



**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:

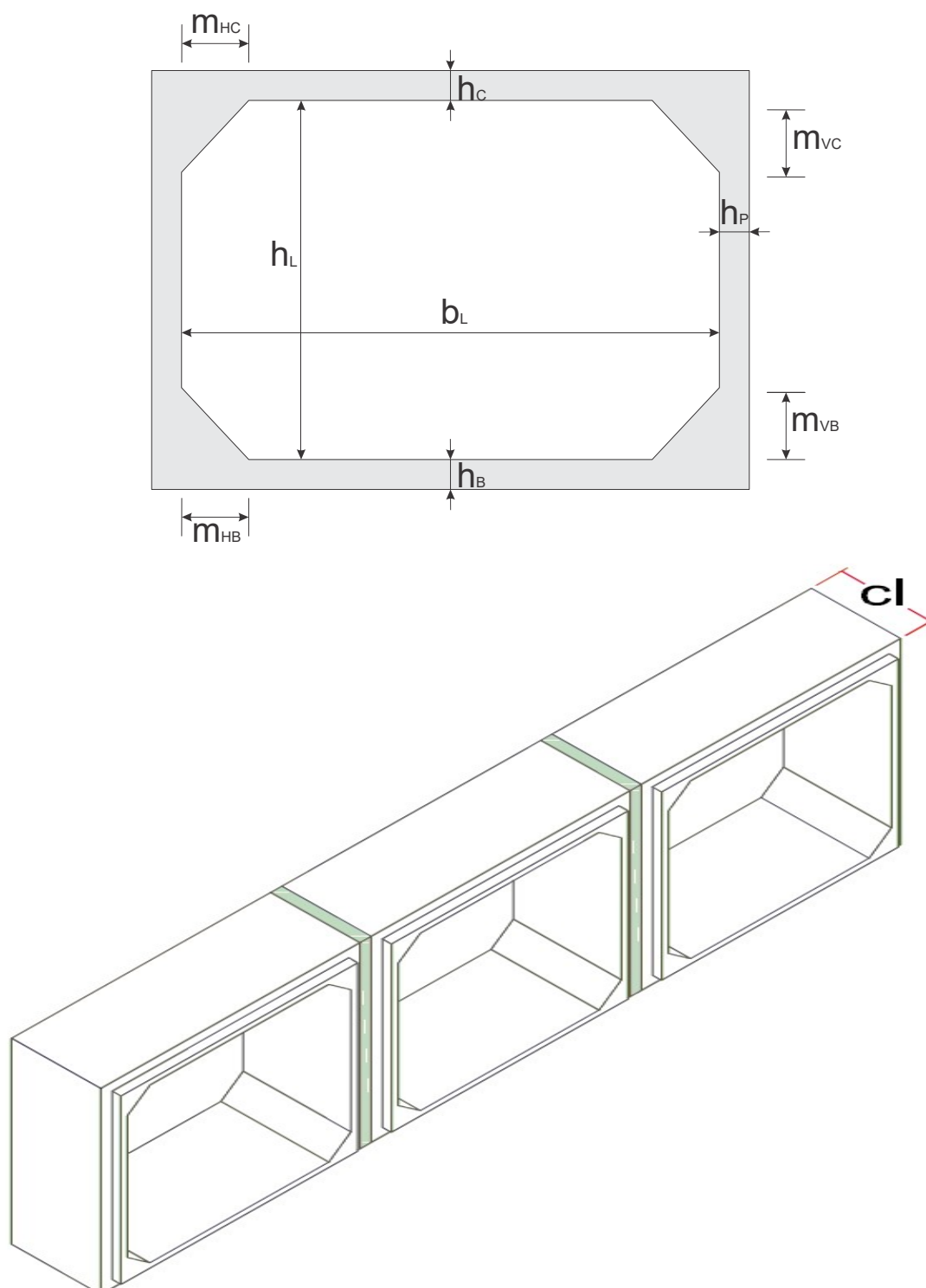
### DADOS DA OBRA



NOME: ADUELA 3,00 X 3,00 M PARA ATERRO DE 0,50 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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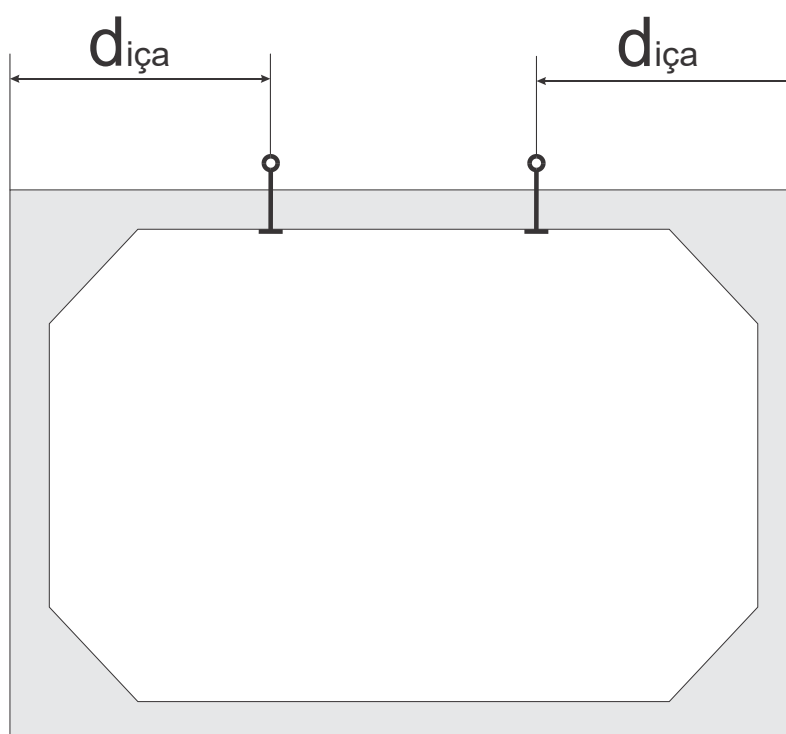
### DADOS DE INSTALAÇÃO

ALTURA DE TERRA.....	: 0.20 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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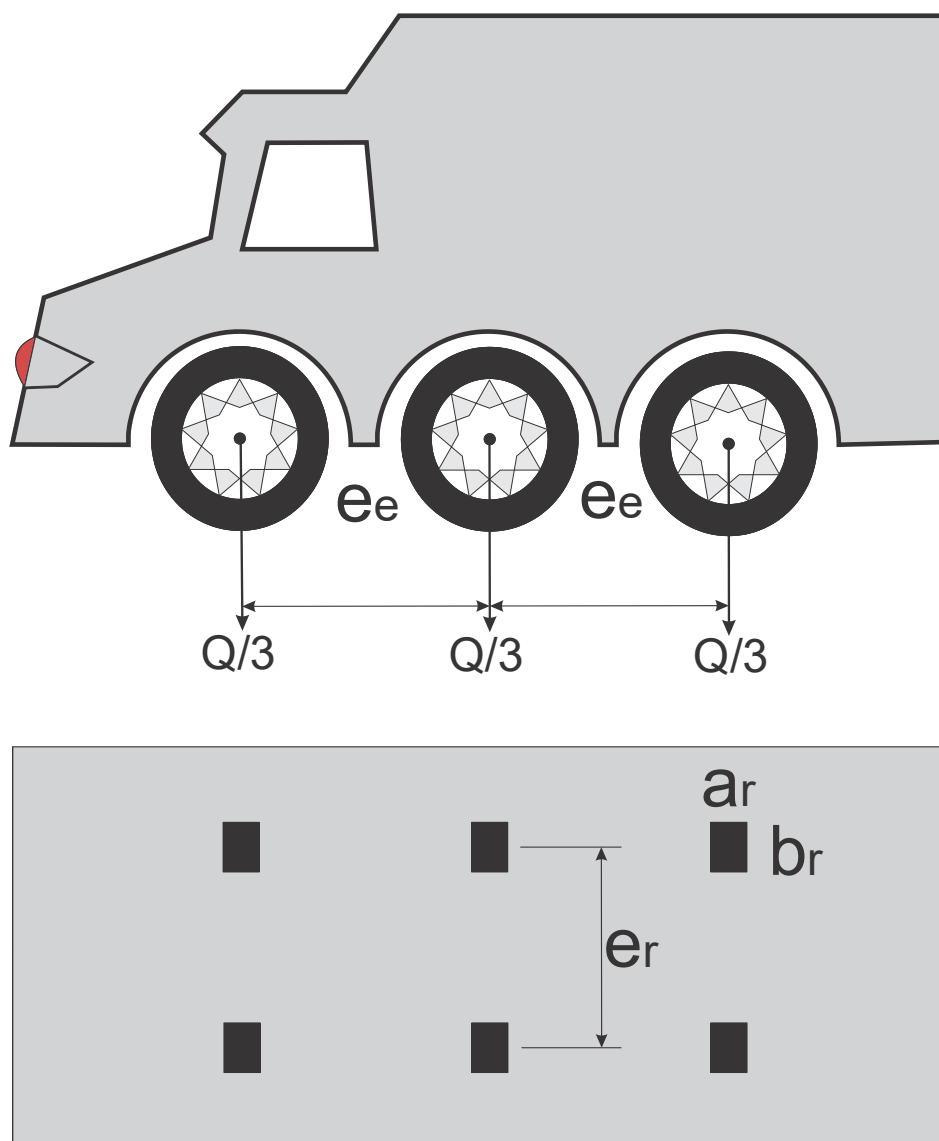
### INFORMAÇÕES DE MANUSEIO

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



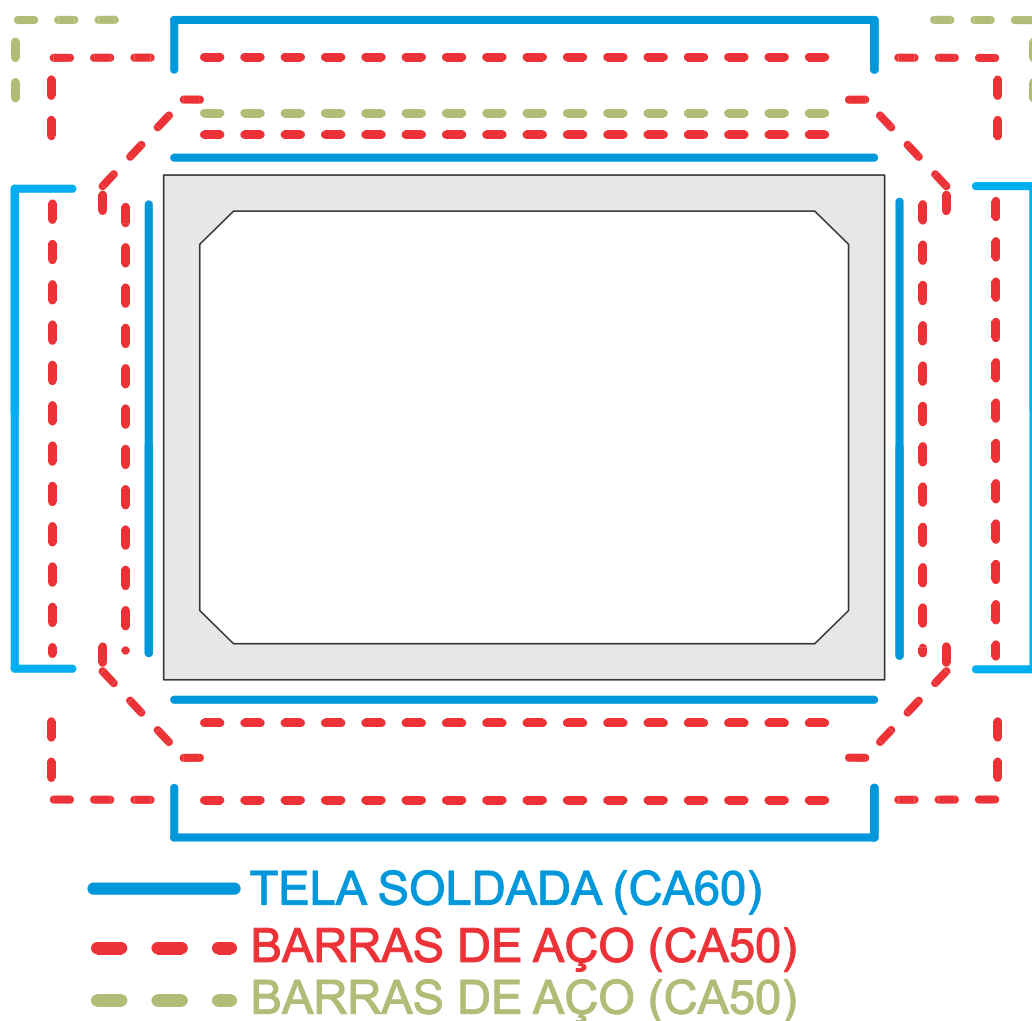
**SOBRECARGA**

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.....: 1.58



## 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:

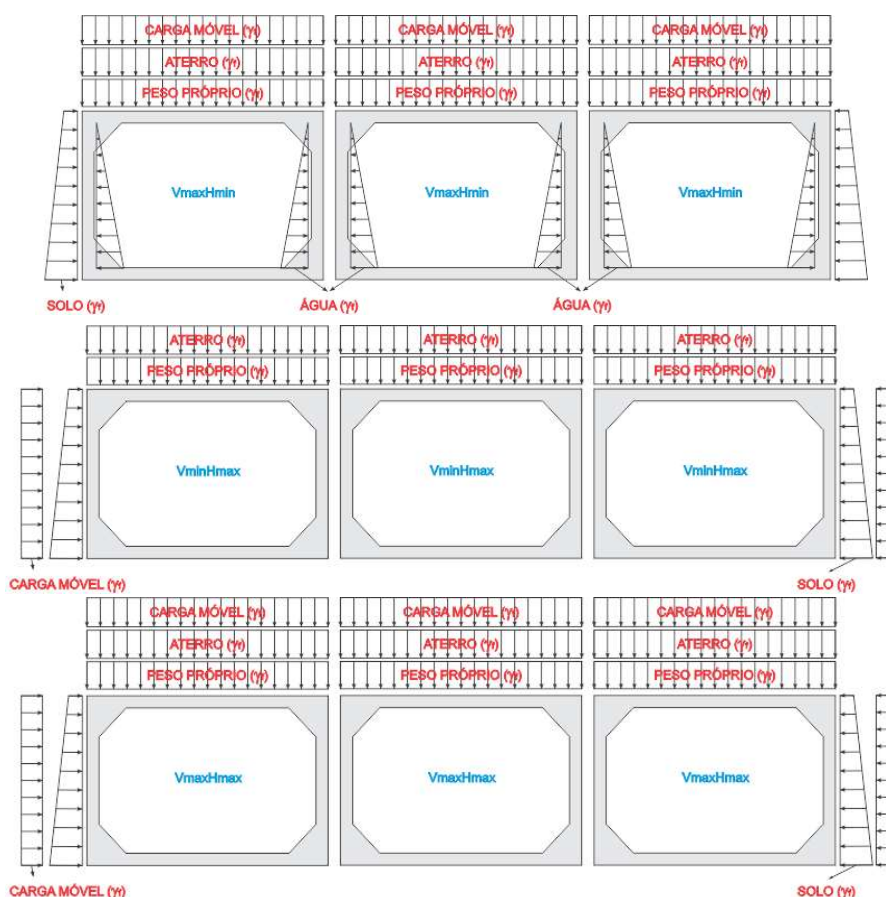
COEFICIENTE DE PONDERAÇÃO CARGA MÓVEL V.:	1.50
COEFICIENTE DE PONDERAÇÃO ATERRO.....	1.35
COEFICIENTE DE PONDERAÇÃO PESO PRÓPRIO...	1.30
COEFICIENTE DE PONDERAÇÃO SOLO.....	1.00
COEFICIENTE DE PONDERAÇÃO ÁGUA.....	1.20

- VminHmax:

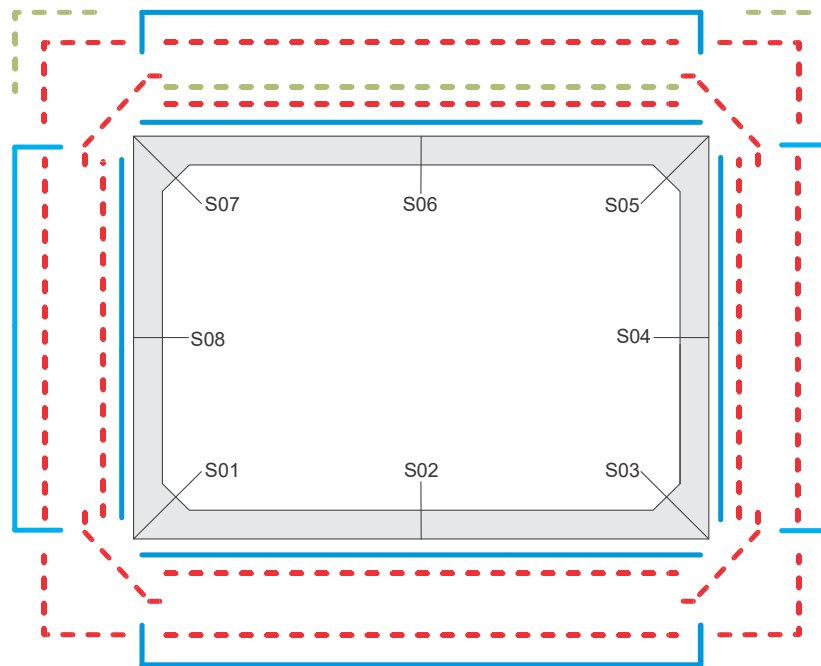
COEFICIENTE DE PONDERAÇÃO ATERRO.....	1.00
COEFICIENTE DE PONDERAÇÃO PESO PRÓPRIO...	1.00
COEFICIENTE DE PONDERAÇÃO SOLO.....	1.35
COEFICIENTE DE PONDERAÇÃO CARGA MÓVEL H.:	1.50

- 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

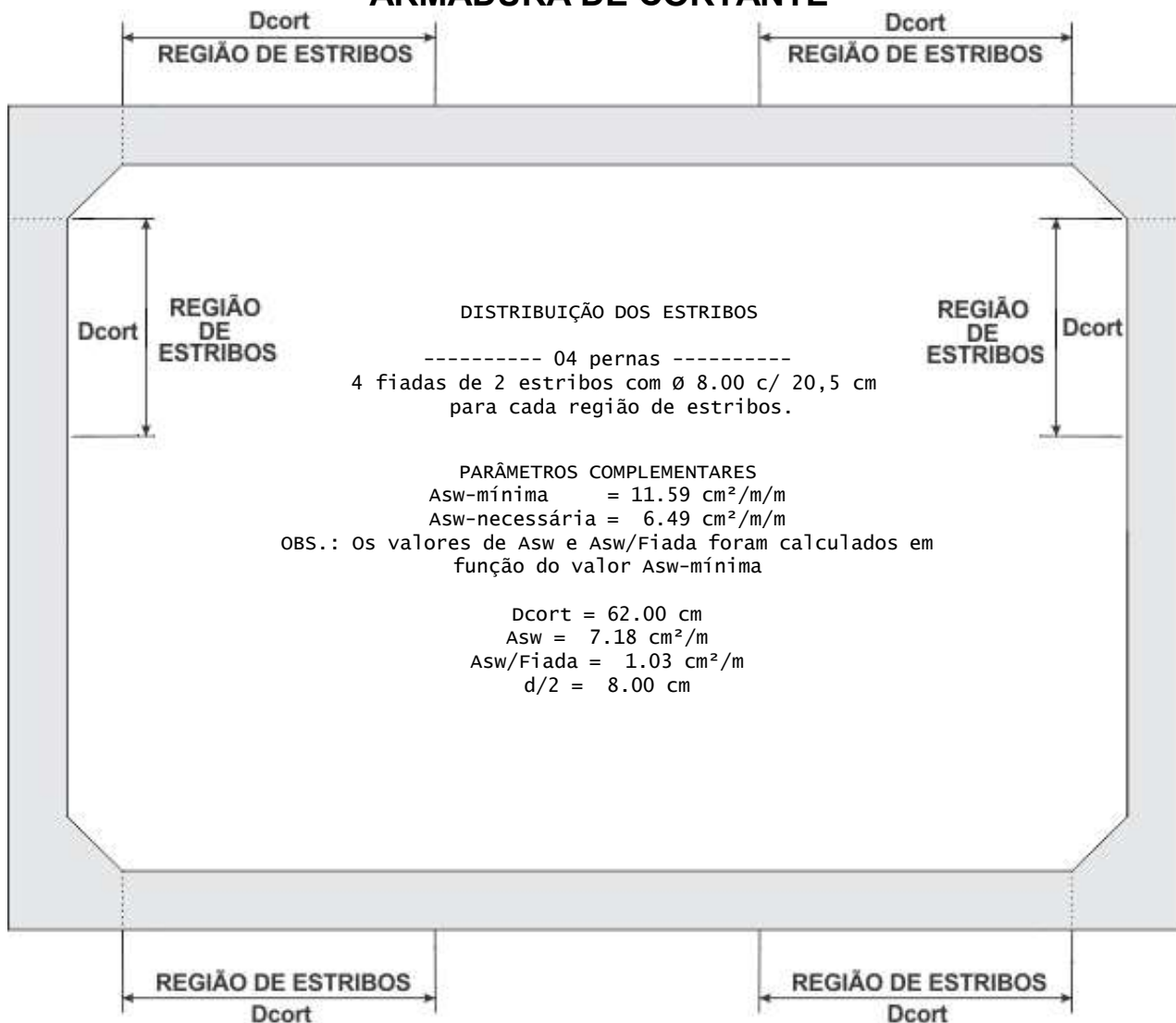
- - - BARRAS DE AÇO (CA50) ARMADURA DE FADIGA

OBS.: VALORES POR METRO DE ADUELA.

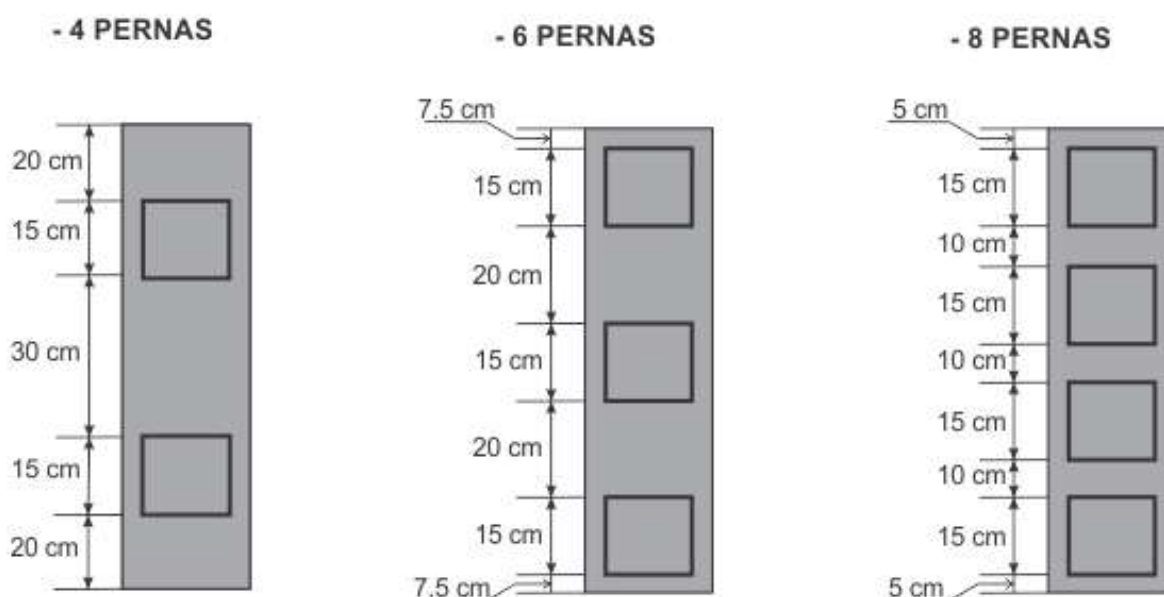
	TELA	ARMADURA COMPLEMENTAR	ARMADURA DE FADIGA
LADO EXTERNO	T-S02: L283	B-S01: 4 Ø6.30 c/ 31 cm (13.53%)	B-S05: 6 Ø12.50 c/ 18 cm ( 3.49%)
	T-S04: L283	B-S02: 4 Ø6.30 c/ 31 cm (74.65%)	B-S07: 6 Ø12.50 c/ 18 cm ( 3.49%)
	T-S06: L283	B-S03: 4 Ø6.30 c/ 31 cm (13.53%)	
	T-S08: L283	B-S04: 6 Ø6.30 c/ 18 cm (-1.26%) B-S05: 4 Ø12.50 c/ 31 cm (15.13%) B-S06: 4 Ø6.30 c/ 31 cm (74.65%) B-S07: 4 Ø12.50 c/ 31 cm (15.13%) B-S08: 6 Ø6.30 c/ 18 cm (-1.26%)	
LADO INTERNO	T-S02: L283	B-S01: 4 Ø6.30 c/ 31 cm ( 0.00%)	B-S06: 4 Ø6.30 c/ 31 cm (20.05%)
	T-S04: L283	B-S02: 4 Ø12.50 c/ 31 cm (-6.91%)	
	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: 6 Ø12.50 c/ 18 cm ( 7.18%) B-S07: 4 Ø6.30 c/ 31 cm ( 0.00%) B-S08: 4 Ø6.30 c/ 31 cm (11.47%)	

NOTA: Os valores entre parênteses representam a percentagem de área de aço que a seção apresenta acima (percentagem positiva) ou a menos (percentagem 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:

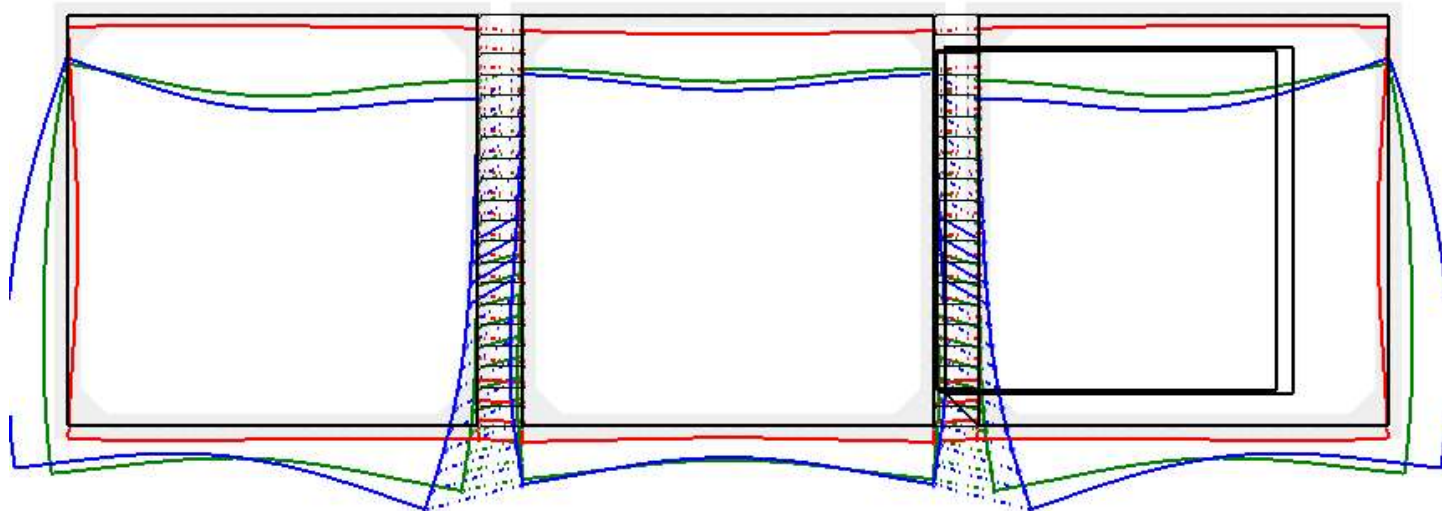
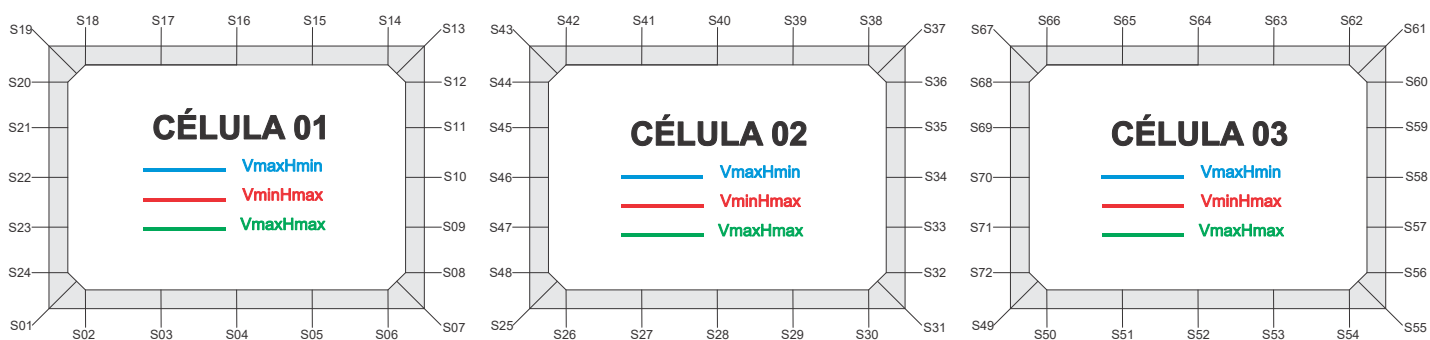


#### OBSERVAÇÃO:

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	-4.86E-003	-3.88E-003
2	-4.86E-003	-3.46E-003
3	-4.85E-003	-2.65E-003
4	-4.85E-003	-2.71E-003
5	-4.85E-003	-4.07E-003
6	-4.85E-003	-6.47E-003
7	-4.85E-003	-7.66E-003
8	-3.69E-003	-7.67E-003
9	-1.81E-003	-7.69E-003
10	-8.61E-004	-7.71E-003
11	-3.99E-004	-7.73E-003
12	-9.00E-005	-7.75E-003
13	-4.86E-005	-7.75E-003
14	-4.88E-005	-7.79E-003
15	-4.96E-005	-8.45E-003
16	-5.04E-005	-8.76E-003
17	-5.12E-005	-7.59E-003
18	-5.20E-005	-5.17E-003
19	-5.22E-005	-3.94E-003
20	-1.26E-003	-3.94E-003
21	-3.51E-003	-3.93E-003
22	-4.99E-003	-3.92E-003
23	-5.59E-003	-3.90E-003
24	-5.25E-003	-3.89E-003
25	6.32E-007	-5.38E-003
26	5.57E-007	-4.77E-003
27	2.78E-007	-3.46E-003
28	-8.52E-011	-2.91E-003
29	-2.79E-007	-3.46E-003
30	-5.57E-007	-4.77E-003
31	-6.32E-007	-5.38E-003
32	5.71E-004	-5.38E-003
33	1.17E-003	-5.40E-003
34	9.09E-004	-5.42E-003
35	3.98E-004	-5.43E-003
36	1.13E-004	-5.45E-003
37	4.43E-006	-5.45E-003
38	3.91E-006	-5.62E-003
39	1.95E-006	-6.42E-003
40	-2.03E-011	-6.91E-003
41	-1.95E-006	-6.42E-003
42	-3.91E-006	-5.62E-003
43	-4.43E-006	-5.45E-003
44	-1.13E-004	-5.45E-003
45	-3.98E-004	-5.43E-003
46	-9.09E-004	-5.42E-003
47	-1.17E-003	-5.40E-003
48	-5.71E-004	-5.38E-003
49	4.85E-003	-7.66E-003

50	4.85E-003	-6.47E-003
51	4.85E-003	-4.07E-003
52	4.85E-003	-2.71E-003
53	4.85E-003	-2.65E-003
54	4.86E-003	-3.46E-003
55	4.86E-003	-3.88E-003
56	5.25E-003	-3.89E-003
57	5.59E-003	-3.90E-003
58	4.99E-003	-3.92E-003
59	3.51E-003	-3.93E-003
60	1.26E-003	-3.94E-003
61	5.22E-005	-3.94E-003
62	5.20E-005	-5.17E-003
63	5.12E-005	-7.59E-003
64	5.04E-005	-8.76E-003
65	4.96E-005	-8.45E-003
66	4.88E-005	-7.79E-003
67	4.86E-005	-7.75E-003
68	9.00E-005	-7.75E-003
69	3.99E-004	-7.73E-003
70	8.61E-004	-7.71E-003
71	1.81E-003	-7.69E-003
72	3.69E-003	-7.67E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.38E-003
2	1.45E-003
3	7.64E-004
4	-1.06E-003
5	-3.06E-003
6	-4.01E-003
7	-3.94E-003
8	-3.76E-003
9	-2.09E-003
10	-9.39E-004
11	-6.06E-004
12	-2.49E-004
13	-2.68E-005
14	2.90E-004
15	1.20E-003
16	-5.53E-004
17	-2.99E-003
18	-4.11E-003
19	-4.08E-003
20	-3.98E-003
21	-2.89E-003
22	-1.62E-003
23	-2.13E-004
24	1.25E-003
25	1.98E-003
26	2.09E-003
27	1.62E-003
28	-1.93E-011
29	-1.62E-003

30	-2.09E-003
31	-1.98E-003
32	-1.79E-003
33	-1.34E-004
34	7.73E-004
35	6.37E-004
36	3.00E-004
37	4.39E-004
38	6.86E-004
39	1.34E-003
40	-2.49E-011
41	-1.34E-003
42	-6.86E-004
43	-4.39E-004
44	-3.00E-004
45	-6.37E-004
46	-7.73E-004
47	1.34E-004
48	1.79E-003
49	3.94E-003
50	4.01E-003
51	3.06E-003
52	1.06E-003
53	-7.64E-004
54	-1.45E-003
55	-1.38E-003
56	-1.25E-003
57	2.13E-004
58	1.62E-003
59	2.89E-003
60	3.98E-003
61	4.08E-003
62	4.11E-003
63	2.99E-003
64	5.53E-004
65	-1.20E-003
66	-2.90E-004
67	2.68E-005
68	2.49E-004
69	6.06E-004
70	9.39E-004
71	2.09E-003
72	3.76E-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	7.03E-005	-1.14E-003
2	6.76E-005	-1.29E-003
3	5.73E-005	-1.34E-003
4	4.70E-005	-1.24E-003
5	3.66E-005	-1.21E-003
6	2.63E-005	-1.22E-003
7	2.36E-005	-1.19E-003
8	-1.66E-005	-1.20E-003
9	-9.19E-005	-1.20E-003
10	-1.20E-004	-1.20E-003
11	-1.00E-004	-1.21E-003
12	-2.76E-005	-1.21E-003
13	1.96E-005	-1.21E-003
14	2.16E-005	-1.17E-003
15	2.92E-005	-1.09E-003
16	3.68E-005	-9.90E-004
17	4.44E-005	-8.94E-004
18	5.20E-005	-1.00E-003
19	5.40E-005	-1.16E-003
20	2.39E-004	-1.16E-003
21	7.27E-004	-1.16E-003
22	9.72E-004	-1.15E-003
23	7.37E-004	-1.15E-003
24	2.47E-004	-1.14E-003
25	2.32E-005	-1.46E-003
26	2.04E-005	-1.40E-003
27	1.02E-005	-1.20E-003
28	-1.83E-011	-1.09E-003
29	-1.02E-005	-1.20E-003
30	-2.04E-005	-1.40E-003
31	-2.32E-005	-1.46E-003
32	2.15E-005	-1.46E-003
33	8.76E-005	-1.46E-003
34	1.17E-004	-1.47E-003
35	1.00E-004	-1.47E-003
36	3.02E-005	-1.48E-003
37	-1.74E-005	-1.48E-003
38	-1.53E-005	-1.53E-003
39	-7.67E-006	-1.69E-003
40	-1.48E-012	-1.77E-003
41	7.67E-006	-1.69E-003
42	1.53E-005	-1.53E-003
43	1.74E-005	-1.48E-003
44	-3.02E-005	-1.48E-003
45	-1.00E-004	-1.47E-003
46	-1.17E-004	-1.47E-003
47	-8.76E-005	-1.46E-003
48	-2.15E-005	-1.46E-003
49	-2.36E-005	-1.19E-003

50	-2.63E-005	-1.22E-003
51	-3.66E-005	-1.21E-003
52	-4.70E-005	-1.24E-003
53	-5.73E-005	-1.34E-003
54	-6.76E-005	-1.29E-003
55	-7.03E-005	-1.14E-003
56	-2.47E-004	-1.14E-003
57	-7.37E-004	-1.15E-003
58	-9.72E-004	-1.15E-003
59	-7.27E-004	-1.16E-003
60	-2.39E-004	-1.16E-003
61	-5.40E-005	-1.16E-003
62	-5.20E-005	-1.00E-003
63	-4.44E-005	-8.94E-004
64	-3.68E-005	-9.90E-004
65	-2.92E-005	-1.09E-003
66	-2.16E-005	-1.17E-003
67	-1.96E-005	-1.21E-003
68	2.76E-005	-1.21E-003
69	1.00E-004	-1.21E-003
70	1.20E-004	-1.20E-003
71	9.19E-005	-1.20E-003
72	1.66E-005	-1.20E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

-----

SEÇÃO	ROTAÇÃO (rad)
1	-5.43E-004
2	-4.27E-004
3	1.34E-004
4	1.22E-004
5	-3.34E-005
6	7.12E-005
7	1.20E-004
8	1.43E-004
9	8.02E-005
10	6.52E-006
11	-6.83E-005
12	-1.57E-004
13	-1.53E-004
14	-1.34E-004
15	-1.24E-004
16	-1.83E-004
17	-6.33E-005
18	4.86E-004
19	5.81E-004
20	6.59E-004
21	6.79E-004
22	1.28E-005
23	-6.79E-004
24	-6.40E-004
25	1.67E-004
26	2.22E-004
27	2.98E-004
28	-5.41E-012
29	-2.98E-004

30	-2.22E-004
31	-1.67E-004
32	-1.33E-004
33	-7.56E-005
34	-1.20E-005
35	6.69E-005
36	1.48E-004
37	1.70E-004
38	2.02E-004
39	2.26E-004
40	-6.55E-012
41	-2.26E-004
42	-2.02E-004
43	-1.70E-004
44	-1.48E-004
45	-6.69E-005
46	1.20E-005
47	7.56E-005
48	1.33E-004
49	-1.20E-004
50	-7.12E-005
51	3.34E-005
52	-1.22E-004
53	-1.34E-004
54	4.27E-004
55	5.43E-004
56	6.40E-004
57	6.79E-004
58	-1.28E-005
59	-6.79E-004
60	-6.59E-004
61	-5.81E-004
62	-4.86E-004
63	6.33E-005
64	1.83E-004
65	1.24E-004
66	1.34E-004
67	1.53E-004
68	1.57E-004
69	6.83E-005
70	-6.52E-006
71	-8.02E-005
72	-1.43E-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	-1.48E-003	-4.38E-003
2	-1.48E-003	-4.00E-003
3	-1.49E-003	-3.18E-003
4	-1.49E-003	-3.01E-003
5	-1.50E-003	-3.86E-003
6	-1.51E-003	-5.32E-003
7	-1.51E-003	-5.95E-003
8	-9.27E-004	-5.96E-003
9	-2.42E-004	-5.98E-003
10	-1.11E-004	-6.00E-003
11	-1.44E-005	-6.02E-003
12	2.41E-005	-6.03E-003
13	-2.62E-005	-6.04E-003
14	-2.47E-005	-6.16E-003
15	-1.93E-005	-6.96E-003
16	-1.39E-005	-7.46E-003
17	-8.53E-006	-6.72E-003
18	-3.14E-006	-5.15E-003
19	-1.68E-006	-4.45E-003
20	-6.65E-004	-4.44E-003
21	-1.64E-003	-4.43E-003
22	-2.07E-003	-4.42E-003
23	-2.17E-003	-4.40E-003
24	-1.82E-003	-4.39E-003
25	1.57E-005	-4.89E-003
26	1.39E-005	-4.53E-003
27	6.93E-006	-3.59E-003
28	6.83E-012	-3.15E-003
29	-6.93E-006	-3.59E-003
30	-1.39E-005	-4.53E-003
31	-1.57E-005	-4.89E-003
32	3.03E-004	-4.90E-003
33	4.59E-004	-4.92E-003
34	1.71E-004	-4.93E-003
35	9.02E-006	-4.95E-003
36	-1.62E-006	-4.97E-003
37	-1.13E-005	-4.97E-003
38	-1.00E-005	-5.04E-003
39	-5.00E-006	-5.69E-003
40	6.49E-011	-6.13E-003
41	5.00E-006	-5.69E-003
42	1.00E-005	-5.04E-003
43	1.13E-005	-4.97E-003
44	1.62E-006	-4.97E-003
45	-9.02E-006	-4.95E-003
46	-1.71E-004	-4.93E-003
47	-4.59E-004	-4.92E-003
48	-3.03E-004	-4.90E-003
49	1.51E-003	-5.95E-003

50	1.51E-003	-5.32E-003
51	1.50E-003	-3.86E-003
52	1.49E-003	-3.01E-003
53	1.49E-003	-3.18E-003
54	1.48E-003	-4.00E-003
55	1.48E-003	-4.38E-003
56	1.82E-003	-4.39E-003
57	2.17E-003	-4.40E-003
58	2.07E-003	-4.42E-003
59	1.64E-003	-4.43E-003
60	6.65E-004	-4.44E-003
61	1.68E-006	-4.45E-003
62	3.14E-006	-5.15E-003
63	8.53E-006	-6.72E-003
64	1.39E-005	-7.46E-003
65	1.93E-005	-6.96E-003
66	2.47E-005	-6.16E-003
67	2.62E-005	-6.04E-003
68	-2.41E-005	-6.03E-003
69	1.44E-005	-6.02E-003
70	1.11E-004	-6.00E-003
71	2.42E-004	-5.98E-003
72	9.27E-004	-5.96E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.21E-003
2	1.31E-003
3	9.46E-004
4	-5.26E-004
5	-1.99E-003
6	-2.18E-003
7	-2.03E-003
8	-1.82E-003
9	-4.72E-004
10	-8.00E-005
11	-1.44E-004
12	7.45E-005
13	2.66E-004
14	5.59E-004
15	1.42E-003
16	-1.20E-004
17	-2.06E-003
18	-2.40E-003
19	-2.28E-003
20	-2.12E-003
21	-9.94E-004
22	-3.95E-004
23	1.21E-004
24	1.06E-003
25	1.15E-003
26	1.30E-003
27	1.26E-003
28	-1.86E-011
29	-1.26E-003

30	-1.30E-003
31	-1.15E-003
32	-9.44E-004
33	2.69E-004
34	4.54E-004
35	1.05E-004
36	-3.66E-005
37	1.15E-004
38	3.76E-004
39	1.18E-003
40	-2.33E-011
41	-1.18E-003
42	-3.76E-004
43	-1.15E-004
44	3.66E-005
45	-1.05E-004
46	-4.54E-004
47	-2.69E-004
48	9.44E-004
49	2.03E-003
50	2.18E-003
51	1.99E-003
52	5.26E-004
53	-9.46E-004
54	-1.31E-003
55	-1.21E-003
56	-1.06E-003
57	-1.21E-004
58	3.95E-004
59	9.94E-004
60	2.12E-003
61	2.28E-003
62	2.40E-003
63	2.06E-003
64	1.20E-004
65	-1.42E-003
66	-5.59E-004
67	-2.66E-004
68	-7.45E-005
69	1.44E-004
70	8.00E-005
71	4.72E-004
72	1.82E-003

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#####
#          SOLICITAÇÕES TANGENCIAIS (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	-8.89E-001	-5.09E-003
2	-8.89E-001	-4.67E-003
3	-8.89E-001	-3.75E-003
4	-8.89E-001	-3.94E-003
5	-8.89E-001	-6.12E-003
6	-8.89E-001	-1.01E-002
7	-8.89E-001	-1.22E-002
8	-8.87E-001	-1.22E-002
9	-8.84E-001	-1.23E-002
10	-8.82E-001	-1.23E-002
11	-8.81E-001	-1.24E-002
12	-8.79E-001	-1.25E-002
13	-8.79E-001	-1.25E-002
14	-8.79E-001	-1.22E-002
15	-8.79E-001	-1.24E-002
16	-8.79E-001	-1.25E-002
17	-8.79E-001	-1.07E-002
18	-8.79E-001	-7.13E-003
19	-8.79E-001	-5.19E-003
20	-8.81E-001	-5.19E-003
21	-8.85E-001	-5.17E-003
22	-8.88E-001	-5.15E-003
23	-8.89E-001	-5.12E-003
24	-8.89E-001	-5.10E-003
25	-8.83E-001	-5.47E-003
26	-8.83E-001	-5.14E-003
27	-8.83E-001	-4.19E-003
28	-8.83E-001	-4.20E-003
29	-8.83E-001	-5.95E-003
30	-8.83E-001	-9.11E-003
31	-8.83E-001	-1.07E-002
32	-8.82E-001	-1.07E-002
33	-8.81E-001	-1.07E-002
34	-8.80E-001	-1.08E-002
35	-8.80E-001	-1.08E-002
36	-8.79E-001	-1.09E-002
37	-8.79E-001	-1.09E-002
38	-8.79E-001	-1.06E-002
39	-8.79E-001	-1.05E-002
40	-8.79E-001	-9.86E-003
41	-8.79E-001	-8.18E-003
42	-8.79E-001	-6.30E-003
43	-8.79E-001	-5.60E-003
44	-8.79E-001	-5.59E-003
45	-8.81E-001	-5.56E-003
46	-8.82E-001	-5.53E-003
47	-8.83E-001	-5.50E-003
48	-8.84E-001	-5.48E-003
49	-8.76E-001	-1.14E-002

50	-8.76E-001	-8.99E-003
51	-8.76E-001	-5.00E-003
52	-8.76E-001	-3.81E-003
53	-8.76E-001	-5.67E-003
54	-8.76E-001	-9.69E-003
55	-8.76E-001	-1.17E-002
56	-8.74E-001	-1.17E-002
57	-8.72E-001	-1.17E-002
58	-8.73E-001	-1.18E-002
59	-8.74E-001	-1.18E-002
60	-8.77E-001	-1.19E-002
61	-8.79E-001	-1.19E-002
62	-8.79E-001	-1.33E-002
63	-8.79E-001	-1.57E-002
64	-8.79E-001	-1.61E-002
65	-8.79E-001	-1.46E-002
66	-8.79E-001	-1.24E-002
67	-8.79E-001	-1.16E-002
68	-8.79E-001	-1.16E-002
69	-8.80E-001	-1.15E-002
70	-8.80E-001	-1.15E-002
71	-8.81E-001	-1.15E-002
72	-8.81E-001	-1.14E-002

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.33E-003
2	1.49E-003
3	8.97E-004
4	-1.72E-003
5	-4.96E-003
6	-6.92E-003
7	-6.88E-003
8	-6.51E-003
9	-3.49E-003
10	-2.13E-003
11	-2.12E-003
12	-1.73E-003
13	-1.18E-003
14	-6.99E-004
15	7.72E-004
16	-1.13E-003
17	-4.25E-003
18	-6.42E-003
19	-6.46E-003
20	-6.38E-003
21	-5.22E-003
22	-3.56E-003
23	-1.43E-003
24	1.07E-003
25	8.53E-004
26	1.41E-003
27	1.05E-003
28	-1.28E-003
29	-4.02E-003

30	-5.25E-003
31	-5.12E-003
32	-3.78E-003
33	-8.79E-004
34	-3.78E-004
35	-6.24E-004
36	-1.42E-003
37	-1.36E-003
38	-5.54E-004
39	-2.41E-004
40	-1.82E-003
41	-3.12E-003
42	-2.44E-003
43	-2.20E-003
44	-1.69E-003
45	-2.11E-003
46	-2.24E-003
47	-1.23E-003
48	5.65E-004
49	8.22E-003
50	7.70E-003
51	4.18E-003
52	-5.79E-004
53	-4.95E-003
54	-6.65E-003
55	-6.45E-003
56	-4.75E-003
57	-1.32E-003
58	1.59E-003
59	3.84E-003
60	4.86E-003
61	4.91E-003
62	4.72E-003
63	2.31E-003
64	-1.08E-003
65	-3.30E-003
66	-3.08E-003
67	-2.59E-003
68	-1.30E-003
69	-6.32E-004
70	-3.77E-004
71	-6.63E-004
72	-7.48E-004

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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	3.12E-001	-6.18E-004
2	3.12E-001	-8.96E-004
3	3.12E-001	-1.17E-003
4	3.12E-001	-1.22E-003
5	3.12E-001	-1.35E-003
6	3.12E-001	-1.59E-003
7	3.12E-001	-1.70E-003
8	3.12E-001	-1.70E-003
9	3.12E-001	-1.71E-003
10	3.12E-001	-1.72E-003
11	3.13E-001	-1.73E-003
12	3.13E-001	-1.73E-003
13	3.13E-001	-1.73E-003
14	3.13E-001	-1.57E-003
15	3.13E-001	-1.28E-003
16	3.13E-001	-9.96E-004
17	3.13E-001	-7.18E-004
18	3.13E-001	-6.00E-004
19	3.13E-001	-6.39E-004
20	3.13E-001	-6.38E-004
21	3.14E-001	-6.34E-004
22	3.13E-001	-6.30E-004
23	3.13E-001	-6.25E-004
24	3.12E-001	-6.19E-004
25	3.12E-001	-8.36E-004
26	3.12E-001	-9.02E-004
27	3.12E-001	-8.80E-004
28	3.12E-001	-8.77E-004
29	3.12E-001	-1.07E-003
30	3.12E-001	-1.44E-003
31	3.12E-001	-1.63E-003
32	3.12E-001	-1.63E-003
33	3.12E-001	-1.64E-003
34	3.13E-001	-1.64E-003
35	3.13E-001	-1.65E-003
36	3.13E-001	-1.65E-003
37	3.13E-001	-1.65E-003
38	3.13E-001	-1.65E-003
39	3.13E-001	-1.70E-003
40	3.13E-001	-1.66E-003
41	3.13E-001	-1.42E-003
42	3.13E-001	-1.03E-003
43	3.13E-001	-8.53E-004
44	3.13E-001	-8.52E-004
45	3.13E-001	-8.49E-004
46	3.12E-001	-8.45E-004
47	3.12E-001	-8.41E-004
48	3.12E-001	-8.37E-004
49	3.12E-001	-1.63E-003

50	3.12E-001	-1.53E-003
51	3.12E-001	-1.32E-003
52	3.12E-001	-1.37E-003
53	3.12E-001	-1.76E-003
54	3.12E-001	-2.26E-003
55	3.12E-001	-2.45E-003
56	3.12E-001	-2.46E-003
57	3.11E-001	-2.47E-003
58	3.11E-001	-2.48E-003
59	3.12E-001	-2.49E-003
60	3.13E-001	-2.50E-003
61	3.13E-001	-2.50E-003
62	3.13E-001	-2.18E-003
63	3.13E-001	-1.86E-003
64	3.13E-001	-1.78E-003
65	3.13E-001	-1.74E-003
66	3.13E-001	-1.68E-003
67	3.13E-001	-1.66E-003
68	3.13E-001	-1.65E-003
69	3.13E-001	-1.65E-003
70	3.13E-001	-1.65E-003
71	3.13E-001	-1.64E-003
72	3.13E-001	-1.63E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	-9.85E-004
2	-8.53E-004
3	-1.38E-004
4	-8.88E-005
5	-3.12E-004
6	-3.79E-004
7	-3.50E-004
8	-3.24E-004
9	-4.64E-004
10	-5.61E-004
11	-5.98E-004
12	-5.89E-004
13	-5.57E-004
14	-5.25E-004
15	-4.20E-004
16	-4.50E-004
17	-3.65E-004
18	8.36E-005
19	1.65E-004
20	2.28E-004
21	1.46E-004
22	-5.57E-004
23	-1.22E-003
24	-1.09E-003
25	-2.92E-004
26	-1.10E-004
27	8.58E-005
28	-1.21E-004
29	-4.62E-004

30	-6.28E-004
31	-6.11E-004
32	-6.68E-004
33	-8.08E-004
34	-6.92E-004
35	-3.18E-004
36	-7.76E-005
37	-4.56E-005
38	5.09E-005
39	5.69E-005
40	-2.16E-004
41	-5.18E-004
42	-6.10E-004
43	-5.97E-004
44	-5.76E-004
45	-5.98E-004
46	-5.59E-004
47	-4.66E-004
48	-3.44E-004
49	2.49E-004
50	3.89E-004
51	1.72E-004
52	-3.67E-004
53	-7.75E-004
54	-7.21E-004
55	-4.93E-004
56	4.47E-004
57	6.02E-004
58	-5.15E-004
59	-1.49E-003
60	-1.45E-003
61	-1.35E-003
62	-8.45E-004
63	-2.29E-004
64	-5.92E-005
65	-8.61E-005
66	-8.90E-005
67	-6.68E-005
68	-7.31E-005
69	-2.37E-004
70	-2.40E-004
71	-2.42E-004
72	-2.42E-004

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#####
#          SOLICITAÇÕES TANGENCIAIS (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	2.07E-001	-5.16E-003
2	2.07E-001	-4.91E-003
3	2.07E-001	-4.18E-003
4	2.07E-001	-4.29E-003
5	2.07E-001	-6.05E-003
6	2.07E-001	-9.19E-003
7	2.07E-001	-1.07E-002
8	2.08E-001	-1.08E-002
9	2.10E-001	-1.08E-002
10	2.12E-001	-1.09E-002
11	2.13E-001	-1.09E-002
12	2.14E-001	-1.10E-002
13	2.15E-001	-1.10E-002
14	2.15E-001	-1.07E-002
15	2.15E-001	-1.09E-002
16	2.15E-001	-1.10E-002
17	2.15E-001	-9.61E-003
18	2.15E-001	-6.75E-003
19	2.15E-001	-5.26E-003
20	2.13E-001	-5.26E-003
21	2.11E-001	-5.24E-003
22	2.08E-001	-5.21E-003
23	2.07E-001	-5.19E-003
24	2.07E-001	-5.16E-003
25	2.09E-001	-4.85E-003
26	2.09E-001	-4.82E-003
27	2.09E-001	-4.19E-003
28	2.09E-001	-4.18E-003
29	2.09E-001	-5.73E-003
30	2.09E-001	-8.70E-003
31	2.09E-001	-1.02E-002
32	2.10E-001	-1.02E-002
33	2.12E-001	-1.03E-002
34	2.13E-001	-1.03E-002
35	2.14E-001	-1.03E-002
36	2.14E-001	-1.04E-002
37	2.15E-001	-1.04E-002
38	2.15E-001	-1.01E-002
39	2.15E-001	-9.97E-003
40	2.15E-001	-9.32E-003
41	2.15E-001	-7.62E-003
42	2.15E-001	-5.70E-003
43	2.15E-001	-4.98E-003
44	2.14E-001	-4.97E-003
45	2.13E-001	-4.94E-003
46	2.12E-001	-4.91E-003
47	2.10E-001	-4.89E-003
48	2.09E-001	-4.86E-003
49	2.11E-001	-1.09E-002

50	2.11E-001	-8.68E-003
51	2.11E-001	-5.05E-003
52	2.11E-001	-4.16E-003
53	2.11E-001	-6.35E-003
54	2.11E-001	-1.08E-002
55	2.11E-001	-1.29E-002
56	2.13E-001	-1.29E-002
57	2.15E-001	-1.30E-002
58	2.16E-001	-1.31E-002
59	2.17E-001	-1.31E-002
60	2.16E-001	-1.31E-002
61	2.15E-001	-1.31E-002
62	2.15E-001	-1.39E-002
63	2.15E-001	-1.54E-002
64	2.15E-001	-1.54E-002
65	2.15E-001	-1.39E-002
66	2.15E-001	-1.19E-002
67	2.15E-001	-1.10E-002
68	2.14E-001	-1.10E-002
69	2.14E-001	-1.10E-002
70	2.13E-001	-1.10E-002
71	2.12E-001	-1.09E-002
72	2.12E-001	-1.09E-002

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	7.42E-004
2	9.51E-004
3	8.17E-004
4	-1.36E-003
5	-4.01E-003
6	-5.21E-003
7	-5.08E-003
8	-4.64E-003
9	-2.19E-003
10	-2.03E-003
11	-2.23E-003
12	-1.81E-003
13	-1.27E-003
14	-7.96E-004
15	7.80E-004
16	-8.29E-004
17	-3.47E-003
18	-4.97E-003
19	-4.93E-003
20	-4.80E-003
21	-3.74E-003
22	-2.81E-003
23	-1.58E-003
24	4.60E-004
25	-2.14E-004
26	5.73E-004
27	8.60E-004
28	-1.07E-003
29	-3.67E-003

30	-5.01E-003
31	-4.91E-003
32	-4.02E-003
33	-1.90E-003
34	-9.34E-004
35	-9.94E-004
36	-1.46E-003
37	-1.37E-003
38	-5.69E-004
39	-2.66E-004
40	-1.85E-003
41	-3.17E-003
42	-2.50E-003
43	-2.26E-003
44	-1.76E-003
45	-2.17E-003
46	-2.43E-003
47	-2.05E-003
48	-5.58E-004
49	7.40E-003
50	7.03E-003
51	3.71E-003
52	-1.04E-003
53	-5.53E-003
54	-7.26E-003
55	-7.02E-003
56	-5.27E-003
57	-2.75E-003
58	-1.11E-003
59	5.95E-004
60	2.03E-003
61	2.21E-003
62	2.68E-003
63	1.41E-003
64	-1.26E-003
65	-3.14E-003
66	-2.93E-003
67	-2.48E-003
68	-1.35E-003
69	-9.96E-004
70	-9.34E-004
71	-9.37E-004
72	-9.39E-004

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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	-9.93E-004	-2.78E-003
2	-9.94E-004	-2.52E-003
3	-9.98E-004	-1.98E-003
4	-1.00E-003	-1.88E-003
5	-1.00E-003	-2.43E-003
6	-1.01E-003	-3.38E-003
7	-1.01E-003	-3.80E-003
8	-6.23E-004	-3.80E-003
9	-1.62E-004	-3.81E-003
10	-7.62E-005	-3.82E-003
11	-1.19E-005	-3.84E-003
12	1.27E-005	-3.85E-003
13	-1.90E-005	-3.85E-003
14	-1.85E-005	-3.92E-003
15	-1.65E-005	-4.40E-003
16	-1.45E-005	-4.69E-003
17	-1.25E-005	-4.25E-003
18	-1.05E-005	-3.27E-003
19	-9.96E-006	-2.82E-003
20	-4.46E-004	-2.81E-003
21	-1.12E-003	-2.81E-003
22	-1.43E-003	-2.80E-003
23	-1.49E-003	-2.79E-003
24	-1.23E-003	-2.78E-003
25	8.55E-006	-3.10E-003
26	7.54E-006	-2.86E-003
27	3.77E-006	-2.26E-003
28	5.75E-012	-1.98E-003
29	-3.77E-006	-2.26E-003
30	-7.54E-006	-2.86E-003
31	-8.55E-006	-3.10E-003
32	2.02E-004	-3.10E-003
33	3.10E-004	-3.11E-003
34	1.17E-004	-3.12E-003
35	8.31E-006	-3.13E-003
36	4.49E-007	-3.14E-003
37	-3.94E-006	-3.14E-003
38	-3.47E-006	-3.18E-003
39	-1.74E-006	-3.55E-003
40	4.24E-011	-3.80E-003
41	1.74E-006	-3.55E-003
42	3.47E-006	-3.18E-003
43	3.94E-006	-3.14E-003
44	-4.49E-007	-3.14E-003
45	-8.31E-006	-3.13E-003
46	-1.17E-004	-3.12E-003
47	-3.10E-004	-3.11E-003
48	-2.02E-004	-3.10E-003
49	1.01E-003	-3.80E-003

50	1.01E-003	-3.38E-003
51	1.00E-003	-2.43E-003
52	1.00E-003	-1.88E-003
53	9.98E-004	-1.98E-003
54	9.94E-004	-2.52E-003
55	9.93E-004	-2.78E-003
56	1.23E-003	-2.78E-003
57	1.49E-003	-2.79E-003
58	1.43E-003	-2.80E-003
59	1.12E-003	-2.81E-003
60	4.46E-004	-2.81E-003
61	9.96E-006	-2.82E-003
62	1.05E-005	-3.27E-003
63	1.25E-005	-4.25E-003
64	1.45E-005	-4.69E-003
65	1.65E-005	-4.40E-003
66	1.85E-005	-3.92E-003
67	1.90E-005	-3.85E-003
68	-1.27E-005	-3.85E-003
69	1.19E-005	-3.84E-003
70	7.62E-005	-3.82E-003
71	1.62E-004	-3.81E-003
72	6.23E-004	-3.80E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	8.19E-004
2	8.77E-004
3	6.01E-004
4	-3.46E-004
5	-1.28E-003
6	-1.43E-003
7	-1.34E-003
8	-1.21E-003
9	-3.17E-004
10	-5.11E-005
11	-9.66E-005
12	4.98E-005
13	1.65E-004
14	3.37E-004
15	8.32E-004
16	-7.30E-005
17	-1.24E-003
18	-1.55E-003
19	-1.49E-003
20	-1.40E-003
21	-7.22E-004
22	-2.75E-004
23	1.25E-004
24	7.30E-004
25	7.54E-004
26	8.47E-004
27	8.02E-004
28	-1.18E-011
29	-8.02E-004

30	-8.47E-004
31	-7.54E-004
32	-6.28E-004
33	1.78E-004
34	3.05E-004
35	6.98E-005
36	-2.53E-005
37	6.25E-005
38	2.13E-004
39	6.74E-004
40	-1.47E-011
41	-6.74E-004
42	-2.13E-004
43	-6.25E-005
44	2.53E-005
45	-6.98E-005
46	-3.05E-004
47	-1.78E-004
48	6.28E-004
49	1.34E-003
50	1.43E-003
51	1.28E-003
52	3.46E-004
53	-6.01E-004
54	-8.77E-004
55	-8.19E-004
56	-7.30E-004
57	-1.25E-004
58	2.75E-004
59	7.22E-004
60	1.40E-003
61	1.49E-003
62	1.55E-003
63	1.24E-003
64	7.30E-005
65	-8.32E-004
66	-3.37E-004
67	-1.65E-004
68	-4.98E-005
69	9.66E-005
70	5.11E-005
71	3.17E-004
72	1.21E-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	2.98E-005	-1.30E-003
2	2.78E-005	-1.34E-003
3	2.08E-005	-1.26E-003
4	1.37E-005	-1.17E-003
5	6.59E-006	-1.21E-003
6	-4.91E-007	-1.31E-003
7	-2.40E-006	-1.32E-003
8	-8.37E-006	-1.32E-003
9	-4.01E-005	-1.33E-003
10	-5.06E-005	-1.33E-003
11	-4.03E-005	-1.34E-003
12	-8.25E-006	-1.34E-003
13	9.53E-006	-1.34E-003
14	1.08E-005	-1.33E-003
15	1.56E-005	-1.35E-003
16	2.03E-005	-1.34E-003
17	2.51E-005	-1.27E-003
18	2.99E-005	-1.26E-003
19	3.12E-005	-1.32E-003
20	1.06E-004	-1.32E-003
21	3.48E-004	-1.31E-003
22	4.76E-004	-1.31E-003
23	3.39E-004	-1.30E-003
24	9.27E-005	-1.30E-003
25	1.60E-005	-1.43E-003
26	1.41E-005	-1.39E-003
27	7.05E-006	-1.21E-003
28	-4.19E-012	-1.11E-003
29	-7.05E-006	-1.21E-003
30	-1.41E-005	-1.39E-003
31	-1.60E-005	-1.43E-003
32	1.23E-005	-1.43E-003
33	3.68E-005	-1.43E-003
34	4.76E-005	-1.44E-003
35	4.01E-005	-1.44E-003
36	1.13E-005	-1.45E-003
37	-1.09E-005	-1.45E-003
38	-9.60E-006	-1.48E-003
39	-4.80E-006	-1.60E-003
40	1.20E-011	-1.67E-003
41	4.80E-006	-1.60E-003
42	9.60E-006	-1.48E-003
43	1.09E-005	-1.45E-003
44	-1.13E-005	-1.45E-003
45	-4.01E-005	-1.44E-003
46	-4.76E-005	-1.44E-003
47	-3.68E-005	-1.43E-003
48	-1.23E-005	-1.43E-003
49	2.40E-006	-1.32E-003

50	4.91E-007	-1.31E-003
51	-6.59E-006	-1.21E-003
52	-1.37E-005	-1.17E-003
53	-2.08E-005	-1.26E-003
54	-2.78E-005	-1.34E-003
55	-2.98E-005	-1.30E-003
56	-9.27E-005	-1.30E-003
57	-3.39E-004	-1.30E-003
58	-4.76E-004	-1.31E-003
59	-3.48E-004	-1.31E-003
60	-1.06E-004	-1.32E-003
61	-3.12E-005	-1.32E-003
62	-2.99E-005	-1.26E-003
63	-2.51E-005	-1.27E-003
64	-2.03E-005	-1.34E-003
65	-1.56E-005	-1.35E-003
66	-1.08E-005	-1.33E-003
67	-9.53E-006	-1.34E-003
68	8.25E-006	-1.34E-003
69	4.03E-005	-1.34E-003
70	5.06E-005	-1.33E-003
71	4.01E-005	-1.33E-003
72	8.37E-006	-1.32E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	-1.76E-004
2	-9.28E-005
3	2.09E-004
4	5.02E-005
5	-1.68E-004
6	-5.57E-005
7	-9.04E-007
8	4.00E-005
9	3.37E-005
10	-5.34E-007
11	-3.05E-005
12	-6.59E-005
13	-4.98E-005
14	-1.92E-005
15	4.01E-005
16	-7.62E-005
17	-1.18E-004
18	1.63E-004
19	2.25E-004
20	2.81E-004
21	3.58E-004
22	-4.42E-006
23	-3.77E-004
24	-2.51E-004
25	1.17E-004
26	1.74E-004
27	2.76E-004
28	-5.30E-012
29	-2.76E-004

30	-1.74E-004
31	-1.17E-004
32	-7.14E-005
33	-2.70E-005
34	-4.29E-006
35	2.90E-005
36	6.31E-005
37	8.63E-005
38	1.22E-004
39	1.86E-004
40	-6.46E-012
41	-1.86E-004
42	-1.22E-004
43	-8.63E-005
44	-6.31E-005
45	-2.90E-005
46	4.29E-006
47	2.70E-005
48	7.14E-005
49	9.04E-007
50	5.57E-005
51	1.68E-004
52	-5.02E-005
53	-2.09E-004
54	9.28E-005
55	1.76E-004
56	2.51E-004
57	3.77E-004
58	4.42E-006
59	-3.58E-004
60	-2.81E-004
61	-2.25E-004
62	-1.63E-004
63	1.18E-004
64	7.62E-005
65	-4.01E-005
66	1.92E-005
67	4.98E-005
68	6.59E-005
69	3.05E-005
70	5.34E-007
71	-3.37E-005
72	-4.00E-005

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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	-8.09E-004	-2.77E-003
2	-8.11E-004	-2.55E-003
3	-8.15E-004	-2.04E-003
4	-8.20E-004	-1.93E-003
5	-8.24E-004	-2.42E-003
6	-8.29E-004	-3.27E-003
7	-8.30E-004	-3.63E-003
8	-5.03E-004	-3.63E-003
9	-1.39E-004	-3.64E-003
10	-7.04E-005	-3.65E-003
11	-3.91E-006	-3.66E-003
12	1.54E-005	-3.67E-003
13	-1.44E-005	-3.68E-003
14	-1.35E-005	-3.75E-003
15	-1.01E-005	-4.21E-003
16	-6.76E-006	-4.50E-003
17	-3.40E-006	-4.08E-003
18	-4.76E-008	-3.20E-003
19	8.56E-007	-2.81E-003
20	-3.68E-004	-2.81E-003
21	-8.99E-004	-2.80E-003
22	-1.14E-003	-2.79E-003
23	-1.20E-003	-2.78E-003
24	-1.01E-003	-2.77E-003
25	1.08E-005	-3.04E-003
26	9.53E-006	-2.83E-003
27	4.76E-006	-2.27E-003
28	5.72E-012	-2.01E-003
29	-4.76E-006	-2.27E-003
30	-9.53E-006	-2.83E-003
31	-1.08E-005	-3.04E-003
32	1.69E-004	-3.04E-003
33	2.39E-004	-3.05E-003
34	7.57E-005	-3.06E-003
35	1.16E-006	-3.07E-003
36	-2.38E-006	-3.08E-003
37	-7.12E-006	-3.08E-003
38	-6.28E-006	-3.12E-003
39	-3.14E-006	-3.49E-003
40	4.18E-011	-3.75E-003
41	3.14E-006	-3.49E-003
42	6.28E-006	-3.12E-003
43	7.12E-006	-3.08E-003
44	2.38E-006	-3.08E-003
45	-1.16E-006	-3.07E-003
46	-7.57E-005	-3.06E-003
47	-2.39E-004	-3.05E-003
48	-1.69E-004	-3.04E-003
49	8.30E-004	-3.63E-003

50	8.29E-004	-3.27E-003
51	8.24E-004	-2.42E-003
52	8.20E-004	-1.93E-003
53	8.15E-004	-2.04E-003
54	8.11E-004	-2.55E-003
55	8.09E-004	-2.77E-003
56	1.01E-003	-2.77E-003
57	1.20E-003	-2.78E-003
58	1.14E-003	-2.79E-003
59	8.99E-004	-2.80E-003
60	3.68E-004	-2.81E-003
61	-8.56E-007	-2.81E-003
62	4.77E-008	-3.20E-003
63	3.40E-006	-4.08E-003
64	6.76E-006	-4.50E-003
65	1.01E-005	-4.21E-003
66	1.35E-005	-3.75E-003
67	1.44E-005	-3.68E-003
68	-1.54E-005	-3.67E-003
69	3.91E-006	-3.66E-003
70	7.04E-005	-3.65E-003
71	1.39E-004	-3.64E-003
72	5.03E-004	-3.63E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	7.10E-004
2	7.79E-004
3	5.90E-004
4	-2.92E-004
5	-1.16E-003
6	-1.24E-003
7	-1.14E-003
8	-1.01E-003
9	-2.31E-004
10	-7.84E-005
11	-7.85E-005
12	4.57E-005
13	1.56E-004
14	3.25E-004
15	8.12E-004
16	-5.96E-005
17	-1.16E-003
18	-1.34E-003
19	-1.27E-003
20	-1.17E-003
21	-5.35E-004
22	-2.23E-004
23	4.67E-005
24	6.15E-004
25	6.53E-004
26	7.51E-004
27	7.59E-004
28	-1.16E-011
29	-7.59E-004

30	-7.51E-004
31	-6.53E-004
32	-5.26E-004
33	1.81E-004
34	2.15E-004
35	5.47E-005
36	-2.43E-005
37	6.36E-005
38	2.14E-004
39	6.74E-004
40	-1.45E-011
41	-6.74E-004
42	-2.14E-004
43	-6.36E-005
44	2.43E-005
45	-5.47E-005
46	-2.15E-004
47	-1.81E-004
48	5.26E-004
49	1.14E-003
50	1.24E-003
51	1.16E-003
52	2.92E-004
53	-5.90E-004
54	-7.79E-004
55	-7.10E-004
56	-6.15E-004
57	-4.67E-005
58	2.23E-004
59	5.35E-004
60	1.17E-003
61	1.27E-003
62	1.34E-003
63	1.16E-003
64	5.96E-005
65	-8.12E-004
66	-3.25E-004
67	-1.56E-004
68	-4.57E-005
69	7.85E-005
70	7.84E-005
71	2.31E-004
72	1.01E-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	-1.55E-004	-1.42E-003
2	-1.56E-004	-1.36E-003
3	-1.60E-004	-1.16E-003
4	-1.64E-004	-1.07E-003
5	-1.67E-004	-1.22E-003
6	-1.71E-004	-1.48E-003
7	-1.72E-004	-1.57E-003
8	-9.69E-005	-1.57E-003
9	-3.54E-005	-1.58E-003
10	-2.05E-005	-1.58E-003
11	-5.38E-006	-1.59E-003
12	3.00E-006	-1.59E-003
13	-1.20E-006	-1.59E-003
14	-7.34E-007	-1.61E-003
15	9.98E-007	-1.71E-003
16	2.73E-006	-1.76E-003
17	4.46E-006	-1.68E-003
18	6.20E-006	-1.51E-003
19	6.66E-006	-1.44E-003
20	-5.26E-005	-1.44E-003
21	-1.08E-004	-1.43E-003
22	-1.36E-004	-1.43E-003
23	-1.95E-004	-1.43E-003
24	-2.04E-004	-1.42E-003
25	8.66E-006	-1.47E-003
26	7.63E-006	-1.41E-003
27	3.81E-006	-1.20E-003
28	4.31E-012	-1.09E-003
29	-3.81E-006	-1.20E-003
30	-7.63E-006	-1.41E-003
31	-8.66E-006	-1.47E-003
32	4.14E-005	-1.47E-003
33	5.07E-005	-1.48E-003
34	2.12E-005	-1.48E-003
35	4.92E-006	-1.49E-003
36	5.05E-007	-1.49E-003
37	-3.83E-006	-1.49E-003
38	-3.38E-006	-1.50E-003
39	-1.69E-006	-1.60E-003
40	2.15E-011	-1.66E-003
41	1.69E-006	-1.60E-003
42	3.38E-006	-1.50E-003
43	3.83E-006	-1.49E-003
44	-5.05E-007	-1.49E-003
45	-4.92E-006	-1.49E-003
46	-2.12E-005	-1.48E-003
47	-5.07E-005	-1.48E-003
48	-4.14E-005	-1.47E-003
49	1.72E-004	-1.57E-003

50	1.71E-004	-1.48E-003
51	1.67E-004	-1.22E-003
52	1.64E-004	-1.07E-003
53	1.60E-004	-1.16E-003
54	1.56E-004	-1.36E-003
55	1.55E-004	-1.42E-003
56	2.04E-004	-1.42E-003
57	1.95E-004	-1.43E-003
58	1.36E-004	-1.43E-003
59	1.08E-004	-1.43E-003
60	5.26E-005	-1.44E-003
61	-6.66E-006	-1.44E-003
62	-6.20E-006	-1.51E-003
63	-4.46E-006	-1.68E-003
64	-2.73E-006	-1.76E-003
65	-9.98E-007	-1.71E-003
66	7.34E-007	-1.61E-003
67	1.20E-006	-1.59E-003
68	-3.00E-006	-1.59E-003
69	5.38E-006	-1.59E-003
70	2.05E-005	-1.58E-003
71	3.54E-005	-1.58E-003
72	9.69E-005	-1.57E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	1.89E-004
2	2.38E-004
3	2.77E-004
4	-4.77E-005
5	-3.74E-004
6	-3.29E-004
7	-2.76E-004
8	-2.18E-004
9	-3.90E-005
10	-2.01E-005
11	-1.93E-005
12	7.39E-007
13	2.86E-005
14	7.03E-005
15	1.70E-004
16	-1.54E-005
17	-2.35E-004
18	-2.39E-004
19	-2.12E-004
20	-1.79E-004
21	-3.35E-005
22	-6.75E-005
23	-9.54E-005
24	1.33E-004
25	1.93E-004
26	2.46E-004
27	3.08E-004
28	-5.57E-012
29	-3.08E-004

30	-2.46E-004
31	-1.93E-004
32	-1.34E-004
33	3.68E-005
34	3.96E-005
35	1.61E-005
36	3.41E-006
37	2.76E-005
38	6.62E-005
39	1.58E-004
40	-6.95E-012
41	-1.58E-004
42	-6.62E-005
43	-2.76E-005
44	-3.41E-006
45	-1.61E-005
46	-3.96E-005
47	-3.68E-005
48	1.34E-004
49	2.76E-004
50	3.29E-004
51	3.74E-004
52	4.77E-005
53	-2.77E-004
54	-2.38E-004
55	-1.89E-004
56	-1.33E-004
57	9.54E-005
58	6.75E-005
59	3.35E-005
60	1.79E-004
61	2.12E-004
62	2.39E-004
63	2.35E-004
64	1.54E-005
65	-1.70E-004
66	-7.03E-005
67	-2.86E-005
68	-7.39E-007
69	1.93E-005
70	2.01E-005
71	3.90E-005
72	2.18E-004

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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	-6.81E-004	-2.27E-003
2	-6.82E-004	-2.08E-003
3	-6.85E-004	-1.67E-003
4	-6.89E-004	-1.58E-003
5	-6.93E-004	-1.98E-003
6	-6.96E-004	-2.67E-003
7	-6.97E-004	-2.96E-003
8	-4.27E-004	-2.97E-003
9	-1.15E-004	-2.98E-003
10	-5.51E-005	-2.98E-003
11	-9.78E-006	-2.99E-003
12	8.96E-006	-3.00E-003
13	-1.24E-005	-3.00E-003
14	-1.18E-005	-3.05E-003
15	-9.94E-006	-3.39E-003
16	-8.04E-006	-3.59E-003
17	-6.14E-006	-3.28E-003
18	-4.24E-006	-2.61E-003
19	-3.73E-006	-2.30E-003
20	-2.98E-004	-2.30E-003
21	-7.40E-004	-2.29E-003
22	-9.48E-004	-2.28E-003
23	-1.00E-003	-2.28E-003
24	-8.46E-004	-2.27E-003
25	8.59E-006	-2.49E-003
26	7.57E-006	-2.31E-003
27	3.79E-006	-1.86E-003
28	5.24E-012	-1.64E-003
29	-3.79E-006	-1.86E-003
30	-7.57E-006	-2.31E-003
31	-8.59E-006	-2.49E-003
32	1.42E-004	-2.49E-003
33	2.14E-004	-2.50E-003
34	8.21E-005	-2.51E-003
35	7.34E-006	-2.51E-003
36	5.69E-007	-2.52E-003
37	-3.90E-006	-2.52E-003
38	-3.44E-006	-2.55E-003
39	-1.72E-006	-2.82E-003
40	3.46E-011	-3.00E-003
41	1.72E-006	-2.82E-003
42	3.44E-006	-2.55E-003
43	3.90E-006	-2.52E-003
44	-5.69E-007	-2.52E-003
45	-7.34E-006	-2.51E-003
46	-8.21E-005	-2.51E-003
47	-2.14E-004	-2.50E-003
48	-1.42E-004	-2.49E-003
49	6.97E-004	-2.96E-003

50	6.96E-004	-2.67E-003
51	6.93E-004	-1.98E-003
52	6.89E-004	-1.58E-003
53	6.85E-004	-1.67E-003
54	6.82E-004	-2.08E-003
55	6.81E-004	-2.27E-003
56	8.46E-004	-2.27E-003
57	1.00E-003	-2.28E-003
58	9.48E-004	-2.28E-003
59	7.40E-004	-2.29E-003
60	2.98E-004	-2.30E-003
61	3.73E-006	-2.30E-003
62	4.24E-006	-2.61E-003
63	6.14E-006	-3.28E-003
64	8.04E-006	-3.59E-003
65	9.94E-006	-3.39E-003
66	1.18E-005	-3.05E-003
67	1.24E-005	-3.00E-003
68	-8.96E-006	-3.00E-003
69	9.78E-006	-2.99E-003
70	5.51E-005	-2.98E-003
71	1.15E-004	-2.98E-003
72	4.27E-004	-2.97E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	5.82E-004
2	6.37E-004
3	4.80E-004
4	-2.35E-004
5	-9.42E-004
6	-1.02E-003
7	-9.43E-004
8	-8.39E-004
9	-2.15E-004
10	-3.79E-005
11	-6.79E-005
12	3.11E-005
13	1.13E-004
14	2.36E-004
15	5.83E-004
16	-5.19E-005
17	-8.66E-004
18	-1.06E-003
19	-1.01E-003
20	-9.43E-004
21	-4.64E-004
22	-1.98E-004
23	4.20E-005
24	5.06E-004
25	5.44E-004
26	6.22E-004
27	6.17E-004
28	-9.44E-012
29	-6.17E-004

30	-6.22E-004
31	-5.44E-004
32	-4.44E-004
33	1.23E-004
34	2.08E-004
35	5.00E-005
36	-1.42E-005
37	4.97E-005
38	1.59E-004
39	4.81E-004
40	-1.18E-011
41	-4.81E-004
42	-1.59E-004
43	-4.97E-005
44	1.42E-005
45	-5.00E-005
46	-2.08E-004
47	-1.23E-004
48	4.44E-004
49	9.43E-004
50	1.02E-003
51	9.42E-004
52	2.35E-004
53	-4.80E-004
54	-6.37E-004
55	-5.82E-004
56	-5.06E-004
57	-4.20E-005
58	1.98E-004
59	4.64E-004
60	9.43E-004
61	1.01E-003
62	1.06E-003
63	8.66E-004
64	5.19E-005
65	-5.83E-004
66	-2.36E-004
67	-1.13E-004
68	-3.11E-005
69	6.79E-005
70	3.79E-005
71	2.15E-004
72	8.39E-004

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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	1.49E-005	-1.33E-003
2	1.32E-005	-1.35E-003
3	6.71E-006	-1.25E-003
4	2.23E-007	-1.15E-003
5	-6.26E-006	-1.21E-003
6	-1.27E-005	-1.34E-003
7	-1.45E-005	-1.36E-003
8	-1.01E-005	-1.36E-003
9	-3.11E-005	-1.36E-003
10	-3.73E-005	-1.37E-003
11	-2.85E-005	-1.37E-003
12	-4.65E-006	-1.38E-003
13	6.91E-006	-1.38E-003
14	7.99E-006	-1.37E-003
15	1.20E-005	-1.42E-003
16	1.60E-005	-1.43E-003
17	2.00E-005	-1.35E-003
18	2.41E-005	-1.31E-003
19	2.51E-005	-1.35E-003
20	7.30E-005	-1.34E-003
21	2.57E-004	-1.34E-003
22	3.60E-004	-1.34E-003
23	2.48E-004	-1.33E-003
24	5.44E-005	-1.33E-003
25	1.47E-005	-1.43E-003
26	1.29E-005	-1.38E-003
27	6.46E-006	-1.21E-003
28	-1.91E-012	-1.11E-003
29	-6.46E-006	-1.21E-003
30	-1.29E-005	-1.38E-003
31	-1.47E-005	-1.43E-003
32	1.24E-005	-1.43E-003
33	2.80E-005	-1.43E-003
34	3.42E-005	-1.44E-003
35	2.82E-005	-1.44E-003
36	7.81E-006	-1.44E-003
37	-9.17E-006	-1.45E-003
38	-8.08E-006	-1.47E-003
39	-4.04E-006	-1.58E-003
40	1.44E-011	-1.65E-003
41	4.04E-006	-1.58E-003
42	8.08E-006	-1.47E-003
43	9.17E-006	-1.45E-003
44	-7.81E-006	-1.44E-003
45	-2.82E-005	-1.44E-003
46	-3.42E-005	-1.44E-003
47	-2.80E-005	-1.43E-003
48	-1.24E-005	-1.43E-003
49	1.45E-005	-1.36E-003

50	1.27E-005	-1.34E-003
51	6.26E-006	-1.21E-003
52	-2.23E-007	-1.15E-003
53	-6.71E-006	-1.25E-003
54	-1.32E-005	-1.35E-003
55	-1.49E-005	-1.33E-003
56	-5.44E-005	-1.33E-003
57	-2.48E-004	-1.33E-003
58	-3.60E-004	-1.34E-003
59	-2.57E-004	-1.34E-003
60	-7.30E-005	-1.34E-003
61	-2.51E-005	-1.35E-003
62	-2.41E-005	-1.31E-003
63	-2.00E-005	-1.35E-003
64	-1.60E-005	-1.43E-003
65	-1.20E-005	-1.42E-003
66	-7.99E-006	-1.37E-003
67	-6.91E-006	-1.38E-003
68	4.65E-006	-1.38E-003
69	2.85E-005	-1.37E-003
70	3.73E-005	-1.37E-003
71	3.11E-005	-1.36E-003
72	1.01E-005	-1.36E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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SEÇÃO	ROTAÇÃO (rad)
1	-9.97E-005
2	-2.41E-005
3	2.22E-004
4	3.16E-005
5	-2.03E-004
6	-9.24E-005
7	-3.68E-005
8	8.70E-006
9	2.28E-005
10	-2.96E-006
11	-2.31E-005
12	-4.66E-005
13	-2.79E-005
14	5.22E-006
15	7.40E-005
16	-5.67E-005
17	-1.37E-004
18	8.21E-005
19	1.37E-004
20	1.88E-004
21	2.86E-004
22	-3.32E-006
23	-3.09E-004
24	-1.71E-004
25	1.14E-004
26	1.71E-004
27	2.75E-004
28	-5.33E-012
29	-2.75E-004

30	-1.71E-004
31	-1.14E-004
32	-6.51E-005
33	-1.55E-005
34	-1.76E-006
35	2.16E-005
36	4.56E-005
37	6.92E-005
38	1.06E-004
39	1.78E-004
40	-6.49E-012
41	-1.78E-004
42	-1.06E-004
43	-6.92E-005
44	-4.56E-005
45	-2.16E-005
46	1.76E-006
47	1.55E-005
48	6.51E-005
49	3.68E-005
50	9.24E-005
51	2.03E-004
52	-3.16E-005
53	-2.22E-004
54	2.41E-005
55	9.97E-005
56	1.71E-004
57	3.09E-004
58	3.32E-006
59	-2.86E-004
60	-1.88E-004
61	-1.37E-004
62	-8.21E-005
63	1.37E-004
64	5.67E-005
65	-7.40E-005
66	-5.22E-006
67	2.79E-005
68	4.66E-005
69	2.31E-005
70	2.96E-006
71	-2.28E-005
72	-8.70E-006

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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	-5.64E-004	-2.26E-003
2	-5.65E-004	-2.10E-003
3	-5.69E-004	-1.71E-003
4	-5.74E-004	-1.61E-003
5	-5.78E-004	-1.97E-003
6	-5.82E-004	-2.60E-003
7	-5.83E-004	-2.86E-003
8	-3.51E-004	-2.86E-003
9	-1.00E-004	-2.87E-003
10	-5.17E-005	-2.88E-003
11	-4.46E-006	-2.88E-003
12	1.07E-005	-2.89E-003
13	-9.44E-006	-2.90E-003
14	-8.70E-006	-2.94E-003
15	-5.95E-006	-3.27E-003
16	-3.20E-006	-3.47E-003
17	-4.54E-007	-3.18E-003
18	2.29E-006	-2.57E-003
19	3.03E-006	-2.30E-003
20	-2.50E-004	-2.29E-003
21	-6.03E-004	-2.29E-003
22	-7.60E-004	-2.28E-003
23	-8.22E-004	-2.27E-003
24	-7.08E-004	-2.27E-003
25	1.00E-005	-2.45E-003
26	8.82E-006	-2.30E-003
27	4.41E-006	-1.87E-003
28	5.19E-012	-1.66E-003
29	-4.41E-006	-1.87E-003
30	-8.82E-006	-2.30E-003
31	-1.00E-005	-2.45E-003
32	1.21E-004	-2.45E-003
33	1.68E-004	-2.46E-003
34	5.52E-005	-2.47E-003
35	2.57E-006	-2.48E-003
36	-1.30E-006	-2.48E-003
37	-5.89E-006	-2.49E-003
38	-5.19E-006	-2.52E-003
39	-2.59E-006	-2.78E-003
40	3.42E-011	-2.96E-003
41	2.60E-006	-2.78E-003
42	5.19E-006	-2.52E-003
43	5.89E-006	-2.49E-003
44	1.30E-006	-2.48E-003
45	-2.57E-006	-2.48E-003
46	-5.52E-005	-2.47E-003
47	-1.68E-004	-2.46E-003
48	-1.21E-004	-2.45E-003
49	5.83E-004	-2.86E-003

50	5.82E-004	-2.60E-003
51	5.78E-004	-1.97E-003
52	5.74E-004	-1.61E-003
53	5.69E-004	-1.71E-003
54	5.65E-004	-2.10E-003
55	5.64E-004	-2.26E-003
56	7.08E-004	-2.27E-003
57	8.22E-004	-2.27E-003
58	7.60E-004	-2.28E-003
59	6.03E-004	-2.29E-003
60	2.50E-004	-2.29E-003
61	-3.03E-006	-2.30E-003
62	-2.29E-006	-2.57E-003
63	4.54E-007	-3.18E-003
64	3.20E-006	-3.47E-003
65	5.95E-006	-3.27E-003
66	8.70E-006	-2.94E-003
67	9.44E-006	-2.90E-003
68	-1.07E-005	-2.89E-003
69	4.46E-006	-2.88E-003
70	5.17E-005	-2.88E-003
71	1.00E-004	-2.87E-003
72	3.51E-004	-2.86E-003

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DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

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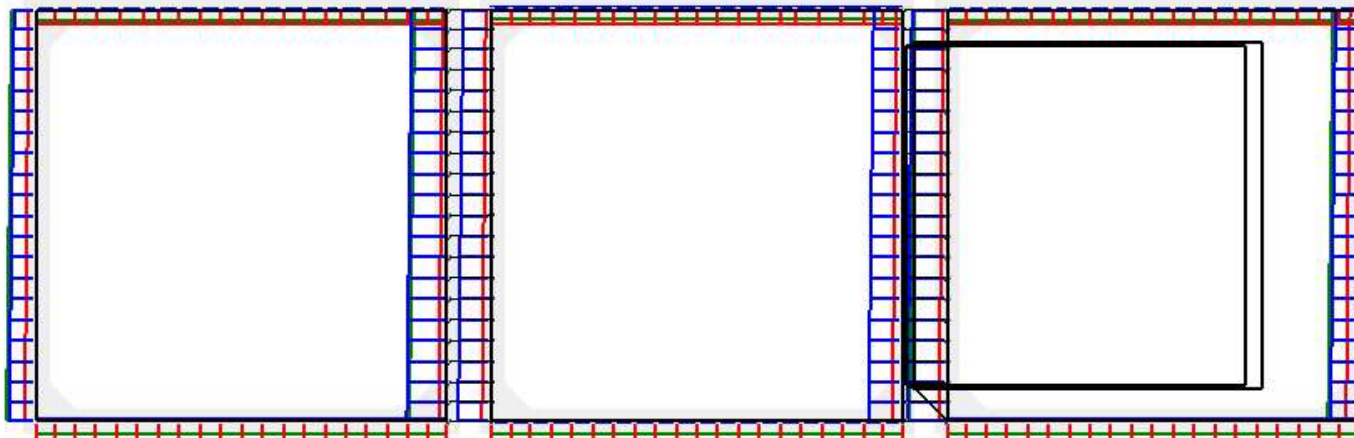
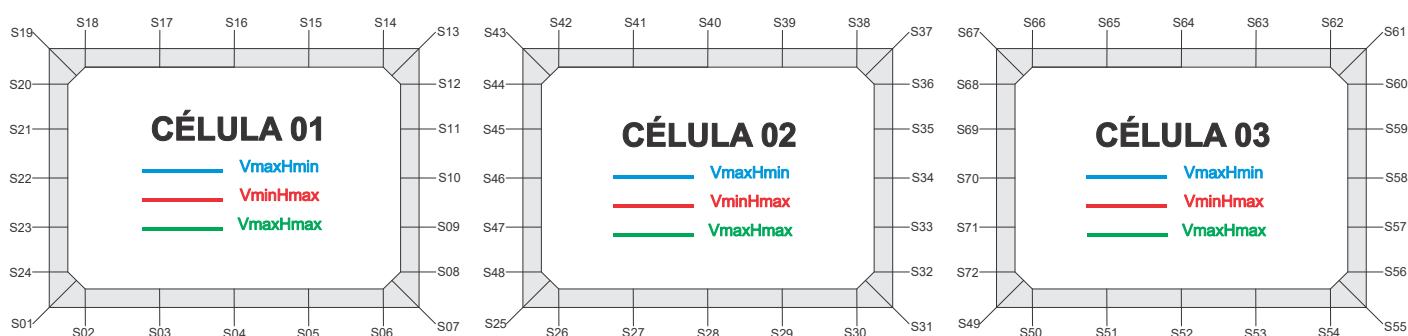
SEÇÃO	ROTAÇÃO (rad)
1	5.14E-004
2	5.76E-004
3	4.73E-004
4	-2.00E-004
5	-8.67E-004
6	-8.99E-004
7	-8.19E-004
8	-7.15E-004
9	-1.59E-004
10	-5.65E-005
11	-5.63E-005
12	2.88E-005
13	1.08E-004
14	2.29E-004
15	5.71E-004
16	-4.30E-005
17	-8.11E-004
18	-9.30E-004
19	-8.74E-004
20	-8.01E-004
21	-3.47E-004
22	-1.65E-004
23	-6.58E-006
24	4.34E-004
25	4.80E-004
26	5.62E-004
27	5.90E-004
28	-9.33E-012
29	-5.90E-004

30	-5.62E-004
31	-4.80E-004
32	-3.79E-004
33	1.27E-004
34	1.49E-004
35	4.02E-005
36	-1.39E-005
37	5.01E-005
38	1.59E-004
39	4.81E-004
40	-1.17E-011
41	-4.81E-004
42	-1.59E-004
43	-5.01E-005
44	1.39E-005
45	-4.02E-005
46	-1.49E-004
47	-1.27E-004
48	3.79E-004
49	8.19E-004
50	8.99E-004
51	8.67E-004
52	2.00E-004
53	-4.73E-004
54	-5.76E-004
55	-5.14E-004
56	-4.34E-004
57	6.58E-006
58	1.65E-004
59	3.47E-004
60	8.01E-004
61	8.74E-004
62	9.30E-004
63	8.11E-004
64	4.30E-005
65	-5.71E-004
66	-2.29E-004
67	-1.08E-004
68	-2.88E-005
69	5.63E-005
70	5.65E-005
71	1.59E-004
72	7.15E-004

---

## 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	-116.35	7.06
2	7.06	7.06
3	7.06	7.06
4	7.06	7.06
5	7.06	7.06
6	7.06	7.06
7	7.06	-172.12
8	-169.85	-169.85
9	-165.62	-165.62
10	-161.40	-161.40
11	-157.17	-157.17
12	-152.95	-152.95
13	-150.67	6.38
14	6.38	6.38
15	6.38	6.38
16	6.38	6.38
17	6.38	6.38
18	6.38	6.38
19	6.38	-94.90
20	-97.18	-97.18
21	-101.40	-101.40
22	-105.63	-105.63
23	-109.85	-109.85
24	-114.08	-114.08
25	-116.35	-2.23
26	-2.23	-2.23
27	-2.23	-2.23
28	-2.23	-2.23
29	-2.23	-2.23
30	-2.23	-2.23
31	-2.23	-144.24
32	-141.96	-141.96
33	-137.74	-137.74
34	-133.51	-133.51
35	-129.29	-129.29
36	-125.06	-125.06
37	-122.79	15.67
38	15.67	15.67
39	15.67	15.67
40	15.67	15.67
41	15.67	15.67
42	15.67	15.67
43	15.67	-122.79
44	-125.06	-125.06
45	-129.29	-129.29
46	-133.51	-133.51
47	-137.74	-137.74
48	-141.96	-141.96
49	-144.24	7.06

	50	7.06	7.06
	51	7.06	7.06
	52	7.06	7.06
	53	7.06	7.06
	54	7.06	7.06
	55	7.06	-116.35
	56	-114.08	-114.08
	57	-109.85	-109.85
	58	-105.63	-105.63
	59	-101.40	-101.40
	60	-97.18	-97.18
	61	-94.90	6.38
	62	6.38	6.38
	63	6.38	6.38
	64	6.38	6.38
	65	6.38	6.38
	66	6.38	6.38
	67	6.38	-150.67
	68	-152.95	-152.95
	69	-157.17	-157.17
	70	-161.40	-161.40
	71	-165.62	-165.62
	72	-169.85	-169.85

---

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-49.42	-82.66
2	-82.66	-82.66
3	-82.66	-82.66
4	-82.66	-82.66
5	-82.66	-82.66
6	-82.66	-82.66
7	-82.66	-34.64
8	-32.89	-32.89
9	-29.64	-29.64
10	-26.39	-26.39
11	-23.14	-23.14
12	-19.89	-19.89
13	-18.14	-60.83
14	-60.83	-60.83
15	-60.83	-60.83
16	-60.83	-60.83
17	-60.83	-60.83
18	-60.83	-60.83
19	-60.83	-32.92
20	-34.67	-34.67
21	-37.92	-37.92
22	-41.17	-41.17
23	-44.42	-44.42
24	-47.67	-47.67
25	-49.42	-81.98
26	-81.98	-81.98
27	-81.98	-81.98
28	-81.98	-81.98
29	-81.98	-81.98
30	-81.98	-81.98
31	-81.98	-42.03
32	-40.28	-40.28
33	-37.03	-37.03
34	-33.78	-33.78
35	-30.53	-30.53
36	-27.28	-27.28
37	-25.53	-61.51
38	-61.51	-61.51
39	-61.51	-61.51
40	-61.51	-61.51
41	-61.51	-61.51
42	-61.51	-61.51
43	-61.51	-25.53
44	-27.28	-27.28
45	-30.53	-30.53
46	-33.78	-33.78
47	-37.03	-37.03
48	-40.28	-40.28
49	-42.03	-82.66

	50	-82.66	-82.66
	51	-82.66	-82.66
	52	-82.66	-82.66
	53	-82.66	-82.66
	54	-82.66	-82.66
	55	-82.66	-49.42
	56	-47.67	-47.67
	57	-44.42	-44.42
	58	-41.17	-41.17
	59	-37.92	-37.92
	60	-34.67	-34.67
	61	-32.92	-60.83
	62	-60.83	-60.83
	63	-60.83	-60.83
	64	-60.83	-60.83
	65	-60.83	-60.83
	66	-60.83	-60.83
	67	-60.83	-18.14
	68	-19.89	-19.89
	69	-23.14	-23.14
	70	-26.39	-26.39
	71	-29.64	-29.64
	72	-32.89	-32.89

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-127.75	-52.41
2	-52.41	-52.41
3	-52.41	-52.41
4	-52.41	-52.41
5	-52.41	-52.41
6	-52.41	-52.41
7	-52.41	-160.72
8	-158.45	-158.45
9	-154.22	-154.22
10	-150.00	-150.00
11	-145.77	-145.77
12	-141.55	-141.55
13	-139.27	-43.25
14	-43.25	-43.25
15	-43.25	-43.25
16	-43.25	-43.25
17	-43.25	-43.25
18	-43.25	-43.25
19	-43.25	-106.30
20	-108.58	-108.58
21	-112.80	-112.80
22	-117.03	-117.03
23	-121.25	-121.25
24	-125.48	-125.48
25	-127.75	-55.56
26	-55.56	-55.56
27	-55.56	-55.56
28	-55.56	-55.56
29	-55.56	-55.56
30	-55.56	-55.56
31	-55.56	-144.24
32	-141.96	-141.96
33	-137.74	-137.74
34	-133.51	-133.51
35	-129.29	-129.29
36	-125.06	-125.06
37	-122.79	-40.10
38	-40.10	-40.10
39	-40.10	-40.10
40	-40.10	-40.10
41	-40.10	-40.10
42	-40.10	-40.10
43	-40.10	-122.79
44	-125.06	-125.06
45	-129.29	-129.29
46	-133.51	-133.51
47	-137.74	-137.74
48	-141.96	-141.96
49	-144.24	-52.41

	50	-52.41	-52.41
	51	-52.41	-52.41
	52	-52.41	-52.41
	53	-52.41	-52.41
	54	-52.41	-52.41
	55	-52.41	-127.75
	56	-125.48	-125.48
	57	-121.25	-121.25
	58	-117.03	-117.03
	59	-112.80	-112.80
	60	-108.58	-108.58
	61	-106.30	-43.25
	62	-43.25	-43.25
	63	-43.25	-43.25
	64	-43.25	-43.25
	65	-43.25	-43.25
	66	-43.25	-43.25
	67	-43.25	-139.27
	68	-141.55	-141.55
	69	-145.77	-145.77
	70	-150.00	-150.00
	71	-154.22	-154.22
	72	-158.45	-158.45

---

```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmin                                #
#####
-----
                ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-----
| SEÇÃO |          ESQUERDA (kN) |          DIREITA (kN) |
-----
|  1 |          -180.81 |          -7.15 |
|  2 |           -7.15 |           -7.15 |
|  3 |           -7.15 |           -7.15 |
|  4 |           -7.15 |           -7.15 |
|  5 |           -7.15 |           -7.15 |
|  6 |           -7.15 |           -7.15 |
|  7 |           -7.15 |          -255.66 |
|  8 |          -253.39 |          -253.39 |
|  9 |          -249.16 |          -249.16 |
| 10 |          -244.94 |          -244.94 |
| 11 |          -240.71 |          -240.71 |
| 12 |          -236.49 |          -236.49 |
| 13 |          -234.21 |           19.70 |
| 14 |           19.70 |           19.70 |
| 15 |           19.70 |           19.70 |
| 16 |           19.70 |           19.70 |
| 17 |           19.70 |           19.70 |
| 18 |           19.70 |           19.70 |
| 19 |           19.70 |          -168.91 |
| 20 |          -171.19 |          -171.19 |
| 21 |          -175.41 |          -175.41 |
| 22 |          -179.64 |          -179.64 |
| 23 |          -183.86 |          -183.86 |
| 24 |          -188.09 |          -188.09 |
| 25 |          -180.81 |          -28.61 |
| 26 |          -28.61 |          -28.61 |
| 27 |          -28.61 |          -28.61 |
| 28 |          -28.61 |          -28.61 |
| 29 |          -28.61 |          -28.61 |
| 30 |          -28.61 |          -28.61 |
| 31 |          -34.77 |          -205.19 |
| 32 |          -203.08 |          -203.08 |
| 33 |          -198.85 |          -198.85 |
| 34 |          -194.63 |          -194.63 |
| 35 |          -190.40 |          -190.40 |
| 36 |          -186.00 |          -186.00 |
| 37 |          -181.54 |           41.53 |
| 38 |           41.53 |           41.53 |
| 39 |           41.53 |           41.53 |
| 40 |           41.53 |           41.53 |
| 41 |           41.53 |           41.53 |
| 42 |           41.53 |           41.53 |
| 43 |           41.40 |          -210.68 |
| 44 |          -212.79 |          -212.79 |
| 45 |          -217.02 |          -217.02 |
| 46 |          -221.24 |          -221.24 |
| 47 |          -225.47 |          -225.47 |
| 48 |          -229.87 |          -219.60 |
| 49 |          -201.34 |           0.17 |
```

50	0.17	0.17
51	0.17	0.17
52	0.17	0.17
53	0.17	0.17
54	0.17	0.17
55	-3.21	-195.93
56	-193.98	-193.98
57	-189.75	-189.75
58	-185.53	-185.53
59	-181.30	-181.30
60	-176.73	-176.73
61	-170.08	12.95
62	12.95	12.95
63	12.95	12.95
64	12.95	12.95
65	12.95	12.95
66	12.95	12.95
67	12.45	-237.43
68	-239.38	-239.38
69	-243.60	-243.60
70	-247.83	-247.83
71	-252.05	-252.05
72	-256.63	-256.63

---

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

-----

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-45.59	-84.96
2	-84.96	-84.96
3	-84.96	-84.96
4	-84.96	-84.96
5	-84.96	-84.96
6	-84.96	-84.96
7	-84.96	-37.31
8	-35.56	-35.56
9	-32.31	-32.31
10	-29.06	-29.06
11	-25.81	-25.81
12	-22.56	-22.56
13	-20.81	-58.22
14	-58.22	-58.22
15	-58.22	-58.22
16	-58.22	-58.22
17	-58.22	-58.22
18	-58.22	-58.22
19	-58.22	-30.25
20	-32.00	-32.00
21	-35.25	-35.25
22	-38.50	-38.50
23	-41.75	-41.75
24	-45.00	-45.00
25	-45.59	-88.42
26	-88.42	-88.42
27	-88.42	-88.42
28	-88.42	-88.42
29	-88.42	-88.42
30	-88.42	-88.42
31	-88.11	-26.85
32	-25.23	-25.23
33	-21.98	-21.98
34	-18.73	-18.73
35	-15.48	-15.48
36	-12.09	-12.09
37	-8.72	-54.76
38	-54.76	-54.76
39	-54.76	-54.76
40	-54.76	-54.76
41	-54.76	-54.76
42	-54.76	-54.76
43	-54.76	-22.84
44	-24.47	-24.47
45	-27.72	-27.72
46	-30.97	-30.97
47	-34.22	-34.22
48	-37.60	-36.03
49	-34.65	-93.43

	50	-93.43	-93.43
	51	-93.43	-93.43
	52	-93.43	-93.43
	53	-93.43	-93.43
	54	-93.43	-93.43
	55	-75.79	-53.13
	56	-51.63	-51.63
	57	-48.38	-48.38
	58	-45.13	-45.13
	59	-41.88	-41.88
	60	-38.35	-38.35
	61	-33.36	-49.44
	62	-49.44	-49.44
	63	-49.44	-49.44
	64	-49.44	-49.44
	65	-49.44	-49.44
	66	-49.44	-49.44
	67	-49.44	-32.36
	68	-33.86	-33.86
	69	-37.11	-37.11
	70	-40.36	-40.36
	71	-43.61	-43.61
	72	-47.13	-47.13

---

```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmaxHmax                                #
#####
-----
                ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-----
| SEÇÃO |          ESQUERDA (kN) |          DIREITA (kN) |
-----
|  1 |          -188.40 |          -68.18 |
|  2 |          -68.18 |          -68.18 |
|  3 |          -68.18 |          -68.18 |
|  4 |          -68.18 |          -68.18 |
|  5 |          -68.18 |          -68.18 |
|  6 |          -68.18 |          -68.18 |
|  7 |          -68.18 |         -247.95 |
|  8 |         -245.67 |         -245.67 |
|  9 |         -241.45 |         -241.45 |
| 10 |         -237.22 |         -237.22 |
| 11 |         -233.00 |         -233.00 |
| 12 |         -228.77 |         -228.77 |
| 13 |         -226.50 |          -27.27 |
| 14 |          -27.27 |          -27.27 |
| 15 |          -27.27 |          -27.27 |
| 16 |          -27.27 |          -27.27 |
| 17 |          -27.27 |          -27.27 |
| 18 |          -27.27 |          -27.27 |
| 19 |          -27.27 |         -176.62 |
| 20 |         -178.90 |         -178.90 |
| 21 |         -183.12 |         -183.12 |
| 22 |         -187.35 |         -187.35 |
| 23 |         -191.57 |         -191.57 |
| 24 |         -195.80 |         -195.80 |
| 25 |         -188.40 |          -86.88 |
| 26 |          -86.88 |          -86.88 |
| 27 |          -86.88 |          -86.88 |
| 28 |          -86.88 |          -86.88 |
| 29 |          -86.88 |          -86.88 |
| 30 |          -86.88 |          -86.88 |
| 31 |          -86.67 |         -186.57 |
| 32 |         -184.46 |         -184.46 |
| 33 |         -180.23 |         -180.23 |
| 34 |         -176.01 |         -176.01 |
| 35 |         -171.78 |         -171.78 |
| 36 |         -167.38 |         -167.38 |
| 37 |         -162.92 |           -8.57 |
| 38 |           -8.57 |           -8.57 |
| 39 |           -8.57 |           -8.57 |
| 40 |           -8.57 |           -8.57 |
| 41 |           -8.57 |           -8.57 |
| 42 |           -8.57 |           -8.57 |
| 43 |           -8.57 |         -210.60 |
| 44 |         -212.71 |         -212.71 |
| 45 |         -216.93 |         -216.93 |
| 46 |         -221.16 |         -221.16 |
| 47 |         -225.38 |         -225.38 |
| 48 |         -229.78 |         -220.67 |
| 49 |         -204.73 |          -62.89 |
```

	50	-62.89	-62.89
	51	-62.89	-62.89
	52	-62.89	-62.89
	53	-62.89	-62.89
	54	-62.89	-62.89
	55	-51.13	-212.51
	56	-210.56	-210.56
	57	-206.33	-206.33
	58	-202.11	-202.11
	59	-197.88	-197.88
	60	-193.30	-193.30
	61	-186.66	-32.35
	62	-32.35	-32.35
	63	-32.35	-32.35
	64	-32.35	-32.35
	65	-32.35	-32.35
	66	-32.35	-32.35
	67	-32.35	-239.55
	68	-241.50	-241.50
	69	-245.73	-245.73
	70	-249.95	-249.95
	71	-254.18	-254.18
	72	-258.75	-258.75

---

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

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ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-78.40	-28.11
2	-28.11	-28.11
3	-28.11	-28.11
4	-28.11	-28.11
5	-28.11	-28.11
6	-28.11	-28.11
7	-28.11	-100.31
8	-98.56	-98.56
9	-95.31	-95.31
10	-92.06	-92.06
11	-88.81	-88.81
12	-85.56	-85.56
13	-83.81	-16.05
14	-16.05	-16.05
15	-16.05	-16.05
16	-16.05	-16.05
17	-16.05	-16.05
18	-16.05	-16.05
19	-16.05	-61.90
20	-63.65	-63.65
21	-66.90	-66.90
22	-70.15	-70.15
23	-73.40	-73.40
24	-76.65	-76.65
25	-78.40	-30.23
26	-30.23	-30.23
27	-30.23	-30.23
28	-30.23	-30.23
29	-30.23	-30.23
30	-30.23	-30.23
31	-30.23	-89.36
32	-87.61	-87.61
33	-84.36	-84.36
34	-81.11	-81.11
35	-77.86	-77.86
36	-74.61	-74.61
37	-72.86	-13.93
38	-13.93	-13.93
39	-13.93	-13.93
40	-13.93	-13.93
41	-13.93	-13.93
42	-13.93	-13.93
43	-13.93	-72.86
44	-74.61	-74.61
45	-77.86	-77.86
46	-81.11	-81.11
47	-84.36	-84.36
48	-87.61	-87.61
49	-89.36	-28.11

	50	-28.11	-28.11
	51	-28.11	-28.11
	52	-28.11	-28.11
	53	-28.11	-28.11
	54	-28.11	-28.11
	55	-28.11	-78.40
	56	-76.65	-76.65
	57	-73.40	-73.40
	58	-70.15	-70.15
	59	-66.90	-66.90
	60	-63.65	-63.65
	61	-61.90	-16.05
	62	-16.05	-16.05
	63	-16.05	-16.05
	64	-16.05	-16.05
	65	-16.05	-16.05
	66	-16.05	-16.05
	67	-16.05	-83.81
	68	-85.56	-85.56
	69	-88.81	-88.81
	70	-92.06	-92.06
	71	-95.31	-95.31
	72	-98.56	-98.56

---

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-45.07	-56.84
2	-56.84	-56.84
3	-56.84	-56.84
4	-56.84	-56.84
5	-56.84	-56.84
6	-56.84	-56.84
7	-56.84	-38.99
8	-37.24	-37.24
9	-33.99	-33.99
10	-30.74	-30.74
11	-27.49	-27.49
12	-24.24	-24.24
13	-22.49	-38.24
14	-38.24	-38.24
15	-38.24	-38.24
16	-38.24	-38.24
17	-38.24	-38.24
18	-38.24	-38.24
19	-38.24	-28.57
20	-30.32	-30.32
21	-33.57	-33.57
22	-36.82	-36.82
23	-40.07	-40.07
24	-43.32	-43.32
25	-45.07	-56.58
26	-56.58	-56.58
27	-56.58	-56.58
28	-56.58	-56.58
29	-56.58	-56.58
30	-56.58	-56.58
31	-56.58	-42.03
32	-40.28	-40.28
33	-37.03	-37.03
34	-33.78	-33.78
35	-30.53	-30.53
36	-27.28	-27.28
37	-25.53	-38.50
38	-38.50	-38.50
39	-38.50	-38.50
40	-38.50	-38.50
41	-38.50	-38.50
42	-38.50	-38.50
43	-38.50	-25.53
44	-27.28	-27.28
45	-30.53	-30.53
46	-33.78	-33.78
47	-37.03	-37.03
48	-40.28	-40.28
49	-42.03	-56.84

	50	-56.84	-56.84
	51	-56.84	-56.84
	52	-56.84	-56.84
	53	-56.84	-56.84
	54	-56.84	-56.84
	55	-56.84	-45.07
	56	-43.32	-43.32
	57	-40.07	-40.07
	58	-36.82	-36.82
	59	-33.57	-33.57
	60	-30.32	-30.32
	61	-28.57	-38.24
	62	-38.24	-38.24
	63	-38.24	-38.24
	64	-38.24	-38.24
	65	-38.24	-38.24
	66	-38.24	-38.24
	67	-38.24	-22.49
	68	-24.24	-24.24
	69	-27.49	-27.49
	70	-30.74	-30.74
	71	-33.99	-33.99
	72	-37.24	-37.24

---

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-80.10	-36.46
2	-36.46	-36.46
3	-36.46	-36.46
4	-36.46	-36.46
5	-36.46	-36.46
6	-36.46	-36.46
7	-36.46	-98.61
8	-96.86	-96.86
9	-93.61	-93.61
10	-90.36	-90.36
11	-87.11	-87.11
12	-83.86	-83.86
13	-82.11	-26.92
14	-26.92	-26.92
15	-26.92	-26.92
16	-26.92	-26.92
17	-26.92	-26.92
18	-26.92	-26.92
19	-26.92	-63.60
20	-65.35	-65.35
21	-68.60	-68.60
22	-71.85	-71.85
23	-75.10	-75.10
24	-78.35	-78.35
25	-80.10	-38.21
26	-38.21	-38.21
27	-38.21	-38.21
28	-38.21	-38.21
29	-38.21	-38.21
30	-38.21	-38.21
31	-38.21	-89.36
32	-87.61	-87.61
33	-84.36	-84.36
34	-81.11	-81.11
35	-77.86	-77.86
36	-74.61	-74.61
37	-72.86	-25.17
38	-25.17	-25.17
39	-25.17	-25.17
40	-25.17	-25.17
41	-25.17	-25.17
42	-25.17	-25.17
43	-25.17	-72.86
44	-74.61	-74.61
45	-77.86	-77.86
46	-81.11	-81.11
47	-84.36	-84.36
48	-87.61	-87.61
49	-89.36	-36.46

	50	-36.46	-36.46
	51	-36.46	-36.46
	52	-36.46	-36.46
	53	-36.46	-36.46
	54	-36.46	-36.46
	55	-36.46	-80.10
	56	-78.35	-78.35
	57	-75.10	-75.10
	58	-71.85	-71.85
	59	-68.60	-68.60
	60	-65.35	-65.35
	61	-63.60	-26.92
	62	-26.92	-26.92
	63	-26.92	-26.92
	64	-26.92	-26.92
	65	-26.92	-26.92
	66	-26.92	-26.92
	67	-26.92	-82.11
	68	-83.86	-83.86
	69	-87.11	-87.11
	70	-90.36	-90.36
	71	-93.61	-93.61
	72	-96.86	-96.86

---

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-40.61	-30.26
2	-30.26	-30.26
3	-30.26	-30.26
4	-30.26	-30.26
5	-30.26	-30.26
6	-30.26	-30.26
7	-30.26	-43.45
8	-41.70	-41.70
9	-38.45	-38.45
10	-35.20	-35.20
11	-31.95	-31.95
12	-28.70	-28.70
13	-26.95	-13.90
14	-13.90	-13.90
15	-13.90	-13.90
16	-13.90	-13.90
17	-13.90	-13.90
18	-13.90	-13.90
19	-13.90	-24.11
20	-25.86	-25.86
21	-29.11	-29.11
22	-32.36	-32.36
23	-35.61	-35.61
24	-38.86	-38.86
25	-40.61	-30.60
26	-30.60	-30.60
27	-30.60	-30.60
28	-30.60	-30.60
29	-30.60	-30.60
30	-30.60	-30.60
31	-30.60	-42.03
32	-40.28	-40.28
33	-37.03	-37.03
34	-33.78	-33.78
35	-30.53	-30.53
36	-27.28	-27.28
37	-25.53	-13.56
38	-13.56	-13.56
39	-13.56	-13.56
40	-13.56	-13.56
41	-13.56	-13.56
42	-13.56	-13.56
43	-13.56	-25.53
44	-27.28	-27.28
45	-30.53	-30.53
46	-33.78	-33.78
47	-37.03	-37.03
48	-40.28	-40.28
49	-42.03	-30.26

	50	-30.26	-30.26
	51	-30.26	-30.26
	52	-30.26	-30.26
	53	-30.26	-30.26
	54	-30.26	-30.26
	55	-30.26	-40.61
	56	-38.86	-38.86
	57	-35.61	-35.61
	58	-32.36	-32.36
	59	-29.11	-29.11
	60	-25.86	-25.86
	61	-24.11	-13.90
	62	-13.90	-13.90
	63	-13.90	-13.90
	64	-13.90	-13.90
	65	-13.90	-13.90
	66	-13.90	-13.90
	67	-13.90	-26.95
	68	-28.70	-28.70
	69	-31.95	-31.95
	70	-35.20	-35.20
	71	-38.45	-38.45
	72	-41.70	-41.70

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-64.23	-28.92
2	-28.92	-28.92
3	-28.92	-28.92
4	-28.92	-28.92
5	-28.92	-28.92
6	-28.92	-28.92
7	-28.92	-78.98
8	-77.23	-77.23
9	-73.98	-73.98
10	-70.73	-70.73
11	-67.48	-67.48
12	-64.23	-64.23
13	-62.48	-15.24
14	-15.24	-15.24
15	-15.24	-15.24
16	-15.24	-15.24
17	-15.24	-15.24
18	-15.24	-15.24
19	-15.24	-47.73
20	-49.48	-49.48
21	-52.73	-52.73
22	-55.98	-55.98
23	-59.23	-59.23
24	-62.48	-62.48
25	-64.23	-30.37
26	-30.37	-30.37
27	-30.37	-30.37
28	-30.37	-30.37
29	-30.37	-30.37
30	-30.37	-30.37
31	-30.37	-71.61
32	-69.86	-69.86
33	-66.61	-66.61
34	-63.36	-63.36
35	-60.11	-60.11
36	-56.86	-56.86
37	-55.11	-13.79
38	-13.79	-13.79
39	-13.79	-13.79
40	-13.79	-13.79
41	-13.79	-13.79
42	-13.79	-13.79
43	-13.79	-55.11
44	-56.86	-56.86
45	-60.11	-60.11
46	-63.36	-63.36
47	-66.61	-66.61
48	-69.86	-69.86
49	-71.61	-28.92

	50	-28.92	-28.92
	51	-28.92	-28.92
	52	-28.92	-28.92
	53	-28.92	-28.92
	54	-28.92	-28.92
	55	-28.92	-64.23
	56	-62.48	-62.48
	57	-59.23	-59.23
	58	-55.98	-55.98
	59	-52.73	-52.73
	60	-49.48	-49.48
	61	-47.73	-15.24
	62	-15.24	-15.24
	63	-15.24	-15.24
	64	-15.24	-15.24
	65	-15.24	-15.24
	66	-15.24	-15.24
	67	-15.24	-62.48
	68	-64.23	-64.23
	69	-67.48	-67.48
	70	-70.73	-70.73
	71	-73.98	-73.98
	72	-77.23	-77.23

---

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-44.09	-52.03
2	-52.03	-52.03
3	-52.03	-52.03
4	-52.03	-52.03
5	-52.03	-52.03
6	-52.03	-52.03
7	-52.03	-39.97
8	-38.22	-38.22
9	-34.97	-34.97
10	-31.72	-31.72
11	-28.47	-28.47
12	-25.22	-25.22
13	-23.47	-32.24
14	-32.24	-32.24
15	-32.24	-32.24
16	-32.24	-32.24
17	-32.24	-32.24
18	-32.24	-32.24
19	-32.24	-27.59
20	-29.34	-29.34
21	-32.59	-32.59
22	-35.84	-35.84
23	-39.09	-39.09
24	-42.34	-42.34
25	-44.09	-51.86
26	-51.86	-51.86
27	-51.86	-51.86
28	-51.86	-51.86
29	-51.86	-51.86
30	-51.86	-51.86
31	-51.86	-42.03
32	-40.28	-40.28
33	-37.03	-37.03
34	-33.78	-33.78
35	-30.53	-30.53
36	-27.28	-27.28
37	-25.53	-32.40
38	-32.40	-32.40
39	-32.40	-32.40
40	-32.40	-32.40
41	-32.40	-32.40
42	-32.40	-32.40
43	-32.40	-25.53
44	-27.28	-27.28
45	-30.53	-30.53
46	-33.78	-33.78
47	-37.03	-37.03
48	-40.28	-40.28
49	-42.03	-52.03

	50	-52.03	-52.03
	51	-52.03	-52.03
	52	-52.03	-52.03
	53	-52.03	-52.03
	54	-52.03	-52.03
	55	-52.03	-44.09
	56	-42.34	-42.34
	57	-39.09	-39.09
	58	-35.84	-35.84
	59	-32.59	-32.59
	60	-29.34	-29.34
	61	-27.59	-32.24
	62	-32.24	-32.24
	63	-32.24	-32.24
	64	-32.24	-32.24
	65	-32.24	-32.24
	66	-32.24	-32.24
	67	-32.24	-23.47
	68	-25.22	-25.22
	69	-28.47	-28.47
	70	-31.72	-31.72
	71	-34.97	-34.97
	72	-38.22	-38.22

---

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

---

ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE

---

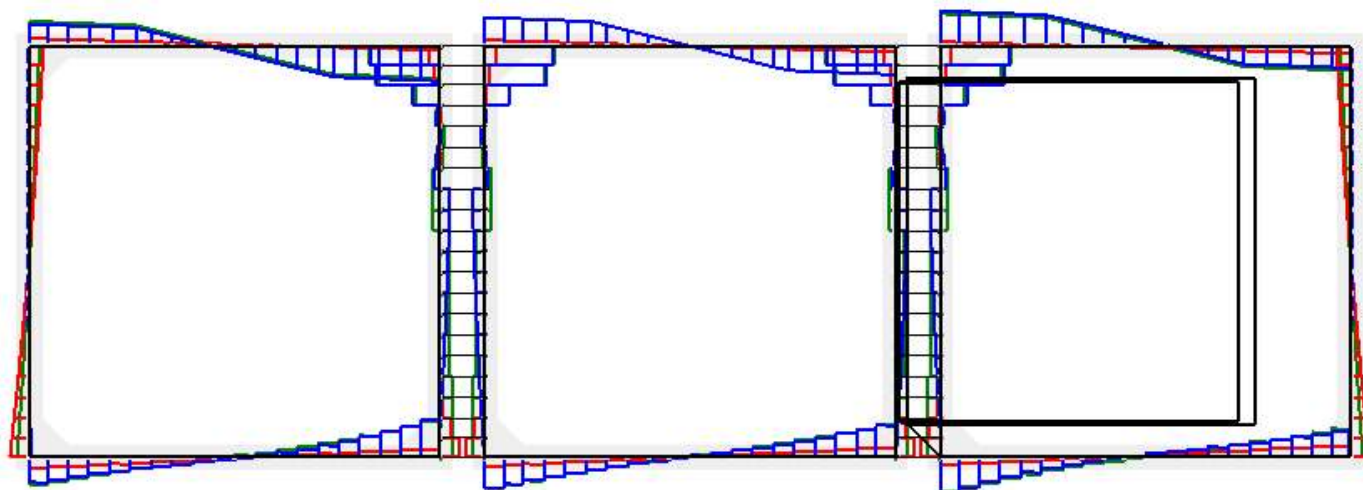
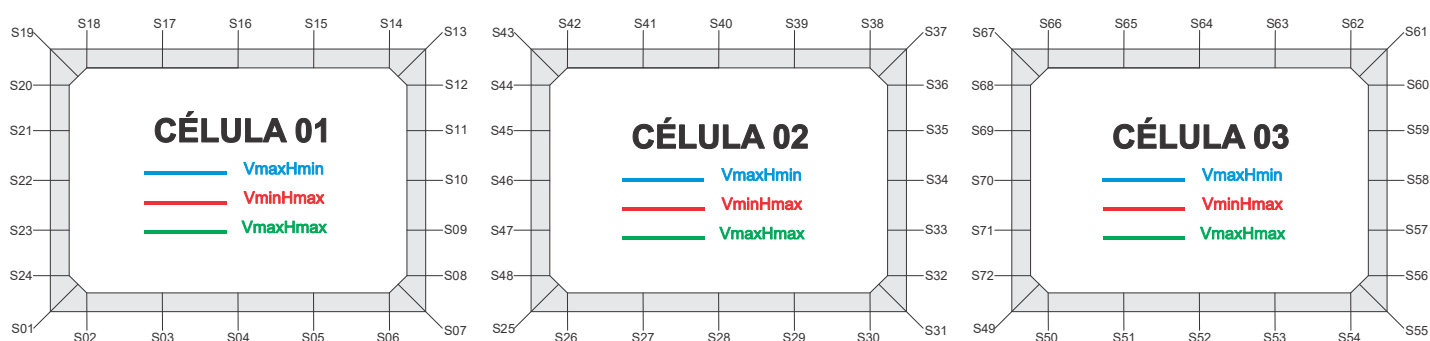
SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	-65.29	-34.14
2	-34.14	-34.14
3	-34.14	-34.14
4	-34.14	-34.14
5	-34.14	-34.14
6	-34.14	-34.14
7	-34.14	-77.93
8	-76.18	-76.18
9	-72.93	-72.93
10	-69.68	-69.68
11	-66.43	-66.43
12	-63.18	-63.18
13	-61.43	-22.04
14	-22.04	-22.04
15	-22.04	-22.04
16	-22.04	-22.04
17	-22.04	-22.04
18	-22.04	-22.04
19	-22.04	-48.79
20	-50.54	-50.54
21	-53.79	-53.79
22	-57.04	-57.04
23	-60.29	-60.29
24	-63.54	-63.54
25	-65.29	-35.36
26	-35.36	-35.36
27	-35.36	-35.36
28	-35.36	-35.36
29	-35.36	-35.36
30	-35.36	-35.36
31	-35.36	-71.61
32	-69.86	-69.86
33	-66.61	-66.61
34	-63.36	-63.36
35	-60.11	-60.11
36	-56.86	-56.86
37	-55.11	-20.82
38	-20.82	-20.82
39	-20.82	-20.82
40	-20.82	-20.82
41	-20.82	-20.82
42	-20.82	-20.82
43	-20.82	-55.11
44	-56.86	-56.86
45	-60.11	-60.11
46	-63.36	-63.36
47	-66.61	-66.61
48	-69.86	-69.86
49	-71.61	-34.14

	50	-34.14	-34.14
	51	-34.14	-34.14
	52	-34.14	-34.14
	53	-34.14	-34.14
	54	-34.14	-34.14
	55	-34.14	-65.29
	56	-63.54	-63.54
	57	-60.29	-60.29
	58	-57.04	-57.04
	59	-53.79	-53.79
	60	-50.54	-50.54
	61	-48.79	-22.04
	62	-22.04	-22.04
	63	-22.04	-22.04
	64	-22.04	-22.04
	65	-22.04	-22.04
	66	-22.04	-22.04
	67	-22.04	-61.43
	68	-63.18	-63.18
	69	-66.43	-66.43
	70	-69.68	-69.68
	71	-72.93	-72.93
	72	-76.18	-76.18

---

## 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	-7.06	-109.07
2	-97.56	-84.05
3	-51.61	-40.83
4	-13.89	-2.87
5	32.55	49.08
6	108.25	133.52
7	157.75	7.06
8	-3.23	-3.24
9	-22.07	-22.07
10	-36.14	-36.14
11	23.08	14.66
12	116.26	275.42
13	300.11	-150.67
14	-144.02	-144.02
15	-116.68	-116.68
16	-27.88	-27.88
17	60.91	60.91
18	88.25	88.25
19	94.90	6.38
20	7.24	7.24
21	7.60	7.60
22	5.90	5.90
23	2.14	2.14
24	-3.68	-3.68
25	-7.06	-134.15
26	-117.39	-98.76
27	-53.23	-39.15
28	-5.91	5.91
29	39.15	53.23
30	98.76	117.39
31	134.15	-2.24
32	-12.53	-12.53
33	-31.37	-31.37
34	-45.44	-45.44
35	13.78	5.37
36	106.96	266.12
37	290.81	-122.79
38	-116.14	-116.14
39	-88.79	-88.79
40	0.00	0.00
41	88.79	88.79
42	116.14	116.14
43	122.79	-290.81
44	-266.12	-106.96
45	-5.37	-13.78
46	45.44	45.44
47	31.37	31.37
48	12.53	12.53
49	2.24	-157.75

	50	-133.52	-108.25
	51	-49.08	-32.55
	52	2.87	13.89
	53	40.83	51.61
	54	84.05	97.56
	55	109.07	7.06
	56	3.68	3.68
	57	-2.14	-2.14
	58	-5.90	-5.90
	59	-7.60	-7.60
	60	-7.24	-7.24
	61	-6.38	-94.90
	62	-88.25	-88.25
	63	-60.91	-60.91
	64	27.88	27.88
	65	116.68	116.68
	66	144.02	144.02
	67	150.67	-300.11
	68	-275.42	-116.26
	69	-14.66	-23.08
	70	36.14	36.14
	71	22.07	22.07
	72	3.24	3.23

---

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

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	82.66	-47.28
2	-44.46	-39.43
3	-26.21	-20.77
4	-8.33	-3.31
5	8.23	13.15
6	24.83	29.61
7	32.40	-80.03
8	-46.47	-12.65
9	-0.05	-0.05
10	-0.05	-0.05
11	-0.05	-1.24
12	4.58	22.19
13	45.53	-18.14
14	-13.15	-13.15
15	-2.88	-2.88
16	7.39	7.39
17	17.66	17.66
18	27.93	27.93
19	32.92	-60.83
20	-51.57	-51.57
21	-28.53	-28.53
22	-1.42	-1.42
23	29.76	29.76
24	65.01	65.01
25	82.66	-39.30
26	-35.68	-30.21
27	-17.57	-12.69
28	-2.22	2.22
29	12.69	17.57
30	30.21	35.68
31	39.30	-79.35
32	-45.79	-11.98
33	0.63	0.63
34	0.63	0.63
35	0.63	-0.56
36	5.25	22.87
37	46.21	-25.53
38	-20.54	-20.54
39	-10.27	-10.27
40	0.00	0.00
41	10.27	10.27
42	20.54	20.54
43	25.53	-46.21
44	-22.87	-5.25
45	0.56	-0.63
46	-0.63	-0.63
47	-0.63	-0.63
48	11.98	45.79
49	79.35	-32.40

	50	-29.61	-24.83
	51	-13.15	-8.23
	52	3.31	8.33
	53	20.77	26.21
	54	39.43	44.46
	55	47.28	-82.66
	56	-65.01	-65.01
	57	-29.76	-29.76
	58	1.42	1.42
	59	28.53	28.53
	60	51.57	51.57
	61	60.83	-32.92
	62	-27.93	-27.93
	63	-17.66	-17.66
	64	-7.39	-7.39
	65	2.88	2.88
	66	13.15	13.15
	67	18.14	-45.53
	68	-22.19	-4.58
	69	1.24	0.05
	70	0.05	0.05
	71	0.05	0.05
	72	12.65	46.47

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

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	52.41	-119.53
2	-106.07	-90.43
3	-51.20	-38.29
4	-6.03	6.21
5	42.64	58.33
6	109.88	130.67
7	149.56	-52.41
8	-52.42	-52.42
9	-37.30	-37.30
10	-37.30	-37.30
11	28.50	-9.03
12	105.93	261.86
13	303.41	-139.27
14	-132.63	-132.63
15	-105.28	-105.28
16	-16.49	-16.49
17	72.30	72.30
18	99.65	99.65
19	106.30	-43.25
20	-37.07	-37.07
21	-21.71	-21.71
22	-3.64	-3.64
23	17.15	17.15
24	40.65	40.65
25	52.41	-135.06
26	-119.65	-101.96
27	-56.76	-42.17
28	-6.39	6.39
29	42.17	56.76
30	101.96	119.65
31	135.06	-55.56
32	-55.56	-55.56
33	-40.45	-40.44
34	-40.44	-40.44
35	25.35	-12.18
36	102.78	258.72
37	300.27	-122.79
38	-116.14	-116.14
39	-88.79	-88.79
40	0.00	0.00
41	88.79	88.79
42	116.14	116.14
43	122.79	-300.27
44	-258.72	-102.78
45	12.18	-25.35
46	40.44	40.44
47	40.44	40.45
48	55.56	55.56
49	55.56	-149.56

	50	-130.67	-109.88
	51	-58.33	-42.64
	52	-6.21	6.03
	53	38.29	51.20
	54	90.43	106.07
	55	119.53	-52.41
	56	-40.65	-40.65
	57	-17.15	-17.15
	58	3.64	3.64
	59	21.71	21.71
	60	37.07	37.07
	61	43.25	-106.30
	62	-99.65	-99.65
	63	-72.30	-72.30
	64	16.49	16.49
	65	105.28	105.28
	66	132.63	132.63
	67	139.27	-303.41
	68	-261.86	-105.93
	69	9.03	-28.50
	70	37.30	37.30
	71	37.30	37.30
	72	52.42	52.42

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

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	7.15	-171.26
2	-155.20	-136.95
3	-90.38	-75.16
4	-34.70	-18.68
5	35.75	60.62
6	153.71	193.23
7	232.80	-7.15
8	-17.44	-17.45
9	-36.28	-36.28
10	-35.37	-35.37
11	26.18	4.29
12	125.27	428.78
13	578.31	-234.21
14	-227.56	-227.56
15	-138.77	-138.77
16	-49.98	-49.98
17	38.81	38.81
18	127.61	127.61
19	168.91	19.70
20	20.56	20.56
21	20.92	20.92
22	19.22	19.22
23	15.46	15.46
24	9.64	9.64
25	7.15	-180.82
26	-162.12	-141.22
27	-88.85	-71.81
28	-26.80	-9.73
29	45.60	69.75
30	154.75	188.91
31	205.19	-34.77
32	-44.55	-44.55
33	-62.19	-49.87
34	-8.69	-8.69
35	-10.52	-11.25
36	15.37	262.72
37	470.42	-190.27
38	-166.45	-166.45
39	-77.66	-77.66
40	11.13	11.13
41	99.92	99.92
42	188.89	188.89
43	210.68	-556.61
44	-407.59	-104.08
45	15.71	-6.18
46	54.18	54.18
47	53.90	53.90
48	33.89	33.89
49	28.62	-212.09

	50	-172.70	-136.18
	51	-58.09	-37.76
	52	7.77	23.26
	53	73.20	96.24
	54	180.03	198.20
	55	195.93	-3.21
	56	-6.13	-6.13
	57	-10.92	-10.92
	58	-13.65	-13.65
	59	-14.32	-14.32
	60	-12.95	-12.95
	61	-12.95	-170.08
	62	-129.10	-129.10
	63	-40.30	-40.30
	64	48.49	48.49
	65	137.28	137.28
	66	226.42	226.42
	67	228.70	-499.50
	68	-293.23	-45.89
	69	-22.82	-23.55
	70	-28.95	-28.95
	71	8.67	21.00
	72	-0.17	-0.17

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

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	84.96	-44.43
2	-43.33	-39.83
3	-29.89	-25.12
4	-13.76	-8.80
5	3.40	8.87
6	23.47	29.69
7	34.12	-69.54
8	-30.65	-6.85
9	1.22	1.22
10	1.22	1.22
11	1.22	0.92
12	5.03	24.79
13	51.87	-20.81
14	-15.82	-15.82
15	-5.55	-5.55
16	4.72	4.72
17	14.99	14.99
18	25.26	25.26
19	30.25	-58.22
20	-48.96	-48.96
21	-25.92	-25.92
22	1.19	1.19
23	32.38	32.38
24	67.63	67.63
25	84.96	-31.51
26	-29.72	-26.05
27	-18.29	-14.71
28	-7.43	-3.86
29	4.45	8.78
30	20.32	25.73
31	26.85	-88.11
32	5.28	5.28
33	5.28	5.28
34	5.28	5.28
35	5.28	-19.95
36	16.03	23.90
37	40.68	-26.61
38	-21.74	-21.74
39	-11.47	-11.47
40	-1.20	-1.20
41	9.07	9.07
42	19.47	19.47
43	22.84	-48.42
44	-21.33	-1.58
45	2.54	2.24
46	2.24	2.24
47	2.24	2.24
48	10.31	34.11
49	73.00	-40.77

	50	-35.84	-29.64
	51	-15.76	-10.42
	52	2.27	7.84
	53	23.37	30.54
	54	50.63	54.88
	55	53.13	-75.79
	56	-59.05	-59.05
	57	-25.83	-25.83
	58	3.32	3.32
	59	28.39	28.39
	60	49.44	49.44
	61	49.44	-33.36
	62	-28.62	-28.62
	63	-18.35	-18.35
	64	-8.08	-8.08
	65	2.19	2.19
	66	12.73	12.73
	67	14.48	-35.35
	68	-18.57	-10.71
	69	25.28	0.05
	70	0.05	0.05
	71	0.05	0.05
	72	0.04	0.04

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

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	68.18	-178.73
2	-162.10	-142.93
3	-91.94	-74.97
4	-29.44	-12.03
5	44.53	69.11
6	156.77	192.69
7	227.81	-68.18
8	-68.18	-68.18
9	-43.94	-43.94
10	-43.94	29.22
11	29.22	-10.84
12	120.27	419.27
13	581.71	-226.50
14	-219.85	-219.85
15	-131.06	-131.06
16	-42.27	-42.27
17	46.53	46.53
18	135.32	135.32
19	176.62	-27.27
20	-21.10	-21.10
21	-5.74	-5.74
22	12.33	12.33
23	33.12	33.12
24	56.63	56.63
25	68.18	-186.53
26	-169.63	-150.04
27	-99.14	-82.11
28	-36.93	-19.94
29	34.07	57.36
30	138.51	171.12
31	186.57	-86.67
32	-23.88	-23.88
33	-23.88	-23.88
34	-23.88	-23.88
35	-1.39	-8.69
36	29.87	252.56
37	447.91	-190.35
38	-166.54	-166.54
39	-77.74	-77.74
40	11.05	11.05
41	99.84	99.84
42	188.81	188.81
43	210.60	-563.01
44	-400.57	-101.57
45	29.54	-10.52
46	-10.52	62.64
47	62.64	62.64
48	86.88	86.88
49	86.88	-216.30

	50	-178.60	-143.34
	51	-66.64	-46.11
	52	1.84	18.73
	53	74.80	100.60
	54	194.60	214.78
	55	212.51	-51.13
	56	-39.97	-39.97
	57	-17.82	-17.82
	58	1.61	1.61
	59	18.33	18.33
	60	32.35	32.35
	61	32.35	-186.66
	62	-145.68	-145.68
	63	-56.88	-56.88
	64	31.91	31.91
	65	120.70	120.70
	66	209.84	209.84
	67	212.12	-471.69
	68	-276.34	-53.65
	69	-15.09	-22.39
	70	0.10	0.10
	71	0.10	0.10
	72	0.10	0.10

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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	28.11	-73.20
2	-65.01	-55.16
3	-31.19	-23.13
4	-3.60	4.05
5	26.32	36.21
6	68.25	81.46
7	93.19	-28.11
8	-28.11	-28.11
9	-25.42	-25.42
10	-25.42	-25.42
11	19.37	-5.60
12	63.19	154.35
13	175.54	-83.81
14	-78.82	-78.82
15	-61.27	-61.27
16	-10.95	-10.95
17	39.37	39.37
18	56.91	56.91
19	61.90	-16.05
20	-14.68	-14.68
21	-9.75	-9.75
22	-2.13	-2.13
23	8.19	8.19
24	21.20	21.20
25	28.11	-83.55
26	-74.12	-62.96
27	-35.08	-25.91
28	-4.02	4.02
29	25.91	35.08
30	62.96	74.12
31	83.55	-30.23
32	-30.23	-30.23
33	-27.54	-27.54
34	-27.54	-27.54
35	17.25	-7.72
36	61.07	152.23
37	173.42	-72.85
38	-67.86	-67.86
39	-50.32	-50.32
40	0.00	0.00
41	50.32	50.32
42	67.87	67.87
43	72.86	-173.42
44	-152.23	-61.07
45	7.72	-17.25
46	27.54	27.54
47	27.54	27.54
48	30.23	30.23
49	30.23	-93.19

	50	-81.46	-68.25
	51	-36.21	-26.32
	52	-4.05	3.60
	53	23.13	31.19
	54	55.16	65.01
	55	73.20	-28.11
	56	-21.20	-21.20
	57	-8.19	-8.19
	58	2.13	2.13
	59	9.75	9.75
	60	14.68	14.68
	61	16.05	-61.90
	62	-56.91	-56.91
	63	-39.37	-39.37
	64	10.95	10.95
	65	61.27	61.27
	66	78.82	78.82
	67	83.81	-175.54
	68	-154.35	-63.19
	69	5.60	-19.37
	70	25.42	25.42
	71	25.42	25.42
	72	28.11	28.11

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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	56.84	-42.64
2	-39.44	-34.21
3	-21.35	-16.21
4	-4.78	-0.04
5	11.02	15.94
6	28.17	33.31
7	36.51	-56.84
8	-56.84	-29.78
9	0.18	0.18
10	0.18	0.18
11	0.18	-1.33
12	10.09	31.26
13	47.71	-22.49
14	-17.50	-17.50
15	-7.23	-7.23
16	3.04	3.04
17	13.31	13.31
18	23.58	23.58
19	28.57	-38.24
20	-32.73	-32.73
21	-18.37	-18.37
22	-0.71	-0.71
23	20.26	20.26
24	44.52	44.52
25	56.84	-39.35
26	-35.82	-30.41
27	-17.78	-12.88
28	-2.25	2.25
29	12.88	17.78
30	30.41	35.82
31	39.35	-56.58
32	-56.58	-29.52
33	0.43	0.43
34	0.43	0.43
35	0.43	-1.07
36	10.35	31.52
37	47.96	-25.53
38	-20.54	-20.54
39	-10.27	-10.27
40	0.00	0.00
41	10.27	10.27
42	20.54	20.54
43	25.53	-47.96
44	-31.52	-10.35
45	1.07	-0.43
46	-0.43	-0.43
47	-0.43	-0.43
48	29.52	56.58
49	56.58	-36.51

	50	-33.31	-28.17
	51	-15.94	-11.02
	52	0.04	4.78
	53	16.21	21.35
	54	34.21	39.44
	55	42.64	-56.84
	56	-44.52	-44.52
	57	-20.26	-20.26
	58	0.71	0.71
	59	18.37	18.37
	60	32.73	32.73
	61	38.24	-28.57
	62	-23.58	-23.58
	63	-13.31	-13.31
	64	-3.04	-3.04
	65	7.23	7.23
	66	17.50	17.50
	67	22.49	-47.71
	68	-31.26	-10.09
	69	1.33	-0.18
	70	-0.18	-0.18
	71	-0.18	-0.18
	72	29.78	56.84

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

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	36.46	-74.90
2	-66.68	-56.73
3	-32.18	-23.88
4	-3.67	4.16
5	26.68	36.51
6	67.85	80.62
7	91.81	-36.46
8	-36.46	-36.46
9	-24.38	-24.38
10	-24.38	11.81
11	11.81	-7.28
12	61.21	151.43
13	176.09	-82.11
14	-77.12	-77.12
15	-59.58	-59.58
16	-9.26	-9.26
17	41.06	41.06
18	58.61	58.61
19	63.60	-26.92
20	-23.25	-23.25
21	-13.68	-13.68
22	-1.90	-1.90
23	12.07	12.07
24	28.25	28.25
25	36.46	-83.66
26	-74.39	-63.34
27	-35.51	-26.27
28	-4.08	4.08
29	26.27	35.51
30	63.34	74.39
31	83.66	-38.21
32	-38.21	-38.21
33	-26.13	-26.13
34	-26.13	10.06
35	10.06	-9.03
36	59.46	149.68
37	174.34	-72.85
38	-67.86	-67.86
39	-50.32	-50.32
40	0.00	0.00
41	50.32	50.32
42	67.87	67.87
43	72.86	-174.34
44	-149.68	-59.46
45	9.03	-10.06
46	-10.06	26.13
47	26.13	26.13
48	38.21	38.21
49	38.21	-91.81

	50	-80.62	-67.85
	51	-36.51	-26.68
	52	-4.16	3.67
	53	23.88	32.18
	54	56.73	66.68
	55	74.90	-36.46
	56	-28.25	-28.25
	57	-12.07	-12.07
	58	1.90	1.90
	59	13.68	13.68
	60	23.25	23.25
	61	26.92	-63.60
	62	-58.61	-58.61
	63	-41.06	-41.06
	64	9.26	9.26
	65	59.58	59.58
	66	77.12	77.12
	67	82.11	-176.09
	68	-151.43	-61.21
	69	7.28	-11.81
	70	-11.81	24.38
	71	24.38	24.38
	72	36.46	36.46

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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	30.26	-37.95
2	-34.49	-29.19
3	-17.09	-12.38
4	-2.30	2.07
5	12.53	17.49
6	30.74	36.52
7	40.50	-30.26
8	-30.26	-30.26
9	-3.21	-3.21
10	-3.21	1.73
11	1.73	-1.43
12	15.63	39.96
13	48.84	-26.95
14	-21.96	-21.96
15	-11.69	-11.69
16	-1.42	-1.42
17	8.85	8.85
18	19.12	19.12
19	24.11	-13.90
20	-12.53	-12.53
21	-7.60	-7.60
22	0.02	0.02
23	10.34	10.34
24	23.35	23.35
25	30.26	-39.27
26	-35.61	-30.12
27	-17.46	-12.60
28	-2.21	2.21
29	12.60	17.46
30	30.12	35.61
31	39.27	-30.60
32	-30.60	-30.60
33	-3.55	-3.55
34	-3.55	1.39
35	1.39	-1.77
36	15.28	39.62
37	48.50	-25.53
38	-20.54	-20.54
39	-10.27	-10.27
40	0.00	0.00
41	10.27	10.27
42	20.54	20.54
43	25.53	-48.50
44	-39.62	-15.28
45	1.77	-1.39
46	-1.39	3.55
47	3.55	3.55
48	30.60	30.60
49	30.60	-40.50

	50	-36.52	-30.74
	51	-17.49	-12.53
	52	-2.07	2.30
	53	12.38	17.09
	54	29.19	34.49
	55	37.95	-30.26
	56	-23.35	-23.35
	57	-10.34	-10.34
	58	-0.02	-0.02
	59	7.60	7.60
	60	12.53	12.53
	61	13.90	-24.11
	62	-19.12	-19.12
	63	-8.85	-8.85
	64	1.42	1.42
	65	11.69	11.69
	66	21.96	21.96
	67	26.95	-48.84
	68	-39.96	-15.63
	69	1.43	-1.73
	70	-1.73	3.21
	71	3.21	3.21
	72	30.26	30.26

---

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

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	28.92	-59.98
2	-53.57	-45.43
3	-25.91	-19.11
4	-3.12	3.30
5	21.14	29.17
6	54.17	64.60
7	73.43	-28.92
8	-28.92	-28.92
9	-16.91	-16.91
10	-16.91	-16.91
11	12.96	-3.92
12	45.34	111.45
13	128.02	-62.48
14	-57.49	-57.49
15	-42.68	-42.68
16	-7.38	-7.38
17	27.92	27.92
18	42.74	42.74
19	47.73	-15.24
20	-13.87	-13.87
21	-8.94	-8.94
22	-1.32	-1.32
23	9.00	9.00
24	22.01	22.01
25	28.92	-66.94
26	-59.68	-50.64
27	-28.47	-20.91
28	-3.34	3.34
29	20.91	28.47
30	50.64	59.68
31	66.94	-30.37
32	-30.37	-30.37
33	-18.36	-18.36
34	-18.36	-18.36
35	11.51	-5.37
36	43.89	109.99
37	126.56	-55.11
38	-50.12	-50.12
39	-35.30	-35.30
40	0.00	0.00
41	35.30	35.30
42	50.12	50.12
43	55.11	-126.56
44	-109.99	-43.89
45	5.37	-11.51
46	18.36	18.36
47	18.36	18.36
48	30.37	30.37
49	30.37	-73.43

	50	-64.60	-54.17
	51	-29.17	-21.14
	52	-3.30	3.12
	53	19.11	25.91
	54	45.43	53.57
	55	59.98	-28.92
	56	-22.01	-22.01
	57	-9.00	-9.00
	58	1.32	1.32
	59	8.94	8.94
	60	13.87	13.87
	61	15.24	-47.73
	62	-42.74	-42.74
	63	-27.92	-27.92
	64	7.38	7.38
	65	42.68	42.68
	66	57.49	57.49
	67	62.48	-128.02
	68	-111.45	-45.34
	69	3.92	-12.96
	70	16.91	16.91
	71	16.91	16.91
	72	28.92	28.92

---

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

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	52.03	-41.61
2	-38.34	-33.09
3	-20.35	-15.29
4	-4.10	0.58
5	11.54	16.47
6	28.87	34.10
7	37.42	-52.03
8	-52.03	-36.37
9	0.23	0.23
10	0.23	0.23
11	0.23	-1.36
12	11.40	33.31
13	47.89	-23.47
14	-18.48	-18.48
15	-8.21	-8.21
16	2.06	2.06
17	12.33	12.33
18	22.60	22.60
19	27.59	-32.24
20	-28.02	-28.02
21	-16.28	-16.28
22	-0.95	-0.95
23	17.96	17.96
24	40.44	40.44
25	52.03	-39.36
26	-35.83	-30.42
27	-17.79	-12.89
28	-2.25	2.25
29	12.89	17.79
30	30.42	35.83
31	39.36	-51.86
32	-51.86	-36.21
33	0.40	0.40
34	0.40	0.40
35	0.40	-1.19
36	11.56	33.47
37	48.05	-25.53
38	-20.54	-20.54
39	-10.27	-10.27
40	0.00	0.00
41	10.27	10.27
42	20.54	20.54
43	25.53	-48.05
44	-33.47	-11.56
45	1.19	-0.40
46	-0.40	-0.40
47	-0.40	-0.40
48	36.21	51.86
49	51.86	-37.42

	50	-34.10	-28.87
	51	-16.47	-11.54
	52	-0.58	4.10
	53	15.29	20.35
	54	33.09	38.34
	55	41.61	-52.03
	56	-40.44	-40.44
	57	-17.96	-17.96
	58	0.95	0.95
	59	16.28	16.28
	60	28.02	28.02
	61	32.24	-27.59
	62	-22.60	-22.60
	63	-12.33	-12.33
	64	-2.06	-2.06
	65	8.21	8.21
	66	18.48	18.48
	67	23.47	-47.89
	68	-33.31	-11.40
	69	1.36	-0.23
	70	-0.23	-0.23
	71	-0.23	-0.23
	72	36.37	52.03

---

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

-----

ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE

-----

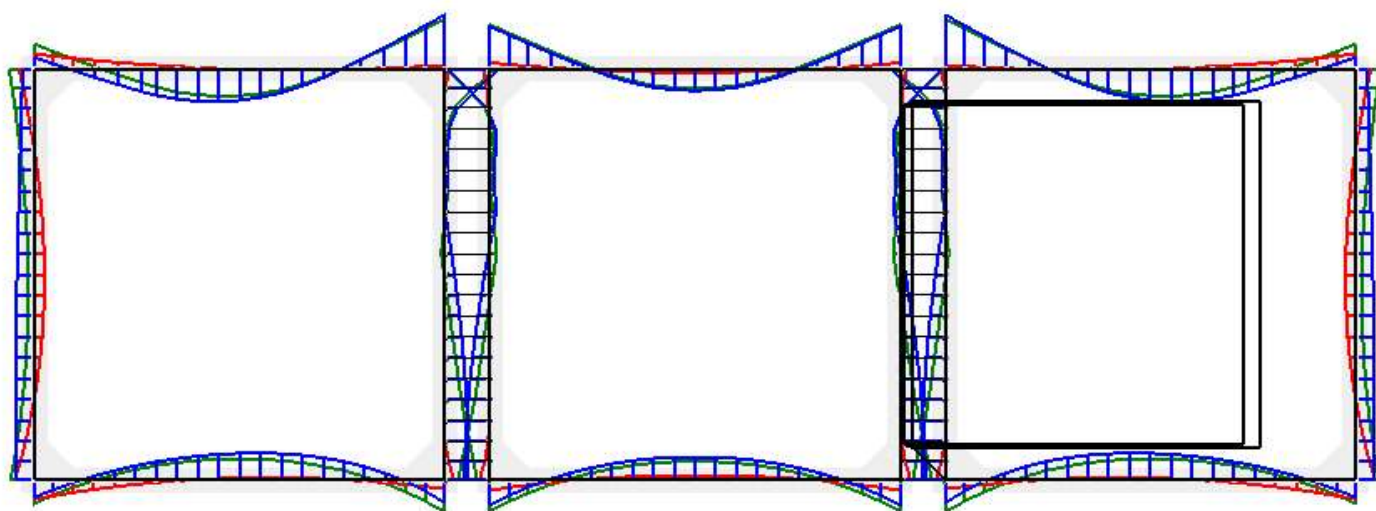
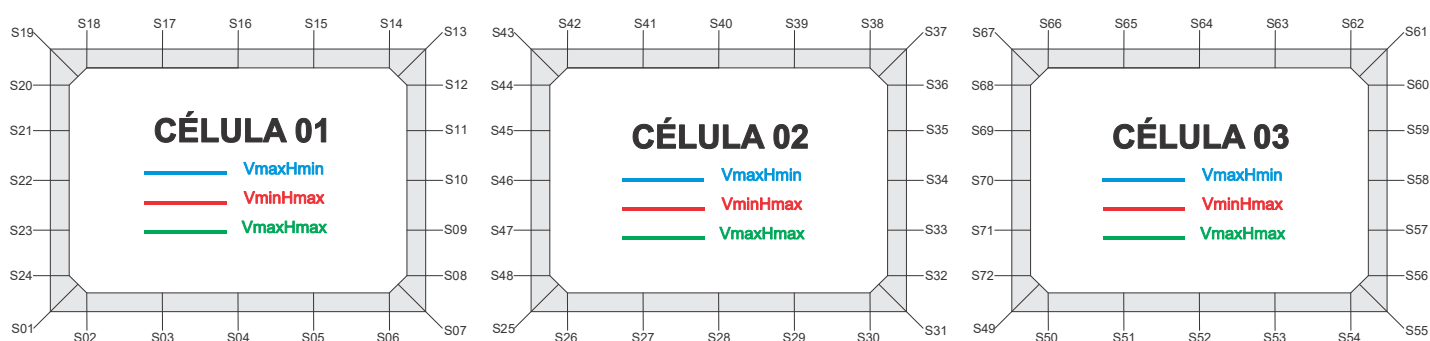
SEÇÃO	ESQUERDA (kN)	DIREITA (kN)
1	34.14	-61.05
2	-54.61	-46.40
3	-26.52	-19.57
4	-3.16	3.37
5	21.37	29.38
6	53.93	64.08
7	72.57	-34.14
8	-34.14	-34.14
9	-16.44	-16.44
10	-16.44	8.03
11	8.03	-5.09
12	44.12	109.63
13	128.37	-61.43
14	-56.44	-56.44
15	-41.62	-41.62
16	-6.32	-6.32
17	28.98	28.98
18	43.80	43.80
19	48.79	-22.04
20	-19.23	-19.23
21	-11.40	-11.40
22	-1.18	-1.18
23	11.42	11.42
24	26.41	26.41
25	34.14	-67.01
26	-59.85	-50.88
27	-28.74	-21.15
28	-3.38	3.38
29	21.15	28.74
30	50.88	59.85
31	67.01	-35.36
32	-35.36	-35.36
33	-17.66	-17.66
34	-17.66	6.81
35	6.81	-6.31
36	42.89	108.41
37	127.15	-55.11
38	-50.12	-50.12
39	-35.30	-35.30
40	0.00	0.00
41	35.30	35.30
42	50.12	50.12
43	55.11	-127.15
44	-108.41	-42.89
45	6.31	-6.81
46	-6.81	17.66
47	17.66	17.66
48	35.36	35.36
49	35.36	-72.57

	50	-64.08	-53.93
	51	-29.38	-21.37
	52	-3.37	3.16
	53	19.57	26.52
	54	46.40	54.61
	55	61.05	-34.14
	56	-26.41	-26.41
	57	-11.42	-11.42
	58	1.18	1.18
	59	11.40	11.40
	60	19.23	19.23
	61	22.04	-48.79
	62	-43.80	-43.80
	63	-28.98	-28.98
	64	6.32	6.32
	65	41.62	41.62
	66	56.44	56.44
	67	61.43	-128.37
	68	-109.63	-44.12
	69	5.09	-8.03
	70	-8.03	16.44
	71	16.44	16.44
	72	34.14	34.14

---

## 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	-36.88	36.88
2	5.88	5.88
3	-37.93	-37.93
4	-55.73	-55.73
5	-46.53	-46.53
6	3.80	3.80
7	47.49	47.49
8	48.04	48.04
9	39.56	39.56
10	20.38	20.38
11	4.74	4.74
12	27.59	27.59
13	113.90	-113.90
14	-69.69	-69.69
15	18.67	18.67
16	65.65	65.65
17	54.92	54.92
18	2.81	2.81
19	-24.66	-24.66
20	-26.72	-26.72
21	-31.65	-31.65
22	-36.15	-36.15
23	-38.87	-38.87
24	-38.48	-38.48
25	-36.88	52.86
26	15.13	15.13
27	-33.83	-33.83
28	-48.28	-48.28
29	-33.83	-33.83
30	15.13	15.13
31	52.86	52.86
32	50.62	50.62
33	36.09	36.09
34	10.87	10.87
35	-10.81	-10.81
36	6.00	6.00
37	89.51	-89.51
38	-53.67	-53.67
39	16.56	16.56
40	45.42	45.42
41	16.56	16.56
42	-53.67	-53.67
43	-89.51	-89.51
44	-6.00	-6.00
45	10.81	10.81
46	-10.87	-10.87
47	-36.09	-36.09
48	-50.62	-50.62
49	-52.86	47.49

	50	3.80	3.80
	51	-46.53	-46.53
	52	-55.73	-55.73
	53	-37.93	-37.93
	54	5.88	5.88
	55	36.88	36.88
	56	38.48	38.48
	57	38.87	38.87
	58	36.15	36.15
	59	31.65	31.65
	60	26.72	26.72
	61	24.66	-24.66
	62	2.81	2.81
	63	54.92	54.92
	64	65.65	65.65
	65	18.67	18.67
	66	-69.69	-69.69
	67	-113.90	-113.90
	68	-27.59	-27.59
	69	-4.74	-4.74
	70	-20.38	-20.38
	71	-39.56	-39.56
	72	-48.04	-48.04

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-40.38	40.38
2	26.62	26.62
3	5.28	5.28
4	-4.15	-4.15
5	-2.54	-2.54
6	9.80	9.80
7	19.10	19.10
8	0.12	0.12
9	-1.96	-1.96
10	-1.99	-1.99
11	-2.02	-2.02
12	-2.02	-2.02
13	8.14	-8.14
14	-3.44	-3.44
15	1.77	1.77
16	0.30	0.30
17	-7.84	-7.84
18	-22.65	-22.65
19	-31.78	-31.78
20	-14.90	-14.90
21	11.36	11.36
22	21.31	21.31
23	12.33	12.33
24	-18.25	-18.25
25	-40.38	21.90
26	10.66	10.66
27	-4.80	-4.80
28	-9.61	-9.61
29	-4.80	-4.80
30	10.66	10.66
31	21.90	21.90
32	3.13	3.13
33	1.49	1.49
34	1.90	1.90
35	2.31	2.31
36	2.75	2.75
37	13.11	-13.11
38	-6.20	-6.20
39	3.81	3.81
40	7.15	7.15
41	3.81	3.81
42	-6.20	-6.20
43	-13.11	-13.11
44	-2.75	-2.75
45	-2.31	-2.31
46	-1.90	-1.90
47	-1.49	-1.49
48	-3.13	-3.13
49	-21.90	19.10

	50	9.80	9.80
	51	-2.54	-2.54
	52	-4.15	-4.15
	53	5.28	5.28
	54	26.62	26.62
	55	40.38	40.38
	56	18.25	18.25
	57	-12.33	-12.33
	58	-21.31	-21.31
	59	-11.36	-11.36
	60	14.90	14.90
	61	31.78	-31.78
	62	-22.65	-22.65
	63	-7.84	-7.84
	64	0.30	0.30
	65	1.77	1.77
	66	-3.44	-3.44
	67	-8.14	-8.14
	68	2.02	2.02
	69	2.02	2.02
	70	1.99	1.99
	71	1.96	1.96
	72	-0.12	-0.12

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-49.63	49.63
2	15.79	15.79
3	-29.96	-29.96
4	-44.30	-44.30
5	-28.71	-28.71
6	25.46	25.46
7	67.50	67.50
8	51.77	51.77
9	22.61	22.61
10	-1.63	-1.63
11	6.20	6.20
12	20.47	20.47
13	105.26	-105.26
14	-64.48	-64.48
15	16.47	16.47
16	56.04	56.04
17	37.90	37.90
18	-21.61	-21.61
19	-52.51	-52.51
20	-40.44	-40.44
21	-21.19	-21.19
22	-12.80	-12.80
23	-17.05	-17.05
24	-35.68	-35.68
25	-49.63	65.95
26	27.75	27.75
27	-23.51	-23.51
28	-39.15	-39.15
29	-23.51	-23.51
30	27.75	27.75
31	65.95	65.95
32	49.28	49.28
33	18.08	18.08
34	-8.21	-8.21
35	-2.42	-2.42
36	9.80	9.80
37	93.65	-93.65
38	-57.81	-57.81
39	12.42	12.42
40	41.28	41.28
41	12.42	12.42
42	-57.81	-57.81
43	-93.65	-93.65
44	-9.80	-9.80
45	2.42	2.42
46	8.21	8.21
47	-18.08	-18.08
48	-49.28	-49.28
49	-65.95	67.50

	50	25.46	25.46
	51	-28.71	-28.71
	52	-44.30	-44.30
	53	-29.96	-29.96
	54	15.79	15.79
	55	49.63	49.63
	56	35.68	35.68
	57	17.05	17.05
	58	12.80	12.80
	59	21.19	21.19
	60	40.44	40.44
	61	52.51	-52.51
	62	-21.61	-21.61
	63	37.90	37.90
	64	56.04	56.04
	65	16.47	16.47
	66	-64.48	-64.48
	67	-105.26	-105.26
	68	-20.47	-20.47
	69	-6.20	-6.20
	70	1.63	1.63
	71	-22.61	-22.61
	72	-51.77	-51.77

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-73.16	73.16
2	24.19	24.19
3	-49.37	-49.37
4	-85.13	-85.13
5	-80.30	-80.30
6	-11.98	-11.98
7	51.93	51.93
8	48.21	48.21
9	30.49	30.49
10	6.95	6.95
11	3.71	3.71
12	21.88	21.88
13	172.92	-172.92
14	-103.65	-103.65
15	15.40	15.40
16	76.75	76.75
17	80.37	80.37
18	26.29	26.29
19	-18.19	-18.19
20	-24.24	-24.24
21	-37.83	-37.83
22	-50.98	-50.98
23	-62.36	-62.36
24	-70.63	-70.63
25	-73.16	82.81
26	31.36	31.36
27	-43.09	-43.09
28	-75.13	-75.13
29	-64.05	-64.05
30	8.10	8.10
31	67.22	67.22
32	55.29	55.29
33	20.34	20.34
34	0.24	0.24
35	-6.82	-6.82
36	-19.48	-19.48
37	90.48	-107.63
38	-52.83	-52.83
39	26.50	26.50
40	48.13	48.13
41	12.03	12.03
42	-81.79	-81.79
43	-143.19	-143.19
44	1.42	1.42
45	6.20	6.20
46	-9.65	-9.65
47	-45.04	-45.04
48	-73.82	-73.82
49	-82.81	-0.02

	50	-57.74	-57.74
	51	-119.54	-119.54
	52	-128.89	-128.89
	53	-98.17	-98.17
	54	-9.25	-9.25
	55	49.87	49.87
	56	48.46	48.46
	57	42.80	42.80
	58	34.71	34.71
	59	25.50	25.50
	60	16.53	16.53
	61	12.64	-12.64
	62	32.23	32.23
	63	87.29	87.29
	64	84.63	84.63
	65	24.25	24.25
	66	-93.89	-93.89
	67	-162.16	-141.95
	68	-23.07	-23.07
	69	-14.75	-14.75
	70	1.50	1.50
	71	7.02	7.02
	72	0.00	0.00

---

```
#####
#          SOLICITAÇÕES TANGENCIAIS (ELU)          #
#          VmínHmax                                #
#####
```

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-44.36	44.36
2	31.20	31.20
3	8.46	8.46
4	-4.19	-4.19
5	-5.99	-5.99
6	4.44	4.44
7	14.01	14.01
8	-1.02	-1.02
9	-1.69	-1.69
10	-0.90	-0.90
11	-0.11	-0.11
12	0.83	0.83
13	12.33	-12.33
14	-6.83	-6.83
15	0.11	0.11
16	0.38	0.38
17	-6.02	-6.02
18	-19.10	-19.10
19	-27.43	-27.43
20	-11.33	-11.33
21	13.22	13.22
22	21.48	21.48
23	10.79	10.79
24	-21.50	-21.50
25	-44.36	22.21
26	13.01	13.01
27	-1.39	-1.39
28	-8.58	-8.58
29	-8.45	-8.45
30	0.95	0.95
31	8.83	8.83
32	-3.59	-3.59
33	-0.16	-0.16
34	3.27	3.27
35	6.71	6.71
36	6.48	6.48
37	16.16	-13.36
38	-6.11	-6.11
39	4.68	4.68
40	8.80	8.80
41	6.25	6.25
42	-3.00	-3.00
43	-9.47	-9.47
44	1.00	1.00
45	-0.32	-0.32
46	-1.77	-1.77
47	-3.23	-3.23
48	-6.14	-6.14
49	-22.21	14.01

	50	2.52	2.52
	51	-12.16	-12.16
	52	-14.83	-14.83
	53	-4.81	-4.81
	54	21.55	21.55
	55	37.75	37.75
	56	17.55	17.55
	57	-9.81	-9.81
	58	-16.91	-16.91
	59	-6.38	-6.38
	60	19.13	19.13
	61	33.96	-33.96
	62	-24.66	-24.66
	63	-9.39	-9.39
	64	-0.80	-0.80
	65	1.12	1.12
	66	-3.68	-3.68
	67	-7.76	-4.31
	68	3.78	3.78
	69	0.09	0.09
	70	0.06	0.06
	71	0.03	0.03
	72	0.00	0.00

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-89.08	89.08
2	37.96	37.96
3	-38.11	-38.11
4	-72.07	-72.07
5	-62.09	-62.09
6	10.26	10.26
7	73.34	73.34
8	52.88	52.88
9	16.44	16.44
10	-12.12	-12.12
11	6.87	6.87
12	20.78	20.78
13	170.92	-170.92
14	-103.97	-103.97
15	10.07	10.07
16	66.40	66.40
17	65.02	65.02
18	5.92	5.92
19	-40.87	-40.87
20	-33.60	-33.60
21	-24.73	-24.73
22	-26.73	-26.73
23	-41.36	-41.36
24	-70.38	-70.38
25	-89.08	104.98
26	51.55	51.55
27	-29.21	-29.21
28	-67.88	-67.88
29	-63.80	-63.80
30	-0.90	-0.90
31	52.75	52.75
32	36.17	36.17
33	20.65	20.65
34	5.13	5.13
35	-3.08	-3.08
36	-9.52	-9.52
37	95.55	-107.44
38	-52.62	-52.62
39	26.77	26.77
40	48.45	48.45
41	12.41	12.41
42	-81.36	-81.36
43	-142.73	-142.73
44	1.81	1.81
45	3.56	3.56
46	10.39	10.39
47	-30.32	-30.32
48	-78.92	-78.92
49	-104.98	9.44

	50	-49.79	-49.79
	51	-116.82	-116.82
	52	-130.91	-130.91
	53	-101.25	-101.25
	54	-6.25	-6.25
	55	57.84	57.84
	56	44.19	44.19
	57	25.55	25.55
	58	20.43	20.43
	59	27.06	27.06
	60	43.67	43.67
	61	53.38	-53.38
	62	-3.53	-3.53
	63	62.30	62.30
	64	70.42	70.42
	65	20.82	20.82
	66	-86.55	-86.55
	67	-149.84	-128.35
	68	-16.14	-16.14
	69	-7.12	-7.12
	70	0.13	0.13
	71	0.06	0.06
	72	0.00	0.00

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-28.96	28.96
2	8.23	8.23
3	-19.65	-19.65
4	-28.30	-28.30
5	-18.61	-18.61
6	15.01	15.01
7	41.21	41.21
8	32.78	32.78
9	15.38	15.38
10	-1.14	-1.14
11	4.17	4.17
12	12.64	12.64
13	62.12	-62.12
14	-37.73	-37.73
15	9.74	9.74
16	33.21	33.21
17	23.97	23.97
18	-9.25	-9.25
19	-27.07	-27.07
20	-22.45	-22.45
21	-14.36	-14.36
22	-10.35	-10.35
23	-12.18	-12.18
24	-21.58	-21.58
25	-28.96	40.20
26	16.55	16.55
27	-15.10	-15.10
28	-24.73	-24.73
29	-15.10	-15.10
30	16.55	16.55
31	40.20	40.20
32	31.14	31.14
33	12.36	12.36
34	-5.54	-5.54
35	-1.60	-1.60
36	5.49	5.49
37	54.34	-54.34
38	-33.23	-33.23
39	7.12	7.12
40	23.47	23.47
41	7.12	7.12
42	-33.23	-33.23
43	-54.34	-54.34
44	-5.49	-5.49
45	1.60	1.60
46	5.54	5.54
47	-12.36	-12.36
48	-31.14	-31.14
49	-40.20	41.21

	50	15.01	15.01
	51	-18.61	-18.61
	52	-28.30	-28.30
	53	-19.65	-19.65
	54	8.23	8.23
	55	28.96	28.96
	56	21.58	21.58
	57	12.18	12.18
	58	10.35	10.35
	59	14.36	14.36
	60	22.45	22.45
	61	27.07	-27.07
	62	-9.25	-9.25
	63	23.97	23.97
	64	33.21	33.21
	65	9.74	9.74
	66	-37.73	-37.73
	67	-62.12	-62.12
	68	-12.64	-12.64
	69	-4.17	-4.17
	70	1.14	1.14
	71	-15.38	-15.38
	72	-32.78	-32.78

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-30.31	30.31
2	18.00	18.00
3	-0.03	-0.03
4	-6.82	-6.82
5	-3.27	-3.27
6	11.03	11.03
7	21.50	21.50
8	4.45	4.45
9	-0.97	-0.97
10	-0.86	-0.86
11	-0.74	-0.74
12	0.31	0.31
13	12.16	-12.16
14	-6.16	-6.16
15	1.87	1.87
16	3.23	3.23
17	-2.08	-2.08
18	-14.08	-14.08
19	-21.90	-21.90
20	-11.24	-11.24
21	5.55	5.55
22	11.93	11.93
23	5.75	5.75
24	-15.12	-15.12
25	-30.31	22.70
26	11.42	11.42
27	-4.18	-4.18
28	-9.06	-9.06
29	-4.18	-4.18
30	11.42	11.42
31	22.70	22.70
32	5.72	5.72
33	0.47	0.47
34	0.75	0.75
35	1.03	1.03
36	2.25	2.25
37	14.18	-14.18
38	-7.27	-7.27
39	2.75	2.75
40	6.09	6.09
41	2.75	2.75
42	-7.27	-7.27
43	-14.18	-14.18
44	-2.25	-2.25
45	-1.03	-1.03
46	-0.75	-0.75
47	-0.47	-0.47
48	-5.72	-5.72
49	-22.70	21.50

	50	11.03	11.03
	51	-3.27	-3.27
	52	-6.82	-6.82
	53	-0.03	-0.03
	54	18.00	18.00
	55	30.31	30.31
	56	15.12	15.12
	57	-5.75	-5.75
	58	-11.93	-11.93
	59	-5.55	-5.55
	60	11.24	11.24
	61	21.90	-21.90
	62	-14.08	-14.08
	63	-2.08	-2.08
	64	3.23	3.23
	65	1.87	1.87
	66	-6.16	-6.16
	67	-12.16	-12.16
	68	-0.31	-0.31
	69	0.74	0.74
	70	0.86	0.86
	71	0.97	0.97
	72	-4.45	-4.45

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-32.25	32.25
2	11.01	11.01
3	-17.71	-17.71
4	-26.63	-26.63
5	-16.78	-16.78
6	16.85	16.85
7	42.72	42.72
8	31.78	31.78
9	12.01	12.01
10	-3.84	-3.84
11	3.84	3.84
12	11.72	11.72
13	60.85	-60.85
14	-36.96	-36.96
15	9.40	9.40
16	31.77	31.77
17	21.44	21.44
18	-12.89	-12.89
19	-31.22	-31.22
20	-23.68	-23.68
21	-11.56	-11.56
22	-6.38	-6.38
23	-9.57	-9.57
24	-22.55	-22.55
25	-32.25	41.79
26	18.09	18.09
27	-13.85	-13.85
28	-23.62	-23.62
29	-13.85	-13.85
30	18.09	18.09
31	41.79	41.79
32	30.33	30.33
33	9.42	9.42
34	-7.57	-7.57
35	-1.03	-1.03
36	5.72	5.72
37	54.32	-54.32
38	-33.22	-33.22
39	7.13	7.13
40	23.48	23.48
41	7.13	7.13
42	-33.22	-33.22
43	-54.32	-54.32
44	-5.72	-5.72
45	1.03	1.03
46	7.57	7.57
47	-9.42	-9.42
48	-30.33	-30.33
49	-41.79	42.72

	50	16.85	16.85
	51	-16.78	-16.78
	52	-26.63	-26.63
	53	-17.71	-17.71
	54	11.01	11.01
	55	32.25	32.25
	56	22.55	22.55
	57	9.57	9.57
	58	6.38	6.38
	59	11.56	11.56
	60	23.68	23.68
	61	31.22	-31.22
	62	-12.89	-12.89
	63	21.44	21.44
	64	31.77	31.77
	65	9.40	9.40
	66	-36.96	-36.96
	67	-60.85	-60.85
	68	-11.72	-11.72
	69	-3.84	-3.84
	70	3.84	3.84
	71	-12.01	-12.01
	72	-31.78	-31.78

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-20.25	20.25
2	9.39	9.39
3	-5.58	-5.58
4	-10.33	-10.33
5	-5.63	-5.63
6	9.95	9.95
7	21.50	21.50
8	12.43	12.43
9	1.55	1.55
10	-0.54	-0.54
11	0.59	0.59
12	2.69	2.69
13	16.01	-16.01
14	-8.68	-8.68
15	2.26	2.26
16	6.52	6.52
17	4.10	4.10
18	-4.99	-4.99
19	-11.48	-11.48
20	-7.50	-7.50
21	-0.81	-0.81
22	1.80	1.80
23	-1.42	-1.42
24	-12.23	-12.23
25	-20.25	21.51
26	10.28	10.28
27	-5.11	-5.11
28	-9.89	-9.89
29	-5.11	-5.11
30	10.28	10.28
31	21.51	21.51
32	12.33	12.33
33	1.23	1.23
34	-1.08	-1.08
35	-0.18	-0.18
36	1.71	1.71
37	14.93	-14.93
38	-8.01	-8.01
39	2.00	2.00
40	5.34	5.34
41	2.00	2.00
42	-8.01	-8.01
43	-14.93	-14.93
44	-1.71	-1.71
45	0.18	0.18
46	1.08	1.08
47	-1.23	-1.23
48	-12.33	-12.33
49	-21.51	21.50

	50	9.95	9.95
	51	-5.63	-5.63
	52	-10.33	-10.33
	53	-5.58	-5.58
	54	9.39	9.39
	55	20.25	20.25
	56	12.23	12.23
	57	1.42	1.42
	58	-1.80	-1.80
	59	0.81	0.81
	60	7.50	7.50
	61	11.48	-11.48
	62	-4.99	-4.99
	63	4.10	4.10
	64	6.52	6.52
	65	2.26	2.26
	66	-8.68	-8.68
	67	-16.01	-16.01
	68	-2.69	-2.69
	69	-0.59	-0.59
	70	0.54	0.54
	71	-1.55	-1.55
	72	-12.43	-12.43

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-25.70	25.70
2	8.67	8.67
3	-14.38	-14.38
4	-21.57	-21.57
5	-13.76	-13.76
6	13.09	13.09
7	33.80	33.80
8	25.12	25.12
9	10.23	10.23
10	-0.77	-0.77
11	2.80	2.80
12	8.91	8.91
13	44.83	-44.83
14	-26.83	-26.83
15	6.94	6.94
16	23.20	23.20
17	16.52	16.52
18	-7.65	-7.65
19	-21.22	-21.22
20	-16.84	-16.84
21	-9.28	-9.28
22	-5.80	-5.80
23	-8.15	-8.15
24	-18.08	-18.08
25	-25.70	33.18
26	14.18	14.18
27	-11.37	-11.37
28	-19.18	-19.18
29	-11.37	-11.37
30	14.18	14.18
31	33.18	33.18
32	24.06	24.06
33	8.22	8.22
34	-3.71	-3.71
35	-1.09	-1.09
36	4.07	4.07
37	39.55	-39.55
38	-23.77	-23.77
39	5.20	5.20
40	16.67	16.67
41	5.20	5.20
42	-23.77	-23.77
43	-39.55	-39.55
44	-4.07	-4.07
45	1.09	1.09
46	3.71	3.71
47	-8.22	-8.22
48	-24.06	-24.06
49	-33.18	33.80

	50	13.09	13.09
	51	-13.76	-13.76
	52	-21.57	-21.57
	53	-14.38	-14.38
	54	8.67	8.67
	55	25.70	25.70
	56	18.08	18.08
	57	8.15	8.15
	58	5.80	5.80
	59	9.28	9.28
	60	16.84	16.84
	61	21.22	-21.22
	62	-7.65	-7.65
	63	16.52	16.52
	64	23.20	23.20
	65	6.94	6.94
	66	-26.83	-26.83
	67	-44.83	-44.83
	68	-8.91	-8.91
	69	-2.80	-2.80
	70	0.77	0.77
	71	-10.23	-10.23
	72	-25.12	-25.12

---

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

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

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-28.15	28.15
2	16.16	16.16
3	-1.17	-1.17
4	-7.43	-7.43
5	-3.52	-3.52
6	11.17	11.17
7	21.90	21.90
8	6.29	6.29
9	-0.76	-0.76
10	-0.61	-0.61
11	-0.46	-0.46
12	0.84	0.84
13	13.02	-13.02
14	-6.73	-6.73
15	1.94	1.94
16	3.94	3.94
17	-0.74	-0.74
18	-12.10	-12.10
19	-19.63	-19.63
20	-10.57	-10.57
21	4.02	4.02
22	9.81	9.81
23	4.48	4.48
24	-14.30	-14.30
25	-28.15	22.75
26	11.47	11.47
27	-4.14	-4.14
28	-9.02	-9.02
29	-4.14	-4.14
30	11.47	11.47
31	22.75	22.75
32	7.19	7.19
33	0.24	0.24
34	0.50	0.50
35	0.75	0.75
36	2.17	2.17
37	14.39	-14.39
38	-7.48	-7.48
39	2.53	2.53
40	5.87	5.87
41	2.53	2.53
42	-7.48	-7.48
43	-14.39	-14.39
44	-2.17	-2.17
45	-0.75	-0.75
46	-0.50	-0.50
47	-0.24	-0.24
48	-7.19	-7.19
49	-22.75	21.90

	50	11.17	11.17
	51	-3.52	-3.52
	52	-7.43	-7.43
	53	-1.17	-1.17
	54	16.16	16.16
	55	28.15	28.15
	56	14.30	14.30
	57	-4.48	-4.48
	58	-9.81	-9.81
	59	-4.02	-4.02
	60	10.57	10.57
	61	19.63	-19.63
	62	-12.10	-12.10
	63	-0.74	-0.74
	64	3.94	3.94
	65	1.94	1.94
	66	-6.73	-6.73
	67	-13.02	-13.02
	68	-0.84	-0.84
	69	0.46	0.46
	70	0.61	0.61
	71	0.76	0.76
	72	-6.29	-6.29

---

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

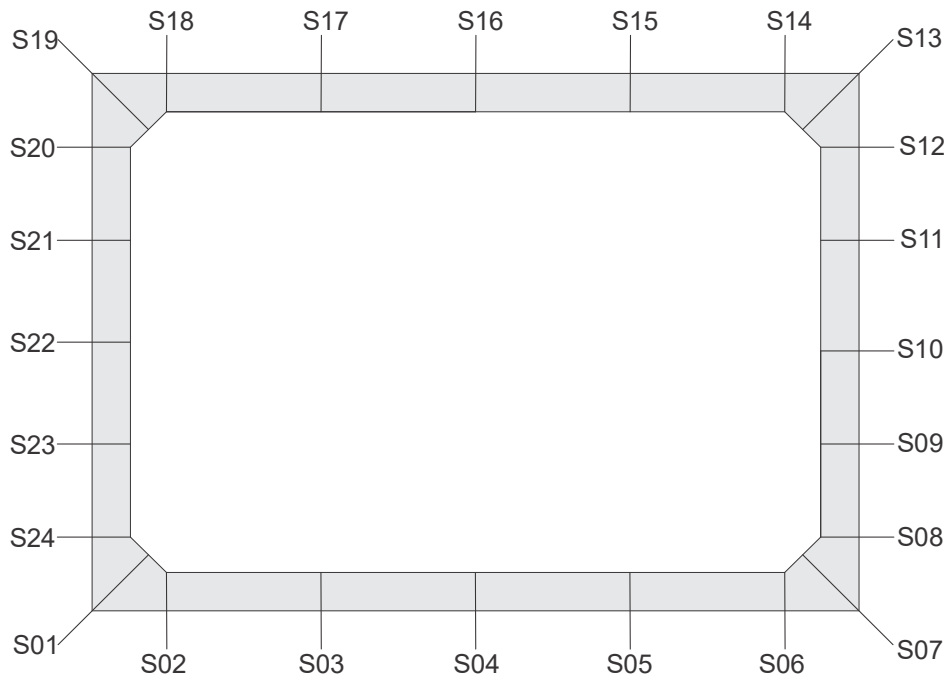
-----  
MOMENTO FLETOR NAS SEÇÕES DE INTERESSE  
-----

SEÇÃO	ESQUERDA (kN.m)	DIREITA (kN.m)
1	-27.75	27.75
2	10.40	10.40
3	-13.17	-13.17
4	-20.52	-20.52
5	-12.60	-12.60
6	14.26	14.26
7	34.76	34.76
8	24.52	24.52
9	8.08	8.08
10	-2.60	-2.60
11	2.62	2.62
12	8.33	8.33
13	44.03	-44.03
14	-26.36	-26.36
15	6.72	6.72
16	22.30	22.30
17	14.94	14.94
18	-9.93	-9.93
19	-23.82	-23.82
20	-17.61	-17.61
21	-7.53	-7.53
22	-3.31	-3.31
23	-6.51	-6.51
24	-18.68	-18.68
25	-27.75	34.19
26	15.16	15.16
27	-10.57	-10.57
28	-18.47	-18.47
29	-10.57	-10.57
30	15.16	15.16
31	34.19	34.19
32	23.58	23.58
33	6.35	6.35
34	-5.13	-5.13
35	-0.71	-0.71
36	4.22	4.22
37	39.55	-39.55
38	-23.76	-23.76
39	5.21	5.21
40	16.68	16.68
41	5.21	5.21
42	-23.76	-23.76
43	-39.55	-39.55
44	-4.22	-4.22
45	0.71	0.71
46	5.13	5.13
47	-6.35	-6.35
48	-23.58	-23.58
49	-34.19	34.76

	50	14.26	14.26
	51	-12.60	-12.60
	52	-20.52	-20.52
	53	-13.17	-13.17
	54	10.40	10.40
	55	27.75	27.75
	56	18.68	18.68
	57	6.51	6.51
	58	3.31	3.31
	59	7.53	7.53
	60	17.61	17.61
	61	23.82	-23.82
	62	-9.93	-9.93
	63	14.94	14.94
	64	22.30	22.30
	65	6.72	6.72
	66	-26.36	-26.36
	67	-44.03	-44.03
	68	-8.33	-8.33
	69	-2.62	-2.62
	70	2.60	2.60
	71	-8.08	-8.08
	72	-24.52	-24.52

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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	3.46	4.15	3.10	3.72
3	3.10	3.72	4.92	5.90
4	3.10	3.72	7.28	8.74
5	3.10	3.72	6.05	7.26
6	3.31	3.97	3.10	3.72
7	6.57	7.88	1.26	1.26
8	5.98	7.18	3.10	3.72
9	4.42	5.31	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	9.20	11.04	3.10	3.72
15	3.10	3.72	3.10	3.72
16	3.10	3.72	8.63	10.36
17	3.10	3.72	7.16	8.59
18	3.10	3.72	3.10	3.72
19	6.57	7.88	1.26	1.26
20	4.44	5.33	3.10	3.72
21	3.24	3.89	3.10	3.72
22	3.76	4.51	3.10	3.72
23	4.05	4.86	3.10	3.72
24	3.94	4.73	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	-83.86	11.72	-28.70	2.69	39.32	0.00
13	-82.11	60.85	-13.90	16.01	105.80	0.08
14	-26.92	36.96	-13.90	8.68	173.87	7.24
16	-16.05	33.21	-38.24	3.23	208.48	1.01
18	-26.92	12.89	-13.90	4.99	63.81	0.00
19	-63.60	31.22	-13.90	11.48	56.50	0.00
20	-65.35	23.68	-25.86	7.50	125.07	1.51

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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	163.76	212.64	0.00	0.00
2	4.15	2.59E-003	155.45	106.92	830.77	1.34
6	3.97	2.48E-003	177.41	106.52	830.77	6.49
7	7.88	2.19E-003	197.19	189.59	1869.23	0.00
13	7.88	2.19E-003	262.98	192.49	1869.23	0.00
14	11.04	6.90E-003	85.90	125.60	0.00	0.00
18	3.72	2.32E-003	118.80	109.16	830.77	0.00
19	7.88	2.19E-003	139.45	200.26	0.00	0.00

**OBSERVAÇÃO 1:** A verificação da resistência à força cortante é feita a uma distância  $d/2$  das seções das mísulas.

**OBSERVAÇÃO 2:** Recomenda-se 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.

**VERIFICAÇÃO DA FISSURAÇÃO**

VmaxHmin

Seção	As (cm <sup>2</sup> /m)	Nsd (kN)	Msd (kN.m)	Ø (mm)	w (mm)
1	7.88	-14.46	25.70	6.30	0.010
2	4.15	-28.92	8.67	6.30	0.016
3	5.90	-28.92	14.38	6.30	0.026
4	8.74	-28.92	21.57	6.30	0.028
5	7.26	-28.92	13.76	6.30	0.015
6	3.97	-28.92	13.09	6.30	0.046
7	7.88	-53.95	33.80	6.30	0.013
8	7.18	-77.23	25.12	6.30	0.047
9	5.31	-73.98	10.23	6.30	0.008
10	3.72	-70.73	0.77	6.30	0.000
11	3.72	-67.48	2.80	6.30	0.000
12	3.72	-64.23	8.91	6.30	0.012
13	7.88	-38.86	44.83	6.30	0.029
14	11.04	-15.24	26.83	6.30	0.030
15	3.72	-15.24	6.94	8.00	0.019
16	10.36	-15.24	23.20	8.00	0.032
17	8.59	-15.24	16.52	8.00	0.023
18	3.72	-15.24	7.65	6.30	0.018
19	7.88	-31.49	21.22	6.30	0.005
20	5.33	-49.48	16.84	6.30	0.039
21	3.89	-52.73	9.28	6.30	0.015
22	4.51	-55.98	5.80	6.30	0.002
23	4.86	-59.23	8.15	6.30	0.006
24	4.73	-62.48	18.08	6.30	0.053

VminHmax

Seção	As (cm <sup>2</sup> /m)	Nsd (kN)	Msd (kN.m)	Ø (mm)	w (mm)
1	7.88	-26.01	28.15	6.30	0.011
2	4.15	-52.03	16.16	6.30	0.057
3	5.90	-52.03	1.17	6.30	0.000
4	8.74	-52.03	7.43	6.30	0.002
5	7.26	-52.03	3.52	6.30	0.000
6	3.97	-52.03	11.17	6.30	0.025
7	7.88	-46.00	21.90	6.30	0.005
8	7.18	-38.22	6.29	6.30	0.002
9	5.31	-34.97	0.76	6.30	0.000
10	3.72	-31.72	0.61	6.30	0.000
11	3.72	-28.47	0.46	6.30	0.000
12	3.72	-25.22	0.84	6.30	0.000
13	7.88	-27.85	13.02	6.30	0.002
14	11.04	-32.24	6.73	6.30	0.001
15	3.72	-32.24	1.94	8.00	0.000
16	10.36	-32.24	3.94	8.00	0.000
17	8.59	-32.24	0.74	8.00	0.000
18	3.72	-32.24	12.10	6.30	0.042
19	7.88	-29.92	19.63	6.30	0.005
20	5.33	-29.34	10.57	6.30	0.015
21	3.89	-32.59	4.02	6.30	0.002
22	4.51	-35.84	9.81	6.30	0.017
23	4.86	-39.09	4.48	6.30	0.001
24	4.73	-42.34	14.30	6.30	0.035

## VERIFICAÇÃO DA FISSURAÇÃO (CONT.)

VmaxHmax

Seção	As(cm <sup>2</sup> /m)	Nsd(kN)	Msd(kN.m)	Ø(mm)	w(mm)
1	7.88	-17.07	27.75	6.30	0.012
2	4.15	-34.14	10.40	6.30	0.023
3	5.90	-34.14	13.17	6.30	0.020
4	8.74	-34.14	20.52	6.30	0.025
5	7.26	-34.14	12.60	6.30	0.012
6	3.97	-34.14	14.26	6.30	0.053
7	7.88	-56.03	34.76	6.30	0.014
8	7.18	-76.18	24.52	6.30	0.044
9	5.31	-72.93	8.08	6.30	0.004
10	3.72	-69.68	2.60	6.30	0.000
11	3.72	-66.43	2.62	6.30	0.000
12	3.72	-63.18	8.33	6.30	0.010
13	7.88	-41.73	44.03	6.30	0.027
14	11.04	-22.04	26.36	6.30	0.028
15	3.72	-22.04	6.72	8.00	0.015
16	10.36	-22.04	22.30	8.00	0.028
17	8.59	-22.04	14.94	8.00	0.018
18	3.72	-22.04	9.93	6.30	0.030
19	7.88	-35.41	23.82	6.30	0.007
20	5.33	-50.54	17.61	6.30	0.043
21	3.89	-53.79	7.53	6.30	0.008
22	4.51	-57.04	3.31	6.30	0.000
23	4.86	-60.29	6.51	6.30	0.003
24	4.73	-63.54	18.68	6.30	0.057

NOTA:

\* Seção com aumento na armadura devido à fissuração.