00	- 0. 91	0. 91				- 593. 61

													- 12.2 2
		0.00											

#### 16.15.4 Esforços da Viga V4

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 1o (cm)	Lar g Bar ra (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			N d (tf)	R d (tf)					
P7		25.00								4.37			
1	643.91 619.91	619.91	200.00	0.00			0.84	0.00	6.53		6561.06		- 4134.32  - 4379.29
P2		25.00								4.52			

#### 16.15.5 Esforços da Viga V5

$f_{ck} = 300.00 \text{ kgf/cm}^2$	$E_{cs} = 268384 \text{ kgf/cm}^2$
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados							Envoltória						
Pilar Trec ho	Apo io 1 e 1o (cm)	Lar g Bar ra (cm)	Carga distribuída		Temper atura Caso T1 Caso T2 (°C)	Retra ção (‰)	Esforç o axial		Vd (tf)	Rm áx (tf)	Mdm áx (kgf. m)	Md+ (kgf. m)	Md- (kgf. m)
			Per m. (kgf/ m)	Acid . (kgf/ m)			N d (tf)	R d (tf)					
		0.00											
1	87.04 75.04	75.04	200.00	0.00			0.00	- 0.09	0.87				- 27.00  - 678.01

P8		25.0 0								3.9 5			
2	646. 95 624. 95	624. 95	200. 00	0.00			0. 47	0. 00	5. 08		5501 .54		- 3975 .60 - 3193 .22
P3		20.0 0								3.6 9			
3	84.9 6 74.9 6	74.9 6	200. 00	0.00			0. 00	- 0. 07	0. 88				- 662. 37 - 26.6 5
		0.00											

### 16.15.6 Resultados da Viga V1

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
				2 ø 10.0 1.20					0.00
1	147.76	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
P1	20.00		2 ø 8.0 0.36	2 ø 12.5 2.08					0.06
2	348.75	20.00 x 40.00	2 ø 10.0 1.29	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.12
P2	20.00		2 ø 8.0 0.36	2 ø 16.0 3.08					0.11
3	321.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.03
P3	25.00		2 ø 8.0 0.36	2 ø 10.0 1.60					0.02
4	74.99	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00

				2 ø 10.0 1.20					0.00
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### 16.15.7 Resultados da Viga V2

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
				2 ø 10.0 1.20					0.00
1	147.76	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
P6	20.00		2 ø 8.0 0.36	2 ø 12.5 2.05					0.05
2	348.75	20.00 x 40.00	2 ø 10.0 1.26	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.11
P7	20.00		2 ø 8.0 0.36	2 ø 16.0 3.11					0.11
3	326.25	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.03
P8	20.00		2 ø 8.0 0.36	2 ø 10.0 1.38					0.01
4	74.99	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

### 16.15.8 Resultados da Viga V3

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)

				2 ø 10.0 1.20					0.00
1	75.04	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.25		ø 5.0 c/ 17			0.00
P6	25.00		2 ø 8.0 0.25	2 ø 16.0 4.11					0.29
2	619.95	20.00 x 40.00	2 ø 16.0 3.44			ø 5.0 c/ 17			0.22
P1	25.00		2 ø 8.0 0.25	2 ø 16.0 4.13					0.29
3	74.96	20.00 x 40.00	2 ø 10.0 1.20	2 ø 8.0 0.25		ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

#### 16.15.9 Resultados da Viga V4

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)
P7	25.00			3 ø 12.5 2.70					0.09
1	619.91	20.00 x 40.00	4 ø 12.5 4.41			ø 5.0 c/ 17			0.14
P2	25.00			3 ø 12.5 2.86					0.11

#### 16.15.10 Resultados da Viga V5

fck = 300.00 kgf/cm <sup>2</sup>	Ecs = 268384 kgf/cm <sup>2</sup>
Cobrimento = 2.00 cm	Peso específico = 2500.00 kgf/m <sup>3</sup>

Dados			Resultados						
Pilar Trecho	Apoio 1 e 1o (cm)	Seção (cm)	As Inf (cm <sup>2</sup> )	As Sup (cm <sup>2</sup> )	As esq trecho (cm <sup>2</sup> )	Asw min (cm <sup>2</sup> )	As dir trecho (cm <sup>2</sup> )	Asw Pele (cm <sup>2</sup> )	Fissura (mm)



				2 ø 10.0 1.20					0.00
1	75.04	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
P8	25.00		2 ø 8.0 0.36	3 ø 12.5 2.95					0.07
2	624.95	20.00 x 40.00	2 ø 16.0 3.67	2 ø 8.0 0.36		ø 5.0 c/ 13		2x3 ø 6.3	0.24
P3	20.00		2 ø 8.0 0.36	2 ø 12.5 2.42					0.11
3	74.96	20.00 x 40.00	2 ø 10.0 1.20			ø 5.0 c/ 17			0.00
				2 ø 10.0 1.20					0.00

## 16.16 LAJES – PAVIMENTO COBERTURA

### 16.16.1 Dados das Lajes

<b>cobertura</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 3</b>		cobr = 3.00 cm	

Seção (cm)						Cargas (kgf/m²)				Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Laje	Tipo	H	ee ec	en ey	ee xy	Peso Próprio	Acidental Revestimento	Paredes Outras	Total		
L1	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L2	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L3	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L4	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L5	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		
L6	Maciça	10				250.00	50.00 154.50	0.00 0.00	454.50		

L7	Maciça	10			250.00	50.00	0.00	454.50		
L8	Maciça	10			250.00	50.00	0.00	454.50		
L9	Maciça	10			250.00	50.00	0.00	454.50		
L10	Maciça	10			250.00	50.00	0.00	454.50		

### 16.16.2 Resultados da Laje

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.00 cm	

Nome	Espessura (cm)	Carga (kgf/m <sup>2</sup> )	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Asx	Asy
L1	10	454.50	10	16	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L2	10	454.50	20	128	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L3	10	454.50	20	19	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L4	10	454.50	20	327	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.86 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
L5	10	454.50	286	401	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.55 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L6	10	454.50	293	419	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.62 cm <sup>2</sup> /m (ø6.3 c/19 - 1.64 cm <sup>2</sup> /m)
L7	10	454.50	12	337	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.91 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
L8	10	454.50	10	16	As = 1.01 cm <sup>2</sup> /m (ø5.0 c/19 - 1.03 cm <sup>2</sup> /m)	As = 1.28 cm <sup>2</sup> /m (ø6.3 c/20 - 1.56 cm <sup>2</sup> /m)
L9	10	454.50	19	136	As = 1.01 cm <sup>2</sup> /m	As = 1.28 cm <sup>2</sup> /m

					(ø5.0 c/19 - 1.03 cm²/m)	(ø6.3 c/20 - 1.56 cm²/m)
L10	10	454.50	20	20	As = 1.01 cm²/m (ø5.0 c/19 - 1.03 cm²/m)	As = 1.28 cm²/m (ø6.3 c/20 - 1.56 cm²/m)

ARMADURA NEGATIVA							
Dados				Resultados			
Viga	Trecho	Laje 1	Laje 2	Reação 1 (kgf/m)	Reação 2 (kgf/m)	Md (kgf.m/m)	As (cm²)
V4	1	L6	L5	591	575	-485	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V2	4	L6	L9	417	349	-337	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V5	2	L6	L7	493	309	-264	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V1	4	L6	L2	442	344	-328	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V5	1	L9	L10	246	170	-295	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V2	3	L9	L5	374	381	-279	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V2	2	L9	L5	250	164	-296	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V3	1	L9	L8	196	218	-284	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V1	3	L2	L5	367	358	-278	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V5	3	L2	L3	292	179	-320	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V3	3	L2	L1	195	221	-283	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V1	2	L2	L5	252	167	-296	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V1	1	L1	L4	257	49	-337	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)
V1	5	L3	L7	195	285	-301	As = 1.81 cm²/m (ø8.0 c/20 - 2.51 cm²/m)



V2	1	L4	L8	54	260	-339	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)
V3	2	L4	L5	681	789	-620	As = 3.53 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m)
V2	5	L7	L10	244	205	-320	As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)

### 16.16.3 Cálculos das Lajes

<b>cobertura</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 3</b>		cobr = 3.00 cm	

ARMADURAS POSITIVAS (LAJE)												
L a j e	Dire ção	Momento positivo				Momento negativo				Arm adur a inferi or	Arm adur a supe rior	Cisalh ament o
		Se ção	Fle xão	Verific ação axial (compr essão)	Verifi cação o axial (tração)	Se ção	Fle xão	Verific ação axial (compr essão)	Verifi cação o axial (tração)			
L 1	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			bw = 10 0.0 cm h = 10. 0 cm	Md = 393 kgf. m/ m As = 1.3 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 1.25 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.10 cm <sup>2</sup> /m		Fd = 0.06 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m)		vsd = 0.68 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m



			1.2 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m					fiss = 0.00 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 2	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.15 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 1.23 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.31 tf Situaç ão: GE As = 0.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm	Md = 464 kgf. m/ m As = 1.8 1 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.31 tf Situaç ão: GE As = 1.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.03 mm		vsd = 2.00 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 3	X	bw = 10 0.0 cm	Md = 336 kgf. m/ m		Fd = 0.13 tf Situaç ão: GE	bw = 10 0.0 cm				As = 1.01 cm <sup>2</sup> / m ø5.0 c/19		vsd = 0.70 tf/m vrd1 = 4.72 tf/m



		h = 10.0 cm	As = 0.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	h = 10.0 cm				(1.03 cm <sup>2</sup> /m) fiss = 0.00 mm		Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 1.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm				As = 1.28 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 0.71 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 4	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.81 tf Situação: GE As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm	Md = 853 kgf. m/m As = 3.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.81 tf Situação: GE As = 3.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 2.48 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10	Md = 474			bw = 10	Md = 492			As = 1.86		vsd = 1.75 tf/m



		0.0 cm h = 10.0 cm	kgf. m/ m As = 1.86 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			0.0 cm h = 10.0 cm	kgf. m/ m As = 1.93 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.08 mm		vrđ1 = 4.64 tf/m vrđ2 = 28.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 5	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/ m As = 0.98 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.78 tf Situaç ão: GE As = 0.94 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm	Md = 620 kgf. m/ m As = 2.25 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.78 tf Situaç ão: GE As = 2.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.15 mm		vsd = 1.65 tf/m vrđ1 = 4.72 tf/m Modelo I vrđ2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10.0 cm h = 10.0 cm	Md = 401 kgf. m/ m As = 1.54 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.07 tf Situaç ão: GE As = 1.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm	Md = 296 kgf. m/ m As = 1.13 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.07 tf Situaç ão: GE As = 1.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.55 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.11 mm		vsd = 0.91 tf/m vrđ1 = 4.48 tf/m vrđ2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



L 6	X	bw = 10 0.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.34 tf Situação: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10.0 cm	Md = 485 kgf. m/m As = 1.7 2 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.34 tf Situação: GE As = 1.78 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m) fiss = 0.15 mm		vsd = 0.93 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
		bw = 10 0.0 cm h = 10.0 cm	Md = 419 kgf. m/m As = 1.6 1 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.07 tf Situação: GE As = 1.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10.0 cm	Md = 337 kgf. m/m As = 1.2 9 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.07 tf Situação: GE As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.62 cm <sup>2</sup> /m ø6.3 c/19 (1.64 cm <sup>2</sup> /m) fiss = 0.11 mm		vsd = 0.91 tf/m vrd1 = 4.50 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	X	bw = 10 0.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0		Fd = 0.17 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10.0 cm				As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 0.78 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m





			0 cm <sup>2</sup> /m									asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 488 kgf. m/ m As = 1.9 1 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			bw = 10 0.0 cm h = 10. 0 cm	Md = 464 kgf. m/ m As = 1.8 1 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			As = 1.91 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m) fiss = 0.08 mm		vsd = 1.72 tf/m vrd1 = 4.64 tf/m vrd2 = 28.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 8	X	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 0.9 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			bw = 10 0.0 cm h = 10. 0 cm	Md = 394 kgf. m/ m As = 1.3 9 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m			As = 1.01 cm <sup>2</sup> / m ø5.0 c/19 (1.03 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 1.25 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m	Fd = 0.06 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		bw = 10 0.0 cm h = 10. 0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 0.68 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m



			A's = 0.00 cm <sup>2</sup> /m								asw = 0.00 cm <sup>2</sup> /m
L 9	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.98 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.12 tf Situação: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm				As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m) fiss = 0.00 mm	vsd = 1.22 tf/m vrd1 = 4.72 tf/m Modelo I vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 1.28 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.32 tf Situação: GE As = 0.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm	Md = 428 kgf. m/m As = 1.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.32 tf Situação: GE As = 1.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.28 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.03 mm	vsd = 2.01 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L 10	X	bw = 10.0 cm h = 10.0 cm	Md = 336 kgf. m/m As = 0.98 cm <sup>2</sup> /m		Fd = 0.14 tf Situação: GE As = 0.10 cm <sup>2</sup> /m	bw = 10.0 cm h = 10.0 cm				As = 1.01 cm <sup>2</sup> /m ø5.0 c/19 (1.03 cm <sup>2</sup> /m)	vsd = 0.69 tf/m vrd1 = 4.72 tf/m Modelo I



			8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m					fiss = 0.00 mm		vrd2 = 31.82 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	bw = 10 0.0 cm h = 10. 0 cm	Md = 336 kgf. m/ m As = 1.2 8 cm <sup>2</sup> /m A's = 0.0 0 cm <sup>2</sup> /m		Fd = 0.17 tf Situaç ão: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 10 0.0 cm h = 10. 0 cm				As = 1.28 cm <sup>2</sup> / m ø6.3 c/20 (1.56 cm <sup>2</sup> / m) fiss = 0.00 mm		vsd = 0.72 tf/m vrd1 = 4.48 tf/m vrd2 = 28.94 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)										
Viga Trecho	Laje 1	Momento negativo				Momento positivo				Armaduras finais
	Laje 2	Seção	Flexão	Flexo compressão	Flexo tração	Seção	Flexão	Flexo compressão	Flexo tração	
V4 1	L6 L5	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.34 tf Situaç ão: GE As = 1.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V2 4	L6 L9	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m		Fd = 0.11 tf Situaç ão: GE As = 1.78 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)



			As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m					fiss = 0.07 mm
V5 2	L6 L7	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.26 tf Situaç ão: GE As = 1.41 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V1 4	L6 L2	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situaç ão: GE As = 1.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V5 1	L9 L1 0	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.15 tf Situaç ão: GE As = 1.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V2 3	L9 L5	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.12 tf Situaç ão: GE As = 1.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V2 2	L9 L5	bw = 100. 0 cm	Md = 502 kgf.m/ m		Fd = 0.12 tf Situaç ão: GE	bw = 100. 0 cm				As = 1.81 cm <sup>2</sup> /m



		h = 10.0 cm	As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	h = 10.0 cm				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V3 1	L9 L8	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm
V1 3	L2 L5	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V5 3	L2 L3	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.25 tf Situaç ão: GE As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V3 3	L2 L1	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.05 mm



V1 2	L2 L5	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V1 1	L1 L4	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V1 5	L3 L7	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.06 mm
V2 1	L4 L8	bw = 100.0 cm h = 10.0 cm	Md = 502 kgf.m/m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			bw = 100.0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm
V3 2	L4 L5	bw = 100.0 cm h = 10.0 cm	Md = 899 kgf.m/m  As = 3.39 cm <sup>2</sup> /m		Fd = 0.81 tf Situação: GE As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100.0 cm h = 10.0 cm				As = 3.53 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.14 mm



			A's = 0.00 cm <sup>2</sup> /m							
V2 5	L7  L1 0	bw = 100. 0 cm h = 10.0 cm	Md = 502 kgf.m/ m  As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situaç ão: GE As = 1.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	bw = 100. 0 cm h = 10.0 cm				As = 1.81 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.07 mm

## 16.17 RESERVATÓRIO - PAVIMENTO TAMPA DO POÇO

### 16.17.1 Dados dos Reservatórios

<b>tampa do poço</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (%)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Parades Outras	Total	Base	Topo		
L1 (RES 1)	18.00	0.00	2904.4.00	450.00 kgf/m <sup>2</sup>	150.00 154.50	0.00 0.00	754.50 kgf/m <sup>2</sup>				
L1 (RES 1)	20.00	0.00	2863.9.00	500.00 kgf/m <sup>2</sup>	150.00 154.50	0.00 0.00	4854.50 kgf/m <sup>2</sup>				
L2 (RES 1)	20.00	0.00	2868.9.00	500.00 kgf/m <sup>2</sup>	150.00 154.50	0.00 0.00	4354.50 kgf/m <sup>2</sup>				
PAR1-A (RES 1)	20.00	0.00	2904.4.00	1775.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		
PAR1-B	20.00	0.00	2904.4.00	1775.00	0.00 0.00	0.00 0.00	0.00 kgf/m	2974.00	0.00		



(RES 1)				kgf/m							
PAR2 (RES 1)	20.00	0.00	2904.400	1775.00 kgf/m	0.00	0.00	0.00 kgf/m	2974.00	0.00		
PAR3 -A (RES 1)	20.00	0.00	2904.400	1775.00 kgf/m	0.00	0.00	0.00 kgf/m	2974.00	0.00		
PAR3 -B (RES 1)	20.00	0.00	2904.400	1775.00 kgf/m	0.00	0.00	0.00 kgf/m	2974.00	0.00		
PAR3 -C (RES 1)	20.00	0.00	2904.400	1775.00 kgf/m	0.00	0.00	0.00 kgf/m	2974.00	0.00		
PAR4 (RES 1)	20.00	0.00	2904.400	1775.00 kgf/m	0.00	0.00	0.00 kgf/m	2974.00	0.00		
PAR5 (RES 1)	20.00	0.00	2904.400	2025.00 kgf/m	0.00	0.00	0.00 kgf/m	3234.00	0.00		
PAR6 (RES 1)	20.00	0.00	2904.400	1775.00 kgf/m	0.00	0.00	0.00 kgf/m	2974.00	0.00		
PAR7 (RES 1)	20.00	0.00	2868.900	250.00 kgf/m	0.00	0.00	0.00 kgf/m	4050.00	3550.00		
PAR8 (RES 1)	20.00	0.00	2868.900	250.00 kgf/m	0.00	0.00	0.00 kgf/m	4050.00	3550.00		
PAR9 (RES 1)	20.00	0.00	2868.900	250.00 kgf/m	0.00	0.00	0.00 kgf/m	4050.00	3550.00		

## 16.17.2 Resultados do Reservatório

<b>tampa do poço</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	





16.17.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	3.58 -2.73	3.46 -2.57	1165	987	As = 2.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 1.92 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
L1	6.17 -4.91	29.35 -6.21	1711	1126	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.79 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.02 cm <sup>2</sup> /m ø10.0 c/19 (4.13 cm <sup>2</sup> /m)	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
L2	6.01 - 11.60	8.67 -9.64	3520	2264	As = 4.69 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	As = 6.69 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	A's = 8.52 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	A's = 6.67 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)
PAR1- A	10.11 - 10.16	9.81 - 32.02	1232	1531	As = 3.42 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	A's = 2.14 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.26 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR1- B	2.60 -5.83	4.92 -3.70	1794	895	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.29 cm <sup>2</sup> /m ø10.0 c/18 (4.36 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2	6.35 - 10.31	9.96 - 31.62	668	1557	As = 2.61 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m)	A's = 2.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.18 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR3- A	2.65 -5.87	4.80 -3.70	1541	1350	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20	A's = 3.15 cm <sup>2</sup> /m ø10.0 c/20	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20



					(3.93 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)	(3.93 cm <sup>2</sup> /m)
PAR3-B	0.82 -5.60	3.22 0.00	465	1459	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.20 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR3-C	2.53 -6.03	4.85 -3.55	687	1345	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.65 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR4	12.40 -9.54	18.10 - 32.50	708	491	As = 2.38 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 6.20 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	A's = 2.63 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.30 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR5	5.34 - 15.01	17.97 -1.08	1295	2086	As = 5.10 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	As = 4.93 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	A's = 3.06 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR6	12.65 -9.54	20.81 - 32.48	695	506	As = 2.40 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 6.21 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	A's = 2.63 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 6.33 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)
PAR7	8.94 - 21.96	9.62 -1.05	1032	1323	As = 3.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.86 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	A's = 2.18 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR8	8.77 - 22.29	9.73 -1.08	1090	1328	As = 3.39 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 5.00 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	A's = 2.19 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR9	30.45 - 11.17	4.24 -0.81	581	958	As = 2.42 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m	A's = 2.57 cm <sup>2</sup> /m	A's = 2.03 cm <sup>2</sup> /m



					ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
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ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR5	-1047		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR5 L1	-1321		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR7	-210		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 L1	-1124		As = 4.86 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m)	
Barra	L1 PAR9	-212		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 L1	-290		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR8	-212		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR8 L1	-1126		As = 5.02 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m)	
Barra	PAR5 PAR8	-2290		As = 6.64 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	
Barra	PAR8 PAR5	-128		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 PAR5	-2252		As = 7.24 cm <sup>2</sup> /m ø10.0 c/10	



				(7.85 cm <sup>2</sup> /m)	
Barra	PAR5 PAR7	-137		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR9	-345		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 L2	-1379		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 PAR9	-788		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 PAR7	-246		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR8 PAR9	-247		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR9 PAR8	-804		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR8	-392		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR8 L2	-1328		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR7	-395		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR7 L2	-1323		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR3-B	-832		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B L2	-890		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	



Barra	L2 PAR3-C	-512		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C L2	-876		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR2	-764		As = 6.50 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	PAR2 L2	-2264		As = 9.51 cm <sup>2</sup> /m ø10.0 c/8 (9.82 cm <sup>2</sup> /m)	
Barra	L2 PAR4	-1090		As = 7.17 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR4 L2	-2356		As = 8.92 cm <sup>2</sup> /m ø10.0 c/8 (9.82 cm <sup>2</sup> /m)	
Barra	L2 PAR6	-1032		As = 7.07 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m)	
Barra	PAR6 L2	-2465		As = 8.91 cm <sup>2</sup> /m ø10.0 c/8 (9.82 cm <sup>2</sup> /m)	
Barra	L2 PAR1-A	-684		As = 6.41 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	PAR1-A L2	-2181		As = 8.84 cm <sup>2</sup> /m ø10.0 c/8 (9.82 cm <sup>2</sup> /m)	
Barra	L2 PAR1-B	-135		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B L2	-756		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR3-A	-530		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A L2	-827		As = 3.00 cm <sup>2</sup> /m	



				ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR1-A	-962		As = 7.22 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR1-A L1	-581		As = 6.42 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	PAR1-A PAR6	-3175		As = 7.39 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR6 PAR1-A			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-A PAR1-B	-519		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR1-A			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR1-B	-840		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B L1	-146		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR3-A			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A PAR1-B	-2711		As = 6.37 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	L1 PAR3-A	-906		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A L1	-435		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A PAR3-B	-494		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	



Barra	PAR3-B PAR3-A	-6		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR3-B	-1165		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B L1	-490		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B PAR3-C	-489		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C PAR3-B	-10		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR3-C	-892		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C L1	-490		As = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3-C	-2716		As = 6.38 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m)	
Barra	PAR3-C PAR2			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-987		As = 7.21 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-155		As = 5.47 cm <sup>2</sup> /m ø10.0 c/14 (5.61 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2	-3187		As = 7.42 cm <sup>2</sup> /m ø10.0 c/10 (7.85 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4			As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L1 PAR6	-1533		As = 8.41 cm <sup>2</sup> /m	

				ø10.0 c/9 (8.73 cm²/m)	
Barra	PAR6 L1	-137		As = 5.49 cm²/m ø10.0 c/14 (5.61 cm²/m)	
Barra	PAR6 PAR5	-1136		As = 3.18 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR5 PAR6	-331		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR4	-1896		As = 9.51 cm²/m ø10.0 c/8 (9.82 cm²/m)	
Barra	PAR4 L1	-143		As = 5.45 cm²/m ø10.0 c/14 (5.61 cm²/m)	
Barra	PAR5 PAR4	-1057		As = 3.07 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	PAR4 PAR5	-345		As = 3.00 cm²/m ø10.0 c/20 (3.93 cm²/m)	
Barra	L1 PAR5	-1896		As = 5.11 cm²/m ø10.0 c/15 (5.24 cm²/m)	
Barra	PAR5 L1	-459		As = 2.70 cm²/m ø10.0 c/20 (3.93 cm²/m)	

### 16.17.3 Cálculos do Reservatório

<b>tampa do poço</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 3.00 cm	

#### 16.17.3.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura	Armadura	Cisalhamento
		Flexão	Verificação	Verificação	Flexão	Verificação	Verificação			





			axial (compre ssão)	axial (traçã o)		axial (compre ssão)	axial (traçã o)	inferi or	super ior	
L1	X	Md = 1090 kgf. m/m As = 1.75 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.58 tf Situação : GE As = 1.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.27 tf Situação: GE As = 2.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1165 kgf. m/m As = 1.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.58 tf Situação : GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.27 tf Situação: GE As = 2.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.04 mm		vsd = 2.64 tf/m vrd1 = 9.99 tf/m Modelo I vrd2 = 71.28 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1090 kgf. m/m As = 1.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.46 tf Situação : GE As = 0.93 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.09 tf Situação: GE As = 1.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 987 kgf. m/m As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.46 tf Situação : GE As = 1.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.09 tf Situação: GE As = 2.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.92 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.04 mm		vsd = 2.29 tf/m vrd1 = 9.43 tf/m vrd2 = 66.19 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 1346 kgf. m/m As = 1.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.17 tf Situação : GE As = 1.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situação: GE As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 1711 kgf. m/m As = 2.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.17 tf Situação : GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situação: GE As = 3.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.68 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.07 mm	A's = 3.09 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 6.50 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134		Fd = 7.46 tf	Md = 348		Fd = 7.46 tf	As = 2.79 cm <sup>2</sup> /m	A's = 3.00 cm <sup>2</sup> /m	vsd = 4.91 tf/m



		6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: GE As = 2.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	kgf. m/m  As = 0.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: GE As = 1.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vrđ1 = 10.55 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L2	X	Md = 140 8 kgf. m/m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.01 tf Situação : GE As = 1.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 13.92 tf Situaç ão: GE As = 3.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 352 0 kgf. m/m  As = 5.09 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 6.01 tf Situação : GE As = 4.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 13.92 tf Situaç ão: GE As = 6.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 4.69 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m ) fiss = 0.08 mm	A's = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 7.02 tf/m vrđ1 = 11.31 tf/m Modelo I vrđ2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 226 4 kgf. m/m  As = 3.45 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 8.67 tf Situação : GE As = 2.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.57 tf Situaç ão: GE As = 5.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 224 8 kgf. m/m  As = 3.43 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 8.67 tf Situação : GE As = 2.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.57 tf Situaç ão: GE As = 5.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 6.69 cm <sup>2</sup> /m ø10.0 c/11 (7.14 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 3.15 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 12.95 tf/m vrđ1 = 11.23 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1- A	X	Md = 134 6 kgf. m/m  As = 1.90	Fd = 10.11 tf Situação : GE As = 0.36 cm <sup>2</sup> /m	Fd = 12.19 tf Situaç ão: GE As = 3.42 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90		Fd = 12.19 tf Situaç ão: PE As = 2.14 cm <sup>2</sup> /m	As = 3.42 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	A's = 2.14 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 6.94 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	A's = 0.00 cm <sup>2</sup> /m	A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.73 cm <sup>2</sup> /m	fiss = 0.10 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 153 1 kgf. m/m  As = 2.31 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.81 tf Situação : GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação: PE As = 7.62 cm <sup>2</sup> /m A's = 2.29 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 38.42 tf Situação: PE As = 5.48 cm <sup>2</sup> /m A's = 3.36 cm <sup>2</sup> /m	As = 8.40 cm <sup>2</sup> /m ø10.0 c/9 (8.73 cm <sup>2</sup> /m ) fiss = 0.08 mm	A's = 6.26 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m )	vsd = 5.02 tf/m vrd1 = 11.56 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1- B	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.60 tf Situação : GE As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.99 tf Situação: GE As = 1.66 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 179 4 kgf. m/m  As = 2.55 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.60 tf Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.99 tf Situação: GE As = 3.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.02 mm	A's = 4.29 cm <sup>2</sup> /m ø10.0 c/18 (4.36 cm <sup>2</sup> /m )	vsd = 5.32 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00	Fd = 4.92 tf Situação : GE As = 0.62 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação: GE As = 1.99 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00		Fd = 4.43 tf Situação: PE As = 0.74 cm <sup>2</sup> /m A's = 0.28 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 3.65 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					
PA R2	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = = 0.00 cm <sup>2</sup> / m	Fd = 6.35 tf Situação : GE As = 0.06 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.38 tf Situação: PE As = 2.61 cm <sup>2</sup> / m A's = 0.74 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = = 0.00 cm <sup>2</sup> / m		Fd = 12.38 tf Situação: PE As = 2.15 cm <sup>2</sup> / m A's = 0.74 cm <sup>2</sup> / m	As = 2.61 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m ) fiss = 0.05 mm	A's = 2.15 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 7.01 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 155 7 kgf. m/m  As = 2.35 cm <sup>2</sup> / m A's = = 0.00 cm <sup>2</sup> / m	Fd = 9.96 tf Situação : GE As = 0.91 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 37.94 tf Situação: PE As = 7.62 cm <sup>2</sup> / m A's = 2.26 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = = 0.00 cm <sup>2</sup> / m		Fd = 37.94 tf Situação: PE As = 5.39 cm <sup>2</sup> / m A's = 3.34 cm <sup>2</sup> / m	As = 8.40 cm <sup>2</sup> / m ø10.0 c/9 (8.73 cm <sup>2</sup> / m ) fiss = 0.08 mm	A's = 6.18 cm <sup>2</sup> / m ø10.0 c/12 (6.54 cm <sup>2</sup> / m )	vsd = 4.86 tf/m vrd1 = 11.56 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PA R3- A	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = = 0.00 cm <sup>2</sup> / m	Fd = 2.65 tf Situação : GE As = 0.43 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 7.04 tf Situação: GE As = 1.78 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 154 1 kgf. m/m  As = 2.18 cm <sup>2</sup> / m A's = = 0.00 cm <sup>2</sup> / m	Fd = 2.65 tf Situação : GE As = 1.82 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 7.04 tf Situação: GE As = 3.15 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.01 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m ) fiss = 0.03 mm	A's = 3.15 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 5.22 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 135 0	Fd = 4.80 tf Situação : GE	Fd = 4.43 tf Situação: GE	Md = 134 6		Fd = 4.43 tf Situação: GE	As = 2.68 cm <sup>2</sup> / m	A's = 2.03 cm <sup>2</sup> / m	vsd = 3.63 tf/m



		kgf. m/m  As = 2.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vrđ1 = 10.55 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3- B	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.82 tf Situação : GE As = 0.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.72 tf Situação: GE As = 1.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.82 tf Situação : GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.72 tf Situação: PE As = 1.11 cm <sup>2</sup> /m A's = 0.43 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.02 mm	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 0.48 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 145 9 kgf. m/m  As = 2.20 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 3.22 tf Situação : GE As = 1.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 3.22 tf Situação : GE As = 0.25 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 2.20 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.06 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 4.07 tf/m vrđ1 = 10.55 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R3- C	X	Md = 134 6 kgf. m/m  As = 1.90	Fd = 2.53 tf Situação : GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.23 tf Situação: GE As = 1.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90	Fd = 2.53 tf Situação : GE As = 0.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.23 tf Situação: GE As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	A's = 2.01 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 5.22 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			fiss = 0.03 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 4.85 tf Situação : GE As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação: GE As = 2.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 4.85 tf Situação : GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação: GE As = 1.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.65 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.07 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 3.61 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R4	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.44 tf Situação: PE As = 2.38 cm <sup>2</sup> /m A's = 0.68 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.44 tf Situação: GE As = 2.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.38 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.63 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 6.34 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00		Fd = 39.00 tf Situação: PE As = 5.42 cm <sup>2</sup> /m A's = 3.55 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00		Fd = 39.00 tf Situação: PE As = 5.51 cm <sup>2</sup> /m A's = 3.46 cm <sup>2</sup> /m	As = 6.20 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m ) fiss = 0.08 mm	A's = 6.30 cm <sup>2</sup> /m ø10.0 c/12 (6.54 cm <sup>2</sup> /m )	vsd = 6.28 tf/m vrd1 = 11.10 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					
PA R5	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.34 tf Situação : GE As = 1.10 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 18.01 tf Situação: GE As = 4.32 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 5.34 tf Situação : GE As = 0.05 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 18.01 tf Situação: PE As = 3.06 cm <sup>2</sup> / m A's = 1.08 cm <sup>2</sup> / m	As = 5.10 cm <sup>2</sup> / m ø10.0 c/15 (5.24 cm <sup>2</sup> / m ) fiss = 0.08 mm	A's = 3.06 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 5.07 tf/m vrd1 = 11.38 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 208 6 kgf. m/m  As = 3.17 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 17.97 tf Situação : GE As = 0.60 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.30 tf Situação: GE As = 3.36 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.30 tf Situação: GE As = 0.85 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 4.93 cm <sup>2</sup> / m ø10.0 c/15 (5.24 cm <sup>2</sup> / m ) fiss = 0.07 mm	A's = 2.03 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 4.91 tf/m vrd1 = 10.83 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PA R6	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.45 tf Situação: PE As = 2.40 cm <sup>2</sup> / m A's = 0.68 cm <sup>2</sup> / m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.45 tf Situação: GE As = 2.63 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 2.40 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m ) fiss = 0.04 mm	A's = 2.63 cm <sup>2</sup> / m ø10.0 c/20 (3.93 cm <sup>2</sup> / m )	vsd = 6.28 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 134 6		Fd = 38.98 tf	Md = 134 6		Fd = 38.98 tf	As = 6.21 cm <sup>2</sup> / m	A's = 6.33 cm <sup>2</sup> / m	vsd = 6.79 tf/m



		kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: PE As = 5.42 cm <sup>2</sup> /m A's = 3.54 cm <sup>2</sup> /m	kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Situaç ão: PE As = 5.54 cm <sup>2</sup> /m A's = 3.43 cm <sup>2</sup> /m	ø10.0 c/12 (6.54 cm <sup>2</sup> /m ) fiss = 0.08 mm	ø10.0 c/12 (6.54 cm <sup>2</sup> /m )	vrđ1 = 11.10 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R7	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 26.36 tf Situaç ão: PE As = 3.34 cm <sup>2</sup> /m A's = 2.72 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 8.94 tf Situação : GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 26.36 tf Situaç ão: PE As = 4.86 cm <sup>2</sup> /m A's = 1.57 cm <sup>2</sup> /m	As = 3.34 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.09 mm	A's = 4.86 cm <sup>2</sup> /m ø10.0 c/16 (4.91 cm <sup>2</sup> /m ) vrđ = 11.86 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.26 tf Situaç ão: GE As = 0.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 9.62 tf Situação : GE As = 0.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.26 tf Situaç ão: GE As = 2.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.18 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) vrđ = 8.83 tf/m vrđ1 = 10.55 tf/m vrđ2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R8	X	Md = 134 6 kgf. m/m  As = 1.90		Fd = 26.75 tf Situaç ão: PE As = 3.39 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90		Fd = 8.77 tf Situação : GE As = 0.34 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 26.75 tf Situaç ão: PE As = 5.00 cm <sup>2</sup> /m	As = 3.39 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	A's = 5.00 cm <sup>2</sup> /m ø10.0 c/15 (5.24 cm <sup>2</sup> /m ) vrđ = 11.96 tf/m vrđ1 = 11.10 tf/m Modelo I vrđ2 = 81.46 tf/m





		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 2.76 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 1.59 cm <sup>2</sup> /m	fiss = 0.09 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 1.30 tf Situação: GE As = 0.88 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 9.73 tf Situação: GE As = 0.59 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.30 tf Situação: GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.01 mm	A's = 2.19 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 8.85 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R9	X	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 13.41 tf Situação: PE As = 2.42 cm <sup>2</sup> /m A's = 0.80 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 1.90 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 13.41 tf Situação: PE As = 2.57 cm <sup>2</sup> /m A's = 0.80 cm <sup>2</sup> /m	As = 2.42 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.04 mm	A's = 2.57 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 2.67 tf/m vrd1 = 11.10 tf/m Modelo I vrd2 = 81.46 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00		Fd = 0.97 tf Situação: PE As = 0.11 cm <sup>2</sup> /m A's = 0.11 cm <sup>2</sup> /m	Md = 134 6 kgf. m/m  As = 2.03 cm <sup>2</sup> / m A's = 0.00	Fd = 4.24 tf Situação: GE As = 0.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.97 tf Situação: GE As = 1.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 2.03 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m )	vsd = 3.07 tf/m vrd1 = 10.55 tf/m vrd2 = 76.37 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m			cm <sup>2</sup> / m					
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ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1 Laje 2	Momento negativo			Momento positivo			Armaduras finais
		Flexão	Flexo compressã o	Flexo tração	Flexã o	Flexo compressã o	Flexo traçã o	
Barra	L1 PAR5	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.60 tf Situação: GE As = 0.43 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situação : GE As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR5 L1	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.60 tf Situação: GE As = 0.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.89 tf Situação : GE As = 2.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	L1 PAR7	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 17.73 tf Situação : PE As = 2.41 cm <sup>2</sup> /m A's = 1.67 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR7 L1	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 17.73 tf Situação : GE As = 4.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 4.86 cm <sup>2</sup> /m (ø10.0 c/16 - 4.91 cm <sup>2</sup> /m) fiss = 0.08 mm



Barra	L1 PAR9	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.48 tf Situação : GE As = 0.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR9 L1	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.48 tf Situação : GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR8	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 18.40 tf Situação : PE As = 2.49 cm <sup>2</sup> /m A's = 1.74 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.05 mm
Barra	PAR8 L1	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 18.40 tf Situação : GE As = 4.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.02 cm <sup>2</sup> /m (ø10.0 c/15 - 5.24 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR5 PAR8	Md = 2290 kgf.m/m As = 3.27 cm <sup>2</sup> /m	Fd = 12.66 tf Situação: GE As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 19.00 tf Situação : GE As = 5.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 6.64 cm <sup>2</sup> /m (ø10.0 c/11 - 7.14 cm <sup>2</sup> /m) fiss = 0.09 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR8 PAR5	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 19.00 tf Situação : PE As = 2.41 cm <sup>2</sup> /m A's = 1.96 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR7 PAR5	Md = 2252 kgf.m/ m  As = 3.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 13.50 tf Situação: GE As = 1.40 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 18.03 tf Situação : GE As = 5.67 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.24 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.07 mm
Barra	PAR5 PAR7	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 18.03 tf Situação : PE As = 2.32 cm <sup>2</sup> /m A's = 1.83 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	L2 PAR9	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.76 tf Situação : GE As = 1.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR9 L2	Md = 2008 kgf.m/ m	Fd = 4.24 tf Situação: GE As = 1.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.76 tf Situação : GE As = 2.60 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.07 mm



		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				
Barra	PAR7 PAR9	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.59 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.71 tf Situação : GE As = 2.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR9 PAR7	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.71 tf Situação : PE As = 1.32 cm <sup>2</sup> /m A's = 0.46 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR8 PAR9	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 7.70 tf Situação : PE As = 1.32 cm <sup>2</sup> /m A's = 0.46 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR9 PAR8	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.71 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 7.70 tf Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	L2 PAR8	Md = 2008 kgf.m/ m		Fd = 4.34 tf Situação : GE				As = 3.00 cm <sup>2</sup> /m



		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 1.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR8 L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.55 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.34 tf Situação : GE As = 2.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	L2 PAR7	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.04 tf Situação : GE As = 1.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR7 L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.75 tf Situação: GE As = 0.27 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.04 tf Situação : GE As = 2.42 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	L2 PAR3 -B	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.00 tf Situação: GE As = 0.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.78 tf Situação : GE As = 2.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR3 -B	Md = 2008	Fd = 3.00 tf Situação: GE	Fd = 6.78 tf				As = 3.00 cm <sup>2</sup> /m



	L2	kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 2.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	L2 PAR3 -C	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.85 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.52 tf Situação : GE As = 1.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3 -C L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.85 tf Situação: GE As = 0.56 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.52 tf Situação : GE As = 1.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L2 PAR2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 37.94 tf Situação : PE As = 5.71 cm <sup>2</sup> /m A's = 3.01 cm <sup>2</sup> /m				As = 6.50 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR2 L2	Md = 2264 kgf.m/ m  As = 3.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.96 tf Situação: GE As = 1.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 37.94 tf Situação : GE As = 8.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 9.51 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.09 mm



Barra	L2 PAR4	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.76 tf Situação : PE As = 6.39 cm <sup>2</sup> /m A's = 2.53 cm <sup>2</sup> /m				As = 7.17 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR4 L2	Md = 2356 kgf.m/m As = 3.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 18.10 tf Situação: GE As = 0.95 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.76 tf Situação : GE As = 8.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 8.92 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	L2 PAR6	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.74 tf Situação : PE As = 6.28 cm <sup>2</sup> /m A's = 2.63 cm <sup>2</sup> /m				As = 7.07 cm <sup>2</sup> /m (ø10.0 c/11 - 7.14 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR6 L2	Md = 2465 kgf.m/m As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 20.81 tf Situação: GE As = 0.76 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.74 tf Situação : GE As = 8.91 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 8.91 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	L2 PAR1-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m		Fd = 38.42 tf Situação : PE As = 5.63 cm <sup>2</sup> /m A's = 3.21 cm <sup>2</sup> /m				As = 6.41 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm





		A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR1 -A  L2	Md = 2181 kgf.m/ m  As = 3.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.81 tf Situação: GE As = 1.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação : GE As = 8.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 8.84 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	L2  PAR1 -B	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.43 tf Situação : PE As = 0.75 cm <sup>2</sup> /m A's = 0.27 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1 -B  L2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.92 tf Situação: GE As = 0.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação : GE As = 1.68 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L2  PAR3 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.80 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.56 tf Situação : GE As = 1.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3 -A  L2	Md = 2008 kgf.m/ m	Fd = 4.80 tf Situação: GE As = 0.50 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.56 tf Situação : GE As = 1.79 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm



		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				
Barra	L1 PAR1 -A	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.33 tf Situação: GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação : PE As = 6.43 cm <sup>2</sup> /m A's = 2.41 cm <sup>2</sup> /m				As = 7.22 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR1 -A  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.42 tf Situação : PE As = 5.63 cm <sup>2</sup> /m A's = 3.20 cm <sup>2</sup> /m				As = 6.42 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR1 -A  PAR6	Md = 3175 kgf.m/ m  As = 4.58 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.41 tf Situação: GE As = 3.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.29 tf Situação : GE As = 5.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.39 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR6  PAR1 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 9.29 tf Situação : PE As = 1.07 cm <sup>2</sup> /m A's = 1.07 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR1 -A	Md = 2008 kgf.m/ m	Fd = 1.11 tf Situação: GE	Fd = 6.60 tf Situação : GE				As = 3.00 cm <sup>2</sup> /m



	PAR1 -B	As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR1 -B  PAR1 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.60 tf Situação : PE As = 0.76 cm <sup>2</sup> /m A's = 0.76 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  PAR1 -B	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.50 tf Situação: GE As = 1.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação : GE As = 1.97 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR1 -B  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 4.43 tf Situação : PE As = 0.81 cm <sup>2</sup> /m A's = 0.21 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR1 -B  PAR3 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.77 tf Situação : PE As = 0.78 cm <sup>2</sup> /m A's = 0.78 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR3 -A	Md = 2711	Fd = 2.65 tf Situação: GE	Fd = 6.77 tf				As = 6.37 cm <sup>2</sup> /m



	PAR1 -B	kgf.m/ m  As = 3.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 4.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	L1  PAR3 -A	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.41 tf Situação: GE As = 1.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação : GE As = 2.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.04 mm
Barra	PAR3 -A  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.41 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.43 tf Situação : GE As = 1.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR3 -A  PAR3 -B	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.91 tf Situação: GE As = 0.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.34 tf Situação : GE As = 1.57 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3 -B  PAR3 -A	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.34 tf Situação : PE As = 0.74 cm <sup>2</sup> /m A's = 0.72 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	L1 PAR3 -B	Md = 1627 kgf.m/ m  As = 2.64 cm²/m A's = 0.00 cm²/m	Fd = 3.03 tf Situação: GE As = 1.45 cm²/m A's = 0.00 cm²/m	Fd = 3.00 tf Situação : GE As = 2.30 cm²/m A's = 0.00 cm²/m				As = 2.70 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.06 mm
Barra	PAR3 -B  L1	Md = 1627 kgf.m/ m  As = 2.64 cm²/m A's = 0.00 cm²/m	Fd = 3.03 tf Situação: GE As = 0.35 cm²/m A's = 0.00 cm²/m	Fd = 3.00 tf Situação : GE As = 1.21 cm²/m A's = 0.00 cm²/m				As = 2.70 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.01 mm
Barra	PAR3 -B  PAR3 -C	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m	Fd = 0.89 tf Situação: GE As = 0.56 cm²/m A's = 0.00 cm²/m	Fd = 6.41 tf Situação : GE As = 1.58 cm²/m A's = 0.00 cm²/m				As = 3.00 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.02 mm
Barra	PAR3 -C  PAR3 -B	Md = 2008 kgf.m/ m  As = 2.86 cm²/m A's = 0.00 cm²/m		Fd = 6.41 tf Situação : PE As = 0.76 cm²/m A's = 0.72 cm²/m				As = 3.00 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.00 mm
Barra	L1 PAR3 -C	Md = 1627 kgf.m/ m  As = 2.64 cm²/m	Fd = 2.35 tf Situação: GE As = 1.10 cm²/m A's = 0.00 cm²/m	Fd = 4.26 tf Situação : GE As = 2.03 cm²/m A's = 0.00 cm²/m				As = 2.70 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.04 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR3 -C  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.35 tf Situação: GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 4.26 tf Situação : GE As = 1.39 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2  PAR3 -C	Md = 2716 kgf.m/ m  As = 3.90 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 2.17 tf Situação: GE As = 3.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.82 tf Situação : GE As = 4.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 6.38 cm <sup>2</sup> /m (ø10.0 c/12 - 6.54 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR3 -C  PAR2	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.82 tf Situação : PE As = 0.78 cm <sup>2</sup> /m A's = 0.78 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  PAR2	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.29 tf Situação: GE As = 0.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 37.94 tf Situação : PE As = 6.43 cm <sup>2</sup> /m A's = 2.30 cm <sup>2</sup> /m				As = 7.21 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR2  L1	Md = 1627 kgf.m/ m		Fd = 37.94 tf Situação : PE As = 4.69 cm <sup>2</sup> /m				As = 5.47 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.08 mm



		As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 4.04 cm <sup>2</sup> /m				
Barra	PAR4 PAR2	Md = 3187 kgf.m/ m  As = 4.60 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.51 tf Situação: GE As = 3.87 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.36 tf Situação : GE As = 5.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 7.42 cm <sup>2</sup> /m (ø10.0 c/10 - 7.85 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR2 PAR4	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 9.36 tf Situação : PE As = 1.08 cm <sup>2</sup> /m A's = 1.08 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	L1 PAR6	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 14.72 tf Situação: GE As = 0.45 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 38.42 tf Situação : PE As = 7.62 cm <sup>2</sup> /m A's = 2.29 cm <sup>2</sup> /m				As = 8.41 cm <sup>2</sup> /m (ø10.0 c/9 - 8.73 cm <sup>2</sup> /m) fiss = 0.09 mm
Barra	PAR6 L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 38.42 tf Situação : PE As = 4.71 cm <sup>2</sup> /m A's = 4.13 cm <sup>2</sup> /m				As = 5.49 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR6 PAR5	Md = 2008 kgf.m/ m		Fd = 11.45 tf Situação : GE				As = 3.18 cm <sup>2</sup> /m



		As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 3.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR5 PAR6	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.45 tf Situação : PE As = 1.90 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1 PAR4	Md = 1896 kgf.m/ m  As = 3.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 17.97 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 37.94 tf Situação : GE As = 8.73 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 9.51 cm <sup>2</sup> /m (ø10.0 c/8 - 9.82 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR4 L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 37.94 tf Situação : PE As = 4.66 cm <sup>2</sup> /m A's = 4.07 cm <sup>2</sup> /m				As = 5.45 cm <sup>2</sup> /m (ø10.0 c/14 - 5.61 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR5 PAR4	Md = 2008 kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.44 tf Situação : GE As = 3.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.07 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR4 PAR5	Md = 2008		Fd = 11.44 tf				As = 3.00 cm <sup>2</sup> /m



		kgf.m/ m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Situação : PE As = 1.93 cm <sup>2</sup> /m A's = 0.71 cm <sup>2</sup> /m				(ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.03 mm
Barra	L1  PAR5	Md = 1896 kgf.m/ m  As = 3.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 17.97 tf Situação: GE As = 0.63 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 3.27 tf Situação : GE As = 3.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 5.11 cm <sup>2</sup> /m (ø10.0 c/15 - 5.24 cm <sup>2</sup> /m) fiss = 0.08 mm
Barra	PAR5  L1	Md = 1627 kgf.m/ m  As = 2.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 3.27 tf Situação : GE As = 1.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.70 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm

## 16.18 CAIXA DE DRENAGEM – RESUMO DOS RESULTADOS

### 16.18.1 Cargas verticais:

- Peso próprio = 1.92 tf
- Adicional = 0.19 tf
- Acidental = 0.43 tf
- Total = 2.54 tf
- Área aproximada = 1.43 m<sup>2</sup>
- Relação = 1782.26 kgf/m<sup>2</sup>

#### **16.18.2 Deslocamento horizontal:**

- $X+ = 0.00$  cm (limite 0.09)
- $X- = 0.00$  cm (limite 0.09)
- $Y+ = 0.00$  cm (limite 0.09)
- $Y- = 0.00$  cm (limite 0.09)

#### **16.18.3 Aceleração horizontal:**

- $X+ = 0.000$  m/s<sup>2</sup> (limite 0.147)
- $X- = 0.000$  m/s<sup>2</sup> (limite 0.147)
- $Y+ = 0.000$  m/s<sup>2</sup> (limite 0.147)
- $Y- = 0.000$  m/s<sup>2</sup> (limite 0.147)

#### **16.18.4 Verificação de estabilidade (Gama-Z):**

- $X+ = 1.00$  (limite 1.10)
- $X- = 1.00$  (limite 1.10)
- $Y+ = 1.00$  (limite 1.10)
- $Y- = 1.00$  (limite 1.10)

#### **16.18.5 Análise de 2ª ordem:**

Processo P-Delta

Sem deslocamentos no topo da edificação

#### **16.18.6 Análise dinâmica:**

Frequência natural: 6.81 Hz

#### **16.18.7 Reservatórios – Pavimento TOPO**

#### **16.18.8 Dados dos Reservatórios**

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
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<b>Lance 2</b>	cobr = 3.00 cm
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Seção (cm)				Cargas Verticais (kgf/m²)				Cargas Horizontais (kgf/m²)		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Parades Outras	Total	Base	Topo		
L1 (RES1)	15.00	0.00	168.10	375.00 kgf/m²	300.00 136.50	0.00 0.00	811.50 kgf/m²				
L1 (RES1)	15.00	0.00	168.10	375.00 kgf/m²	300.00 136.50	0.00 0.00	811.50 kgf/m²				
L1 (RES1)	15.00	0.00	168.10	375.00 kgf/m²	300.00 136.50	0.00 0.00	811.50 kgf/m²				
PAR1 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		
PAR2 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		
PAR3 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		
PAR4 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		

#### 16.18.9 Resultados do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 3.00 cm	

##### 16.18.9.1 Reservatório RES1

ARMADURAS NA LAJE							
Esforços					Resultados		
Trecho	Ndx Rdx	Ndy Rdy	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior
					Asx	Asy	Asx Asy



	(tf)	(tf)						
L1	0.31 - 0.05	0.19 - 0.10	10	10	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.06 - 0.02	0.10 - 0.14	59	104	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.00 0.00	0.02 - 0.03	24	22	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1	0.83 - 0.03	0.95 - 0.01	41	39	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR2	0.83 - 0.03	0.95 - 0.01	41	39	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR3	0.86 - 0.08	0.77 - 0.01	39	32	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR4	0.86 - 0.12	0.95 - 0.01	38	32	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR3	-27		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	



Barra	PAR3 L1	-3		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 LF1	-47		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-74		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-20		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-104		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR4	-32		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-10		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-182		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR1	-74		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 L1	-20		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-104		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2	-88		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2			As = 2.29 cm <sup>2</sup> /m	

				ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4	-87		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR4			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR1	-87		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR3	-88		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR1			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	

#### 16.18.10 Cálculos do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

##### 16.18.10.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	Md = 757 kgf.m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00		Fd = 0.06 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m			Fd = 0.06 tf Situação: GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 0.16 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		cm <sup>2</sup> / m								
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.12 tf Situaç ão: GE As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Fd = 0.12 tf Situaç ão: PE As = 0.02 cm <sup>2</sup> / m A's = 0.01 cm <sup>2</sup> / m	As = 1.64 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m ) fiss = 0.00 mm		vsd = 0.16 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
L1	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.06 tf Situação : GE As = 0.11 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.02 tf Situaç ão: GE As = 0.12 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m				As = 1.52 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m ) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	vsd = 0.24 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.10 tf Situação : GE As = 0.20 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.17 tf Situaç ão: GE As = 0.25 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 6 kgf. m/m  As = 0.01 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.17 tf Situaç ão: GE As = 0.04 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.64 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m ) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	vsd = 0.92 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
L1	X	Md = 757 kgf. m/m						As = 1.52 cm <sup>2</sup> / m ø8.0 c/20	A's = 2.25 cm <sup>2</sup> / m ø8.0 c/20	vsd = 0.42 tf/m vrd1 = 8.02 tf/m Modelo I



		As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m						(2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	(2.51 cm <sup>2</sup> /m )	vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.02 tf Situação : GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.04 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 12 kgf. m/m As = 0.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.02 tf Situação : GE As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.04 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.17 tf/m vr1 = 7.54 tf/m vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.04 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.04 tf Situação: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.91 tf/m vr1 = 8.02 tf/m Modelo I vr2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.01 tf Situação: GE As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.01 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.42 tf/m vr1 = 7.54 tf/m vr2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m





PA R2	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.04 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.04 tf Situaç ão: GE As = 0.09 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.52 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	vsd = 0.91 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.01 tf Situaç ão: GE As = 0.01 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.01 tf Situaç ão: GE As = 0.08 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.64 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	vsd = 0.42 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
PA R3	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.10 tf Situaç ão: GE As = 0.03 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.10 tf Situaç ão: GE As = 0.09 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	As = 1.52 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	vsd = 0.83 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> / m
	Y	Md = 757 kgf. m/m  As = 1.64			Md = 757 kgf. m/m  As = 1.64			As = 1.64 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	A's = 1.64 cm <sup>2</sup> / m ø8.0 c/20 (2.51 cm <sup>2</sup> / m )	vsd = 0.15 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			fiss = 0.00 mm		asw = 0.00 cm <sup>2</sup> /m
PA R4	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.14 tf Situaç ão: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.14 tf Situaç ão: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.79 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.29 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trech o	Laje 1	Momento negativo			Momento positivo			Armadura s finais
	Laje 2	Flexão	Flexo compressã o	Flexo tração	Flexã o	Flexo compressã o	Flexo traçã o	
Barra	L1 PAR 3	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	PAR 3  L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.20 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  PAR 2	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação : GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2  L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.17 tf Situação : GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  L1	Md = 1130 kgf.m/ m	Fd = 0.19 tf Situação: GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.17 tf Situação : GE As = 0.23 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		A's = 0.00 cm <sup>2</sup> /m				
Barra	L1 PAR 4	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.06 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.31 tf Situação: GE As = 0.32 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.06 tf Situação : GE As = 0.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação : GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1 L1	Md = 1130 kgf.m/m		Fd = 0.17 tf Situação : GE				As = 2.29 cm <sup>2</sup> /m



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1  L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.19 tf Situação: GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.17 tf Situação : GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2  PAR 3	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.10 tf Situação : PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3  PAR 2	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.86 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.10 tf Situação : GE As = 0.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 2	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação : PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2	Md = 1130	Fd = 0.83 tf Situação: GE	Fd = 0.14 tf				As = 2.29 cm <sup>2</sup> /m



	PAR 4	kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 0.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1 PAR 4	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.14 tf Situação : PE As = 0.02 cm <sup>2</sup> /m A's = 0.02 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 PAR 1	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.83 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.14 tf Situação : GE As = 0.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1 PAR 3	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.86 tf Situação: GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.10 tf Situação : GE As = 0.19 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 PAR 1	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.10 tf Situação : PE As = 0.01 cm <sup>2</sup> /m A's = 0.01 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

## **16.19 CAIXA DE DRENAGEM 2 – RESUMO DOS RESULTADOS**

### **16.19.1 Cargas verticais:**

- Peso próprio = 3.53 tf
- Adicional = 0.39 tf
- Acidental = 0.86 tf
- Total = 4.78 tf
- Área aproximada = 2.88 m<sup>2</sup>
- Relação = 1663.15 kgf/m<sup>2</sup>

### **AVISO: Relação de carga por área não usual para edifícios**

### **16.19.2 Deslocamento horizontal:**

- X+ = 0.00 cm (limite 0.09)
- X- = 0.00 cm (limite 0.09)
- Y+ = 0.00 cm (limite 0.09)
- Y- = 0.00 cm (limite 0.09)

### **16.19.3 Aceleração horizontal:**

X+ = 0.000 m/s<sup>2</sup> (limite 0.147)

X- = 0.000 m/s<sup>2</sup> (limite 0.147)

Y+ = 0.000 m/s<sup>2</sup> (limite 0.147)

Y- = 0.000 m/s<sup>2</sup> (limite 0.147)

### **16.19.4 Verificação de estabilidade (Gama-Z):**

- X+ = 1.00 (limite 1.10)
- X- = 1.00 (limite 1.10)
- Y+ = 1.00 (limite 1.10)
- Y- = 1.00 (limite 1.10)

### 16.19.5 Análise de 2ª ordem:

Processo P-Delta

Sem deslocamentos no topo da edificação

### 16.20 ANÁLISE DINÂMICA:

Frequência natural: 8.70 Hz

### 16.21 RESERVATÓRIO - PAVIMENTO TOPO

#### 16.21.1 Dados dos Reservatórios

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Parades Outras	Total	Base	Topo		
L1 (RES1)	15.00	0.00	168.10	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
L1 (RES1)	15.00	0.00	168.10	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
L1 (RES1)	15.00	0.00	168.10	375.00 kgf/m <sup>2</sup>	300.00 136.50	0.00 0.00	811.50 kgf/m <sup>2</sup>				
PAR1 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		
PAR2 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		
PAR3 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		



PAR4 (RES1)	15.00	0.00	310.10	532.50 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	2096.00	960.00		
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## 16.21.2 Resultados do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

### 16.21.2.1 Reservatório RES1

ARMADURAS NA LAJE								
Esforços					Resultados			
Trecho	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	0.79 0.00	0.69 0.00	82	81	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.26 - 0.11	0.27 - 0.24	80	45	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
L1	0.01 - 0.01	0.24 - 0.04	18	53	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR1	1.25 - 0.07	0.89 - 0.01	95	47	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR2	1.25 - 0.07	0.89 - 0.01	95	47	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)
PAR3	1.26 - 0.06	0.55 - 0.01	94	46	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20



					(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)	(2.51 cm <sup>2</sup> /m)
PAR4	1.34 - 0.24	0.87 - 0.02	94	42	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L1 PAR3	-7		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 L1	-76		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-82		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR2	-37		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 L1	-81		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-97		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR4	-37		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 L1	-86		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-162		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 PAR1	-37		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20	



				(2.51 cm <sup>2</sup> /m)	
Barra	PAR1 L1	-85		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	L1 L1	-97		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR3			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR2	-215		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR2			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR2 PAR4	-214		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR4			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR4 PAR1	-214		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR1 PAR3	-215		As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	
Barra	PAR3 PAR1			As = 2.29 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	

### 16.21.3 Cálculos do Reservatório

<b>TOPO</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	



16.21.3.1 Reservatório RES1

ARMADURAS POSITIVAS (LAJE)										
Trecho	Direção	Momento positivo			Momento negativo			Armadura inferior	Armadura superior	Cisalhamento
		Flexão	Verificação axial (compressão)	Verificação axial (tração)	Flexão	Verificação axial (compressão)	Verificação axial (tração)			
L1	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.79 tf Situação : GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 0.25 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.69 tf Situação : GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm		vsd = 0.28 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.26 tf Situação : GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.13 tf Situação : GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 6 kgf. m/m As = 0.01 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.13 tf Situação : GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.35 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.27 tf Situação : GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 9 kgf. m/m As = 0.02 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.29 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.83 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L1	X	Md = 757 kgf. m/m As = 1.52 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.31 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m As = 1.64 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.24 tf Situação : GE As = 0.05 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.04 tf Situação: GE As = 0.10 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 53 kgf. m/m As = 0.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.24 tf Situação : GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.04 tf Situação: GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.00 mm	A's = 2.25 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 0.45 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R1	X	Md = 757 kgf. m/m As = 1.52		Fd = 0.09 tf Situação: GE As = 0.12 cm <sup>2</sup> /m	Md = 757 kgf. m/m As = 1.52		Fd = 0.09 tf Situação: GE As = 0.20 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 1.27 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.00 mm		vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm  A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )		vsd = 0.88 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R2	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.09 tf Situaç ão: GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.09 tf Situaç ão: GE As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 1.27 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.88 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



PA R3	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.07 tf Situaç ão: GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.07 tf Situaç ão: GE As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 1.25 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			Md = 757 kgf. m/m  As = 1.64 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.83 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PA R4	X	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.29 tf Situaç ão: GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 757 kgf. m/m  As = 1.52 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.29 tf Situaç ão: GE As = 0.23 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m ) fiss = 0.00 mm	A's = 1.52 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 1.25 tf/m vrd1 = 8.02 tf/m Modelo I vrd2 = 56.51 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 757 kgf. m/m  As = 1.64			Md = 757 kgf. m/m  As = 1.64		Fd = 0.02 tf Situaç ão: GE As = 0.09 cm <sup>2</sup> /m	As = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	A's = 1.64 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m )	vsd = 0.85 tf/m vrd1 = 7.54 tf/m vrd2 = 52.44 tf/m vsw = 0.00 tf/m



		cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m			cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m	fiss = 0.00 mm		asw = 0.00 cm <sup>2</sup> /m
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ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1 Laje 2	Momento negativo			Momento positivo			Armaduras finais
		Flexão	Flexo compressã o	Flexo tração	Flexã o	Flexo compressã o	Flexo traçã o	
Barra	L1 PAR 3	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.55 tf Situação: GE As = 0.07 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.13 tf Situação : GE As = 0.17 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.66 tf Situação: GE As = 0.06 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.13 tf Situação : GE As = 0.18 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 2	Md = 1130 kgf.m/ m		Fd = 0.29 tf Situação : GE				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m)





		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				fiss = 0.00 mm
Barra	PAR 2 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.89 tf Situação: GE As = 0.03 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação: GE As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.69 tf Situação: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação: GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 4	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.09 tf Situação: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.87 tf Situação: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m					As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/m	Fd = 0.79 tf Situação: GE	Fd = 0.09 tf Situação: GE				As = 2.29 cm <sup>2</sup> /m



		As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 PAR 1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.29 tf Situação : GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.87 tf Situação: GE As = 0.04 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação : GE As = 0.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L1 L1	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.69 tf Situação: GE As = 0.09 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação : GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2 PAR 3	Md = 1130 kgf.m/m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3	Md = 1130	Fd = 1.26 tf Situação: GE	Fd = 0.07 tf				As = 2.29 cm <sup>2</sup> /m



	PAR 2	kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Situação : GE As = 0.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				(ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 2	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.29 tf Situação : PE As = 0.03 cm <sup>2</sup> /m A's = 0.03 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 2  PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.29 tf Situação: GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação : GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 1  PAR 4	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 0.29 tf Situação : PE As = 0.03 cm <sup>2</sup> /m A's = 0.03 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 4  PAR 1	Md = 1130 kgf.m/ m  As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.29 tf Situação: GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.29 tf Situação : GE As = 0.47 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

Barra	PAR 1 PAR 3	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.26 tf Situação: GE As = 0.24 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 0.07 tf Situação: GE As = 0.44 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	PAR 3 PAR 1	Md = 1130 kgf.m/m As = 2.29 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m						As = 2.29 cm <sup>2</sup> /m (ø8.0 c/20 - 2.51 cm <sup>2</sup> /m) fiss = 0.00 mm

## 17. RESERVATÓRIO APOIADO

### 17.1 RESUMO DOS RESULTADOS

#### 17.1.1 Cargas verticais:

Peso próprio = 52.52 tf

Adicional = 1.34 tf

Acidental = 4.57 tf

Água = 53.71 tf

Total = 112.13 tf

Área aproximada = 19.63 m<sup>2</sup>

Relação = 5711.76 kgf/m<sup>2</sup>

#### 17.1.2 Deslocamento horizontal:

X+ = 0.00 cm (limite 0.47)

X- = 0.00 cm (limite 0.47)

Y+ = 0.00 cm (limite 0.47)

Y- = 0.00 cm (limite 0.47)

### 17.1.3 Verificação de estabilidade (Gama-Z):

X+ = 1.00 (limite 1.10)

X- = 1.00 (limite 1.10)

Y+ = 1.00 (limite 1.10)

Y- = 1.00 (limite 1.10)

### 17.1.4 Análise de 2ª ordem:

Processo P-Delta

Deslocamentos no topo da edificação:

Vento X+: 0.01 »» 0.01 (+0.32%)

Vento X-: 0.01 »» 0.01 (+0.32%)

Vento Y+: 0.01 »» 0.01 (+0.32%)

Vento Y-: 0.01 »» 0.01 (+0.32%)

## 17.2 VERIFICAÇÃO DA ESTABILIDADE GLOBAL DA ESTRUTURA

### 17.2.1 Maior coeficiente Gama-Z

Combinação: 1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2							
Pavimento	Altura relativa (cm)	Carga vertical (tf)	Carga horizontal (tf)	Deslocamento horizontal (cm)	Momento 2a. ordem (kgf.m)	Momento tombamento (kgf.m)	Gama-Z
Tampa	792.00	65.77	0.52	0.01	5.89	4145.84	1.00 (lim=1.10)
Fundo	100.00	67.43	0.09	0.00	2.51	86.64	
<b>TOTAL</b>					<b>8.39</b>	<b>4232.48</b>	

### 17.2.2 Coeficiente Gama-Z por combinação

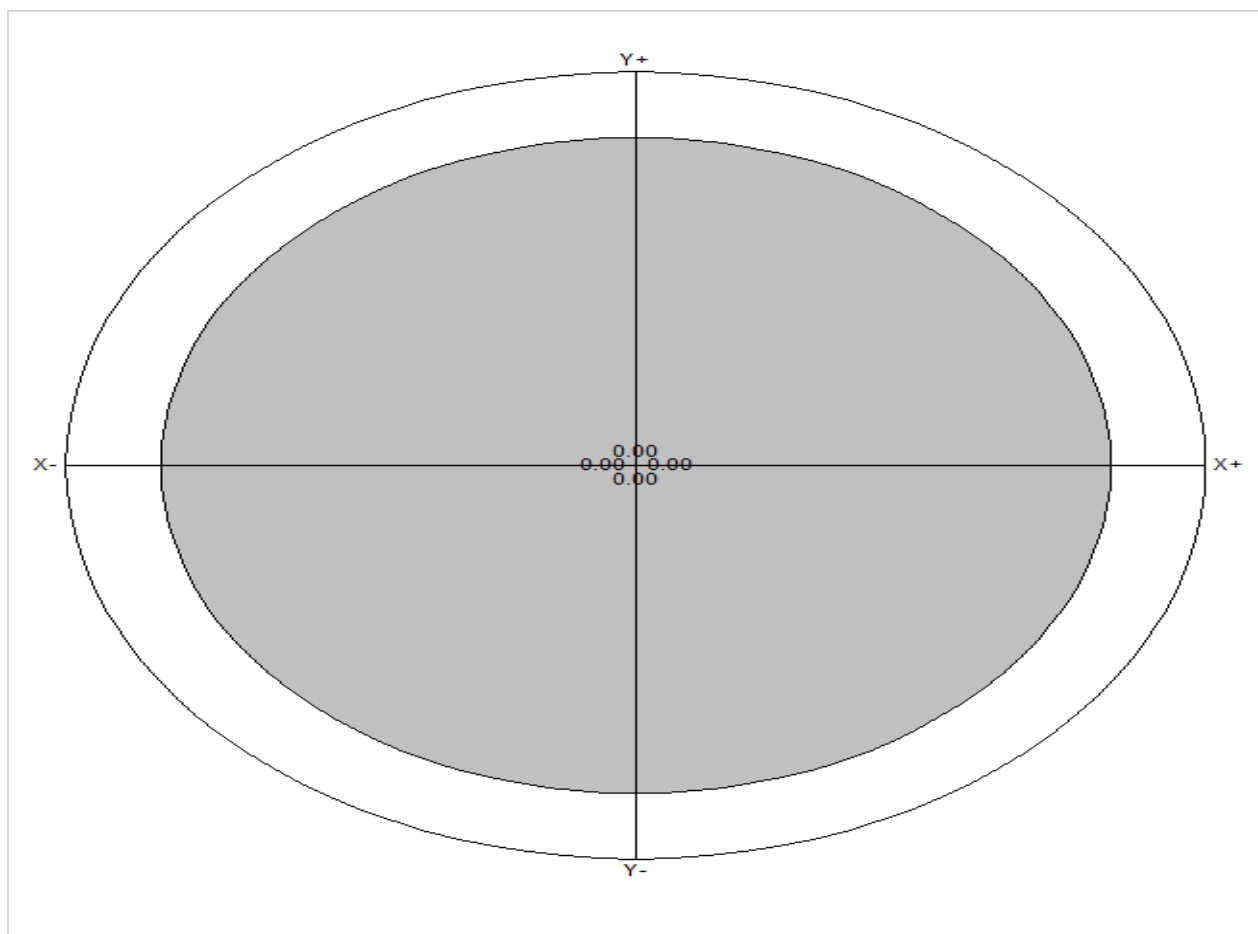
Combinação	Momento 2a. ordem (kgf.m)	Momento tombamento (kgf.m)	Gama-Z
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.4D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	8.27	4232.48	1.00

1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.4D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.4D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.4D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.84D1	13.31	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.84D2	13.66	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.84D3	13.46	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.84D4	13.52	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.4D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.4D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.4D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.4D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.84D1	13.31	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.84D2	13.66	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.84D3	13.46	7054.14	1.00
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	13.52	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.4D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.4D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.4D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.4D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.84D1	13.31	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.84D2	13.66	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.84D3	13.46	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.84D4	13.52	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.4D1	7.92	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.4D2	8.27	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.4D3	8.06	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.4D4	8.13	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.84D1	13.31	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.84D2	13.66	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.84D3	13.46	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	13.52	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	13.52	7054.14	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	8.00	4232.48	1.00
<b>1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2</b>	<b>8.39</b>	<b>4232.48</b>	<b>1.00</b>
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	8.17	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	8.23	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	8.00	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	8.00	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	8.39	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	8.17	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	8.17	4232.48	1.00
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	8.23	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	8.00	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	8.39	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	8.17	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	8.23	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	8.00	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	8.39	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	8.17	4232.48	1.00
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	8.23	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	7.01	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.4D1	7.01	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	7.26	4232.48	1.00



G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.4D2	7.26	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	7.11	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.4D3	7.11	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	7.16	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.4D4	7.16	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.84D1	11.77	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.84D2	12.02	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.84D3	11.87	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.84D4	11.92	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	7.01	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.4D1	7.01	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	7.26	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.4D2	7.26	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	7.11	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.4D3	7.11	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	7.16	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.4D4	7.16	4232.48	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.84D1	11.77	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.84D2	12.02	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.84D3	11.87	7054.14	1.00
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	11.92	7054.14	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	7.09	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	7.39	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	7.21	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	7.27	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	7.09	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	7.39	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	7.21	4232.48	1.00
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	7.27	4232.48	1.00

### 17.3 DESLOCAMENTOS HORIZONTAIS DEVIDO À AÇÃO DO VENTO



Verificações	X+	X-	Y+	Y-
Altura total da edificação (cm)	792.00			
Deslocamento limite (cm)	0.47			
Deslocamento característico (cm)	0.01	-0.01	0.01	-0.01
gf2	0.30	0.30	0.30	0.30
Deslocamento combinações frequentes (cm)	0.00	0.00	0.00	0.00

Pavimento	Altura (cm)	Deslocamento combinações frequentes (cm)				Diferença (cm)				Limite (cm)
		X+	X-	Y+	Y-	X+	X-	Y+	Y-	
Tampa	692.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81
Fundo	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

### 17.4 ANÁLISE DA NÃO LINEARIDADE GEOMÉTRICA PELO PROCESSO P-DELTA

Acidental								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Variação no deslocamento do topo da edificação: 0.00%



Água								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Variação no deslocamento do topo da edificação: 2.78%

Vento X+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.01	0.00	0.01	0.00	0.62	0.00	0.62	0.00
Fundo	0.00	0.00	0.00	0.00	0.10	0.00	0.12	0.00

Variação no deslocamento do topo da edificação: 0.32%

Vento X-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	-0.01	0.00	-0.01	0.00	-0.62	0.00	-0.62	0.00
Fundo	0.00	0.00	0.00	0.00	-0.10	0.00	-0.12	0.00

Variação no deslocamento do topo da edificação: 0.32%

Vento Y+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.01	0.00	0.01	0.00	0.62	0.00	0.62
Fundo	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.12

Variação no deslocamento do topo da edificação: 0.32%

Vento Y-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	-0.01	0.00	-0.01	0.00	-0.62	0.00	-0.62
Fundo	0.00	0.00	0.00	0.00	0.00	-0.10	0.00	-0.12

Variação no deslocamento do topo da edificação: 0.32%

Desaprumo X+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundo	0.00	0.00	0.00	0.00	0.15	0.00	0.16	0.00

Variação no deslocamento do topo da edificação: 0.64%

Desaprumo X-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y

	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundo	0.00	0.00	0.00	0.00	-0.15	0.00	-0.16	0.00

Variação no deslocamento do topo da edificação: 0.64%

Desaprumo Y+								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundo	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.16

Variação no deslocamento do topo da edificação: 0.64%

Desaprumo Y-								
Pavimento	Deslocamentos horizontais médios (cm)				Esforço aplicado (tf)			
	1a. ordem		1a. + 2a. ordem		1a. ordem		1a. + 2a. ordem	
	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y	Eixo X	Eixo Y
Tampa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundo	0.00	0.00	0.00	0.00	0.00	-0.15	0.00	-0.16

Variação no deslocamento do topo da edificação: 0.64%

## 17.5 IMPERFEIÇÕES GEOMÉTRICAS GLOBAIS

Parâmetros	
Altura total da edificação (cm)	792.00
Nº de pilares contínuos	4
Combinação vertical	G1+G2+Q+A
Tipo de estrutura	Estruturas usuais
Ângulo adotado	1/356

Pavimento	Carga vertical (tf)	Carga aplicada (tf)		Deslocamento (cm)	
		X	Y	X	Y
Tampa	52.41	0.15	0.15	0.00	0.00
Fundo	53.41	0.15	0.15	0.00	0.00

## 17.6 RELATÓRIO DE ESFORÇOS NAS FUNDAÇÕES POR ELEMENTOS

Fundação S1						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	12.69	0.00	0.00	0.00	0.32	0.00
Adicional (G2)	0.32	0.00	0.00	0.00	0.01	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.11	0.00	0.00	0.00	0.01	0.00
Água (A)	12.34	0.00	0.00	0.00	0.71	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.06	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	-0.06	0.00	0.00
Vento Y+ (V3)	1.41	0.00	0.00	0.00	0.22	0.00
Vento Y- (V4)	-1.41	0.00	0.00	0.00	-0.22	0.00
Desaprumo X+ (D1)	0.00	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	0.00	-0.03	0.00	0.00



Desaprumo Y+ (D3)	0.13	0.00	0.00	0.00	0.09	0.00
Desaprumo Y- (D4)	-0.13	0.00	0.00	0.00	-0.09	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+D1	13.78	0.00	0.00	0.07	0.34	0.00
G1+G2+0.7Q+0.6V2+D2	13.78	0.00	0.00	-0.06	0.34	0.00
G1+G2+0.7Q+0.6V3+D3	14.75	0.00	0.00	0.00	0.55	0.00
G1+G2+0.7Q+0.6V4+D4	12.80	0.00	0.00	0.00	0.12	0.00
G1+G2+0.7Q+A+0.6V1+0.6D1	26.12	0.00	0.00	0.06	1.04	0.00
G1+G2+0.7Q+A+0.6V1+D1	26.12	0.00	0.00	0.07	1.04	0.00
G1+G2+0.7Q+A+0.6V2+0.6D2	26.12	0.00	0.00	-0.05	1.04	0.00
G1+G2+0.7Q+A+0.6V2+D2	26.12	0.00	0.00	-0.06	1.04	0.00
G1+G2+0.7Q+A+0.6V3+0.6D3	27.05	0.00	0.00	0.00	1.23	0.00
G1+G2+0.7Q+A+0.6V3+D3	27.10	0.00	0.00	0.00	1.26	0.00
G1+G2+0.7Q+A+0.6V4+0.6D4	25.20	0.00	0.00	0.00	0.86	0.00
G1+G2+0.7Q+A+0.6V4+D4	25.15	0.00	0.00	0.00	0.83	0.00
G1+G2+0.7Q+A+D1	26.12	0.00	0.00	0.03	1.04	0.00
G1+G2+0.7Q+A+D2	26.12	0.00	0.00	-0.03	1.04	0.00
G1+G2+0.7Q+A+D3	26.25	0.00	0.00	0.00	1.13	0.00
G1+G2+0.7Q+A+D4	26.00	0.00	0.00	0.00	0.96	0.00
G1+G2+0.7Q+A+V1+0.6D1	26.12	0.00	0.00	0.08	1.04	0.00
G1+G2+0.7Q+A+V2+0.6D2	26.12	0.00	0.00	-0.08	1.04	0.00
G1+G2+0.7Q+A+V3+0.6D3	27.61	0.00	0.00	0.00	1.31	0.00
G1+G2+0.7Q+A+V4+0.6D4	24.63	0.00	0.00	0.00	0.78	0.00
G1+G2+0.7Q+V1+0.6D1	13.78	0.00	0.00	0.08	0.34	0.00
G1+G2+0.7Q+V2+0.6D2	13.78	0.00	0.00	-0.08	0.34	0.00
G1+G2+0.7Q+V3+0.6D3	15.27	0.00	0.00	0.00	0.60	0.00
G1+G2+0.7Q+V4+0.6D4	12.29	0.00	0.00	0.00	0.07	0.00
G1+G2+A+0.6V1+0.6D1	25.35	0.00	0.00	0.06	1.03	0.00
G1+G2+A+0.6V1+D1	25.35	0.00	0.00	0.07	1.03	0.00
G1+G2+A+0.6V2+0.6D2	25.35	0.00	0.00	-0.05	1.04	0.00
G1+G2+A+0.6V2+D2	25.35	0.00	0.00	-0.06	1.04	0.00
G1+G2+A+0.6V3+0.6D3	26.27	0.00	0.00	0.00	1.22	0.00
G1+G2+A+0.6V3+D3	26.32	0.00	0.00	0.00	1.25	0.00
G1+G2+A+0.6V4+0.6D4	24.43	0.00	0.00	0.00	0.85	0.00
G1+G2+A+0.6V4+D4	24.37	0.00	0.00	0.00	0.82	0.00
G1+G2+A+D1	25.35	0.00	0.00	0.03	1.03	0.00
G1+G2+A+D2	25.35	0.00	0.00	-0.03	1.04	0.00
G1+G2+A+D3	25.48	0.00	0.00	0.00	1.12	0.00
G1+G2+A+D4	25.22	0.00	0.00	0.00	0.95	0.00
G1+G2+A+V1+0.6D1	25.35	0.00	0.00	0.08	1.03	0.00
G1+G2+A+V2+0.6D2	25.35	0.00	0.00	-0.08	1.04	0.00
G1+G2+A+V3+0.6D3	26.84	0.00	0.00	0.00	1.30	0.00
G1+G2+A+V4+0.6D4	23.86	0.00	0.00	0.00	0.77	0.00
G1+G2+D1	13.01	0.00	0.00	0.03	0.33	0.00
G1+G2+D2	13.01	0.00	0.00	-0.03	0.33	0.00
G1+G2+D3	13.13	0.00	0.00	0.00	0.41	0.00
G1+G2+D4	12.88	0.00	0.00	0.00	0.24	0.00
G1+G2+Q+0.6V1+0.6D1	14.11	0.00	0.00	0.05	0.34	0.00
G1+G2+Q+0.6V2+0.6D2	14.11	0.00	0.00	-0.05	0.34	0.00
G1+G2+Q+0.6V3+0.6D3	15.04	0.00	0.00	0.00	0.52	0.00
G1+G2+Q+0.6V4+0.6D4	13.19	0.00	0.00	0.00	0.16	0.00
G1+G2+Q+A+0.6V1+0.6D1	26.45	0.00	0.00	0.06	1.05	0.00
G1+G2+Q+A+0.6V2+0.6D2	26.46	0.00	0.00	-0.05	1.05	0.00
G1+G2+Q+A+0.6V3+0.6D3	27.38	0.00	0.00	0.00	1.23	0.00
G1+G2+Q+A+0.6V4+0.6D4	25.53	0.00	0.00	0.00	0.87	0.00
G1+G2+Q+A+D1	26.46	0.00	0.00	0.03	1.05	0.00
G1+G2+Q+A+D2	26.46	0.00	0.00	-0.03	1.05	0.00
G1+G2+Q+A+D3	26.58	0.00	0.00	0.00	1.13	0.00
G1+G2+Q+A+D4	26.33	0.00	0.00	0.00	0.96	0.00
G1+G2+Q+D1	14.11	0.00	0.00	0.03	0.34	0.00
G1+G2+Q+D2	14.11	0.00	0.00	-0.03	0.34	0.00



G1+G2+Q+D3	14.24	0.00	0.00	0.00	0.43	0.00
G1+G2+Q+D4	13.98	0.00	0.00	0.00	0.25	0.00

Fundação S2						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	12.71	0.00	0.00	-0.32	0.00	0.00
Adicional (G2)	0.33	0.00	0.00	-0.01	0.00	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.12	0.00	0.00	-0.01	0.00	0.00
Água (A)	12.34	0.00	0.00	-0.71	0.00	0.00
Vento X+ (V1)	-1.41	0.00	0.00	0.22	0.00	0.00
Vento X- (V2)	1.41	0.00	0.00	-0.22	0.00	0.00
Vento Y+ (V3)	0.00	0.00	0.00	0.00	0.06	0.00
Vento Y- (V4)	0.00	0.00	0.00	0.00	-0.06	0.00
Desaprumo X+ (D1)	-0.13	0.00	0.00	0.09	0.00	0.00
Desaprumo X- (D2)	0.13	0.00	0.00	-0.09	0.00	0.00
Desaprumo Y+ (D3)	0.00	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	0.00	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+D1	12.85	0.00	0.00	-0.12	0.00	0.00
G1+G2+0.7Q+0.6V2+D2	14.80	0.00	0.00	-0.55	0.00	0.00
G1+G2+0.7Q+0.6V3+D3	13.83	0.00	0.00	-0.34	0.07	0.00
G1+G2+0.7Q+0.6V4+D4	13.83	0.00	0.00	-0.34	-0.07	0.00
G1+G2+0.7Q+A+0.6V1+0.6D1	25.25	0.00	0.00	-0.87	0.00	0.00
G1+G2+0.7Q+A+0.6V1+D1	25.20	0.00	0.00	-0.83	0.00	0.00
G1+G2+0.7Q+A+0.6V2+0.6D2	27.10	0.00	0.00	-1.23	0.00	0.00
G1+G2+0.7Q+A+0.6V2+D2	27.15	0.00	0.00	-1.26	0.00	0.00
G1+G2+0.7Q+A+0.6V3+0.6D3	26.17	0.00	0.00	-1.05	0.05	0.00
G1+G2+0.7Q+A+0.6V3+D3	26.17	0.00	0.00	-1.05	0.07	0.00
G1+G2+0.7Q+A+0.6V4+0.6D4	26.17	0.00	0.00	-1.05	-0.05	0.00
G1+G2+0.7Q+A+0.6V4+D4	26.17	0.00	0.00	-1.05	-0.06	0.00
G1+G2+0.7Q+A+D1	26.05	0.00	0.00	-0.96	0.00	0.00
G1+G2+0.7Q+A+D2	26.30	0.00	0.00	-1.13	0.00	0.00
G1+G2+0.7Q+A+D3	26.17	0.00	0.00	-1.05	0.03	0.00
G1+G2+0.7Q+A+D4	26.17	0.00	0.00	-1.05	-0.03	0.00
G1+G2+0.7Q+A+V1+0.6D1	24.68	0.00	0.00	-0.78	0.00	0.00
G1+G2+0.7Q+A+V2+0.6D2	27.66	0.00	0.00	-1.31	0.00	0.00
G1+G2+0.7Q+A+V3+0.6D3	26.17	0.00	0.00	-1.05	0.08	0.00
G1+G2+0.7Q+A+V4+0.6D4	26.17	0.00	0.00	-1.05	-0.08	0.00
G1+G2+0.7Q+V1+0.6D1	12.34	0.00	0.00	-0.07	0.00	0.00
G1+G2+0.7Q+V2+0.6D2	15.32	0.00	0.00	-0.60	0.00	0.00
G1+G2+0.7Q+V3+0.6D3	13.83	0.00	0.00	-0.34	0.08	0.00
G1+G2+0.7Q+V4+0.6D4	13.83	0.00	0.00	-0.34	-0.08	0.00
G1+G2+A+0.6V1+0.6D1	24.46	0.00	0.00	-0.86	0.00	0.00
G1+G2+A+0.6V1+D1	24.41	0.00	0.00	-0.82	0.00	0.00
G1+G2+A+0.6V2+0.6D2	26.31	0.00	0.00	-1.22	0.00	0.00
G1+G2+A+0.6V2+D2	26.36	0.00	0.00	-1.25	0.00	0.00
G1+G2+A+0.6V3+0.6D3	25.39	0.00	0.00	-1.04	0.05	0.00
G1+G2+A+0.6V3+D3	25.39	0.00	0.00	-1.04	0.07	0.00
G1+G2+A+0.6V4+0.6D4	25.39	0.00	0.00	-1.04	-0.05	0.00
G1+G2+A+0.6V4+D4	25.39	0.00	0.00	-1.04	-0.06	0.00
G1+G2+A+D1	25.26	0.00	0.00	-0.95	0.00	0.00
G1+G2+A+D2	25.51	0.00	0.00	-1.12	0.00	0.00
G1+G2+A+D3	25.39	0.00	0.00	-1.04	0.03	0.00
G1+G2+A+D4	25.39	0.00	0.00	-1.04	-0.03	0.00
G1+G2+A+V1+0.6D1	23.90	0.00	0.00	-0.77	0.00	0.00
G1+G2+A+V2+0.6D2	26.88	0.00	0.00	-1.30	0.00	0.00
G1+G2+A+V3+0.6D3	25.39	0.00	0.00	-1.04	0.08	0.00
G1+G2+A+V4+0.6D4	25.39	0.00	0.00	-1.04	-0.08	0.00
G1+G2+D1	12.92	0.00	0.00	-0.24	0.00	0.00



G1+G2+D2	13.17	0.00	0.00	-0.41	0.00	0.00
G1+G2+D3	13.04	0.00	0.00	-0.33	0.03	0.00
G1+G2+D4	13.04	0.00	0.00	-0.33	-0.03	0.00
G1+G2+Q+0.6V1+0.6D1	13.24	0.00	0.00	-0.16	0.00	0.00
G1+G2+Q+0.6V2+0.6D2	15.09	0.00	0.00	-0.52	0.00	0.00
G1+G2+Q+0.6V3+0.6D3	14.17	0.00	0.00	-0.34	0.05	0.00
G1+G2+Q+0.6V4+0.6D4	14.17	0.00	0.00	-0.34	-0.05	0.00
G1+G2+Q+A+0.6V1+0.6D1	25.59	0.00	0.00	-0.87	0.00	0.00
G1+G2+Q+A+0.6V2+0.6D2	27.43	0.00	0.00	-1.23	0.00	0.00
G1+G2+Q+A+0.6V3+0.6D3	26.51	0.00	0.00	-1.05	0.05	0.00
G1+G2+Q+A+0.6V4+0.6D4	26.51	0.00	0.00	-1.05	-0.05	0.00
G1+G2+Q+A+D1	26.38	0.00	0.00	-0.97	0.00	0.00
G1+G2+Q+A+D2	26.64	0.00	0.00	-1.14	0.00	0.00
G1+G2+Q+A+D3	26.51	0.00	0.00	-1.05	0.03	0.00
G1+G2+Q+A+D4	26.51	0.00	0.00	-1.05	-0.03	0.00
G1+G2+Q+D1	14.04	0.00	0.00	-0.26	0.00	0.00
G1+G2+Q+D2	14.29	0.00	0.00	-0.43	0.00	0.00
G1+G2+Q+D3	14.17	0.00	0.00	-0.34	0.03	0.00
G1+G2+Q+D4	14.17	0.00	0.00	-0.34	-0.03	0.00

Fundação S3						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	12.66	0.00	0.00	0.32	0.00	0.00
Adicional (G2)	0.31	0.00	0.00	0.01	0.00	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.09	0.00	0.00	0.01	0.00	0.00
Água (A)	12.34	0.00	0.00	0.71	0.00	0.00
Vento X+ (V1)	1.41	0.00	0.00	0.22	0.00	0.00
Vento X- (V2)	-1.41	0.00	0.00	-0.22	0.00	0.00
Vento Y+ (V3)	0.00	0.00	0.00	0.00	0.06	0.00
Vento Y- (V4)	0.00	0.00	0.00	0.00	-0.06	0.00
Desaprumo X+ (D1)	0.13	0.00	0.00	0.09	0.00	0.00
Desaprumo X- (D2)	-0.13	0.00	0.00	-0.09	0.00	0.00
Desaprumo Y+ (D3)	0.00	0.00	0.00	0.00	0.03	0.00
Desaprumo Y- (D4)	0.00	0.00	0.00	0.00	-0.03	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+D1	14.71	0.00	0.00	0.55	0.00	0.00
G1+G2+0.7Q+0.6V2+D2	12.76	0.00	0.00	0.12	0.00	0.00
G1+G2+0.7Q+0.6V3+D3	13.73	0.00	0.00	0.34	0.07	0.00
G1+G2+0.7Q+0.6V4+D4	13.73	0.00	0.00	0.34	-0.06	0.00
G1+G2+0.7Q+A+0.6V1+0.6D1	27.00	0.00	0.00	1.23	0.00	0.00
G1+G2+0.7Q+A+0.6V1+D1	27.05	0.00	0.00	1.26	0.00	0.00
G1+G2+0.7Q+A+0.6V2+0.6D2	25.15	0.00	0.00	0.86	0.00	0.00
G1+G2+0.7Q+A+0.6V2+D2	25.10	0.00	0.00	0.83	0.00	0.00
G1+G2+0.7Q+A+0.6V3+0.6D3	26.07	0.00	0.00	1.05	0.06	0.00
G1+G2+0.7Q+A+0.6V3+D3	26.07	0.00	0.00	1.05	0.07	0.00
G1+G2+0.7Q+A+0.6V4+0.6D4	26.07	0.00	0.00	1.05	-0.05	0.00
G1+G2+0.7Q+A+0.6V4+D4	26.07	0.00	0.00	1.05	-0.06	0.00
G1+G2+0.7Q+A+D1	26.20	0.00	0.00	1.13	0.00	0.00
G1+G2+0.7Q+A+D2	25.95	0.00	0.00	0.96	0.00	0.00
G1+G2+0.7Q+A+D3	26.07	0.00	0.00	1.05	0.03	0.00
G1+G2+0.7Q+A+D4	26.07	0.00	0.00	1.05	-0.02	0.00
G1+G2+0.7Q+A+V1+0.6D1	27.56	0.00	0.00	1.31	0.00	0.00
G1+G2+0.7Q+A+V2+0.6D2	24.58	0.00	0.00	0.78	0.00	0.00
G1+G2+0.7Q+A+V3+0.6D3	26.07	0.00	0.00	1.05	0.08	0.00
G1+G2+0.7Q+A+V4+0.6D4	26.07	0.00	0.00	1.05	-0.07	0.00
G1+G2+0.7Q+V1+0.6D1	15.22	0.00	0.00	0.60	0.00	0.00
G1+G2+0.7Q+V2+0.6D2	12.24	0.00	0.00	0.07	0.00	0.00



G1+G2+0.7Q+V3+0.6D3	13.73	0.00	0.00	0.34	0.08	0.00
G1+G2+0.7Q+V4+0.6D4	13.73	0.00	0.00	0.34	-0.08	0.00
G1+G2+A+0.6V1+0.6D1	26.24	0.00	0.00	1.22	0.00	0.00
G1+G2+A+0.6V1+D1	26.29	0.00	0.00	1.25	0.00	0.00
G1+G2+A+0.6V2+0.6D2	24.39	0.00	0.00	0.86	0.00	0.00
G1+G2+A+0.6V2+D2	24.34	0.00	0.00	0.82	0.00	0.00
G1+G2+A+0.6V3+0.6D3	25.31	0.00	0.00	1.04	0.06	0.00
G1+G2+A+0.6V3+D3	25.31	0.00	0.00	1.04	0.07	0.00
G1+G2+A+0.6V4+0.6D4	25.31	0.00	0.00	1.04	-0.05	0.00
G1+G2+A+0.6V4+D4	25.31	0.00	0.00	1.04	-0.06	0.00
G1+G2+A+D1	25.44	0.00	0.00	1.12	0.00	0.00
G1+G2+A+D2	25.19	0.00	0.00	0.95	0.00	0.00
G1+G2+A+D3	25.31	0.00	0.00	1.04	0.03	0.00
G1+G2+A+D4	25.31	0.00	0.00	1.04	-0.02	0.00
G1+G2+A+V1+0.6D1	26.80	0.00	0.00	1.30	0.00	0.00
G1+G2+A+V2+0.6D2	23.82	0.00	0.00	0.77	0.00	0.00
G1+G2+A+V3+0.6D3	25.31	0.00	0.00	1.04	0.08	0.00
G1+G2+A+V4+0.6D4	25.31	0.00	0.00	1.04	-0.07	0.00
G1+G2+D1	13.10	0.00	0.00	0.41	0.00	0.00
G1+G2+D2	12.84	0.00	0.00	0.24	0.00	0.00
G1+G2+D3	12.97	0.00	0.00	0.33	0.03	0.00
G1+G2+D4	12.97	0.00	0.00	0.33	-0.03	0.00
G1+G2+Q+0.6V1+0.6D1	14.98	0.00	0.00	0.52	0.00	0.00
G1+G2+Q+0.6V2+0.6D2	13.13	0.00	0.00	0.16	0.00	0.00
G1+G2+Q+0.6V3+0.6D3	14.06	0.00	0.00	0.34	0.05	0.00
G1+G2+Q+0.6V4+0.6D4	14.06	0.00	0.00	0.34	-0.05	0.00
G1+G2+Q+A+0.6V1+0.6D1	27.33	0.00	0.00	1.23	0.00	0.00
G1+G2+Q+A+0.6V2+0.6D2	25.48	0.00	0.00	0.87	0.00	0.00
G1+G2+Q+A+0.6V3+0.6D3	26.40	0.00	0.00	1.05	0.06	0.00
G1+G2+Q+A+0.6V4+0.6D4	26.40	0.00	0.00	1.05	-0.05	0.00
G1+G2+Q+A+D1	26.53	0.00	0.00	1.13	0.00	0.00
G1+G2+Q+A+D2	26.27	0.00	0.00	0.96	0.00	0.00
G1+G2+Q+A+D3	26.40	0.00	0.00	1.05	0.03	0.00
G1+G2+Q+A+D4	26.40	0.00	0.00	1.05	-0.02	0.00
G1+G2+Q+D1	14.18	0.00	0.00	0.43	0.00	0.00
G1+G2+Q+D2	13.93	0.00	0.00	0.25	0.00	0.00
G1+G2+Q+D3	14.06	0.00	0.00	0.34	0.03	0.00
G1+G2+Q+D4	14.06	0.00	0.00	0.34	-0.03	0.00

Fundação S4						
Combinação	N (tf)	Mx (kgf.m)	My (kgf.m)	Vx (tf)	Vy (tf)	Mt (kgf/m)
Peso próprio (G1)	12.69	0.00	0.00	0.00	-0.32	0.00
Adicional (G2)	0.32	0.00	0.00	0.00	-0.01	0.00
Solo (S)	0.00	0.00	0.00	0.00	0.00	0.00
Acidental (Q)	1.11	0.00	0.00	0.00	-0.01	0.00
Água (A)	12.34	0.00	0.00	0.00	-0.71	0.00
Vento X+ (V1)	0.00	0.00	0.00	0.06	0.00	0.00
Vento X- (V2)	0.00	0.00	0.00	-0.06	0.00	0.00
Vento Y+ (V3)	-1.41	0.00	0.00	0.00	0.22	0.00
Vento Y- (V4)	1.41	0.00	0.00	0.00	-0.22	0.00
Desaprumo X+ (D1)	0.00	0.00	0.00	0.03	0.00	0.00
Desaprumo X- (D2)	0.00	0.00	0.00	-0.03	0.00	0.00
Desaprumo Y+ (D3)	-0.13	0.00	0.00	0.00	0.09	0.00
Desaprumo Y- (D4)	0.13	0.00	0.00	0.00	-0.09	0.00
Subpressão (AS)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 1 (T1)	0.00	0.00	0.00	0.00	0.00	0.00
Temperatura 2 (T2)	0.00	0.00	0.00	0.00	0.00	0.00
Retração (R)	0.00	0.00	0.00	0.00	0.00	0.00
G1+G2+0.7Q+0.6V1+D1	13.78	0.00	0.00	0.07	-0.34	0.00
G1+G2+0.7Q+0.6V2+D2	13.78	0.00	0.00	-0.07	-0.34	0.00
G1+G2+0.7Q+0.6V3+D3	12.81	0.00	0.00	0.00	-0.12	0.00
G1+G2+0.7Q+0.6V4+D4	14.76	0.00	0.00	0.00	-0.55	0.00
G1+G2+0.7Q+A+0.6V1+0.6D1	26.12	0.00	0.00	0.05	-1.05	0.00

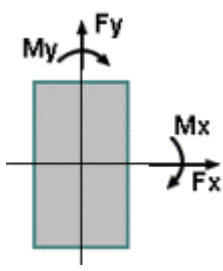


G1+G2+0.7Q+A+0.6V1+D1	26.12	0.00	0.00	0.06	-1.05	0.00
G1+G2+0.7Q+A+0.6V2+0.6D2	26.12	0.00	0.00	-0.05	-1.05	0.00
G1+G2+0.7Q+A+0.6V2+D2	26.12	0.00	0.00	-0.07	-1.05	0.00
G1+G2+0.7Q+A+0.6V3+0.6D3	25.20	0.00	0.00	0.00	-0.87	0.00
G1+G2+0.7Q+A+0.6V3+D3	25.15	0.00	0.00	0.00	-0.83	0.00
G1+G2+0.7Q+A+0.6V4+0.6D4	27.05	0.00	0.00	0.00	-1.23	0.00
G1+G2+0.7Q+A+0.6V4+D4	27.10	0.00	0.00	0.00	-1.26	0.00
G1+G2+0.7Q+A+D1	26.12	0.00	0.00	0.03	-1.05	0.00
G1+G2+0.7Q+A+D2	26.12	0.00	0.00	-0.03	-1.05	0.00
G1+G2+0.7Q+A+D3	26.00	0.00	0.00	0.00	-0.96	0.00
G1+G2+0.7Q+A+D4	26.25	0.00	0.00	0.00	-1.13	0.00
G1+G2+0.7Q+A+V1+0.6D1	26.12	0.00	0.00	0.08	-1.05	0.00
G1+G2+0.7Q+A+V2+0.6D2	26.12	0.00	0.00	-0.08	-1.05	0.00
G1+G2+0.7Q+A+V3+0.6D3	24.63	0.00	0.00	0.00	-0.78	0.00
G1+G2+0.7Q+A+V4+0.6D4	27.61	0.00	0.00	0.00	-1.31	0.00
G1+G2+0.7Q+V1+0.6D1	13.78	0.00	0.00	0.08	-0.34	0.00
G1+G2+0.7Q+V2+0.6D2	13.78	0.00	0.00	-0.08	-0.34	0.00
G1+G2+0.7Q+V3+0.6D3	12.29	0.00	0.00	0.00	-0.07	0.00
G1+G2+0.7Q+V4+0.6D4	15.27	0.00	0.00	0.00	-0.60	0.00
G1+G2+A+0.6V1+0.6D1	25.35	0.00	0.00	0.05	-1.04	0.00
G1+G2+A+0.6V1+D1	25.35	0.00	0.00	0.06	-1.04	0.00
G1+G2+A+0.6V2+0.6D2	25.35	0.00	0.00	-0.05	-1.04	0.00
G1+G2+A+0.6V2+D2	25.35	0.00	0.00	-0.07	-1.04	0.00
G1+G2+A+0.6V3+0.6D3	24.43	0.00	0.00	0.00	-0.86	0.00
G1+G2+A+0.6V3+D3	24.38	0.00	0.00	0.00	-0.82	0.00
G1+G2+A+0.6V4+0.6D4	26.27	0.00	0.00	0.00	-1.22	0.00
G1+G2+A+0.6V4+D4	26.33	0.00	0.00	0.00	-1.25	0.00
G1+G2+A+D1	25.35	0.00	0.00	0.03	-1.04	0.00
G1+G2+A+D2	25.35	0.00	0.00	-0.03	-1.04	0.00
G1+G2+A+D3	25.22	0.00	0.00	0.00	-0.95	0.00
G1+G2+A+D4	25.48	0.00	0.00	0.00	-1.12	0.00
G1+G2+A+V1+0.6D1	25.35	0.00	0.00	0.08	-1.04	0.00
G1+G2+A+V2+0.6D2	25.35	0.00	0.00	-0.08	-1.04	0.00
G1+G2+A+V3+0.6D3	23.86	0.00	0.00	0.00	-0.77	0.00
G1+G2+A+V4+0.6D4	26.84	0.00	0.00	0.00	-1.31	0.00
G1+G2+D1	13.01	0.00	0.00	0.03	-0.33	0.00
G1+G2+D2	13.01	0.00	0.00	-0.03	-0.33	0.00
G1+G2+D3	12.88	0.00	0.00	0.00	-0.24	0.00
G1+G2+D4	13.13	0.00	0.00	0.00	-0.41	0.00
G1+G2+Q+0.6V1+0.6D1	14.11	0.00	0.00	0.05	-0.34	0.00
G1+G2+Q+0.6V2+0.6D2	14.11	0.00	0.00	-0.05	-0.34	0.00
G1+G2+Q+0.6V3+0.6D3	13.19	0.00	0.00	0.00	-0.16	0.00
G1+G2+Q+0.6V4+0.6D4	15.04	0.00	0.00	0.00	-0.52	0.00
G1+G2+Q+A+0.6V1+0.6D1	26.46	0.00	0.00	0.05	-1.05	0.00
G1+G2+Q+A+0.6V2+0.6D2	26.46	0.00	0.00	-0.05	-1.05	0.00
G1+G2+Q+A+0.6V3+0.6D3	25.53	0.00	0.00	0.00	-0.87	0.00
G1+G2+Q+A+0.6V4+0.6D4	27.38	0.00	0.00	0.00	-1.23	0.00
G1+G2+Q+A+D1	26.46	0.00	0.00	0.03	-1.05	0.00
G1+G2+Q+A+D2	26.46	0.00	0.00	-0.03	-1.05	0.00
G1+G2+Q+A+D3	26.33	0.00	0.00	0.00	-0.97	0.00
G1+G2+Q+A+D4	26.58	0.00	0.00	0.00	-1.14	0.00
G1+G2+Q+D1	14.11	0.00	0.00	0.03	-0.34	0.00
G1+G2+Q+D2	14.11	0.00	0.00	-0.03	-0.34	0.00
G1+G2+Q+D3	13.99	0.00	0.00	0.00	-0.26	0.00
G1+G2+Q+D4	14.24	0.00	0.00	0.00	-0.43	0.00

#### Legenda

- Caso: indica o caso de carregamento no qual serão apresentados os esforços atuantes;
- Elemento: nome da fundação;
- N: esforço axial na fundação;
- Mx: momento fletor na fundação, atuante em torno do eixo X global;
- My: momento fletor na fundação, atuante em torno do eixo Y global;



	- Fx: esforço cortante na fundação, atuante no plano paralelo à direção X global;
	- Fy: esforço cortante na fundação, atuante no plano paralelo à direção Y global;
	- Mt: momento de torção atuante.

## 17.7 QUADRO DE CARGAS DOS PILARES

Pilares	Fundo		Tampa	
	NPos (tf)	NNeg	NPos (tf)	NNeg
P1	27.61	0.00	13.41	0.00
P2	27.66	0.00	13.44	0.00
P3	27.56	0.00	13.37	0.00
P4	27.61	0.00	13.39	0.00

## 17.8 SAPATAS - PAVIMENTO FUNDO

### 17.8.1 Relatório de Resultados das Sapatas

<b>Fundo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	

Nome	Dimensões (cm)		Armaduras inferiores		Armaduras superiores	
	B H	H0 H1	Dir. B	Dir. H	Dir. B	Dir. H
S1	85.00	30.00	7 ø 10.0 c/15	6 ø 10.0 c/15		
	105.00	30.00	(5.50 cm <sup>2</sup> )	(4.71 cm <sup>2</sup> )		
S2	85.00	30.00	7 ø 10.0 c/15	6 ø 10.0 c/15		
	105.00	30.00	(5.50 cm <sup>2</sup> )	(4.71 cm <sup>2</sup> )		
S3	85.00	30.00	7 ø 10.0 c/15	6 ø 10.0 c/15		
	105.00	30.00	(5.50 cm <sup>2</sup> )	(4.71 cm <sup>2</sup> )		
S4	85.00	30.00	7 ø 10.0 c/15	6 ø 10.0 c/15		
	105.00	30.00	(5.50 cm <sup>2</sup> )	(4.71 cm <sup>2</sup> )		

### 17.8.2 Relatório de Cálculos das Sapatas

<b>Fundo</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 1</b>		cobr = 4.00 cm	



### 17.8.3 Esforços e pressões

Nome	MB MH (kgf.m)	FB FH (tf)	Carga Carga total (tf)	Pressão Sig1 (kgf/cm²)	Pressão Sig2 (kgf/cm²)	Pressão Sig3 (kgf/cm²)	Pressão Sig4 (kgf/cm²)
S1	184.09 368.18	0.08 1.31	27.61 28.67	3.30 (lim = 4.00)	3.59 (lim = 4.00)	3.12 (lim = 4.00)	2.83 (lim = 4.00)
S2	184.42 368.84	0.08 1.31	27.66 28.72	3.31 (lim = 4.00)	3.60 (lim = 4.00)	3.13 (lim = 4.00)	2.84 (lim = 4.00)
S3	183.76 367.53	0.08 1.31	27.56 28.62	3.30 (lim = 4.00)	3.59 (lim = 4.00)	3.12 (lim = 4.00)	2.83 (lim = 4.00)
S4	184.10 368.19	0.08 1.31	27.61 28.67	3.30 (lim = 4.00)	3.59 (lim = 4.00)	3.12 (lim = 4.00)	2.83 (lim = 4.00)

### 17.8.4 Estabilidade

Nome	Tombamento B		Tombamento H		Deslizamento		Arrancamento	
	Mrd Msd (kgf.m)	Mrd / Msd	Mrd Msd (kgf.m)	Mrd / Msd	Frd Fsd (tf)	Frd / Fsd	Nt (tf)	Ns (tf)
S1	12186.07 184.09	66.20 (lim = 1.50)	15053.38 368.18	40.89 (lim = 1.50)	10.21 1.30	7.84 lim = (1.50)		
S2	12206.99 184.42	66.19 (lim = 1.50)	15079.22 368.84	40.88 (lim = 1.50)	10.22 1.30	7.84 lim = (1.50)		
S3	12165.17 183.76	66.20 (lim = 1.50)	15027.56 367.53	40.89 (lim = 1.50)	10.20 1.30	7.83 lim = (1.50)		
S4	12186.34 184.10	66.20 (lim = 1.50)	15053.72 368.19	40.89 (lim = 1.50)	10.21 1.31	7.82 lim = (1.50)		

### 17.8.5 Dimensionamento

Nome	Armaduras inferiores		Armaduras superiores	
	Dir. B	Dir. H	Dir. B	Dir. H
	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) As (cm²/m)	Md (kgf.m/m) A's (cm²/m)	Md (kgf.m/m) A's (cm²/m)
S1	3227.49 5.00	3227.49 5.00	0.00 0.00	0.00 0.00
S2	3227.49 5.00	3227.49 5.00	0.00 0.00	0.00 0.00
S3	3227.49 5.00	3227.49 5.00	0.00 0.00	0.00 0.00
S4	3227.49 5.00	3227.49 5.00	0.00 0.00	0.00 0.00

## 17.9 PILARES – PAVIMENTO FUNDO

### 17.9.1 Resultados dos Pilares

Fundo	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura	lib vínc	Nd máx	MBd topo	MHd topo	As b Armaduras	Estribo Topo	Esb b Esb h

		(cm)	lih vínc (cm)	Nd mín (tf)	MBd base (kgf.m)	MHd base (kgf.m)	As h % armad total	Base cota	
P1 1:25	20.00 X 40.00	35910.00 60.00	100.00 RR 100.00 RR	34.92 12.63	115 0	1666 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	17.30 8.65
P2 1:25	20.00 X 40.00	35910.00 60.00	100.00 RR 100.00 RR	34.99 12.67	113 0	1668 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	17.30 8.65
P3 1:25	20.00 X 40.00	35910.00 60.00	100.00 RR 100.00 RR	34.86 12.59	117 0	1667 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	17.30 8.65
P4 1:25	20.00 X 40.00	35910.00 60.00	100.00 RR 100.00 RR	34.92 12.63	113 0	1670 0	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	17.30 8.65

### 17.9.2 Cálculo do Pilar P1

#### 17.9.2.1 Pavimento Fundo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 40.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.58

#### 17.9.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 100.00 cm Esbeltez = 17.30	Msdtopo = 115 kgf.m Msdbase = 0 kgf.m	Ndmax = 34.92 tf Ndmin = 12.63 tf ni = 0.20
H	Vínculo = RR li = 100.00 cm Esbeltez = 8.65	Msdtopo = 1666 kgf.m Msdbase = 0 kgf.m	

### 17.9.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 2 Msdcentro = 1	Madtopy = 731	Td = 0 kgf.m	2 ø 12.5 2 ø 12.5	1.3G1+1.4G2+0.98Q+1.2A+1.4V3+0.84D3 Msdx) = 733 kgf.m

	Msdbase = 0	Madcentro = 732 Madbase = 733 M2d = 39 Mcd = 0	Asl = 0.00 cm <sup>2</sup>	4ø12.5 4.91 cm <sup>2</sup> 0.6 %	Msd(y) = 1666 kgf.m Mrd(x) = 2364 kgf.m Mrd(y) = 5371 kgf.m Mrd/Msd=3.22
H	Msdtopo = 1666 Msdcentro = 999 Msdbase = 0	Madtopo = 175 Madcentro = 87 Madbase = 943 M2d = 15 Mcd = 1			

### 17.9.3.1 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I	VBd topo = 0.11 tf VBd base = 0.11 tf	Td = 0 kgf.m
45	VHd topo = 1.66 tf VHd base = 1.66 tf	

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.11 tf VRd2 = 31.31 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.00
H	Vd = 1.66 tf VRd2 = 36.02 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 2.00 Vc = 10.69 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 35.38 cm Vc0 = 6.15 tf k = 2.00 Vc = 12.30 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm <sup>2</sup>	A90 = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.00 cm <sup>2</sup> /m ø 5.0 c/15

## 17.9.4 Cálculo do Pilar P2

### 17.9.4.1 Pavimento Fundo - Lance 1

Dados da seção transversal	Dados do concreto
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Seção retangular b = 20.00 cm    h = 40.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.58
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#### 17.9.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 100.00 cm Esbeltez = 17.30	Msdtopo = 113 kgf.m Msdbase = 0 kgf.m	Ndmax = 34.99 tf Ndmin = 12.67 tf ni = 0.20
H	Vínculo = RR li = 100.00 cm Esbeltez = 8.65	Msdtopo = 1668 kgf.m Msdbase = 0 kgf.m	

#### 17.9.4.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1 Msdcentro = 0 Msdbase = 0	Madtopo = 734 Madcentro = 734 Madbase = 735 M2d = 39 Mcd = 0	Td = 0 kgf.m	2 ø 12.5 2 ø 12.5	1.3G1+1.4G2+0.98Q+1.2A+1.4V2+0.84D2 Msdx = 735 kgf.m Msdy = 1668 kgf.m Mrdx = 2366 kgf.m Mrdy = 5372 kgf.m Mrd/Msd=3.22
H	Msdtopo = 1668 Msdcentro = 1001 Msdbase = 0	Madtopo = 175 Madcentro = 87 Madbase = 945 M2d = 15 Mcd = 1	Asl = 0.00 cm <sup>2</sup>	4ø12.5 4.91 cm <sup>2</sup> 0.6 %	

#### 17.9.4.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.11 tf VBd base = 0.11 tf VHd topo = 1.67 tf VHd base = 1.67 tf	Td = 0 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.11 tf VRd2 = 31.31 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.00
H	Vd = 1.67 tf VRd2 = 36.02 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05

Direção	Armadura de cisalhamento		
	Dados	Armadura	Armadura

		mínima	cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 2.00 Vc = 10.69 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 35.38 cm Vc0 = 6.15 tf k = 2.00 Vc = 12.30 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm <sup>2</sup>	A90 = 0.00 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.00 cm <sup>2</sup> /m ø 5.0 c/15

### 17.9.5 Cálculo do Pilar P3

#### 17.9.5.1 Pavimento Fundo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 40.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.58

#### 17.9.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 100.00 cm Esbeltez = 17.30	Msdtopo = 117 kgf.m Msdbase = 0 kgf.m	Ndmax = 34.86 tf Ndmin = 12.59 tf ni = 0.20
H	Vínculo = RR li = 100.00 cm Esbeltez = 8.65	Msdtopo = 1667 kgf.m Msdbase = 0 kgf.m	

#### 17.9.5.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 4 Msdcentro = 3 Msdbase = 0	Madtopo = 728 Madcentro = 729 Madbase = 732 M2d = 39 Mcd = 0	Td = 0 kgf.m  Asl = 0.00 cm <sup>2</sup>	2 ø 12.5 2 ø 12.5  4ø12.5 4.91 cm <sup>2</sup> 0.6 %	1.3G1+1.4G2+0.98Q+1.2A+1.4V1+0.84D1 Msdx) = 732 kgf.m Msdy) = 1667 kgf.m Mrdx) = 2361 kgf.m Mrdy) = 5375 kgf.m Mrd/Msd=3.22
H	Msdtopo = 1667	Madtopo = 174			

	Msdcentro = 1000 Msdbase = 0	Madcentro = 87 Madbase = 941 M2d = 15 Mcd = 1			
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#### 17.9.5.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.11 tf VBd base = 0.11 tf VHd topo = 1.66 tf VHd base = 1.66 tf	Td = 0 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.11 tf VRd2 = 31.31 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.00
H	Vd = 1.66 tf VRd2 = 36.02 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 2.00 Vc = 10.69 tf	Vmin = 0.00 tf Aswmin = 0.00 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 35.38 cm Vc0 = 6.15 tf k = 2.00 Vc = 12.30 tf	Vmin = 0.00 tf Aswmin = 0.00 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm²	A90 = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.00 cm²/m ø 5.0 c/15

### 17.9.6 Cálculo do Pilar P4

#### 17.9.6.1 Pavimento Fundo - Lance 1

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 40.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm² Ecs = 268384 kgf/cm² Peso específico = 2500.00 kgf/m³ Fi = 2.58

### 17.9.6.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 100.00 cm Esbeltez = 17.30	Msdtopo = 113 kgf.m Msdbase = 0 kgf.m	Ndmax = 34.92 tf Ndmin = 12.63 tf ni = 0.20
H	Vínculo = RR li = 100.00 cm Esbeltez = 8.65	Msdtopo = 1670 kgf.m Msdbase = 0 kgf.m	

### 17.9.6.3 Seção crítica do pilar: TOPO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1 Msdcentro = 0 Msdbase = 0	Madtopo = 733 Madcentro = 733 Madbase = 733 M2d = 39 Mcd = 0	Td = 0 kgf.m	2 ø 12.5 2 ø 12.5	1.3G1+1.4G2+0.98Q+1.2A+1.4V4+0.84D4 Msdx = 733 kgf.m Msdy = 1670 kgf.m Mrdx = 2363 kgf.m Mrdy = 5378 kgf.m Mrd/Msd=3.22
H	Msdtopo = 1670 Msdcentro = 1002 Msdbase = 0	Madtopo = 175 Madcentro = 87 Madbase = 943 M2d = 15 Mcd = 1	Asl = 0.00 cm <sup>2</sup>	4ø12.5 4.91 cm <sup>2</sup> 0.6 %	

### 17.9.6.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I	VBd topo = 0.11 tf VBd base = 0.11 tf VHd topo = 1.67 tf VHd base = 1.67 tf	Td = 0 kgf.m
45		

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.11 tf VRd2 = 31.31 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.00
H	Vd = 1.67 tf VRd2 = 36.02 tf	Td = 0 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.05

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 2.00 Vc = 10.69 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 35.38 cm Vc0 = 6.15 tf	Vmin = 0.00 tf	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

	k = 2.00 Vc = 12.30 tf	Aswmin = 0.00 cm²/m	
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Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm²	A90 = 0.00 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.00 cm²/m ø 5.0 c/15

### 17.9.7 Cálculo dos Pilares

<b>Fundo</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 1</b>		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm²)
P1	20.00 X 40.00	RR 17.30	34.92	733	2364	3.22	2.45 (2 ø 12.5)
		RR 8.65	12.63	1666	5371		2.45 (2 ø 12.5)
P2	20.00 X 40.00	RR 17.30	34.99	735	2366	3.22	2.45 (2 ø 12.5)
		RR 8.65	12.67	1668	5372		2.45 (2 ø 12.5)
P3	20.00 X 40.00	RR 17.30	34.86	732	2361	3.22	2.45 (2 ø 12.5)
		RR 8.65	12.59	1667	5375		2.45 (2 ø 12.5)
P4	20.00 X 40.00	RR 17.30	34.92	733	2363	3.22	2.45 (2 ø 12.5)
		RR 8.65	12.63	1670	5378		2.45 (2 ø 12.5)

### 17.10 PILARES - PAVIMENTO TAMPA

#### 17.10.1 Resultados dos Pilares

<b>Tampa</b>	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
<b>Lance 2</b>		cobr = 3.50 cm	

Dados				Resultados					
Pilar	Seção (cm)	Nível Altura (cm)	lib vínc lih vínc (cm)	Nd máx Nd mín (tf)	MBd topo MBd base (kgf.m)	MHd topo MHd base (kgf.m)	As b Armaduras As h % armad total	Estribo Topo Base cota	Esb b Esb h
P1 1:25	20.00 X 40.00	36602.00 692.00	692.00 RR	16.87	10	12	2.45 2 ø 12.5	ø 5.0 c/15	119.72 59.86
			692.00 RR	-0.07	30	1330	2.45 2 ø 12.5		



							0.6 4 ø 12.5		
P2 1:25	20.00 X 40.00	36602.00 692.00	692.00 RR 692.00 RR	16.91 -0.06	10 30	12 1330	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	119.72 59.86
P3 1:25	20.00 X 40.00	36602.00 692.00	692.00 RR 692.00 RR	16.82 -0.10	10 26	11 1325	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	119.72 59.86
P4 1:25	20.00 X 40.00	36602.00 692.00	692.00 RR 692.00 RR	16.85 -0.07	10 30	12 1325	2.45 2 ø 12.5 2.45 2 ø 12.5 0.6 4 ø 12.5	ø 5.0 c/15	119.72 59.86

## 17.10.2 Cálculo do Pilar P1

### 17.10.2.1 Pavimento Tampa - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 40.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.58

### 17.10.2.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 692.00 cm Esbeltez = 119.72	Msdtopo = 10 kgf.m Msdbase = 30 kgf.m	Ndmax = 16.87 tf Ndmin = -0.07 tf ni = 0.10
H	Vínculo = RR li = 692.00 cm Esbeltez = 59.86	Msdtopo = 12 kgf.m Msdbase = 1330 kgf.m	

### 17.10.2.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 14 Msdbase = 14	Madtopo = 1 Madcentro = 340 Madbase = 444 M2d = 2020 Mcd = 58	Td = 2 kgf.m  Asl = 0.01 cm <sup>2</sup>	2 ø 12.5 2 ø 12.5  4ø12.5 4.91 cm <sup>2</sup> 0.6 %	1.3G1+1.4G2+0.98Q+1.2A+1.4V3+0.84D3 Msdx = 2432 kgf.m Msdy = 996 kgf.m Mrdx = 2570 kgf.m Mrdy = 1052 kgf.m Mrd/Msd=1.06
H	Msdtopo = 12	Madtopo = 1			



	Msdcentro = 996 Msdbase = 1121	Madcentro = 222 Madbase = 444 M2d = 1010 Mcd = 64			
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#### 17.10.2.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.15 tf VBd base = 0.15 tf VHd topo = 3.67 tf VHd base = 3.67 tf	Td = 2 kgf.m

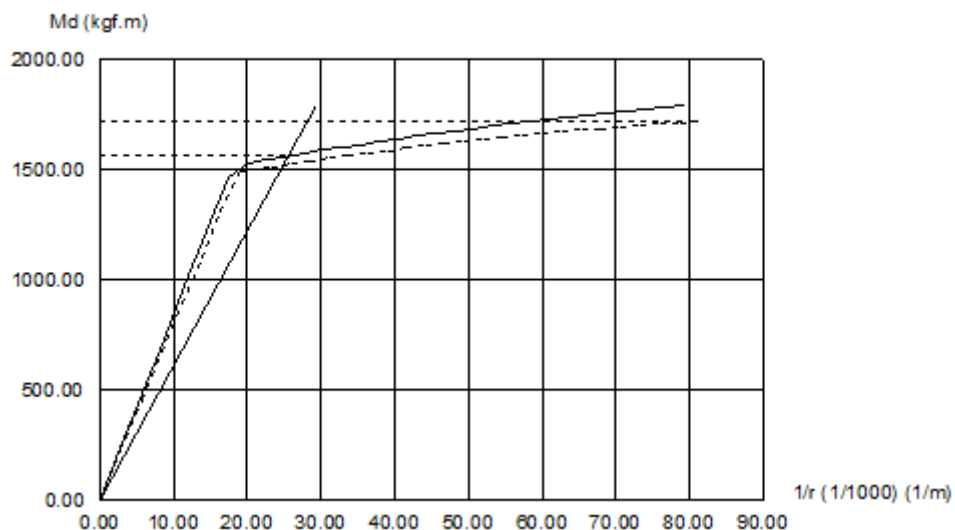
Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.15 tf VRd2 = 31.31 tf	Td = 2 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.01
H	Vd = 3.67 tf VRd2 = 36.02 tf	Td = 2 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.10

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 1.00 Vc = 5.34 tf	Vmin = 0.00 tf Aswmin = 0.00 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 35.38 cm Vc0 = 6.15 tf k = 1.00 Vc = 6.15 tf	Vmin = 0.00 tf Aswmin = 0.00 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

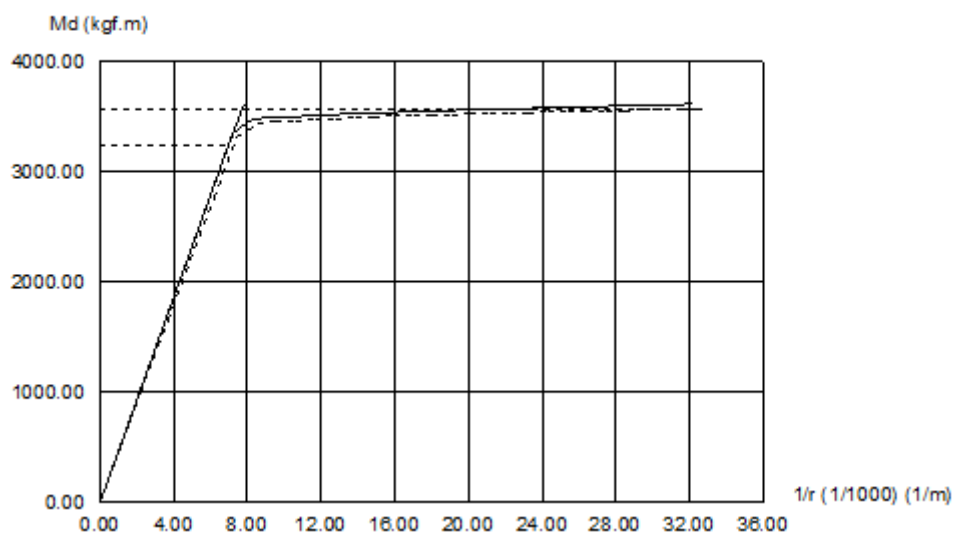
Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm²	A90 = 0.01 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.02 cm²/m ø 5.0 c/15



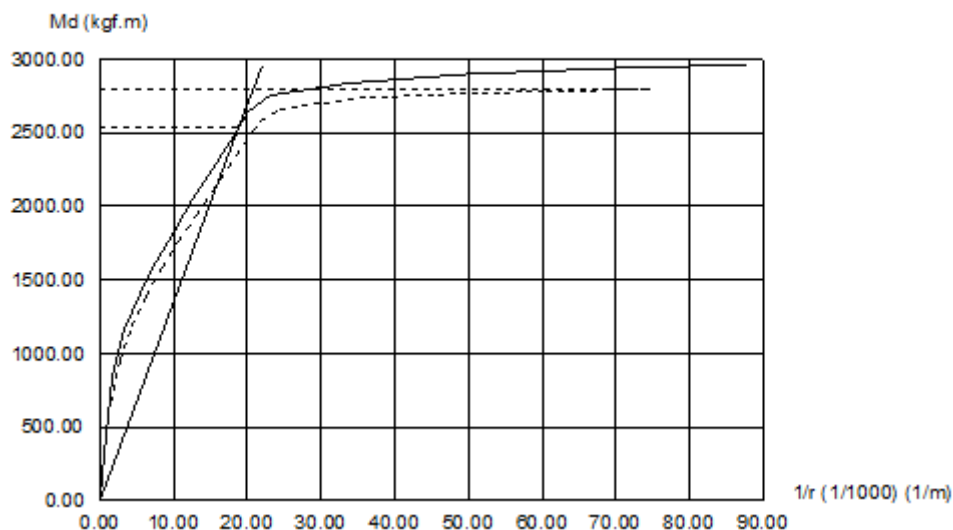
### Diagrama Ndmín., Momento, Curvatura - Direção B



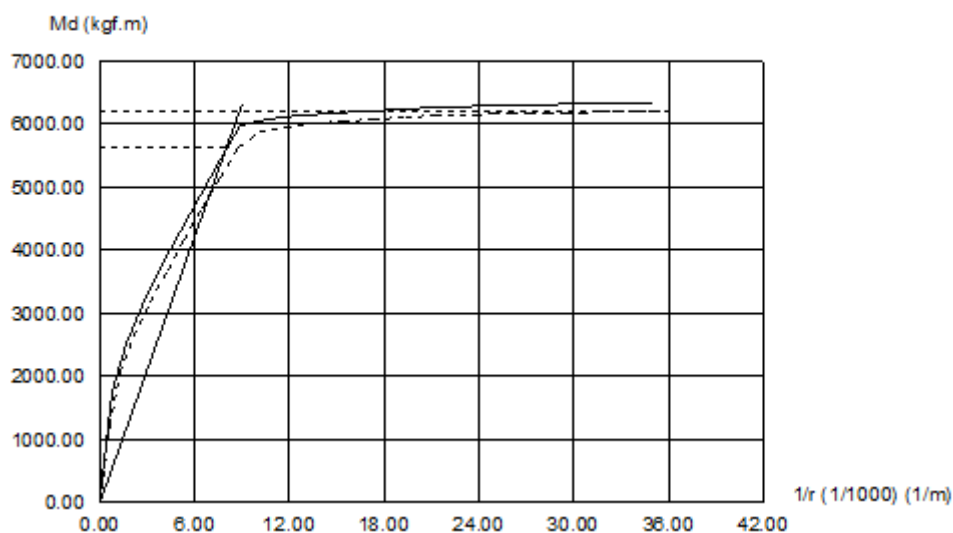
### Diagrama Ndmín., Momento, Curvatura - Direção H



### Diagrama Ndmáx., Momento, Curvatura - Direção B



### Diagrama Ndmáx., Momento, Curvatura - Direção H



## 17.10.3 Cálculo do Pilar P2

### 17.10.3.1 Pavimento Tampa - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular	$f_{ck} = 300.00 \text{ kgf/cm}^2$



b = 20.00 cm    h = 40.00 cm Cobrimento = 3.50 cm	Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.58
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### 17.10.3.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 692.00 cm Esbeltez = 119.72	Msdtopo = 10 kgf.m Msdbase = 30 kgf.m	Ndmax = 16.91 tf Ndmin = -0.06 tf ni = 0.10
H	Vínculo = RR li = 692.00 cm Esbeltez = 59.86	Msdtopo = 12 kgf.m Msdbase = 1330 kgf.m	

### 17.10.3.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		A armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 0 Msdcentro = 14 Msdbase = 15	Madtopo = 1 Madcentro = 341 Madbase = 445 M2d = 2024 Mcd = 57	Td = 2 kgf.m	2 ø 12.5 2 ø 12.5	1.3G1+1.4G2+0.98Q+1.2A+1.4V2+0.84D2 Msd(x) = 2436 kgf.m Msd(y) = 996 kgf.m Mrd(x) = 2572 kgf.m Mrd(y) = 1052 kgf.m Mrd/Msd=1.06
H	Msdtopo = 12 Msdcentro = 996 Msdbase = 1121	Madtopo = 1 Madcentro = 222 Madbase = 445 M2d = 1012 Mcd = 64	Asl = 0.01 cm <sup>2</sup>	4ø12.5 4.91 cm <sup>2</sup> 0.6 %	

### 17.10.3.4 Dimensionamento da armadura transversal

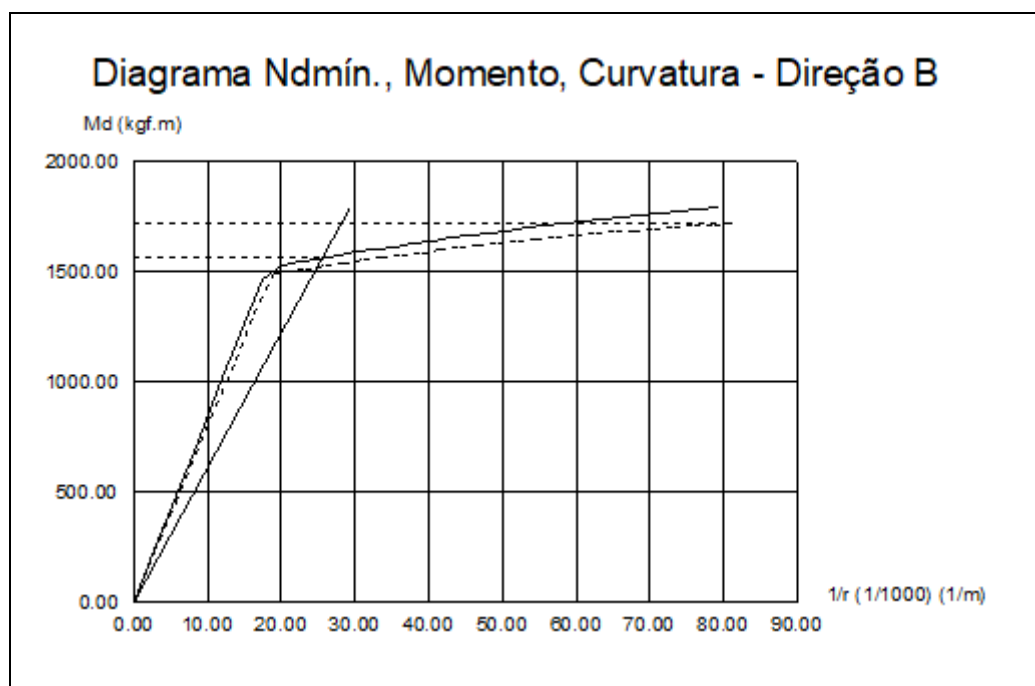
Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.15 tf VBd base = 0.15 tf VHd topo = 3.67 tf VHd base = 3.67 tf	Td = 2 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.15 tf VRd2 = 31.31 tf	Td = 2 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.01
H	Vd = 3.67 tf VRd2 = 36.02 tf	Td = 2 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.10

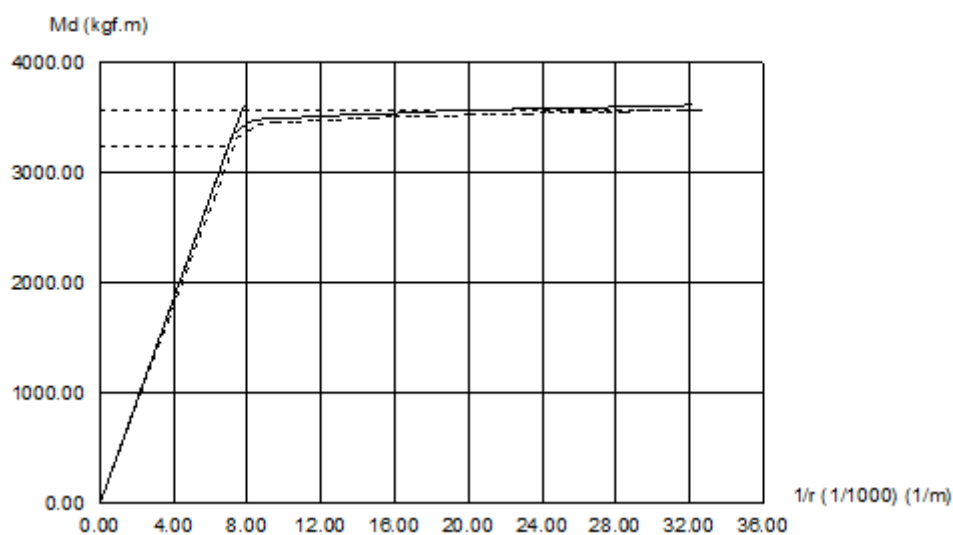


Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 1.00 Vc = 5.34 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 35.38 cm Vc0 = 6.15 tf k = 1.00 Vc = 6.15 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

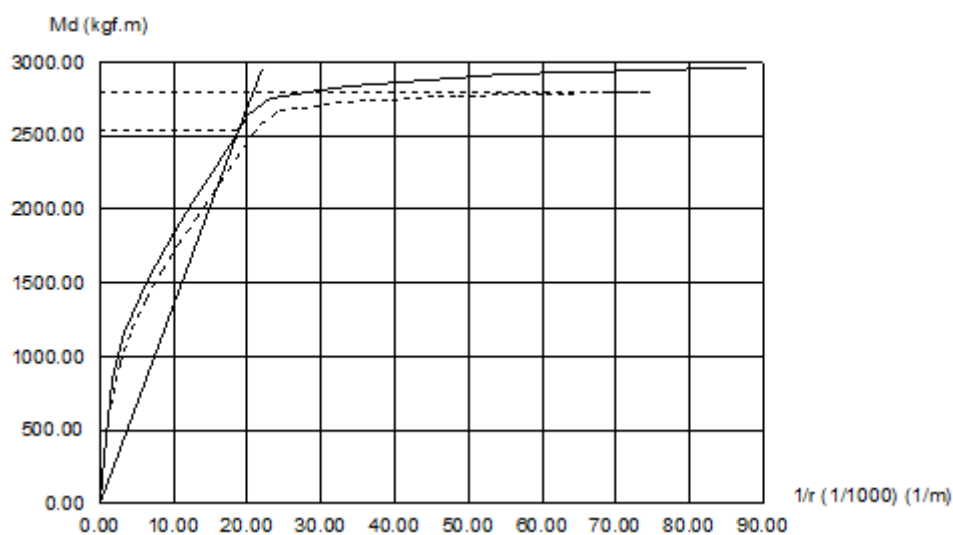
Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm <sup>2</sup>	A90 = 0.01 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.02 cm <sup>2</sup> /m ø 5.0 c/15



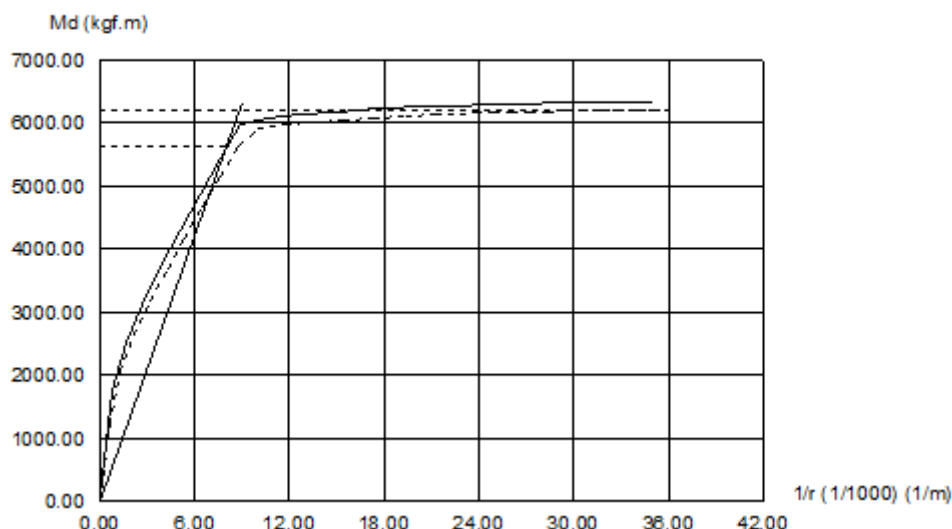
### Diagrama Ndmín., Momento, Curvatura - Direção H



### Diagrama Ndmáx., Momento, Curvatura - Direção B



### Diagrama Ndmáx., Momento, Curvatura - Direção H



#### 17.10.4 Cálculo do Pilar P3

##### 17.10.4.1 Pavimento Tampa - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular b = 20.00 cm h = 40.00 cm Cobrimento = 3.50 cm	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup> Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.58

##### 17.10.4.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 692.00 cm Esbeltez = 119.72	Msdtopo = 10 kgf.m Msdbase = 26 kgf.m	Ndmax = 16.82 tf Ndmin = -0.10 tf ni = 0.10
H	Vínculo = RR li = 692.00 cm Esbeltez = 59.86	Msdtopo = 11 kgf.m Msdbase = 1325 kgf.m	

##### 17.10.4.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	



B	Msdtopo = 0 Msdcentro = 6 Msdbase = 11	Madtopo = 0 Madcentro = 347 Madbase = 442 M2d = 2014 Mcd = 58	Td = 3 kgf.m	2 ø 12.5 2 ø 12.5	1.3G1+1.4G2+0.98Q+1.2A+1.4V1+0.84D1 Msd(x) = 2425 kgf.m Msd(y) = 991 kgf.m Mrd(x) = 2567 kgf.m Mrd(y) = 1049 kgf.m Mrd/Msd=1.06
H	Msdtopo = 11 Msdcentro = 991 Msdbase = 1117	Madtopo = 0 Madcentro = 221 Madbase = 442 M2d = 1007 Mcd = 67	Asl = 0.01 cm²	4ø12.5 4.91 cm² 0.6 %	

#### 17.10.4.4 Dimensionamento da armadura transversal

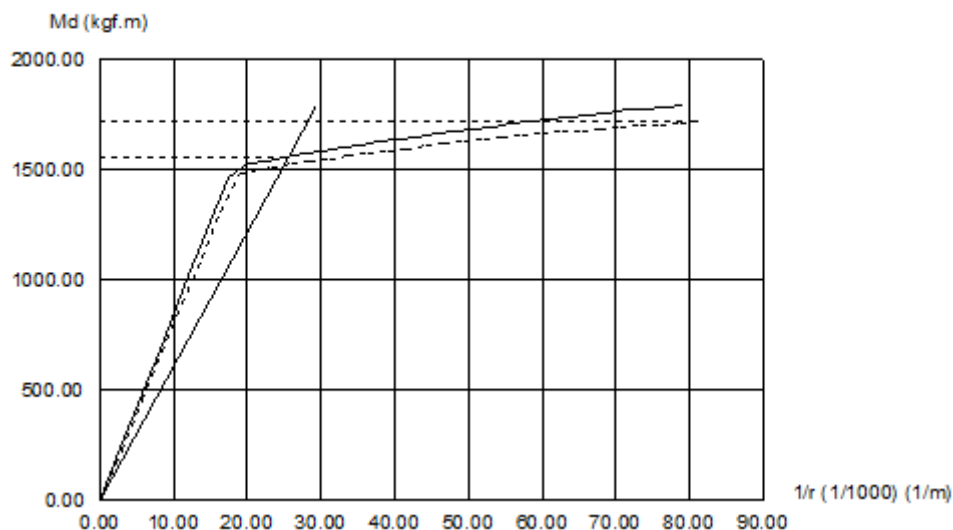
Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I  45	VBd topo = 0.11 tf VBd base = 0.11 tf VHd topo = 3.66 tf VHd base = 3.66 tf	Td = 3 kgf.m

Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.11 tf VRd2 = 31.31 tf	Td = 3 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.00
H	Vd = 3.66 tf VRd2 = 36.02 tf	Td = 3 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.10

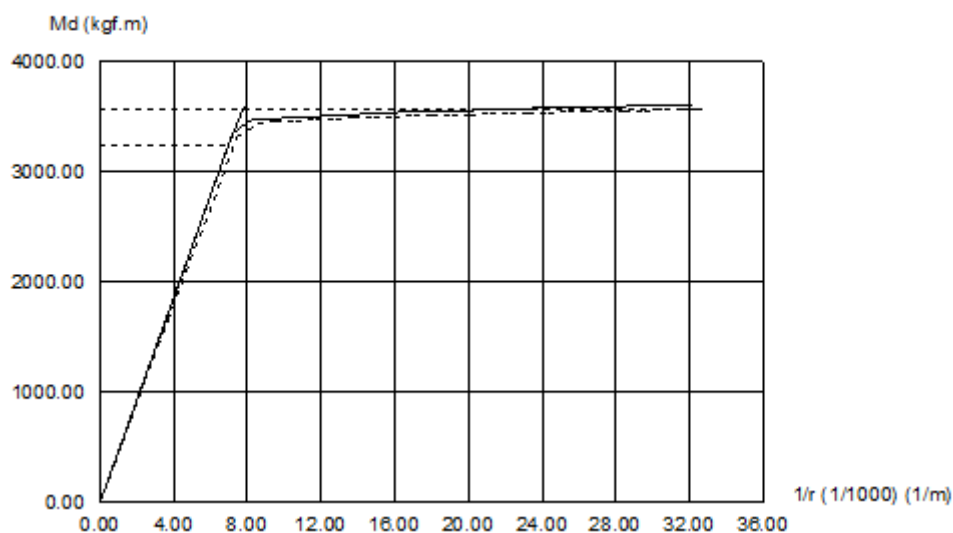
Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento
B	d = 15.38 cm Vc0 = 5.34 tf k = 1.00 Vc = 5.34 tf	Vmin = 0.00 tf Aswmin = 0.00 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m
H	d = 35.38 cm Vc0 = 6.15 tf k = 1.00 Vc = 6.15 tf	Vmin = 0.00 tf Aswmin = 0.00 cm²/m	Vsw = 0.00 tf Asw = 0.00 cm²/m

Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm²	A90 = 0.01 cm²	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.02 cm²/m ø 5.0 c/15

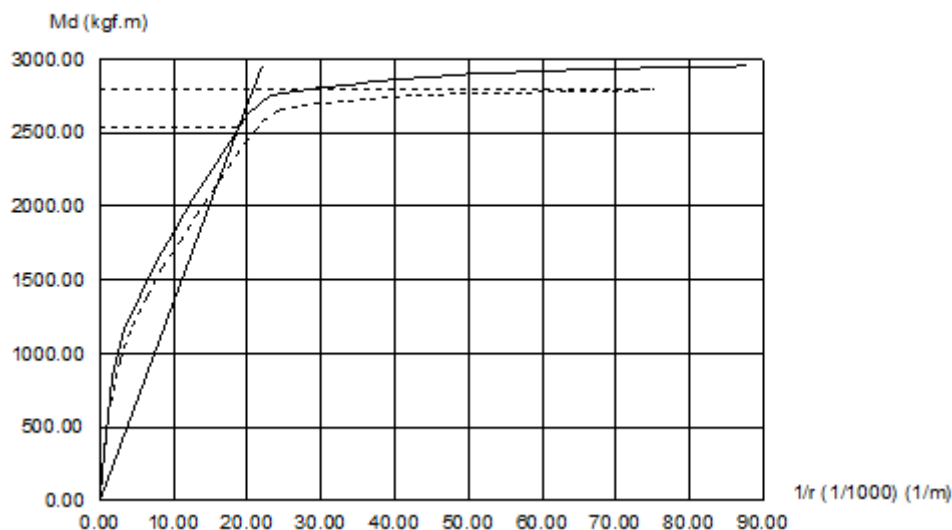
### Diagrama Ndmín., Momento, Curvatura - Direção B



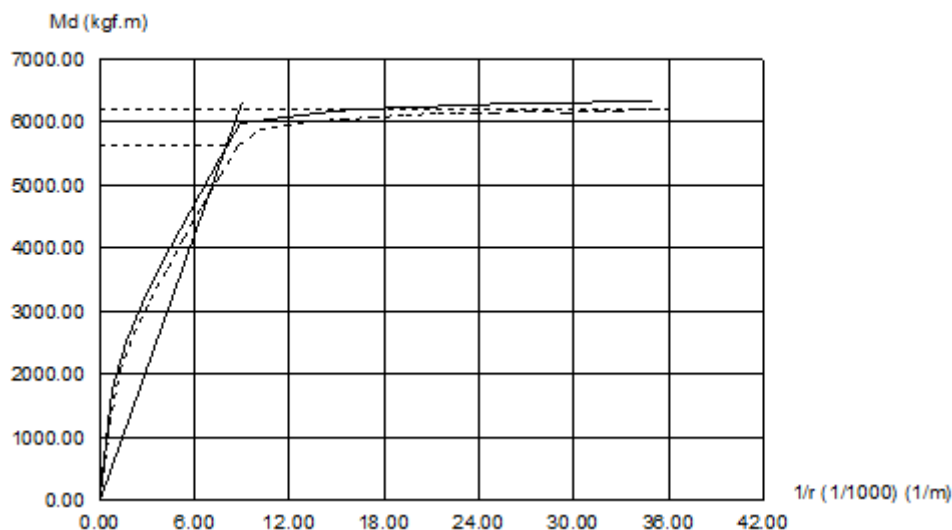
### Diagrama Ndmín., Momento, Curvatura - Direção H



### Diagrama Ndmáx., Momento, Curvatura - Direção B



### Diagrama Ndmáx., Momento, Curvatura - Direção H



## 17.10.5 Cálculo do Pilar P4

### 17.10.5.1 Pavimento Tampa - Lance 2

Dados da seção transversal	Dados do concreto
Seção retangular	fck = 300.00 kgf/cm <sup>2</sup> Ecs = 268384 kgf/cm <sup>2</sup>

b = 20.00 cm    h = 40.00 cm Cobrimento = 3.50 cm	Peso específico = 2500.00 kgf/m <sup>3</sup> Fi = 2.58
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#### 17.10.5.2 Dimensionamento da armadura longitudinal

Direção	Cálculo da esbeltez	Esforços máximos	
B	Vínculo = RR li = 692.00 cm Esbeltez = 119.72	Msdtopo = 10 kgf.m Msdbase = 30 kgf.m	Ndmax = 16.85 tf Ndmin = -0.07 tf ni = 0.10
H	Vínculo = RR li = 692.00 cm Esbeltez = 59.86	Msdtopo = 12 kgf.m Msdbase = 1325 kgf.m	

#### 17.10.5.3 Seção crítica do pilar: CENTRO

Direção	Momentos (kgf.m)		Armadura longitudinal		Processo de cálculo
	Iniciais	Adicionais	Torção	Final	
B	Msdtopo = 1 Msdcentro = 13 Msdbase = 14	Madtopo = 1 Madcentro = 341 Madbase = 443 M2d = 2018 Mcd = 58	Td = 2 kgf.m	2 ø 12.5 2 ø 12.5	1.3G1+1.4G2+0.98Q+1.2A+1.4V4+0.84D4 Msdx) = 2429 kgf.m Msdy) = 993 kgf.m Mrdx) = 2570 kgf.m Mrdy) = 1050 kgf.m Mrd/Msd=1.06
H	Msdtopo = 12 Msdcentro = 993 Msdbase = 1117	Madtopo = 1 Madcentro = 222 Madbase = 443 M2d = 1009 Mcd = 64	Asl = 0.01 cm <sup>2</sup>	4ø12.5 4.91 cm <sup>2</sup> 0.6 %	

#### 17.10.5.4 Dimensionamento da armadura transversal

Modelo cálculo Inclinação bielas	Esforços	
	Cisalhamento	Torção
I 45	VBd topo = 0.15 tf VBd base = 0.15 tf VHd topo = 3.66 tf VHd base = 3.66 tf	Td = 2 kgf.m

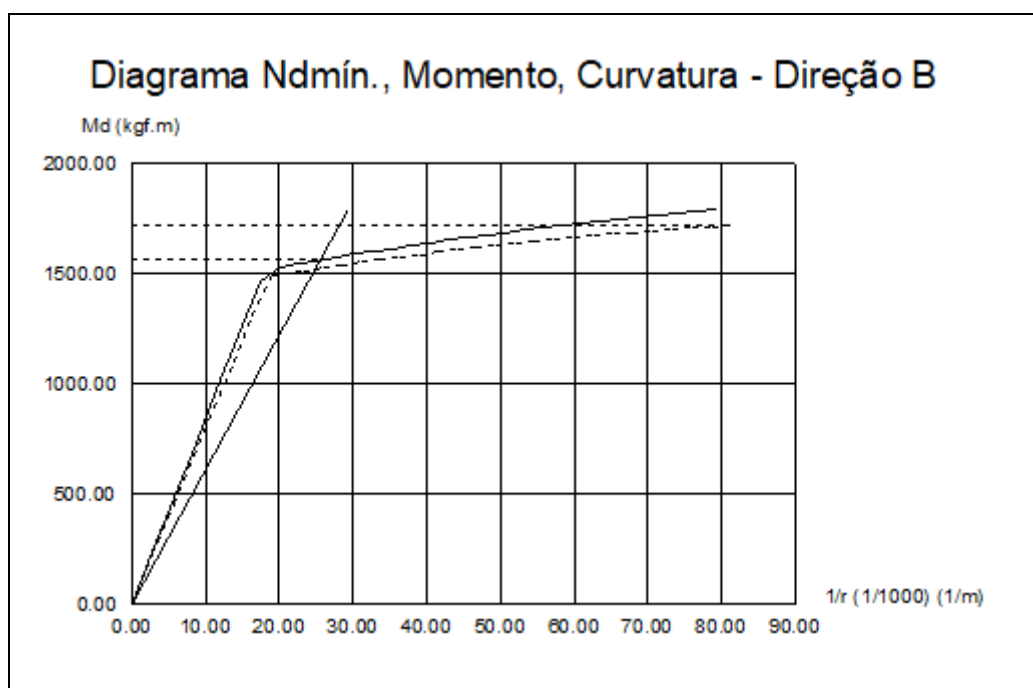
Verificação de esforços limites			
Direção	Cisalhamento	Torção	Cisalhamento + Torção
B	Vd = 0.15 tf VRd2 = 31.31 tf	Td = 2 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.01
H	Vd = 3.66 tf VRd2 = 36.02 tf	Td = 2 kgf.m TRd2 = 2078 kgf.m	Vd/VRd2 + Td/TRd2 = 0.10

Direção	Armadura de cisalhamento		
	Dados	Armadura mínima	Armadura cisalhamento

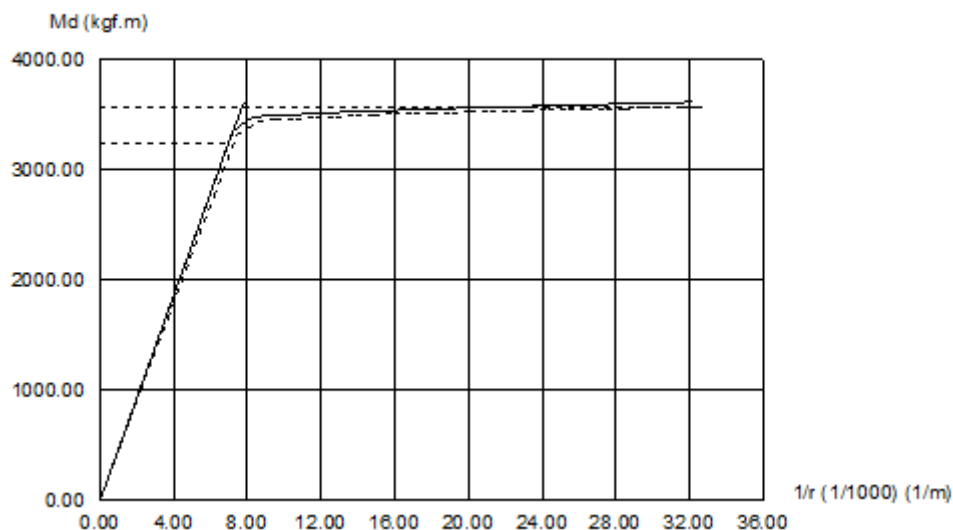


B	d = 15.38 cm Vc0 = 5.34 tf k = 1.00 Vc = 5.34 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m
H	d = 35.38 cm Vc0 = 6.15 tf k = 1.00 Vc = 6.15 tf	Vmin = 0.00 tf Aswmin = 0.00 cm <sup>2</sup> /m	Vsw = 0.00 tf Asw = 0.00 cm <sup>2</sup> /m

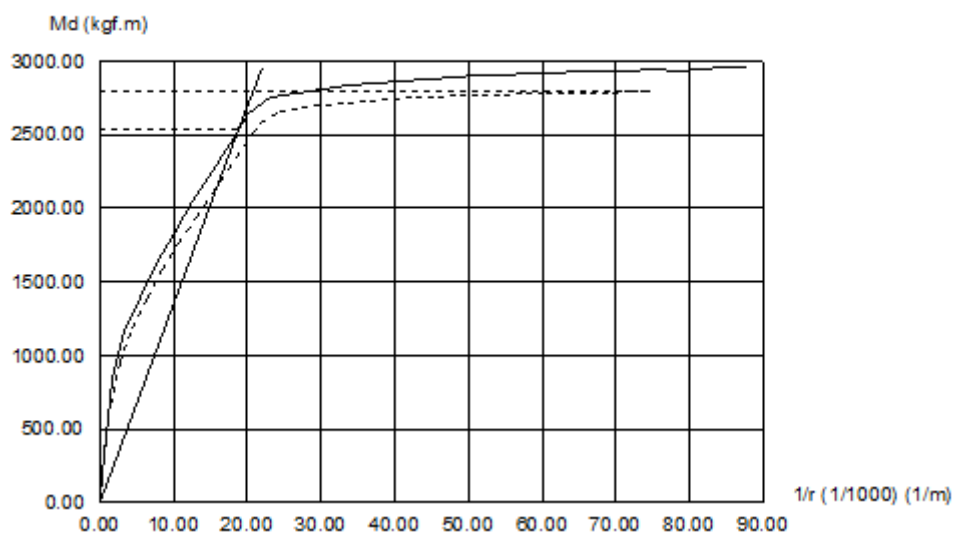
Armadura de torção		Armadura de fretagem		Armadura final
Dados	Armadura torção	Topo	Base	
he = 6.67 cm Ae = 330.56 cm <sup>2</sup>	A90 = 0.01 cm <sup>2</sup>	Zr = 0.00 tf Zs = 0.00 tf	Zr = 0.00 tf Zs = 0.00 tf	Asw = 0.02 cm <sup>2</sup> /m ø 5.0 c/15

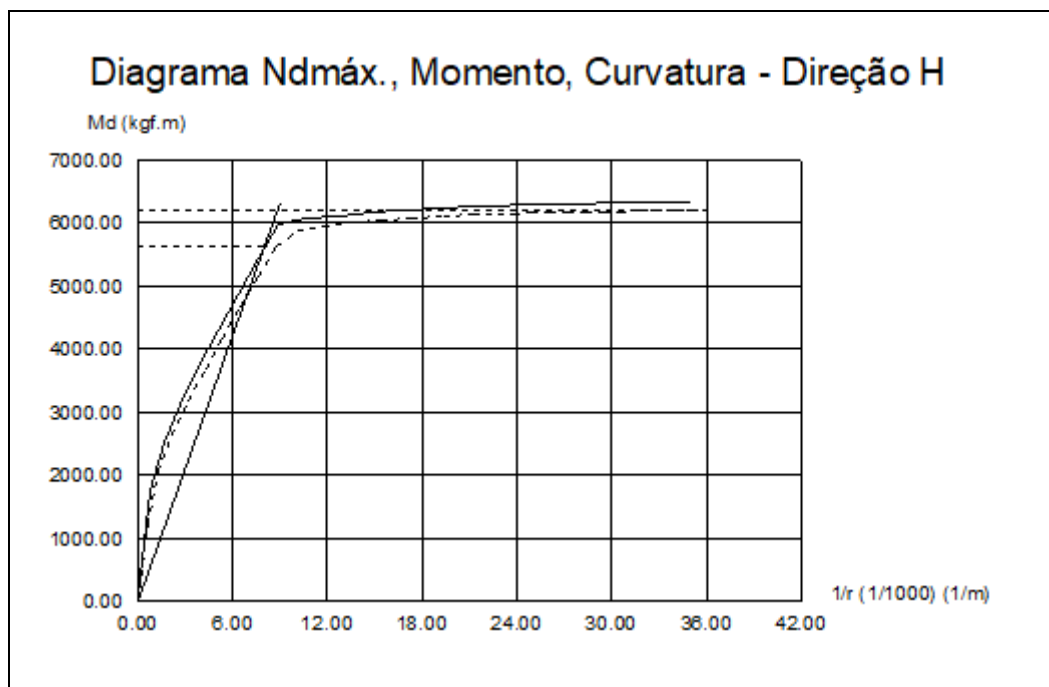


### Diagrama Ndmín., Momento, Curvatura - Direção H



### Diagrama Ndmáx., Momento, Curvatura - Direção B





### 17.10.6 Cálculo dos Pilares

<b>Tampa</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.50 cm	

Pilar	Seção (cm)	vínc esb B vínc esb H	Nd máx Nd mín (tf)	Msd(x) Msd(y) (kgf.m)	Mrd(x) Mrd(y) (kgf.m)	Mrd/Msd	As b As h (cm <sup>2</sup> )
P1	20.00 X 40.00	RR 119.72 RR 59.86	16.87 -0.07	2432 996	2570 1052	1.06	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P2	20.00 X 40.00	RR 119.72 RR 59.86	16.91 -0.06	2436 996	2572 1052	1.06	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P3	20.00 X 40.00	RR 119.72 RR 59.86	16.82 -0.10	2425 991	2567 1049	1.06	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)
P4	20.00 X 40.00	RR 119.72 RR 59.86	16.85 -0.07	2429 993	2570 1050	1.06	2.45 (2 ø 12.5) 2.45 (2 ø 12.5)

## 17.11 RESERVATÓRIO – PAVIMENTO TAMPA

### 17.11.1 Dados dos Reservatórios

<b>Tampa</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

Seção (cm)				Cargas Verticais (kgf/m <sup>2</sup> )				Cargas Horizontais (kgf/m <sup>2</sup> )		Temperatura Caso T1 Caso T2 (°C)	Retração Deform. X Deform. Y (‰)
Elemento	H	Elevação	Nível	Peso Próprio	Acidental Revestimento	Paredes Outras	Total	Base	Topo		
L1 (RAP)	12.00	0.00	36602.00	300.00 kgf/m <sup>2</sup>	200.00 100.00	0.00 0.00	600.00 kgf/m <sup>2</sup>				
L2 (RAP)	30.00	0.00	35910.00	750.00 kgf/m <sup>2</sup>	100.00 50.00	0.00 0.00	7820.00 kgf/m <sup>2</sup>				
PAR1-A (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR1-B (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR1-C (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR2-A (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR2-B (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR2-C (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR3-A (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR3-B (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR3-C (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR4-A (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR4-B (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		
PAR4-C (RAP)	20.00	0.00	36602.00	3460.00 kgf/m	0.00 0.00	0.00 0.00	0.00 kgf/m	6920.00	0.00		



## 17.11.2 Resultados do Reservatório

<b>Tampa</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

### 17.11.2.1 Reservatório RAP

ARMADURAS NA LAJE								
Trecho	Esforços				Resultados			
	Ndx Rdx (tf)	Ndy Rdy (tf)	Mdx (kgf.m/m)	Mdy (kgf.m/m)	Armadura inferior		Armadura superior	
					Asx	Asy	Asx	Asy
L1	0.45 -0.11	0.44 -0.13	413	411	As = 1.31 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)	As = 1.41 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m)		
L2	0.92 -7.32	0.92 -7.32	2112	2112	As = 3.02 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	As = 3.02 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	A's = 4.50 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	A's = 4.50 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)
PAR1-A	1.87 -10.20	12.56 -4.45	435	1299	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR1-B	1.19 -9.30	2.22 -8.27	338	1299	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 3.37 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR1-C	1.86 -10.19	12.59 -5.20	434	1107	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.53 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)
PAR2-A	1.89 -10.21	12.59 -4.50	436	1297	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.71 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-B	1.20 -9.30	2.24 -8.28	338	1297	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR2-C	1.86 -10.19	12.63 -5.19	434	1107	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.53 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)
PAR3-A	1.90 -10.21	12.63 -4.49	436	1297	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.71 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR3-B	1.20 -9.30	2.24 -8.28	338	1297	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)



PAR3-C	1.86 -10.19	12.59 -5.20	434	1107	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.53 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)
PAR4-A	1.89 -10.21	12.59 -4.48	435	1300	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.71 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR4-B	1.20 -9.30	2.23 -8.32	337	1300	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 3.38 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)
PAR4-C	1.87 -10.20	12.56 -5.25	434	1109	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	A's = 2.54 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)

ARMADURAS NA CONTINUIDADE					
Viga Trecho	Laje 1 Laje 2	Momentos fletores (kgf.m/m)		Armaduras	
		Md negativo	Md positivo	As (superior)	A's (inferior)
Barra	L2 PAR1-A	-1763		As = 3.21 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-A L2	-88		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR1-B	-1809		As = 3.89 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B L2	-235		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR1-C	-1784		As = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-C L2	-235		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR2-A	-1763		As = 3.22 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-A L2	-88		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR2-B	-1808		As = 3.89 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-B L2	-235		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR2-C	-1784		As = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-C L2	-235		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR3-A	-1763		As = 3.21 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A L2	-88		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	



Barra	L2 PAR3-B	-1809		As = 3.89 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B L2	-235		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR3-C	-1785		As = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C L2	-235		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR4-A	-1753		As = 3.20 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-A L2	-88		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR4-B	-1821		As = 3.92 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-B L2	-236		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	L2 PAR4-C	-1774		As = 3.35 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-C L2	-236		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-A PAR4-C	-815		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-C PAR1-A	-2		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR1-A	-215		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-A PAR1-B	-69		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-C PAR1-B	-222		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-B PAR1-C	-64		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR1-C	-817		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR1-C PAR2-A	-2		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-A PAR3-C	-816		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C PAR4-A	-2		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-B PAR4-A	-216		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-A PAR4-B	-69		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	



Barra	PAR4-C PAR4-B	-223		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR4-B PAR4-C	-64		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR3-A	-2		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A PAR2-C	-817		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-A PAR3-B	-69		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B PAR3-A	-216		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-B PAR3-C	-64		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR3-C PAR3-B	-221		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-A PAR2-B	-69		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR2-A	-216		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-B PAR2-C	-64		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	
Barra	PAR2-C PAR2-B	-222		As = 3.00 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	

### 17.11.3 Cálculos do Reservatório

<b>Tampa</b>	fck = 300.00 kgf/cm <sup>2</sup>	E = 268384 kgf/cm <sup>2</sup>	Peso Espec = 2500.00 kgf/m <sup>3</sup>
<b>Lance 2</b>		cobr = 3.00 cm	

#### 17.11.3.1 Reservatório RAP

ARMADURAS POSITIVAS (LAJE)										
Trec ho	Direç ão	Momento positivo			Momento negativo			Armad ura inferior	Armad ura superi or	Cisalh mento
		Flexã o	Verificaçã o axial (compres são)	Verifica ção axial (tração)	Flexã o	Verificaçã o axial (compres são)	Verifica ção axial (tração)			
L1	X	Md = 484 kgf.m /m  As = 1.31 cm²/m	Fd = 0.45 tf Situação: GE As = 1.04 cm²/m A's = 0.00 cm²/m	Fd = 0.13 tf Situação : GE As = 1.13 cm²/m				As = 1.31 cm²/m ø6.3 c/20 (1.56 cm²/m)		vsd = 1.10 tf/m vrd1 = 6.05 tf/m Modelo I vrd2 = 41.67 tf/m vsw = 0.00 tf/m



		A's = 0.00 cm <sup>2</sup> / m		A's = 0.00 cm <sup>2</sup> /m				fiss = 0.06 mm		asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 484 kgf.m /m  As = 1.41 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 0.15 tf Situação : GE As = 1.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 1.41 cm <sup>2</sup> /m ø6.3 c/20 (1.56 cm <sup>2</sup> /m) fiss = 0.07 mm		vsd = 1.09 tf/m vrd1 = 5.66 tf/m vrd2 = 38.47 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
L2	X	Md = 3027 kgf.m /m  As = 2.66 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.92 tf Situação: GE As = 1.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.79 tf Situação : GE As = 2.55 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 2112 kgf.m /m  As = 1.86 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.92 tf Situação: GE As = 1.74 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.79 tf Situação : GE As = 3.00 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.02 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.06 mm	A's = 4.50 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	vsd = 7.92 tf/m vrd1 = 16.13 tf/m Modelo I vrd2 = 132.38 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 3027 kgf.m /m  As = 2.77 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.92 tf Situação: GE As = 1.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.79 tf Situação : GE As = 2.65 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Md = 2112 kgf.m /m  As = 1.93 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 0.92 tf Situação: GE As = 1.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 8.79 tf Situação : GE As = 3.11 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 3.02 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m) fiss = 0.06 mm	A's = 4.50 cm <sup>2</sup> /m ø12.5 c/20 (6.14 cm <sup>2</sup> /m)	vsd = 7.93 tf/m vrd1 = 15.67 tf/m vrd2 = 127.29 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 1-A	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.24 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.09 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.87 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.24 tf Situação : PE As = 2.17 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.73 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m		Fd = 5.34 tf Situação : PE As = 0.95 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m	Fd = 12.56 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.34 tf Situação : GE As = 2.70 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 2.70 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.10 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> / m			A's = 0.00 cm <sup>2</sup> / m					
PAR 1-B	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.19 tf Situação: GE As = 0.31 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.16 tf Situação : PE As = 1.87 cm <sup>2</sup> /m A's = 0.69 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.16 tf Situação : PE As = 1.50 cm <sup>2</sup> /m A's = 1.07 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.05 mm	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.76 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 9.93 tf Situação : PE As = 1.56 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.22 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.93 tf Situação : GE As = 3.37 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.37 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.22 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 1-C	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.23 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.86 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.23 tf Situação : PE As = 2.16 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.72 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 6.24 tf Situação : PE As = 1.03 cm <sup>2</sup> /m A's = 0.41 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 6.24 tf Situação : GE As = 2.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 2.53 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	vsd = 5.10 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-A	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m		Fd = 12.26 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m	Fd = 1.89 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.26 tf Situação : PE As = 2.17 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.74 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m



		A's = 0.00 cm <sup>2</sup> / m			A's = 0.00 cm <sup>2</sup> / m					asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 5.40 tf Situação : PE As = 0.96 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.59 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.40 tf Situação : GE As = 2.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 2.71 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.09 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-B	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.20 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.16 tf Situação : PE As = 1.87 cm <sup>2</sup> /m A's = 0.69 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.16 tf Situação : PE As = 1.50 cm <sup>2</sup> /m A's = 1.07 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.05 mm	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.76 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 9.93 tf Situação : PE As = 1.56 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.24 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.93 tf Situação : GE As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.22 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 2-C	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.23 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.86 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.23 tf Situação : PE As = 2.16 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.72 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m		Fd = 6.23 tf Situação : PE As = 1.03 cm <sup>2</sup> /m A's = 0.41 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m		Fd = 6.23 tf Situação : GE As = 2.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 2.53 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	vsd = 5.09 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m





		A's = 0.00 cm <sup>2</sup> / m			A's = 0.00 cm <sup>2</sup> / m					
PAR 3-A	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.26 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.90 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.26 tf Situação : PE As = 2.17 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.74 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 5.39 tf Situação : PE As = 0.96 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.63 tf Situação: GE As = 0.12 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.39 tf Situação : GE As = 2.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 2.71 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.09 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 3-B	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.20 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.16 tf Situação : PE As = 1.87 cm <sup>2</sup> /m A's = 0.69 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.16 tf Situação : PE As = 1.50 cm <sup>2</sup> /m A's = 1.07 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.05 mm	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.76 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 9.93 tf Situação : PE As = 1.56 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 2.24 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.93 tf Situação : GE As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.36 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.22 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 3-C	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m		Fd = 12.23 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m	Fd = 1.86 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.23 tf Situação : PE As = 2.16 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.72 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m





		A's = 0.00 cm <sup>2</sup> / m			A's = 0.00 cm <sup>2</sup> / m					asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 6.24 tf Situação : PE As = 1.03 cm <sup>2</sup> /m A's = 0.41 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 6.24 tf Situação : GE As = 2.53 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 2.53 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	vsd = 5.10 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-A	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.26 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.89 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.26 tf Situação : PE As = 2.17 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.17 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.73 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 5.38 tf Situação : PE As = 0.96 cm <sup>2</sup> /m A's = 0.32 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 12.59 tf Situação: GE As = 0.13 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.38 tf Situação : GE As = 2.71 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.01 mm	A's = 2.71 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.09 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
PAR 4-B	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.20 tf Situação: GE As = 0.30 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.16 tf Situação : PE As = 1.87 cm <sup>2</sup> /m A's = 0.70 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 11.16 tf Situação : PE As = 1.50 cm <sup>2</sup> /m A's = 1.07 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.05 mm	A's = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 2.76 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m		Fd = 9.99 tf Situação : PE As = 1.56 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 2.00 cm <sup>2</sup> / m	Fd = 2.23 tf Situação: GE As = 1.61 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.99 tf Situação : GE As = 3.38 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.03 mm	A's = 3.38 cm <sup>2</sup> /m ø10.0 c/20 (3.93 cm <sup>2</sup> /m)	vsd = 5.20 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m



		A's = 0.00 cm <sup>2</sup> / m			A's = 0.00 cm <sup>2</sup> / m					
PAR 4-C	X	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 12.24 tf Situação : PE As = 1.72 cm <sup>2</sup> /m A's = 1.10 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.89 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m	Fd = 1.87 tf Situação: GE As = 0.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.24 tf Situação : PE As = 2.16 cm <sup>2</sup> /m A's = 0.73 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.04 mm	A's = 2.16 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m)	vsd = 3.72 tf/m vrd1 = 10.86 tf/m Modelo I vrd2 = 81.97 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m
	Y	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 6.30 tf Situação : PE As = 1.03 cm <sup>2</sup> /m A's = 0.42 cm <sup>2</sup> /m	Md = 1346 kgf.m /m  As = 1.99 cm <sup>2</sup> / m A's = 0.00 cm <sup>2</sup> / m		Fd = 6.30 tf Situação : GE As = 2.54 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	As = 2.01 cm <sup>2</sup> /m ø8.0 c/20 (2.51 cm <sup>2</sup> /m) fiss = 0.02 mm	A's = 2.54 cm <sup>2</sup> /m ø8.0 c/19 (2.65 cm <sup>2</sup> /m)	vsd = 5.09 tf/m vrd1 = 10.42 tf/m vrd2 = 77.90 tf/m vsw = 0.00 tf/m asw = 0.00 cm <sup>2</sup> /m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)								
Viga Trecho	Laje 1 Laje 2	Momento negativo			Momento positivo			Armaduras finais
		Flexão	Flexo compressão	Flexo tração	Flexão	Flexo compressão	Flexo tração	
Barra	L2 PAR1-A	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.56 tf Situação: GE As = 0.81 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.16 tf Situação: GE As = 3.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.21 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR1-A L2	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.16 tf Situação: PE As = 0.75 cm <sup>2</sup> /m A's = 0.44 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L2 PAR1-B	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.77 tf Situação: GE As = 2.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: GE As = 3.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.89 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR1-B L2	Md = 2008 kgf.m/m  As = 2.86 cm <sup>2</sup> /m	Fd = 1.77 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: PE As = 1.53 cm <sup>2</sup> /m A's = 0.70 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm



		A's = 0.00 cm <sup>2</sup> /m						
Barra	L2 PAR1-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.59 tf Situação: GE As = 0.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.06 tf Situação: GE As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.36 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR1-C L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.06 tf Situação: PE As = 1.11 cm <sup>2</sup> /m A's = 0.36 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	L2 PAR2-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.59 tf Situação: GE As = 0.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.23 tf Situação: GE As = 3.22 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.22 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR2-A L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.23 tf Situação: PE As = 0.76 cm <sup>2</sup> /m A's = 0.45 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L2 PAR2-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.78 tf Situação: GE As = 2.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: GE As = 3.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.89 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR2-B L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.78 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: PE As = 1.53 cm <sup>2</sup> /m A's = 0.70 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	L2 PAR2-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.63 tf Situação: GE As = 0.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.05 tf Situação: GE As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.36 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR2-C L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.05 tf Situação: PE As = 1.11 cm <sup>2</sup> /m A's = 0.36 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm



Barra	L2 PAR3-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.63 tf Situação: GE As = 0.80 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.22 tf Situação: GE As = 3.21 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.21 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR3-A L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.22 tf Situação: PE As = 0.76 cm <sup>2</sup> /m A's = 0.44 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm
Barra	L2 PAR3-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.79 tf Situação: GE As = 2.33 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: GE As = 3.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.89 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR3-B L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.79 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.70 tf Situação: PE As = 1.53 cm <sup>2</sup> /m A's = 0.70 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	L2 PAR3-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.59 tf Situação: GE As = 0.83 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.06 tf Situação: GE As = 3.36 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.36 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR3-C L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.06 tf Situação: PE As = 1.11 cm <sup>2</sup> /m A's = 0.36 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	L2 PAR4-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.59 tf Situação: GE As = 0.79 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 5.20 tf Situação: GE As = 3.20 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.20 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.10 mm
Barra	PAR4-A L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 5.20 tf Situação: PE As = 0.75 cm <sup>2</sup> /m A's = 0.44 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.00 mm



Barra	L2 PAR4-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.77 tf Situação: GE As = 2.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.76 tf Situação: GE As = 3.92 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.92 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.14 mm
Barra	PAR4-B L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.77 tf Situação: GE As = 0.08 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 9.76 tf Situação: PE As = 1.54 cm <sup>2</sup> /m A's = 0.71 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	L2 PAR4-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.56 tf Situação: GE As = 0.82 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 6.12 tf Situação: GE As = 3.35 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.35 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.11 mm
Barra	PAR4-C L2	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 6.12 tf Situação: PE As = 1.12 cm <sup>2</sup> /m A's = 0.36 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.01 mm
Barra	PAR1-A PAR4-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.87 tf Situação: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.24 tf Situação: GE As = 2.84 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR4-C PAR1-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.24 tf Situação: PE As = 1.41 cm <sup>2</sup> /m A's = 1.40 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR1-B PAR1-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.15 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.65 tf Situação: PE As = 1.72 cm <sup>2</sup> /m A's = 0.96 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR1-A PAR1-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.65 tf Situação: PE As = 1.46 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm



Barra	PAR1-C PAR1-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.16 tf Situação: GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.60 tf Situação: PE As = 1.73 cm <sup>2</sup> /m A's = 0.94 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR1-B PAR1-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.60 tf Situação: PE As = 1.45 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2-A PAR1-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.89 tf Situação: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.26 tf Situação: GE As = 2.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR1-C PAR2-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.26 tf Situação: PE As = 1.41 cm <sup>2</sup> /m A's = 1.41 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-A PAR3-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.89 tf Situação: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.26 tf Situação: GE As = 2.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR3-C PAR4-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.26 tf Situação: PE As = 1.41 cm <sup>2</sup> /m A's = 1.41 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-B PAR4-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.16 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.65 tf Situação: PE As = 1.72 cm <sup>2</sup> /m A's = 0.96 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-A PAR4-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.65 tf Situação: PE As = 1.46 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm



Barra	PAR4-C PAR4-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.17 tf Situação: GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.60 tf Situação: PE As = 1.73 cm <sup>2</sup> /m A's = 0.94 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR4-B PAR4-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.60 tf Situação: PE As = 1.45 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2-C PAR3-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 12.26 tf Situação: PE As = 1.41 cm <sup>2</sup> /m A's = 1.41 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3-A PAR2-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.90 tf Situação: GE As = 0.89 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 12.26 tf Situação: GE As = 2.85 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.06 mm
Barra	PAR3-A PAR3-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.65 tf Situação: PE As = 1.46 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3-B PAR3-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.16 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.65 tf Situação: PE As = 1.72 cm <sup>2</sup> /m A's = 0.96 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3-B PAR3-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.59 tf Situação: PE As = 1.45 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR3-C PAR3-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.16 tf Situação: GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.59 tf Situação: PE As = 1.72 cm <sup>2</sup> /m A's = 0.94 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm



Barra	PAR2-A PAR2-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.65 tf Situação: PE As = 1.46 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2-B PAR2-A	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.16 tf Situação: GE As = 0.14 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.65 tf Situação: PE As = 1.72 cm <sup>2</sup> /m A's = 0.96 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2-B PAR2-C	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m		Fd = 11.59 tf Situação: PE As = 1.45 cm <sup>2</sup> /m A's = 1.22 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm
Barra	PAR2-C PAR2-B	Md = 2008 kgf.m/m As = 2.86 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 1.16 tf Situação: GE As = 0.15 cm <sup>2</sup> /m A's = 0.00 cm <sup>2</sup> /m	Fd = 11.59 tf Situação: PE As = 1.73 cm <sup>2</sup> /m A's = 0.94 cm <sup>2</sup> /m				As = 3.00 cm <sup>2</sup> /m (ø10.0 c/20 - 3.93 cm <sup>2</sup> /m) fiss = 0.02 mm

## 18. ESTAÇÃO ELEVATÓRIA DE ÁGUA TRATADA 03 – EEAT-03

### 18.1 PARÂMETROS DE PROJETO

Para as estruturas dos muros foi adotado:

- Classe De Agressividade Ambiental=II;
- Características do concreto  $F_{ck} \geq 25\text{MPa}$ ;
- Módulo De Elasticidade  $E_{ci} \geq 28\text{GPa}$ ;
- Relação Água/Cimento  $\leq 0,60$ ;
- Consumo Mínimo de Cimento por Volume de Concreto=280 kg/m<sup>3</sup>;
- Concreto magro  $\geq 10\text{ MPa}$ ;
- Aço CA-50;
- Cobrimento das Armaduras = 3,0cm
- Abertura de fissuras  $w_k = 0,30\text{mm}$
- Agregados: brita tipo gnaiss diametro máximo 19mm
- Blocos de concreto vazados espessura  $t=14\text{cm}$ .
- Carga do vento:  $V_0 = 40\text{m/s}$ ;  $S_1 = 1,0$ ;  $S_2 = 0,74$ ;  $S_3 = 0,95$ ;



- Resistências mínimas adotadas: Blocos = 4,5MPa. Prisma de Alvenaria = 3,6MPa. Argamassa = 3,6MPa. Graute = 15MPa.

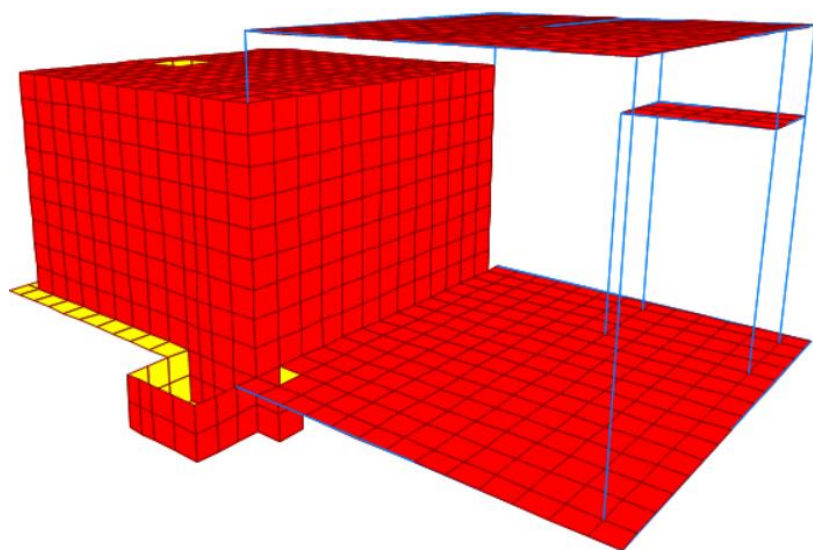
Para as demais estruturas, adotou-se:

- Classe de Agressividade Ambiental = III;
- Características do concreto  $F_{ck} \geq 30\text{MPa}$ ;
- Módulo De Elasticidade  $E_{ci} \geq 31\text{GPa}$ ;
- Relação Água/Cimento  $\leq 0,50$ ;
- Consumo Mínimo de Cimento por Volume de Concreto = 320 kg/m<sup>3</sup>;
- Diâmetro máximo do agregado graúdo = 19mm.
- Concreto magro  $\geq 10\text{MPa}$ ;
- Aço CA-50;
- Cobrimento das armaduras: 4,0 cm;

## 18.2 CARREGAMENTOS

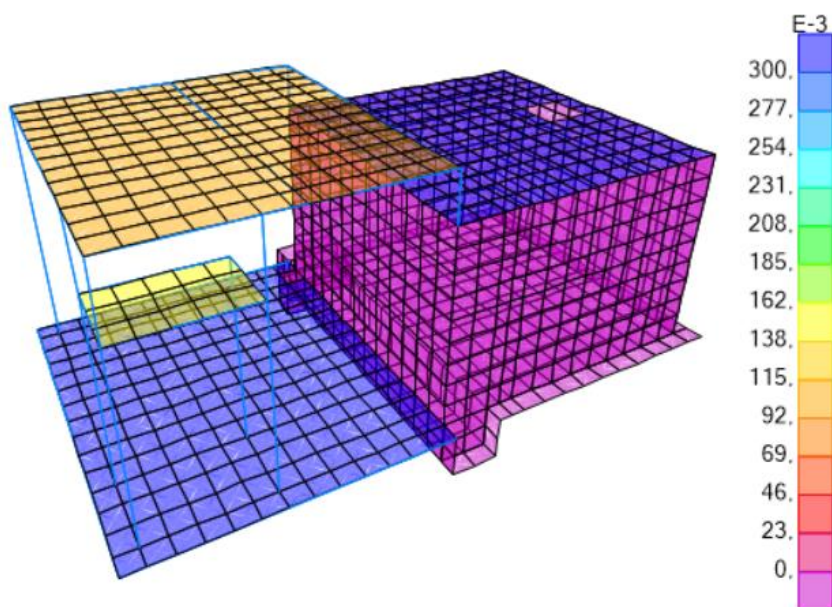
### 18.2.1 Peso Próprio

Carregamento definido pelo programa SAP 2000 considerando a modelagem da estrutura e o peso específico do concreto.



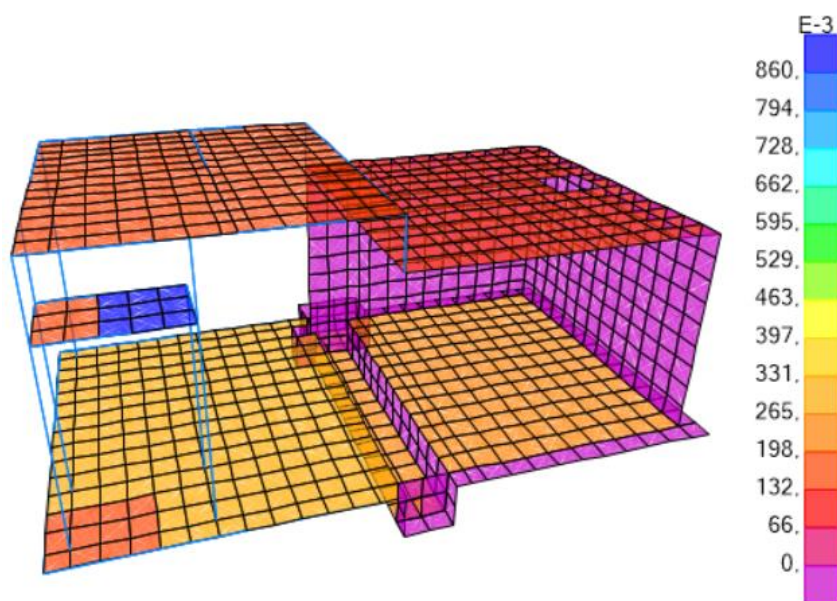
### 18.2.2 Acidental

Carga acidental  $q=0,30\text{t/m}^2$  sobre a laje superior do poço de sucção e da laje inferior da casa da EEAT. Carga acidental  $q=0,10\text{t/m}^2$  para a laje superior da casa da EEAT e  $q=0,15\text{t/m}^2$  da laje intermediária da casa da EEAT



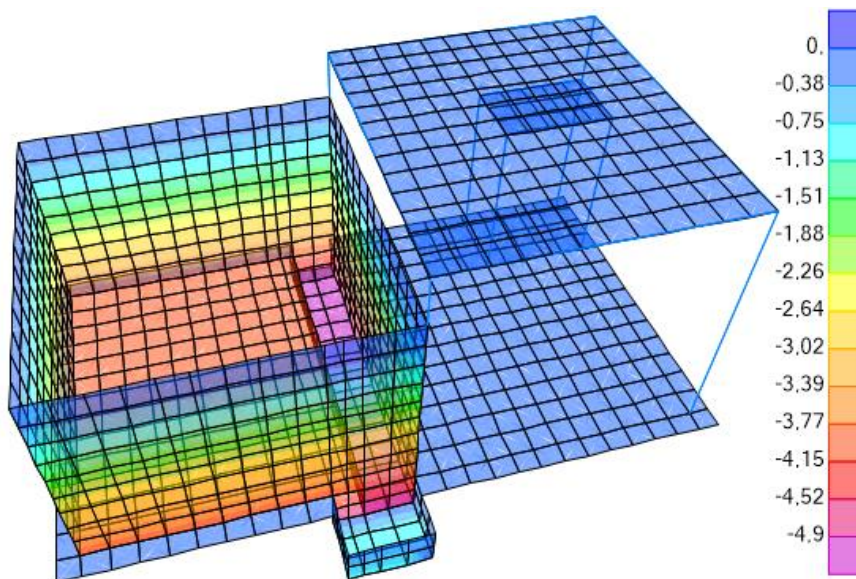
### 18.2.3 Permanente

Carga permanente  $q=0,15\text{t/m}^2$  sobre a laje superior do poço de sucção e da laje inferior da casa da EEAT. Carga permanente  $q=0,05\text{t/m}^2$  para a laje superior da casa da EEAT.

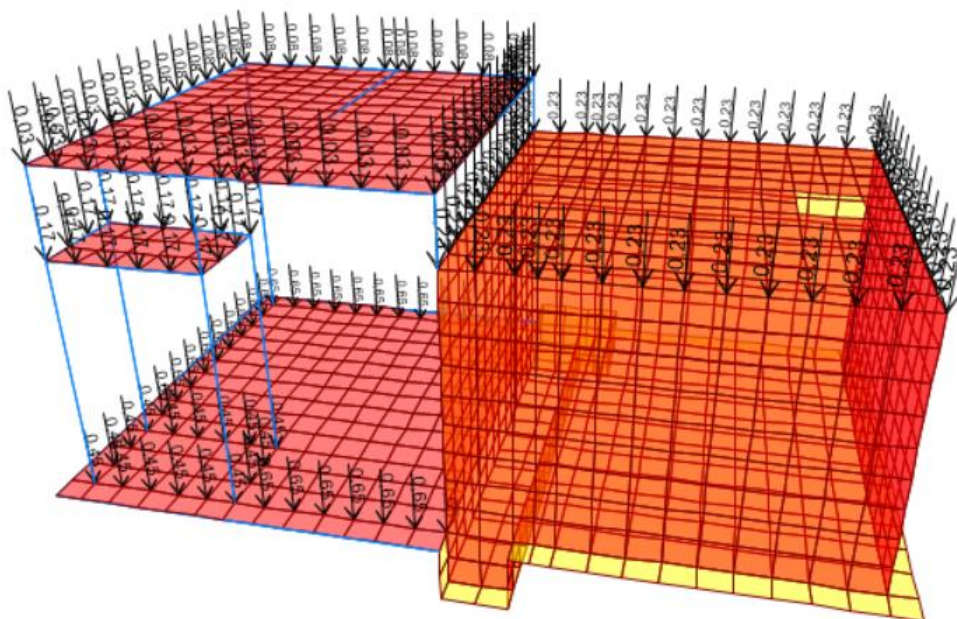


### 18.2.4 Peso e empuxo de água

Considerou-se atuando perpendicularmente às paredes e sobre a laje de fundo do poço de sucção, a altura da lamina de água. Sendo o NA da face inferior da laje superior, El.339,10, à laje de fundo e o peso específico da água ( $\gamma=1,00\text{t/m}^3$ ):



### 18.2.5 Alvenaria



Carregamento sobre:

Vigas da Cobertura:  $1,3\text{t/m}^3 \times 0,20 \times 0,22\text{m} = 0,06\text{t/m}$



Paredes:  $1,3\text{t/m}^3 \times 0,20 \times 0,90\text{m} = 0,24\text{t/m}$

Vigas intermediárias:

$1,3\text{t/m}^3 \times 0,20 \times 1,30\text{m} = 0,24\text{t/m}$  e  $1,3\text{t/m}^3 \times 0,20 \times 1,60\text{m} = 0,42\text{t/m}$

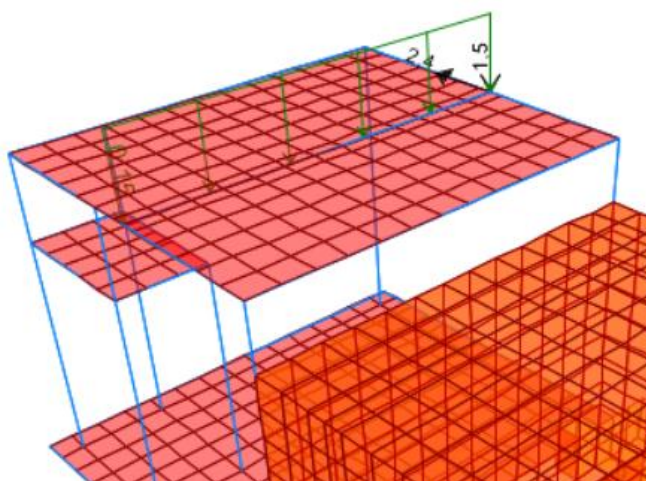
Laje inferior:

$1,3\text{t/m}^3 \times 0,20 \times 3,30\text{m} = 0,86\text{t/m}$  e  $1,3\text{t/m}^3 \times 0,20 \times 5,00\text{m} = 1,30\text{t/m}$

### 18.2.6 Equipamentos

Peso das bombas = 1,0t cada

Foi considerado um incremento de 20% na carga da monovia devido ao balanço e demais impactos (coeficiente de impacto). Monovia =  $1,2 \times 1,0\text{t} = 1,2\text{t}$  envoltória para a carga da monovia nos seguintes pontos. Foi considerado também a hipótese de carga de teste (conforme ABNT NBR 16147 e NR-11, as monovias devem ser testadas a 120% da carga nominal;  $1,2 \times 1,0\text{t} = 1,2\text{t}$ ) e de carga devido ao balanço e demais impactos (coeficiente de impacto = 1,2;  $1,2 \times 1,0\text{t} = 1,2\text{t}$ ) no ponto de extremidade do balanço da monovia.



### 18.2.7 Vento

$$V_k = V_0 \times S_1 \times S_2 \times S_3$$

$V_0 = 30\text{m/s}$  (Velocidade básica dos ventos)

$S_1 = 1,00$  (fator topográfico)

$S_2 = 0,96$  (Categoria II, A)

$S_3 = 0,95$  (instalação industrial)

$Ca = 1,17$  (coeficiente de arrasto direção y)

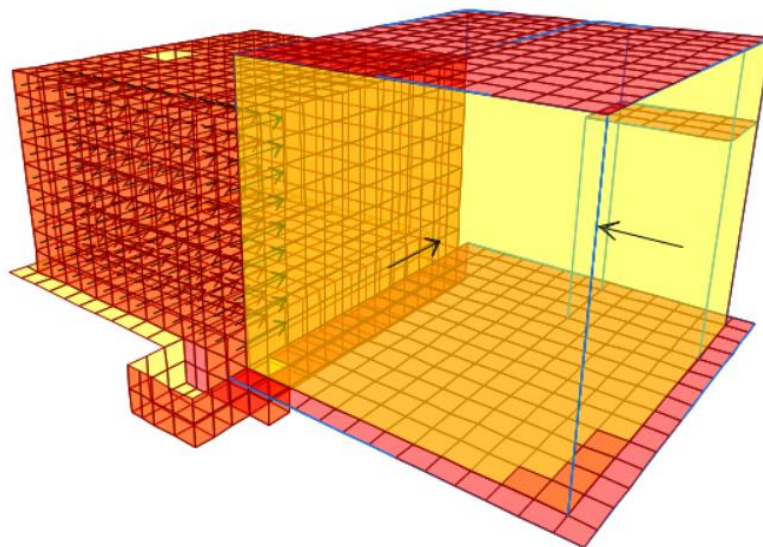
$C_a = 0,85$  (coeficiente de arrasto direção x)

$$V_k = 30 \times 1,0 \times 0,96 \times 0,95 = 27,36 \text{ m/s}$$

$$q_{\text{vento}} = V_k^2 \times 0,613 = 27,36^2 \times 0,613 = 459 \text{ N/m}^2 = 0,046 \text{ t/m}^2$$

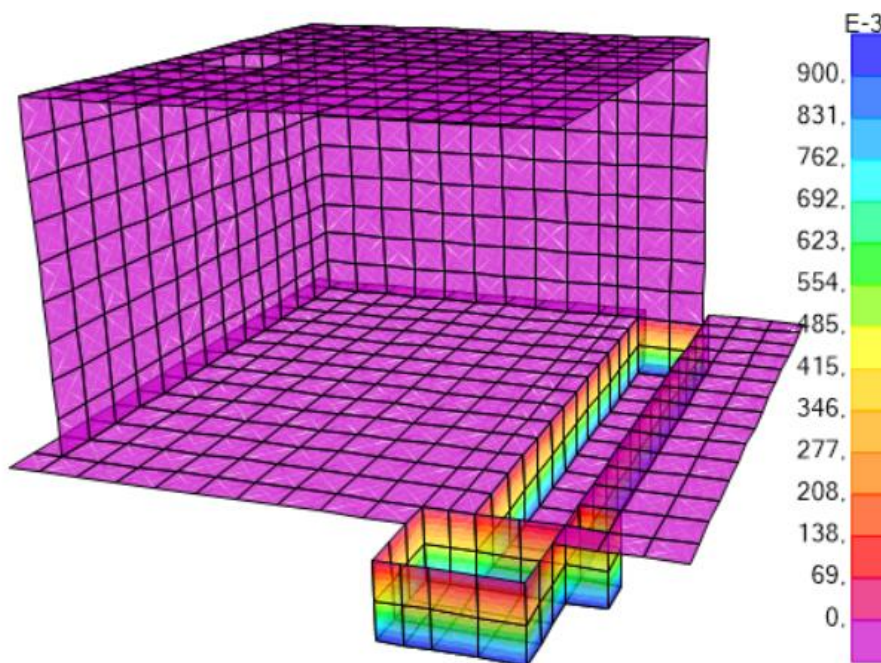
$$q_{\text{vento},y} = C_a \times q_{\text{vento}} = 1,17 \times 0,046 \text{ t/m}^2 = 0,054 \text{ t/m}^2$$

$$q_{\text{vento},x} = C_a \times q_{\text{vento}} = 0,85 \times 0,046 \text{ t/m}^2 = 0,039 \text{ t/m}^2$$



### 18.2.8 Empuxo de solo

Considerou-se atuando perpendicularmente a face externa das paredes o empuxo do solo. Atuando entre a face inferior da laje inferior, El.339,10 e a laje de fundo, coeficiente de empuxo ativo e o peso específico do solo ( $\gamma=1,80 \text{ t/m}^3$ ):  $q=H.k_a.\gamma=0,60H$ .



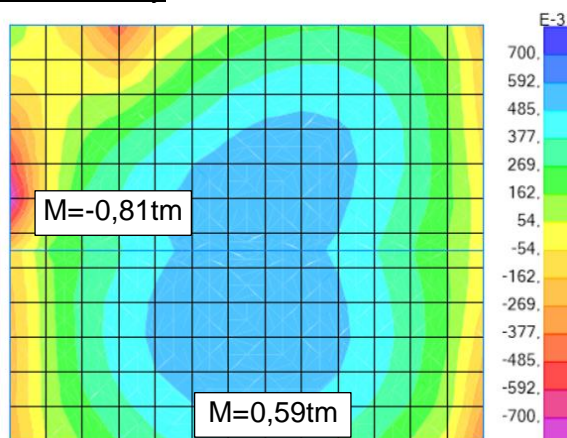
### 18.3 DIMENSIONAMENTO E RESULTADOS

A seguir são apresentados os resultados da envoltória com os maiores esforços à flexão, apresentados na escala de cores em t.m e o maior valor destacado na caixa de texto

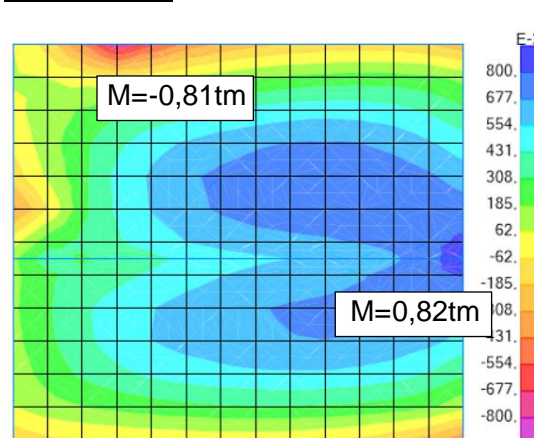
#### Dimensionamento à Flexão

#### 18.3.1 Laje L201

##### Momento My



##### Momento Mx

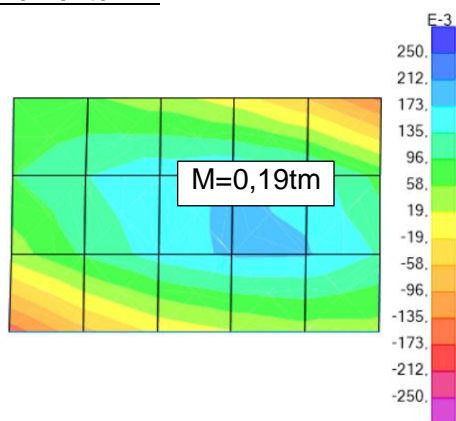


DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	15cm	30 MPa	4,0 cm	0,82t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	Espaçamento	As <sub>min</sub>	
0,066	2,79cm²	8,0	18,0	2,74 cm²	

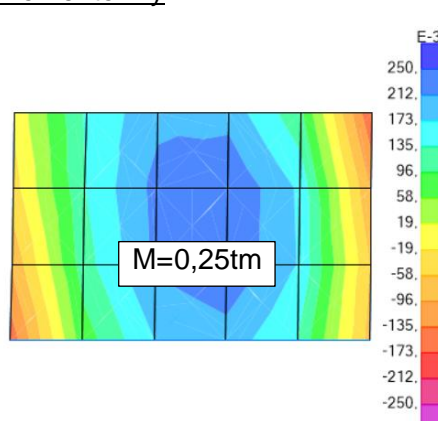
Adotar Adotar  $\phi 8,0\text{c}/15$  nos dois sentidos superior e inferior

### 18.3.2 Laje L101

Momento Mx



Momento My

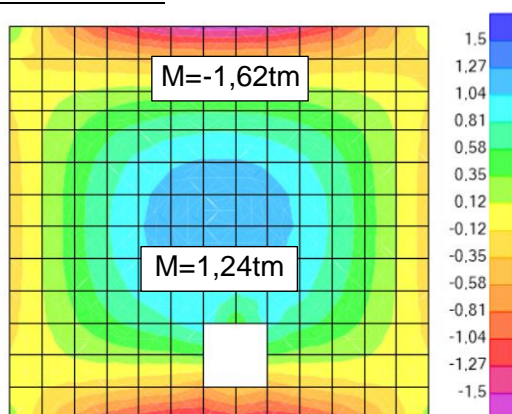


DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	15cm	30 MPa	4,0 cm	0,25t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	As <sub>min</sub>	
0,020	0,83cm <sup>2</sup>	8,0	18,3	2,74 cm <sup>2</sup>	

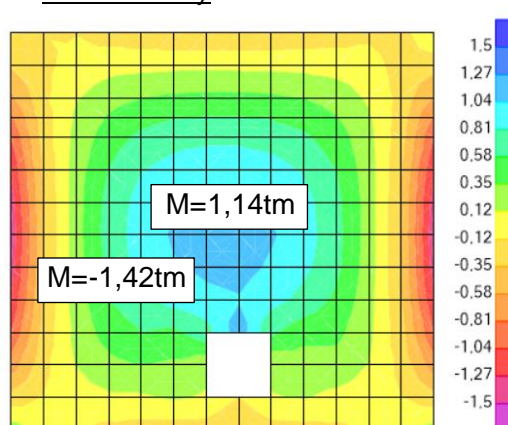
Adotar Adotar  $\phi 8,0\text{c}/15$  nos dois sentidos superior e inferior

### 18.3.3 Laje L102

Momento Mx



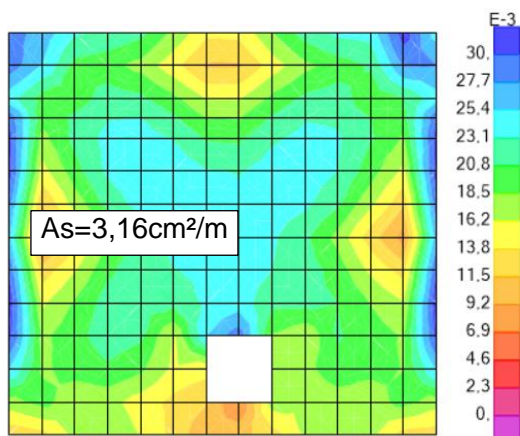
Momento My



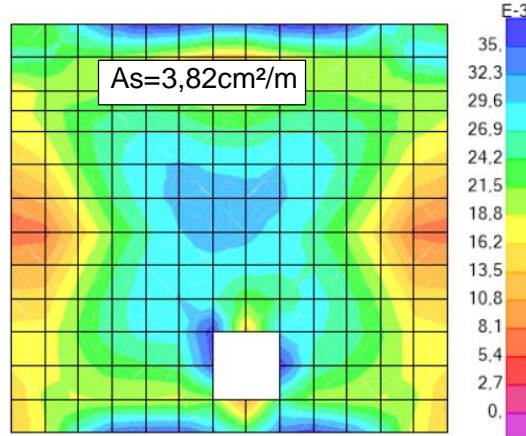
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	25cm	30 MPa	4,0 cm	1,62t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	As <sub>min</sub>	
0,032	2,68cm <sup>2</sup>	8,0	13,4	3,75 cm <sup>2</sup>	



As,x



As,y



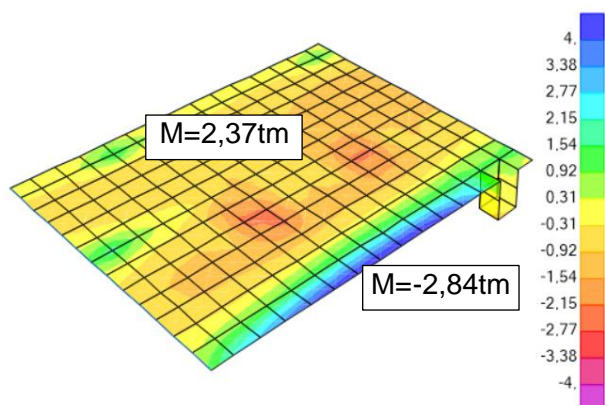
DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
3,160cm²	8,0	15,9

DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
3,820cm²	8,0	13,2

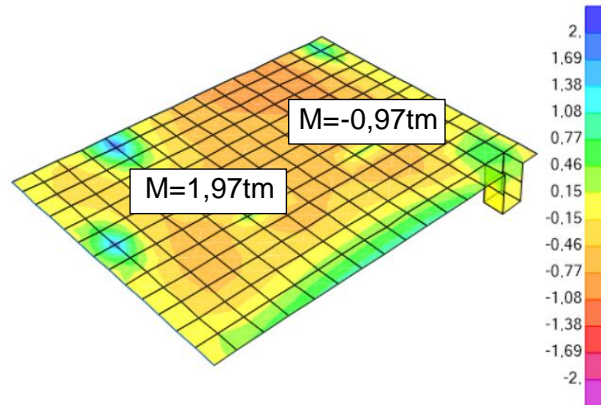
Adotar  $\phi 8,0c/12$  nos dois sentidos superior e inferior

### 18.3.4 Laje L1

Momento My



Momento Mx



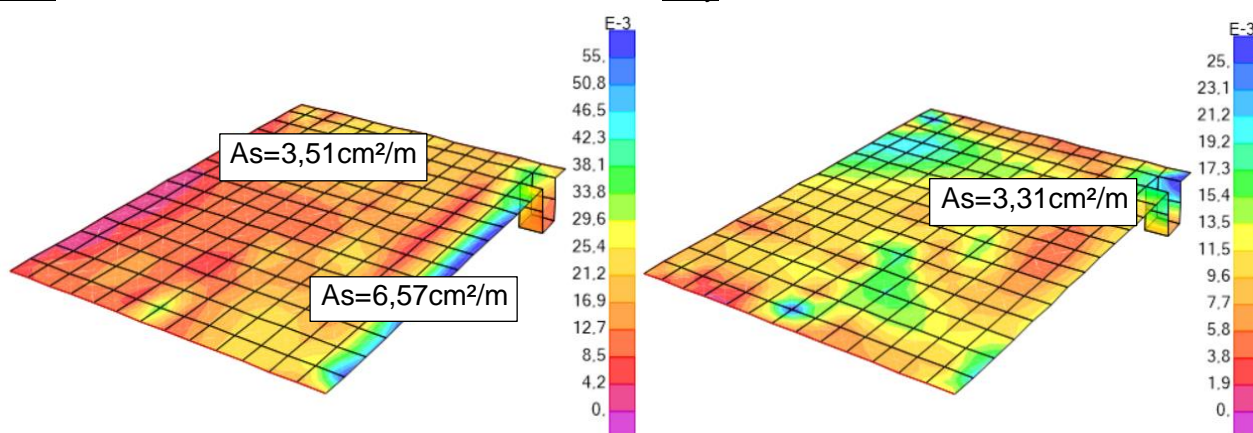
DADOS DE ENTRADA					
b	h	fck	Cobrimento	$M_{MÁX}$	d'
100cm	30cm	30 MPa	4,0 cm	2,84t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	$A_{S_{min}}$	
0,036	3,80cm²	10	17,5	4,50 cm²	



DADOS DE ENTRADA					
b	h	fck	Cobrimento	$M_{MÁX}$	d'
100cm	30cm	30 MPa	4,0 cm	1,97t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	$A_{s_{min}}$	
0,025	2,62cm <sup>2</sup>	8,0	11,2	4,50 cm <sup>2</sup>	

As,x

As,y



DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
6,570cm <sup>2</sup>	10	12,0

DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
3,310cm <sup>2</sup>	8,0	15,2

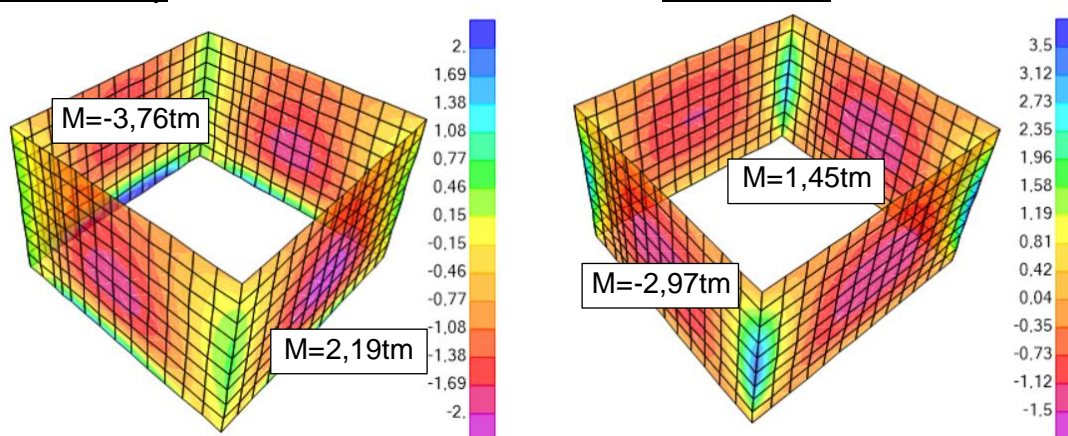
Adotar  $\phi 10c/15$  no sentido horizontal, superior e inferior

Adotar  $\phi 8,0c/11$  no sentido vertical, com  $\phi 10c/11$  no engaste, superior e inferior

### 18.3.5 Paredes PAR.1 a PAR.5

Momento My

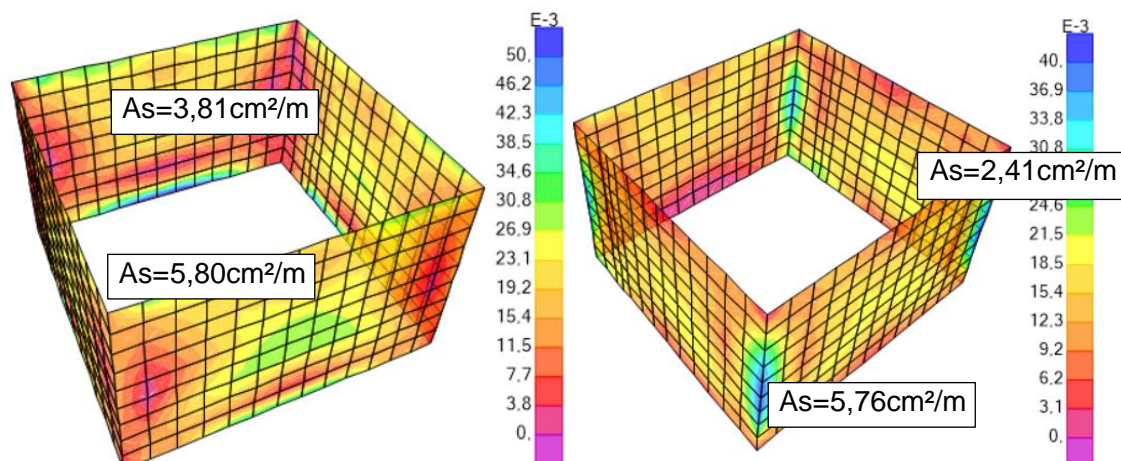
Momento Mx



DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	25cm	30 MPa	4,0 cm	3,76t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	Espaçamento	As <sub>min</sub>	
0,076	6,46cm <sup>2</sup>	10	12,1	3,79 cm <sup>2</sup>	
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	25cm	30 MPa	4,0 cm	2,97t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	Espaçamento	As <sub>min</sub>	
0,060	5,06cm <sup>2</sup>	10	15,5	3,79 cm <sup>2</sup>	

As,x

As,y



DIMENSIONAMENTO À FLEXÃO-TRAÇÃO			DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	φ <sub>L</sub> (mm)	Espaçamento	As	φ <sub>L</sub> (mm)	Espaçamento
5,800cm <sup>2</sup>	10	13,5	5,760cm <sup>2</sup>	10	13,6

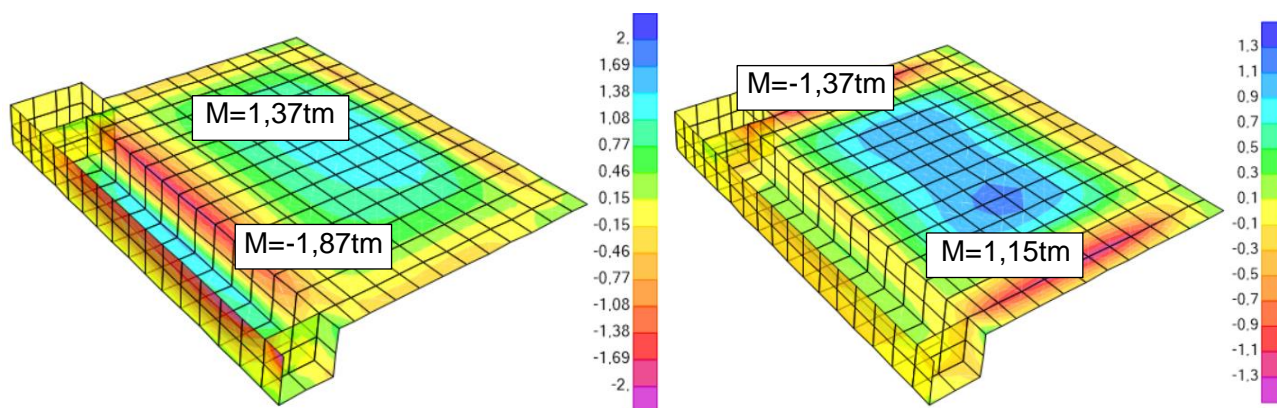
Adotar φ10c/12 no sentido horizontal, superior e inferior

Adotar φ8,0c/12 no sentido vertical, com φ10c/12 no engaste, superior e inferior

### 18.3.6 Lajes L2 e L3 e PAR.6 a PAR.8

Momento My

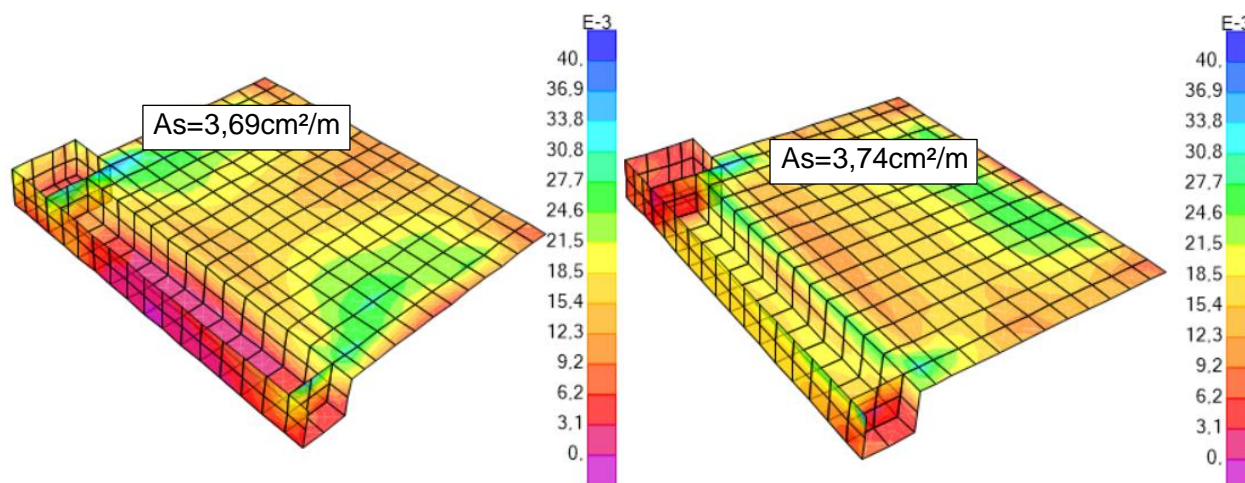
Momento Mx



DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	30cm	30 MPa	4,0 cm	1,87t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	Espaçamento	As <sub>min</sub>	
0,024	2,49cm <sup>2</sup>	10	17,5	4,50 cm <sup>2</sup>	

As,x

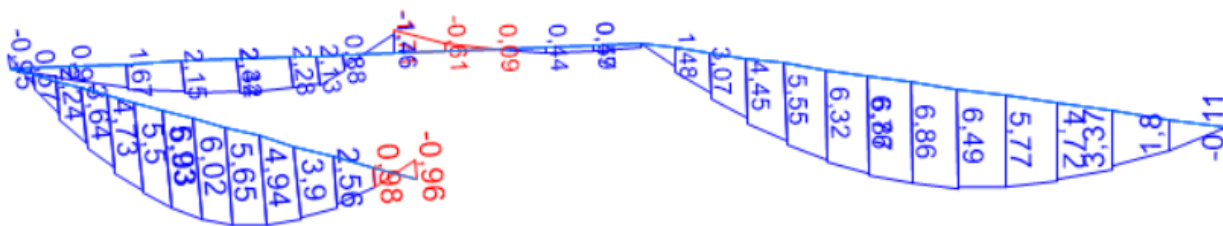
As,y



DIMENSIONAMENTO À FLEXÃO-TRAÇÃO			DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	φ <sub>L</sub> (mm)	Espaçamento	As	φ <sub>L</sub> (mm)	Espaçamento
3,690cm <sup>2</sup>	8,0	13,6	3,740cm <sup>2</sup>	8,0	13,4

Adotar φ8,0c/11 no sentido horizontal e φ8,0c/15 vertical, superior e inferior

### 18.3.7 Vigas V101, V103 e V104



DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	60cm	30 MPa	4,0 cm	6,04t.m	5,1 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,077	3,69cm²	12,5	3,0	1,80 cm²	4,0φ/Camada

Viga V101: Adotar 3φ12,5 inferior e 2φ12,5 superior

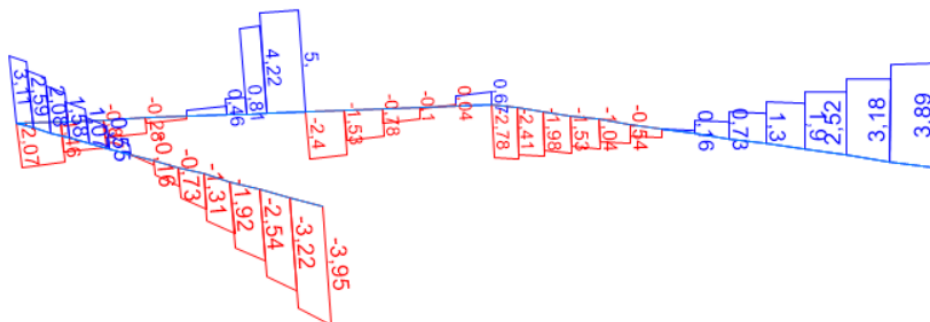
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	60cm	30 MPa	4,0 cm	2,43t.m	5,1 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,031	1,45cm²	12,5	1,5	1,80 cm²	4,0φ/Camada

Viga V103: Adotar 2φ12,5 inferior e superior

DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	60cm	30 MPa	4,0 cm	6,87t.m	5,1 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,088	4,22cm²	12,5	3,4	1,80 cm²	4,0φ/Camada

Viga V104: Adotar 4φ12,5 inferior e 2φ12,5superior





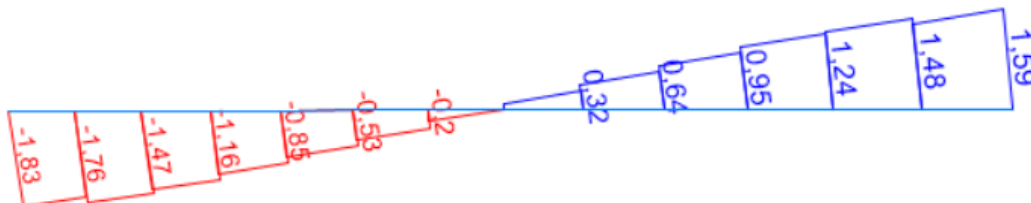
CÁLCULO DA ARMADURA DE CISALHAMENTO				
$V_{Sd,máx}$	$\tau_{wd,máx}$	$\tau_{wd2}$	$\tau_{wd,máx} < \tau_{wd2}$ = Biela comprimida do concreto não romperá	
6,24t	0,057kN/cm <sup>2</sup>	0,509kN/cm <sup>2</sup>		
$\tau_{c0}$	$Asw=Asw,mín$	$\phi_t$ (mm)	Espaçamento	Adotar $\phi 5$ a c/17,1cm
0,087kN/cm <sup>2</sup>	2,32cm <sup>2</sup> /m	5,0	c/17,1 cm	

Adotar estribos  $\phi 5,0c/17$

### 18.3.8 Viga V102



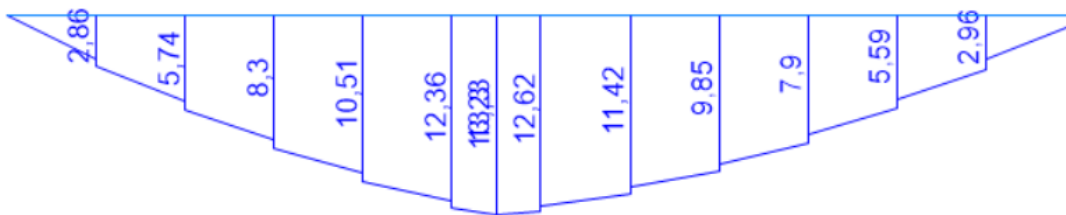
DADOS DE ENTRADA					
b	h	fck	Cobrimento	$M_{MÁX}$	d'
20cm	50cm	30 MPa	4,0 cm	5,05t.m	5,1 cm
DIMENSIONAMENTO À FLEXÃO					
K	$A_s$	$\phi_L$ (mm)	n barras	$A_{smin}$	$n_{\phi máx/cam,As}$
0,096	3,81cm <sup>2</sup>	12,5	3,1	1,50 cm <sup>2</sup>	4,0 $\phi$ /Camada



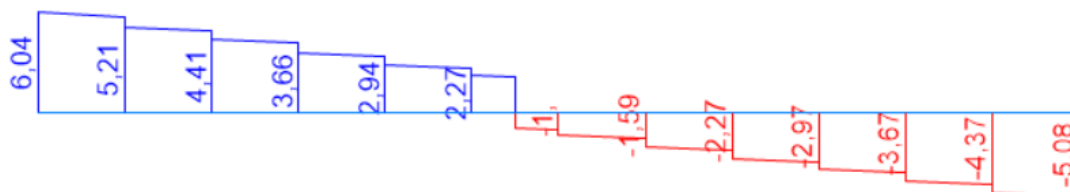
CÁLCULO DA ARMADURA DE CISALHAMENTO				
$V_{Sd,máx}$	$\tau_{wd,máx}$	$\tau_{wd2}$	$\tau_{wd,máx} < \tau_{wd2}$ = Biela comprimida do concreto não romperá	
6,24t	0,057kN/cm <sup>2</sup>	0,509kN/cm <sup>2</sup>		
$\tau_{c0}$	$Asw=Asw,mín$	$\phi_t$ (mm)	Espaçamento	Adotar $\phi 5$ a c/17,1cm
0,087kN/cm <sup>2</sup>	2,32cm <sup>2</sup> /m	5,0	c/17,1 cm	

Adotar 4 $\phi 12,5$  inferior e 2 $\phi 12,5$  superior e estribos  $\phi 5,0c/17$

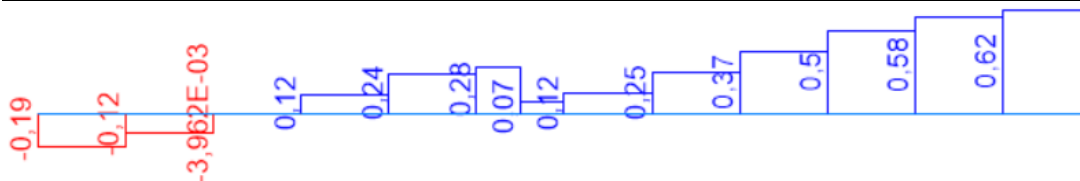
### 18.3.9 Viga V105



DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	90cm	30 MPa	4,0 cm	13,29t.m	5,1 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,071	5,23cm <sup>2</sup>	12,5	4,3	2,70 cm <sup>2</sup>	4,0φ/Camada

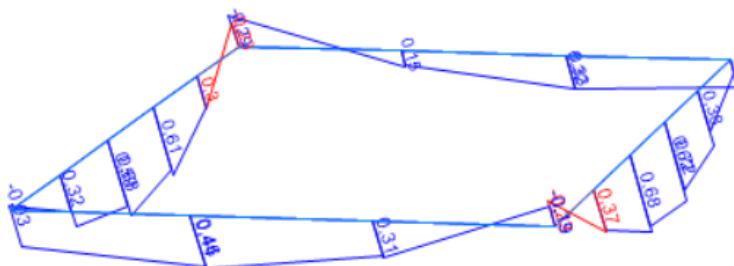


CÁLCULO DA ARMADURA DE CISALHAMENTO				
V <sub>Sd,máx</sub>	τ <sub>wd,máx</sub>	τ <sub>wd2</sub>	τ <sub>wd,máx</sub> < τ <sub>wd2</sub> = Biela comprimida do concreto não romperá	
8,46t	0,050kN/cm <sup>2</sup>	0,509kN/cm <sup>2</sup>		
τ <sub>c0</sub>	Asw=Asw,mín	φ <sub>t</sub> (mm)	Espaçamento	Adotar φ5 a c/17,1cm
0,087kN/cm <sup>2</sup>	2,32cm <sup>2</sup> /m	5,0	c/17,1 cm	

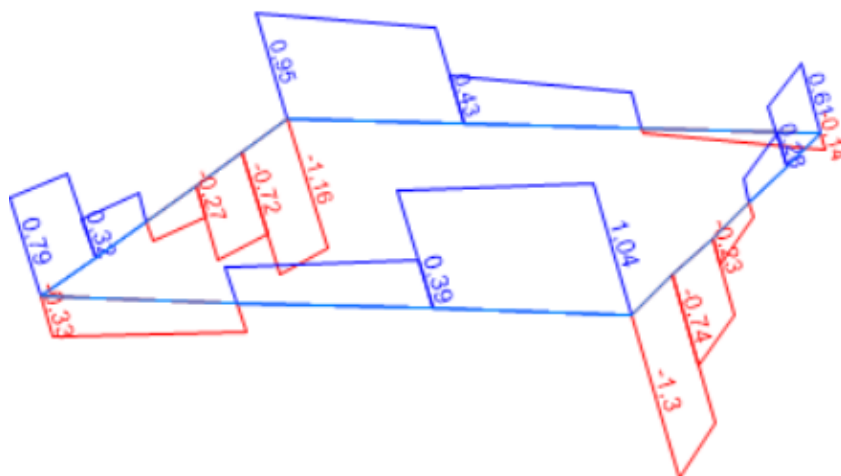


CÁLCULO DA ARMADURA DE TORÇÃO					
T <sub>Sk,máx</sub>	he	τ <sub>td</sub>	τ <sub>td2</sub>	τ <sub>td,máx</sub> < τ <sub>td2</sub> = concreto OK	
0,62t.m	10cm	0,054kN/cm <sup>2</sup>	0,471t.m		
A <sub>e</sub>	A <sub>90/s</sub> =Asw,mín	φ <sub>t</sub> (mm)	Espaçamento	Adotar φ5 a c/16,9cm	
800cm <sup>2</sup>	2,32cm <sup>2</sup> /m	5,0	c/16,9 cm		
Asl,mín	Asl	φ <sub>L</sub> (mm)	n barras	n <sub>φLat</sub>	n <sub>φInf/Sup</sub>
2,085cm <sup>2</sup>	4,171cm <sup>2</sup>	12,5	3,4	1,5	0,2
φ <sub>Costela</sub> (mm)		Armadura de pele			
8,0		2x5 φ 8,0			

Adotar 6φ12,5 inferior e 2φ12,5 superior, armadura de pele 2x5φ8,0 e estribos φ6,3c/17

**18.3.10 Vigas V1 a V4**
Momento


DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	40cm	30 MPa	4,0 cm	0,40t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,013	0,37cm <sup>2</sup>	10	1,5	1,20 cm <sup>2</sup>	4,3φ/Camada

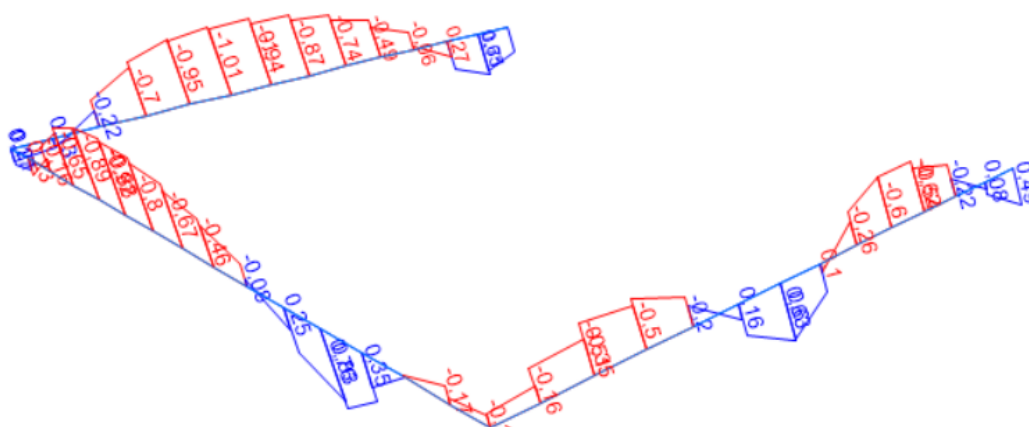
Cortante


CÁLCULO DA ARMADURA DE CISALHAMENTO					
V <sub>Sd,máx</sub>	τ <sub>wd,máx</sub>	τ <sub>wd2</sub>	τ <sub>wd,máx</sub> < τ <sub>wd2</sub> = Biela comprimida do concreto não romperá		
1,82t	0,026kN/cm <sup>2</sup>	0,509kN/cm <sup>2</sup>			
τ <sub>c0</sub>	Asw=Asw,mín	φ <sub>t</sub> (mm)	Espaçamento	Adotar φ5 a c/17,1cm	
0,087kN/cm <sup>2</sup>	2,32cm <sup>2</sup> /m	5,0	c/17,1 cm		

Adotar 2φ8,0 inferior e superior, estribos φ5,0c/17

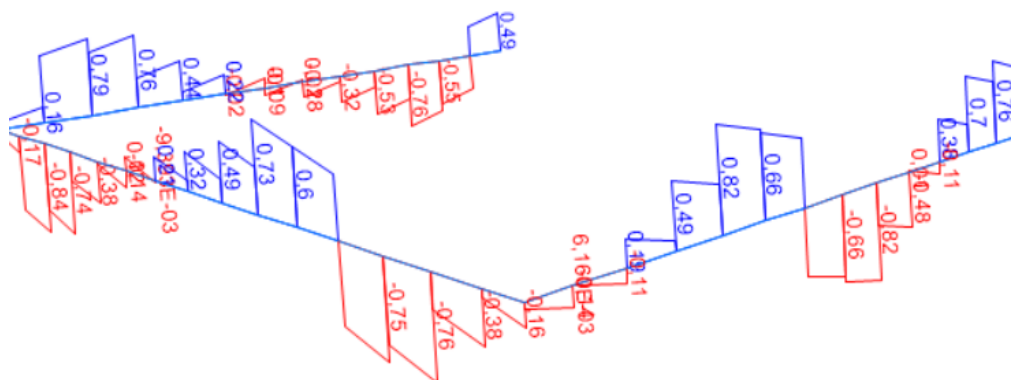
### 18.3.11 Cintas C1 a C4

#### Momento



DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	50cm	30 MPa	4,0 cm	1,01t.m	5,0 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,019	0,73cm <sup>2</sup>	10	1,9	1,50 cm <sup>2</sup>	4,3φ/Camada

#### Cortante



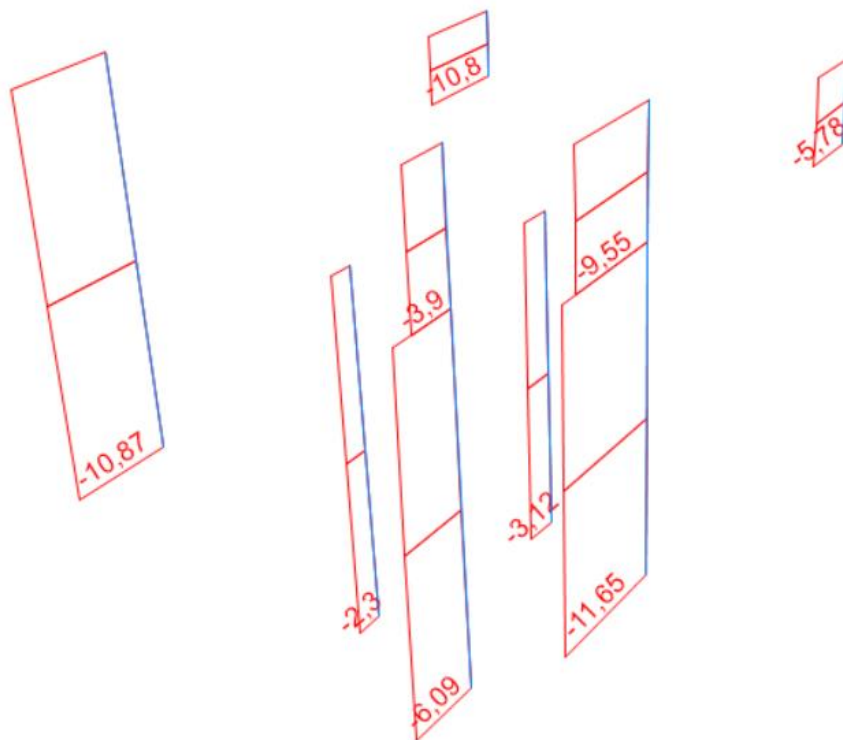
CÁLCULO DA ARMADURA DE CISALHAMENTO				
V <sub>Sd,máx</sub>	τ <sub>wd,máx</sub>	τ <sub>wd2</sub>	τ <sub>wd,máx</sub> < τ <sub>wd2</sub> = Biela comprimida do concreto não romperá	
1,15t	0,013kN/cm <sup>2</sup>	0,509kN/cm <sup>2</sup>		
τ <sub>c0</sub>	Asw=Asw,mín	φ <sub>t</sub> (mm)	Espaçamento	Adotar φ5 a c/17,1cm
0,087kN/cm <sup>2</sup>	2,32cm <sup>2</sup> /m	5,0	c/17,1 cm	

Adotar 2φ10 inferior e superior e estribos φ5,0c/17

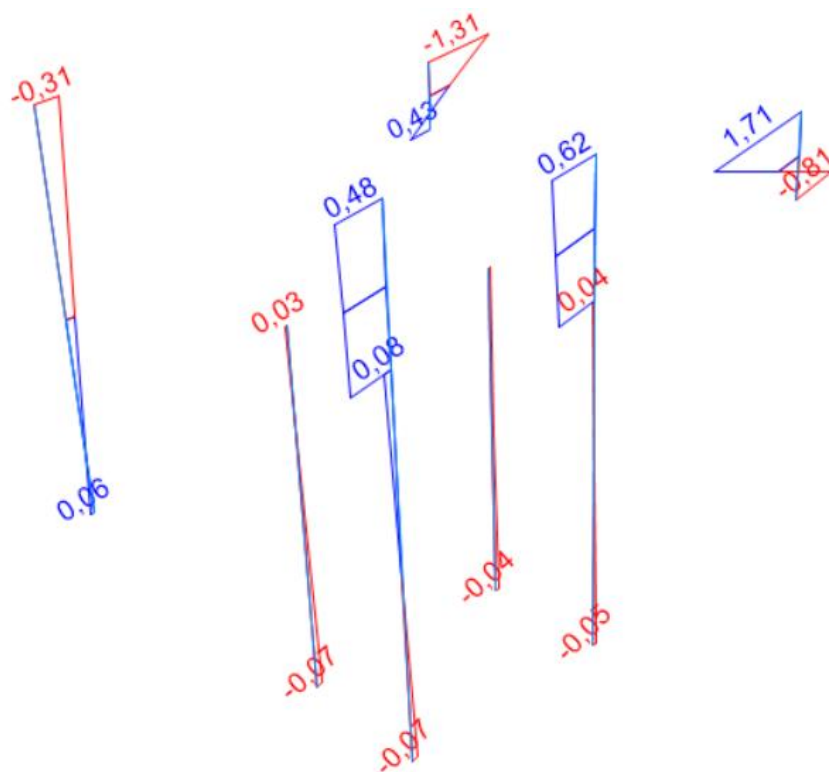


### 18.3.12 Pilares

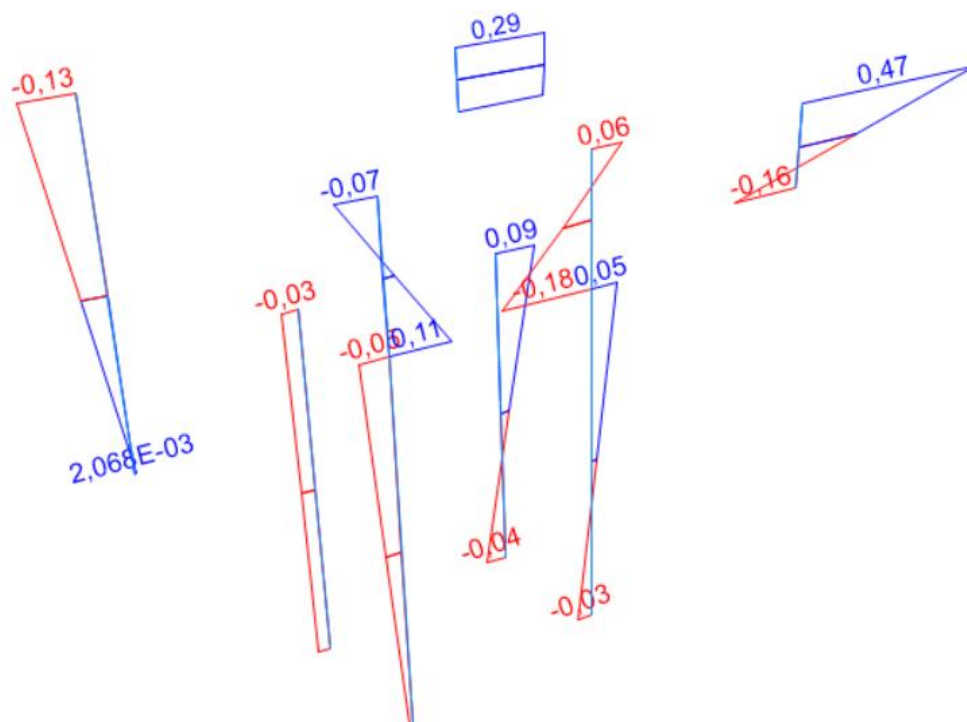
#### Carga normal N



#### Momento Mx



## Momento My



### 18.3.12.1 Pilares P1=P4

Cobr.(até CG da Arm.)= 4 cm Fck = 30 MPa Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coefficientes de Majoração

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

Base b=20 cm (X) Altura h=20 cm (Y) Área Total = 400 cm<sup>2</sup>  
Valor de Lo = 340 cm  
Valor de le = 360 cm LâmbdaE(b) = 62,3 LâmbdaE(h) = 62,3

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

N = 11,45 tf MAx = 0,18 tfm MBx = -0,03 tfm MAy = 0,12 tfm MBy = 0,08 tfm  
Pilar com Carga Transversal  
Pilar com Carga TransversalAlfaB (b) = 1 AlfaB (h) = 1  
Pilar com Carga TransversalCritério do Momento mínimo foi utilizado. M1d,minB=0,33663  
Pilar com Carga TransversalCritério do Momento mínimo foi utilizado. M1d,minH=0,33663  
Seção A : Lâmbda1(b) = 35 Lâmbda1(h) = 35  
Seção B : Lâmbda1(b) = 35 Lâmbda1(h) = 35

ANÁLISE :

Nd = 16,03 t

----- Seção A Direção b -----

Flexo-Compressão-Obliqua

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =1,05 cm

Lâmbdae = 62,28 > Lambda1 = 35

Efeito local de 2a ordem!

Crítério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.



$N_i = 0,187 - 1/r = 0,025 \text{ 1/cm}$   
Exc. 2a ordem (Curv. Aprox.)=5,34 cm  
Rig. K Aprox.= 12,2107  
Exc. 2a ordem (Rig. Aprox.)= 4,16 cm  
Exc. p/ dimensionamento = 5,34 cm

----- Seção A Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =1,57 cm

$\Lambda_{bdae} = 62,28 > \Lambda_{bda1} = 35$

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

$N_i = 0,187 - 1/r = 0,025 \text{ 1/cm}$

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 12,2107

Exc. 2a ordem (Rig. Aprox.)= 4,16 cm

Exc. p/ dimensionamento = 5,34 cm

----- Seção B Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =0,7 cm

$\Lambda_{bdae} = 62,28 > \Lambda_{bda1} = 35$

Efeito local de 2a ordem!

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

$N_i = 0,187 - 1/r = 0,025 \text{ 1/cm}$

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 12,2107

Exc. 2a ordem (Rig. Aprox.)= 4,16 cm

Exc. p/ dimensionamento = 5,34 cm

----- Seção B Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =-0,26 cm

$\Lambda_{bdae} = 62,28 > \Lambda_{bda1} = 35$

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

$N_i = 0,187 - 1/r = 0,025 \text{ 1/cm}$

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 12,2107

Exc. 2a ordem (Rig. Aprox.)= 4,16 cm

Exc. p/ dimensionamento = 5,34 cm

\*===== Dimensionamento =====

Seção Intermediária

1a) Hip. : Nd=16,03t, eb=5,34 cm (Mb = 0,86 t.m), eh =5,34 cm (Mh = 0,86 t.m)

=====

Seção A

2a) Hip. : Nd=16,03t, eb=5,34 cm (Mb = 0,86 t.m), eh=0 cm

3a) Hip. : Nd=16,03t, eb=0 cm, eh =5,34 cm (Mh = 0,86 t.m)

=====

Seção B

4a) Hip. : Nd=16,03t, eb=5,34 cm (Mb = 0,86 t.m), eh =0 cm

5a) Hip. : Nd=16,03t, eb=0 cm, eh =5,34 cm (Mh = 0,86 t.m)

=====

Ferragem - Resultado

=====

Área de Cálculo (1a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 1,6 cm<sup>2</sup>

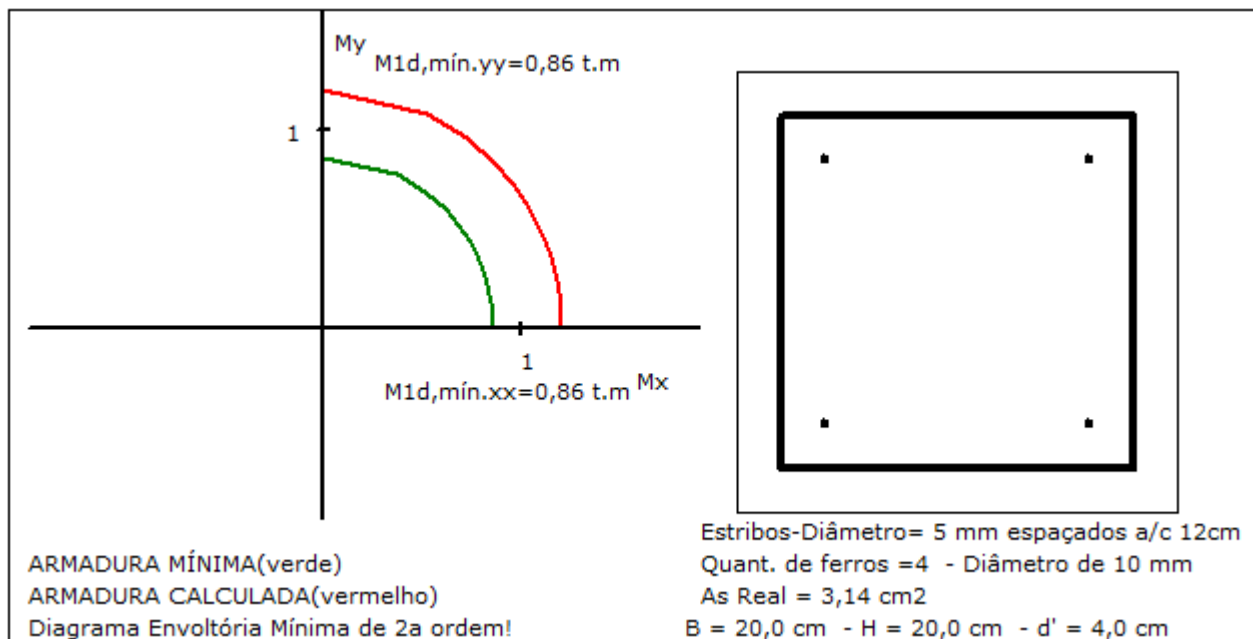
Área de Cálculo (4a Hip.) = 1,6 cm<sup>2</sup>  
 Área de Cálculo (5a Hip.) = 1,6 cm<sup>2</sup>  
 Diâmetro : 10 mm  
 Ferragem distribuída : 4 ferros nos cantos  
 Ferros ao longo de b (de cada lado): 0  
 Ferros ao longo de h (de cada lado): 0  
 Total de Ferros : 4  
 Área do Total de Ferros : 3,14 cm<sup>2</sup> - Percentual = 0,79 %

Estribo - Diâmetro = 5 mm espaçados a cada 12 cm

ou h))  
 ESPAÇAMENTO LIVRE ENTRE AS BARRAS: ( $\geq 2$ cm, Dia.Long. e 1,2 dmáx. agregado) - ( $\leq 40$  cm;  $\leq 2x(b$   
 11 cm  
 Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 11 cm. Ao longo de H =

COMPRIMENTO DE ESPERA DAS BARRAS:  
 Comprimento de Ancoragem Básico = 34 cm e Comprimento de Espera = 21 cm

ESTRIBOS  
 Diâmetro = 5 mm espaçados a cada 12 cm



Adotar 4 $\phi$ 10, estribos  $\phi$ 5,0c/12



### 18.3.12.2 Pilares P2=P5

Cobr.(até CG da Arm.)= 4 cm Fck = 30 MPa Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coeficientes de Majoração

=====

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

=====

Base b=20 cm (X) Altura h=20 cm (Y) Área Total = 400 cm<sup>2</sup>

Valor de Lo = 340 cm

Valor de le = 360 cm

LâmbdaE(b) = 62,3

LâmbdaE(h) = 62,3

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

N = 3,12 tf MAx = 0,09 tfm MBx = -0,04 tfm MAy = 0,03 tfm MBy = -,07 tfm

Pilar com Carga Transversal

Pilar com Carga Transversal AlfaB (b) = 1 AlfaB (h) = 1

Seção A : Lâmbda1(b) = 35 Lâmbda1(h) = 35

Seção B : Lâmbda1(b) = 35 Lâmbda1(h) = 35

A N A L I S E :

=====

Nd = 4,37 t

----- Seção A Direção b -----

Flexo-Compressão-Obliqua

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =0,96 cm

Lâmbdae = 62,28 > Lambda1 = 35

Efeito local de 2a ordem!

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,051 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 3,3273

Exc. 2a ordem (Rig. Aprox.)= 4,16 cm

Exc. p/ dimensionamento = 5,34 cm

----- Seção A Direção h -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =2,88 cm

Lâmbdae = 62,28 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,051 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 3,7354

Exc. 2a ordem (Rig. Aprox.)= 5,16 cm

Exc. p/ dimensionamento = 5,34 cm

----- Seção B Direção b -----

Flexo-Compressão-Obliqua

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =-2,24 cm

Lâmbdae = 62,28 > Lambda1 = 35

Efeito local de 2a ordem!

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,051 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 3,404

Exc. 2a ordem (Rig. Aprox.)= 4,35 cm

Exc. p/ dimensionamento = 5,34 cm



----- Seção B Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =-1,28 cm

Lambdae = 62,28 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,051 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=5,34 cm

Rig. K Aprox.= 3,3273

Exc. 2a ordem (Rig. Aprox.)= 4,16 cm

Exc. p/ dimensionamento = 5,34 cm

\*===== Dimensionamento =====

Seção Intermediária

1a) Hip. : Nd=4,37t, eb=5,34 cm (Mb = 0,23 t.m), eh =5,34 cm (Mh = 0,23 t.m)

=====

Seção A

2a) Hip. : Nd=4,37t, eb=5,34 cm (Mb = 0,23 t.m), eh=0 cm

3a) Hip. : Nd=4,37t, eb=0 cm, eh =5,34 cm (Mh = 0,23 t.m)

=====

Seção B

4a) Hip. : Nd=4,37t, eb=5,34 cm (Mb = 0,23 t.m), eh =0 cm

5a) Hip. : Nd=4,37t, eb=0 cm, eh =5,34 cm (Mh = 0,23 t.m)

=====

Ferragem - Resultado

=====

Área de Cálculo (1a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 1,6 cm<sup>2</sup>

Diâmetro : 10 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 0

Ferros ao longo de h (de cada lado): 0

Total de Ferros : 4

Área do Total de Ferros : 3,14 cm<sup>2</sup> - Percentual = 0,79 %

=====

Estribo - Diâmetro = 5 mm espaçados a cada 12 cm

=====

ou h)) ESPAÇAMENTO LIVRE ENTRE AS BARRAS: (>= 2cm, Dia.Long. e 1,2 dmáx. agregado) - (<= 40 cm; <= 2x(b

11 cm Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 11 cm. Ao longo de H =

=====

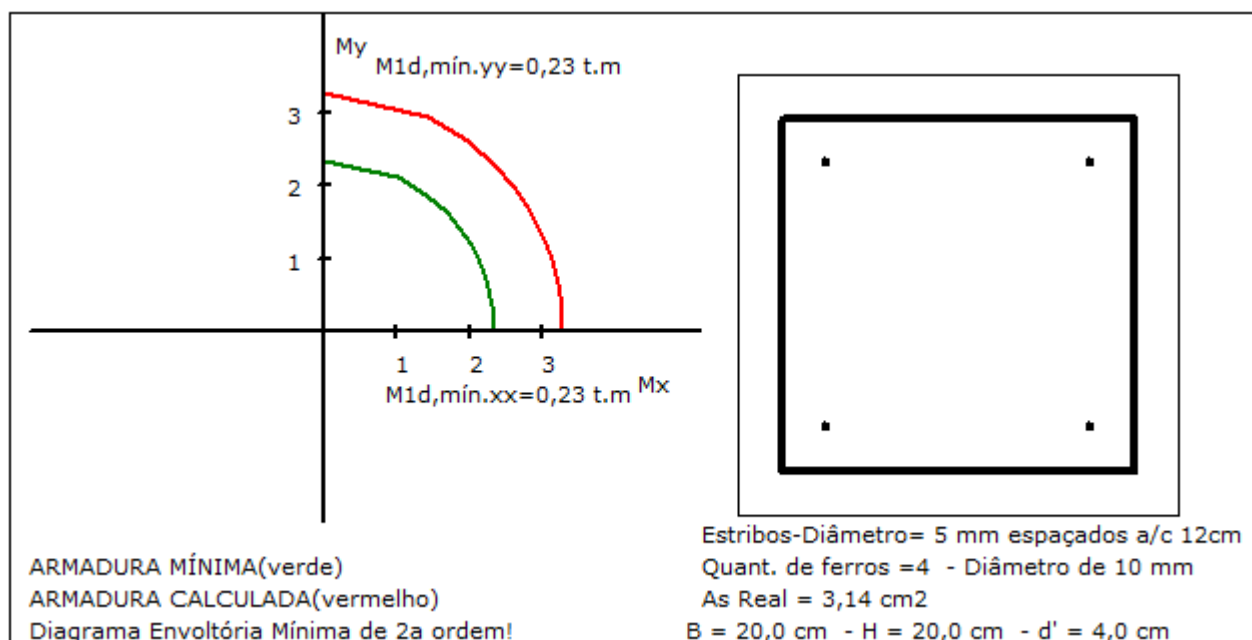
COMPRIMENTO DE ESPERA DAS BARRAS:

Comprimento de Ancoragem Básico = 34 cm e Comprimento de Espera = 21 cm

=====

ESTRIBOS

Diâmetro = 5 mm espaçados a cada 12 cm



Adotar 4 $\phi$ 10, estribos  $\phi$ 5,0c/12

### 18.3.12.3 Pilar P3

Cobr.(até CG da Arm.)= 4 cm Fck = 30 MPa Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coeficientes de Majoração

=====

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

=====

Base b=20 cm (X) Altura h=20 cm (Y) Área Total = 400 cm2  
Valor de Lo = 500 cm LâmbdaE(b) = 90 LâmbdaE(h) = 90  
Valor de le = 520 cm

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

N = 10,87 tf MAx = -0,13 tfm MBx = 0 tfm MAy = -0,31 tfm MBy = 0,06 tfm

Pilar com Carga Transversal

Pilar com Carga TransversalAlfaB (b) = 1 AlfaB (h) = 1

Seção A : Lâmbda1(b) = 35 Lâmbda1(h) = 35

Seção B : Lâmbda1(b) = 35 Lâmbda1(h) = 35

ANÁLISE :

=====

Nd = 15,22 t

----- Seção A Direção b -----

Flexo-Compressão-Obliqua

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =-2,85 cm

Lâmbdae = 89,96 > Lambda1 = 35

Efeito local de 2a ordem!

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,178 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=8,86 cm

Rig. K Aprox.= 17,9159

Exc. 2a ordem (Rig. Aprox.)= 8,61 cm

Exc. p/ dimensionamento = 8,86 cm



----- Seção A Direção h -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =-1,2 cm

Lambdae = 89,96 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,178 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=8,86 cm

Rig. K Aprox.= 16,5291

Exc. 2a ordem (Rig. Aprox.)= 7,64 cm

Exc. p/ dimensionamento = 8,86 cm

----- Seção B Direção b -----

Flexo-Compressão-Obliqua

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =0,55 cm

Lambdae = 89,96 > Lambda1 = 35

Efeito local de 2a ordem!

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,178 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=8,86 cm

Rig. K Aprox.= 16,5291

Exc. 2a ordem (Rig. Aprox.)= 7,64 cm

Exc. p/ dimensionamento = 8,86 cm

----- Seção B Direção h -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =0 cm

Lambdae = 89,96 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,178 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=8,86 cm

Rig. K Aprox.= 16,5291

Exc. 2a ordem (Rig. Aprox.)= 7,64 cm

Exc. p/ dimensionamento = 8,86 cm

\*===== Dimensionamento =====

Seção Intermediária

1a) Hip. : Nd=15,22t, eb=8,86 cm (Mb = 1,35 t.m), eh=8,86 cm (Mh = 1,35 t.m)

=====

Seção A

2a) Hip. : Nd=15,22t, eb=8,86 cm (Mb = 1,35 t.m), eh=0 cm

3a) Hip. : Nd=15,22t, eb=0 cm, eh=8,86 cm (Mh = 1,35 t.m)

=====

Seção B

4a) Hip. : Nd=15,22t, eb=8,86 cm (Mb = 1,35 t.m), eh=0 cm

5a) Hip. : Nd=15,22t, eb=0 cm, eh=8,86 cm (Mh = 1,35 t.m)

=====

Ferragem - Resultado

Área de Cálculo (1a Hip.) = 3,23 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 1,6 cm<sup>2</sup>

Diâmetro : 12,5 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 0



Ferros ao longo de h (de cada lado): 0  
Total de Ferros : 4  
Área do Total de Ferros : 4,91 cm<sup>2</sup> - Percentual = 1,23 %

-----  
Estribo - Diâmetro = 5 mm espaçados a cada 15 cm  
-----

ESPAÇAMENTO LIVRE ENTRE AS BARRAS: ( $\geq 2$ cm, Dia.Long. e 1,2 dmáx. agregado) - ( $\leq 40$  cm;  $\leq 2x(b$  ou h))

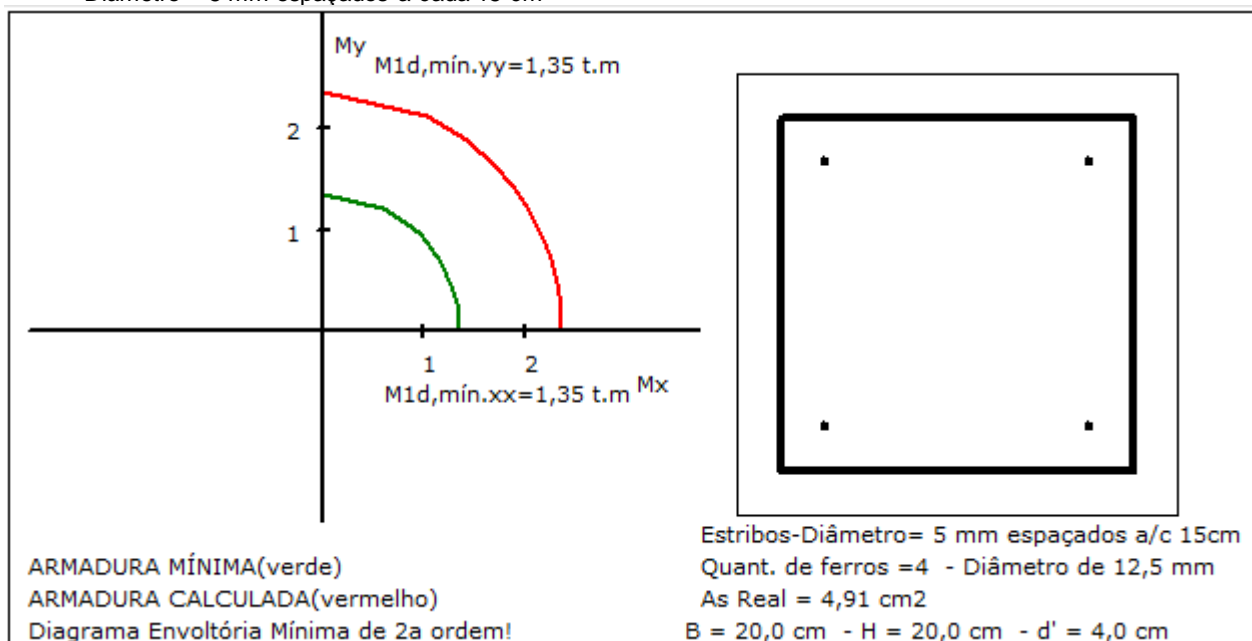
Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 10,75 cm. Ao longo de H = 10,75 cm

-----  
COMPRIMENTO DE ESPERA DAS BARRAS:

Comprimento de Ancoragem Básico = 42 cm e Comprimento de Espera = 28 cm  
-----

ESTRIBOS

Diâmetro = 5 mm espaçados a cada 15 cm



Adotar 4 $\phi$ 12,5, estribos  $\phi$ 5,0c/15

#### 18.3.12.4 Pilares P6=P7

Cobr.(até CG da Arm.)= 4 cm Fck = 30 MPa Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coeficientes de Majoração

=====

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

=====

Base b=20 cm (X) Altura h=20 cm (Y) Área Total = 400 cm<sup>2</sup>

Valor de Lo = 80 cm

Valor de le = 100 cm

LâmbdaE(b) = 17,3

LâmbdaE(h) = 17,3

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

N = 10,8 tf Max = ,47 tfm MBx = -0,16 tfm M Ay = 1,71 tfm M By = -0,81 tfm

Pilar com Carga Transversal

Pilar com Carga TransversalAlfaB (b) = 1 AlfaB (h) = 1

Seção A : Lâmbda1(b) = 35 Lâmbda1(h) = 35

Seção B : Lâmbda1(b) = 35 Lâmbda1(h) = 35

A N A L I S E :

=====

Nd = 15,12 t

----- Seção A Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Lâmbdae = 17,3

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =15,83 cm

Exc. p/ dimensionamento = 15,83 cm

----- Seção A Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Lâmbdae = 17,3

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =4,35 cm

Exc. p/ dimensionamento = 4,35 cm

----- Seção B Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Lâmbdae = 17,3

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =-7,5 cm

Exc. p/ dimensionamento = 7,5 cm

----- Seção B Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Lâmbdae = 17,3

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =-1,48 cm

Exc. p/ dimensionamento = 2,1 cm

\*===== Dimensionamento =====

Seção Intermediária

-----

1a) Hip. : Nd=15,12t, eb=15,83 cm (Mb = 2,39 t.m), eh =4,35 cm (Mh = 0,66 t.m)

=====

Seção A

-----

2a) Hip. : Nd=15,12t, eb=15,83 cm (Mb = 2,39 t.m), eh=0 cm

3a) Hip. : Nd=15,12t, eb=0 cm, eh =4,35 cm (Mh = 0,66 t.m)

=====

Seção B

-----

4a) Hip. : Nd=15,12t, eb=7,5 cm (Mb = 1,13 t.m), eh =0 cm

5a) Hip. : Nd=15,12t, eb=0 cm, eh =2,1 cm (Mh = 0,32 t.m)

=====

Ferragem - Resultado

=====

Área de Cálculo (1a Hip.) = 6,06 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 5,37 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 1,6 cm<sup>2</sup>

Diâmetro : 12,5 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 1

Ferros ao longo de h (de cada lado): 1

Total de Ferros : 8

Área do Total de Ferros : 9,82 cm<sup>2</sup> - Percentual = 2,45 %

-----

Estribo - Diâmetro = 5 mm espaçados a cada 15 cm

ESPAÇAMENTO LIVRE ENTRE AS BARRAS: ( $\geq 2\text{cm}$ , Dia.Long. e 1,2  $d_{\text{máx.}}$  agregado) - ( $\leq 40\text{ cm}$ ;  $\leq 2x(b$  ou  $h)$ )

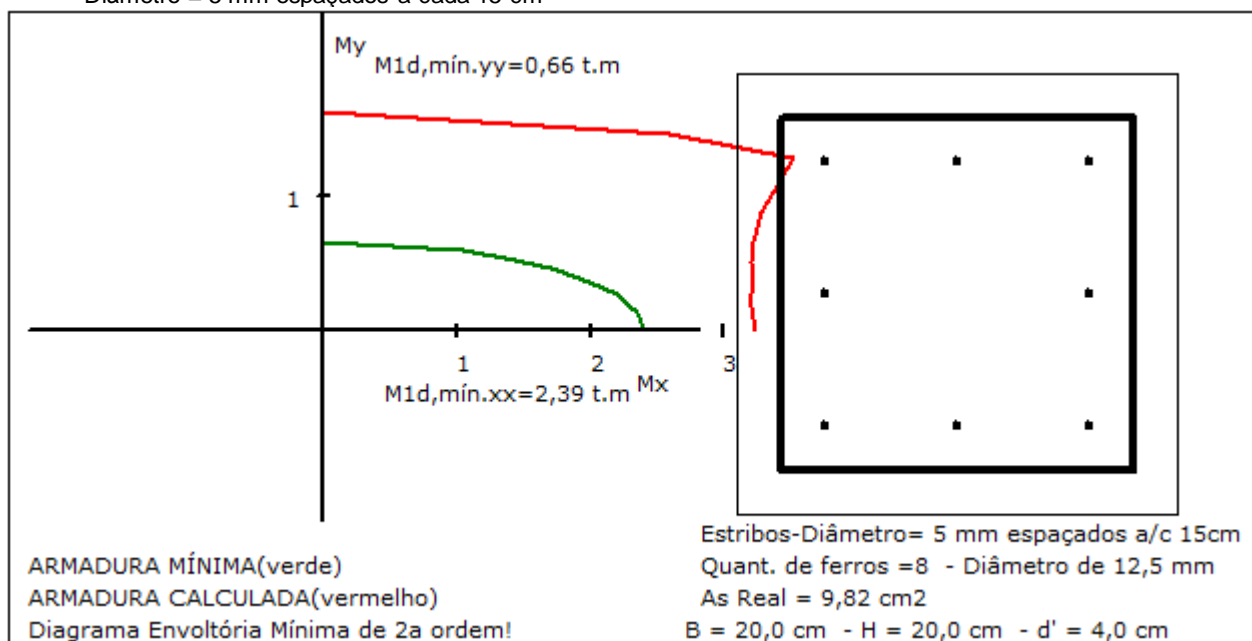
Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 4,75 cm. Ao longo de H = 4,75 cm

COMPRIMENTO DE ESPERA DAS BARRAS:

Comprimento de Ancoragem Básico = 42 cm e Comprimento de Espera = 26 cm

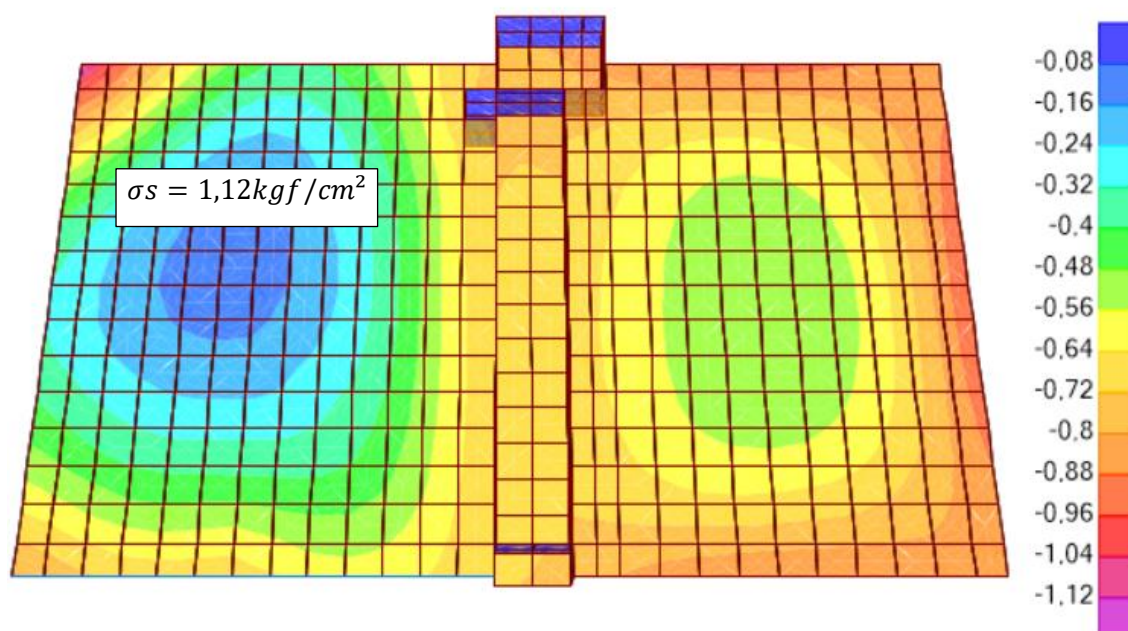
ESTRIBOS

Diâmetro = 5 mm espaçados a cada 15 cm



Adotar 8 $\phi$ 12,5 e estribos  $\phi$ 5,0c/15

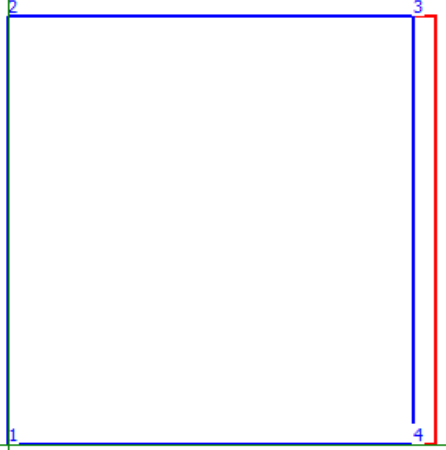
## 18.4 TENSÃO ADMISSÍVEL





$$\sigma_s = 1,12 \text{ kgf/cm}^2 < \sigma_{adm} = 4,0 \text{ kgf/cm}^2 \rightarrow OK!$$

#### 18.4.1 Reservatório Hidropneumático de Membrana



Coordenadas da Seção:

Nodo	X(m)	Y(m)
1	0,00	0,00
2	0,00	2,20
3	2,20	2,20
4	2,20	0,00

Coordenadas da Área Comprimada

Nodo	X(m)	Y(m)
1	0,00	0,00
2	0,00	2,20
3	2,08	2,20
4	2,08	0,00

Área Comprim. : -4,583 m<sup>2</sup>  
Porcentagem : 94,688 %

Programa SecPlan - Mudados  
www.mudados.com.br - e-mail : renato.mudados@yahoo.com.br

---

Seção - - No de Ordem = 1  
PROPRIEDADES GEOMÉTRICAS DA SEÇÃO

=====

Área : -4,840 m<sup>2</sup>  
 Inercia Ix : -1,952 m<sup>4</sup>  
 Inercia Iy : -1,952 m<sup>4</sup>  
 Prod. In. Ixy : 0,000 m<sup>4</sup>  
 Abcissa Xcg : 1,100 m  
 Ordenada Ycg : 1,100 m  
 Ang. alfa : 0,000 graus  
 Iksi : -1,952  
 Ieta : -1,952

Área Comprim. : -4,583 m<sup>2</sup>  
 Porcentagem : 94,688 %

ESFORÇOS NA SEÇÃO :

RESULTANTE DA FORÇA NORMAL (+)=compressao : -3,900 tf  
 Abcissa Xp da RESULTANTE DA carga Normal : 1,100 m  
 Ordenada Yp da RESULTANTE DA carga Normal : 1,100 m  
 MOMENTO Mx (em torno de XX) : 0,000 tf.m  
 MOMENTO My (em torno de YY) : 1,600 tf.m

Opção: Material Resistente à Tração

TENSÕES DE COMPRESSÃO SÃO POSITIVAS !

VÉRTICE	X(m)	Y(m)	Tensao(tf/m <sup>2</sup> )
1	0,000	0,000	1,707
2	0,000	2,200	1,707
3	2,200	2,200	-0,096
4	2,200	0,000	-0,096

$$\sigma_s = 0,17 \text{ kgf/cm}^2 < \sigma_{adm} = 1,0 \text{ kgf/cm}^2 \rightarrow OK!$$

## 18.1 MURO DA EEAT 3

### 18.1.1 Dimensionamento dos pilares

Cobr.(até CG da Arm.)= 4 cm  $F_{ck} = 25 \text{ MPa}$  Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coeficientes de Majoração

=====

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

=====

Base  $b=20 \text{ cm (X)}$  Altura  $h=20 \text{ cm (Y)}$  Área Total = 400 cm<sup>2</sup>

Pilar em Balanço SOMENTE na direção de b (eixo X)

Valor de  $L_o = 250$  - Valor de  $l_e = 500 \text{ cm}$

$\lambda_{E(b)}(\text{eixo X}) = 86,5$

Pilar Contraventado na direção h (eixo Y):

Alturas : Viga Superior = 100 cm Viga Inferior = 100 cm

Valor de  $L_o = 150$  - Valor de  $l_e = 170 \text{ cm}$

$\lambda_{E(h)}(\text{eixo Y}) = 29,4$

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

$N = 1 \text{ tf}$   $MC_x = 0 \text{ tfm}$   $MB_x = 0,20 \text{ tfm}$   $MA_y = 0 \text{ tfm}$   $MB_y = 0,2 \text{ tfm}$

Pilar com Carga Transversal

Pilar com Carga Transversal AlfaB (b) = 1 AlfaB (h) = 1

Seção A :  $\lambda_{b1}(b) = 35$   $\lambda_{b1}(h) = 35$

Seção B :  $\lambda_{b1}(b) = 90$   $\lambda_{b1}(h) = 90$

A N A L I S E :

=====

$N_d = 0,14 \text{ t}$

Pilar em Balanço Contraventado na direção h (eixo Y)

----- Seção A Direção b -----

Excentricidade acidental 1a.Ordem (mín.):  $E_a = 2,1 \text{ cm}$

(Valor considerado ZERADO. Se isso não acontecer, será compensado pelo momento em "C".)

Exc. Inicial = 0 cm

----- Seção A Direção h -----

Excentricidade acidental 1a.Ordem (mín.):  $E_a = 2,1 \text{ cm}$

Exc. Inicial = 0 cm

----- Seção C Direção h -----

Excentricidade acidental 1a.Ordem (mín.):  $E_a = 2,1 \text{ cm}$

$\lambda_{bdaE} = 29,41$

$\lambda_{bda1} = 35$

$\lambda_{bda1} > \lambda_{bdaE}$ : Desconsideração do efeito local de 2a. ordem!

Exc. Inicial = 0 cm

Exc. p/ dimensionamento = 2,1 cm

----- Seção C Direção b -----

Excentricidade acidental 1a.Ordem (mín.):  $E_a = 2,1 \text{ cm}$

Exc. Inicial = 0 cm

$\lambda_{bdaE} = 86,5 > \lambda_{bda1} = 35$

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

$N_i = 0,002 - 1/r = 0,025 \text{ 1/cm}$

Exc. 2a ordem (Curv. Aprox.) = 8,35 cm

Rig. K Aprox. = 0,1737

Exc. 2a ordem (Rig. Aprox.) = 7,08 cm

Exc. p/ dimensionamento = 8,35 cm

----- Seção B Direção b -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Lâmbdae = 86,5

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =200 cm

Exc. p/ dimensionamento = 200 cm

----- Seção B Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,1 cm

Lâmbdae = 29,41

Lâmbda1 = 90

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =200 cm

Exc. p/ dimensionamento = 200 cm

\*===== Dimensionamento =====

Flexo Compressão Obliqua na seção "A" (início do Pilar)

1a) Hip. : Nd=0,14t, eb=2,1 cm (Mb = 0 t.m), eh =2,1 cm (Mh = 0 t.m)

Flexo Compressão Obliqua na seção "C" (meio do Pilar)

2a) Hip. : Nd=0,14t, eb=200 cm (Mb = 0,28 t.m), eh =200 cm (Mh = 0,28 t.m)

Flexo Compressões Normais na seção "B" (Pé do Pilar)

3a) Hip. : Nd=0,14t, eb=200 cm (Mb = 0,28 t.m), eh =0 cm

4a) Hip. : Nd=0,14t, eb=0 cm, eh =200 cm (Mh = 0,28 t.m)

Flexo Compressão Obliqua na seção "B" (Pé do Pilar)

5a) Hip. : Nd=0,14t, eb=200 cm (Mb = 0,28 t.m), eh =200 cm (Mh = 0,28 t.m)

Ferragem - Resultado

Área de Cálculo (1a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 1,6 cm<sup>2</sup>

Diâmetro : 10 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 0

Ferros ao longo de h (de cada lado): 0

Total de Ferros : 4

Área do Total de Ferros : 3,14 cm<sup>2</sup> - Percentual = 0,79 %

Estribo - Diâmetro = 5 mm espaçados a cada 12 cm

ESPAÇAMENTO LIVRE ENTRE AS BARRAS: (>= 2cm, Dia.Long. e 1,2 dmáx. agregado) - (<= 40 cm; <= 2x(b ou

h))

Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 11 cm. Ao longo de H = 11

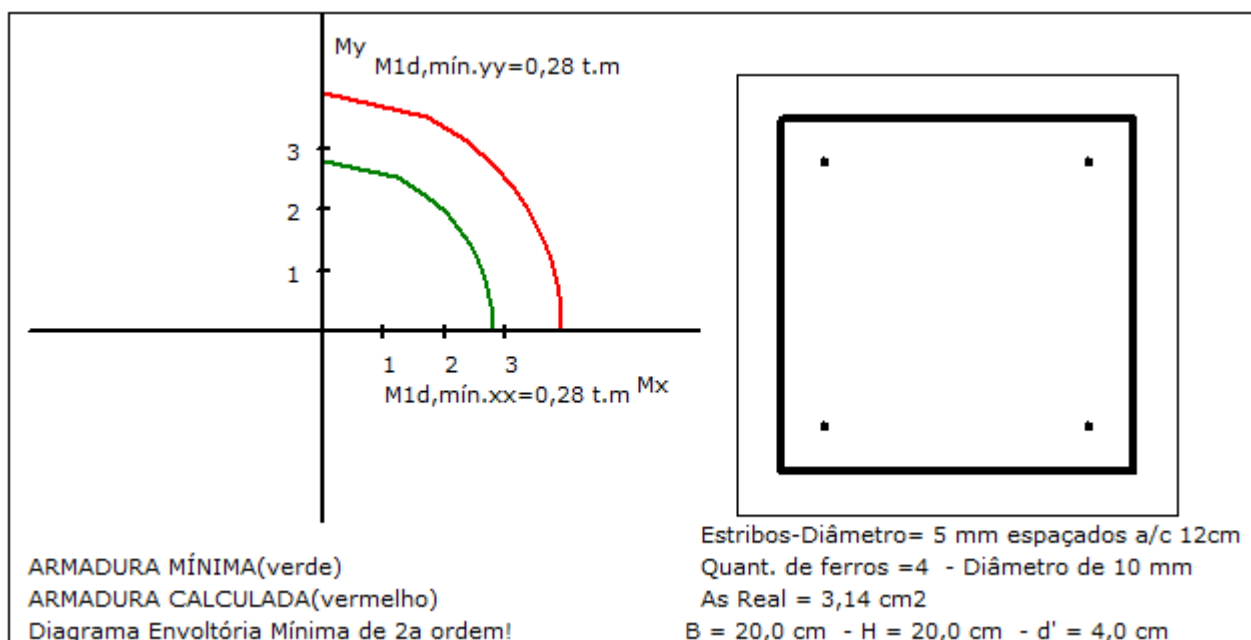
cm

COMPRIMENTO DE ESPERA DAS BARRAS:

Comprimento de Ancoragem Básico = 38 cm e Comprimento de Espera = 23 cm

ESTRIBOS

Diâmetro = 5 mm espaçados a cada 12 cm



Adotar 4φ10 e estribos φ5,0c/12

## 18.1.2 Dimensionamento da Sapata

### 18.1.2.1 Peso Próprio do muro

Foi considerado um peso próprio de  $q = 2,4 \times 0,20 \times 2,50 = 1,27 \text{ t/m}$

### 18.1.2.2 Vento

$$V_k = V_0 \times S_1 \times S_2 \times S_3$$

$V_0 = 30 \text{ m/s}$  (Velocidade básica dos ventos)

$S_1 = 1,00$  (fator topográfico)

$S_2 = 0,92$  (Categoria II, A)

$S_3 = 0,95$  (instalação industrial)

$C_f = 1,50$

$$V_k = 30 \times 1,0 \times 0,92 \times 0,95 = 26,22 \text{ m/s}$$

$$q_{\text{vento}} = C_f \times V_k^2 \times 0,613 = 1,5 \times 26,22^2 \times 0,613 = 632 \text{ N/m}^2 = 0,063 \text{ t/m}^2$$

## VERIFICAÇÃO À ESTABILIDADE

### Geometria

A =	90,00	cm
B =	100,00	cm
h =	25,00	cm
hsugerido =	25,00	cm

a =	25,00	cm
b =	25,00	cm
Ho =	100,00	cm
Ht =	100,00	cm

### Pesos Específicos

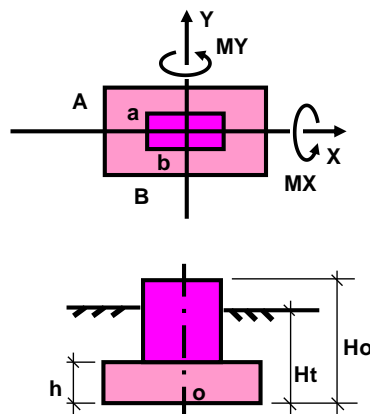
$\gamma_{conc.}$ =	2,50	tf/m <sup>3</sup>
$\gamma_{solo}$ =	1,80	tf/m <sup>3</sup>

### Limites de Cálculo

$\sigma_{s,adm}$ =	40,00	tf/m <sup>2</sup>
Área mín =		%
A max =		cm
B max =		cm

### Sobrecarga no Solo

SC solo =		tf/m <sup>2</sup>
-----------	--	-------------------



Tensão máx. (t/m <sup>2</sup> )	Tensão mín. (t/m <sup>2</sup> )	Área Comprimida (%)	Reviramento	Deslizamento
6,09	0,76	100,00	3,85	7,01

HIP.	CARREGAMENTOS COMBINADOS	Tensão máx. (t/m <sup>2</sup> )	Tensão mín. (t/m <sup>2</sup> )	Área Comp. (%)	Reviram.	Deslizam.
1	CP	6,09	0,76	100,00	3,85	7,01
1	CP	6,09	0,76	100,00	3,85	7,01
1	CP	6,09	0,76	100,00	3,85	7,01
1	CP	6,09	0,76	100,00	3,85	7,01
1	CP	6,09	0,76	100,00	3,85	7,01

HIP.	CARREGAMENTOS COMBINADOS	V (tf)	X (tf)	Y (tf)	MY (tf.m)	MX (tf.m)
1	CP	1,27	0,00	0,16	0,00	-0,20
1	CP	1,27	0,00	0,16	0,00	-0,20
1	CP	1,27	0,00	0,16	0,00	-0,20
1	CP	1,27	0,00	0,16	0,00	-0,20
1	CP	1,27	0,00	0,16	0,00	-0,20

## DIMENSIONAMENTO DA ARMADURA

### Propriedades Concreto e Aço

fck =	2,50	kN/cm <sup>2</sup>
fyk =	50,00	kN/cm <sup>2</sup>
Es =	21.000,00	kN/cm <sup>2</sup>

### Diâmetros das Armaduras

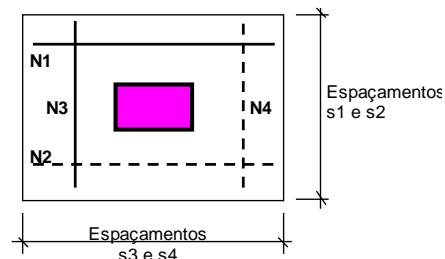
$\phi$ N1 =	0,80	cm
$\phi$ N2 =	0,50	cm
$\phi$ N3 =	0,80	cm
$\phi$ N4 =	0,50	cm

### Cobrimento, abertura de fissura e coef. conf. superf.

c =	3,00	cm
wk =	0,03	cm
$\eta_1$ =	2,25	

### Resultados

	N1 (INF)	N2 (SUP)	N3 (INF)	N4 (SUP)
Md (tf.m)	0,35	0,10	0,31	0,08
Excentricidade (m)	0,000		0,117	
As min (cm <sup>2</sup> /m)	1,14	0,32	0,90	0,27
As calculado (cm <sup>2</sup> /m)	0,57	0,16	0,45	0,14
As adotado (cm <sup>2</sup> /m)	1,14	N.A.	0,90	N.A.
Diâmetro (cm)	0,80	N.A.	0,80	N.A.
Espaçamento (cm)	43,95	N.A.	55,70	N.A.





## **19. CAIXAS DE VENTOSA – TRECHO 03**

### **19.1 PARÂMETROS DE PROJETO**

Para as demais estruturas, adotou-se:

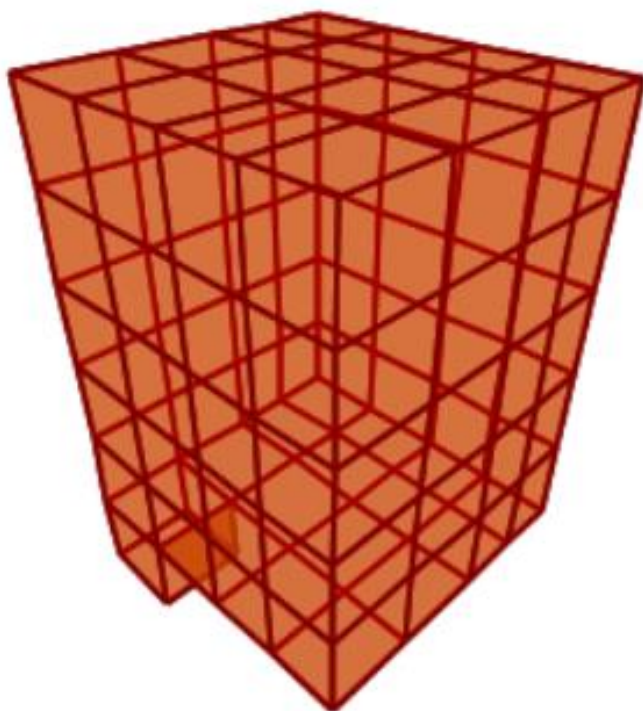
- Classe de Agressividade Ambiental = III;
- Características do concreto  $F_{ck} \geq 30\text{MPa}$ ;
- Módulo De Elasticidade  $E_{ci} \geq 31\text{GPa}$ ;
- Relação Água/Cimento  $\leq 0,50$ ;
- Consumo Mínimo de Cimento por Volume de Concreto =  $320 \text{ kg/m}^3$ ;
- Diâmetro máximo do agregado graúdo = 19mm.
- Concreto magro  $\geq 10 \text{ MPa}$ ;
- Aço CA-50;
- Cobrimento das armaduras: 4,0 cm;

Para dimensionamento das caixas de ventosa do Trecho 3, como as dimensões das 13 caixas são próximas, foi considerada a caixa com as maiores dimensões para o cálculo ( $H=2,34\text{m}$ ).

### **19.2 CARREGAMENTOS**

#### **19.2.1 Peso Próprio**

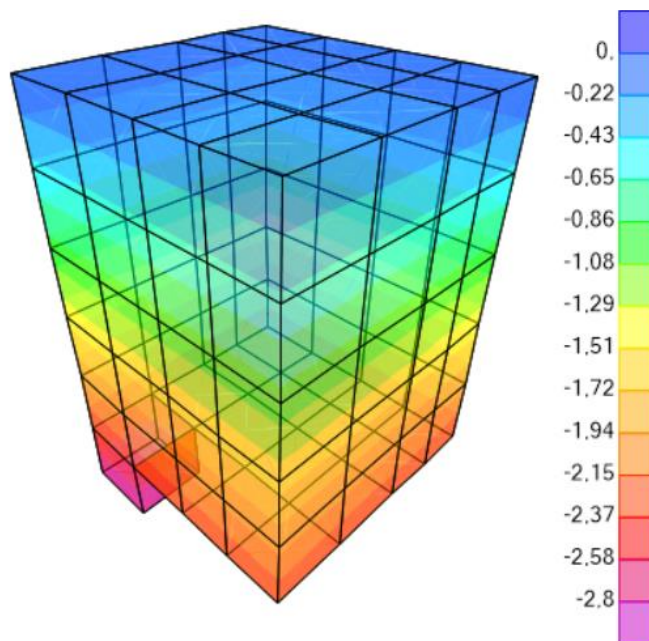
Carregamento definido pelo programa SAP 2000 considerando a modelagem da estrutura e o peso específico do concreto.



### 19.2.2 Peso e Empuxo de Água

Considerou-se atuando perpendicularmente às paredes e sobre a laje de fundo, a altura da lâmina de água da face inferior da laje superior à laje de fundo e o peso específico da água:

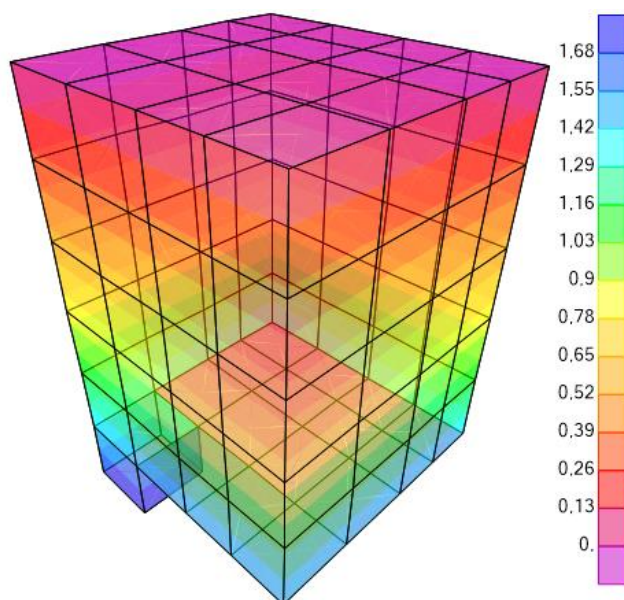
$q=\gamma H$ ;  $0,00\text{m}<H<2,80\text{m}$ .



### 19.2.3 Empuxo de Solo

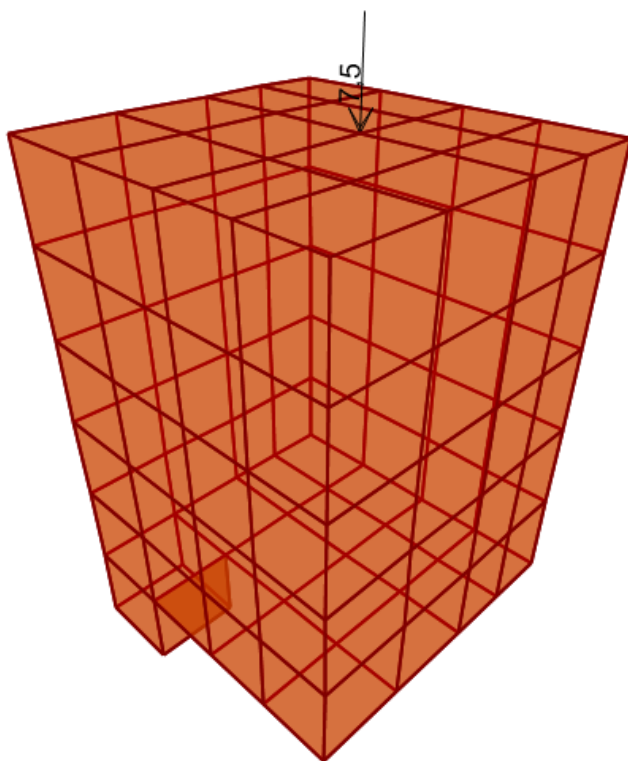
Considerou-se atuando perpendicularmente às paredes e sobre a laje de fundo, a altura de solo da face inferior da laje superior à laje de fundo e o peso específico do solo  $\gamma=1,8\text{t/m}^3$  e o  $K_a=0,333$ :

$q=\gamma K_a H$ ;  $0,00\text{m}<H<2,80\text{m}$ .



### 19.2.4 Carga TB-45

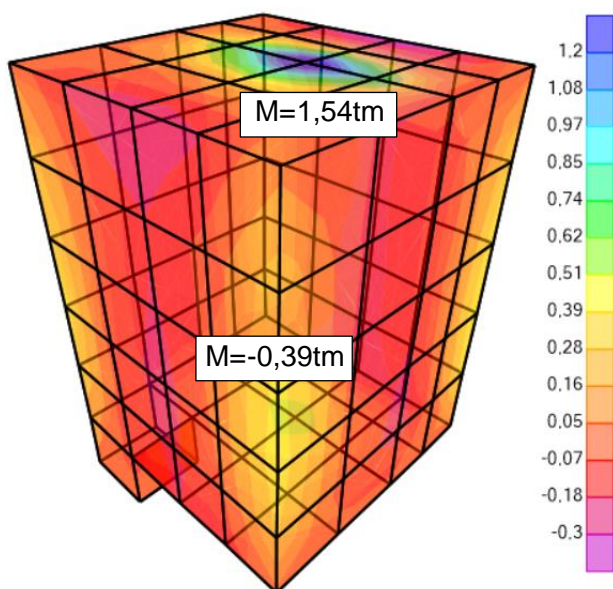
Foi considerada uma sobrecarga  $p=7,50t$  no centro da laje superior.



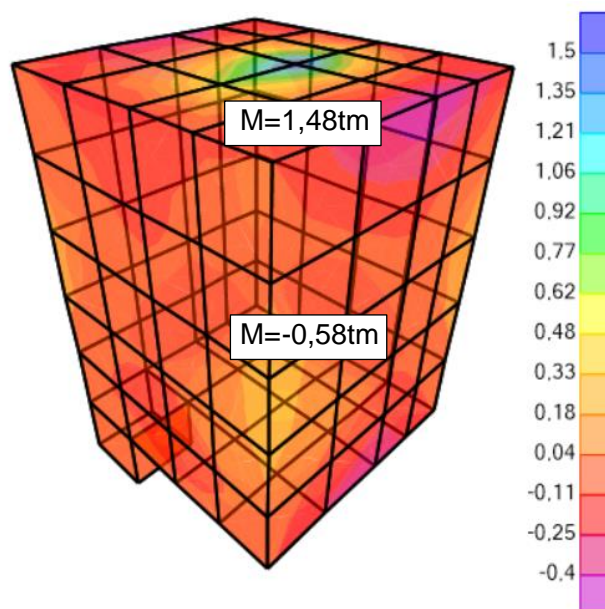
### 19.3 DIMENSIONAMENTO

Armadura de flexão

Momento  $M_y$



Momento  $M_x$





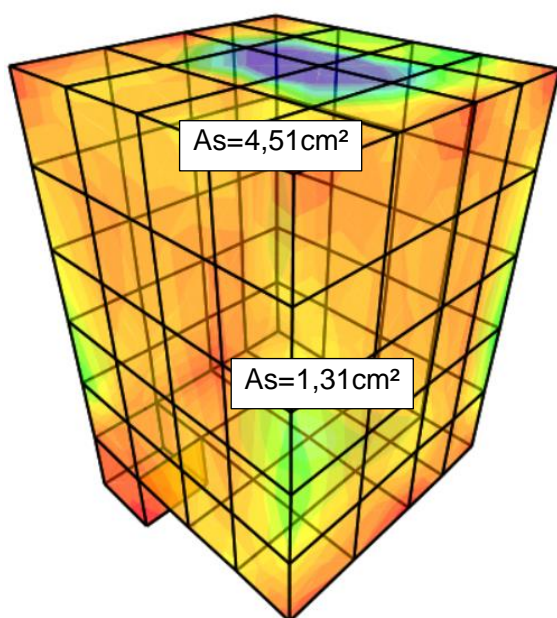
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	20cm	30 MPa	4,0 cm	1,54t.m	4,8 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	As <sub>min</sub>	
0,051	3,35cm <sup>2</sup>	8,0	15,0	3,11 cm <sup>2</sup>	

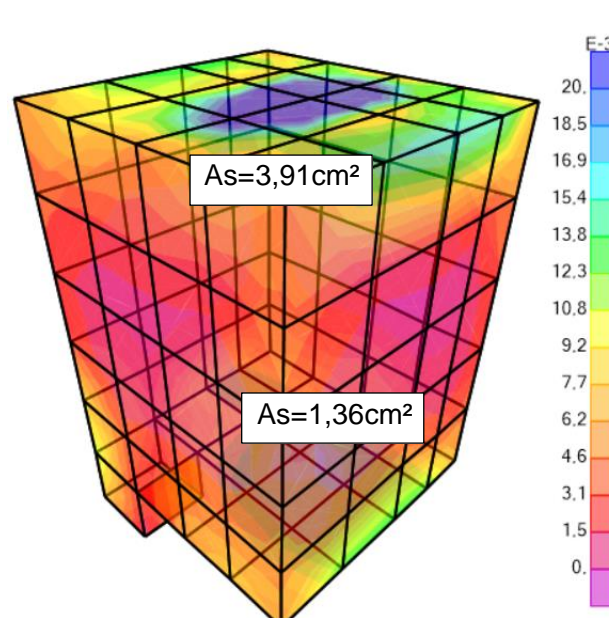
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	20cm	30 MPa	4,0 cm	0,55t.m	4,8 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	As <sub>min</sub>	
0,018	1,18cm <sup>2</sup>	8,0	16,1	3,11 cm <sup>2</sup>	

### Armadura de flexo-tração

As,x



As,y



DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
4,510cm <sup>2</sup>	10	17,4

DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
1,360cm <sup>2</sup>	6,3	22,9

Adotar  $\phi 8,0c/15$  inferior e superior nos dois sentidos para a laje inferior e paredes da caixa e  $\phi 10c/15$  na laje superior

## **20. RESERVATÓRIO DONA JOANA**

### **20.1 PARÂMETROS DE PROJETO**

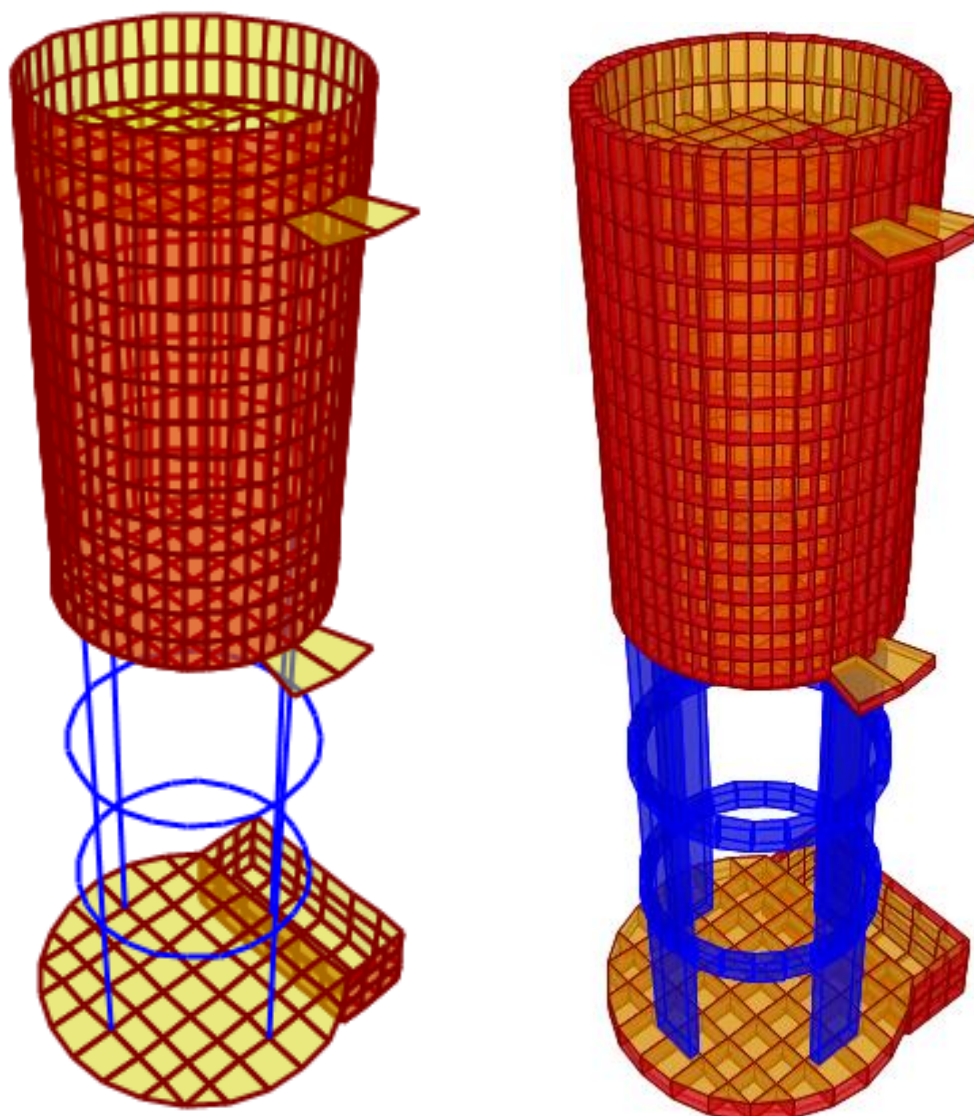
Para as estruturas, adotou-se:

- Classe de Agressividade Ambiental = III;
- Características do concreto  $F_{ck} \geq 30\text{MPa}$ ;
- Módulo De Elasticidade  $E_{ci} \geq 31\text{GPa}$ ;
- Relação Água/Cimento  $\leq 0,50$ ;
- Consumo Mínimo de Cimento por Volume de Concreto =  $320\text{ kg/m}^3$ ;
- Diâmetro máximo do agregado graúdo = 19mm.
- Concreto magro  $\geq 10\text{ MPa}$ ;
- Aço CA-50;
- Cobrimento das armaduras: 4,0 cm;

### **20.2 CARREGAMENTOS**

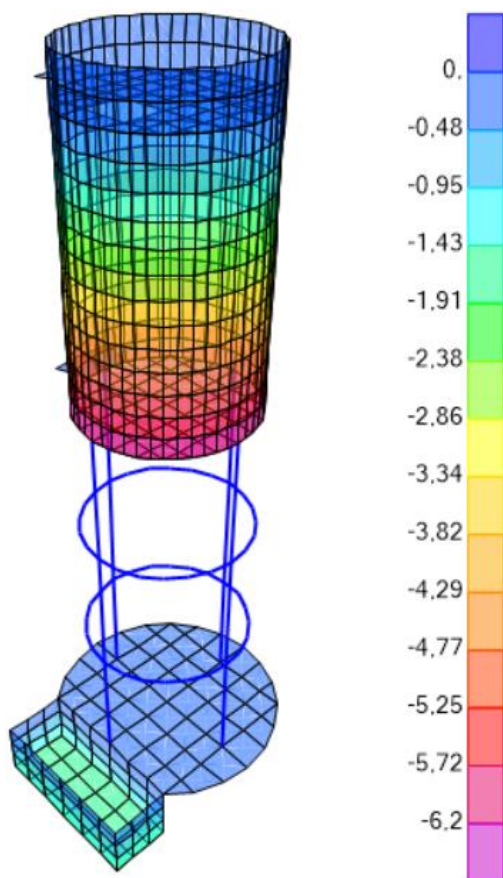
#### **20.2.1 Peso Próprio**

Carregamento definido pelo programa SAP 2000 considerando a modelagem da estrutura e o peso específico do concreto.



### 20.2.2 Peso e Empuxo de Água

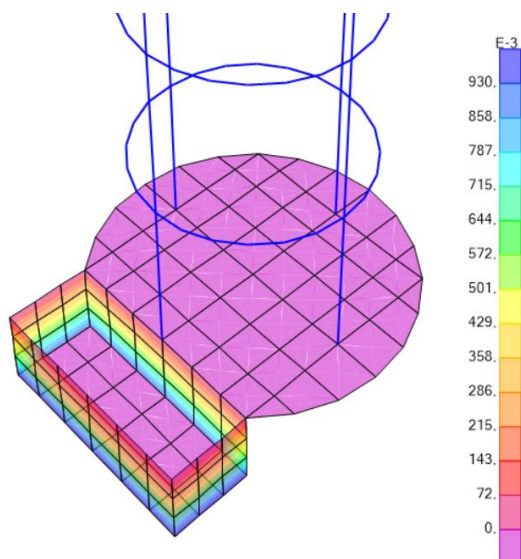
Considerou-se atuando perpendicularmente às faces internas das paredes e sobre a laje de fundo, um carregamento da altura da lâmina de água da face inferior da laje superior, El.373,00, à laje de fundo e o peso específico da água:  $q=\gamma H$ ;  $0,00\text{m}<H<6,40\text{m}$ .





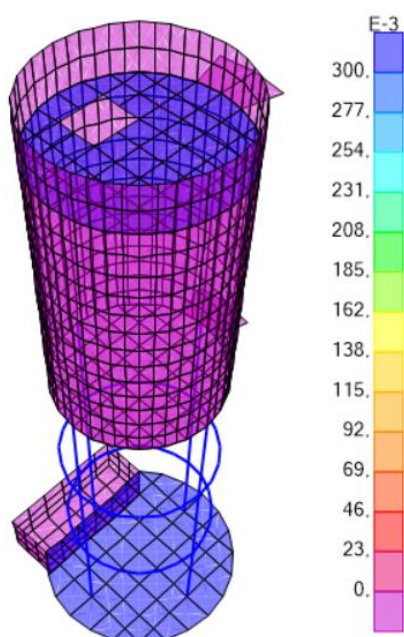
### 20.2.3 Empuxo de Solo

Considerou-se atuando perpendicularmente às faces externas das paredes, um carregamento do nível do terreno, El.357,10, à laje de fundo, multiplicado por  $K_a$  e o peso específico do solo:  $q=K_a\gamma H=0,33.1,8.H=0,6H$ ;  $0,00m < H < 1,55m$ .



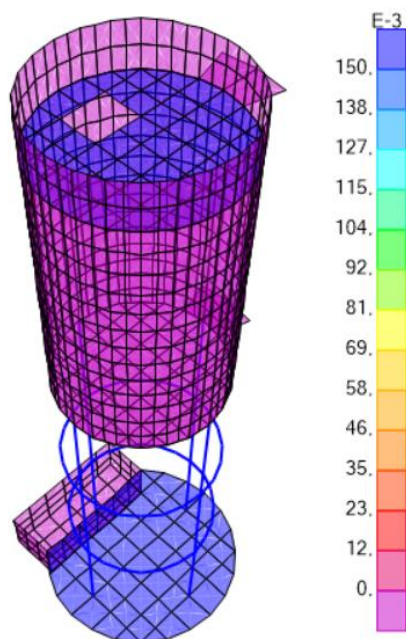
### 20.2.4 Carga Acidental

Foi considerada uma sobrecarga de  $q=0,30t/m^2$  sobre a laje superior e  $q=0,30t/m^2$  sobre a laje inferior.



### 20.2.5 Carga Permanente

Foi considerada uma sobrecarga de  $q=0,15\text{t/m}^2$  sobre a laje superior e  $q=0,15\text{t/m}^2$  sobre a laje inferior.



### 20.2.6 Vento

$$V_k = V_0 \times S_1 \times S_2 \times S_3$$

$V_0 = 30\text{m/s}$  (Velocidade básica dos ventos)

$S_1 = 1,00$  (fator topográfico)

$S_2 = 1,06$  (Categoria II, A)

$S_3 = 0,95$  (instalação industrial)

$C_a = 1,35$  (coeficiente de arrasto direção y)

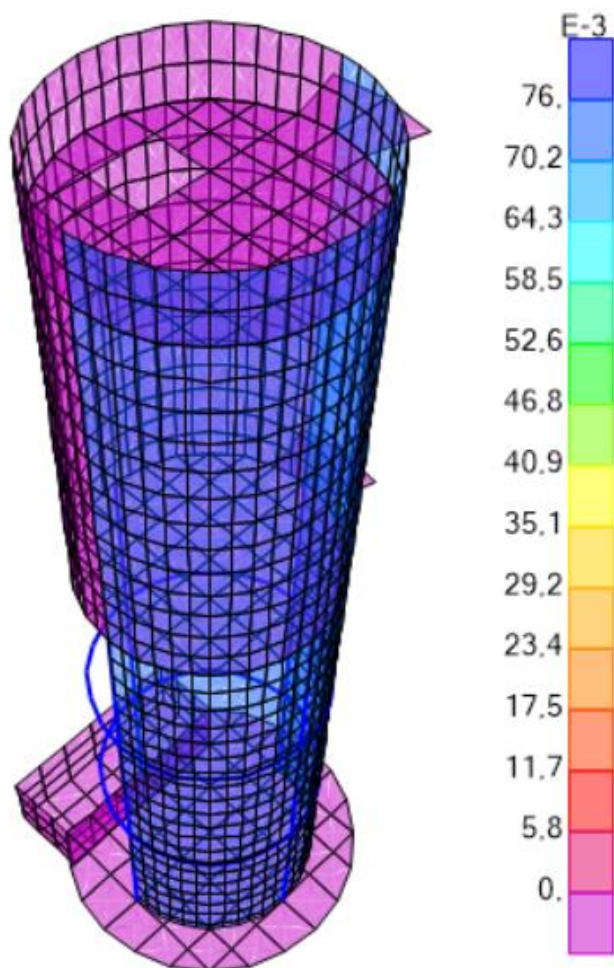
$C_a = 1,35$  (coeficiente de arrasto direção x)

$$V_k = 30 \times 1,0 \times 1,06 \times 0,95 = 30,21\text{m/s}$$

$$q_{\text{vento}} = V_k^2 \times 0,613 = 30,21^2 \times 0,613 = 559 \text{ N/m}^2 = 0,056\text{t/m}^2$$

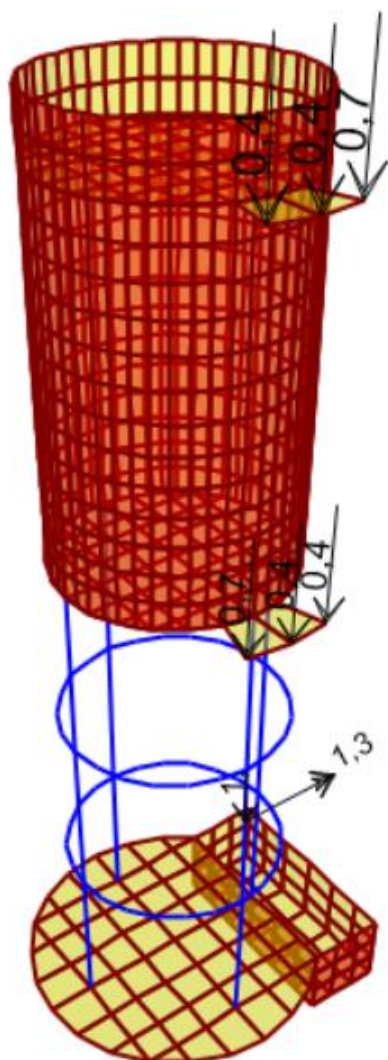
$$q_{\text{vento},y} = C_a \times q_{\text{vento}} = 1,35 \times 0,056\text{t/m}^2 = 0,076\text{t/m}^2$$

$$q_{\text{vento},x} = C_a \times q_{\text{vento}} = 1,35 \times 0,056\text{t/m}^2 = 0,076\text{t/m}^2$$



### 20.2.7 Guarda-corpo e escada

Foi considerada uma sobrecarga  $q=0,3t/m$  referente ao peso próprio e carga acidental, além de  $0,3t$  referente as escadas.



### 20.3 HIPÓTESES

#### Hipótese 1: Vazio com Vento

COMB1 = Peso Próprio + Empuxo de Solo + Carga Permanente + Vento + Guarda Corpo e Escada

#### Hipótese 2: Cheio com Vento

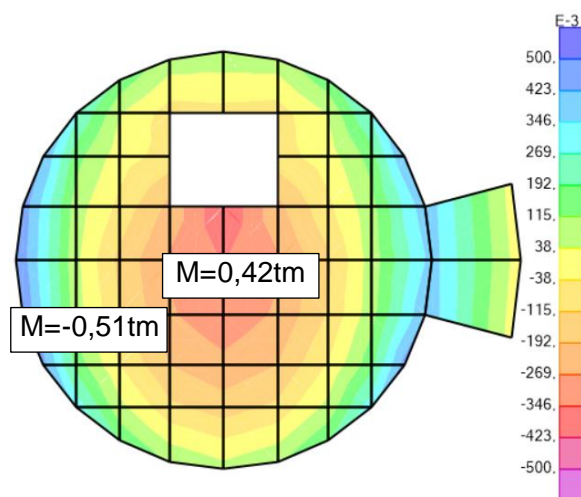
COMB2 = Peso Próprio + Peso e Empuxo da Água + Empuxo de Solo + Carga Acidental + Carga Permanente + Vento + Guarda Corpo e Escada

## 20.4 DIMENSIONAMENTO

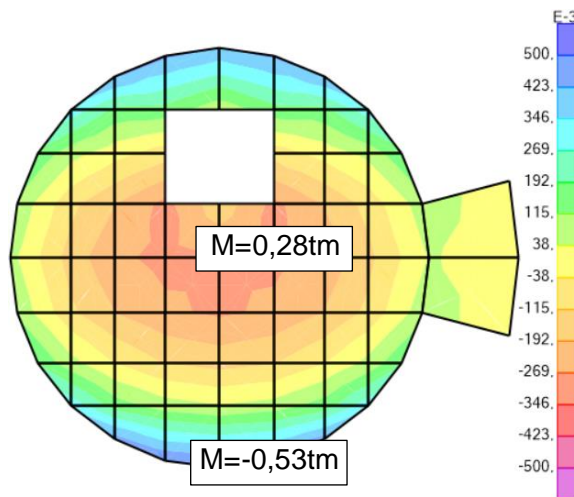
### 20.4.1 Laje Superior

Armadura de flexão

Momento  $M_y$



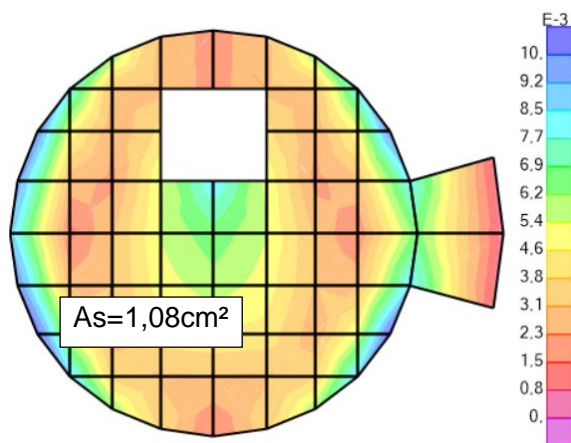
Momento  $M_x$



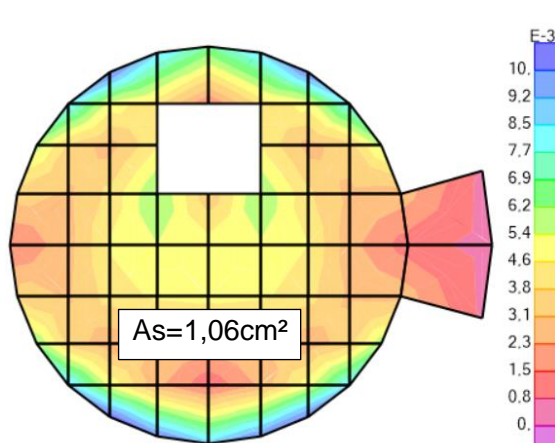
DADOS DE ENTRADA					
b	h	fck	Cobrimento	$M_{MÁX}$	d'
100cm	20cm	30 MPa	4,0 cm	0,53t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	$A_{s_{min}}$	
0,019	1,16cm <sup>2</sup>	8,0	15,7	3,20 cm <sup>2</sup>	

Armadura de flexo-tração

As,x



As,y





DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
1,080cm <sup>2</sup>	8,0	46,5

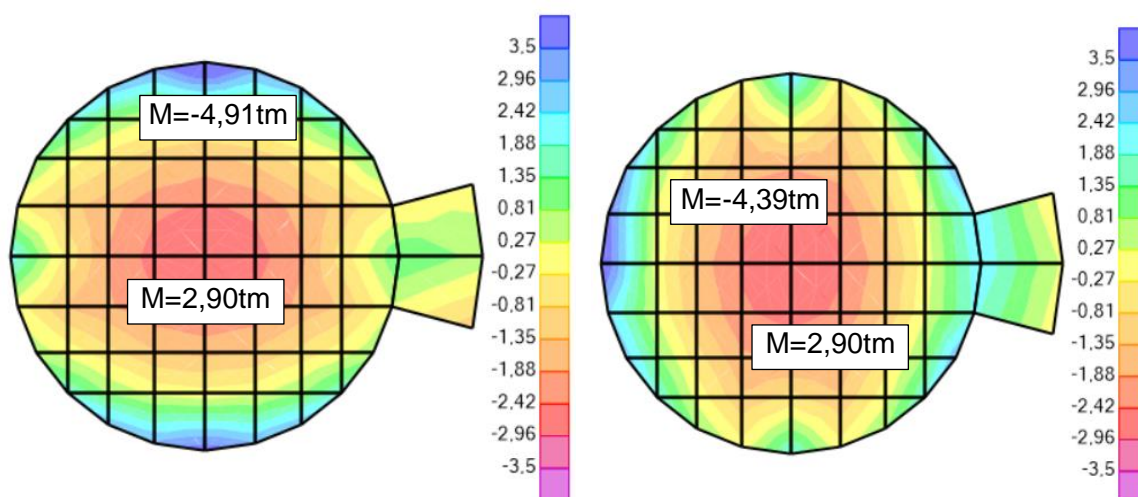
Adotar  $\phi 8,0c/15$  inferior e superior nos dois sentidos para a laje superior

## 20.4.2 Laje intermediária

Armadura de flexão

Momento My

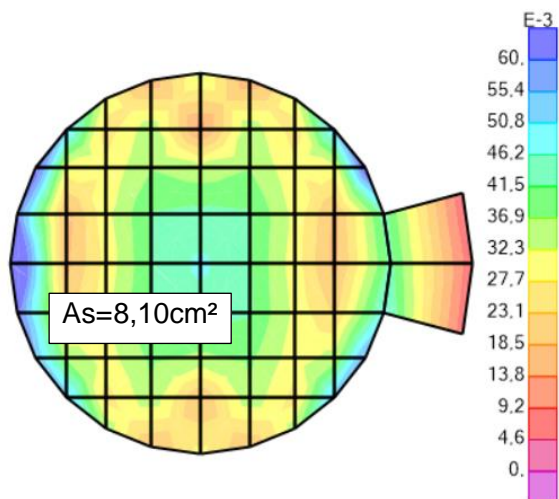
Momento Mx



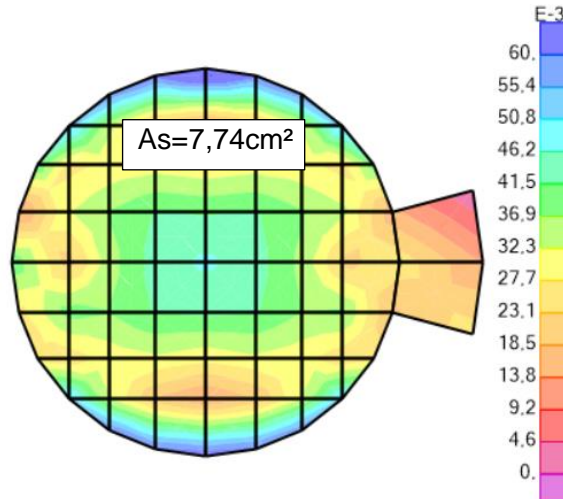
DADOS DE ENTRADA					
b	h	fck	Cobrimento	$M_{MÁX}$	d'
100cm	25cm	30 MPa	4,0 cm	4,91t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	$A_{S_{min}}$	
0,099	8,56cm <sup>2</sup>	12,5	14,3	3,79 cm <sup>2</sup>	

## Armadura de flexo-tração

As,x



As,y



DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
8,100cm²	12,5	15,2

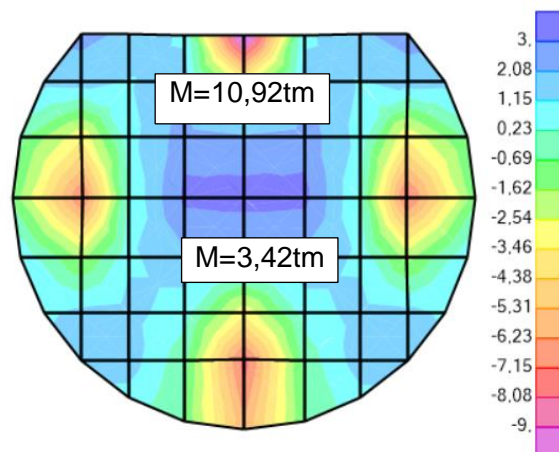
DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
7,740cm²	12,5	15,9

Adotar  $\phi 12,5c/13$  inferior e superior nos dois sentidos para a laje intermediária

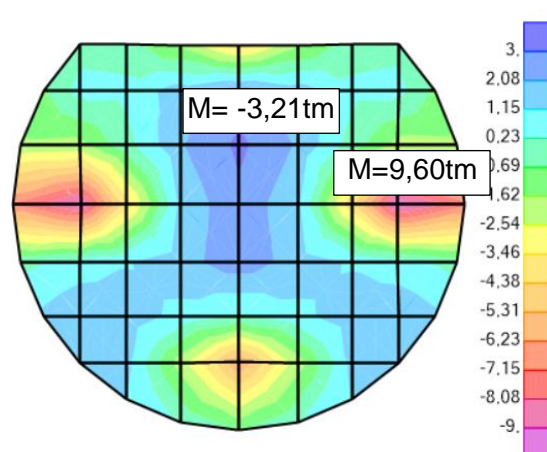
## 20.4.3 Bloco de fundação

### Armadura de flexão

Momento My



Momento Mx



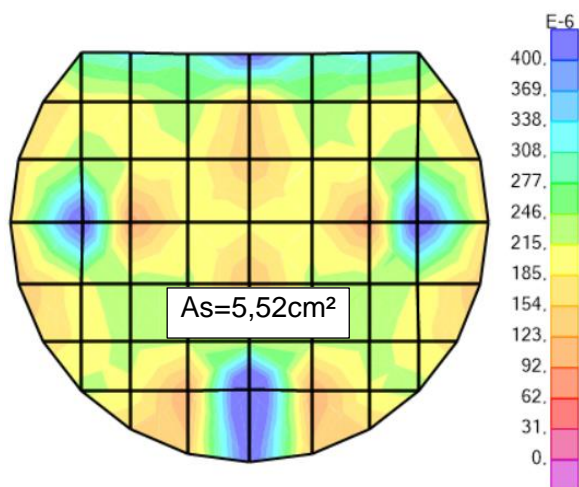
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
100cm	100cm	30 MPa	4,0 cm	10,92t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	$\phi_L$ (mm)	Espaçamento	As <sub>min</sub>	
0,009	3,74cm²	16	13,4	15,00 cm²	



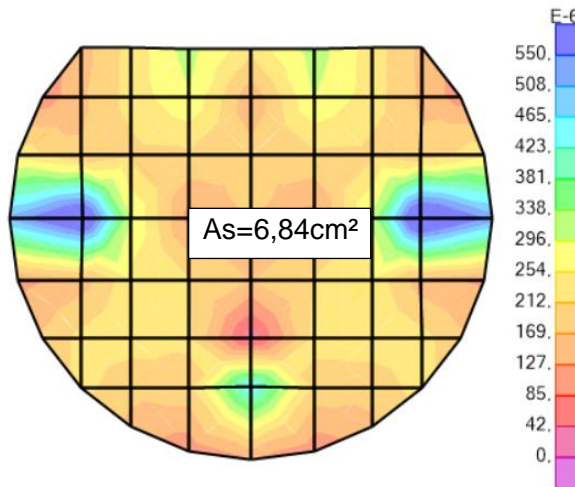
$As_{2M_{máx}}$	$\phi_L$ (mm)	Espaçamento	$\phi_{Costela}$ (mm)	Armadura de pele
7,477cm <sup>2</sup>	12,5	16,4	12,5	2x7 $\phi$ 12,5

### Armadura de flexo-tração

As,x



As,y



DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
5,520cm <sup>2</sup>	10	14,2

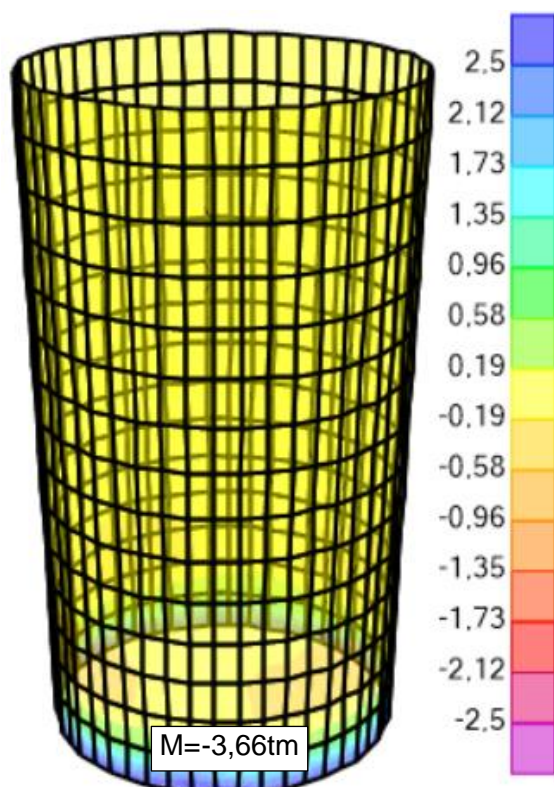
DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	$\phi_L$ (mm)	Espaçamento
6,840cm <sup>2</sup>	12,5	17,9

Adotar  $\phi$ 16c/13 inferior e superior nos dois sentidos e costela de 2x7 $\phi$ 12,5

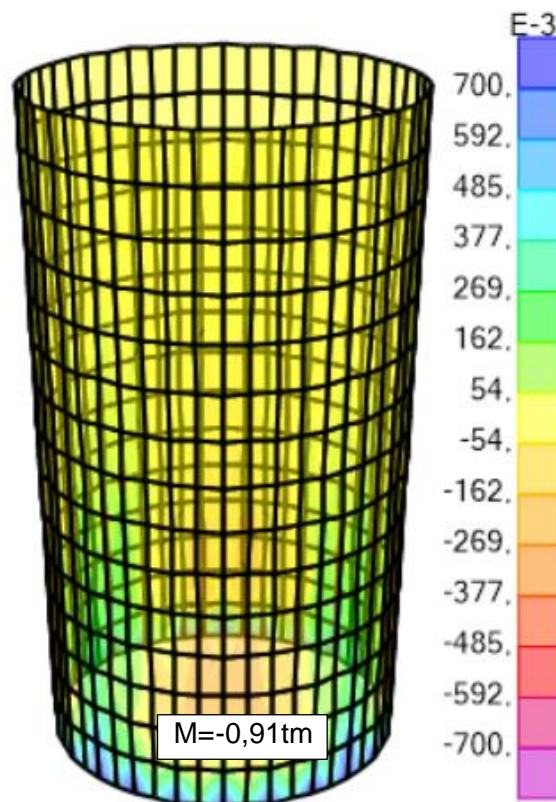


## 20.4.4 Paredes

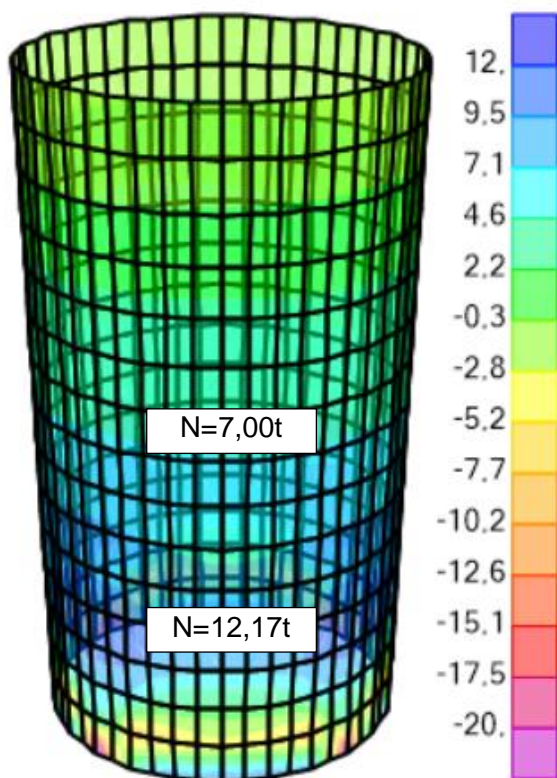
Momento Mx



Momento My

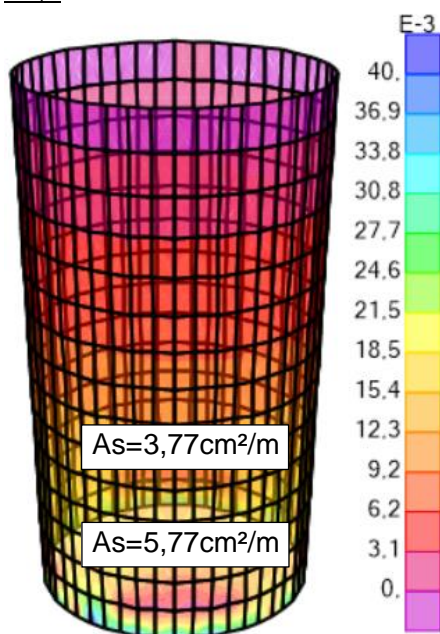


Normal Nx

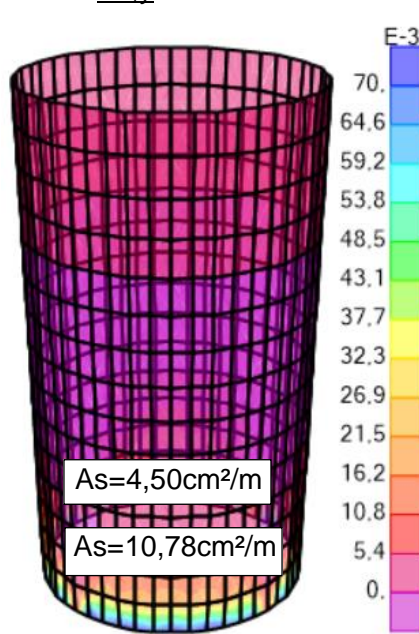


DIMENSIONAMENTO À FLEXO-TRAÇÃO (Caso 1)					
N <sub>MÁX</sub>	As > 0	φ <sub>L</sub> (mm)	Espaçamento	M <sub>MÁX</sub>	K > 0
-12,17t	6,04cm <sup>2</sup>	10	13,0	0,40t.m	0,025
DIMENSIONAMENTO À FLEXO-TRAÇÃO (Caso 1)					
N <sub>MÁX</sub>	As > 0	φ <sub>L</sub> (mm)	Espaçamento	M <sub>MÁX</sub>	K > 0
-7,00t	3,75cm <sup>2</sup>	8,0	13,4	0,40t.m	0,018
DADOS DE ENTRADA					
b	h	f <sub>ck</sub>	Cobrimento	M <sub>MÁX</sub>	d'
100cm	25cm	30 MPa	4,0 cm	3,66t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	Espaçamento	As <sub>min</sub>	
0,072	6,18cm <sup>2</sup>	10	12,7	3,75 cm <sup>2</sup>	

As,x



As,y

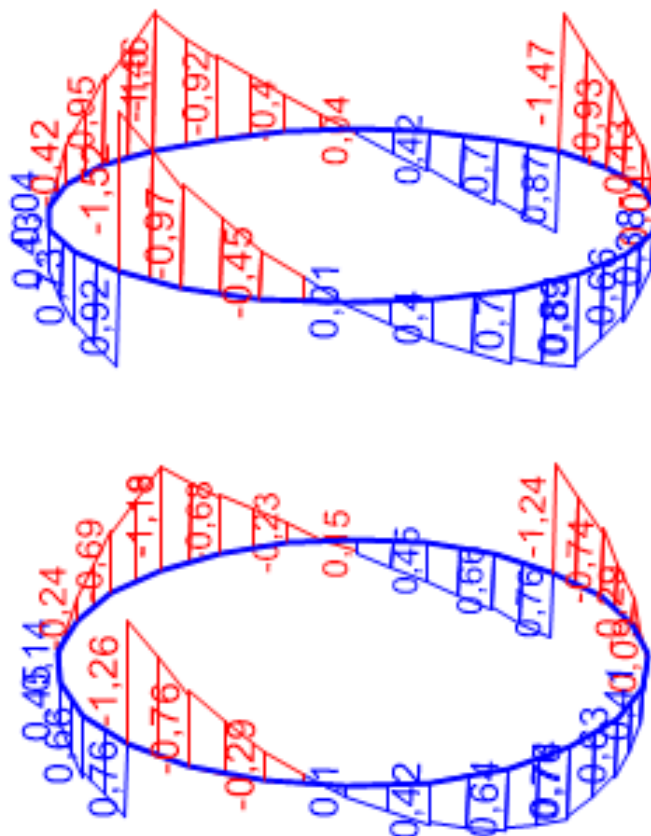


DIMENSIONAMENTO À FLEXÃO-TRAÇÃO			DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	φ <sub>L</sub> (mm)	Espaçamento	As	φ <sub>L</sub> (mm)	Espaçamento
3,770cm <sup>2</sup>	8,0	13,3	4,500cm <sup>2</sup>	8,0	11,2
DIMENSIONAMENTO À FLEXÃO-TRAÇÃO			DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
As	φ <sub>L</sub> (mm)	Espaçamento	As	φ <sub>L</sub> (mm)	Espaçamento
5,770cm <sup>2</sup>	10	13,6	10,780cm <sup>2</sup>	12,5	11,4

Adotar uma armadura de φ10c/11 vertical com φ12,5c/11 no engaste e φ8,0c/13 horizontal com φ10c/13 na faixa inferior dos 3,5m, superior e inferior

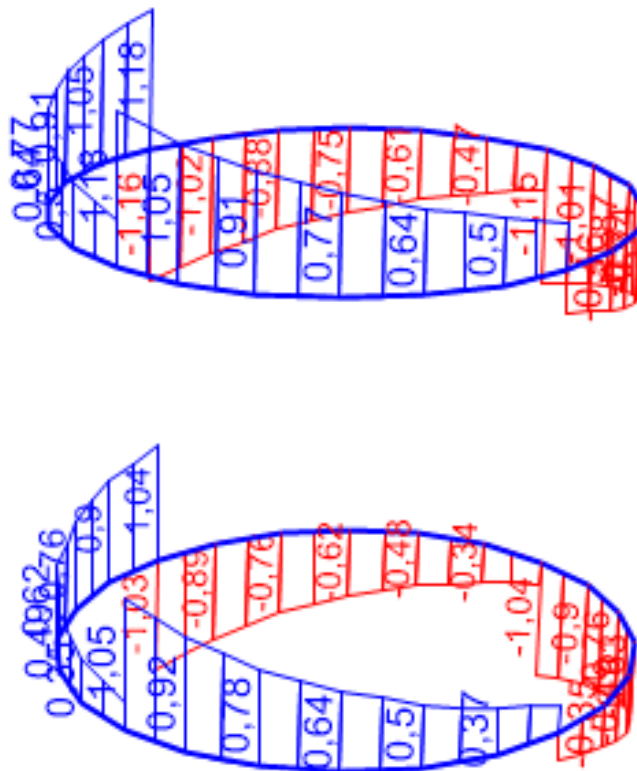
## 20.4.5 Vigas V1 e V101

- Flexão



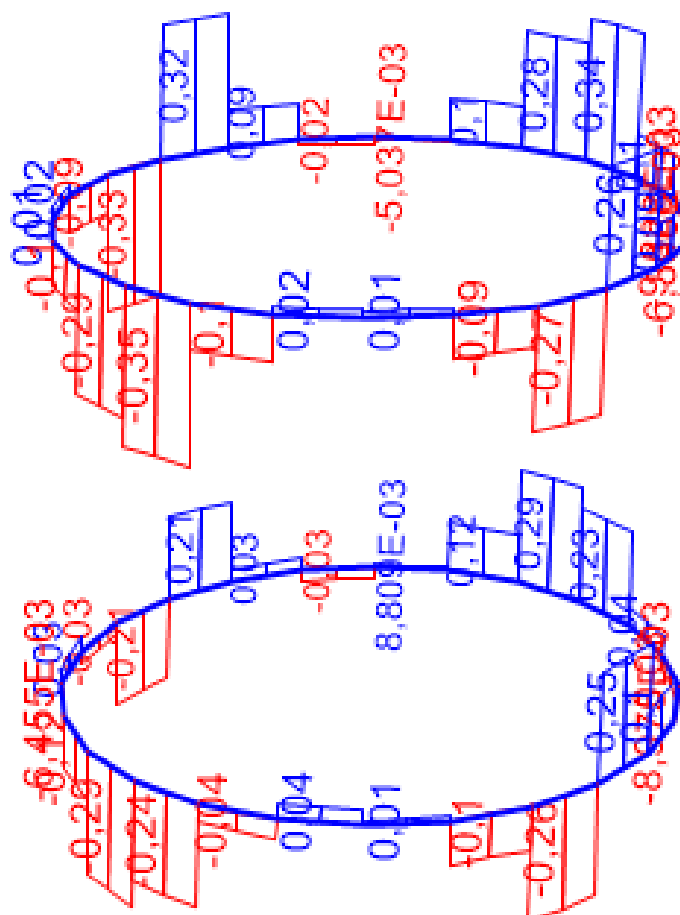
DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
25cm	40cm	30 MPa	4,0 cm	1,46t.m	5,0 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,037	1,37cm²	10	1,9	1,50 cm²	6,0φ/Camada

- Cisalhamento



CÁLCULO DA ARMADURA DE CISALHAMENTO				
$V_{Sd,máx}$	$\tau_{wd,máx}$	$\tau_{wd2}$	$\tau_{wd,máx} < \tau_{wd2}$ = Biela comprimida do concreto não romperá	
1,65t	0,019kN/cm <sup>2</sup>	0,509kN/cm <sup>2</sup>		
$\tau_{c0}$	$Asw=Asw,mín$	$\phi_t$ (mm)	Espaçamento	Adotar $\phi 6,3$ a c/21,2cm
0,087kN/cm <sup>2</sup>	2,90cm <sup>2</sup> /m	6,3	c/21,2 cm	

-Torção



CÁLCULO DA ARMADURA DE TORÇÃO					
$T_{Sk,máx}$	he	$\tau_{td}$	$\tau_{td2}$	$\tau_{td,máx} < \tau_{td2} = \text{concreto OK}$	
0,39t.m	10cm	0,061kN/cm²	0,471t.m		
$A_e$	$A_{90/s} = A_{sw,mín}$	$\phi_t$ (mm)	Espaçamento	Adotar $\phi 6,3$ a c/21cm	
450cm²	2,90cm²/m	6,3	c/21,0 cm		
$A_{sl,mín}$	$A_{sl}$	$\phi_L$ (mm)	n barras	$n_{\phi Lat}$	$n_{\phi Inf/Sup}$
1,043cm²	2,607cm²	12,5	2,1	0,7	0,4

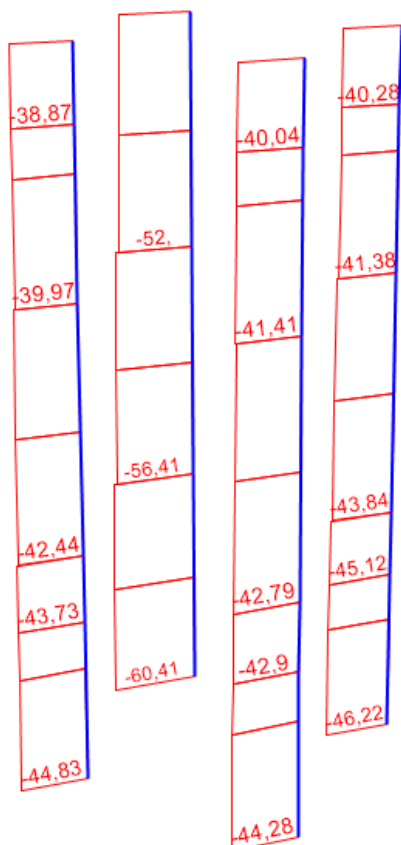
Adotar 3 $\phi 12,5$  inferior e superior para todas as vigas e estribos  $\phi 6,3$ c/17



## 20.4.6 Pilares

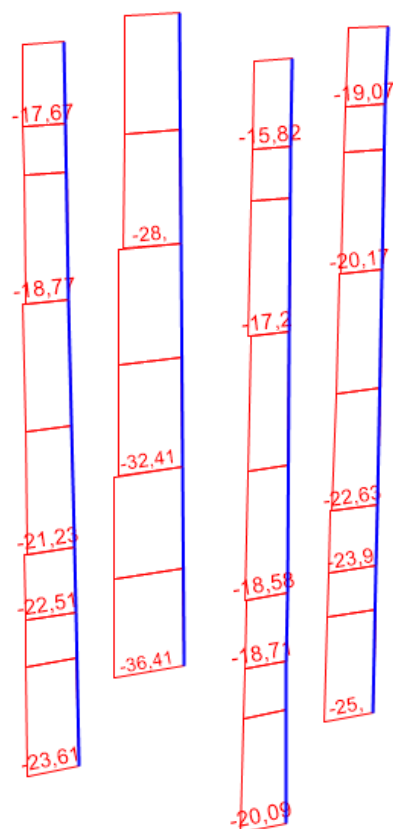
### Hipótese Cheio com Vento

Normal

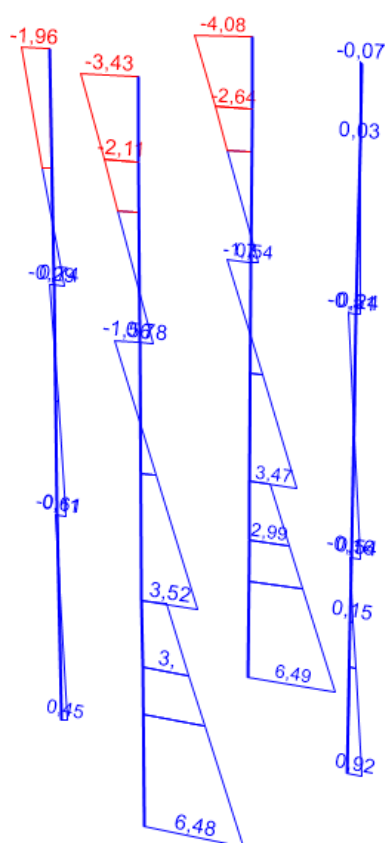


### Hipótese Vazio com Vento

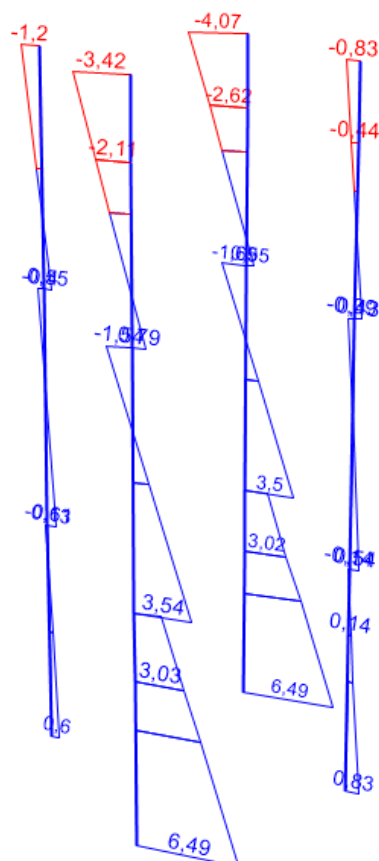
Normal



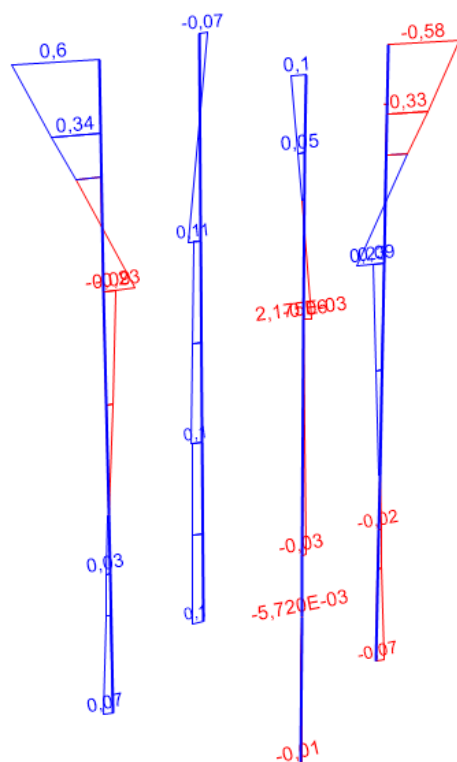
### Momento Mx



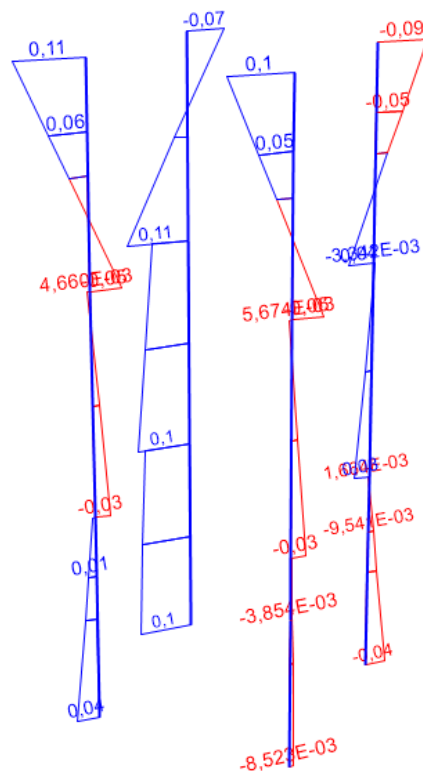
### Momento Mx



### Momento My



### Momento My





## HIPÓTESE 1 - Vazio com Vento

Cobr.(até CG da Arm.)= 4 cm Fck = 30 MPa Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coeficientes de Majoração

=====

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

=====

Base b=100 cm (X) Altura h=25 cm (Y) Área Total = 2500 cm<sup>2</sup>

Valor de Lo = 293 cm

Valor de le = 318 cm LâmbdaE(b) = 11 LâmbdaE(h) = 44

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

N = 23,61 tf MAx = 3,52 tfm MBx = 6,49 tfm MAy = 0,6 tfm MBy = -0,2 tfm

Pilar com Carga Transversal

Pilar com Carga TransversalAlfaB (b) = 1 AlfaB (h) = 1

Seção A : Lâmbda1(b) = 35 Lâmbda1(h) = 35

Seção B : Lâmbda1(b) = 35 Lâmbda1(h) = 38,7

A N A L I S E :

=====

Nd = 33,05 t

----- Seção A Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=4,5 cm

Lâmbdae = 11

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =2,54 cm

Exc. p/ dimensionamento = 4,5 cm

----- Seção A Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,25 cm

Exc. Inicial =14,91 cm

Lambdae = 44,01 > Lambda1 = 35

Efeito local de 2a ordem:

Crítério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,062 - 1/r = 0,02 1/cm

Exc. 2a ordem (Curv. Aprox.)=4,27 cm

Rig. K Aprox.= 8,6294

Exc. 2a ordem (Rig. Aprox.)= 16,85 cm

Exc. p/ dimensionamento = 16,85 cm

----- Seção B Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=4,5 cm

Lâmbdae = 11

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =-0,85 cm

Exc. p/ dimensionamento = 4,5 cm

----- Seção B Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,25 cm

Exc. Inicial =27,49 cm

Lambdae = 44,01 > Lambda1 = 38,7

Efeito local de 2a ordem:

Crítério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,062 - 1/r = 0,02 1/cm

Exc. 2a ordem (Curv. Aprox.)=4,27 cm

Rig. K Aprox.= 13,6809

Exc. 2a ordem (Rig. Aprox.)= 29,65 cm

Exc. p/ dimensionamento = 29,65 cm



\*===== Dimensionamento =====

Seção Intermediária

1a) Hip. : Nd=33,05t, eb=4,5 cm (Mb = 1,49 t.m), eh =29,65 cm (Mh = 9,8 t.m)

Seção A

2a) Hip. : Nd=33,05t, eb=4,5 cm (Mb = 1,49 t.m), eh=0 cm

3a) Hip. : Nd=33,05t, eb=0 cm, eh =16,85 cm (Mh = 5,57 t.m)

Seção B

4a) Hip. : Nd=33,05t, eb=4,5 cm (Mb = 1,49 t.m), eh =0 cm

5a) Hip. : Nd=33,05t, eb=0 cm, eh =29,65 cm (Mh = 9,8 t.m)

Ferragem - Resultado

Área de Cálculo (1a Hip.) = 15,41 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 15,39 cm<sup>2</sup>

Diâmetro : 16 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 2

Ferros ao longo de h (de cada lado): 0

Total de Ferros : 8

Área do Total de Ferros : 16,08 cm<sup>2</sup> - Percentual = 0,64 %

Estribo - Diâmetro = 5 mm espaçados a cada 19 cm

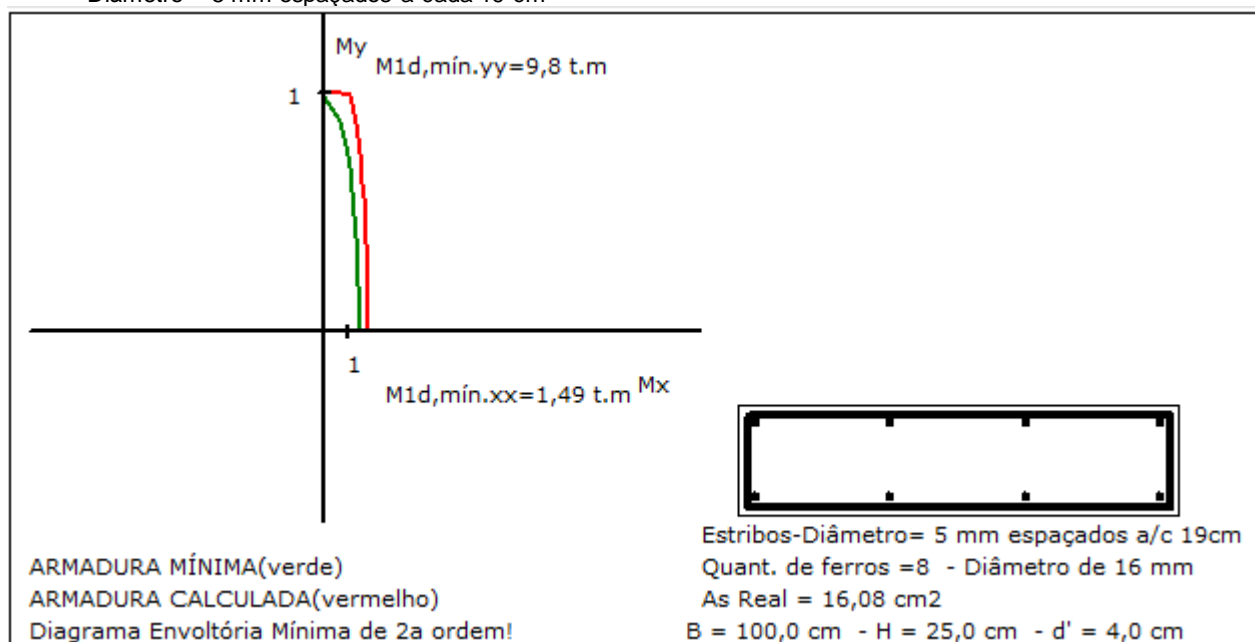
ESPAÇAMENTO LIVRE ENTRE AS BARRAS: ( $\geq 2$ cm, Dia.Long. e 1,2 dmáx. agregado) - ( $\leq 40$  cm;  $\leq 2 \times (b \text{ ou } h)$ )  
Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 29,06 cm. Ao longo de H = 15,4cm

COMPRIMENTO DE ESPERA DAS BARRAS:

Comprimento de Ancoragem Básico = 54 cm e Comprimento de Espera = 52 cm

ESTRIBOS

Diâmetro = 5 mm espaçados a cada 19 cm





## HIPÓTESE 2 - Cheio com Vento

Cobr.(até CG da Arm.)= 4 cm Fck = 30 MPa

Aço CA-50

Diâmetro do Agregado = 19 mm (Brita 1)

Coeficientes de Majoração

=====

Gama F = 1,4

Gama C = 1,4

Gama S = 1,15

Dimensões do Pilar :

=====

Base b=100 cm (X)      Altura h=25 cm (Y)      Área Total = 2500 cm<sup>2</sup>

Valor de Lo = 293 cm

Valor de le = 318 cm

LâmbdaE(b) = 11

LâmbdaE(h) = 44

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

N = 60,41 tf      M<sub>AX</sub> = 3,52 tfm      M<sub>BX</sub> = 6,49 tfm      M<sub>AY</sub> = 0,6 tfm      M<sub>BY</sub> = -0,2 tfm

Pilar com Carga Transversal

Pilar com Carga Transversal AlfaB (b) = 1      AlfaB (h) = 1

Seção A :      Lâmbda1(b) = 35      Lâmbda1(h) = 35

Seção B :      Lâmbda1(b) = 35      Lâmbda1(h) = 35

A N A L I S E :

=====

Nd = 84,57 t

----- Seção A Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=4,5 cm

Lâmbdae = 11

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =0,99 cm

Exc. p/ dimensionamento = 4,5 cm

----- Seção A Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,25 cm

Exc. Inicial =5,83 cm

Lambdae = 44,01 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,158 - 1/r = 0,02 1/cm

Exc. 2a ordem (Curv. Aprox.)=4,27 cm

Rig. K Aprox.= 12,4529

Exc. 2a ordem (Rig. Aprox.)= 7,33 cm

Exc. p/ dimensionamento = 7,33 cm

----- Seção B Direção b -----

Flexo-Compressão-Oblíqua

Excentricidade accidental 1a.Ordem (mín.):Ea=4,5 cm

Lâmbdae = 11

Lâmbda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =-0,33 cm

Exc. p/ dimensionamento = 4,5 cm

----- Seção B Direção h -----

Excentricidade accidental 1a.Ordem (mín.):Ea=2,25 cm

Exc. Inicial =10,74 cm

Lambdae = 44,01 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,158 - 1/r = 0,02 1/cm

Exc. 2a ordem (Curv. Aprox.)=4,27 cm

Rig. K Aprox.= 17,7278

Exc. 2a ordem (Rig. Aprox.)= 12,55 cm

Exc. p/ dimensionamento = 12,55 cm

\*===== Dimensionamento =====

Seção Intermediária

1a) Hip. : Nd=84,57t, eb=4,5 cm (Mb = 3,81 t.m), eh =12,55 cm (Mh = 10,61 t.m)

Seção A

2a) Hip. : Nd=84,57t, eb=4,5 cm (Mb = 3,81 t.m), eh=0 cm

3a) Hip. : Nd=84,57t, eb=0 cm, eh =7,33 cm (Mh = 6,2 t.m)

Seção B

4a) Hip. : Nd=84,57t, eb=4,5 cm (Mb = 3,81 t.m), eh =0 cm

5a) Hip. : Nd=84,57t, eb=0 cm, eh =12,55 cm (Mh = 10,61 t.m)

Ferragem - Resultado

Área de Cálculo (1a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 10 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 10 cm<sup>2</sup>

Diâmetro : 12,5 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 3

Ferros ao longo de h (de cada lado): 1

Total de Ferros : 12

Área do Total de Ferros : 14,73 cm<sup>2</sup> - Percentual = 0,59 %

Estribo - Diâmetro = 5 mm espaçados a cada 15 cm

ESPAÇAMENTO LIVRE ENTRE AS BARRAS: (>= 2cm, Dia.Long. e 1,2 dmáx. agregado) - (<= 40 cm; <= 2x(b ou h))  
Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 21,75 cm. Ao longo de H = 7,25cm

COMPRIMENTO DE ESPERA DAS BARRAS:

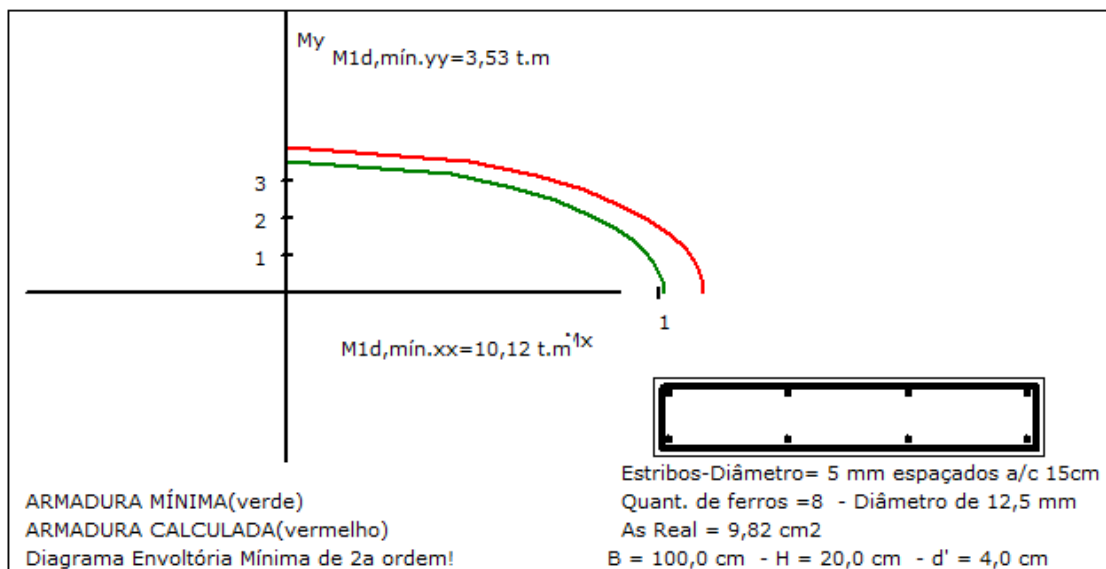
Comprimento de Ancoragem Básico = 42 cm e Comprimento de Espera = 29 cm

ESTRIBOS

Diâmetro = 5 mm espaçados a cada 15 cm

PROTEÇÃO CONTRA FLAMBAGEM :

Necessidade de ESTRIBOS COMPLEMENTARES ao longo de "B".(Veja item 18.2.4 da NBR6118:2014)

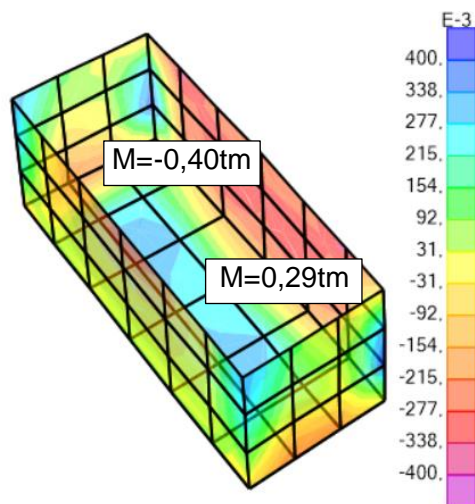


Adotar 8φ16 e φ5,0c/19

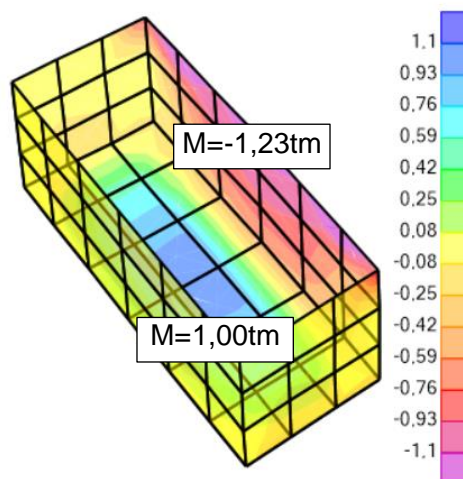
## 20.4.7 Caixa

### Armadura de flexão

#### Momento $M_y$



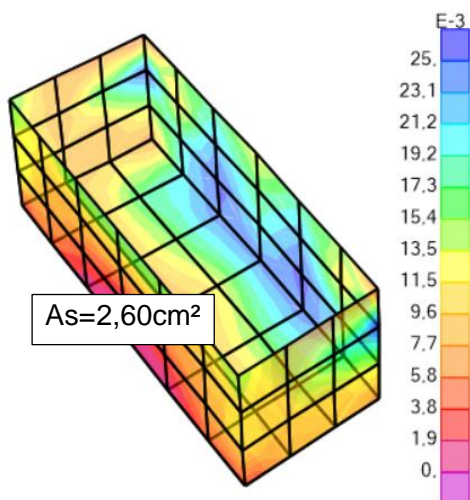
#### Momento $M_x$



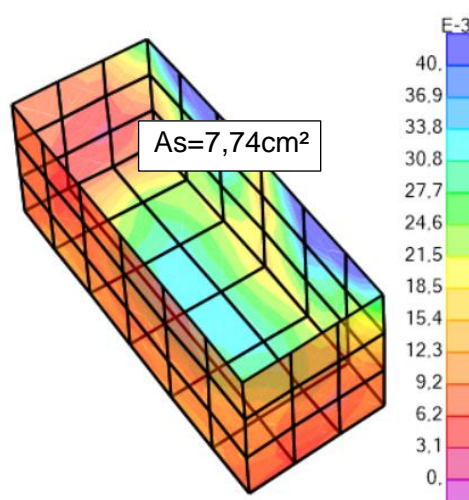
DADOS DE ENTRADA					
b	h	fck	Cobrimento	$M_{MÁX}$	d'
100cm	25cm	30 MPa	4,0 cm	1,23t.m	5,5 cm
DIMENSIONAMENTO À FLEXÃO					
K	$A_s$	$\phi_L$ (mm)	n barras	$A_{smin}$	$n_{\phi máx}/cam, A_s$
0,025	2,06cm <sup>2</sup>	12,5	3,1	3,79 cm <sup>2</sup>	28,6 $\phi$ /Camada

### Armadura de flexo-tração

#### $A_{s,x}$



#### $A_{s,y}$

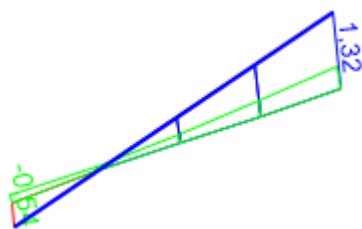


DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
$A_s$	$\phi_L$ (mm)	Espaçamento
2,600cm <sup>2</sup>	8,0	19,3

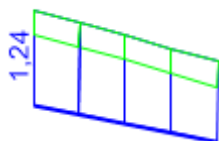
DIMENSIONAMENTO À FLEXÃO-TRAÇÃO		
$A_s$	$\phi_L$ (mm)	Espaçamento
7,740cm <sup>2</sup>	12,5	15,9

Adotar  $\phi 12,5c/13$  inferior e superior no sentido do bloco e o  $\phi 8,0c/15$  no outro sentido

## 20.4.8 Cinta C2

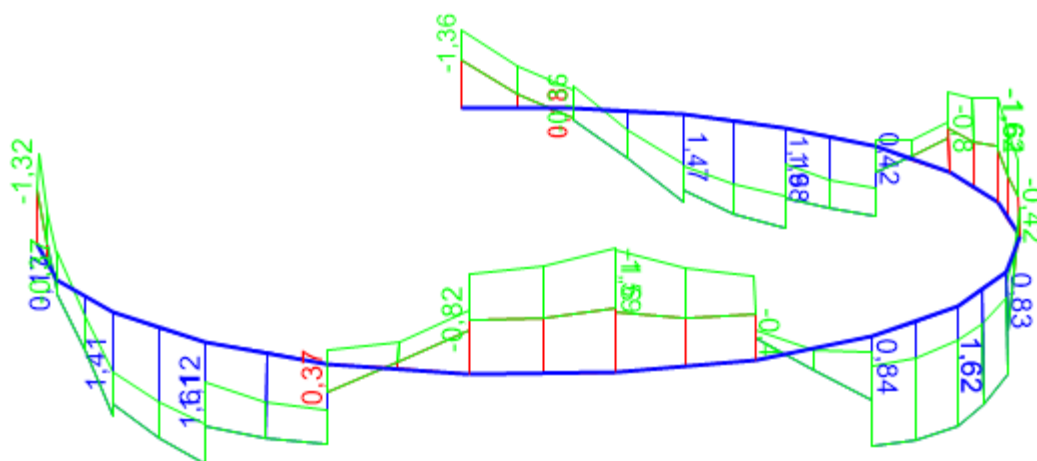


DADOS DE ENTRADA					
b	h	fck	Cobrimento	M <sub>MÁX</sub>	d'
20cm	30cm	30 MPa	4,0 cm	1,32t.m	5,2 cm
DIMENSIONAMENTO À FLEXÃO					
K	As	φ <sub>L</sub> (mm)	n barras	As <sub>min</sub>	n <sub>φmáx/cam,As</sub>
0,082	1,79cm²	12,5	1,5	0,90 cm²	4,0φ/Camada



CÁLCULO DA ARMADURA DE CISALHAMENTO					
V <sub>Sd,máx</sub>	τ <sub>wd,máx</sub>	τ <sub>wd2</sub>	τ <sub>wd,máx</sub> < τ <sub>wd2</sub> = Biela comprimida do concreto não romperá		
1,78t	0,036kN/cm²	0,509kN/cm²			
τ <sub>c0</sub>	Asw=Asw,mín	φ <sub>t</sub> (mm)	Espaçamento	Adotar φ5 a c/15cm	
0,087kN/cm²	2,32cm²/m	5,0	c/15,0 cm		

## 20.4.9 Cinta C1

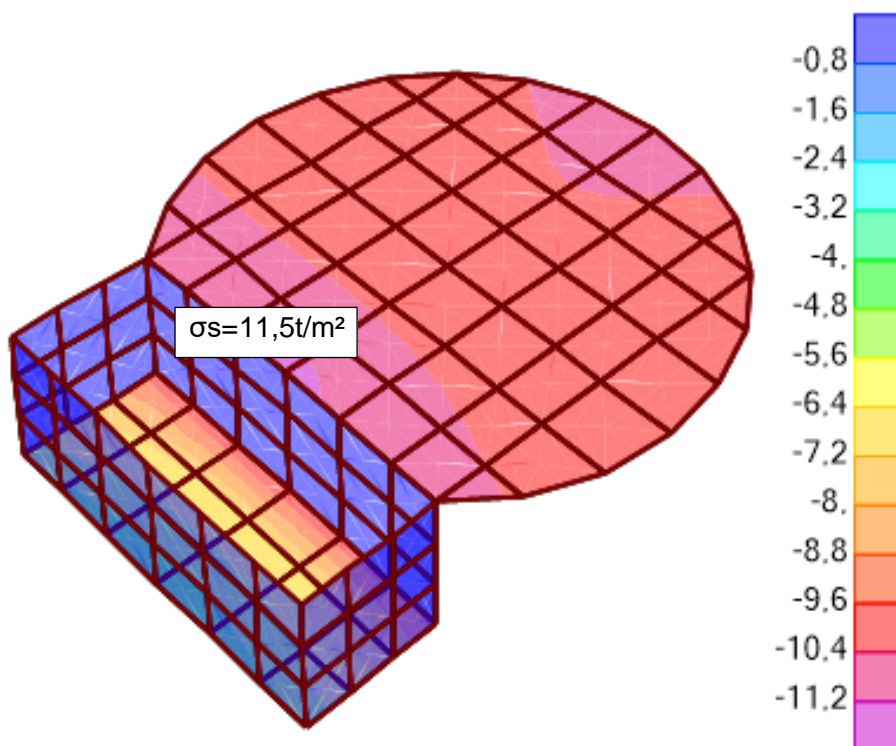


Conforme item 17.3.5.2.1 da NBR6118:2014, “Em elementos estruturais, exceto elementos em balanço, cujas armaduras sejam calculadas com um momento fletor igual ou maior ao dobro de Md, não é necessário atender à armadura mínima.”. Por isso a estrutura foi dimensionada considerando

a armadura equivalente ao dobro do momento máximo de cada seção, resultando em uma armadura de 2 $\phi$ 12,5 superior e inferior

$AS_{2M_{\max}}$	$\phi_L$ (mm)	n barras
0,837cm <sup>2</sup>	12,5	0,7

#### 20.4.10 Tensão superficial



$$\sigma_s = 11,5 \text{ t/m}^2 = 1,15 \text{ kgf/cm}^2 < \sigma_{adm} = 4,00 \text{ kgf/cm}^2 \rightarrow \text{OK!}$$

## 21. MURO DO RESERVATÓRIO DONA JOANA

### 21.1 DIMENSIONAMENTO DOS PILARES

Cobr.(até CG da Arm.)= 4 cm  $F_{ck} = 25 \text{ MPa}$  Aço CA-50 Diâmetro do Agregado = 19 mm (Brita 1)

Coefficientes de Majoração

Gama F = 1,4 Gama C = 1,4 Gama S = 1,15

Dimensões do Pilar :

Base  $b=20 \text{ cm}$  (X) Altura  $h=20 \text{ cm}$  (Y) Área Total = 400 cm<sup>2</sup>  
Pilar em Balanço SOMENTE na direção de b (eixo X)  
Valor de  $L_o = 250$  - Valor de  $l_e = 500 \text{ cm}$





LambdaE(b)(eixo X)= 86,5  
Pilar Contraventado na direção h (eixo Y):  
Alturas : Viga Superior =100 cm Viga Inferior =100 cm  
Valor de Lo = 150 - Valor de le = 170 cm  
LambdaE(h)(eixo Y)= 29,4

Esforços: MA (Mom.em "A") \*\*\* MB (Mom.em "B") \*\*\* MC (Mom. na seção média-só p/ pilar em Balanço)

=====

N = ,1 tf MCx = 0 tfm MBx = 0,20 tfm MAy = 0 tfm MBy = 0,2 tfm

Pilar com Carga Transversal

Pilar com Carga TransversalAlfaB (b) = 1 AlfaB (h) = 1

Seção A : Lambda1(b) = 35 Lambda1(h) = 35

Seção B : Lambda1(b) = 90 Lambda1(h) = 90

A N A L I S E :

=====

Nd = 0,14 t

Pilar em Balanço Contraventado na direção h (eixo Y)

----- Seção A Direção b -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

(Valor considerado ZERADO. Se isso não acontecer, será compensado pelo momento em "C".)

Exc. Inicial =0 cm

----- Seção A Direção h -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =0 cm

----- Seção C Direção h -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Lambdae = 29,41

Lambda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =0 cm

Exc. p/ dimensionamento = 2,1 cm

----- Seção C Direção b -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Exc. Inicial =0 cm

Lambdae = 86,5 > Lambda1 = 35

Efeito local de 2a ordem:

Critério de Cálculo escolhido:

MAIOR Valor entre as Excentricidades Calculadas pelos Métodos da Rigidez Aprox. e Curvatura Aprox.

Ni = 0,002 - 1/r = 0,025 1/cm

Exc. 2a ordem (Curv. Aprox.)=8,35 cm

Rig. K Aprox.= 0,1737

Exc. 2a ordem (Rig. Aprox.)= 7,08 cm

Exc. p/ dimensionamento = 8,35 cm

----- Seção B Direção b -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Lambdae = 86,5

Lambda1 = 35

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =200 cm

Exc. p/ dimensionamento = 200 cm

----- Seção B Direção h -----

Excentricidade acidental 1a.Ordem (mín.):Ea=2,1 cm

Lambdae = 29,41

Lambda1 = 90

Lambda1>Lambdae:Desconsideração do efeito local de 2a. ordem!

Exc. Inicial =200 cm

Exc. p/ dimensionamento = 200 cm

\*===== Dimensionamento =====



Flexo Compressão Obliqua na seção "A" (início do Pilar)

1a) Hip. : Nd=0,14t, eb=2,1 cm (Mb = 0 t.m), eh =2,1 cm (Mh = 0 t.m)

Flexo Compressão Obliqua na seção "C" (meio do Pilar)

2a) Hip. : Nd=0,14t, eb=200 cm (Mb = 0,28 t.m), eh =200 cm (Mh = 0,28 t.m)

Flexo Compressões Normais na seção "B" (Pé do Pilar)

3a) Hip. : Nd=0,14t, eb=200 cm (Mb = 0,28 t.m), eh =0 cm

4a) Hip. : Nd=0,14t, eb=0 cm, eh =200 cm (Mh = 0,28 t.m)

Flexo Compressão Obliqua na seção "B" (Pé do Pilar)

5a) Hip. : Nd=0,14t, eb=200 cm (Mb = 0,28 t.m), eh =200 cm (Mh = 0,28 t.m)

Ferragem - Resultado

Área de Cálculo (1a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (2a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (3a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (4a Hip.) = 1,6 cm<sup>2</sup>

Área de Cálculo (5a Hip.) = 1,6 cm<sup>2</sup>

Diâmetro : 10 mm

Ferragem distribuída : 4 ferros nos cantos

Ferros ao longo de b (de cada lado): 0

Ferros ao longo de h (de cada lado): 0

Total de Ferros : 4

Área do Total de Ferros : 3,14 cm<sup>2</sup> - Percentual = 0,79 %

Estribo - Diâmetro = 5 mm espaçados a cada 12 cm

h))

ESPAÇAMENTO LIVRE ENTRE AS BARRAS: ( $\geq 2$ cm, Dia.Long. e 1,2 dmáx. agregado) - ( $\leq 40$  cm;  $\leq 2 \times (b$  ou

cm

Espaçamentos Mín. = 2,27 cm e Máx. = 40 cm. Espaçamentos Reais: ao longo de B = 11 cm. Ao longo de H = 11

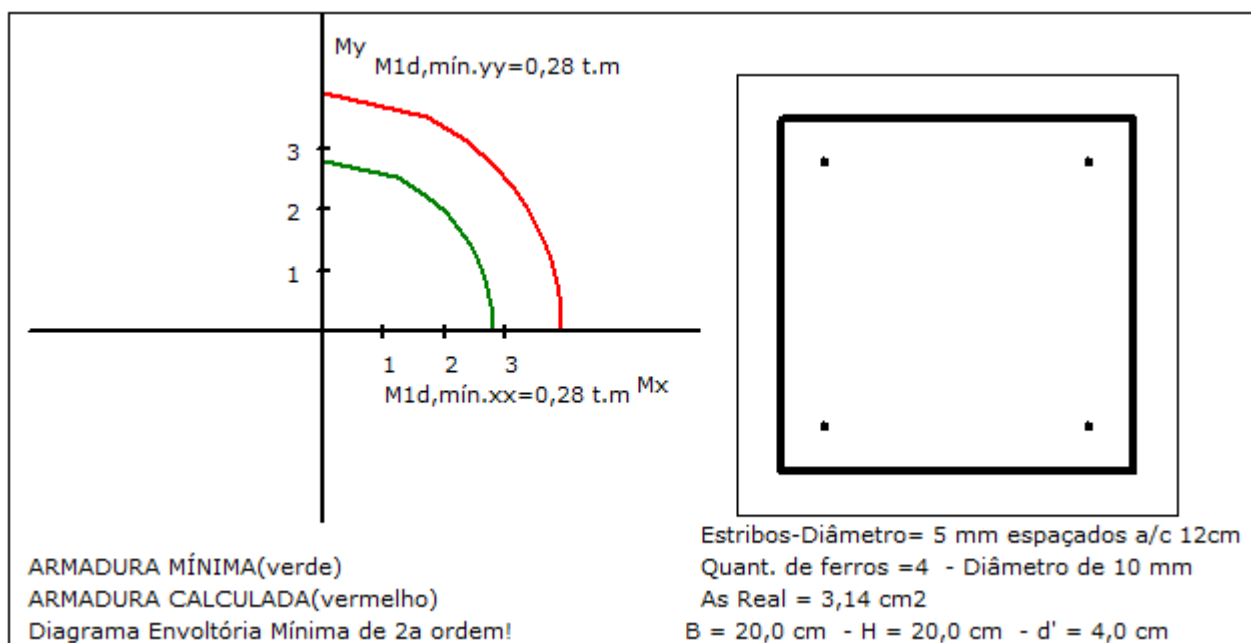
COMPRIMENTO DE ESPERA DAS BARRAS:

Comprimento de Ancoragem Básico = 38 cm e Comprimento de Espera = 23 cm

ESTRIBOS

Diâmetro = 5 mm espaçados a cada 12 cm





Adotar 4 $\phi$ 10 e estribos  $\phi$ 5,0c/12