



**ASSOCIAÇÃO BRASILEIRA DOS  
FABRICANTES DE TUBOS DE CONCRETO**

**RELATÓRIO DE DIMENSIONAMENTO DE  
ASSOCIAÇÃO DE TRÊS ADUELAS  
RETANGULARES MONOLÍTICAS DE CONCRETO**

segunda-feira, 7 de outubro de 2019



ASSOCIAÇÃO BRASILEIRA  
DOS FABRICANTES DE  
TUBOS DE CONCRETO

### DADOS DO FABRICANTE



NOME:  
CPF/CNPJ:  
ENDEREÇO: ,  
BAIRRO:  
CIDADE:  
ESTADO: Não Informado  
CEP:  
TEL.:  
CEL.:  
E-MAIL:  
SITE:

### DADOS DO CLIENTE



NOME: DEFESA CIVIL DO ESTADO DE SÃO PAULO  
CPF/CNPJ:  
ENDEREÇO: ,  
BAIRRO:  
CIDADE:  
ESTADO: Não Informado  
CEP:  
TEL.:  
CEL.:  
E-MAIL:  
SITE:

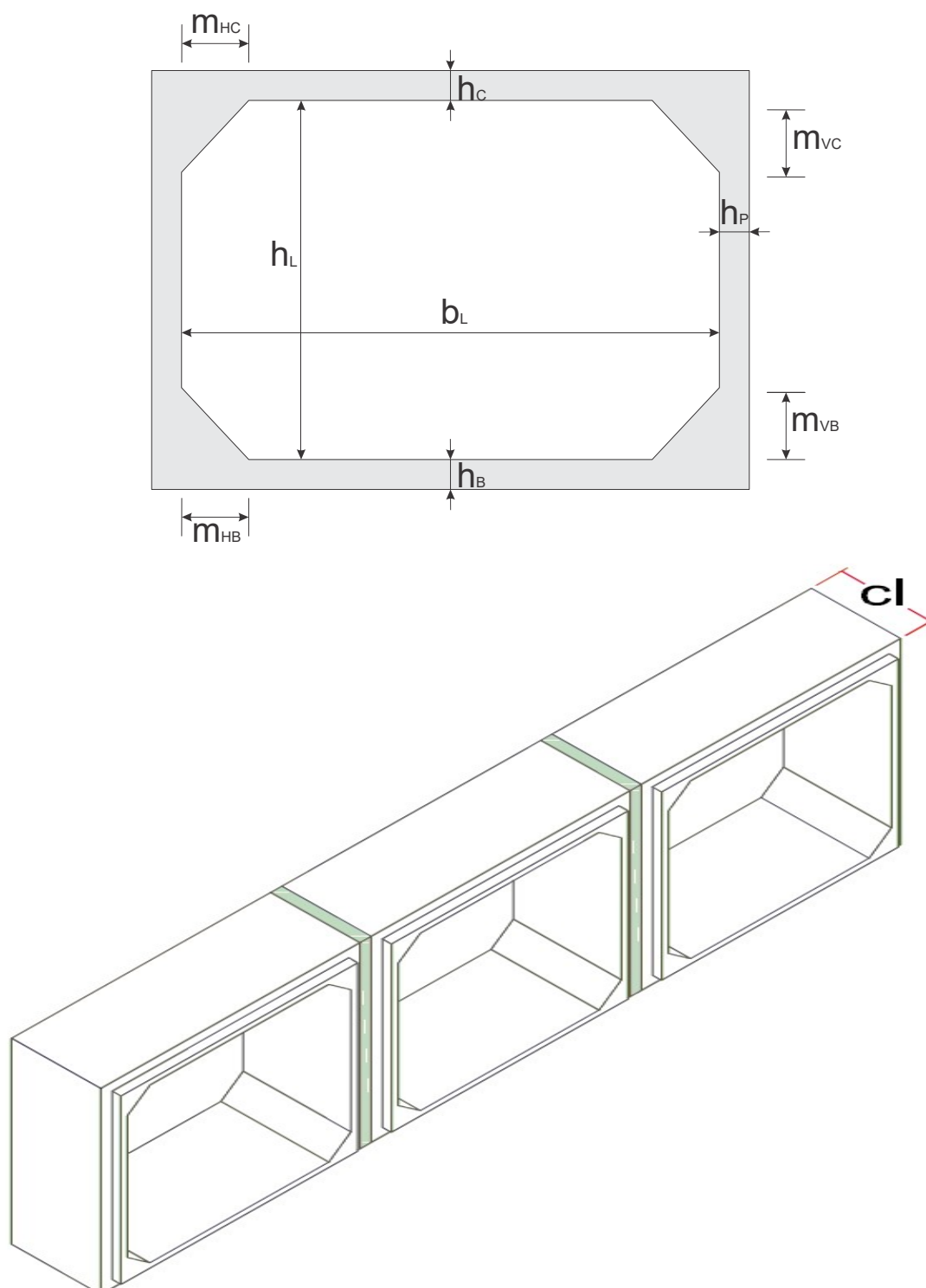
### DADOS DA OBRA



NOME: ADUELA 3,00 X 3,00 M PARA ATERRO DE 2,50 M - LINHA TRIPLA  
ENDEREÇO: ,  
BAIRRO:  
CIDADE:  
ESTADO: Não Informado  
CEP:  
TEL.:  
CEL.:  
E-MAIL:  
SITE:

**GEOMETRIA**

SEÇÃO CONSTANTE.....	: SIM
FINALIDADE.....	: ÁGUAS PLUVIAIS
COMPRIMENTO ( $c_l$ ).....	: 1.00 m
LARGURA LIVRE ( $b_l$ ).....	: 3.00 m
ALTURA LIVRE ( $h_l$ ).....	: 3.00 m
ALTURA DA LAJE DA COBERTURA ( $h_c$ ).....	: 0.20 m
ESPESSURA DAS PAREDES LATERAIS ( $h_p$ ).....	: 0.20 m
ALTURA DA LAJE DA BASE ( $h_b$ ).....	: 0.20 m
MÍSULA HOR. DA COBERTURA.....	: 0.20 m
MÍSULA VERT. DA COBERTURA.....	: 0.20 m
MÍSULA VERT. DA BASE.....	: 0.20 m
MÍSULA HOR. DA BASE.....	: 0.20 m



## INSTALAÇÃO E MANUSEIO

### ESPECIFICAÇÃO DO SOLO

PESO ESPECÍFICO.....	: 18.00 kN/m <sup>3</sup>
ÂNGULO DE ATRITO.....	: 30.00 graus
COEFICIENTE DE ATRITO ATIVO.....	: 0.33
COEFICIENTE DE ATRITO ESTÁTICO.....	: 0.50
COEFICIENTE DE ATRITO.....	: 0.58

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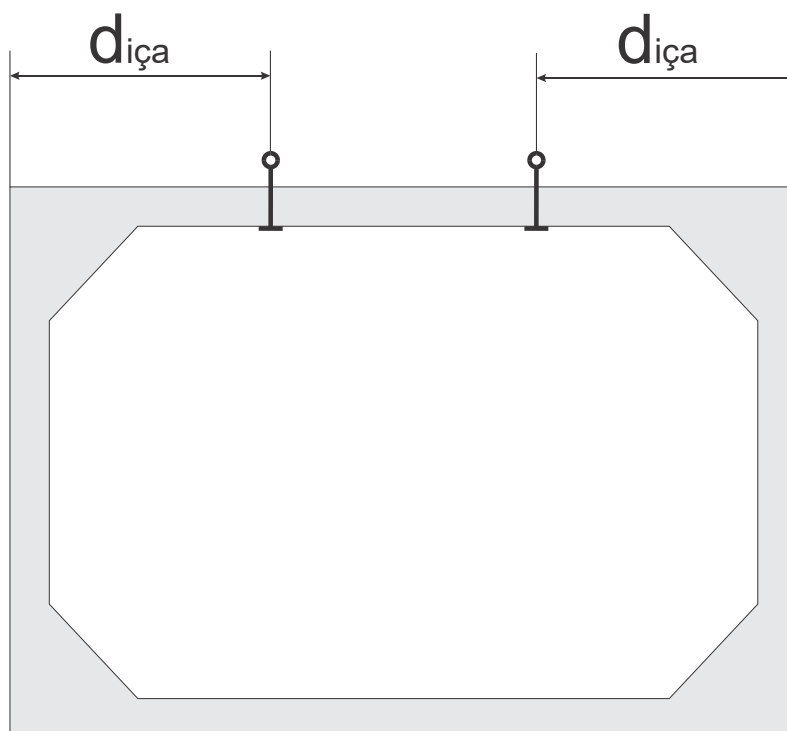
### DADOS DE INSTALAÇÃO

ALTURA DE TERRA.....	: 2.50 m
ESPESSURA DO PAVIMENTO.....	: 0.30 m
EFEITO DO ARQUEAMENTO.....	: NÃO CONSIDERADO
TIPO DE INSTALAÇÃO.....	: ---
LARGURA DA VALA.....	: ---
0.80 x Ka x COEFICIENTE DE ATRITO.....	: 0.15
RAZÃO DE RECALQUE.....	: ---

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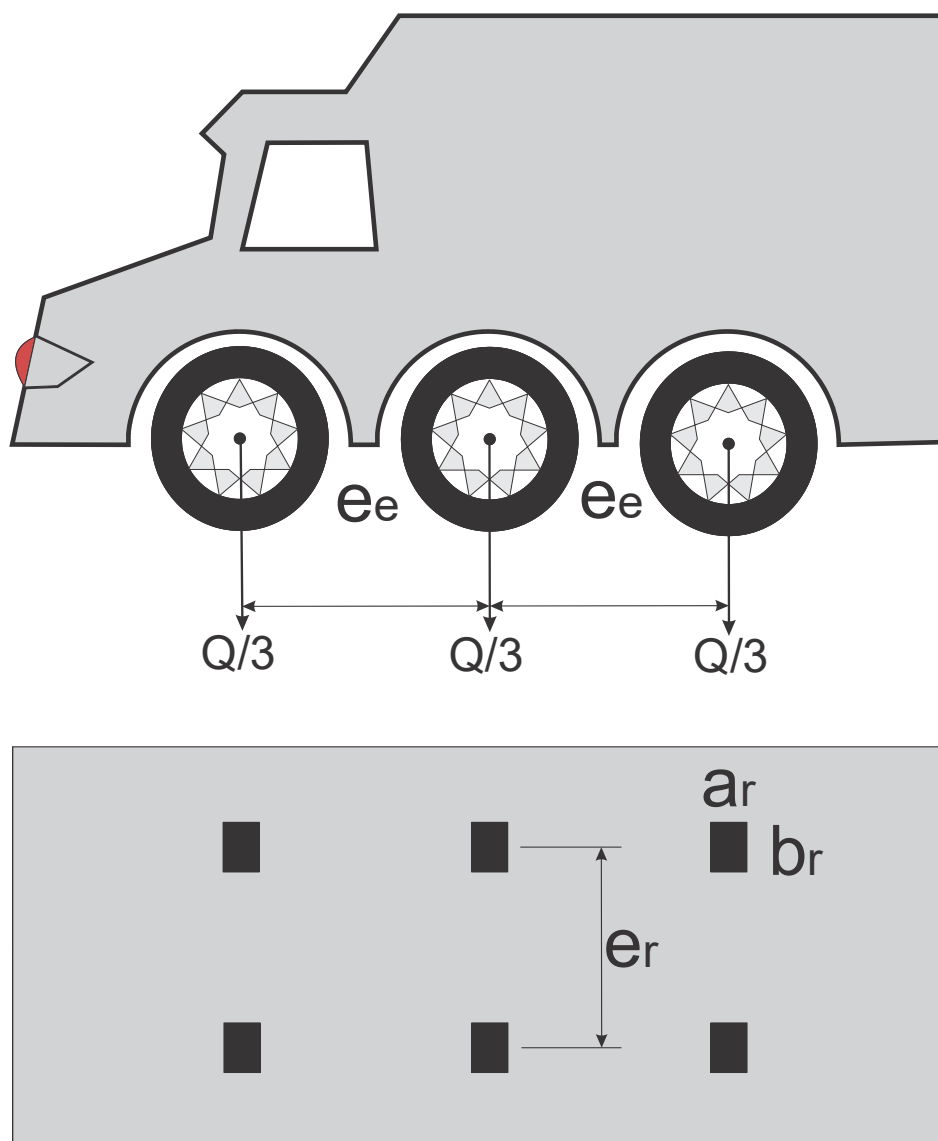
### INFORMAÇÕES DE MANUSEIO

RESISTÊNCIA DO CONCRETO (fcj).....	: 20.00 MPa
COEFICIENTE DE IMPACTO.....	: 1.20
DISTÂNCIA DE IÇAMENTO.....	: 50.00 cm



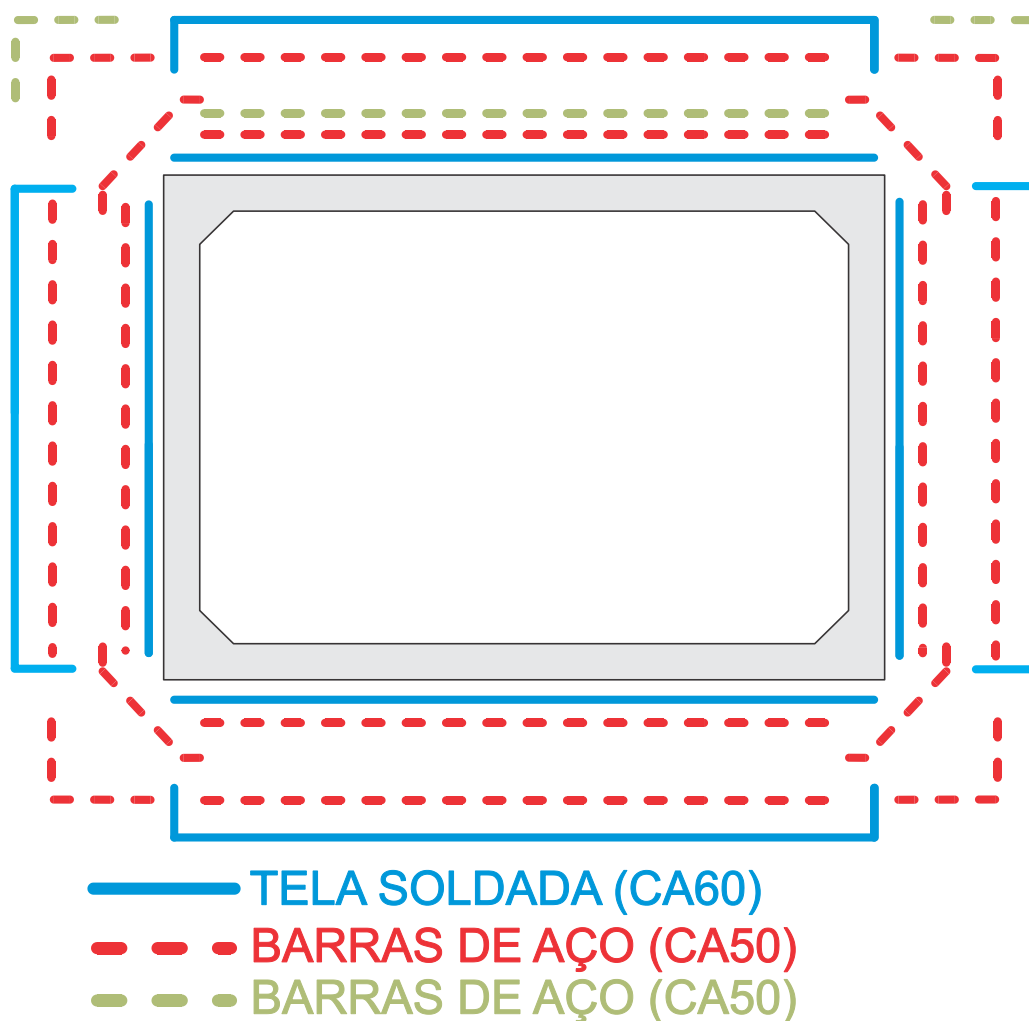
## SOBRECARGA

TIPO DE SOBRECARGA.....: RODOVIÁRIO  
TIPO DE TRÁFEGO.....: CLASSE 45  
PESO DO VEÍCULO (Q).....: 450.00 kN  
DISTÂNCIA ENTRE EIXOS ( $e_e$ ).....: 1.50 m  
DISTÂNCIA ENTRE RODAS ( $e_r$ ).....: 2.00 m  
ÁREA DE CONTATO DA RODA ( $a_r$ ).....: 0.20 m  
ÁREA DE CONTATO DA RODA ( $b_r$ ).....: 0.50 m  
COEF. DE IMPACTO ADICIONAL.....: 1.25  
COEF. DE IMPACTO EMPREGADO.....: 1.00



## PARÂMETROS DA ARMADURA

ABERTURA MÁX. DAS FISSURAS.....	: 0.20 mm
DIMINUIÇÃO DA RIGIDEZ.....	: 1.00
RESISTÊNCIA DA ARMADURA DO COROAMENTO.....	: 190.00 MPa
RESISTÊNCIA DA ARMADURA DA QUINA.....	: 105.00 MPa
COEF. DE PONDERAÇÃO DO CONCRETO.....	: 1.30
COEF. DE PONDERAÇÃO DO AÇO.....	: 1.15
ESPAÇAMENTO MÍN. ENTRE ARMADURAS.....	: 5.00 cm
ESPAÇAMENTO MÁX. ENTRE ARMADURAS.....	: 35.00 cm
COBRIMENTO DAS ARMADURAS.....	: 4.00 cm
TELA PADRÃO INTERNA.....	: L283
TELA PADRÃO EXTERNA.....	: L283
CONSIDERAR ANCOR. DA ARM. INT. P/ CORTANTE..	: SIM



## CRITÉRIOS E CONSTANTES

RESISTÊNCIA CARACTERÍSTICA DO CONCRETO...	30.00 MPa
PESO ESPECÍFICO DO CONCRETO.....	25.00 kN/m <sup>3</sup>
PESO ESPECÍFICO DO AÇO.....	78.00 kN/m <sup>3</sup>
MÓDULO DE DEFORMAÇÃO LONGITUDINAL.....	26071.59 MPa
MÓDULO DE REAÇÃO DO SOLO.....	25.00 MPa/m
COMPRIMENTO DO ELEMENTO FINITO.....	20.00 cm

# ELS:

COEFICIENTE DE PONDERAÇÃO PESO PRÓPRIO...	1.00
COEFICIENTE DE PONDERAÇÃO SOLO.....	1.00
COEFICIENTE DE PONDERAÇÃO FISSURAÇÃO.....	0.50
COEFICIENTE DE PONDERAÇÃO FADIGA.....	0.80

# ELU:

- VmaxHmin:

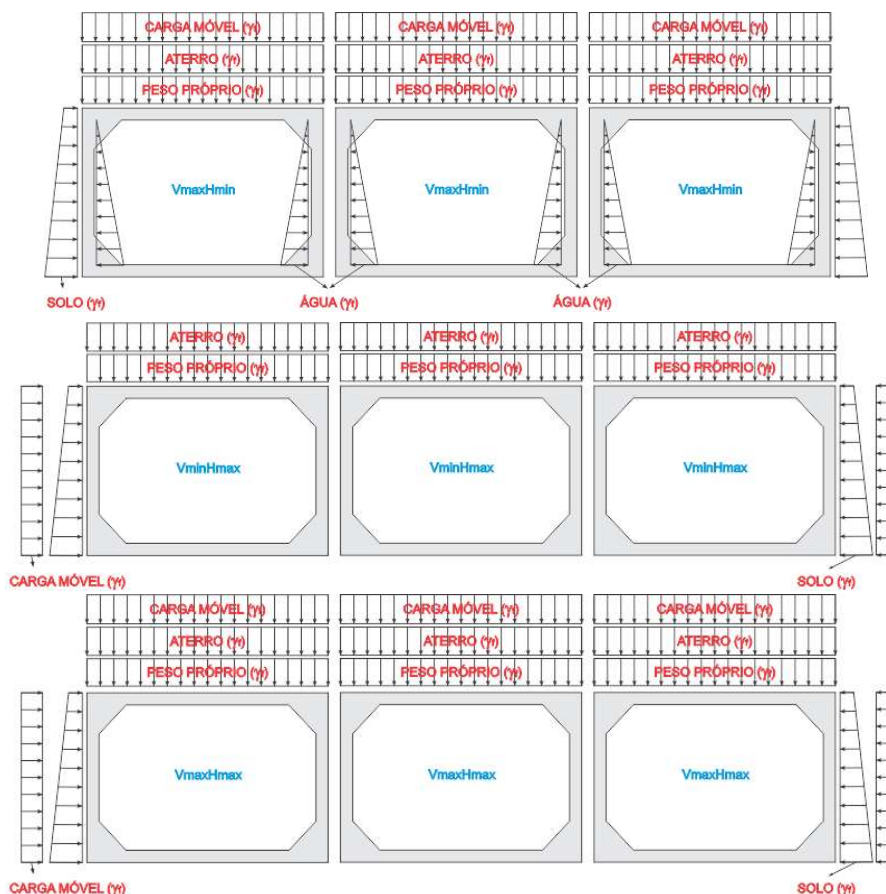
COEFICIENTE DE PONDERAÇÃO CARGA MÓVEL V.:	1.50
COEFICIENTE DE PONDERAÇÃO ATERRO.....	1.35
COEFICIENTE DE PONDERAÇÃO PESO PRÓPRIO...	1.30
COEFICIENTE DE PONDERAÇÃO SOLO.....	1.00
COEFICIENTE DE PONDERAÇÃO ÁGUA.....	1.20

- VminHmax:

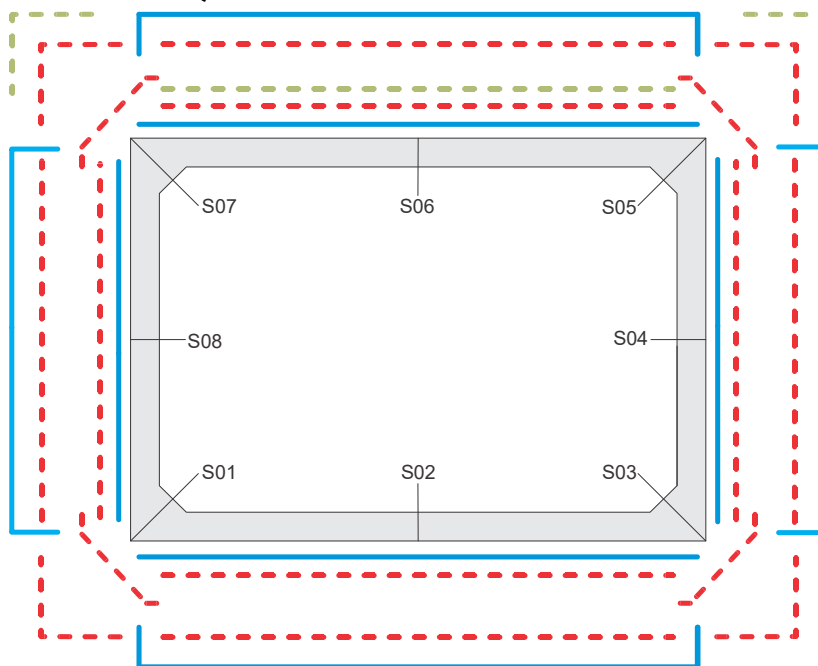
COEFICIENTE DE PONDERAÇÃO ATERRO.....	1.00
COEFICIENTE DE PONDERAÇÃO PESO PRÓPRIO...	1.00
COEFICIENTE DE PONDERAÇÃO SOLO.....	1.35
COEFICIENTE DE PONDERAÇÃO CARGA MÓVEL H.:	1.50

- VmaxHmax:

COEFICIENTE DE PONDERAÇÃO CARGA MÓVEL V.:	1.50
COEFICIENTE DE PONDERAÇÃO ATERRO.....	1.35
COEFICIENTE DE PONDERAÇÃO PESO PRÓPRIO...	1.30
COEFICIENTE DE PONDERAÇÃO SOLO.....	1.35
COEFICIENTE DE PONDERAÇÃO CARGA MÓVEL H.:	1.50



## ESQUEMA P/ DETALHAMENTO



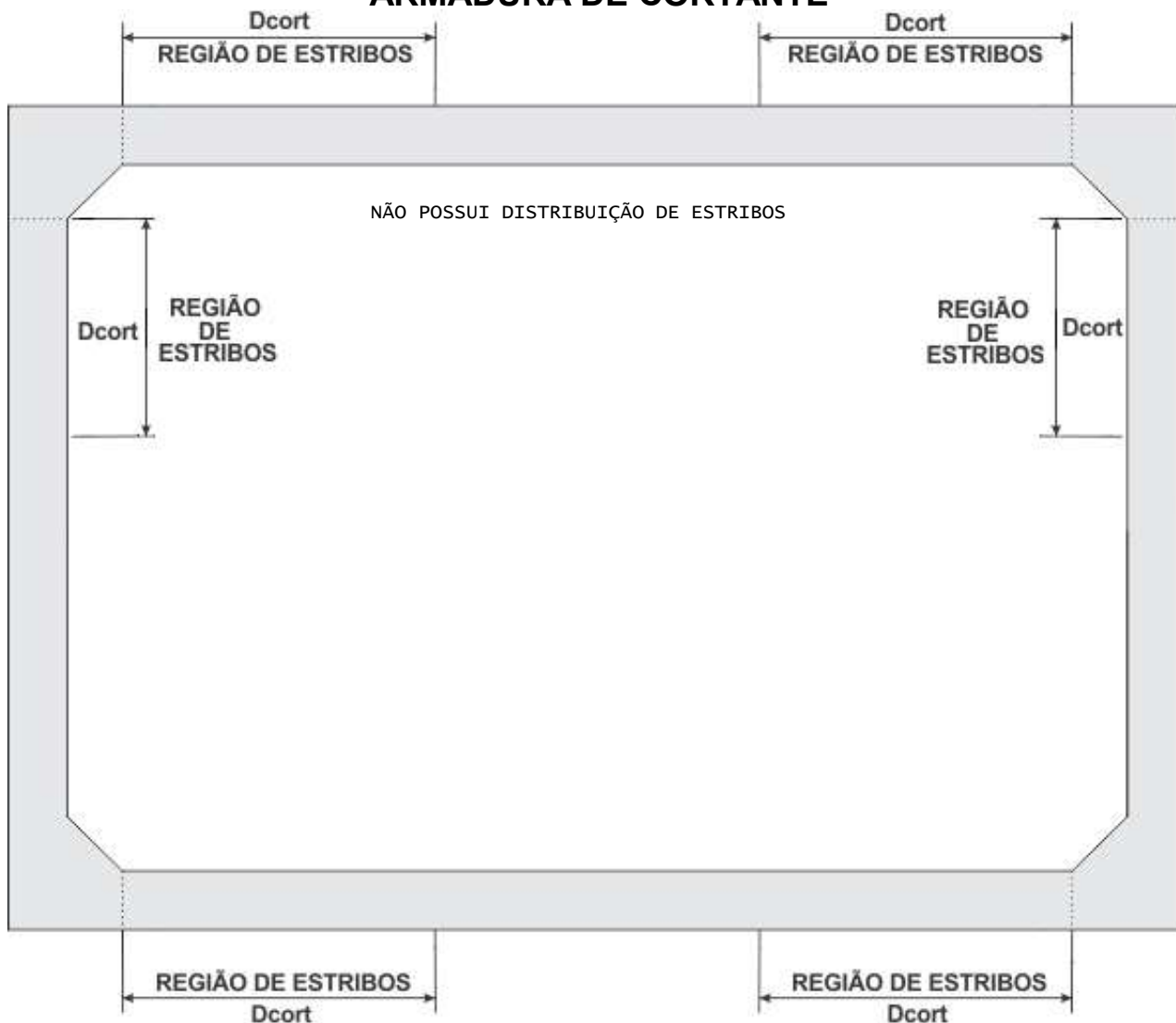
- TELA SOLDADA (CA60) ARMADURA BÁSICA  
 - - - BARRAS DE AÇO (CA50) ARMADURA COMPLEMENTAR  
 - - - BARRAS DE AÇO (CA50) ARMADURA DE FADIGA

OBS.: VALORES POR METRO DE ADUELA.

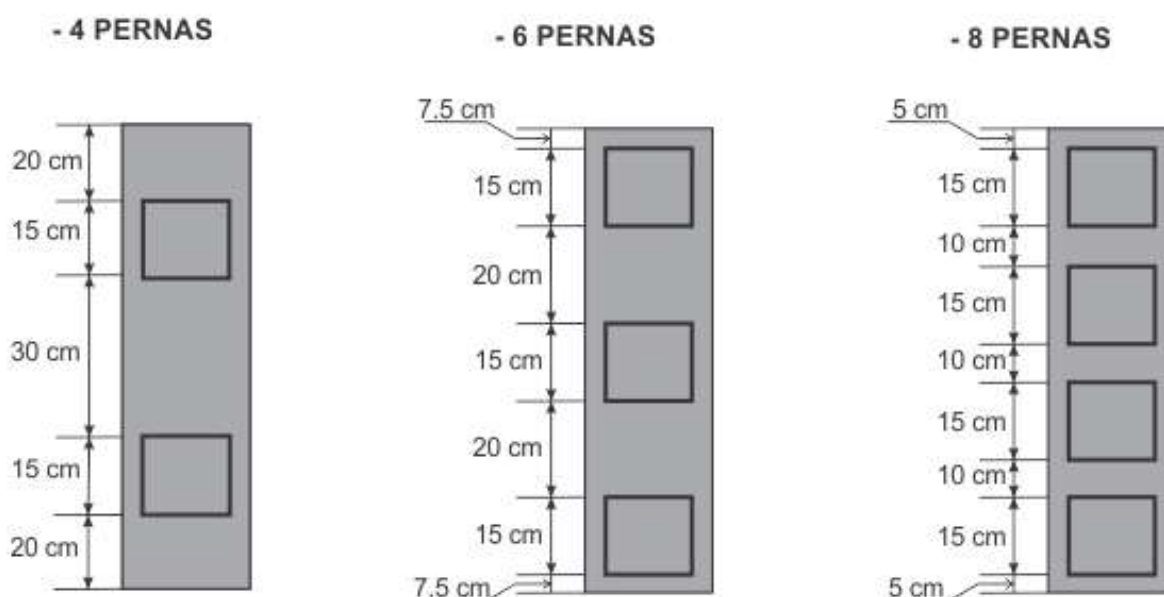
	TELA	ARMADURA COMPLEMENTAR	ARMADURA DE FADIGA
LADO EXTERNO	T-S02: L283	B-S01: 4 Ø6.30 c/ 31 cm (13.53%)	B-S05: 0.00 cm <sup>2</sup> de área acima
	T-S04: L283	B-S02: 4 Ø6.30 c/ 31 cm (74.65%)	B-S07: 0.00 cm <sup>2</sup> de área acima
	T-S06: L283	B-S03: 4 Ø6.30 c/ 31 cm (13.53%)	
	T-S08: L283	B-S04: 4 Ø6.30 c/ 31 cm (74.65%)	
		B-S05: 6 Ø6.30 c/ 18 cm ( 4.04%)	
		B-S06: 4 Ø6.30 c/ 31 cm (74.65%)	
		B-S07: 6 Ø6.30 c/ 18 cm ( 4.04%)	
		B-S08: 4 Ø6.30 c/ 31 cm (74.65%)	
LADO INTERNO	T-S02: L283	B-S01: 4 Ø6.30 c/ 31 cm ( 0.00%)	B-S06: 0.00 cm <sup>2</sup> de área acima
	T-S04: L283	B-S02: 7 Ø10.00 c/ 15 cm ( 6.56%)	
	T-S06: L283	B-S03: 4 Ø6.30 c/ 31 cm ( 0.00%)	
	T-S08: L283	B-S04: 4 Ø6.30 c/ 31 cm (74.65%)	
		B-S05: 4 Ø6.30 c/ 31 cm ( 0.00%)	
		B-S06: 5 Ø10.00 c/ 23 cm (-2.31%)	
		B-S07: 4 Ø6.30 c/ 31 cm ( 0.00%)	
		B-S08: 4 Ø6.30 c/ 31 cm (74.65%)	

NOTA: Os valores entre parênteses representam a percentagem de área de aço que a seção apresenta acima (porcentagem positiva) ou a menos (porcentagem negativa) em relação ao necessário (calculado) para o tipo de armadura correspondente (armadura complementar ou armadura de fadiga) e não em relação a área total de aço na seção que é o resultado das áreas de tela, armadura complementar e armadura de fadiga. Assim sendo, se uma seção apresenta (X %) de área acima ou abaixo para armadura complementar, esta percentagem é calculada em função da área de armadura complementar necessária e não em relação a área total de aço.

## ARMADURA DE CORTANTE



DISTRIBUIÇÃO (POR METRO LONGITUDINAL) DOS ESTRIBOS AO LONGO DE UMA FIADA:

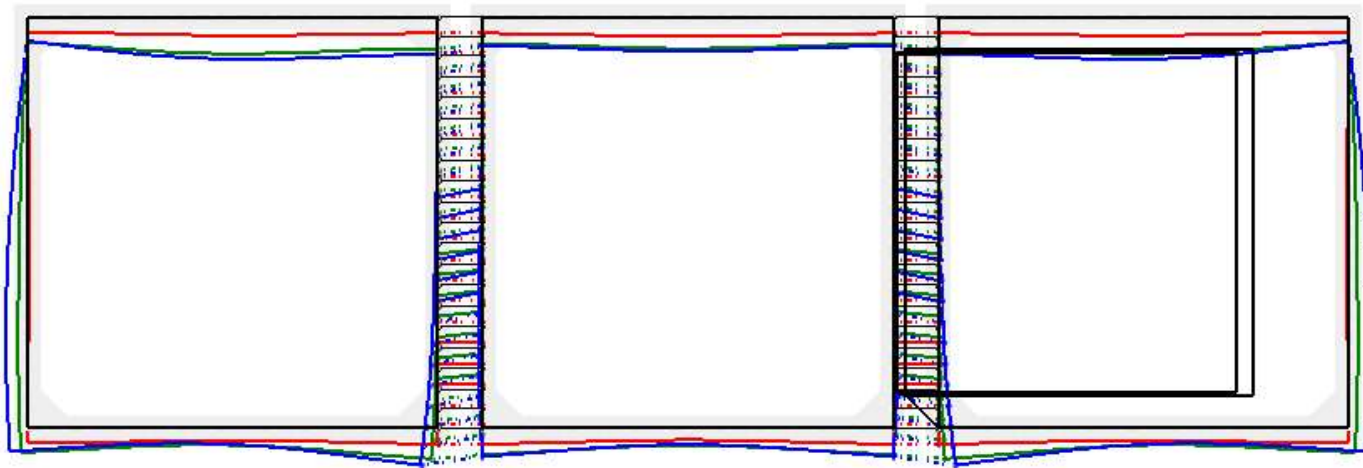
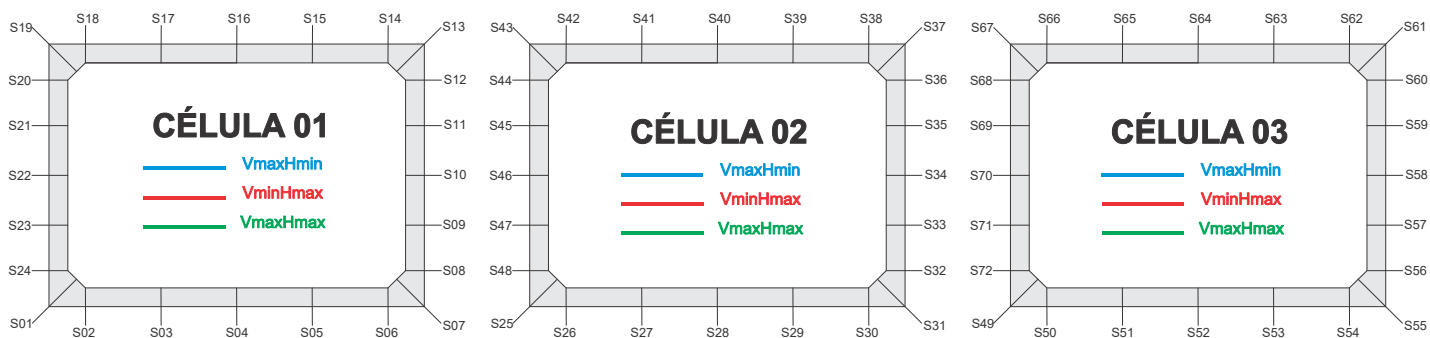


### OBSERVAÇÃO:

Quando houver necessidade de armadura transversal, esta deve necessariamente ser colocada na laje de cobertura e na laje de fundo nas regiões apontadas na figura esquemática acima (REGIÃO DE ESTRIBOS). É RECOMENDADO ainda a colocação de armadura transversal nas partes superiores das paredes, repedindo o arranjo da armadura transversal das lajes de cobertura, a partir das quinas, em função de possíveis concentrações de pressões mútuas entre as células.

## DESLOCAMENTOS

## NOMENCLATURA DAS SEÇÕES PARA VERSÃO COMPLETA DO RELATÓRIO



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#####
#          SOLICITAÇÕES NORMAIS (ELU)          #
#          VmaxHmin                             #
#####
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-3.64E-003	-4.92E-003
2	-3.64E-003	-4.43E-003
3	-3.65E-003	-3.42E-003
4	-3.65E-003	-3.31E-003
5	-3.65E-003	-4.55E-003
6	-3.65E-003	-6.76E-003
7	-3.65E-003	-7.81E-003
8	-2.65E-003	-7.81E-003
9	-1.21E-003	-7.84E-003
10	-5.86E-004	-7.86E-003
11	-2.60E-004	-7.88E-003
12	-4.81E-005	-7.90E-003
13	-3.76E-005	-7.91E-003
14	-3.72E-005	-7.97E-003
15	-3.56E-005	-8.55E-003
16	-3.41E-005	-8.83E-003
17	-3.25E-005	-7.94E-003
18	-3.09E-005	-6.01E-003
19	-3.05E-005	-5.00E-003
20	-1.02E-003	-5.00E-003
21	-2.82E-003	-4.98E-003
22	-4.01E-003	-4.96E-003
23	-4.49E-003	-4.95E-003
24	-4.10E-003	-4.93E-003
25	7.18E-006	-5.99E-003
26	6.33E-006	-5.41E-003
27	3.17E-006	-4.09E-003
28	1.41E-010	-3.50E-003
29	-3.16E-006	-4.09E-003
30	-6.33E-006	-5.41E-003
31	-7.18E-006	-5.99E-003
32	5.21E-004	-5.99E-003
33	9.53E-004	-6.01E-003
34	6.50E-004	-6.03E-003
35	2.58E-004	-6.05E-003
36	6.96E-005	-6.07E-003
37	-1.51E-006	-6.08E-003
38	-1.33E-006	-6.20E-003
39	-6.64E-007	-6.81E-003
40	2.11E-010	-7.17E-003
41	6.65E-007	-6.81E-003
42	1.33E-006	-6.20E-003
43	1.51E-006	-6.08E-003
44	-6.96E-005	-6.07E-003
45	-2.58E-004	-6.05E-003
46	-6.50E-004	-6.03E-003
47	-9.53E-004	-6.01E-003
48	-5.21E-004	-5.99E-003
49	3.65E-003	-7.81E-003

50	3.65E-003	-6.76E-003
51	3.65E-003	-4.55E-003
52	3.65E-003	-3.31E-003
53	3.65E-003	-3.42E-003
54	3.64E-003	-4.43E-003
55	3.64E-003	-4.92E-003
56	4.10E-003	-4.93E-003
57	4.49E-003	-4.95E-003
58	4.01E-003	-4.96E-003
59	2.82E-003	-4.98E-003
60	1.02E-003	-5.00E-003
61	3.05E-005	-5.00E-003
62	3.09E-005	-6.01E-003
63	3.25E-005	-7.94E-003
64	3.41E-005	-8.83E-003
65	3.56E-005	-8.55E-003
66	3.72E-005	-7.97E-003
67	3.76E-005	-7.91E-003
68	4.81E-005	-7.90E-003
69	2.60E-004	-7.88E-003
70	5.86E-004	-7.86E-003
71	1.21E-003	-7.84E-003
72	2.65E-003	-7.81E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.59E-003
2	1.69E-003
3	1.08E-003
4	-8.47E-004
5	-2.88E-003
6	-3.55E-003
7	-3.42E-003
8	-3.20E-003
9	-1.41E-003
10	-6.40E-004
11	-4.34E-004
12	-1.35E-004
13	6.60E-005
14	3.41E-004
15	9.99E-004
16	-3.71E-004
17	-2.31E-003
18	-3.37E-003
19	-3.34E-003
20	-3.24E-003
21	-2.30E-003
22	-1.32E-003
23	-1.29E-004
24	1.41E-003
25	1.86E-003
26	2.01E-003
27	1.70E-003
28	-2.06E-011
29	-1.70E-003

30	-2.01E-003
31	-1.86E-003
32	-1.62E-003
33	1.10E-004
34	6.52E-004
35	4.56E-004
36	1.78E-004
37	3.11E-004
38	5.29E-004
39	9.92E-004
40	-2.57E-011
41	-9.92E-004
42	-5.29E-004
43	-3.11E-004
44	-1.78E-004
45	-4.56E-004
46	-6.52E-004
47	-1.10E-004
48	1.62E-003
49	3.42E-003
50	3.55E-003
51	2.88E-003
52	8.47E-004
53	-1.08E-003
54	-1.69E-003
55	-1.59E-003
56	-1.41E-003
57	1.29E-004
58	1.32E-003
59	2.30E-003
60	3.24E-003
61	3.34E-003
62	3.37E-003
63	2.31E-003
64	3.71E-004
65	-9.99E-004
66	-3.41E-004
67	-6.60E-005
68	1.35E-004
69	4.34E-004
70	6.40E-004
71	1.41E-003
72	3.20E-003

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#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VminHmax #
#####
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

-----

SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-4.09E-005	-3.15E-003
2	-4.47E-005	-3.13E-003
3	-5.88E-005	-2.80E-003
4	-7.28E-005	-2.58E-003
5	-8.69E-005	-2.82E-003
6	-1.01E-004	-3.25E-003
7	-1.05E-004	-3.35E-003
8	-4.58E-005	-3.35E-003
9	-4.94E-005	-3.36E-003
10	-4.51E-005	-3.38E-003
11	-2.63E-005	-3.39E-003
12	8.20E-006	-3.40E-003
13	1.18E-005	-3.40E-003
14	1.47E-005	-3.43E-003
15	2.56E-005	-3.71E-003
16	3.64E-005	-3.86E-003
17	4.72E-005	-3.60E-003
18	5.81E-005	-3.25E-003
19	6.10E-005	-3.21E-003
20	5.91E-005	-3.20E-003
21	3.33E-004	-3.19E-003
22	5.34E-004	-3.18E-003
23	3.19E-004	-3.17E-003
24	-1.48E-005	-3.15E-003
25	3.20E-005	-3.35E-003
26	2.82E-005	-3.24E-003
27	1.41E-005	-2.79E-003
28	1.67E-011	-2.53E-003
29	-1.41E-005	-2.79E-003
30	-2.82E-005	-3.24E-003
31	-3.20E-005	-3.35E-003
32	3.77E-005	-3.35E-003
33	4.56E-005	-3.37E-003
34	3.96E-005	-3.38E-003
35	2.56E-005	-3.39E-003
36	3.89E-006	-3.40E-003
37	-2.46E-005	-3.41E-003
38	-2.17E-005	-3.47E-003
39	-1.08E-005	-3.82E-003
40	5.32E-011	-4.04E-003
41	1.08E-005	-3.82E-003
42	2.17E-005	-3.47E-003
43	2.46E-005	-3.41E-003
44	-3.89E-006	-3.40E-003
45	-2.56E-005	-3.39E-003
46	-3.96E-005	-3.38E-003
47	-4.56E-005	-3.37E-003
48	-3.77E-005	-3.35E-003
49	1.05E-004	-3.35E-003

50	1.01E-004	-3.25E-003
51	8.69E-005	-2.82E-003
52	7.28E-005	-2.58E-003
53	5.88E-005	-2.80E-003
54	4.47E-005	-3.13E-003
55	4.09E-005	-3.15E-003
56	1.48E-005	-3.15E-003
57	-3.19E-004	-3.17E-003
58	-5.34E-004	-3.18E-003
59	-3.33E-004	-3.19E-003
60	-5.91E-005	-3.20E-003
61	-6.10E-005	-3.21E-003
62	-5.81E-005	-3.25E-003
63	-4.72E-005	-3.60E-003
64	-3.64E-005	-3.86E-003
65	-2.56E-005	-3.71E-003
66	-1.47E-005	-3.43E-003
67	-1.18E-005	-3.40E-003
68	-8.20E-006	-3.40E-003
69	2.63E-005	-3.39E-003
70	4.51E-005	-3.38E-003
71	4.94E-005	-3.36E-003
72	4.58E-005	-3.35E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

-----

SEÇÃO	ROTAÇÃO (rad)
1	-1.26E-005
2	1.56E-004
3	5.97E-004
4	-5.89E-006
5	-6.69E-004
6	-4.04E-004
7	-2.59E-004
8	-1.24E-004
9	9.51E-006
10	-2.02E-005
11	-3.52E-005
12	-5.01E-005
13	3.33E-005
14	1.69E-004
15	4.74E-004
16	-9.17E-005
17	-6.25E-004
18	-2.22E-004
19	-7.32E-005
20	7.89E-005
21	5.29E-004
22	-6.46E-007
23	-5.87E-004
24	-1.79E-004
25	2.96E-004
26	4.44E-004
27	7.07E-004
28	-1.15E-011
29	-7.07E-004

30	-4.44E-004
31	-2.96E-004
32	-1.58E-004
33	8.44E-006
34	1.27E-005
35	3.31E-005
36	5.47E-005
37	1.42E-004
38	2.80E-004
39	5.92E-004
40	-1.41E-011
41	-5.92E-004
42	-2.80E-004
43	-1.42E-004
44	-5.47E-005
45	-3.31E-005
46	-1.27E-005
47	-8.44E-006
48	1.58E-004
49	2.59E-004
50	4.04E-004
51	6.69E-004
52	5.89E-006
53	-5.97E-004
54	-1.56E-004
55	1.26E-005
56	1.79E-004
57	5.87E-004
58	6.46E-007
59	-5.29E-004
60	-7.89E-005
61	7.32E-005
62	2.22E-004
63	6.25E-004
64	9.17E-005
65	-4.74E-004
66	-1.69E-004
67	-3.33E-005
68	5.01E-005
69	3.52E-005
70	2.02E-005
71	-9.51E-006
72	1.24E-004

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#####
#          SOLICITAÇÕES NORMAIS (ELU)          #
#          VmaxHmax                            #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-1.36E-003	-5.14E-003
2	-1.36E-003	-4.76E-003
3	-1.37E-003	-3.84E-003
4	-1.38E-003	-3.58E-003
5	-1.39E-003	-4.42E-003
6	-1.40E-003	-5.89E-003
7	-1.40E-003	-6.50E-003
8	-8.51E-004	-6.50E-003
9	-2.60E-004	-6.52E-003
10	-1.48E-004	-6.55E-003
11	-2.96E-005	-6.57E-003
12	1.91E-005	-6.59E-003
13	-1.82E-005	-6.59E-003
14	-1.63E-005	-6.69E-003
15	-9.42E-006	-7.33E-003
16	-2.51E-006	-7.70E-003
17	4.40E-006	-7.11E-003
18	1.13E-005	-5.82E-003
19	1.32E-005	-5.23E-003
20	-5.41E-004	-5.22E-003
21	-1.33E-003	-5.20E-003
22	-1.73E-003	-5.19E-003
23	-1.93E-003	-5.17E-003
24	-1.69E-003	-5.15E-003
25	2.28E-005	-5.59E-003
26	2.01E-005	-5.21E-003
27	1.01E-005	-4.19E-003
28	6.60E-011	-3.70E-003
29	-1.01E-005	-4.19E-003
30	-2.01E-005	-5.21E-003
31	-2.28E-005	-5.59E-003
32	2.97E-004	-5.59E-003
33	4.24E-004	-5.61E-003
34	1.56E-004	-5.63E-003
35	2.51E-005	-5.65E-003
36	1.75E-006	-5.67E-003
37	-1.49E-005	-5.68E-003
38	-1.31E-005	-5.75E-003
39	-6.55E-006	-6.28E-003
40	1.30E-010	-6.61E-003
41	6.55E-006	-6.28E-003
42	1.31E-005	-5.75E-003
43	1.49E-005	-5.68E-003
44	-1.74E-006	-5.67E-003
45	-2.51E-005	-5.65E-003
46	-1.56E-004	-5.63E-003
47	-4.24E-004	-5.61E-003
48	-2.97E-004	-5.59E-003
49	1.40E-003	-6.50E-003

50	1.40E-003	-5.89E-003
51	1.39E-003	-4.42E-003
52	1.38E-003	-3.58E-003
53	1.37E-003	-3.84E-003
54	1.36E-003	-4.76E-003
55	1.36E-003	-5.14E-003
56	1.69E-003	-5.15E-003
57	1.93E-003	-5.17E-003
58	1.73E-003	-5.19E-003
59	1.33E-003	-5.20E-003
60	5.41E-004	-5.22E-003
61	-1.32E-005	-5.23E-003
62	-1.13E-005	-5.82E-003
63	-4.40E-006	-7.11E-003
64	2.51E-006	-7.70E-003
65	9.42E-006	-7.33E-003
66	1.63E-005	-6.69E-003
67	1.82E-005	-6.59E-003
68	-1.91E-005	-6.59E-003
69	2.96E-005	-6.57E-003
70	1.48E-004	-6.55E-003
71	2.60E-004	-6.52E-003
72	8.51E-004	-6.50E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.20E-003
2	1.35E-003
3	1.13E-003
4	-4.44E-004
5	-2.02E-003
6	-2.12E-003
7	-1.93E-003
8	-1.69E-003
9	-3.70E-004
10	-1.35E-004
11	-1.49E-004
12	3.99E-005
13	2.15E-004
14	4.69E-004
15	1.07E-003
16	-1.14E-004
17	-1.63E-003
18	-2.03E-003
19	-1.92E-003
20	-1.76E-003
21	-8.15E-004
22	-4.65E-004
23	-9.12E-005
24	1.01E-003
25	1.17E-003
26	1.36E-003
27	1.41E-003
28	-1.94E-011
29	-1.41E-003

30	-1.36E-003
31	-1.17E-003
32	-9.31E-004
33	2.91E-004
34	3.60E-004
35	1.10E-004
36	-8.48E-006
37	1.32E-004
38	3.58E-004
39	9.07E-004
40	-2.41E-011
41	-9.07E-004
42	-3.58E-004
43	-1.32E-004
44	8.48E-006
45	-1.10E-004
46	-3.60E-004
47	-2.91E-004
48	9.31E-004
49	1.93E-003
50	2.12E-003
51	2.02E-003
52	4.44E-004
53	-1.13E-003
54	-1.35E-003
55	-1.20E-003
56	-1.01E-003
57	9.12E-005
58	4.65E-004
59	8.15E-004
60	1.76E-003
61	1.92E-003
62	2.03E-003
63	1.63E-003
64	1.14E-004
65	-1.07E-003
66	-4.69E-004
67	-2.15E-004
68	-3.99E-005
69	1.49E-004
70	1.35E-004
71	3.70E-004
72	1.69E-003

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#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmin                                #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

-----

SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-3.90E-003	-5.05E-003
2	-3.90E-003	-4.49E-003
3	-3.90E-003	-3.37E-003
4	-3.90E-003	-3.19E-003
5	-3.91E-003	-4.48E-003
6	-3.91E-003	-6.94E-003
7	-3.91E-003	-8.16E-003
8	-2.74E-003	-8.17E-003
9	-1.32E-003	-8.22E-003
10	-1.01E-003	-8.26E-003
11	-8.17E-004	-8.31E-003
12	-6.25E-004	-8.35E-003
13	-6.17E-004	-8.36E-003
14	-6.16E-004	-8.44E-003
15	-6.14E-004	-9.01E-003
16	-6.13E-004	-9.19E-003
17	-6.11E-004	-8.20E-003
18	-6.09E-004	-6.16E-003
19	-6.09E-004	-5.13E-003
20	-1.62E-003	-5.12E-003
21	-3.43E-003	-5.11E-003
22	-4.56E-003	-5.09E-003
23	-4.94E-003	-5.07E-003
24	-4.42E-003	-5.05E-003
25	6.98E-006	-6.11E-003
26	6.15E-006	-5.46E-003
27	3.08E-006	-4.02E-003
28	-9.94E-010	-3.39E-003
29	-3.08E-006	-4.03E-003
30	-6.15E-006	-5.58E-003
31	-6.98E-006	-6.31E-003
32	6.63E-004	-6.32E-003
33	9.67E-004	-6.36E-003
34	2.46E-004	-6.40E-003
35	-3.39E-004	-6.44E-003
36	-5.36E-004	-6.48E-003
37	-5.77E-004	-6.49E-003
38	-5.76E-004	-6.60E-003
39	-5.76E-004	-7.15E-003
40	-5.75E-004	-7.43E-003
41	-5.74E-004	-6.99E-003
42	-5.73E-004	-6.33E-003
43	-5.73E-004	-6.20E-003
44	-6.49E-004	-6.19E-003
45	-8.15E-004	-6.17E-003
46	-1.05E-003	-6.15E-003
47	-1.19E-003	-6.13E-003
48	-5.90E-004	-6.11E-003
49	3.93E-003	-8.14E-003

50	3.92E-003	-6.98E-003
51	3.92E-003	-4.55E-003
52	3.92E-003	-3.19E-003
53	3.92E-003	-3.29E-003
54	3.92E-003	-4.46E-003
55	3.91E-003	-5.09E-003
56	4.50E-003	-5.10E-003
57	4.94E-003	-5.14E-003
58	4.22E-003	-5.17E-003
59	2.72E-003	-5.20E-003
60	5.99E-004	-5.23E-003
61	-5.42E-004	-5.24E-003
62	-5.42E-004	-6.40E-003
63	-5.40E-004	-8.52E-003
64	-5.39E-004	-9.40E-003
65	-5.37E-004	-9.03E-003
66	-5.35E-004	-8.34E-003
67	-5.35E-004	-8.25E-003
68	-5.59E-004	-8.24E-003
69	-3.37E-004	-8.22E-003
70	2.08E-004	-8.19E-003
71	1.10E-003	-8.17E-003
72	2.81E-003	-8.15E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.80E-003
2	1.90E-003
3	1.23E-003
4	-8.25E-004
5	-3.08E-003
6	-4.12E-003
7	-4.03E-003
8	-3.67E-003
9	-1.00E-003
10	-2.02E-004
11	-3.39E-004
12	-1.80E-004
13	1.49E-004
14	4.04E-004
15	9.04E-004
16	-5.46E-004
17	-2.49E-003
18	-3.48E-003
19	-3.43E-003
20	-3.32E-003
21	-2.26E-003
22	-1.19E-003
23	5.83E-005
24	1.62E-003
25	2.08E-003
26	2.23E-003
27	1.83E-003
28	4.96E-006
29	-1.90E-003

30	-2.51E-003
31	-2.39E-003
32	-2.00E-003
33	7.05E-004
34	1.22E-003
35	6.00E-004
36	3.92E-005
37	2.69E-004
38	4.78E-004
39	8.74E-004
40	-1.36E-004
41	-1.10E-003
42	-5.56E-004
43	-3.26E-004
44	-1.95E-004
45	-3.22E-004
46	-4.09E-004
47	1.61E-004
48	1.85E-003
49	3.81E-003
50	3.93E-003
51	3.15E-003
52	9.65E-004
53	-1.18E-003
54	-2.12E-003
55	-2.07E-003
56	-1.80E-003
57	3.31E-004
58	1.78E-003
59	2.80E-003
60	3.74E-003
61	3.85E-003
62	3.84E-003
63	2.44E-003
64	2.80E-004
65	-1.18E-003
66	-4.74E-004
67	-1.86E-004
68	2.41E-005
69	6.17E-004
70	1.02E-003
71	1.84E-003
72	3.59E-003

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#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VminHmax                                #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-7.92E-005	-3.16E-003
2	-8.30E-005	-3.13E-003
3	-9.71E-005	-2.79E-003
4	-1.11E-004	-2.56E-003
5	-1.25E-004	-2.82E-003
6	-1.39E-004	-3.29E-003
7	-1.43E-004	-3.42E-003
8	-6.70E-005	-3.43E-003
9	-1.22E-004	-3.45E-003
10	-1.37E-004	-3.48E-003
11	-1.09E-004	-3.50E-003
12	-4.09E-005	-3.52E-003
13	-2.30E-005	-3.53E-003
14	-2.01E-005	-3.56E-003
15	-9.20E-006	-3.82E-003
16	1.66E-006	-3.94E-003
17	1.25E-005	-3.65E-003
18	2.34E-005	-3.27E-003
19	2.63E-005	-3.22E-003
20	1.42E-005	-3.21E-003
21	2.73E-004	-3.20E-003
22	4.71E-004	-3.19E-003
23	2.61E-004	-3.18E-003
24	-6.02E-005	-3.16E-003
25	3.20E-005	-3.39E-003
26	2.82E-005	-3.26E-003
27	1.41E-005	-2.77E-003
28	-2.47E-010	-2.50E-003
29	-1.41E-005	-2.77E-003
30	-2.82E-005	-3.28E-003
31	-3.20E-005	-3.42E-003
32	5.91E-005	-3.43E-003
33	2.02E-005	-3.46E-003
34	-8.55E-006	-3.48E-003
35	-2.47E-005	-3.51E-003
36	-3.23E-005	-3.53E-003
37	-5.77E-005	-3.54E-003
38	-5.48E-005	-3.61E-003
39	-4.39E-005	-3.97E-003
40	-3.31E-005	-4.17E-003
41	-2.22E-005	-3.92E-003
42	-1.14E-005	-3.53E-003
43	-8.45E-006	-3.45E-003
44	-5.42E-005	-3.44E-003
45	-1.09E-004	-3.43E-003
46	-1.28E-004	-3.42E-003
47	-1.13E-004	-3.41E-003
48	-5.91E-005	-3.39E-003
49	1.43E-004	-3.40E-003

50	1.40E-004	-3.28E-003
51	1.25E-004	-2.83E-003
52	1.11E-004	-2.57E-003
53	9.72E-005	-2.79E-003
54	8.31E-005	-3.11E-003
55	7.93E-005	-3.13E-003
56	2.70E-005	-3.14E-003
57	-6.42E-004	-3.16E-003
58	-1.07E-003	-3.19E-003
59	-6.66E-004	-3.21E-003
60	-1.01E-004	-3.24E-003
61	-9.22E-005	-3.24E-003
62	-8.93E-005	-3.29E-003
63	-7.85E-005	-3.66E-003
64	-6.77E-005	-3.92E-003
65	-5.69E-005	-3.77E-003
66	-4.60E-005	-3.49E-003
67	-4.31E-005	-3.45E-003
68	-4.55E-005	-3.45E-003
69	-2.42E-005	-3.44E-003
70	2.23E-007	-3.42E-003
71	2.91E-005	-3.41E-003
72	6.70E-005	-3.40E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.11E-005
2	1.80E-004
3	6.15E-004
4	-6.73E-006
5	-7.09E-004
6	-5.10E-004
7	-3.73E-004
8	-1.19E-004
9	6.83E-005
10	-1.56E-005
11	-6.48E-005
12	-1.25E-004
13	2.45E-005
14	1.57E-004
15	4.38E-004
16	-1.40E-004
17	-6.73E-004
18	-2.59E-004
19	-1.08E-004
20	4.60E-005
21	5.16E-004
22	1.54E-006
23	-5.73E-004
24	-1.56E-004
25	3.67E-004
26	5.11E-004
27	7.45E-004
28	3.28E-006
29	-7.53E-004

30	-5.63E-004
31	-4.24E-004
32	-1.66E-004
33	6.61E-005
34	2.85E-005
35	2.72E-005
36	1.64E-005
37	1.71E-004
38	3.05E-004
39	5.79E-004
40	-3.85E-005
41	-6.45E-004
42	-3.36E-004
43	-1.98E-004
44	-1.15E-004
45	-6.22E-005
46	-9.33E-007
47	4.57E-005
48	2.31E-004
49	3.16E-004
50	4.58E-004
51	6.96E-004
52	1.77E-005
53	-5.89E-004
54	-1.44E-004
55	2.50E-005
56	3.59E-004
57	1.18E-003
58	-3.53E-007
59	-1.08E-003
60	-1.98E-004
61	1.04E-004
62	2.51E-004
63	6.40E-004
64	9.39E-005
65	-4.83E-004
66	-1.86E-004
67	-5.13E-005
68	2.66E-005
69	2.98E-005
70	4.31E-005
71	4.35E-005
72	1.84E-004

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#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmax                                #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

-----

SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-1.66E-003	-5.18E-003
2	-1.66E-003	-4.77E-003
3	-1.67E-003	-3.78E-003
4	-1.68E-003	-3.49E-003
5	-1.69E-003	-4.38E-003
6	-1.70E-003	-6.07E-003
7	-1.70E-003	-6.83E-003
8	-1.02E-003	-6.84E-003
9	-4.62E-004	-6.88E-003
10	-5.25E-004	-6.93E-003
11	-4.48E-004	-6.97E-003
12	-3.60E-004	-7.01E-003
13	-3.78E-004	-7.02E-003
14	-3.76E-004	-7.12E-003
15	-3.69E-004	-7.71E-003
16	-3.62E-004	-7.99E-003
17	-3.55E-004	-7.28E-003
18	-3.48E-004	-5.89E-003
19	-3.46E-004	-5.27E-003
20	-9.36E-004	-5.26E-003
21	-1.77E-003	-5.24E-003
22	-2.17E-003	-5.23E-003
23	-2.33E-003	-5.21E-003
24	-2.03E-003	-5.19E-003
25	2.29E-005	-5.69E-003
26	2.02E-005	-5.26E-003
27	1.01E-005	-4.13E-003
28	-6.80E-010	-3.60E-003
29	-1.01E-005	-4.15E-003
30	-2.02E-005	-5.35E-003
31	-2.29E-005	-5.86E-003
32	4.05E-004	-5.87E-003
33	4.15E-004	-5.91E-003
34	-1.18E-004	-5.95E-003
35	-3.59E-004	-5.99E-003
36	-3.74E-004	-6.02E-003
37	-3.71E-004	-6.03E-003
38	-3.69E-004	-6.10E-003
39	-3.63E-004	-6.60E-003
40	-3.56E-004	-6.88E-003
41	-3.50E-004	-6.47E-003
42	-3.43E-004	-5.88E-003
43	-3.41E-004	-5.78E-003
44	-3.83E-004	-5.78E-003
45	-4.44E-004	-5.76E-003
46	-5.32E-004	-5.74E-003
47	-6.50E-004	-5.72E-003
48	-3.61E-004	-5.70E-003
49	1.72E-003	-6.80E-003

50	1.72E-003	-6.09E-003
51	1.71E-003	-4.44E-003
52	1.70E-003	-3.50E-003
53	1.69E-003	-3.73E-003
54	1.68E-003	-4.72E-003
55	1.68E-003	-5.17E-003
56	2.06E-003	-5.18E-003
57	2.11E-003	-5.22E-003
58	1.64E-003	-5.25E-003
59	1.16E-003	-5.29E-003
60	3.04E-004	-5.32E-003
61	-3.66E-004	-5.33E-003
62	-3.64E-004	-6.04E-003
63	-3.58E-004	-7.51E-003
64	-3.51E-004	-8.13E-003
65	-3.44E-004	-7.72E-003
66	-3.37E-004	-7.02E-003
67	-3.35E-004	-6.90E-003
68	-3.97E-004	-6.89E-003
69	-3.56E-004	-6.87E-003
70	-1.25E-004	-6.85E-003
71	2.24E-004	-6.83E-003
72	1.07E-003	-6.81E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.32E-003
2	1.47E-003
3	1.22E-003
4	-4.51E-004
5	-2.21E-003
6	-2.60E-003
7	-2.45E-003
8	-2.04E-003
9	-1.05E-004
10	4.95E-005
11	-1.57E-004
12	-7.41E-005
13	2.23E-004
14	4.63E-004
15	9.59E-004
16	-2.82E-004
17	-1.81E-003
18	-2.16E-003
19	-2.04E-003
20	-1.87E-003
21	-8.45E-004
22	-4.32E-004
23	-1.04E-005
24	1.12E-003
25	1.38E-003
26	1.56E-003
27	1.52E-003
28	-3.10E-006
29	-1.57E-003

30	-1.77E-003
31	-1.61E-003
32	-1.19E-003
33	6.96E-004
34	6.73E-004
35	1.84E-004
36	-1.16E-004
37	1.31E-004
38	3.50E-004
39	8.35E-004
40	-1.05E-004
41	-1.02E-003
42	-4.44E-004
43	-2.13E-004
44	-7.84E-005
45	-1.15E-004
46	-2.04E-004
47	-2.06E-005
48	1.15E-003
49	2.27E-003
50	2.45E-003
51	2.24E-003
52	5.48E-004
53	-1.16E-003
54	-1.56E-003
55	-1.43E-003
56	-1.09E-003
57	5.67E-004
58	7.41E-004
59	8.37E-004
60	2.09E-003
61	2.34E-003
62	2.43E-003
63	1.78E-003
64	9.69E-005
65	-1.17E-003
66	-5.57E-004
67	-2.96E-004
68	-1.21E-004
69	2.26E-004
70	4.17E-004
71	7.81E-004
72	2.04E-003

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#####
#                VERIFICAÇÃO DA FADIGA (ELS)                #
#                VmaxHmin                                    #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-1.02E-003	-3.71E-003
2	-1.02E-003	-3.42E-003
3	-1.03E-003	-2.75E-003
4	-1.04E-003	-2.57E-003
5	-1.04E-003	-3.18E-003
6	-1.05E-003	-4.27E-003
7	-1.05E-003	-4.72E-003
8	-6.41E-004	-4.72E-003
9	-1.94E-004	-4.74E-003
10	-1.10E-004	-4.75E-003
11	-2.22E-005	-4.77E-003
12	1.31E-005	-4.78E-003
13	-1.46E-005	-4.79E-003
14	-1.34E-005	-4.86E-003
15	-8.95E-006	-5.31E-003
16	-4.53E-006	-5.58E-003
17	-1.13E-007	-5.15E-003
18	4.31E-006	-4.21E-003
19	5.50E-006	-3.77E-003
20	-4.11E-004	-3.76E-003
21	-1.02E-003	-3.75E-003
22	-1.33E-003	-3.74E-003
23	-1.47E-003	-3.73E-003
24	-1.27E-003	-3.71E-003
25	1.56E-005	-4.03E-003
26	1.37E-005	-3.76E-003
27	6.86E-006	-3.01E-003
28	4.91E-011	-2.65E-003
29	-6.86E-006	-3.01E-003
30	-1.37E-005	-3.76E-003
31	-1.56E-005	-4.03E-003
32	2.22E-004	-4.04E-003
33	3.19E-004	-4.05E-003
34	1.17E-004	-4.07E-003
35	1.89E-005	-4.08E-003
36	1.71E-006	-4.09E-003
37	-9.41E-006	-4.10E-003
38	-8.30E-006	-4.15E-003
39	-4.15E-006	-4.52E-003
40	9.51E-011	-4.76E-003
41	4.15E-006	-4.52E-003
42	8.30E-006	-4.15E-003
43	9.41E-006	-4.10E-003
44	-1.71E-006	-4.09E-003
45	-1.89E-005	-4.08E-003
46	-1.17E-004	-4.07E-003
47	-3.19E-004	-4.05E-003
48	-2.22E-004	-4.04E-003
49	1.05E-003	-4.72E-003

50	1.05E-003	-4.27E-003
51	1.04E-003	-3.18E-003
52	1.04E-003	-2.57E-003
53	1.03E-003	-2.75E-003
54	1.02E-003	-3.42E-003
55	1.02E-003	-3.71E-003
56	1.27E-003	-3.71E-003
57	1.47E-003	-3.73E-003
58	1.33E-003	-3.74E-003
59	1.02E-003	-3.75E-003
60	4.11E-004	-3.76E-003
61	-5.50E-006	-3.77E-003
62	-4.31E-006	-4.21E-003
63	1.13E-007	-5.15E-003
64	4.53E-006	-5.58E-003
65	8.95E-006	-5.31E-003
66	1.34E-005	-4.86E-003
67	1.46E-005	-4.79E-003
68	-1.31E-005	-4.78E-003
69	2.22E-005	-4.77E-003
70	1.10E-004	-4.75E-003
71	1.94E-004	-4.74E-003
72	6.41E-004	-4.72E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	9.02E-004
2	1.01E-003
3	8.19E-004
4	-3.33E-004
5	-1.48E-003
6	-1.57E-003
7	-1.44E-003
8	-1.26E-003
9	-2.80E-004
10	-1.01E-004
11	-1.11E-004
12	3.15E-005
13	1.57E-004
14	3.39E-004
15	7.69E-004
16	-8.21E-005
17	-1.19E-003
18	-1.51E-003
19	-1.43E-003
20	-1.32E-003
21	-6.44E-004
22	-3.50E-004
23	-3.64E-005
24	7.64E-004
25	8.65E-004
26	9.99E-004
27	1.02E-003
28	-1.40E-011
29	-1.02E-003

30	-9.99E-004
31	-8.65E-004
32	-6.94E-004
33	2.18E-004
34	2.71E-004
35	8.13E-005
36	-8.16E-006
37	9.13E-005
38	2.52E-004
39	6.42E-004
40	-1.74E-011
41	-6.42E-004
42	-2.52E-004
43	-9.13E-005
44	8.16E-006
45	-8.13E-005
46	-2.71E-004
47	-2.18E-004
48	6.94E-004
49	1.44E-003
50	1.57E-003
51	1.48E-003
52	3.33E-004
53	-8.19E-004
54	-1.01E-003
55	-9.02E-004
56	-7.64E-004
57	3.64E-005
58	3.50E-004
59	6.44E-004
60	1.32E-003
61	1.43E-003
62	1.51E-003
63	1.19E-003
64	8.21E-005
65	-7.69E-004
66	-3.39E-004
67	-1.57E-004
68	-3.15E-005
69	1.11E-004
70	1.01E-004
71	2.80E-004
72	1.26E-003

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#####
#                VERIFICAÇÃO DA FADIGA (ELS)                #
#                VminHmax                                    #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-3.28E-004	-3.27E-003
2	-3.30E-004	-3.14E-003
3	-3.41E-004	-2.67E-003
4	-3.51E-004	-2.47E-003
5	-3.61E-004	-2.84E-003
6	-3.72E-004	-3.47E-003
7	-3.74E-004	-3.68E-003
8	-2.01E-004	-3.69E-003
9	-7.16E-005	-3.70E-003
10	-3.58E-005	-3.71E-003
11	-3.15E-006	-3.73E-003
12	1.60E-005	-3.74E-003
13	4.72E-007	-3.74E-003
14	2.53E-006	-3.79E-003
15	1.02E-005	-4.14E-003
16	1.78E-005	-4.35E-003
17	2.55E-005	-4.06E-003
18	3.31E-005	-3.51E-003
19	3.52E-005	-3.32E-003
20	-1.23E-004	-3.32E-003
21	-1.97E-004	-3.31E-003
22	-1.92E-004	-3.30E-003
23	-3.43E-004	-3.29E-003
24	-4.24E-004	-3.27E-003
25	2.35E-005	-3.44E-003
26	2.07E-005	-3.28E-003
27	1.04E-005	-2.76E-003
28	2.52E-011	-2.49E-003
29	-1.04E-005	-2.76E-003
30	-2.07E-005	-3.28E-003
31	-2.35E-005	-3.44E-003
32	9.09E-005	-3.44E-003
33	1.01E-004	-3.45E-003
34	3.71E-005	-3.47E-003
35	2.08E-006	-3.48E-003
36	-3.43E-006	-3.49E-003
37	-1.71E-005	-3.49E-003
38	-1.51E-005	-3.54E-003
39	-7.56E-006	-3.88E-003
40	6.36E-011	-4.08E-003
41	7.56E-006	-3.88E-003
42	1.51E-005	-3.54E-003
43	1.71E-005	-3.49E-003
44	3.43E-006	-3.49E-003
45	-2.08E-006	-3.48E-003
46	-3.71E-005	-3.47E-003
47	-1.01E-004	-3.45E-003
48	-9.09E-005	-3.44E-003
49	3.74E-004	-3.68E-003

50	3.72E-004	-3.47E-003
51	3.61E-004	-2.84E-003
52	3.51E-004	-2.47E-003
53	3.41E-004	-2.67E-003
54	3.30E-004	-3.14E-003
55	3.28E-004	-3.27E-003
56	4.24E-004	-3.27E-003
57	3.43E-004	-3.29E-003
58	1.92E-004	-3.30E-003
59	1.97E-004	-3.31E-003
60	1.23E-004	-3.32E-003
61	-3.52E-005	-3.32E-003
62	-3.31E-005	-3.51E-003
63	-2.55E-005	-4.06E-003
64	-1.78E-005	-4.35E-003
65	-1.02E-005	-4.14E-003
66	-2.53E-006	-3.79E-003
67	-4.72E-007	-3.74E-003
68	-1.60E-005	-3.74E-003
69	3.15E-006	-3.73E-003
70	3.58E-005	-3.71E-003
71	7.16E-005	-3.70E-003
72	2.01E-004	-3.69E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	3.86E-004
2	5.18E-004
3	6.71E-004
4	-1.24E-004
5	-9.30E-004
6	-7.80E-004
7	-6.43E-004
8	-4.93E-004
9	-8.51E-005
10	-4.78E-005
11	-3.96E-005
12	6.47E-006
13	1.02E-004
14	2.49E-004
15	5.94E-004
16	-5.02E-005
17	-7.80E-004
18	-6.91E-004
19	-5.81E-004
20	-4.54E-004
21	6.17E-005
22	-1.08E-004
23	-3.01E-004
24	2.40E-004
25	4.47E-004
26	5.86E-004
27	7.72E-004
28	-1.19E-011
29	-7.72E-004

30	-5.86E-004
31	-4.47E-004
32	-2.98E-004
33	8.65E-005
34	8.36E-005
35	3.44E-005
36	5.48E-006
37	9.30E-005
38	2.33E-004
39	5.69E-004
40	-1.48E-011
41	-5.69E-004
42	-2.33E-004
43	-9.30E-005
44	-5.48E-006
45	-3.44E-005
46	-8.36E-005
47	-8.65E-005
48	2.98E-004
49	6.43E-004
50	7.80E-004
51	9.30E-004
52	1.24E-004
53	-6.71E-004
54	-5.18E-004
55	-3.86E-004
56	-2.40E-004
57	3.01E-004
58	1.08E-004
59	-6.17E-005
60	4.54E-004
61	5.81E-004
62	6.91E-004
63	7.80E-004
64	5.02E-005
65	-5.94E-004
66	-2.49E-004
67	-1.02E-004
68	-6.47E-006
69	3.96E-005
70	4.78E-005
71	8.51E-005
72	4.93E-004

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#####
#                VERIFICAÇÃO DA FADIGA (ELS)                #
#                VmaxHmax                                    #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-9.62E-004	-3.70E-003
2	-9.64E-004	-3.43E-003
3	-9.71E-004	-2.77E-003
4	-9.78E-004	-2.58E-003
5	-9.85E-004	-3.18E-003
6	-9.92E-004	-4.23E-003
7	-9.94E-004	-4.66E-003
8	-6.04E-004	-4.66E-003
9	-1.85E-004	-4.68E-003
10	-1.05E-004	-4.69E-003
11	-2.15E-005	-4.71E-003
12	1.34E-005	-4.72E-003
13	-1.28E-005	-4.73E-003
14	-1.15E-005	-4.80E-003
15	-6.58E-006	-5.25E-003
16	-1.66E-006	-5.51E-003
17	3.26E-006	-5.09E-003
18	8.18E-006	-4.18E-003
19	9.51E-006	-3.76E-003
20	-3.82E-004	-3.76E-003
21	-9.39E-004	-3.74E-003
22	-1.22E-003	-3.73E-003
23	-1.37E-003	-3.72E-003
24	-1.20E-003	-3.70E-003
25	1.65E-005	-4.02E-003
26	1.46E-005	-3.75E-003
27	7.28E-006	-3.02E-003
28	4.73E-011	-2.66E-003
29	-7.28E-006	-3.02E-003
30	-1.46E-005	-3.75E-003
31	-1.65E-005	-4.02E-003
32	2.12E-004	-4.02E-003
33	3.01E-004	-4.03E-003
34	1.11E-004	-4.05E-003
35	1.83E-005	-4.06E-003
36	1.38E-006	-4.08E-003
37	-1.06E-005	-4.08E-003
38	-9.33E-006	-4.13E-003
39	-4.67E-006	-4.50E-003
40	9.31E-011	-4.74E-003
41	4.67E-006	-4.50E-003
42	9.33E-006	-4.13E-003
43	1.06E-005	-4.08E-003
44	-1.38E-006	-4.08E-003
45	-1.83E-005	-4.06E-003
46	-1.11E-004	-4.05E-003
47	-3.01E-004	-4.03E-003
48	-2.12E-004	-4.02E-003
49	9.94E-004	-4.66E-003

50	9.92E-004	-4.23E-003
51	9.85E-004	-3.18E-003
52	9.78E-004	-2.58E-003
53	9.71E-004	-2.77E-003
54	9.64E-004	-3.43E-003
55	9.62E-004	-3.70E-003
56	1.20E-003	-3.70E-003
57	1.37E-003	-3.72E-003
58	1.22E-003	-3.73E-003
59	9.39E-004	-3.74E-003
60	3.82E-004	-3.76E-003
61	-9.51E-006	-3.76E-003
62	-8.18E-006	-4.18E-003
63	-3.26E-006	-5.09E-003
64	1.66E-006	-5.51E-003
65	6.58E-006	-5.25E-003
66	1.15E-005	-4.80E-003
67	1.28E-005	-4.73E-003
68	-1.34E-005	-4.72E-003
69	2.15E-005	-4.71E-003
70	1.05E-004	-4.69E-003
71	1.85E-004	-4.68E-003
72	6.04E-004	-4.66E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	8.56E-004
2	9.64E-004
3	8.13E-004
4	-3.14E-004
5	-1.44E-003
6	-1.51E-003
7	-1.37E-003
8	-1.20E-003
9	-2.62E-004
10	-9.63E-005
11	-1.06E-004
12	2.76E-005
13	1.51E-004
14	3.31E-004
15	7.58E-004
16	-8.10E-005
17	-1.16E-003
18	-1.43E-003
19	-1.35E-003
20	-1.24E-003
21	-5.75E-004
22	-3.32E-004
23	-7.01E-005
24	7.15E-004
25	8.33E-004
26	9.70E-004
27	1.01E-003
28	-1.40E-011
29	-1.01E-003

30	-9.70E-004
31	-8.33E-004
32	-6.62E-004
33	2.07E-004
34	2.55E-004
35	7.83E-005
36	-5.37E-006
37	9.40E-005
38	2.55E-004
39	6.43E-004
40	-1.73E-011
41	-6.43E-004
42	-2.55E-004
43	-9.40E-005
44	5.37E-006
45	-7.83E-005
46	-2.55E-004
47	-2.07E-004
48	6.62E-004
49	1.37E-003
50	1.51E-003
51	1.44E-003
52	3.14E-004
53	-8.13E-004
54	-9.64E-004
55	-8.56E-004
56	-7.15E-004
57	7.01E-005
58	3.32E-004
59	5.75E-004
60	1.24E-003
61	1.35E-003
62	1.43E-003
63	1.16E-003
64	8.10E-005
65	-7.58E-004
66	-3.31E-004
67	-1.51E-004
68	-2.76E-005
69	1.06E-004
70	9.63E-005
71	2.62E-004
72	1.20E-003

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#####
#                VERIFICAÇÃO DA FADIGA (ELS)                #
#                VminHmin                                    #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-8.21E-004	-3.33E-003
2	-8.23E-004	-3.09E-003
3	-8.29E-004	-2.51E-003
4	-8.36E-004	-2.34E-003
5	-8.42E-004	-2.86E-003
6	-8.49E-004	-3.77E-003
7	-8.51E-004	-4.15E-003
8	-5.15E-004	-4.15E-003
9	-1.58E-004	-4.16E-003
10	-9.01E-005	-4.18E-003
11	-1.83E-005	-4.19E-003
12	1.18E-005	-4.20E-003
13	-1.08E-005	-4.21E-003
14	-9.60E-006	-4.27E-003
15	-5.16E-006	-4.66E-003
16	-7.21E-007	-4.89E-003
17	3.72E-006	-4.53E-003
18	8.16E-006	-3.74E-003
19	9.35E-006	-3.38E-003
20	-3.26E-004	-3.38E-003
21	-7.94E-004	-3.37E-003
22	-1.03E-003	-3.36E-003
23	-1.16E-003	-3.34E-003
24	-1.03E-003	-3.33E-003
25	1.54E-005	-3.60E-003
26	1.36E-005	-3.36E-003
27	6.79E-006	-2.72E-003
28	4.12E-011	-2.41E-003
29	-6.79E-006	-2.72E-003
30	-1.36E-005	-3.36E-003
31	-1.54E-005	-3.60E-003
32	1.82E-004	-3.60E-003
33	2.57E-004	-3.61E-003
34	9.52E-005	-3.63E-003
35	1.56E-005	-3.64E-003
36	1.10E-006	-3.65E-003
37	-9.58E-006	-3.65E-003
38	-8.44E-006	-3.70E-003
39	-4.22E-006	-4.03E-003
40	8.21E-011	-4.24E-003
41	4.22E-006	-4.03E-003
42	8.44E-006	-3.70E-003
43	9.58E-006	-3.65E-003
44	-1.10E-006	-3.65E-003
45	-1.56E-005	-3.64E-003
46	-9.52E-005	-3.63E-003
47	-2.57E-004	-3.61E-003
48	-1.82E-004	-3.60E-003
49	8.51E-004	-4.15E-003

50	8.49E-004	-3.77E-003
51	8.42E-004	-2.86E-003
52	8.36E-004	-2.34E-003
53	8.29E-004	-2.51E-003
54	8.23E-004	-3.09E-003
55	8.21E-004	-3.33E-003
56	1.03E-003	-3.33E-003
57	1.16E-003	-3.34E-003
58	1.03E-003	-3.36E-003
59	7.94E-004	-3.37E-003
60	3.26E-004	-3.38E-003
61	-9.35E-006	-3.38E-003
62	-8.16E-006	-3.74E-003
63	-3.72E-006	-4.53E-003
64	7.22E-007	-4.89E-003
65	5.16E-006	-4.66E-003
66	9.60E-006	-4.27E-003
67	1.08E-005	-4.21E-003
68	-1.18E-005	-4.20E-003
69	1.83E-005	-4.19E-003
70	9.01E-005	-4.18E-003
71	1.58E-004	-4.16E-003
72	5.15E-004	-4.15E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	7.41E-004
2	8.41E-004
3	7.25E-004
4	-2.68E-004
5	-1.26E-003
6	-1.30E-003
7	-1.18E-003
8	-1.03E-003
9	-2.23E-004
10	-8.32E-005
11	-9.06E-005
12	2.33E-005
13	1.31E-004
14	2.89E-004
15	6.62E-004
16	-6.97E-005
17	-1.00E-003
18	-1.23E-003
19	-1.16E-003
20	-1.06E-003
21	-4.77E-004
22	-2.85E-004
23	-7.71E-005
24	6.14E-004
25	7.23E-004
26	8.46E-004
27	8.90E-004
28	-1.25E-011
29	-8.90E-004

30	-8.46E-004
31	-7.23E-004
32	-5.71E-004
33	1.77E-004
34	2.17E-004
35	6.73E-005
36	-4.10E-006
37	8.30E-005
38	2.24E-004
39	5.64E-004
40	-1.55E-011
41	-5.64E-004
42	-2.24E-004
43	-8.30E-005
44	4.10E-006
45	-6.73E-005
46	-2.17E-004
47	-1.77E-004
48	5.71E-004
49	1.18E-003
50	1.30E-003
51	1.26E-003
52	2.68E-004
53	-7.25E-004
54	-8.41E-004
55	-7.41E-004
56	-6.14E-004
57	7.71E-005
58	2.85E-004
59	4.77E-004
60	1.06E-003
61	1.16E-003
62	1.23E-003
63	1.00E-003
64	6.97E-005
65	-6.62E-004
66	-2.89E-004
67	-1.31E-004
68	-2.33E-005
69	9.06E-005
70	8.32E-005
71	2.23E-004
72	1.03E-003

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#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmin                                   #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-9.46E-004	-3.57E-003
2	-9.48E-004	-3.30E-003
3	-9.54E-004	-2.66E-003
4	-9.61E-004	-2.48E-003
5	-9.67E-004	-3.06E-003
6	-9.74E-004	-4.08E-003
7	-9.76E-004	-4.50E-003
8	-5.94E-004	-4.51E-003
9	-1.81E-004	-4.52E-003
10	-1.03E-004	-4.54E-003
11	-2.08E-005	-4.55E-003
12	1.26E-005	-4.57E-003
13	-1.31E-005	-4.57E-003
14	-1.20E-005	-4.64E-003
15	-7.53E-006	-5.07E-003
16	-3.10E-006	-5.32E-003
17	1.32E-006	-4.92E-003
18	5.75E-006	-4.03E-003
19	6.94E-006	-3.62E-003
20	-3.79E-004	-3.62E-003
21	-9.35E-004	-3.61E-003
22	-1.22E-003	-3.59E-003
23	-1.35E-003	-3.58E-003
24	-1.18E-003	-3.57E-003
25	1.55E-005	-3.87E-003
26	1.37E-005	-3.61E-003
27	6.83E-006	-2.90E-003
28	4.61E-011	-2.56E-003
29	-6.83E-006	-2.90E-003
30	-1.37E-005	-3.61E-003
31	-1.55E-005	-3.87E-003
32	2.07E-004	-3.87E-003
33	2.96E-004	-3.89E-003
34	1.09E-004	-3.90E-003
35	1.77E-005	-3.92E-003
36	1.48E-006	-3.93E-003
37	-9.48E-006	-3.93E-003
38	-8.35E-006	-3.98E-003
39	-4.18E-006	-4.34E-003
40	9.03E-011	-4.56E-003
41	4.18E-006	-4.34E-003
42	8.35E-006	-3.98E-003
43	9.48E-006	-3.93E-003
44	-1.48E-006	-3.93E-003
45	-1.77E-005	-3.92E-003
46	-1.09E-004	-3.90E-003
47	-2.96E-004	-3.89E-003
48	-2.07E-004	-3.87E-003
49	9.76E-004	-4.50E-003

50	9.74E-004	-4.08E-003
51	9.67E-004	-3.06E-003
52	9.61E-004	-2.48E-003
53	9.54E-004	-2.66E-003
54	9.48E-004	-3.30E-003
55	9.46E-004	-3.57E-003
56	1.18E-003	-3.57E-003
57	1.35E-003	-3.58E-003
58	1.22E-003	-3.59E-003
59	9.35E-004	-3.61E-003
60	3.79E-004	-3.62E-003
61	-6.94E-006	-3.62E-003
62	-5.75E-006	-4.03E-003
63	-1.32E-006	-4.92E-003
64	3.10E-006	-5.32E-003
65	7.53E-006	-5.07E-003
66	1.20E-005	-4.64E-003
67	1.32E-005	-4.57E-003
68	-1.26E-005	-4.57E-003
69	2.08E-005	-4.55E-003
70	1.03E-004	-4.54E-003
71	1.81E-004	-4.52E-003
72	5.94E-004	-4.51E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	8.42E-004
2	9.44E-004
3	7.84E-004
4	-3.09E-004
5	-1.40E-003
6	-1.47E-003
7	-1.34E-003
8	-1.18E-003
9	-2.59E-004
10	-9.40E-005
11	-1.03E-004
12	2.84E-005
13	1.47E-004
14	3.20E-004
15	7.29E-004
16	-7.74E-005
17	-1.12E-003
18	-1.40E-003
19	-1.33E-003
20	-1.22E-003
21	-5.82E-004
22	-3.25E-004
23	-5.17E-005
24	7.08E-004
25	8.11E-004
26	9.42E-004
27	9.71E-004
28	-1.35E-011
29	-9.71E-004

30	-9.42E-004
31	-8.11E-004
32	-6.47E-004
33	2.03E-004
34	2.51E-004
35	7.61E-005
36	-6.64E-006
37	8.82E-005
38	2.41E-004
39	6.12E-004
40	-1.67E-011
41	-6.12E-004
42	-2.41E-004
43	-8.82E-005
44	6.64E-006
45	-7.61E-005
46	-2.51E-004
47	-2.03E-004
48	6.47E-004
49	1.34E-003
50	1.47E-003
51	1.40E-003
52	3.09E-004
53	-7.84E-004
54	-9.44E-004
55	-8.42E-004
56	-7.08E-004
57	5.17E-005
58	3.25E-004
59	5.82E-004
60	1.22E-003
61	1.33E-003
62	1.40E-003
63	1.12E-003
64	7.74E-005
65	-7.29E-004
66	-3.20E-004
67	-1.47E-004
68	-2.84E-005
69	1.03E-004
70	9.40E-005
71	2.59E-004
72	1.18E-003

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#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VminHmax          #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-3.61E-004	-3.27E-003
2	-3.64E-004	-3.13E-003
3	-3.74E-004	-2.66E-003
4	-3.84E-004	-2.46E-003
5	-3.94E-004	-2.84E-003
6	-4.04E-004	-3.49E-003
7	-4.07E-004	-3.72E-003
8	-2.22E-004	-3.72E-003
9	-7.68E-005	-3.73E-003
10	-3.87E-005	-3.75E-003
11	-3.57E-006	-3.76E-003
12	1.58E-005	-3.77E-003
13	-5.05E-007	-3.78E-003
14	1.48E-006	-3.83E-003
15	8.84E-006	-4.18E-003
16	1.62E-005	-4.39E-003
17	2.36E-005	-4.10E-003
18	3.09E-005	-3.53E-003
19	3.29E-005	-3.33E-003
20	-1.38E-004	-3.33E-003
21	-2.42E-004	-3.31E-003
22	-2.53E-004	-3.30E-003
23	-4.01E-004	-3.29E-003
24	-4.66E-004	-3.28E-003
25	2.30E-005	-3.45E-003
26	2.03E-005	-3.29E-003
27	1.01E-005	-2.76E-003
28	2.62E-011	-2.48E-003
29	-1.01E-005	-2.76E-003
30	-2.03E-005	-3.29E-003
31	-2.30E-005	-3.45E-003
32	9.68E-005	-3.45E-003
33	1.11E-004	-3.46E-003
34	4.02E-005	-3.48E-003
35	2.39E-006	-3.49E-003
36	-3.25E-006	-3.50E-003
37	-1.65E-005	-3.50E-003
38	-1.45E-005	-3.55E-003
39	-7.26E-006	-3.88E-003
40	6.49E-011	-4.09E-003
41	7.26E-006	-3.88E-003
42	1.45E-005	-3.55E-003
43	1.65E-005	-3.50E-003
44	3.25E-006	-3.50E-003
45	-2.39E-006	-3.49E-003
46	-4.02E-005	-3.48E-003
47	-1.11E-004	-3.46E-003
48	-9.68E-005	-3.45E-003
49	4.07E-004	-3.72E-003

50	4.04E-004	-3.49E-003
51	3.94E-004	-2.84E-003
52	3.84E-004	-2.46E-003
53	3.74E-004	-2.66E-003
54	3.64E-004	-3.13E-003
55	3.61E-004	-3.27E-003
56	4.66E-004	-3.28E-003
57	4.01E-004	-3.29E-003
58	2.53E-004	-3.30E-003
59	2.42E-004	-3.31E-003
60	1.38E-004	-3.33E-003
61	-3.29E-005	-3.33E-003
62	-3.09E-005	-3.53E-003
63	-2.36E-005	-4.10E-003
64	-1.62E-005	-4.39E-003
65	-8.84E-006	-4.18E-003
66	-1.48E-006	-3.83E-003
67	5.05E-007	-3.78E-003
68	-1.58E-005	-3.77E-003
69	3.57E-006	-3.76E-003
70	3.87E-005	-3.75E-003
71	7.68E-005	-3.73E-003
72	2.22E-004	-3.72E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

-----

SEÇÃO	ROTAÇÃO (rad)
1	4.12E-004
2	5.42E-004
3	6.74E-004
4	-1.35E-004
5	-9.54E-004
6	-8.17E-004
7	-6.80E-004
8	-5.30E-004
9	-9.48E-005
10	-5.02E-005
11	-4.25E-005
12	8.67E-006
13	1.06E-004
14	2.53E-004
15	6.00E-004
16	-5.09E-005
17	-7.96E-004
18	-7.33E-004
19	-6.25E-004
20	-5.00E-004
21	2.30E-005
22	-1.18E-004
23	-2.82E-004
24	2.68E-004
25	4.65E-004
26	6.03E-004
27	7.79E-004
28	-1.20E-011
29	-7.79E-004

30	-6.03E-004
31	-4.65E-004
32	-3.16E-004
33	9.31E-005
34	9.27E-005
35	3.61E-005
36	3.90E-006
37	9.15E-005
38	2.32E-004
39	5.68E-004
40	-1.49E-011
41	-5.68E-004
42	-2.32E-004
43	-9.15E-005
44	-3.90E-006
45	-3.61E-005
46	-9.27E-005
47	-9.31E-005
48	3.16E-004
49	6.80E-004
50	8.17E-004
51	9.54E-004
52	1.35E-004
53	-6.74E-004
54	-5.42E-004
55	-4.12E-004
56	-2.68E-004
57	2.82E-004
58	1.18E-004
59	-2.30E-005
60	5.00E-004
61	6.25E-004
62	7.33E-004
63	7.96E-004
64	5.09E-005
65	-6.00E-004
66	-2.53E-004
67	-1.06E-004
68	-8.67E-006
69	4.25E-005
70	5.02E-005
71	9.48E-005
72	5.30E-004

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#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmax          #
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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y

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SEÇÃO	DIREÇÃO X (m)	DIREÇÃO Y (m)
1	-9.09E-004	-3.56E-003
2	-9.11E-004	-3.30E-003
3	-9.18E-004	-2.67E-003
4	-9.24E-004	-2.49E-003
5	-9.31E-004	-3.06E-003
6	-9.38E-004	-4.06E-003
7	-9.40E-004	-4.47E-003
8	-5.71E-004	-4.47E-003
9	-1.75E-004	-4.49E-003
10	-9.96E-005	-4.50E-003
11	-2.03E-005	-4.51E-003
12	1.28E-005	-4.53E-003
13	-1.21E-005	-4.53E-003
14	-1.08E-005	-4.60E-003
15	-6.05E-006	-5.03E-003
16	-1.31E-006	-5.28E-003
17	3.43E-006	-4.88E-003
18	8.17E-006	-4.01E-003
19	9.45E-006	-3.62E-003
20	-3.61E-004	-3.61E-003
21	-8.85E-004	-3.60E-003
22	-1.15E-003	-3.59E-003
23	-1.29E-003	-3.58E-003
24	-1.14E-003	-3.57E-003
25	1.61E-005	-3.86E-003
26	1.42E-005	-3.60E-003
27	7.10E-006	-2.91E-003
28	4.50E-011	-2.57E-003
29	-7.10E-006	-2.91E-003
30	-1.42E-005	-3.60E-003
31	-1.61E-005	-3.86E-003
32	2.00E-004	-3.86E-003
33	2.85E-004	-3.88E-003
34	1.05E-004	-3.89E-003
35	1.73E-005	-3.90E-003
36	1.28E-006	-3.92E-003
37	-1.02E-005	-3.92E-003
38	-9.00E-006	-3.97E-003
39	-4.50E-006	-4.33E-003
40	8.89E-011	-4.55E-003
41	4.50E-006	-4.33E-003
42	9.00E-006	-3.97E-003
43	1.02E-005	-3.92E-003
44	-1.28E-006	-3.92E-003
45	-1.73E-005	-3.90E-003
46	-1.05E-004	-3.89E-003
47	-2.85E-004	-3.88E-003
48	-2.00E-004	-3.86E-003
49	9.40E-004	-4.47E-003

50	9.38E-004	-4.06E-003
51	9.31E-004	-3.06E-003
52	9.24E-004	-2.49E-003
53	9.18E-004	-2.67E-003
54	9.11E-004	-3.30E-003
55	9.09E-004	-3.56E-003
56	1.14E-003	-3.57E-003
57	1.29E-003	-3.58E-003
58	1.15E-003	-3.59E-003
59	8.85E-004	-3.60E-003
60	3.61E-004	-3.61E-003
61	-9.45E-006	-3.62E-003
62	-8.17E-006	-4.01E-003
63	-3.43E-006	-4.88E-003
64	1.31E-006	-5.28E-003
65	6.05E-006	-5.03E-003
66	1.08E-005	-4.60E-003
67	1.21E-005	-4.53E-003
68	-1.28E-005	-4.53E-003
69	2.03E-005	-4.51E-003
70	9.96E-005	-4.50E-003
71	1.75E-004	-4.49E-003
72	5.71E-004	-4.47E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

-----

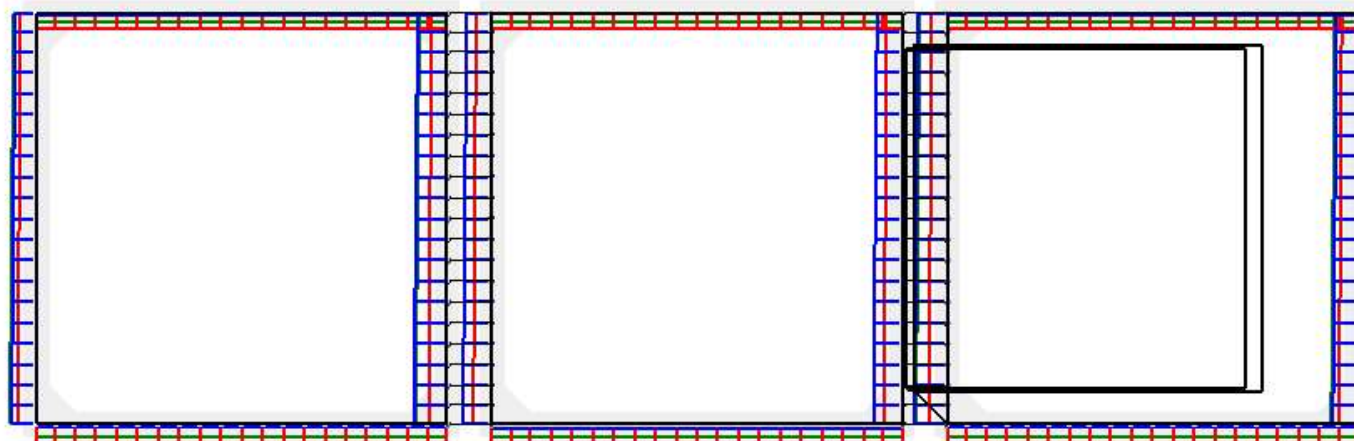
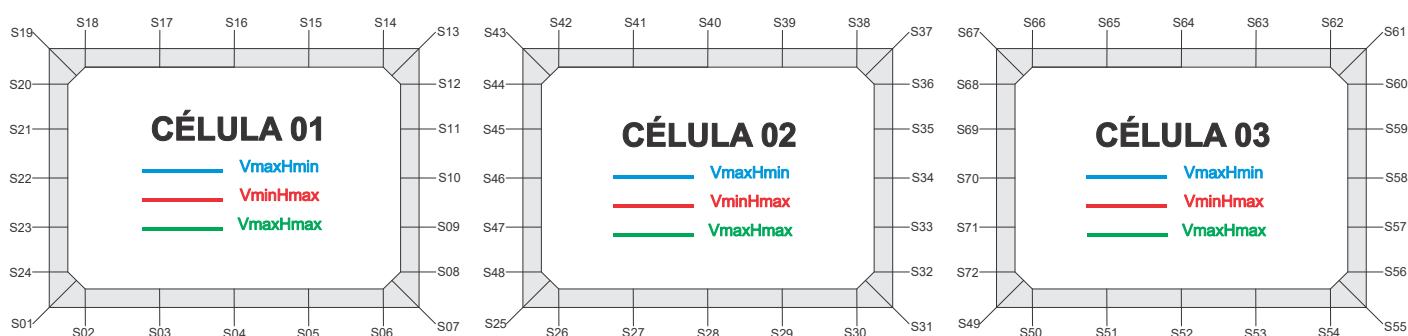
SEÇÃO	ROTAÇÃO (rad)
1	8.13E-004
2	9.18E-004
3	7.80E-004
4	-2.97E-004
5	-1.37E-003
6	-1.43E-003
7	-1.30E-003
8	-1.14E-003
9	-2.48E-004
10	-9.14E-005
11	-1.00E-004
12	2.60E-005
13	1.44E-004
14	3.15E-004
15	7.22E-004
16	-7.67E-005
17	-1.10E-003
18	-1.36E-003
19	-1.28E-003
20	-1.17E-003
21	-5.39E-004
22	-3.14E-004
23	-7.28E-005
24	6.78E-004
25	7.92E-004
26	9.23E-004
27	9.62E-004
28	-1.34E-011
29	-9.62E-004

30	-9.23E-004
31	-7.92E-004
32	-6.28E-004
33	1.96E-004
34	2.41E-004
35	7.42E-005
36	-4.89E-006
37	8.99E-005
38	2.43E-004
39	6.13E-004
40	-1.66E-011
41	-6.13E-004
42	-2.43E-004
43	-8.99E-005
44	4.89E-006
45	-7.42E-005
46	-2.41E-004
47	-1.96E-004
48	6.28E-004
49	1.30E-003
50	1.43E-003
51	1.37E-003
52	2.97E-004
53	-7.80E-004
54	-9.18E-004
55	-8.13E-004
56	-6.78E-004
57	7.28E-005
58	3.14E-004
59	5.39E-004
60	1.17E-003
61	1.28E-003
62	1.36E-003
63	1.10E-003
64	7.67E-005
65	-7.22E-004
66	-3.15E-004
67	-1.44E-004
68	-2.60E-005
69	1.00E-004
70	9.14E-005
71	2.48E-004
72	1.14E-003

---

## ESFORÇO NORMAL

### NOMENCLATURA DAS SEÇÕES PARA VERSÃO COMPLETA DO RELATÓRIO



```
#####
#          SOLICITAÇÕES NORMAIS (ELU)          #
#          VmaxHmin                             #
#####
```

-----

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-145.54	-18.22
2	-18.22	-18.22
3	-18.22	-18.22
4	-18.22	-18.22
5	-18.22	-18.22
6	-18.22	-18.22
7	-18.22	-192.64
8	-190.37	-190.37
9	-186.14	-186.14
10	-181.92	-181.92
11	-177.69	-177.69
12	-173.47	-173.47
13	-171.19	-12.50
14	-12.50	-12.50
15	-12.50	-12.50
16	-12.50	-12.50
17	-12.50	-12.50
18	-12.50	-12.50
19	-12.50	-124.09
20	-126.37	-126.37
21	-130.59	-130.59
22	-134.82	-134.82
23	-139.04	-139.04
24	-143.27	-143.27
25	-145.54	-25.39
26	-25.39	-25.39
27	-25.39	-25.39
28	-25.39	-25.39
29	-25.39	-25.39
30	-25.39	-25.39
31	-25.39	-169.09
32	-166.82	-166.82
33	-162.59	-162.59
34	-158.37	-158.37
35	-154.14	-154.14
36	-149.92	-149.92
37	-147.64	-5.33
38	-5.33	-5.33
39	-5.33	-5.33
40	-5.33	-5.33
41	-5.33	-5.33
42	-5.33	-5.33
43	-5.33	-147.64
44	-149.92	-149.92
45	-154.14	-154.14
46	-158.37	-158.37
47	-162.59	-162.59
48	-166.82	-166.82
49	-169.09	-18.22

	50	-18.22	-18.22
	51	-18.22	-18.22
	52	-18.22	-18.22
	53	-18.22	-18.22
	54	-18.22	-18.22
	55	-18.22	-145.54
	56	-143.27	-143.27
	57	-139.04	-139.04
	58	-134.82	-134.82
	59	-130.59	-130.59
	60	-126.37	-126.37
	61	-124.09	-12.50
	62	-12.50	-12.50
	63	-12.50	-12.50
	64	-12.50	-12.50
	65	-12.50	-12.50
	66	-12.50	-12.50
	67	-12.50	-171.19
	68	-173.47	-173.47
	69	-177.69	-177.69
	70	-181.92	-181.92
	71	-186.14	-186.14
	72	-190.37	-190.37

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```
#####
#          SOLICITAÇÕES NORMAIS (ELU)          #
#          VminHmax                             #
#####
```

-----

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-109.61	-113.01
2	-113.01	-113.01
3	-113.01	-113.01
4	-113.01	-113.01
5	-113.01	-113.01
6	-113.01	-113.01
7	-113.01	-106.93
8	-105.18	-105.18
9	-101.93	-101.93
10	-98.68	-98.68
11	-95.43	-95.43
12	-92.18	-92.18
13	-90.43	-86.98
14	-86.98	-86.98
15	-86.98	-86.98
16	-86.98	-86.98
17	-86.98	-86.98
18	-86.98	-86.98
19	-86.98	-93.11
20	-94.86	-94.86
21	-98.11	-98.11
22	-101.36	-101.36
23	-104.61	-104.61
24	-107.86	-107.86
25	-109.61	-112.96
26	-112.96	-112.96
27	-112.96	-112.96
28	-112.96	-112.96
29	-112.96	-112.96
30	-112.96	-112.96
31	-112.96	-108.27
32	-106.52	-106.52
33	-103.27	-103.27
34	-100.02	-100.02
35	-96.77	-96.77
36	-93.52	-93.52
37	-91.77	-87.03
38	-87.03	-87.03
39	-87.03	-87.03
40	-87.03	-87.03
41	-87.03	-87.03
42	-87.03	-87.03
43	-87.03	-91.77
44	-93.52	-93.52
45	-96.77	-96.77
46	-100.02	-100.02
47	-103.27	-103.27
48	-106.52	-106.52
49	-108.27	-113.01

	50	-113.01	-113.01
	51	-113.01	-113.01
	52	-113.01	-113.01
	53	-113.01	-113.01
	54	-113.01	-113.01
	55	-113.01	-109.61
	56	-107.86	-107.86
	57	-104.61	-104.61
	58	-101.36	-101.36
	59	-98.11	-98.11
	60	-94.86	-94.86
	61	-93.11	-86.98
	62	-86.98	-86.98
	63	-86.98	-86.98
	64	-86.98	-86.98
	65	-86.98	-86.98
	66	-86.98	-86.98
	67	-86.98	-90.43
	68	-92.18	-92.18
	69	-95.43	-95.43
	70	-98.68	-98.68
	71	-101.93	-101.93
	72	-105.18	-105.18

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```
#####
#          SOLICITAÇÕES NORMAIS (ELU)          #
#          VmaxHmax                             #
#####
```

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ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-155.39	-77.88
2	-77.88	-77.88
3	-77.88	-77.88
4	-77.88	-77.88
5	-77.88	-77.88
6	-77.88	-77.88
7	-77.88	-182.79
8	-180.52	-180.52
9	-176.29	-176.29
10	-172.07	-172.07
11	-167.84	-167.84
12	-163.62	-163.62
13	-161.34	-55.46
14	-55.46	-55.46
15	-55.46	-55.46
16	-55.46	-55.46
17	-55.46	-55.46
18	-55.46	-55.46
19	-55.46	-133.94
20	-136.22	-136.22
21	-140.44	-140.44
22	-144.67	-144.67
23	-148.89	-148.89
24	-153.12	-153.12
25	-155.39	-80.77
26	-80.77	-80.77
27	-80.77	-80.77
28	-80.77	-80.77
29	-80.77	-80.77
30	-80.77	-80.77
31	-80.77	-169.09
32	-166.82	-166.82
33	-162.59	-162.59
34	-158.37	-158.37
35	-154.14	-154.14
36	-149.92	-149.92
37	-147.64	-52.57
38	-52.57	-52.57
39	-52.57	-52.57
40	-52.57	-52.57
41	-52.57	-52.57
42	-52.57	-52.57
43	-52.57	-147.64
44	-149.92	-149.92
45	-154.14	-154.14
46	-158.37	-158.37
47	-162.59	-162.59
48	-166.82	-166.82
49	-169.09	-77.88

	50	-77.88	-77.88
	51	-77.88	-77.88
	52	-77.88	-77.88
	53	-77.88	-77.88
	54	-77.88	-77.88
	55	-77.88	-155.39
	56	-153.12	-153.12
	57	-148.89	-148.89
	58	-144.67	-144.67
	59	-140.44	-140.44
	60	-136.22	-136.22
	61	-133.94	-55.46
	62	-55.46	-55.46
	63	-55.46	-55.46
	64	-55.46	-55.46
	65	-55.46	-55.46
	66	-55.46	-55.46
	67	-55.46	-161.34
	68	-163.62	-163.62
	69	-167.84	-167.84
	70	-172.07	-172.07
	71	-176.29	-176.29
	72	-180.52	-180.52

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```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmin                                #
#####
```

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ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-148.72	-16.94
2	-16.94	-16.94
3	-16.94	-16.94
4	-16.94	-16.94
5	-16.94	-16.94
6	-16.94	-16.94
7	-16.94	-189.47
8	-187.19	-187.19
9	-182.97	-182.97
10	-178.74	-178.74
11	-174.52	-174.52
12	-170.29	-170.29
13	-168.02	-13.78
14	-13.78	-13.78
15	-13.78	-13.78
16	-13.78	-13.78
17	-13.78	-13.78
18	-13.78	-13.78
19	-13.78	-127.27
20	-129.54	-129.54
21	-133.77	-133.77
22	-137.99	-137.99
23	-142.22	-142.22
24	-146.44	-146.44
25	-148.72	-24.68
26	-24.68	-24.68
27	-24.68	-24.68
28	-24.68	-24.68
29	-24.68	-24.68
30	-24.68	-24.68
31	-24.68	-167.09
32	-164.81	-164.81
33	-160.59	-160.59
34	-156.36	-156.36
35	-152.14	-152.14
36	-147.91	-147.91
37	-145.64	-6.04
38	-6.04	-6.04
39	-6.04	-6.04
40	-6.04	-6.04
41	-6.04	-6.04
42	-6.04	-6.04
43	-6.04	-149.65
44	-151.92	-151.92
45	-156.15	-156.15
46	-160.37	-160.37
47	-164.60	-164.60
48	-168.82	-168.82
49	-171.10	-18.16

	50	-18.16	-18.16
	51	-18.16	-18.16
	52	-18.16	-18.16
	53	-18.16	-18.16
	54	-18.16	-18.16
	55	-18.16	-140.25
	56	-137.97	-137.97
	57	-133.75	-133.75
	58	-129.52	-129.52
	59	-125.30	-125.30
	60	-121.07	-121.07
	61	-118.80	-12.56
	62	-12.56	-12.56
	63	-12.56	-12.56
	64	-12.56	-12.56
	65	-12.56	-12.56
	66	-12.56	-12.56
	67	-12.56	-176.49
	68	-178.76	-178.76
	69	-182.99	-182.99
	70	-187.21	-187.21
	71	-191.44	-191.44
	72	-195.66	-195.66

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```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VminHmax                                #
#####
```

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-110.09	-112.87
2	-112.87	-112.87
3	-112.87	-112.87
4	-112.87	-112.87
5	-112.87	-112.87
6	-112.87	-112.87
7	-112.87	-106.45
8	-104.70	-104.70
9	-101.45	-101.45
10	-98.20	-98.20
11	-94.95	-94.95
12	-91.70	-91.70
13	-89.95	-87.13
14	-87.13	-87.13
15	-87.13	-87.13
16	-87.13	-87.13
17	-87.13	-87.13
18	-87.13	-87.13
19	-87.13	-93.59
20	-95.34	-95.34
21	-98.59	-98.59
22	-101.84	-101.84
23	-105.09	-105.09
24	-108.34	-108.34
25	-110.09	-112.98
26	-112.98	-112.98
27	-112.98	-112.98
28	-112.98	-112.98
29	-112.98	-112.98
30	-112.98	-112.98
31	-112.98	-107.80
32	-106.05	-106.05
33	-102.80	-102.80
34	-99.55	-99.55
35	-96.30	-96.30
36	-93.05	-93.05
37	-91.30	-87.02
38	-87.02	-87.02
39	-87.02	-87.02
40	-87.02	-87.02
41	-87.02	-87.02
42	-87.02	-87.02
43	-87.02	-92.24
44	-93.99	-93.99
45	-97.24	-97.24
46	-100.49	-100.49
47	-103.74	-103.74
48	-106.99	-106.99
49	-108.74	-113.20

	50	-113.20	-113.20
	51	-113.20	-113.20
	52	-113.20	-113.20
	53	-113.20	-113.20
	54	-113.20	-113.20
	55	-113.20	-109.53
	56	-107.78	-107.78
	57	-104.53	-104.53
	58	-101.28	-101.28
	59	-98.03	-98.03
	60	-94.78	-94.78
	61	-93.03	-86.80
	62	-86.80	-86.80
	63	-86.80	-86.80
	64	-86.80	-86.80
	65	-86.80	-86.80
	66	-86.80	-86.80
	67	-86.80	-90.51
	68	-92.26	-92.26
	69	-95.51	-95.51
	70	-98.76	-98.76
	71	-102.01	-102.01
	72	-105.26	-105.26

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```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmax                                #
#####
```

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-157.49	-77.22
2	-77.22	-77.22
3	-77.22	-77.22
4	-77.22	-77.22
5	-77.22	-77.22
6	-77.22	-77.22
7	-77.22	-180.69
8	-178.42	-178.42
9	-174.19	-174.19
10	-169.97	-169.97
11	-165.74	-165.74
12	-161.52	-161.52
13	-159.24	-56.12
14	-56.12	-56.12
15	-56.12	-56.12
16	-56.12	-56.12
17	-56.12	-56.12
18	-56.12	-56.12
19	-56.12	-136.04
20	-138.31	-138.31
21	-142.54	-142.54
22	-146.76	-146.76
23	-150.99	-150.99
24	-155.21	-155.21
25	-157.49	-81.00
26	-81.00	-81.00
27	-81.00	-81.00
28	-81.00	-81.00
29	-81.00	-81.00
30	-81.00	-81.00
31	-81.00	-167.90
32	-165.62	-165.62
33	-161.40	-161.40
34	-157.17	-157.17
35	-152.95	-152.95
36	-148.72	-148.72
37	-146.45	-52.33
38	-52.33	-52.33
39	-52.33	-52.33
40	-52.33	-52.33
41	-52.33	-52.33
42	-52.33	-52.33
43	-52.33	-148.84
44	-151.11	-151.11
45	-155.34	-155.34
46	-159.56	-159.56
47	-163.79	-163.79
48	-168.01	-168.01
49	-170.29	-78.51

	50	-78.51	-78.51
	51	-78.51	-78.51
	52	-78.51	-78.51
	53	-78.51	-78.51
	54	-78.51	-78.51
	55	-78.51	-151.87
	56	-149.60	-149.60
	57	-145.37	-145.37
	58	-141.15	-141.15
	59	-136.92	-136.92
	60	-132.70	-132.70
	61	-130.42	-54.83
	62	-54.83	-54.83
	63	-54.83	-54.83
	64	-54.83	-54.83
	65	-54.83	-54.83
	66	-54.83	-54.83
	67	-54.83	-164.86
	68	-167.14	-167.14
	69	-171.36	-171.36
	70	-175.59	-175.59
	71	-179.81	-179.81
	72	-184.04	-184.04

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```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VmaxHmin                             #
#####
```

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ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-110.82	-52.86
2	-52.86	-52.86
3	-52.86	-52.86
4	-52.86	-52.86
5	-52.86	-52.86
6	-52.86	-52.86
7	-52.86	-131.50
8	-129.75	-129.75
9	-126.50	-126.50
10	-123.25	-123.25
11	-120.00	-120.00
12	-116.75	-116.75
13	-115.00	-35.46
14	-35.46	-35.46
15	-35.46	-35.46
16	-35.46	-35.46
17	-35.46	-35.46
18	-35.46	-35.46
19	-35.46	-94.32
20	-96.07	-96.07
21	-99.32	-99.32
22	-102.57	-102.57
23	-105.82	-105.82
24	-109.07	-109.07
25	-110.82	-55.04
26	-55.04	-55.04
27	-55.04	-55.04
28	-55.04	-55.04
29	-55.04	-55.04
30	-55.04	-55.04
31	-55.04	-121.16
32	-119.41	-119.41
33	-116.16	-116.16
34	-112.91	-112.91
35	-109.66	-109.66
36	-106.41	-106.41
37	-104.66	-33.28
38	-33.28	-33.28
39	-33.28	-33.28
40	-33.28	-33.28
41	-33.28	-33.28
42	-33.28	-33.28
43	-33.28	-104.66
44	-106.41	-106.41
45	-109.66	-109.66
46	-112.91	-112.91
47	-116.16	-116.16
48	-119.41	-119.41
49	-121.16	-52.86

50	-52.86	-52.86
51	-52.86	-52.86
52	-52.86	-52.86
53	-52.86	-52.86
54	-52.86	-52.86
55	-52.86	-110.82
56	-109.07	-109.07
57	-105.82	-105.82
58	-102.57	-102.57
59	-99.32	-99.32
60	-96.07	-96.07
61	-94.32	-35.46
62	-35.46	-35.46
63	-35.46	-35.46
64	-35.46	-35.46
65	-35.46	-35.46
66	-35.46	-35.46
67	-35.46	-115.00
68	-116.75	-116.75
69	-120.00	-120.00
70	-123.25	-123.25
71	-126.50	-126.50
72	-129.75	-129.75

---

```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VminHmax                             #
#####
```

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-104.76	-82.43
2	-82.43	-82.43
3	-82.43	-82.43
4	-82.43	-82.43
5	-82.43	-82.43
6	-82.43	-82.43
7	-82.43	-111.78
8	-110.03	-110.03
9	-106.78	-106.78
10	-103.53	-103.53
11	-100.28	-100.28
12	-97.03	-97.03
13	-95.28	-61.33
14	-61.33	-61.33
15	-61.33	-61.33
16	-61.33	-61.33
17	-61.33	-61.33
18	-61.33	-61.33
19	-61.33	-88.26
20	-90.01	-90.01
21	-93.26	-93.26
22	-96.51	-96.51
23	-99.76	-99.76
24	-103.01	-103.01
25	-104.76	-83.15
26	-83.15	-83.15
27	-83.15	-83.15
28	-83.15	-83.15
29	-83.15	-83.15
30	-83.15	-83.15
31	-83.15	-108.27
32	-106.52	-106.52
33	-103.27	-103.27
34	-100.02	-100.02
35	-96.77	-96.77
36	-93.52	-93.52
37	-91.77	-60.61
38	-60.61	-60.61
39	-60.61	-60.61
40	-60.61	-60.61
41	-60.61	-60.61
42	-60.61	-60.61
43	-60.61	-91.77
44	-93.52	-93.52
45	-96.77	-96.77
46	-100.02	-100.02
47	-103.27	-103.27
48	-106.52	-106.52
49	-108.27	-82.43

50	-82.43	-82.43
51	-82.43	-82.43
52	-82.43	-82.43
53	-82.43	-82.43
54	-82.43	-82.43
55	-82.43	-104.76
56	-103.01	-103.01
57	-99.76	-99.76
58	-96.51	-96.51
59	-93.26	-93.26
60	-90.01	-90.01
61	-88.26	-61.33
62	-61.33	-61.33
63	-61.33	-61.33
64	-61.33	-61.33
65	-61.33	-61.33
66	-61.33	-61.33
67	-61.33	-95.28
68	-97.03	-97.03
69	-100.28	-100.28
70	-103.53	-103.53
71	-106.78	-106.78
72	-110.03	-110.03

---

```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VmaxHmax                             #
#####
```

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-111.48	-56.37
2	-56.37	-56.37
3	-56.37	-56.37
4	-56.37	-56.37
5	-56.37	-56.37
6	-56.37	-56.37
7	-56.37	-130.84
8	-129.09	-129.09
9	-125.84	-125.84
10	-122.59	-122.59
11	-119.34	-119.34
12	-116.09	-116.09
13	-114.34	-39.47
14	-39.47	-39.47
15	-39.47	-39.47
16	-39.47	-39.47
17	-39.47	-39.47
18	-39.47	-39.47
19	-39.47	-94.98
20	-96.73	-96.73
21	-99.98	-99.98
22	-103.23	-103.23
23	-106.48	-106.48
24	-109.73	-109.73
25	-111.48	-58.42
26	-58.42	-58.42
27	-58.42	-58.42
28	-58.42	-58.42
29	-58.42	-58.42
30	-58.42	-58.42
31	-58.42	-121.16
32	-119.41	-119.41
33	-116.16	-116.16
34	-112.91	-112.91
35	-109.66	-109.66
36	-106.41	-106.41
37	-104.66	-37.42
38	-37.42	-37.42
39	-37.42	-37.42
40	-37.42	-37.42
41	-37.42	-37.42
42	-37.42	-37.42
43	-37.42	-104.66
44	-106.41	-106.41
45	-109.66	-109.66
46	-112.91	-112.91
47	-116.16	-116.16
48	-119.41	-119.41
49	-121.16	-56.37

	50	-56.37	-56.37
	51	-56.37	-56.37
	52	-56.37	-56.37
	53	-56.37	-56.37
	54	-56.37	-56.37
	55	-56.37	-111.48
	56	-109.73	-109.73
	57	-106.48	-106.48
	58	-103.23	-103.23
	59	-99.98	-99.98
	60	-96.73	-96.73
	61	-94.98	-39.47
	62	-39.47	-39.47
	63	-39.47	-39.47
	64	-39.47	-39.47
	65	-39.47	-39.47
	66	-39.47	-39.47
	67	-39.47	-114.34
	68	-116.09	-116.09
	69	-119.34	-119.34
	70	-122.59	-122.59
	71	-125.84	-125.84
	72	-129.09	-129.09

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```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VminHmin                             #
#####
```

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-100.01	-52.71
2	-52.71	-52.71
3	-52.71	-52.71
4	-52.71	-52.71
5	-52.71	-52.71
6	-52.71	-52.71
7	-52.71	-116.53
8	-114.78	-114.78
9	-111.53	-111.53
10	-108.28	-108.28
11	-105.03	-105.03
12	-101.78	-101.78
13	-100.03	-35.61
14	-35.61	-35.61
15	-35.61	-35.61
16	-35.61	-35.61
17	-35.61	-35.61
18	-35.61	-35.61
19	-35.61	-83.51
20	-85.26	-85.26
21	-88.51	-88.51
22	-91.76	-91.76
23	-95.01	-95.01
24	-98.26	-98.26
25	-100.01	-54.46
26	-54.46	-54.46
27	-54.46	-54.46
28	-54.46	-54.46
29	-54.46	-54.46
30	-54.46	-54.46
31	-54.46	-108.27
32	-106.52	-106.52
33	-103.27	-103.27
34	-100.02	-100.02
35	-96.77	-96.77
36	-93.52	-93.52
37	-91.77	-33.86
38	-33.86	-33.86
39	-33.86	-33.86
40	-33.86	-33.86
41	-33.86	-33.86
42	-33.86	-33.86
43	-33.86	-91.77
44	-93.52	-93.52
45	-96.77	-96.77
46	-100.02	-100.02
47	-103.27	-103.27
48	-106.52	-106.52
49	-108.27	-52.71

	50	-52.71	-52.71
	51	-52.71	-52.71
	52	-52.71	-52.71
	53	-52.71	-52.71
	54	-52.71	-52.71
	55	-52.71	-100.01
	56	-98.26	-98.26
	57	-95.01	-95.01
	58	-91.76	-91.76
	59	-88.51	-88.51
	60	-85.26	-85.26
	61	-83.51	-35.61
	62	-35.61	-35.61
	63	-35.61	-35.61
	64	-35.61	-35.61
	65	-35.61	-35.61
	66	-35.61	-35.61
	67	-35.61	-100.03
	68	-101.78	-101.78
	69	-105.03	-105.03
	70	-108.28	-108.28
	71	-111.53	-111.53
	72	-114.78	-114.78

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#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmin                                  #
#####
```

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ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-106.76	-52.80
2	-52.80	-52.80
3	-52.80	-52.80
4	-52.80	-52.80
5	-52.80	-52.80
6	-52.80	-52.80
7	-52.80	-125.89
8	-124.14	-124.14
9	-120.89	-120.89
10	-117.64	-117.64
11	-114.39	-114.39
12	-111.14	-111.14
13	-109.39	-35.52
14	-35.52	-35.52
15	-35.52	-35.52
16	-35.52	-35.52
17	-35.52	-35.52
18	-35.52	-35.52
19	-35.52	-90.26
20	-92.01	-92.01
21	-95.26	-95.26
22	-98.51	-98.51
23	-101.76	-101.76
24	-105.01	-105.01
25	-106.76	-54.82
26	-54.82	-54.82
27	-54.82	-54.82
28	-54.82	-54.82
29	-54.82	-54.82
30	-54.82	-54.82
31	-54.82	-116.32
32	-114.57	-114.57
33	-111.32	-111.32
34	-108.07	-108.07
35	-104.82	-104.82
36	-101.57	-101.57
37	-99.82	-33.50
38	-33.50	-33.50
39	-33.50	-33.50
40	-33.50	-33.50
41	-33.50	-33.50
42	-33.50	-33.50
43	-33.50	-99.82
44	-101.57	-101.57
45	-104.82	-104.82
46	-108.07	-108.07
47	-111.32	-111.32
48	-114.57	-114.57
49	-116.32	-52.80

	50	-52.80	-52.80
	51	-52.80	-52.80
	52	-52.80	-52.80
	53	-52.80	-52.80
	54	-52.80	-52.80
	55	-52.80	-106.76
	56	-105.01	-105.01
	57	-101.76	-101.76
	58	-98.51	-98.51
	59	-95.26	-95.26
	60	-92.01	-92.01
	61	-90.26	-35.52
	62	-35.52	-35.52
	63	-35.52	-35.52
	64	-35.52	-35.52
	65	-35.52	-35.52
	66	-35.52	-35.52
	67	-35.52	-109.39
	68	-111.14	-111.14
	69	-114.39	-114.39
	70	-117.64	-117.64
	71	-120.89	-120.89
	72	-124.14	-124.14

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VminHmax                                  #
#####
```

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-104.39	-80.46
2	-80.46	-80.46
3	-80.46	-80.46
4	-80.46	-80.46
5	-80.46	-80.46
6	-80.46	-80.46
7	-80.46	-112.15
8	-110.40	-110.40
9	-107.15	-107.15
10	-103.90	-103.90
11	-100.65	-100.65
12	-97.40	-97.40
13	-95.65	-59.07
14	-59.07	-59.07
15	-59.07	-59.07
16	-59.07	-59.07
17	-59.07	-59.07
18	-59.07	-59.07
19	-59.07	-87.89
20	-89.64	-89.64
21	-92.89	-92.89
22	-96.14	-96.14
23	-99.39	-99.39
24	-102.64	-102.64
25	-104.39	-81.25
26	-81.25	-81.25
27	-81.25	-81.25
28	-81.25	-81.25
29	-81.25	-81.25
30	-81.25	-81.25
31	-81.25	-108.27
32	-106.52	-106.52
33	-103.27	-103.27
34	-100.02	-100.02
35	-96.77	-96.77
36	-93.52	-93.52
37	-91.77	-58.28
38	-58.28	-58.28
39	-58.28	-58.28
40	-58.28	-58.28
41	-58.28	-58.28
42	-58.28	-58.28
43	-58.28	-91.77
44	-93.52	-93.52
45	-96.77	-96.77
46	-100.02	-100.02
47	-103.27	-103.27
48	-106.52	-106.52
49	-108.27	-80.46

	50	-80.46	-80.46
	51	-80.46	-80.46
	52	-80.46	-80.46
	53	-80.46	-80.46
	54	-80.46	-80.46
	55	-80.46	-104.39
	56	-102.64	-102.64
	57	-99.39	-99.39
	58	-96.14	-96.14
	59	-92.89	-92.89
	60	-89.64	-89.64
	61	-87.89	-59.07
	62	-59.07	-59.07
	63	-59.07	-59.07
	64	-59.07	-59.07
	65	-59.07	-59.07
	66	-59.07	-59.07
	67	-59.07	-95.65
	68	-97.40	-97.40
	69	-100.65	-100.65
	70	-103.90	-103.90
	71	-107.15	-107.15
	72	-110.40	-110.40

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#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmax                                  #
#####
```

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ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

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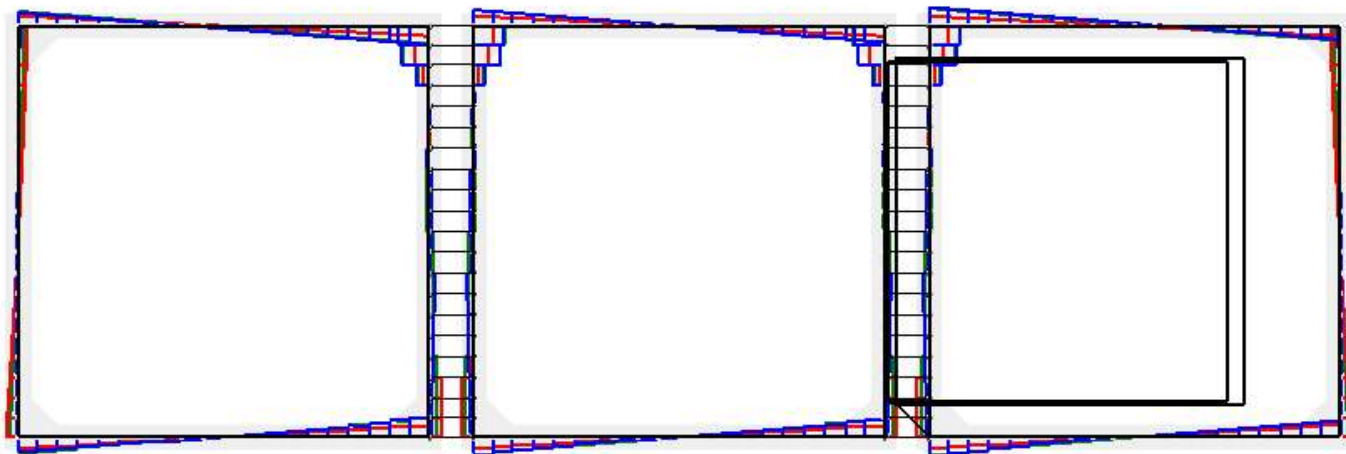
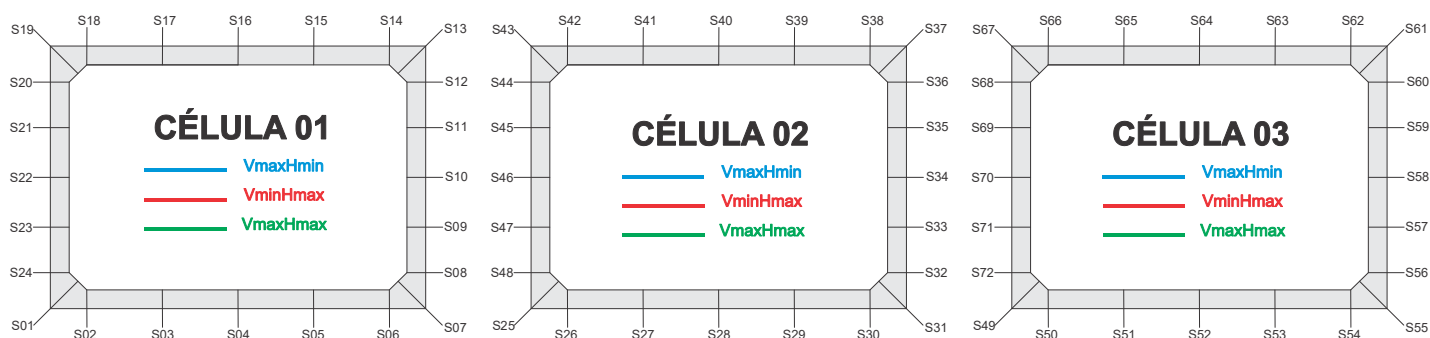
SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-107.18	-55.00
2	-55.00	-55.00
3	-55.00	-55.00
4	-55.00	-55.00
5	-55.00	-55.00
6	-55.00	-55.00
7	-55.00	-125.47
8	-123.72	-123.72
9	-120.47	-120.47
10	-117.22	-117.22
11	-113.97	-113.97
12	-110.72	-110.72
13	-108.97	-38.03
14	-38.03	-38.03
15	-38.03	-38.03
16	-38.03	-38.03
17	-38.03	-38.03
18	-38.03	-38.03
19	-38.03	-90.68
20	-92.43	-92.43
21	-95.68	-95.68
22	-98.93	-98.93
23	-102.18	-102.18
24	-105.43	-105.43
25	-107.18	-56.93
26	-56.93	-56.93
27	-56.93	-56.93
28	-56.93	-56.93
29	-56.93	-56.93
30	-56.93	-56.93
31	-56.93	-116.32
32	-114.57	-114.57
33	-111.32	-111.32
34	-108.07	-108.07
35	-104.82	-104.82
36	-101.57	-101.57
37	-99.82	-36.09
38	-36.09	-36.09
39	-36.09	-36.09
40	-36.09	-36.09
41	-36.09	-36.09
42	-36.09	-36.09
43	-36.09	-99.82
44	-101.57	-101.57
45	-104.82	-104.82
46	-108.07	-108.07
47	-111.32	-111.32
48	-114.57	-114.57
49	-116.32	-55.00

	50	-55.00	-55.00
	51	-55.00	-55.00
	52	-55.00	-55.00
	53	-55.00	-55.00
	54	-55.00	-55.00
	55	-55.00	-107.18
	56	-105.43	-105.43
	57	-102.18	-102.18
	58	-98.93	-98.93
	59	-95.68	-95.68
	60	-92.43	-92.43
	61	-90.68	-38.03
	62	-38.03	-38.03
	63	-38.03	-38.03
	64	-38.03	-38.03
	65	-38.03	-38.03
	66	-38.03	-38.03
	67	-38.03	-108.97
	68	-110.72	-110.72
	69	-113.97	-113.97
	70	-117.22	-117.22
	71	-120.47	-120.47
	72	-123.72	-123.72

---

## ESFORÇO CORTANTE

### NOMENCLATURA DAS SEÇÕES PARA VERSÃO COMPLETA DO RELATÓRIO



```
#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VmaxHmin #
#####
```

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	18.22	-136.31
2	-121.02	-103.71
3	-60.57	-46.66
4	-11.46	1.99
5	43.96	62.44
6	126.54	152.95
7	178.01	-18.22
8	-28.51	-28.51
9	-47.34	-47.34
10	-20.06	-20.06
11	21.77	11.49
12	105.59	254.41
13	283.80	-171.19
14	-143.25	-143.25
15	-83.40	-83.40
16	-23.55	-23.55
17	36.30	36.30
18	96.14	96.14
19	124.09	-12.50
20	-7.50	-7.50
21	1.83	1.83
22	9.10	9.10
23	14.31	14.31
24	17.46	17.46
25	18.22	-157.87
26	-138.75	-117.62
27	-64.26	-47.67
28	-7.10	7.10
29	47.67	64.26
30	117.62	138.75
31	157.87	-25.39
32	-35.69	-35.69
33	-54.52	-54.52
34	-27.23	-27.23
35	14.60	4.31
36	98.42	247.24
37	276.63	-147.64
38	-119.70	-119.70
39	-59.85	-59.85
40	0.00	0.00
41	59.85	59.85
42	119.70	119.70
43	147.64	-276.63
44	-247.24	-98.42
45	-4.31	-14.60
46	27.23	27.23
47	54.52	54.52
48	35.69	35.69
49	25.39	-178.01

	50	-152.95	-126.54
	51	-62.44	-43.96
	52	-1.99	11.46
	53	46.66	60.57
	54	103.71	121.02
	55	136.31	-18.22
	56	-17.46	-17.46
	57	-14.31	-14.31
	58	-9.10	-9.10
	59	-1.83	-1.83
	60	7.50	7.50
	61	12.50	-124.09
	62	-96.14	-96.14
	63	-36.30	-36.30
	64	23.55	23.55
	65	83.40	83.40
	66	143.25	143.25
	67	171.19	-283.80
	68	-254.41	-105.59
	69	-11.49	-21.77
	70	20.06	20.06
	71	47.34	47.34
	72	28.51	28.51

---

```
#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VminHmax #
#####
```

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	113.01	-103.70
2	-93.64	-81.41
3	-48.15	-36.77
4	-7.72	2.76
5	31.88	43.35
6	77.31	90.01
7	100.66	-113.01
8	-113.01	-113.01
9	0.61	0.61
10	0.61	0.61
11	0.61	-4.06
12	48.40	132.28
13	175.99	-90.43
14	-73.02	-73.02
15	-35.84	-35.84
16	1.34	1.34
17	38.52	38.52
18	75.70	75.70
19	93.11	-86.98
20	-73.59	-73.59
21	-40.78	-40.78
22	-2.76	-2.76
23	40.47	40.47
24	88.91	88.91
25	113.01	-101.99
26	-91.36	-78.70
27	-45.02	-33.70
28	-5.14	5.14
29	33.70	45.02
30	78.70	91.36
31	101.99	-112.96
32	-112.96	-112.96
33	0.66	0.66
34	0.66	0.66
35	0.66	-4.01
36	48.45	132.33
37	176.04	-91.77
38	-74.36	-74.36
39	-37.18	-37.18
40	0.00	0.00
41	37.18	37.18
42	74.36	74.36
43	91.77	-176.04
44	-132.33	-48.45
45	4.01	-0.66
46	-0.66	-0.66
47	-0.66	-0.66
48	112.96	112.96
49	112.96	-100.66

	50	-90.01	-77.31
	51	-43.35	-31.88
	52	-2.76	7.72
	53	36.77	48.15
	54	81.41	93.64
	55	103.70	-113.01
	56	-88.91	-88.91
	57	-40.47	-40.47
	58	2.76	2.76
	59	40.78	40.78
	60	73.59	73.59
	61	86.98	-93.11
	62	-75.70	-75.70
	63	-38.52	-38.52
	64	-1.34	-1.34
	65	35.84	35.84
	66	73.02	73.02
	67	90.43	-175.99
	68	-132.28	-48.40
	69	4.06	-0.61
	70	-0.61	-0.61
	71	-0.61	-0.61
	72	113.01	113.01

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#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VmaxHmax #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	77.88	-145.75
2	-129.42	-110.82
3	-62.83	-47.22
4	-7.54	7.00
5	50.20	68.15
6	126.63	149.64
7	170.61	-77.88
8	-77.88	-77.88
9	-39.82	-39.82
10	-39.82	19.38
11	19.38	-11.72
12	96.67	241.32
13	284.90	-161.34
14	-133.40	-133.40
15	-73.55	-73.55
16	-13.70	-13.70
17	46.15	46.15
18	105.99	105.99
19	133.94	-55.46
20	-46.53	-46.53
21	-24.65	-24.65
22	0.70	0.70
23	29.51	29.51
24	61.80	61.80
25	77.88	-158.61
26	-140.61	-120.25
27	-67.18	-50.15
28	-7.51	7.51
29	50.15	67.18
30	120.25	140.61
31	158.61	-80.77
32	-80.77	-80.77
33	-42.71	-42.71
34	-42.71	16.50
35	16.50	-14.61
36	93.78	238.43
37	282.01	-147.64
38	-119.70	-119.70
39	-59.85	-59.85
40	0.00	0.00
41	59.85	59.85
42	119.70	119.70
43	147.64	-282.01
44	-238.43	-93.78
45	14.61	-16.50
46	-16.50	42.71
47	42.71	42.71
48	80.77	80.77
49	80.77	-170.61

50	-149.64	-126.63
51	-68.15	-50.20
52	-7.00	7.54
53	47.22	62.83
54	110.82	129.42
55	145.75	-77.88
56	-61.80	-61.80
57	-29.51	-29.51
58	-0.70	-0.70
59	24.65	24.65
60	46.53	46.53
61	55.46	-133.94
62	-105.99	-105.99
63	-46.15	-46.15
64	13.70	13.70
65	73.55	73.55
66	133.40	133.40
67	161.34	-284.90
68	-241.32	-96.67
69	11.72	-19.38
70	-19.38	39.82
71	39.82	39.82
72	77.88	77.88

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#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmin                                #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	16.94	-139.25
2	-123.62	-106.07
3	-62.97	-49.30
4	-15.28	-2.32
5	38.34	56.55
6	121.02	148.12
7	174.16	-16.94
8	-27.24	-27.24
9	-46.07	-46.07
10	-34.71	-34.71
11	12.33	-2.56
12	84.65	254.00
13	313.81	-168.02
14	-140.07	-140.07
15	-80.22	-80.22
16	-20.37	-20.37
17	39.47	39.47
18	99.32	99.32
19	127.27	-13.78
20	-8.78	-8.78
21	0.55	0.55
22	7.82	7.82
23	13.03	13.03
24	16.18	16.18
25	16.94	-159.64
26	-140.20	-118.86
27	-65.64	-49.30
28	-9.90	3.86
29	43.26	59.64
30	113.44	135.22
31	155.25	-24.68
32	-34.98	-34.98
33	-53.81	-53.81
34	-38.30	-38.30
35	7.20	-7.09
36	76.51	238.48
37	294.86	-145.64
38	-117.69	-117.69
39	-57.84	-57.84
40	2.00	2.00
41	61.85	61.85
42	121.70	121.70
43	149.65	-306.07
44	-246.26	-76.90
45	10.30	-4.59
46	42.45	42.45
47	53.81	53.81
48	34.98	34.98
49	24.68	-182.68

	50	-156.58	-129.33
	51	-63.96	-45.47
	52	-4.36	8.58
	53	42.02	55.38
	54	97.60	115.04
	55	130.70	-18.16
	56	-17.40	-17.40
	57	-14.25	-14.25
	58	-9.04	-9.04
	59	-1.77	-1.77
	60	7.56	7.56
	61	12.56	-118.80
	62	-90.85	-90.85
	63	-31.00	-31.00
	64	28.85	28.85
	65	88.69	88.69
	66	148.54	148.54
	67	176.49	-301.38
	68	-245.00	-83.03
	69	0.57	-13.72
	70	31.78	31.78
	71	47.29	47.29
	72	28.46	28.46

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#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmínHmax                                #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	112.87	-104.17
2	-94.09	-81.85
3	-48.67	-37.34
4	-8.52	1.89
5	30.81	42.25
6	76.34	89.19
7	100.04	-112.87
8	-112.87	-112.87
9	0.71	0.71
10	0.71	0.71
11	0.71	-2.63
12	37.56	129.47
13	188.01	-89.95
14	-72.54	-72.54
15	-35.36	-35.36
16	1.82	1.82
17	39.00	39.00
18	76.18	76.18
19	93.59	-87.13
20	-73.74	-73.74
21	-40.92	-40.92
22	-2.90	-2.90
23	40.33	40.33
24	88.76	88.76
25	112.87	-102.38
26	-91.63	-78.89
27	-45.20	-33.94
28	-5.68	4.49
29	32.74	43.99
30	77.74	90.55
31	101.38	-112.98
32	-112.98	-112.98
33	0.75	0.75
34	0.75	0.75
35	0.75	-2.59
36	37.58	129.45
37	187.93	-91.30
38	-73.89	-73.89
39	-36.71	-36.71
40	0.47	0.47
41	37.65	37.65
42	74.83	74.83
43	92.24	-187.90
44	-129.35	-37.44
45	2.74	-0.60
46	-0.60	-0.60
47	-0.60	-0.60
48	112.98	112.98
49	112.98	-100.64

	50	-89.85	-77.03
	51	-42.87	-31.38
	52	-2.27	8.19
	53	37.11	48.45
	54	81.52	93.68
	55	103.66	-113.20
	56	-89.09	-89.09
	57	-40.66	-40.66
	58	2.57	2.57
	59	40.59	40.59
	60	73.41	73.41
	61	86.80	-93.03
	62	-75.62	-75.62
	63	-38.44	-38.44
	64	-1.26	-1.26
	65	35.92	35.92
	66	73.10	73.10
	67	90.51	-187.71
	68	-129.23	-37.37
	69	2.81	-0.53
	70	-0.53	-0.53
	71	-0.53	-0.53
	72	113.20	113.20

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#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmax                                #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	77.22	-147.77
2	-131.36	-112.74
3	-65.12	-49.77
4	-11.11	3.06
5	45.34	63.15
6	122.27	145.97
7	167.90	-77.22
8	-77.22	-77.22
9	-30.89	-30.89
10	-30.89	16.03
11	16.03	-9.87
12	76.56	238.48
13	310.11	-159.24
14	-131.30	-131.30
15	-71.45	-71.45
16	-11.60	-11.60
17	48.24	48.24
18	108.09	108.09
19	136.04	-56.12
20	-47.19	-47.19
21	-25.31	-25.31
22	0.04	0.04
23	28.85	28.85
24	61.14	61.14
25	77.22	-159.61
26	-141.33	-120.79
27	-67.86	-51.07
28	-9.43	5.21
29	46.90	63.76
30	117.24	138.15
31	156.91	-81.00
32	-81.00	-81.00
33	-33.26	-33.26
34	-33.26	14.06
35	14.06	-11.98
36	73.01	231.67
37	301.66	-146.45
38	-118.50	-118.50
39	-58.65	-58.65
40	1.20	1.20
41	61.04	61.04
42	120.89	120.89
43	148.84	-306.32
44	-234.70	-72.77
45	13.66	-12.24
46	-12.24	34.67
47	34.67	34.67
48	81.00	81.00
49	81.00	-173.56

	50	-151.64	-127.84
	51	-68.08	-50.04
	52	-7.29	6.93
	53	45.33	60.49
	54	107.44	125.89
	55	142.18	-78.51
	56	-62.43	-62.43
	57	-30.14	-30.14
	58	-1.33	-1.33
	59	24.02	24.02
	60	45.90	45.90
	61	54.83	-130.42
	62	-102.47	-102.47
	63	-42.63	-42.63
	64	17.22	17.22
	65	77.07	77.07
	66	136.92	136.92
	67	164.86	-304.15
	68	-234.17	-75.51
	69	9.49	-16.56
	70	-16.56	30.77
	71	30.77	30.77
	72	78.51	78.51

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#####
# VERIFICAÇÃO DA FADIGA (ELS) #
# VmaxHmin #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	52.86	-103.86
2	-92.23	-78.86
3	-44.66	-33.49
4	-5.32	5.10
5	35.92	48.85
6	90.89	107.55
7	122.66	-52.86
8	-52.86	-52.86
9	-30.35	-30.35
10	-30.35	14.73
11	14.73	-8.66
12	69.31	172.18
13	201.83	-115.00
14	-95.17	-95.17
15	-52.76	-52.76
16	-10.34	-10.34
17	32.07	32.07
18	74.49	74.49
19	94.32	-35.46
20	-29.95	-29.95
21	-16.05	-16.05
22	0.54	0.54
23	19.83	19.83
24	41.81	41.81
25	52.86	-113.59
26	-100.72	-86.05
27	-48.05	-35.82
28	-5.39	5.39
29	35.82	48.05
30	86.05	100.72
31	113.59	-55.04
32	-55.04	-55.04
33	-32.53	-32.53
34	-32.52	12.55
35	12.55	-10.84
36	67.13	170.00
37	199.65	-104.66
38	-84.83	-84.83
39	-42.42	-42.42
40	0.00	0.00
41	42.42	42.42
42	84.83	84.83
43	104.66	-199.65
44	-170.00	-67.13
45	10.84	-12.55
46	-12.55	32.52
47	32.53	32.53
48	55.04	55.04
49	55.04	-122.66

	50	-107.55	-90.89
	51	-48.85	-35.92
	52	-5.10	5.32
	53	33.49	44.66
	54	78.86	92.23
	55	103.86	-52.86
	56	-41.81	-41.81
	57	-19.83	-19.83
	58	-0.54	-0.54
	59	16.05	16.05
	60	29.95	29.95
	61	35.46	-94.32
	62	-74.49	-74.49
	63	-32.07	-32.07
	64	10.34	10.34
	65	52.76	52.76
	66	95.17	95.17
	67	115.00	-201.83
	68	-172.18	-69.31
	69	8.66	-14.73
	70	-14.73	30.35
	71	30.35	30.35
	72	52.86	52.86

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#####
# VERIFICAÇÃO DA FADIGA (ELS) #
# VminHmax #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	82.43	-98.63
2	-88.35	-76.10
3	-43.85	-32.99
4	-5.59	4.43
5	32.82	44.34
6	79.63	93.19
7	104.88	-82.43
8	-82.43	-82.43
9	-5.63	-5.63
10	-5.63	3.25
11	3.25	-4.17
12	54.22	141.33
13	177.02	-95.28
14	-77.87	-77.87
15	-40.69	-40.69
16	-3.51	-3.51
17	33.67	33.67
18	70.85	70.85
19	88.26	-61.33
20	-51.87	-51.87
21	-28.53	-28.53
22	-1.28	-1.28
23	29.87	29.87
24	64.93	64.93
25	82.43	-101.82
26	-90.95	-78.12
27	-44.38	-33.15
28	-5.05	5.05
29	33.15	44.38
30	78.12	90.95
31	101.82	-83.15
32	-83.15	-83.15
33	-6.35	-6.35
34	-6.35	2.53
35	2.53	-4.89
36	53.50	140.62
37	176.30	-91.77
38	-74.36	-74.36
39	-37.18	-37.18
40	0.00	0.00
41	37.18	37.18
42	74.36	74.36
43	91.77	-176.30
44	-140.62	-53.50
45	4.89	-2.53
46	-2.53	6.35
47	6.35	6.35
48	83.15	83.15
49	83.15	-104.88

	50	-93.19	-79.63
	51	-44.34	-32.82
	52	-4.43	5.59
	53	32.99	43.85
	54	76.10	88.35
	55	98.63	-82.43
	56	-64.93	-64.93
	57	-29.87	-29.87
	58	1.28	1.28
	59	28.53	28.53
	60	51.87	51.87
	61	61.33	-88.26
	62	-70.85	-70.85
	63	-33.67	-33.67
	64	3.51	3.51
	65	40.69	40.69
	66	77.87	77.87
	67	95.28	-177.02
	68	-141.33	-54.22
	69	4.17	-3.25
	70	-3.25	5.63
	71	5.63	5.63
	72	82.43	82.43

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#####
# VERIFICAÇÃO DA FADIGA (ELS) #
# VmaxHmax #
#####
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-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	56.37	-104.54
2	-92.90	-79.51
3	-45.12	-33.87
4	-5.45	5.04
5	35.95	48.87
6	90.67	107.18
7	122.11	-56.37
8	-56.37	-56.37
9	-28.18	-28.18
10	-28.18	13.72
11	13.72	-8.30
12	68.49	170.99
13	201.93	-114.34
14	-94.51	-94.51
15	-52.10	-52.10
16	-9.68	-9.68
17	32.73	32.73
18	75.15	75.15
19	94.98	-39.47
20	-33.17	-33.17
21	-17.61	-17.61
22	0.55	0.55
23	21.32	21.32
24	44.70	44.70
25	56.37	-113.63
26	-100.80	-86.17
27	-48.19	-35.93
28	-5.41	5.41
29	35.93	48.19
30	86.17	100.80
31	113.63	-58.42
32	-58.42	-58.42
33	-30.23	-30.23
34	-30.23	11.67
35	11.67	-10.35
36	66.44	168.94
37	199.88	-104.66
38	-84.83	-84.83
39	-42.42	-42.42
40	0.00	0.00
41	42.42	42.42
42	84.83	84.83
43	104.66	-199.88
44	-168.94	-66.44
45	10.35	-11.67
46	-11.67	30.23
47	30.23	30.23
48	58.42	58.42
49	58.42	-122.11

	50	-107.18	-90.67
	51	-48.87	-35.95
	52	-5.04	5.45
	53	33.87	45.12
	54	79.51	92.90
	55	104.54	-56.37
	56	-44.70	-44.70
	57	-21.32	-21.32
	58	-0.55	-0.55
	59	17.61	17.61
	60	33.17	33.17
	61	39.47	-94.98
	62	-75.15	-75.15
	63	-32.73	-32.73
	64	9.68	9.68
	65	52.10	52.10
	66	94.51	94.51
	67	114.34	-201.93
	68	-170.99	-68.49
	69	8.30	-13.72
	70	-13.72	28.18
	71	28.18	28.18
	72	56.37	56.37

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#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VminHmin                             #
#####
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ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	52.71	-93.77
2	-83.46	-71.38
3	-40.60	-30.41
4	-4.94	4.57
5	32.16	43.78
6	80.90	95.64
7	108.76	-52.71
8	-52.71	-52.71
9	-23.75	-23.75
10	-23.75	11.61
11	11.61	-7.12
12	59.80	149.53
13	176.97	-100.03
14	-82.62	-82.62
15	-45.44	-45.44
16	-8.26	-8.26
17	28.92	28.92
18	66.10	66.10
19	83.51	-35.61
20	-30.10	-30.10
21	-16.20	-16.20
22	0.39	0.39
23	19.68	19.68
24	41.66	41.66
25	52.71	-101.52
26	-90.20	-77.06
27	-43.21	-32.15
28	-4.89	4.89
29	32.15	43.21
30	77.06	90.20
31	101.52	-54.46
32	-54.46	-54.46
33	-25.51	-25.51
34	-25.51	9.86
35	9.86	-8.88
36	58.05	147.78
37	175.22	-91.77
38	-74.36	-74.36
39	-37.18	-37.18
40	0.00	0.00
41	37.18	37.18
42	74.36	74.36
43	91.77	-175.22
44	-147.78	-58.05
45	8.88	-9.86
46	-9.86	25.51
47	25.51	25.51
48	54.46	54.46
49	54.46	-108.76

	50	-95.64	-80.90
	51	-43.78	-32.16
	52	-4.57	4.94
	53	30.41	40.60
	54	71.38	83.46
	55	93.77	-52.71
	56	-41.66	-41.66
	57	-19.68	-19.68
	58	-0.39	-0.39
	59	16.20	16.20
	60	30.10	30.10
	61	35.61	-83.51
	62	-66.10	-66.10
	63	-28.92	-28.92
	64	8.26	8.26
	65	45.44	45.44
	66	82.62	82.62
	67	100.03	-176.97
	68	-149.53	-59.80
	69	7.12	-11.61
	70	-11.61	23.75
	71	23.75	23.75
	72	52.71	52.71

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmin                                   #
#####
```

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	52.80	-100.08
2	-88.94	-76.05
3	-43.14	-32.34
4	-5.18	4.90
5	34.51	46.95
6	87.14	103.08
7	117.44	-52.81
8	-52.81	-52.81
9	-27.87	-27.87
10	-27.87	13.56
11	13.56	-8.08
12	65.74	163.69
13	192.51	-109.39
14	-90.47	-90.47
15	-50.01	-50.01
16	-9.56	-9.56
17	30.89	30.89
18	71.34	71.34
19	90.26	-35.52
20	-30.01	-30.01
21	-16.11	-16.11
22	0.48	0.48
23	19.77	19.77
24	41.75	41.75
25	52.80	-109.07
26	-96.77	-82.68
27	-46.24	-34.44
28	-5.20	5.20
29	34.44	46.24
30	82.68	96.77
31	109.07	-54.82
32	-54.82	-54.82
33	-29.89	-29.89
34	-29.89	11.54
35	11.54	-10.10
36	63.73	161.67
37	190.49	-99.82
38	-80.90	-80.90
39	-40.45	-40.45
40	0.00	0.00
41	40.45	40.45
42	80.90	80.90
43	99.82	-190.49
44	-161.67	-63.73
45	10.10	-11.54
46	-11.54	29.89
47	29.89	29.89
48	54.82	54.82
49	54.82	-117.44

	50	-103.08	-87.14
	51	-46.95	-34.51
	52	-4.90	5.18
	53	32.34	43.14
	54	76.05	88.94
	55	100.08	-52.80
	56	-41.75	-41.75
	57	-19.77	-19.77
	58	-0.48	-0.48
	59	16.11	16.11
	60	30.01	30.01
	61	35.52	-90.26
	62	-71.34	-71.34
	63	-30.89	-30.89
	64	9.56	9.56
	65	50.01	50.01
	66	90.47	90.47
	67	109.39	-192.51
	68	-163.69	-65.74
	69	8.08	-13.56
	70	-13.56	27.87
	71	27.87	27.87
	72	52.81	52.81

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VminHmax                                  #
#####
```

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	80.46	-98.25
2	-87.97	-75.73
3	-43.59	-32.79
4	-5.52	4.47
5	32.80	44.33
6	79.75	93.40
7	105.19	-80.46
8	-80.46	-80.46
9	-6.85	-6.85
10	-6.85	3.81
11	3.81	-4.37
12	54.68	142.00
13	176.96	-95.65
14	-78.24	-78.24
15	-41.06	-41.06
16	-3.88	-3.88
17	33.30	33.30
18	70.48	70.48
19	87.89	-59.07
20	-50.06	-50.06
21	-27.65	-27.65
22	-1.29	-1.29
23	29.03	29.03
24	63.31	63.31
25	80.46	-101.80
26	-90.90	-78.05
27	-44.30	-33.09
28	-5.04	5.04
29	33.09	44.30
30	78.05	90.90
31	101.80	-81.25
32	-81.25	-81.25
33	-7.64	-7.64
34	-7.64	3.02
35	3.02	-5.16
36	53.90	141.21
37	176.17	-91.77
38	-74.36	-74.36
39	-37.18	-37.18
40	0.00	0.00
41	37.18	37.18
42	74.36	74.36
43	91.77	-176.17
44	-141.21	-53.90
45	5.16	-3.02
46	-3.02	7.64
47	7.64	7.64
48	81.25	81.25
49	81.25	-105.19

	50	-93.40	-79.75
	51	-44.33	-32.80
	52	-4.47	5.52
	53	32.79	43.59
	54	75.73	87.97
	55	98.25	-80.46
	56	-63.31	-63.31
	57	-29.03	-29.03
	58	1.29	1.29
	59	27.65	27.65
	60	50.06	50.06
	61	59.07	-87.89
	62	-70.48	-70.48
	63	-33.30	-33.30
	64	3.88	3.88
	65	41.06	41.06
	66	78.24	78.24
	67	95.65	-176.96
	68	-142.00	-54.68
	69	4.37	-3.81
	70	-3.81	6.85
	71	6.85	6.85
	72	80.46	80.46

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmax                                   #
#####
```

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

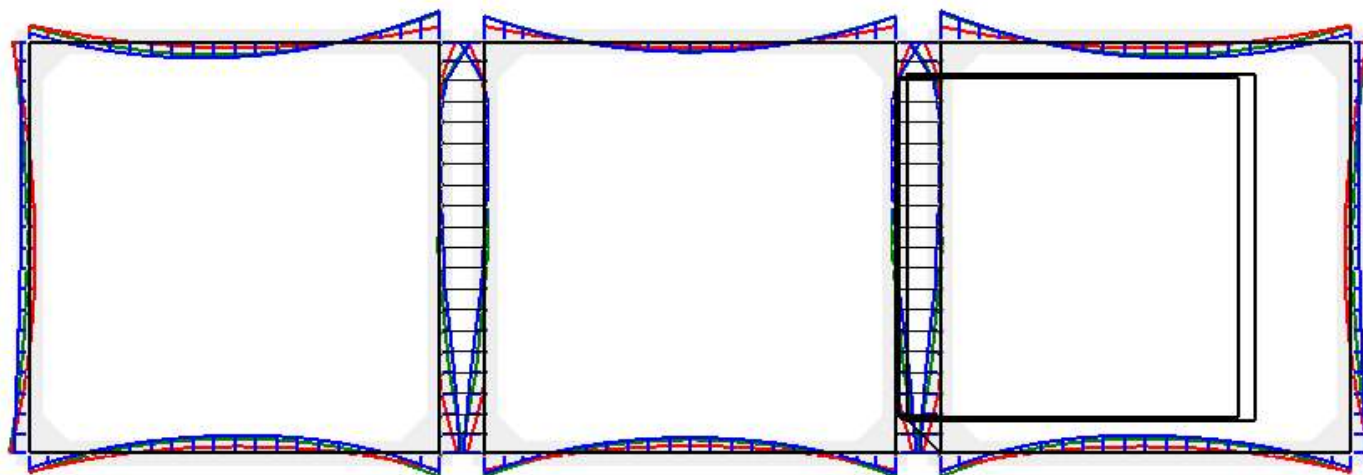
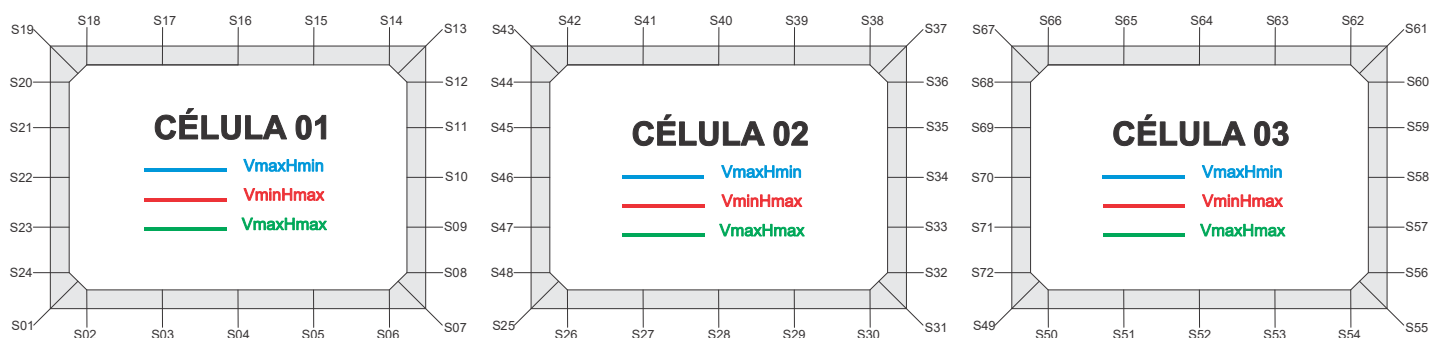
SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	55.00	-100.50
2	-89.36	-76.46
3	-43.43	-32.57
4	-5.26	4.86
5	34.53	46.96
6	87.00	102.85
7	117.10	-55.00
8	-55.00	-55.00
9	-26.52	-26.52
10	-26.52	12.93
11	12.93	-7.86
12	65.23	162.94
13	192.57	-108.97
14	-90.05	-90.05
15	-49.60	-49.60
16	-9.15	-9.15
17	31.30	31.30
18	71.76	71.76
19	90.68	-38.03
20	-32.02	-32.02
21	-17.08	-17.08
22	0.49	0.49
23	20.71	20.71
24	43.56	43.56
25	55.00	-109.09
26	-96.83	-82.75
27	-46.32	-34.51
28	-5.22	5.22
29	34.51	46.32
30	82.75	96.83
31	109.09	-56.93
32	-56.93	-56.93
33	-28.46	-28.46
34	-28.46	10.99
35	10.99	-9.80
36	63.29	161.01
37	190.63	-99.82
38	-80.90	-80.90
39	-40.45	-40.45
40	0.00	0.00
41	40.45	40.45
42	80.90	80.90
43	99.82	-190.63
44	-161.01	-63.29
45	9.80	-10.99
46	-10.99	28.46
47	28.46	28.46
48	56.93	56.93
49	56.93	-117.10

	50	-102.85	-87.00
	51	-46.96	-34.53
	52	-4.86	5.26
	53	32.57	43.43
	54	76.46	89.36
	55	100.50	-55.00
	56	-43.56	-43.56
	57	-20.71	-20.71
	58	-0.49	-0.49
	59	17.08	17.08
	60	32.02	32.02
	61	38.03	-90.68
	62	-71.76	-71.76
	63	-31.30	-31.30
	64	9.15	9.15
	65	49.60	49.60
	66	90.05	90.05
	67	108.97	-192.57
	68	-162.94	-65.23
	69	7.86	-12.93
	70	-12.93	26.52
	71	26.52	26.52
	72	55.00	55.00

---

## MOMENTO FLETOR

### NOMENCLATURA DAS SEÇÕES PARA VERSÃO COMPLETA DO RELATÓRIO



```
#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VmaxHmin #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-51.90	51.90
2	13.30	13.30
3	-39.75	-39.75
4	-58.59	-58.59
5	-44.07	-44.07
6	16.60	16.60
7	66.25	66.25
8	59.21	59.21
9	34.30	34.30
10	12.14	12.14
11	4.12	4.12
12	24.11	24.11
13	104.82	-104.82
14	-57.65	-57.65
15	16.01	16.01
16	50.77	50.77
17	46.63	46.63
18	3.58	3.58
19	-29.45	-29.45
20	-26.46	-26.46
21	-24.73	-24.73
22	-28.39	-28.39
23	-36.10	-36.10
24	-46.54	-46.54
25	-51.90	69.28
26	24.79	24.79
27	-33.87	-33.87
28	-51.47	-51.47
29	-33.87	-33.87
30	24.79	24.79
31	69.28	69.28
32	60.10	60.10
33	30.52	30.52
34	3.70	3.70
35	-8.98	-8.98
36	6.34	6.34
37	84.90	-84.90
38	-44.80	-44.80
39	13.56	13.56
40	33.01	33.01
41	13.56	13.56
42	-44.80	-44.80
43	-84.90	-84.90
44	-6.34	-6.34
45	8.98	8.98
46	-3.70	-3.70
47	-30.52	-30.52
48	-60.10	-60.10
49	-69.28	66.25

	50	16.60	16.60
	51	-44.07	-44.07
	52	-58.59	-58.59
	53	-39.75	-39.75
	54	13.30	13.30
	55	51.90	51.90
	56	46.54	46.54
	57	36.10	36.10
	58	28.39	28.39
	59	24.73	24.73
	60	26.46	26.46
	61	29.45	-29.45
	62	3.58	3.58
	63	46.63	46.63
	64	50.77	50.77
	65	16.01	16.01
	66	-57.65	-57.65
	67	-104.82	-104.82
	68	-24.11	-24.11
	69	-4.12	-4.12
	70	-12.14	-12.14
	71	-34.30	-34.30
	72	-59.21	-59.21

---

```
#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VminHmax #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-64.67	64.67
2	35.07	35.07
3	-6.92	-6.92
4	-21.30	-21.30
5	-10.12	-10.12
6	28.94	28.94
7	57.54	57.54
8	23.64	23.64
9	-0.99	-0.99
10	-0.60	-0.60
11	-0.20	-0.20
12	6.15	6.15
13	52.39	-52.39
14	-27.87	-27.87
15	7.51	7.51
16	18.72	18.72
17	5.77	5.77
18	-31.35	-31.35
19	-56.67	-56.67
20	-32.55	-32.55
21	4.90	4.90
22	19.33	19.33
23	7.35	7.35
24	-34.41	-34.41
25	-64.67	58.39
26	29.39	29.39
27	-10.66	-10.66
28	-23.19	-23.19
29	-10.66	-10.66
30	29.39	29.39
31	58.39	58.39
32	24.50	24.50
33	-0.10	-0.10
34	0.33	0.33
35	0.76	0.76
36	7.15	7.15
37	53.40	-53.40
38	-28.48	-28.48
39	7.77	7.77
40	19.85	19.85
41	7.77	7.77
42	-28.48	-28.48
43	-53.40	-53.40
44	-7.15	-7.15
45	-0.76	-0.76
46	-0.33	-0.33
47	0.10	0.10
48	-24.50	-24.50
49	-58.39	57.54

	50	28.94	28.94
	51	-10.12	-10.12
	52	-21.30	-21.30
	53	-6.92	-6.92
	54	35.07	35.07
	55	64.67	64.67
	56	34.41	34.41
	57	-7.35	-7.35
	58	-19.33	-19.33
	59	-4.90	-4.90
	60	32.55	32.55
	61	56.67	-56.67
	62	-31.35	-31.35
	63	5.77	5.77
	64	18.72	18.72
	65	7.51	7.51
	66	-27.87	-27.87
	67	-52.39	-52.39
	68	-6.15	-6.15
	69	0.20	0.20
	70	0.60	0.60
	71	0.99	0.99
	72	-23.64	-23.64

---

```
#####
# SOLICITAÇÕES NORMAIS (ELU) #
# VmaxHmax #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-66.79	66.79
2	25.52	25.52
3	-30.60	-30.60
4	-48.31	-48.31
5	-30.00	-30.00
6	32.80	32.80
7	80.84	80.84
8	57.48	57.48
9	19.22	19.22
10	-6.66	-6.66
11	5.94	5.94
12	18.26	18.26
13	97.19	-97.19
14	-52.98	-52.98
15	14.28	14.28
16	42.63	42.63
17	32.09	32.09
18	-17.36	-17.36
19	-53.35	-53.35
20	-38.03	-38.03
21	-14.71	-14.71
22	-6.74	-6.74
23	-16.37	-16.37
24	-45.86	-45.86
25	-66.79	80.07
26	35.19	35.19
27	-25.38	-25.38
28	-43.95	-43.95
29	-25.38	-25.38
30	35.19	35.19
31	80.07	80.07
32	55.84	55.84
33	15.71	15.71
34	-12.05	-12.05
35	-1.33	-1.33
36	9.11	9.11
37	87.18	-87.18
38	-47.08	-47.08
39	11.28	11.28
40	30.73	30.73
41	11.28	11.28
42	-47.08	-47.08
43	-87.18	-87.18
44	-9.11	-9.11
45	1.33	1.33
46	12.05	12.05
47	-15.71	-15.71
48	-55.84	-55.84
49	-80.07	80.84

	50	32.80	32.80
	51	-30.00	-30.00
	52	-48.31	-48.31
	53	-30.60	-30.60
	54	25.52	25.52
	55	66.79	66.79
	56	45.86	45.86
	57	16.37	16.37
	58	6.74	6.74
	59	14.71	14.71
	60	38.03	38.03
	61	53.35	-53.35
	62	-17.36	-17.36
	63	32.09	32.09
	64	42.63	42.63
	65	14.28	14.28
	66	-52.98	-52.98
	67	-97.19	-97.19
	68	-18.26	-18.26
	69	-5.94	-5.94
	70	6.66	6.66
	71	-19.22	-19.22
	72	-57.48	-57.48

---

```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmin                                 #
#####
```

-----

MOMENTO FLETOR NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-51.80	51.80
2	12.37	12.37
3	-42.18	-42.18
4	-63.11	-63.11
5	-51.83	-51.83
6	5.06	5.06
7	53.40	53.40
8	46.75	46.75
9	22.66	22.66
10	0.29	0.29
11	1.92	1.92
12	13.48	13.48
13	98.63	-98.63
14	-52.42	-52.42
15	19.18	19.18
16	51.87	51.87
17	45.66	45.66
18	0.56	0.56
19	-33.43	-33.43
20	-30.06	-30.06
21	-27.50	-27.50
22	-30.33	-30.33
23	-37.21	-37.21
24	-46.82	-46.82
25	-51.80	67.81
26	22.83	22.83
27	-36.64	-36.64
28	-55.66	-55.66
29	-40.56	-40.56
30	15.16	15.16
31	58.73	58.73
32	49.76	49.76
33	20.64	20.64
34	-4.74	-4.74
35	-6.20	-6.20
36	1.88	1.88
37	81.85	-81.85
38	-42.35	-42.35
39	14.69	14.69
40	32.84	32.84
41	12.09	12.09
42	-47.56	-47.56
43	-88.26	-88.26
44	-5.44	-5.44
45	1.09	1.09
46	-2.31	-2.31
47	-29.72	-29.72
48	-58.83	-58.83
49	-67.81	65.30

	50	14.41	14.41
	51	-47.59	-47.59
	52	-63.33	-63.33
	53	-46.93	-46.93
	54	2.39	2.39
	55	39.25	39.25
	56	33.91	33.91
	57	23.51	23.51
	58	15.82	15.82
	59	12.20	12.20
	60	13.97	13.97
	61	16.97	-16.97
	62	14.47	14.47
	63	54.08	54.08
	64	54.78	54.78
	65	16.57	16.57
	66	-60.53	-60.53
	67	-109.28	-109.28
	68	-27.35	-27.35
	69	-15.04	-15.04
	70	-12.25	-12.25
	71	-33.40	-33.40
	72	-58.28	-58.28

---

```
#####
# SOLICITAÇÕES TANGENCIAIS (ELU) #
# VminHmax #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-64.81	64.81
2	35.07	35.07
3	-7.22	-7.22
4	-22.05	-22.05
5	-11.51	-11.51
6	26.87	26.87
7	55.25	55.25
8	21.39	21.39
9	-1.35	-1.35
10	-0.89	-0.89
11	-0.43	-0.43
12	3.83	3.83
13	51.45	-51.45
14	-27.08	-27.08
15	7.99	7.99
16	18.89	18.89
17	5.62	5.62
18	-31.81	-31.81
19	-57.27	-57.27
20	-33.12	-33.12
21	4.43	4.43
22	18.96	18.96
23	7.08	7.08
24	-34.60	-34.60
25	-64.81	57.77
26	28.66	28.66
27	-11.50	-11.50
28	-24.28	-24.28
29	-12.27	-12.27
30	27.11	27.11
31	55.90	55.90
32	22.01	22.01
33	-0.75	-0.75
34	-0.26	-0.26
35	0.23	0.23
36	4.50	4.50
37	52.11	-52.11
38	-27.33	-27.33
39	8.62	8.62
40	20.40	20.40
41	8.01	8.01
42	-28.54	-28.54
43	-53.60	-53.60
44	-6.01	-6.01
45	-1.83	-1.83
46	-1.44	-1.44
47	-1.05	-1.05
48	-23.87	-23.87
49	-57.77	56.69

	50	28.12	28.12
	51	-10.69	-10.69
	52	-21.54	-21.54
	53	-6.89	-6.89
	54	35.23	35.23
	55	64.83	64.83
	56	34.52	34.52
	57	-7.37	-7.37
	58	-19.47	-19.47
	59	-5.16	-5.16
	60	32.18	32.18
	61	56.24	-56.24
	62	-30.94	-30.94
	63	6.13	6.13
	64	19.03	19.03
	65	7.77	7.77
	66	-27.66	-27.66
	67	-52.21	-52.21
	68	-4.66	-4.66
	69	-0.53	-0.53
	70	-0.18	-0.18
	71	0.16	0.16
	72	-22.73	-22.73

---

```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmax                                #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-67.22	67.22
2	25.35	25.35
3	-32.11	-32.11
4	-51.80	-51.80
5	-36.36	-36.36
6	23.33	23.33
7	70.41	70.41
8	47.24	47.24
9	12.11	12.11
10	-7.97	-7.97
11	2.45	2.45
12	10.74	10.74
13	93.02	-93.02
14	-49.44	-49.44
15	16.45	16.45
16	43.44	43.44
17	31.53	31.53
18	-19.28	-19.28
19	-55.90	-55.90
20	-40.38	-40.38
21	-16.63	-16.63
22	-8.23	-8.23
23	-17.43	-17.43
24	-46.49	-46.49
25	-67.22	78.07
26	32.93	32.93
27	-28.00	-28.00
28	-47.48	-47.48
29	-30.73	-30.73
30	27.68	27.68
31	71.94	71.94
32	47.64	47.64
33	10.51	10.51
34	-11.11	-11.11
35	-1.97	-1.97
36	4.75	4.75
37	84.75	-84.75
38	-45.01	-45.01
39	12.57	12.57
40	31.24	31.24
41	11.01	11.01
42	-48.12	-48.12
43	-88.57	-88.57
44	-7.42	-7.42
45	-1.60	-1.60
46	6.36	6.36
47	-16.18	-16.18
48	-53.77	-53.77
49	-78.07	78.80

	50	30.02	30.02
	51	-33.10	-33.10
	52	-51.41	-51.41
	53	-34.51	-34.51
	54	19.73	19.73
	55	59.94	59.94
	56	38.81	38.81
	57	8.91	8.91
	58	-1.13	-1.13
	59	6.44	6.44
	60	29.35	29.35
	61	44.48	-44.48
	62	-9.54	-9.54
	63	37.61	37.61
	64	45.87	45.87
	65	15.23	15.23
	66	-54.32	-54.32
	67	-99.59	-99.59
	68	-18.84	-18.84
	69	-10.49	-10.49
	70	0.27	0.27
	71	-19.73	-19.73
	72	-55.24	-55.24

---

```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VmaxHmin                             #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-46.73	46.73
2	17.32	17.32
3	-22.59	-22.59
4	-35.14	-35.14
5	-22.02	-22.02
6	23.03	23.03
7	57.56	57.56
8	41.70	41.70
9	14.65	14.65
10	-5.07	-5.07
11	4.50	4.50
12	13.28	13.28
13	69.38	-69.38
14	-37.86	-37.86
15	10.22	10.22
16	30.73	30.73
17	23.66	23.66
18	-10.97	-10.97
19	-36.29	-36.29
20	-26.47	-26.47
21	-11.37	-11.37
22	-6.18	-6.18
23	-12.66	-12.66
24	-32.54	-32.54
25	-46.73	56.96
26	24.81	24.81
27	-18.52	-18.52
28	-31.79	-31.79
29	-18.52	-18.52
30	24.81	24.81
31	56.96	56.96
32	40.44	40.44
33	11.98	11.98
34	-9.16	-9.16
35	-1.00	-1.00
36	6.37	6.37
37	61.81	-61.81
38	-33.39	-33.39
39	7.96	7.96
40	21.75	21.75
41	7.96	7.96
42	-33.39	-33.39
43	-61.81	-61.81
44	-6.37	-6.37
45	1.00	1.00
46	9.16	9.16
47	-11.98	-11.98
48	-40.44	-40.44
49	-56.96	57.56

	50	23.03	23.03
	51	-22.02	-22.02
	52	-35.14	-35.14
	53	-22.59	-22.59
	54	17.32	17.32
	55	46.73	46.73
	56	32.54	32.54
	57	12.66	12.66
	58	6.18	6.18
	59	11.37	11.37
	60	26.47	26.47
	61	36.29	-36.29
	62	-10.97	-10.97
	63	23.66	23.66
	64	30.73	30.73
	65	10.22	10.22
	66	-37.86	-37.86
	67	-69.38	-69.38
	68	-13.28	-13.28
	69	-4.50	-4.50
	70	5.07	5.07
	71	-14.65	-14.65
	72	-41.70	-41.70

---

```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VminHmax                             #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-53.75	53.75
2	25.71	25.71
3	-13.11	-13.11
4	-25.58	-25.58
5	-13.60	-13.60
6	26.47	26.47
7	56.18	56.18
8	31.45	31.45
9	2.83	2.83
10	-0.83	-0.83
11	1.28	1.28
12	8.72	8.72
13	56.47	-56.47
14	-30.50	-30.50
15	8.03	8.03
16	22.40	22.40
17	12.60	12.60
18	-21.37	-21.37
19	-45.23	-45.23
20	-28.23	-28.23
21	-1.89	-1.89
22	8.01	8.01
23	-1.07	-1.07
24	-31.67	-31.67
25	-53.75	56.02
26	27.10	27.10
27	-12.53	-12.53
28	-24.85	-24.85
29	-12.53	-12.53
30	27.10	27.10
31	56.02	56.02
32	31.07	31.07
33	1.99	1.99
34	-2.14	-2.14
35	-0.50	-0.50
36	6.48	6.48
37	54.02	-54.02
38	-29.10	-29.10
39	7.15	7.15
40	19.23	19.23
41	7.15	7.15
42	-29.10	-29.10
43	-54.02	-54.02
44	-6.48	-6.48
45	0.50	0.50
46	2.14	2.14
47	-1.99	-1.99
48	-31.07	-31.07
49	-56.02	56.18

	50	26.47	26.47
	51	-13.60	-13.60
	52	-25.58	-25.58
	53	-13.11	-13.11
	54	25.71	25.71
	55	53.75	53.75
	56	31.67	31.67
	57	1.07	1.07
	58	-8.01	-8.01
	59	1.89	1.89
	60	28.23	28.23
	61	45.23	-45.23
	62	-21.37	-21.37
	63	12.60	12.60
	64	22.40	22.40
	65	8.03	8.03
	66	-30.50	-30.50
	67	-56.47	-56.47
	68	-8.72	-8.72
	69	-1.28	-1.28
	70	0.83	0.83
	71	-2.83	-2.83
	72	-31.45	-31.45

---

```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VmaxHmax                             #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-48.08	48.08
2	18.46	18.46
3	-21.81	-21.81
4	-34.53	-34.53
5	-21.40	-21.40
6	23.59	23.59
7	57.98	57.98
8	41.07	41.07
9	13.60	13.60
10	-4.72	-4.72
11	4.20	4.20
12	12.93	12.93
13	68.87	-68.87
14	-37.54	-37.54
15	10.11	10.11
16	30.19	30.19
17	22.70	22.70
18	-12.37	-12.37
19	-37.89	-37.89
20	-26.98	-26.98
21	-10.33	-10.33
22	-4.65	-4.65
23	-11.61	-11.61
24	-32.93	-32.93
25	-48.08	57.45
26	25.29	25.29
27	-18.12	-18.12
28	-31.44	-31.44
29	-18.12	-18.12
30	25.29	25.29
31	57.45	57.45
32	39.93	39.93
33	11.12	11.12
34	-8.53	-8.53
35	-0.94	-0.94
36	6.46	6.46
37	61.78	-61.78
38	-33.36	-33.36
39	8.00	8.00
40	21.78	21.78
41	8.00	8.00
42	-33.36	-33.36
43	-61.78	-61.78
44	-6.46	-6.46
45	0.94	0.94
46	8.53	8.53
47	-11.12	-11.12
48	-39.93	-39.93
49	-57.45	57.98

	50	23.59	23.59
	51	-21.40	-21.40
	52	-34.53	-34.53
	53	-21.81	-21.81
	54	18.46	18.46
	55	48.08	48.08
	56	32.93	32.93
	57	11.61	11.61
	58	4.65	4.65
	59	10.33	10.33
	60	26.98	26.98
	61	37.89	-37.89
	62	-12.37	-12.37
	63	22.70	22.70
	64	30.19	30.19
	65	10.11	10.11
	66	-37.54	-37.54
	67	-68.87	-68.87
	68	-12.93	-12.93
	69	-4.20	-4.20
	70	4.72	4.72
	71	-13.60	-13.60
	72	-41.07	-41.07

---

```
#####
#          VERIFICAÇÃO DA FADIGA (ELS)          #
#          VminHmin                             #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-43.71	43.71
2	17.13	17.13
3	-19.07	-19.07
4	-30.50	-30.50
5	-18.73	-18.73
6	21.47	21.47
7	52.13	52.13
8	36.32	36.32
9	11.47	11.47
10	-3.97	-3.97
11	3.57	3.57
12	11.22	11.22
13	60.20	-60.20
14	-32.80	-32.80
15	8.82	8.82
16	26.27	26.27
17	19.56	19.56
18	-11.32	-11.32
19	-33.76	-33.76
20	-23.89	-23.89
21	-8.69	-8.69
22	-3.41	-3.41
23	-9.78	-9.78
24	-29.57	-29.57
25	-43.71	51.69
26	22.93	22.93
27	-15.94	-15.94
28	-27.87	-27.87
29	-15.94	-15.94
30	22.93	22.93
31	51.69	51.69
32	35.35	35.35
33	9.36	9.36
34	-7.22	-7.22
35	-0.81	-0.81
36	5.70	5.70
37	54.15	-54.15
38	-29.23	-29.23
39	7.02	7.02
40	19.10	19.10
41	7.02	7.02
42	-29.23	-29.23
43	-54.15	-54.15
44	-5.70	-5.70
45	0.81	0.81
46	7.22	7.22
47	-9.36	-9.36
48	-35.35	-35.35
49	-51.69	52.13

	50	21.47	21.47
	51	-18.73	-18.73
	52	-30.50	-30.50
	53	-19.07	-19.07
	54	17.13	17.13
	55	43.71	43.71
	56	29.57	29.57
	57	9.78	9.78
	58	3.41	3.41
	59	8.69	8.69
	60	23.89	23.89
	61	33.76	-33.76
	62	-11.32	-11.32
	63	19.56	19.56
	64	26.27	26.27
	65	8.82	8.82
	66	-32.80	-32.80
	67	-60.20	-60.20
	68	-11.22	-11.22
	69	-3.57	-3.57
	70	3.97	3.97
	71	-11.47	-11.47
	72	-36.32	-36.32

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmin                                   #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-45.60	45.60
2	17.25	17.25
3	-21.27	-21.27
4	-33.40	-33.40
5	-20.79	-20.79
6	22.44	22.44
7	55.52	55.52
8	39.68	39.68
9	13.46	13.46
10	-4.66	-4.66
11	4.15	4.15
12	12.51	12.51
13	65.94	-65.94
14	-35.96	-35.96
15	9.69	9.69
16	29.06	29.06
17	22.12	22.12
18	-11.10	-11.10
19	-35.34	-35.34
20	-25.50	-25.50
21	-10.37	-10.37
22	-5.14	-5.14
23	-11.58	-11.58
24	-31.43	-31.43
25	-45.60	54.98
26	24.10	24.10
27	-17.55	-17.55
28	-30.32	-30.32
29	-17.55	-17.55
30	24.10	24.10
31	54.98	54.98
32	38.53	38.53
33	11.00	11.00
34	-8.43	-8.43
35	-0.93	-0.93
36	6.12	6.12
37	58.94	-58.94
38	-31.83	-31.83
39	7.61	7.61
40	20.76	20.76
41	7.61	7.61
42	-31.83	-31.83
43	-58.94	-58.94
44	-6.12	-6.12
45	0.93	0.93
46	8.43	8.43
47	-11.00	-11.00
48	-38.53	-38.53
49	-54.98	55.52

	50	22.44	22.44
	51	-20.79	-20.79
	52	-33.40	-33.40
	53	-21.27	-21.27
	54	17.25	17.25
	55	45.60	45.60
	56	31.43	31.43
	57	11.58	11.58
	58	5.14	5.14
	59	10.37	10.37
	60	25.50	25.50
	61	35.34	-35.34
	62	-11.10	-11.10
	63	22.12	22.12
	64	29.06	29.06
	65	9.69	9.69
	66	-35.96	-35.96
	67	-65.94	-65.94
	68	-12.51	-12.51
	69	-4.15	-4.15
	70	4.66	4.66
	71	-13.46	-13.46
	72	-39.68	-39.68

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VminHmax                                   #
#####
```

-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-53.00	53.00
2	25.06	25.06
3	-13.55	-13.55
4	-25.93	-25.93
5	-13.95	-13.95
6	26.15	26.15
7	55.94	55.94
8	31.80	31.80
9	3.42	3.42
10	-1.03	-1.03
11	1.44	1.44
12	8.92	8.92
13	56.76	-56.76
14	-30.68	-30.68
15	8.10	8.10
16	22.70	22.70
17	13.14	13.14
18	-20.58	-20.58
19	-44.34	-44.34
20	-27.95	-27.95
21	-2.48	-2.48
22	7.15	7.15
23	-1.66	-1.66
24	-31.45	-31.45
25	-53.00	55.74
26	26.83	26.83
27	-12.75	-12.75
28	-25.04	-25.04
29	-12.75	-12.75
30	26.83	26.83
31	55.74	55.74
32	31.36	31.36
33	2.47	2.47
34	-2.50	-2.50
35	-0.53	-0.53
36	6.43	6.43
37	54.04	-54.04
38	-29.12	-29.12
39	7.13	7.13
40	19.21	19.21
41	7.13	7.13
42	-29.12	-29.12
43	-54.04	-54.04
44	-6.43	-6.43
45	0.53	0.53
46	2.50	2.50
47	-2.47	-2.47
48	-31.36	-31.36
49	-55.74	55.94

	50	26.15	26.15
	51	-13.95	-13.95
	52	-25.93	-25.93
	53	-13.55	-13.55
	54	25.06	25.06
	55	53.00	53.00
	56	31.45	31.45
	57	1.66	1.66
	58	-7.15	-7.15
	59	2.48	2.48
	60	27.95	27.95
	61	44.34	-44.34
	62	-20.58	-20.58
	63	13.14	13.14
	64	22.70	22.70
	65	8.10	8.10
	66	-30.68	-30.68
	67	-56.76	-56.76
	68	-8.92	-8.92
	69	-1.44	-1.44
	70	1.03	1.03
	71	-3.42	-3.42
	72	-31.80	-31.80

---

```
#####
#          VERIFICAÇÃO DA FISSURAÇÃO (ELS)          #
#          VmaxHmax                                  #
#####
```

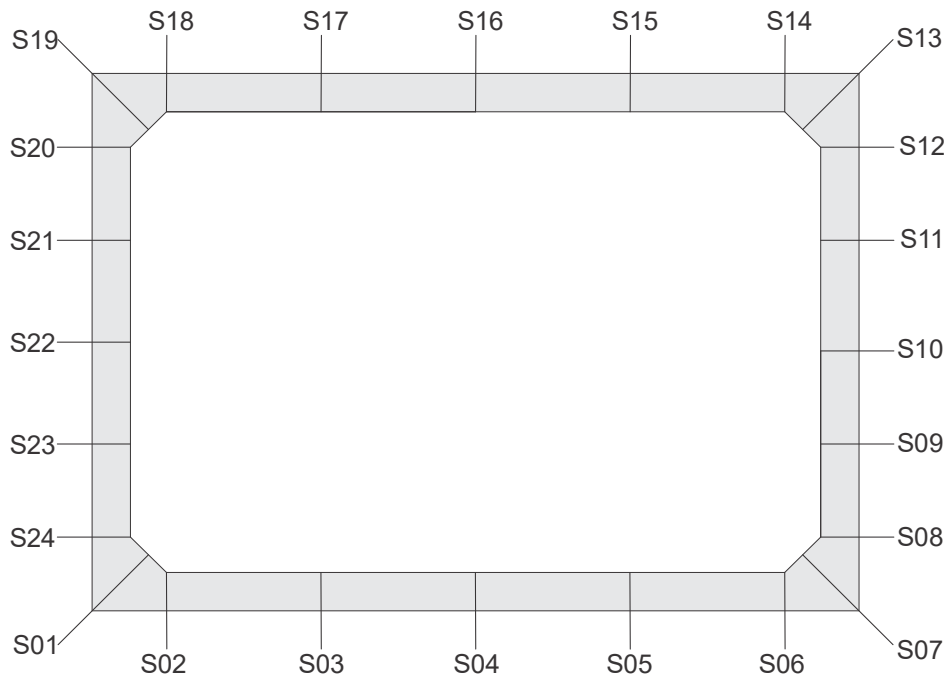
-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-46.44	46.44
2	17.96	17.96
3	-20.78	-20.78
4	-33.01	-33.01
5	-20.40	-20.40
6	22.80	22.80
7	55.79	55.79
8	39.29	39.29
9	12.80	12.80
10	-4.44	-4.44
11	3.97	3.97
12	12.29	12.29
13	65.62	-65.62
14	-35.76	-35.76
15	9.63	9.63
16	28.72	28.72
17	21.52	21.52
18	-11.97	-11.97
19	-36.34	-36.34
20	-25.82	-25.82
21	-9.72	-9.72
22	-4.18	-4.18
23	-10.93	-10.93
24	-31.67	-31.67
25	-46.44	55.29
26	24.41	24.41
27	-17.30	-17.30
28	-30.10	-30.10
29	-17.30	-17.30
30	24.41	24.41
31	55.29	55.29
32	38.21	38.21
33	10.46	10.46
34	-8.04	-8.04
35	-0.89	-0.89
36	6.17	6.17
37	58.92	-58.92
38	-31.81	-31.81
39	7.63	7.63
40	20.78	20.78
41	7.63	7.63
42	-31.81	-31.81
43	-58.92	-58.92
44	-6.17	-6.17
45	0.89	0.89
46	8.04	8.04
47	-10.46	-10.46
48	-38.21	-38.21
49	-55.29	55.79

	50	22.80	22.80
	51	-20.40	-20.40
	52	-33.01	-33.01
	53	-20.78	-20.78
	54	17.96	17.96
	55	46.44	46.44
	56	31.67	31.67
	57	10.93	10.93
	58	4.18	4.18
	59	9.72	9.72
	60	25.82	25.82
	61	36.34	-36.34
	62	-11.97	-11.97
	63	21.52	21.52
	64	28.72	28.72
	65	9.63	9.63
	66	-35.76	-35.76
	67	-65.62	-65.62
	68	-12.29	-12.29
	69	-3.97	-3.97
	70	4.44	4.44
	71	-12.80	-12.80
	72	-39.29	-39.29

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## ARMADURAS P/ SOLICITAÇÕES NORMAIS



Seção	As-CA60ext(cm <sup>2</sup> /m)	As-CA50ext(cm <sup>2</sup> /m)	As-CA60int(cm <sup>2</sup> /m)	As-CA50int(cm <sup>2</sup> /m)
1	6.57	7.88	1.26	1.26
2	4.06	4.87	3.10	3.72
3	3.10	3.72	4.67	5.60
4	3.10	3.72	7.19	8.63
5	3.10	3.72	5.24	6.29
6	3.77	4.52	3.10	3.72
7	6.57	7.88	1.26	1.26
8	5.61	6.73	3.10	3.72
9	3.10	3.72	3.10	3.72
10	3.10	3.72	3.10	3.72
11	3.10	3.72	3.10	3.72
12	3.10	3.72	3.10	3.72
13	6.57	7.88	1.26	1.26
14	7.17	8.61	3.10	3.72
15	3.10	3.72	3.10	3.72
16	3.10	3.72	6.24	7.49
17	3.10	3.72	5.69	6.83
18	3.69	4.43	3.10	3.72
19	6.57	7.88	1.26	1.26
20	3.10	3.72	3.10	3.72
21	3.10	3.72	3.10	3.72
22	3.10	3.72	3.10	3.72
23	3.10	3.72	3.10	3.72
24	3.85	4.62	3.10	3.72

NOTA: A tabela acima mostra as áreas de aço calculadas para parte interna e externa das seções de interesse. Estas áreas são mostradas para o caso de se utilizar apenas aço do tipo CA60 (As-CA60ext e As-CA60int) e os correspondentes valores para o caso de se utilizar apenas aço do tipo CA50 (As-CA50ext e As-CA50int). Possibilitando os cálculos para o uso combinado dos tipos de aço: CA60 contido nas telas soldadas e o CA50 presentes nas barras.

**VERIFICAÇÃO DA FADIGA**

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Seção	Nsdmax(kN)	Msdmax(kN.m)	Nsdmin(kN)	Msdmin(kN.m)	DSs(MPa)	Asad(cm <sup>2</sup> /m)
12	-116.09	12.93	-101.78	11.22	7.94	0.00
13	-114.34	68.87	-35.61	60.20	-0.43	0.00
14	-39.47	37.54	-35.61	32.80	36.65	0.00
16	-35.46	30.73	-61.33	22.40	89.30	0.00
18	-39.47	12.37	-35.61	11.32	7.50	0.00
19	-94.98	37.89	-35.61	33.76	-9.95	0.00
20	-96.73	26.98	-85.26	23.89	22.09	0.00

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## VERIFICAÇÃO DA CORTANTE

Seção	fck(MPa)	fcd(MPa)	fctm(MPa)	fctk,inf(MPa)	fctd(MPa)	Trd(MPa)
1	30.00	23.08	2.90	2.03	1.56	0.39
2	30.00	23.08	2.90	2.03	1.56	0.39
6	30.00	23.08	2.90	2.03	1.56	0.39
7	30.00	23.08	2.90	2.03	1.56	0.39
13	30.00	23.08	2.90	2.03	1.56	0.39
14	30.00	23.08	2.90	2.03	1.56	0.39
18	30.00	23.08	2.90	2.03	1.56	0.39
19	30.00	23.08	2.90	2.03	1.56	0.39

Seção	As(cm <sup>2</sup> /m)	ro	vsd(kN)	vrd1(kN)	vrd2(kN)	Asw(cm <sup>2</sup> /m/m)
1	7.88	2.19E-003	133.01	208.87	0.00	0.00
2	4.87	3.05E-003	124.80	105.20	830.77	0.00
6	4.52	2.82E-003	137.70	104.41	830.77	0.00
7	7.88	2.19E-003	150.72	198.53	0.00	0.00
13	7.88	2.19E-003	157.44	201.43	0.00	0.00
14	8.61	5.38E-003	70.57	116.67	0.00	0.00
18	4.43	2.77E-003	96.91	107.29	0.00	0.00
19	7.88	2.19E-003	110.89	205.74	0.00	0.00

**OBSERVAÇÃO:** A verificação da resistência à força cortante é feita a uma distância  $d/2$  das seções das mísulas.

## VERIFICAÇÃO DA FISSURAÇÃO

VmaxHmin

Seção	As (cm <sup>2</sup> /m)	Nsd (kN)	Msd (kN.m)	Ø (mm)	w (mm)
1	7.88	-26.40	45.60	6.30	0.032
2	4.87	-52.80	17.25	6.30	0.048
3	5.60	-52.80	21.27	6.30	0.059
4	8.63	-52.80	33.40	6.30	0.068
5	6.29	-52.80	20.79	6.30	0.044
6	4.52	-52.80	22.44	6.30	0.102
7	7.88	-89.35	55.52	6.30	0.036
8	6.73	-124.14	39.68	6.30	0.131
9	3.72	-120.89	13.46	6.30	0.021
10	3.72	-117.64	4.66	6.30	0.000
11	3.72	-114.39	4.15	6.30	0.000
12	3.72	-111.14	12.51	6.30	0.018
13	7.88	-72.45	65.94	6.30	0.059
14	8.61	-35.52	35.96	6.30	0.084
15	3.72	-35.52	9.69	6.30	0.024
16	7.49	-35.52	29.06	6.30	0.071
17	6.83	-35.52	22.12	6.30	0.047
18	4.43	-35.52	11.10	6.30	0.024
19	7.88	-62.89	35.34	6.30	0.014
20	3.72	-92.01	25.50	6.30	0.168
21	3.72	-95.26	10.37	6.30	0.012
22	3.72	-98.51	5.14	6.30	0.000
23	3.72	-101.76	11.58	6.30	0.016
24	4.62	-105.01	31.43	6.30	0.171

VminHmax

Seção	As (cm <sup>2</sup> /m)	Nsd (kN)	Msd (kN.m)	Ø (mm)	w (mm)
1	7.88	-40.23	53.00	6.30	0.041
2	4.87	-80.46	25.06	6.30	0.099
3	5.60	-80.46	13.55	6.30	0.015
4	8.63	-80.46	25.93	6.30	0.034
5	6.29	-80.46	13.95	6.30	0.013
6	4.52	-80.46	26.15	6.30	0.127
7	7.88	-96.31	55.94	6.30	0.036
8	6.73	-110.40	31.80	6.30	0.081
9	3.72	-107.15	3.42	6.30	0.000
10	3.72	-103.90	1.03	6.30	0.000
11	3.72	-100.65	1.44	6.30	0.000
12	3.72	-97.40	8.92	6.30	0.006
13	7.88	-77.36	56.76	6.30	0.041
14	8.61	-59.07	30.68	6.30	0.055
15	3.72	-59.07	8.10	6.30	0.010
16	7.49	-59.07	22.70	6.30	0.037
17	6.83	-59.07	13.14	6.30	0.012
18	4.43	-59.07	20.58	6.30	0.084
19	7.88	-73.48	44.34	6.30	0.023
20	3.82*	-89.64	27.95	6.30	0.200
21	3.72	-92.89	2.48	6.30	0.000
22	3.72	-96.14	7.15	6.30	0.002
23	3.72	-99.39	1.66	6.30	0.000
24	4.62	-102.64	31.45	6.30	0.172

## VERIFICAÇÃO DA FISSURAÇÃO (CONT.)

VmaxHmax

Seção	As (cm <sup>2</sup> /m)	Nsd (kN)	Msd (kN.m)	Ø (mm)	w (mm)
1	7.88	-27.50	46.44	6.30	0.033
2	4.87	-55.00	17.96	6.30	0.052
3	5.60	-55.00	20.78	6.30	0.055
4	8.63	-55.00	33.01	6.30	0.065
5	6.29	-55.00	20.40	6.30	0.042
6	4.52	-55.00	22.80	6.30	0.105
7	7.88	-90.23	55.79	6.30	0.037
8	6.73	-123.72	39.29	6.30	0.129
9	3.72	-120.47	12.80	6.30	0.017
10	3.72	-117.22	4.44	6.30	0.000
11	3.72	-113.97	3.97	6.30	0.000
12	3.72	-110.72	12.29	6.30	0.017
13	7.88	-73.50	65.62	6.30	0.058
14	8.61	-38.03	35.76	6.30	0.082
15	3.72	-38.03	9.63	6.30	0.023
16	7.49	-38.03	28.72	6.30	0.068
17	6.83	-38.03	21.52	6.30	0.044
18	4.43	-38.03	11.97	6.30	0.028
19	7.88	-64.35	36.34	6.30	0.015
20	3.82*	-92.43	25.82	6.30	0.163
21	3.72	-95.68	9.72	6.30	0.009
22	3.72	-98.93	4.18	6.30	0.000
23	3.72	-102.18	10.93	6.30	0.013
24	4.62	-105.43	31.67	6.30	0.174

NOTA:

\* Seção com aumento na armadura devido à fissuração.