MEMÓRIA DE CÁLCULO
GUARITA
CEPI PARANOÁ PARQUE

Autor do Projeto: Eng. Civil Dalmo Blanco Cinnanti

CREA: 7962/D-DF

R00	30/10/2022	VERSÃO INICIAL	DALMO B.CINNANTI
REVISÃO	DATA	DESCRIÇÃO	RESPONSÁVEL
Nome do projeto		MEMÓRIA DE CÁLCULO – GUARITA– CEPI PARANOÁ PARQUE	
Número do projeto		**314-SEEDF-CEPI PARANOÁ PARQUE-MEM-EST-GUARITA-R00**	
Local		***QUADRA 01 CONJUNTO 01 AE 02 – PARANOÁ PARQUE / PARANOÁ-DF***	

SUMÁRIO

Resumo de resultados

Cargas verticais:

Peso próprio = 26.22 tf

Adicional = 1.63 tf

Acidental = 4.88 tf

Total = 32.73 tf

Área aproximada = 32.54 m²

Relação = 1005.61 kgf/m²

Deslocamento horizontal:

X+ = 0.02 cm (limite 0.19)

X- = 0.02 cm (limite 0.19)

Y+ = 0.01 cm (limite 0.19)

Y- = 0.01 cm (limite 0.19)

Aceleração horizontal:

X+ = 0.747 m/s² (limite 0.147)

X- = 0.747 m/s² (limite 0.147)

Y+ = 0.121 m/s² (limite 0.147)

Y- = 0.121 m/s² (limite 0.147)

AVISO: Acelerações excessivas

Verificação de estabilidade (Gama-Z):

X+ = 1.02 (limite 1.10)

X- = 1.01 (limite 1.10)

Y+ = 1.02 (limite 1.10)

Y- = 1.02 (limite 1.10)

Análise de 2ª ordem:

Processo P-Delta

Deslocamentos no topo da edificação:

Vento X+: 0.10 »» 0.10 (+1.54%)

Vento X-: 0.10 »» 0.10 (+1.54%)

Vento Y+: 0.05 »» 0.05 (+1.66%)

Vento Y-: 0.05 »» 0.05 (+1.66%)

Desaprumo X+: 0.02 »» 0.02 (+1.52%)

Desaprumo X-: 0.02 »» 0.02 (+1.52%)

Desaprumo Y+: 0.02 »» 0.02 (+1.66%)

Desaprumo Y-: 0.02 »» 0.02 (+1.66%)

Análise dinâmica:

Frequência natural: 3.54 Hz

Verificação da Estabilidade Global da Estrutura

Maior coeficiente Gama-Z

Combinação: 1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4							
Pavimento	**Altura relativa (cm)**	**Carga vertical (tf)**	**Carga horizontal (tf)**	**Deslocamento horizontal (cm)**	**Momento 2a. ordem (kgf.m)**	**Momento tombamento (kgf.m)**	**Gama-Z**
TÉRREO	315.00	40.35	0.40	0.07	29.34	1249.21	1.02 (lim=1.10)
FUND-NV 000	40.00	2.85	0.09	0.00	0.03	36.28	
TOTAL					**29.38**	**1285.49**	

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.

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	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.4D1	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.4D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.4D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.4D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.84D1	71.41	4173.48	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.84D2	37.14	4173.48	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.84D3	28.52	2142.49	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.84D4	35.87	2142.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.4D1	49.72	2504.09	1.02

1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.4D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.4D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.4D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.84D1	71.41	4173.48	1.02
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.84D2	37.14	4173.48	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.84D3	28.52	2142.49	1.01
1.3G1+1.4G2+1.4S+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	35.87	2142.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.4D1	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.4D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.4D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.4D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.84D1	71.41	4173.48	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.84D2	37.14	4173.48	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.84D3	28.52	2142.49	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.84D4	35.87	2142.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.4D1	49.72	2504.09	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.4D2	15.50	2504.09	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.4D3	20.63	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.4D4	26.64	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.84D1	71.41	4173.48	1.02
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.84D2	37.14	4173.48	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.84D3	28.52	2142.49	1.01
1.3G1+1.4G2+1.4S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	35.87	2142.49	1.02
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	53.79	2504.09	1.02
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	14.98	2504.09	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	22.48	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	**29.38**	**1285.49**	**1.02**
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	53.79	2504.09	1.02
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	14.98	2504.09	1.01
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	22.48	1285.49	1.02
1.3G1+1.4G2+1.4S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	29.38	1285.49	1.02
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	53.79	2504.09	1.02
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	14.98	2504.09	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	22.48	1285.49	1.02
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	29.38	1285.49	1.02
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	53.79	2504.09	1.02
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	14.98	2504.09	1.01
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	22.48	1285.49	1.02
1.3G1+1.4G2+1.4S+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	29.38	1285.49	1.02
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	36.87	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V1+1.4D1	36.87	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	14.93	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V2+1.4D2	14.93	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	14.78	1285.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V3+1.4D3	14.78	1285.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	19.18	1285.49	1.02
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+0.84V4+1.4D4	19.18	1285.49	1.02

G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V1+0.84D1	54.11	4173.48	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V2+0.84D2	32.15	4173.48	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V3+0.84D3	21.75	2142.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T1+1.4V4+0.84D4	26.88	2142.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	36.87	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V1+1.4D1	36.87	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	14.93	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V2+1.4D2	14.93	2504.09	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	14.78	1285.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V3+1.4D3	14.78	1285.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	19.18	1285.49	1.02
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+0.84V4+1.4D4	19.18	1285.49	1.02
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V1+0.84D1	54.11	4173.48	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V2+0.84D2	32.15	4173.48	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V3+0.84D3	21.75	2142.49	1.01
G1+G2+S+1.2R+0.98Q+1.2A+1.1AS+0.72T2+1.4V4+0.84D4	26.88	2142.49	1.01
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V1+0.84D1	40.49	2504.09	1.02
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V2+0.84D2	14.84	2504.09	1.01
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V3+0.84D3	16.24	1285.49	1.01
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T1+0.84V4+0.84D4	21.48	1285.49	1.02
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V1+0.84D1	40.49	2504.09	1.02
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V2+0.84D2	14.84	2504.09	1.01
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V3+0.84D3	16.24	1285.49	1.01
G1+G2+S+1.2R+1.4Q+1.2A+1.1AS+0.72T2+0.84V4+0.84D4	21.48	1285.49	1.02

Pavimento FUND-NV 000

Resultado dos Blocos

FUND-NV 000	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 1		cobr = 4.50 cm	

Blocos	ne Estaca	LB LH (cm)	hb (cm)	Principal (cm²)		Estribo (cm²)		Superior (cm²)		As dist. (cm²)
				X	Y	Hor.	Vert.	X	Y	
B1	1 E30-10m	60.00 60.00		-	-	3.93 (5 ø 10.0)	1.25 2x(2 ø 6.3)	-	-	-
B2	1 E30-10m	60.00 60.00		-	-	3.93 (5 ø 10.0)	1.25 2x(2 ø 6.3)	-	-	-
B3	1 E30-10m	60.00 60.00		-	-	3.93 (5 ø 10.0)	1.25 2x(2 ø 6.3)	-	-	-
B4	1 E30-10m	60.00 60.00		-	-	3.93 (5 ø 10.0)	1.25 2x(2 ø 6.3)	-	-	-
B5	2 E30-10m	150.00 60.00	45.00	4.91 (4 ø 12.5)	-	3.93 (5 ø 10.0)	7.04 2x(7 ø 8.0)	3.14 (4 ø 10.0)	-	1.57 (ø 10.0 c/10)
B6	1 E30-10m	60.00 60.00		-	-	3.93 (5 ø 10.0)	1.25 2x(2 ø 6.3)	-	-	-

Cálculo dos Pilares

FUND-NV 000	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
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 (cm²)
P1	15.00 X 40.00	RR 11.99 RR 4.50	7.64 4.66	239 135	1359 770	5.69	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P2	15.00 X 40.00	RR 11.99 RR 4.50	5.97 3.74	89 934	385 4039	4.33	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P3	15.00 X 40.00	RR 11.99 RR 4.50	12.17 7.08	228 861	994 3754	4.36	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P4	15.00 X 40.00	RR 11.99 RR 4.50	10.98 6.43	205 548	1099 2936	5.35	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P5	25.00 X 50.00	RR 45.67 RR 22.84	13.09 8.27	281 2391	959 8171	3.42	1.57 (2 ø 10.0) 3.14 (4 ø 10.0)
P6	25.00 X 25.00	RR 6.57 RR 6.57	0.57 0.31	177 11	1435 91	8.12	1.57 (2 ø 10.0) 1.57 (2 ø 10.0)

Vigas do pavimento FUND-NV 000

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
VB1	238.90	2 ø 10.0		-394.39 -1.47 -525.56	2 ø 10.0 2 ø 10.0 2 ø 10.0		Aviso 26
VB2	155.94	2 ø 10.0		-442.01	2 ø 10.0		Aviso 26
VB3	146.54	2 ø 10.0		-117.68 -120.20	2 ø 10.0 2 ø 10.0		Aviso 26
VB4	245.22	2 ø 10.0		-329.54 -227.33	2 ø 10.0 2 ø 10.0		Aviso 26
VB5	167.14 164.83	2 ø 10.0 2 ø 10.0		-178.04 -47.70 -5.44	2 ø 10.0 2 ø 10.0 2 ø 10.0		Avisos 26, 02
VB6	243.26	2 ø 10.0		-70.65 -208.67	2 ø 10.0 2 ø 10.0		Aviso 26

Pavimento TÉRREO

Cálculo dos Pilares

TÉRREO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
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 (cm²)
P1	15.00 X 40.00	RR 63.43 RR 23.79	6.81 3.84	389 452	1212 1411	3.12	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P2	15.00 X 40.00	RR 63.43 RR 23.79	4.90 2.74	78 1323	235 3986	3.01	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P3	15.00 X 40.00	RR 63.43 RR 23.79	11.50 6.41	595 51	1596 137	2.68	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P4	15.00 X 40.00	RR 63.43 RR 23.79	10.27 5.71	382 364	1377 1312	3.60	1.57 (2 ø 10.0) 2.36 (3 ø 10.0)
P5	25.00 X 50.00	RR 45.67 RR 22.84	12.87 7.41	85 2339	303 8353	3.57	1.57 (2 ø 10.0) 3.14 (4 ø 10.0)

Vigas do pavimento TÉRREO

Viga	Vãos			Nós			Avisos
	Md (kgf.m)	As	Als	Md (kgf.m)	As	Als	
V101	0.11 209.30 0.11	2 ø 10.0 2 ø 10.0 2 ø 10.0		-42.32 -196.21 -244.46 -114.93	2 ø 10.0 2 ø 10.0 2 ø 10.0 2 ø 10.0		Aviso 02
V102	43.28 118.31	6 ø 10.0 8 ø 10.0		-295.10 -278.39	8 ø 10.0 8 ø 10.0		Aviso 08
V103	20.10 119.13	6 ø 10.0 6 ø 10.0		-8.46 -414.13 -225.77	6 ø 10.0 6 ø 10.0 6 ø 10.0		Aviso 08
V104	50.49 0.11 37.30	2 ø 10.0 2 ø 10.0 2 ø 10.0	2 ø 12.5	-1112.60 -1810.61	2 ø 10.0 2 ø 10.0		Avisos 02, 08
V105	21.15 0.11 7.85	6 ø 10.0 8 ø 10.0 6 ø 10.0		-51.37 -73.55 -667.43 -125.26 -27.30	6 ø 10.0 6 ø 10.0 8 ø 10.0 8 ø 10.0 6 ø 10.0		Aviso 38
V106	1222.65 0.11 0.11	2 ø 10.0 2 ø 10.0 2 ø 10.0		-641.77 -519.08 -55.60	2 ø 10.0 2 ø 10.0 2 ø 10.0		Aviso 08
V107	85.19 112.97 68.56	8 ø 10.0 8 ø 10.0 8 ø 10.0		-33.19 -415.43 -344.26	8 ø 10.0 8 ø 10.0 8 ø 10.0		Aviso 38
V108	139.25 70.31 37.79 99.74	8 ø 10.0 6 ø 10.0 6 ø 10.0 8 ø 10.0	6 ø 10.0	-43.35 -539.38 -124.28 -182.77	8 ø 10.0 8 ø 10.0 6 ø 10.0 8 ø 10.0	6 ø 10.0 8 ø 10.0	Avisos 02, 06, 08
V109	2190.45 0.11	2 ø 10.0 2 ø 10.0		-1035.62 -96.87	2 ø 10.0 2 ø 10.0		Aviso 08

Cálculos das Lajes

TÉRREO	fck = 300.00 kgf/cm²	E = 268384 kgf/cm²	Peso Espec = 2500.00 kgf/m³
Lance 2		cobr = 2.50 cm	

ARMADURAS POSITIVAS (LAJE)												
		Momento positivo				Momento negativo						
Laje	**Direção**	**Seção**	**Flexão**	**Verificação axial (compressão)**	**Verificação axial (tração)**	**Seção**	**Flexão**	**Verificação axial (compressão)**	**Verificação axial (tração)**	**Armadura inferior**	**Armadura superior**	**Cisalhamento**
L101	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 2035 kgf.m/m As = 4.06 cm²/m A's = 0.00 cm²/m			As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 505.28 kgf.m/m F = 0.00 tf fiss = 0.09 mm		vsd = 32.56 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = 22.41 tf/m asw = 85.22 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 1192 kgf.m/m As = 2.45 cm²/m A's = 0.00 cm²/m			As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 448.92 kgf.m/m F = 0.00 tf fiss = 0.08 mm		vsd = 26.24 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = 16.64 tf/m asw = 66.88 cm²/m
L102	X	bw = 100.0 cm h = 15.0 cm	Md = 972 kgf.m/m As = 1.88 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 1209 kgf.m/m As = 2.35 cm²/m			As = 1.88 cm²/m ø8.0 c/20 (2.51 cm²/m) M = 617.72		vsd = 36.87 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 59.06 tf/m

			A's = 0.00 cm²/m				A's = 0.00 cm²/m			kgf.m/m F = 0.00 tf fiss = 0.06 mm		vsw = 26.79 tf/m asw = 102.66 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 945 kgf.m/m As = 1.96 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 1715 kgf.m/m As = 3.67 cm²/m A's = 0.00 cm²/m			As = 1.96 cm²/m ø8.0 c/20 (2.51 cm²/m) M = 685.29 kgf.m/m F = 0.00 tf fiss = 0.09 mm		vsd = 42.01 tf/m vrd1 = 7.84 tf/m vrd2 = 54.99 tf/m vsw = 32.62 tf/m asw = 134.26 cm²/m
L103	X	bw = 100.0 cm h = 15.0 cm	Md = 1267 kgf.m/m As = 2.47 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 2307 kgf.m/m As = 4.69 cm²/m A's = 0.00 cm²/m			As = 2.47 cm²/m ø8.0 c/20 (2.51 cm²/m) M = 754.62 kgf.m/m F = 0.00 tf fiss = 0.10 mm		vsd = 45.78 tf/m vrd1 = 8.31 tf/m Modelo I vrd2 = 59.06 tf/m vsw = erro asw = erro
	Y	bw = 100.0 cm h = 15.0 cm	Md = 1208 kgf.m/m As = 2.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 931 kgf.m/m As = 1.93 cm²/m A's = 0.00 cm²/m			As = 2.53 cm²/m ø8.0 c/19 (2.65 cm²/m) M = 864.52 kgf.m/m F = 0.00 tf fiss = 0.13 mm		vsd = 60.66 tf/m vrd1 = 7.87 tf/m vrd2 = 54.99 tf/m vsw = erro asw = erro
L104	X	bw = 100.0 cm	Md = 757 kgf.m/m			bw = 100.0 cm	Md = 3000 kgf.m/m			As = 1.51 cm²/m ø6.3 c/20		vsd = 27.07 tf/m vrd1 = 8.16 tf/m Modelo I

		h = 15.0 cm	As = 1.45 cm²/m A's = 0.00 cm²/m			h = 15.0 cm	As = 6.20 cm²/m A's = 0.00 cm²/m			(1.56 cm²/m) M = 321.37 kgf.m/m F = 0.00 tf fiss = 0.03 mm		vrd2 = 59.49 tf/m vsw = 16.92 tf/m asw = 64.36 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 1178 kgf.m/m As = 2.42 cm²/m A's = 0.00 cm²/m			As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 353.02 kgf.m/m F = 0.00 tf fiss = 0.05 mm		vsd = 22.89 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = 13.28 tf/m asw = 53.39 cm²/m
L105	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 2214 kgf.m/m As = 4.49 cm²/m A's = 0.00 cm²/m			As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 358.22 kgf.m/m F = 0.00 tf fiss = 0.04 mm	A's = 1.85 cm²/m ø8.0 c/20 (2.51 cm²/m) M = 1526.75 kgf.m/m F = 0.00 tf fiss = 0.11 mm	vsd = 20.62 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = 10.47 tf/m asw = 39.83 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 2133 kgf.m/m As = 4.59 cm²/m A's = 0.00 cm²/m			As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 135.42 kgf.m/m F = 0.00 tf fiss = 0.01 mm		vsd = 27.10 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = 17.49 tf/m asw = 70.32 cm²/m

L106	X	bw = 100.0 cm h = 15.0 cm	Md = 1359 kgf.m/m As = 2.68 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 5112 kgf.m/m As = 11.15 cm²/m A's = 0.00 cm²/m			As = 2.68 cm²/m ø10.0 c/20 (3.93 cm²/m) M = 754.99 kgf.m/m F = 0.00 tf fiss = 0.05 mm		vsd = 60.05 tf/m vrd1 = 8.56 tf/m Modelo I vrd2 = 58.55 tf/m vsw = erro asw = erro
	Y	bw = 100.0 cm h = 15.0 cm	Md = 1159 kgf.m/m As = 2.47 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 2737 kgf.m/m As = 6.21 cm²/m A's = 0.00 cm²/m			As = 2.47 cm²/m ø8.0 c/20 (2.51 cm²/m) M = 830.16 kgf.m/m F = 0.00 tf fiss = 0.14 mm	A's = 3.55 cm²/m ø10.0 c/20 (3.93 cm²/m) M = 1805.95 kgf.m/m F = 0.00 tf fiss = 0.17 mm	vsd = 50.13 tf/m vrd1 = 7.72 tf/m vrd2 = 53.97 tf/m vsw = erro asw = erro
L107	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 3200 kgf.m/m As = 6.64 cm²/m A's = 0.00 cm²/m			As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 226.97 kgf.m/m F = 0.00 tf fiss = 0.02 mm		vsd = 41.52 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = 31.36 tf/m asw = 119.29 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.53 cm²/m A's = 0.00			bw = 100.0 cm h = 15.0 cm	Md = 1921 kgf.m/m As = 4.06 cm²/m A's = 0.00			As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 334.28 kgf.m/m	A's = 1.47 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 1293.67 kgf.m/m	vsd = 23.52 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = 13.92 tf/m

			cm²/m				cm²/m			F = 0.00 tf fiss = 0.04 mm	F = 0.00 tf fiss = 0.15 mm	asw = 55.96 cm²/m
L108	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 3037 kgf.m/m As = 6.28 cm²/m A's = 0.00 cm²/m			As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 185.21 kgf.m/m F = 0.00 tf fiss = 0.01 mm		vsd = 40.75 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = erro asw = erro
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 5579 kgf.m/m As = 13.28 cm²/m A's = 0.00 cm²/m			As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 463.80 kgf.m/m F = 0.00 tf fiss = 0.08 mm	A's = 1.50 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 3885.49 kgf.m/m F = 0.00 tf fiss = 0.18 mm	vsd = 68.21 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = erro asw = erro
L109	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 160.22 kgf.m/m F = 0.00 tf fiss = 0.01 mm		vsd = 12.53 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = 2.38 tf/m asw = 9.05 cm²/m
	Y	bw = 100.0 cm h = 15.	Md = 757 kgf.m/m As = 1.53			bw = 100.0 cm h = 15.				As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m)		vsd = 12.73 tf/m vrd1 = 7.79 tf/m

		0 cm	cm²/m A's = 0.00 cm²/m			0 cm				M = 379.82 kgf.m/m F = 0.00 tf fiss = 0.05 mm		vrd2 = 56.29 tf/m vsw = 3.13 tf/m asw = 12.58 cm²/m
L110	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 33.84 kgf.m/m F = 0.00 tf fiss = 0.00 mm		vsd = 23.31 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = 13.16 tf/m asw = 50.04 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 71.80 kgf.m/m F = 0.00 tf fiss = 0.00 mm		vsd = 29.72 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = 20.11 tf/m asw = 80.87 cm²/m
L111	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf.m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm	Md = 2469 kgf.m/m As = 5.04 cm²/m A's = 0.00 cm²/m			As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 76.53 kgf.m/m F = 0.00 tf fiss = 0.00 mm	A's = 0.39 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 1523.20 kgf.m/m F = 0.00 tf fiss = 0.11 mm	vsd = 21.35 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = erro asw = erro
	Y	bw = 100	Md = 757			bw = 100	Md = 5055			As = 1.53 cm²/m		vsd = 67.60 tf/m

		.0 cm h = 15.0 cm	kgf. m/m As = 1.53 cm²/m A's = 0.00 cm²/m			.0 cm h = 15.0 cm	kgf. m/m As = 11.82 cm²/m A's = 0.00 cm²/m			ø6.3 c/20 (1.56 cm²/m) M = 68.03 kgf.m/m F = 0.00 tf fiss = 0.00 mm		vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = erro asw = erro
L112	X	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf. m/m As = 1.45 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 1.51 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 33.72 kgf.m/m F = 0.00 tf fiss = 0.00 mm		vsd = 13.54 tf/m vrd1 = 8.16 tf/m Modelo I vrd2 = 59.49 tf/m vsw = 3.38 tf/m asw = 12.87 cm²/m
	Y	bw = 100.0 cm h = 15.0 cm	Md = 757 kgf. m/m As = 1.53 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 1.53 cm²/m ø6.3 c/20 (1.56 cm²/m) M = 58.62 kgf.m/m F = 0.00 tf fiss = 0.00 mm		vsd = 18.02 tf/m vrd1 = 7.79 tf/m vrd2 = 56.29 tf/m vsw = 8.42 tf/m asw = 33.85 cm²/m

ARMADURAS NEGATIVAS (NA CONTINUIDADE)										
Viga / Trecho	Laje 1 / Laje 2	Momento negativo				Momento positivo				Armaduras finais
		Seção	Flexão	Flexo compressão	Flexo tração	Seção	Flexão	Flexo compressão	Flexo tração	
V107 4	L101 L102	bw = 100.0 cm h = 15.0 cm	Md = 2035 kgf.m/m As = 4.11 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 4.11 cm²/m (ø12.5 c/20 - 6.14 cm²/m) fiss = 0.10 mm

			A's = 0.00 cm²/m							
V102 1	L101 L104	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.02 mm
V107 3	L104 L105	bw = 100.0 cm h = 15.0 cm	Md = 3000 kgf.m/m As = 6.20 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 6.20 cm²/m (ø12.5 c/19 - 6.46 cm²/m) fiss = 0.20 mm
V103 1	L104 L107	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.07 mm
V103 2	L105 L108	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.05 mm
V108 3	L105 L106	bw = 100.0 cm h = 15.0 cm	Md = 5112 kgf.m/m As = 11.15 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 11.15 cm²/m (ø12.5 c/11 - 11.16 cm²/m) fiss = 0.21 mm
V108 4	L105 L106	bw = 100.0 cm h = 15.0 cm	Md = 5112 kgf.m/m As = 11.15 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 11.15 cm²/m (ø12.5 c/11 - 11.16 cm²/m) fiss = 0.21 mm

			A's = 0.00 cm²/m							
V102 2	L105 L102	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.01 mm
V103 3	L106 L109	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.00 mm
V102 3	L106 L103	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.03 mm
V107 2	L107 L108	bw = 100.0 cm h = 15.0 cm	Md = 3200 kgf.m/m As = 6.64 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 6.64 cm²/m (ø12.5 c/18 - 6.82 cm²/m) fiss = 0.21 mm
V105 1	L107 L110	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.03 mm
V108 2	L108 L109	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.01 mm

			A's = 0.00 cm²/m							
V105 2	L108 L111	bw = 100.0 cm h = 15.0 cm	Md = 5579 kgf.m/m As = 12.33 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 12.33 cm²/m (ø12.5 c/9 - 13.64 cm²/m) fiss = 0.17 mm
V105 3	L108 L111	bw = 100.0 cm h = 15.0 cm	Md = 5579 kgf.m/m As = 12.33 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 12.33 cm²/m (ø12.5 c/9 - 13.64 cm²/m) fiss = 0.17 mm
V105 4	L109 L112	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.19 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø8.0 c/20 - 2.51 cm²/m) fiss = 0.01 mm
V107 1	L110 L111	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.21 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.02 mm
V108 1	L111 L112	bw = 100.0 cm h = 15.0 cm	Md = 1130 kgf.m/m As = 2.21 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 2.25 cm²/m (ø10.0 c/20 - 3.93 cm²/m) fiss = 0.01 mm
V108 6	L102 L103	bw = 100.0 cm h = 15.0 cm	Md = 2282 kgf.m/m As = 4.64 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 4.64 cm²/m (ø12.5 c/20 - 6.14 cm²/m) fiss = 0.13 mm

			A's = 0.00 cm²/m							
V108 5	L102 L103	bw = 100.0 cm h = 15.0 cm	Md = 2282 kgf.m/m As = 4.64 cm²/m A's = 0.00 cm²/m			bw = 100.0 cm h = 15.0 cm				As = 4.64 cm²/m (ø12.5 c/20 - 6.14 cm²/m) fiss = 0.13 mm

VERIFICAÇÃO DAS VIBRAÇÕES			
f (Hz)	**fcrit (Hz)**	**f/fcrit**	**Condição (f/fcrit>1.2)**
10.75	4.00	2.69	Ok