ABTC

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

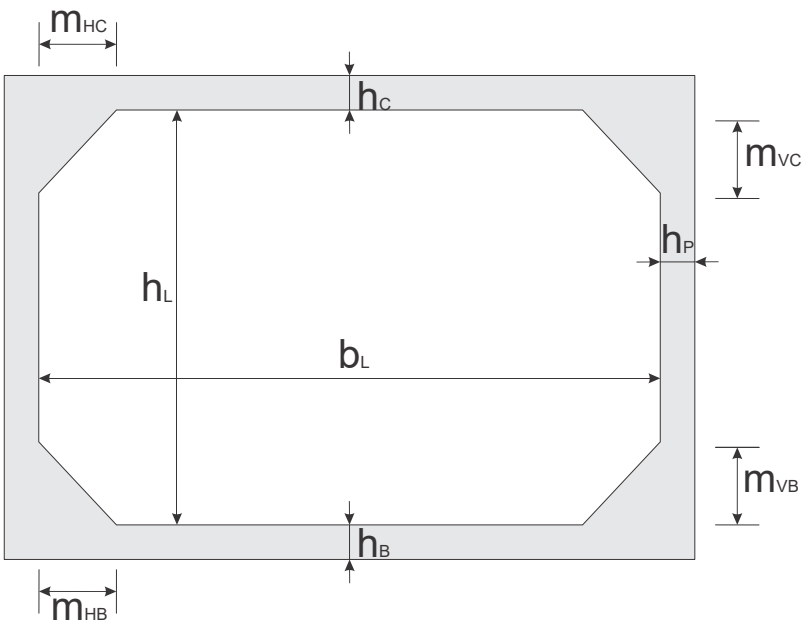
NOME: DEFESA CIVIL DO ESTADO DE SÃO PAULO
CPF/CNPJ:
ENDEREÇO: ,
BAIRRO:
CIDADE:
ESTADO: Não Informado
CEP:
TEL.:
CEL.:
E-MAIL:
SITE:

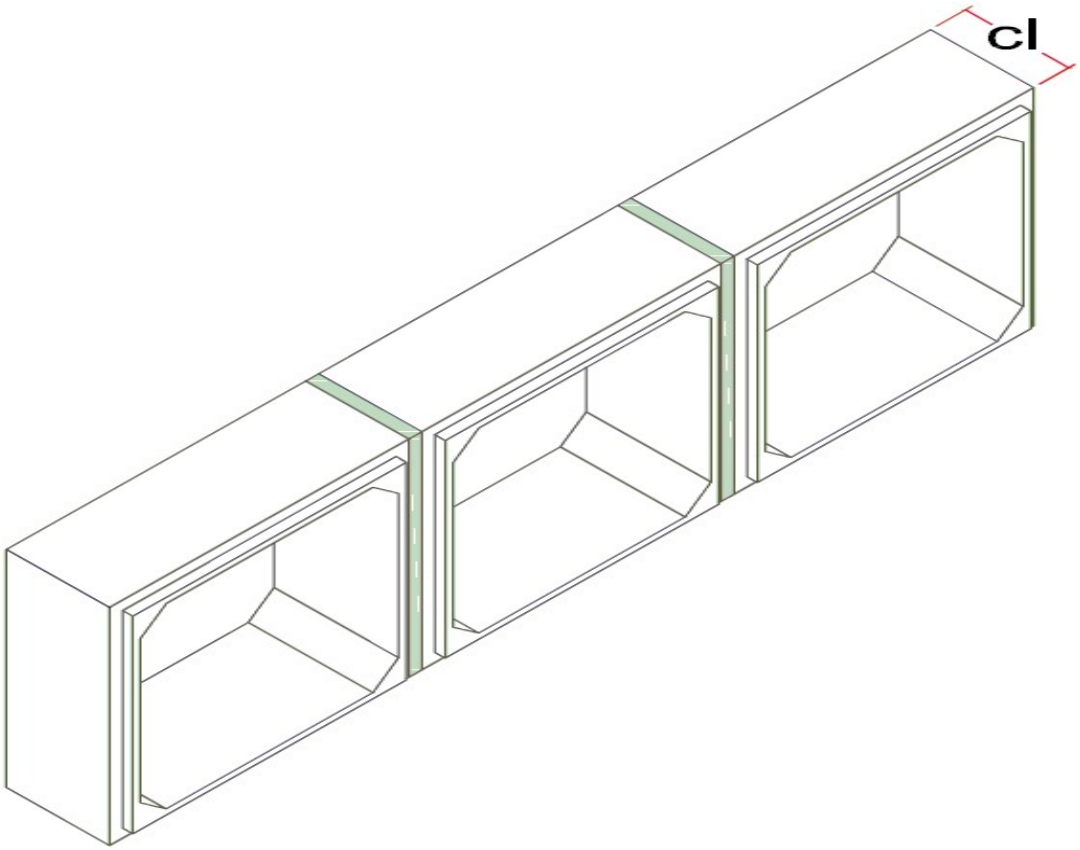
DADOS DA OBRA

NOME: ADUELA 3,00 X 3,00 M PARA ATERRO DE 1,00 M - LINHA TRIPLA
ENDEREÇO: ,
BAIRRO:
CIDADE:
ESTADO: Não Informado
CEP:
TEL.:
CEL.:
E-MAIL:
SITE:

GEOMETRIA

```
SEÇÃO CONSTANTE.........................:  SIM
FINALIDADE..............................:  ÁGUAS PLUVIAIS
COMPRIMENTO (cl)........................:  1.00 m
LARGURA LIVRE (bl)......................:  3.00 m
ALTURA LIVRE (hl).......................:  3.00 m
ALTURA DA LAJE DA COBERTURA (hc)........:  0.20 m
ESPESSURA DAS PAREDES LATERAIS (hp).....:  0.20 m
ALTURA DA LAJE DA BASE (hb).............:  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

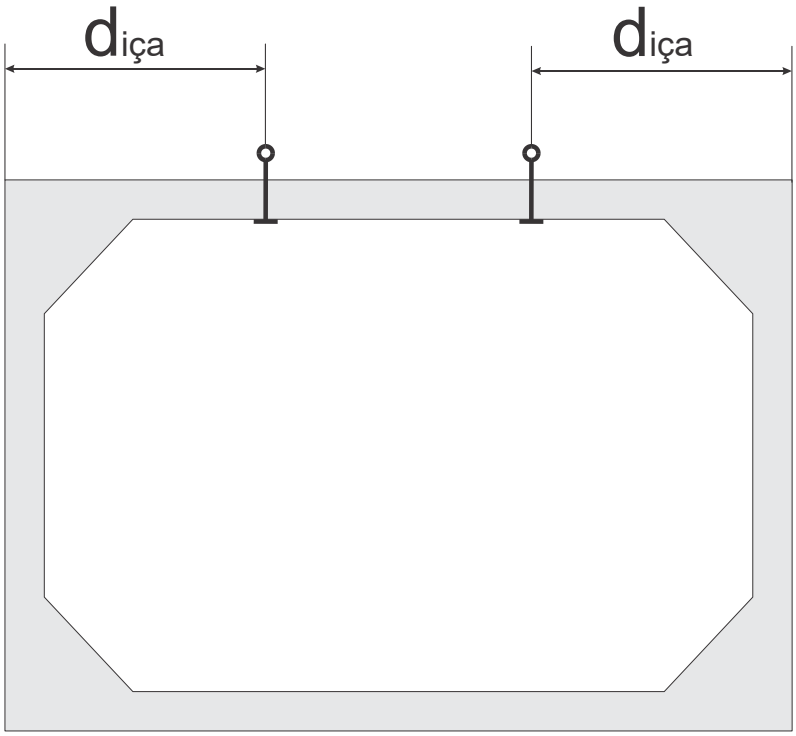
PESO ESPECÍFICO.....: 18.00 kN/m³
ÂNGULO DE ATRITO.....: 30.00 graus
COEFICIENTE DE ATRITO ATIVO.....: 0.33
COEFICIENTE DE ATRITO ESTÁTICO.....: 0.50
COEFICIENTE DE ATRITO.....: 0.58

DADOS DE INSTALAÇÃO

ALTURA DE TERRA.....: 0.70 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.....: ---

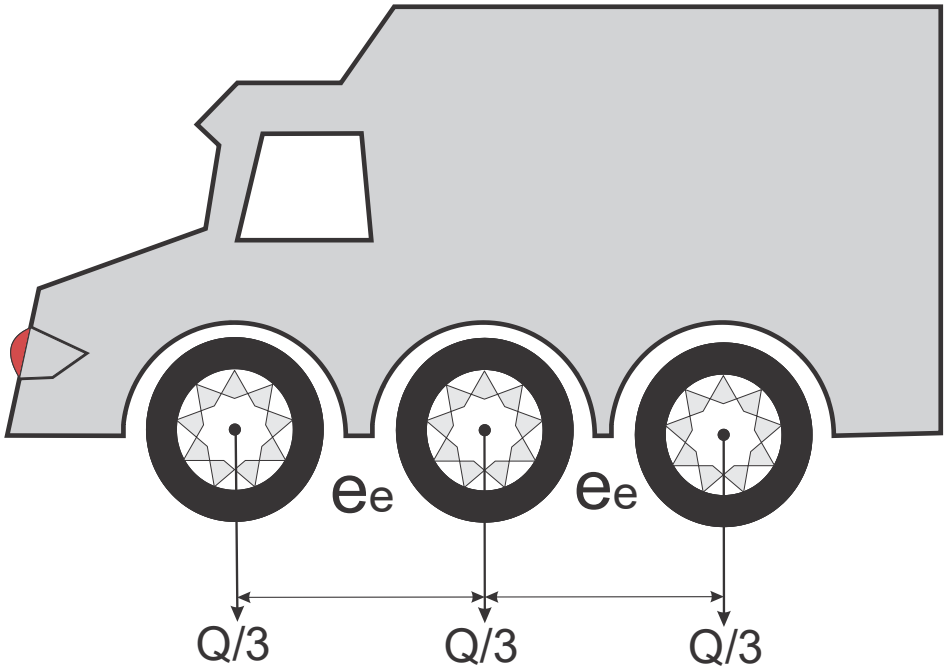
INFORMAÇÕES DE MANUSEIO

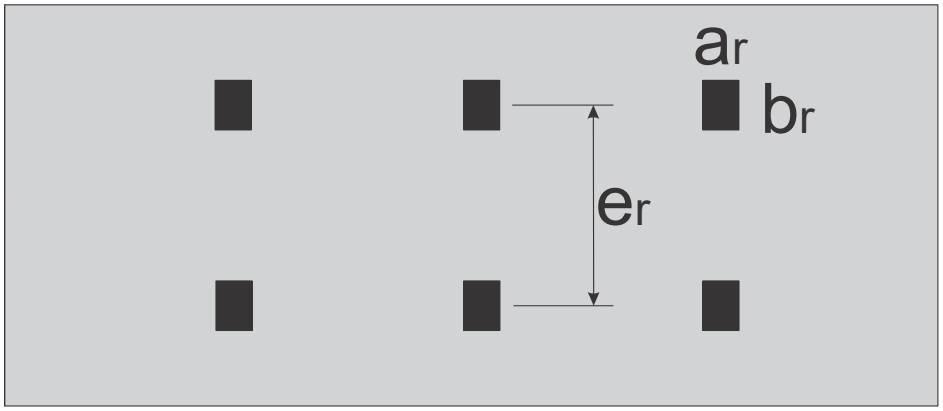
RESISTÊNCIA DO CONCRETO (fcj).....: 20.00 MPa
COEFICIENTE DE IMPACTO.....: 1.20
DISTÂNCIA DE IÇAMENTO.....: 50.00 cm



SOBRECARGA

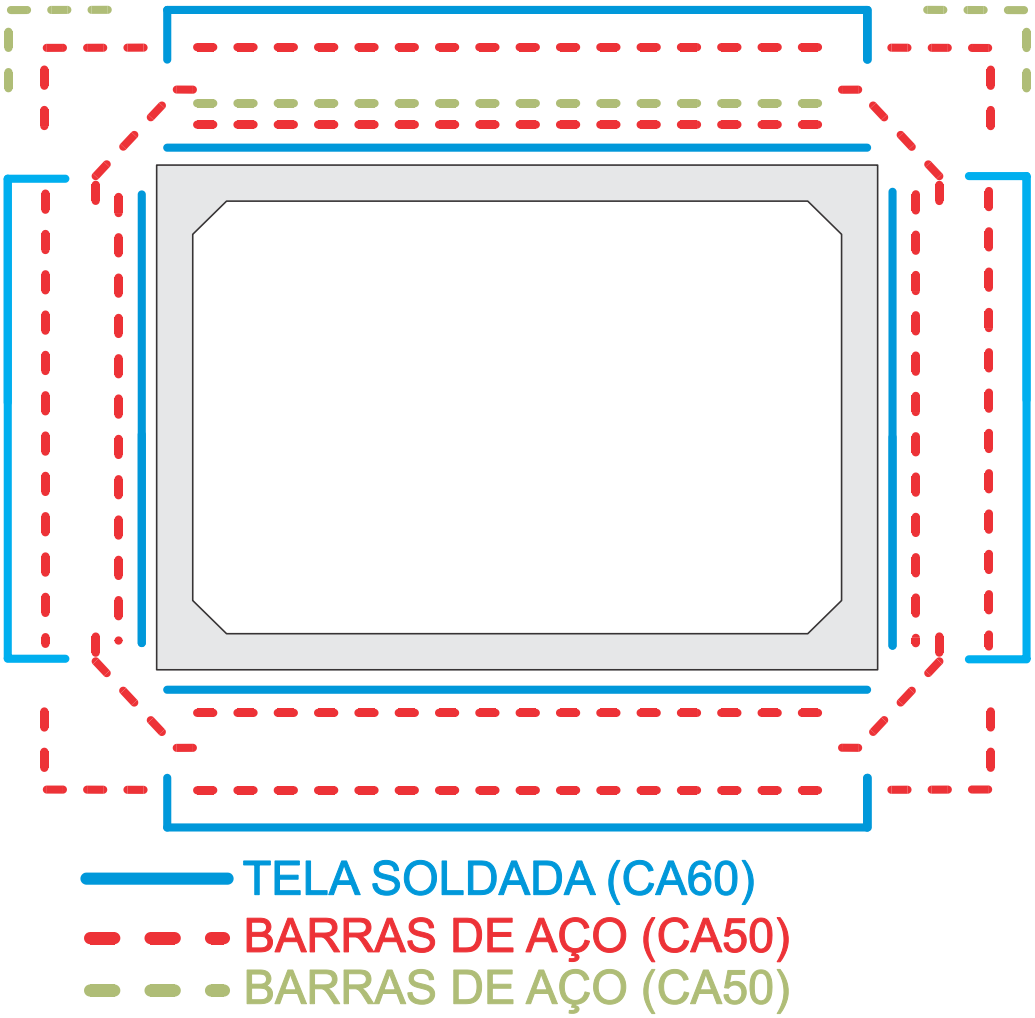
```
TIPO DE SOBRECARGA......................:  RODOVIÁRIO
TIPO DE TRÁFEGO.........................:  CLASSE 45
PESO DO VEÍCULO (Q).....................: 450.00 kN
DISTÂNCIA ENTRE EIXOS (ee)..............: 1.50 m
DISTÂNCIA ENTRE RODAS (er)..............: 2.00 m
ÁREA DE CONTATO DA RODA (ar)............: 0.20 m
ÁREA DE CONTATO DA RODA (br)............: 0.50 m
COEF. DE IMPACTO ADICIONAL..............: 1.25
COEF. DE IMPACTO EMPREGADO..............: 1.30
```





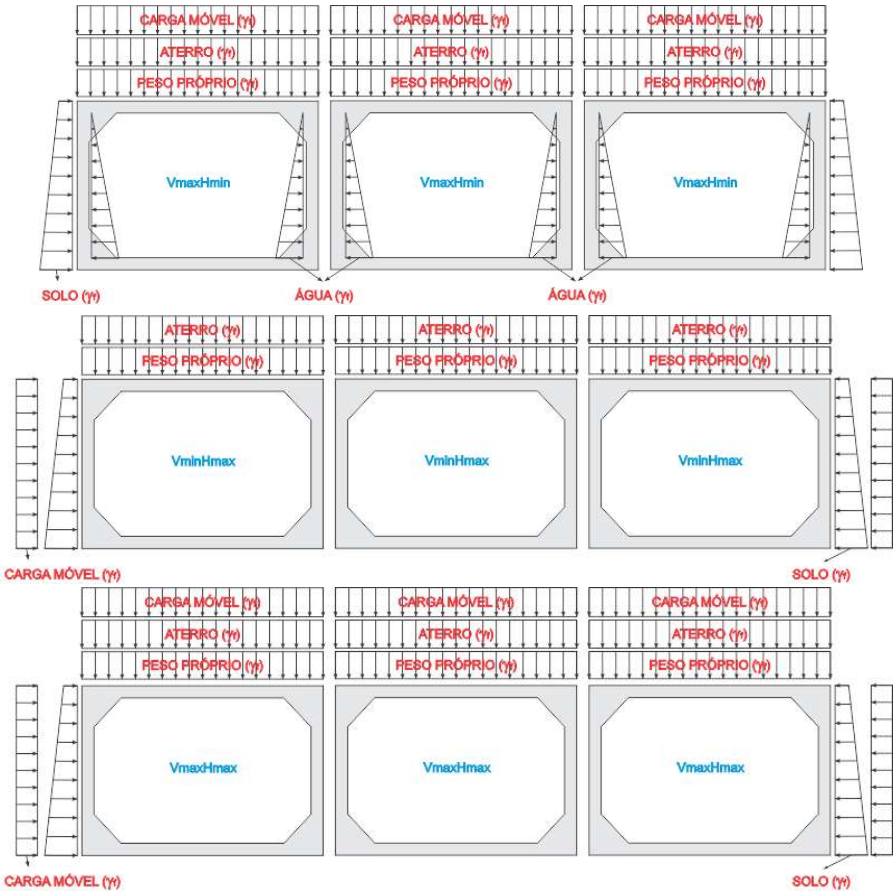
PARÂMETROS DA ARMADURA

```
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
```

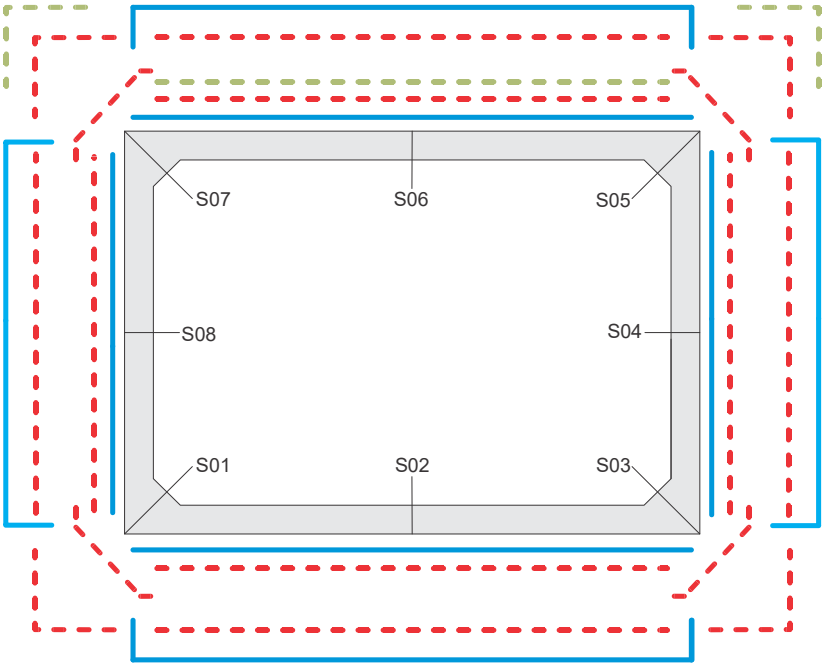


CRITÉRIOS E CONSTANTES

```
RESISTÊNCIA CARACTERÍSTICA DO CONCRETO..:  30.00 MPa
PESO ESPECÍFICO DO CONCRETO.............:  25.00 kN/m³
PESO ESPECÍFICO DO AÇO..................:  78.00 kN/m³
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



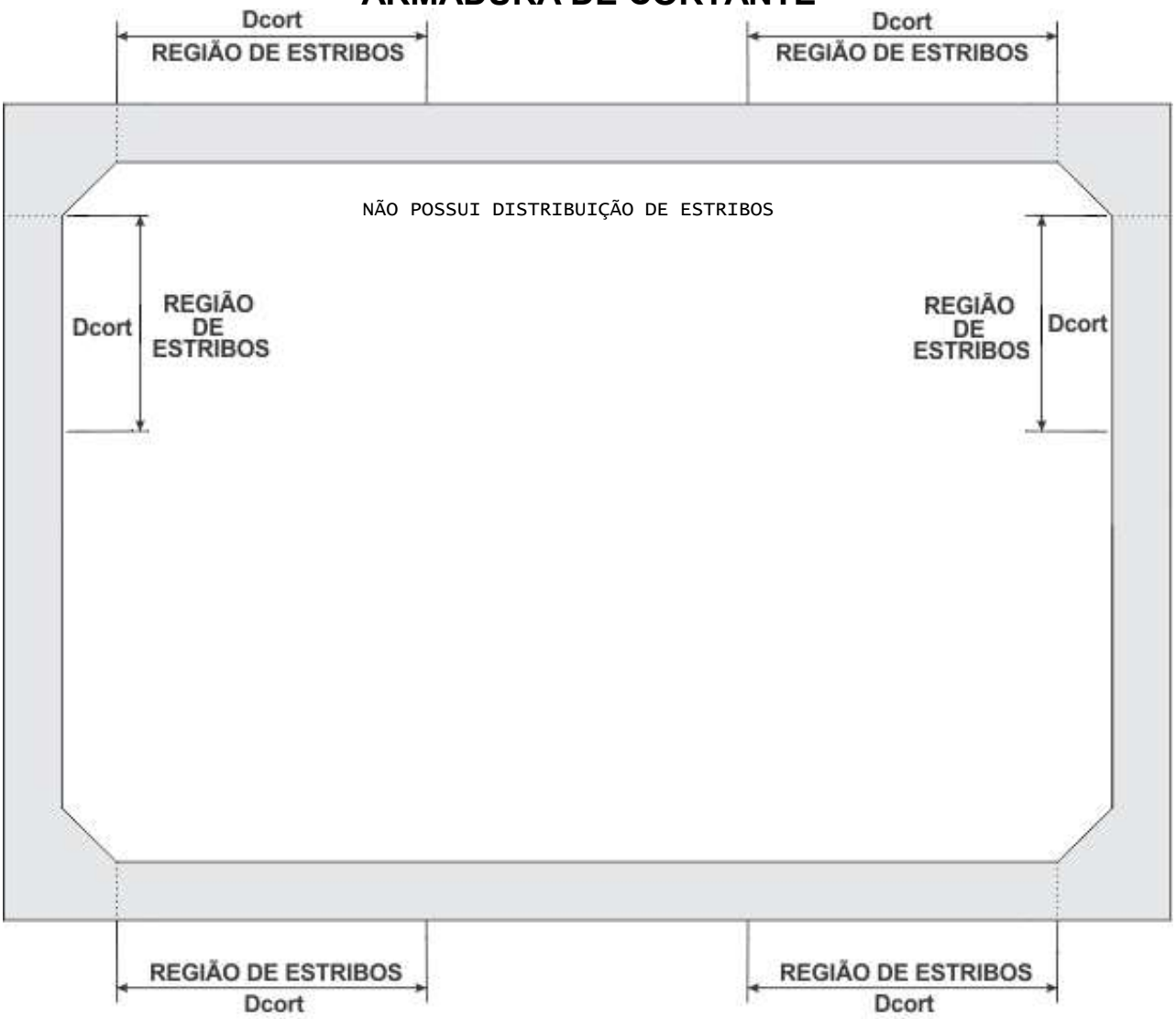
TELA SOLDADA (CA60) ARMADURA BÁSICA
BARRAS DE AÇO (CA50) ARMADURA COMPLEMENTAR
BARRAS DE AÇO (CA50) ARMADURA DE FADIGA

OBS.: VALORES POR METRO DE ADUELA.

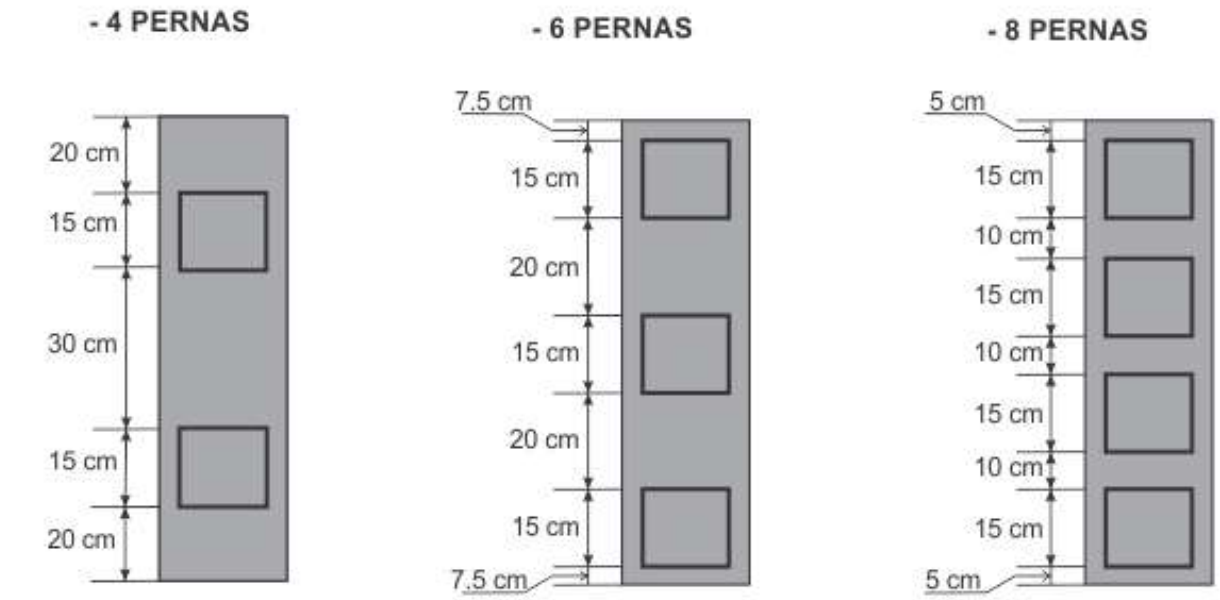
	TELA	ARMADURA COMPLEMENTAR	ARMADURA DE FADIGA
LADO EXTERNO	T-S02: L283 T-S04: L283 T-S06: L283 T-S08: L283	B-S01: 4 Ø6.30 c/ 31 cm (13.53%) B-S02: 4 Ø6.30 c/ 31 cm (74.65%) B-S03: 4 Ø6.30 c/ 31 cm (13.53%) B-S04: 4 Ø6.30 c/ 31 cm (74.65%) B-S05: 4 Ø6.30 c/ 31 cm (13.53%) B-S06: 4 Ø6.30 c/ 31 cm (74.65%) B-S07: 4 Ø6.30 c/ 31 cm (13.53%) B-S08: 4 Ø6.30 c/ 31 cm (74.65%)	B-S05: 0.00 cm² de área acima B-S07: 0.00 cm² de área acima
LADO INTERNO	T-S02: L283 T-S04: L283 T-S06: L283 T-S08: L283	B-S01: 4 Ø6.30 c/ 31 cm (0.00%) B-S02: 7 Ø8.00 c/ 15 cm (1.31%) B-S03: 4 Ø6.30 c/ 31 cm (0.00%) B-S04: 4 Ø6.30 c/ 31 cm (74.65%) B-S05: 4 Ø6.30 c/ 31 cm (0.00%) B-S06: 5 Ø8.00 c/ 23 cm (4.68%) B-S07: 4 Ø6.30 c/ 31 cm (0.00%) B-S08: 4 Ø6.30 c/ 31 cm (74.65%)	B-S06: 0.00 cm² de área acima

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

ARMADURA DE CORTANTE



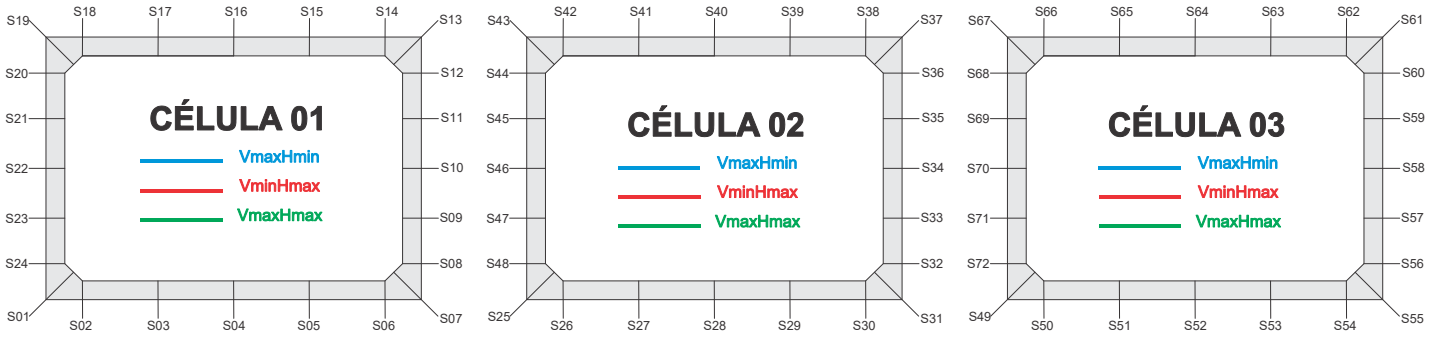
DISTRIBUIÇÃO (POR METRO LONGITUDINAL) DOS ESTRIBOS AO LONGO DE UMA FIADA:

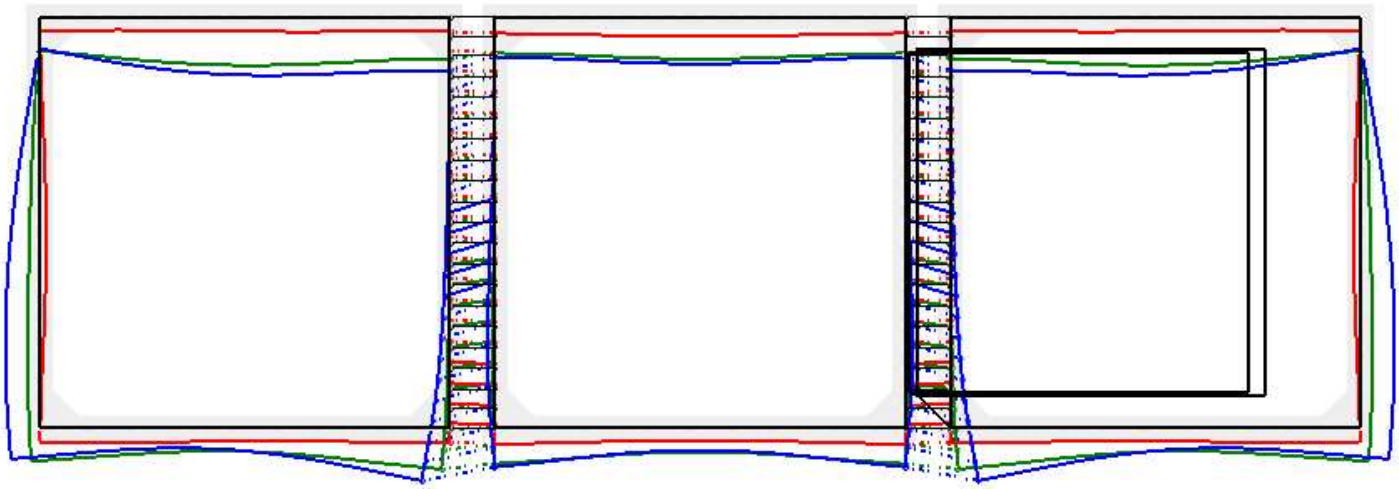


OBSERVAÇÃO:
Quando houver necessidade de armadura transversal, esta deve necessariamente ser colocada na laje de cobertura e na laje de fundo nas regiões apontadas na figura esquemática acima (REGIÃO DE ESTRIBOS). É RECOMENDADO ainda a colocação de armadura transversal nas partes superiores das paredes, 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





```
#####################################################
#            SOLICITAÇÕES NORMAIS (ELU)             #
#                      VmaxHmin                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -3.29E-003|            -3.59E-003|
|     2|            -3.29E-003|            -3.22E-003|
|     3|            -3.29E-003|            -2.48E-003|
|     4|            -3.29E-003|            -2.43E-003|
|     5|            -3.29E-003|            -3.43E-003|
|     6|            -3.29E-003|            -5.22E-003|
|     7|            -3.29E-003|            -6.09E-003|
|     8|            -2.45E-003|            -6.09E-003|
|     9|            -1.17E-003|            -6.11E-003|
|    10|            -5.73E-004|            -6.13E-003|
|    11|            -2.59E-004|            -6.14E-003|
|    12|            -5.75E-005|            -6.16E-003|
|    13|            -3.19E-005|            -6.16E-003|
|    14|            -3.21E-005|            -6.19E-003|
|    15|            -3.27E-005|            -6.57E-003|
|    16|            -3.32E-005|            -6.72E-003|
|    17|            -3.38E-005|            -6.01E-003|
|    18|            -3.44E-005|            -4.47E-003|
|    19|            -3.46E-005|            -3.65E-003|
|    20|            -8.54E-004|            -3.64E-003|
|    21|            -2.41E-003|            -3.63E-003|
|    22|            -3.49E-003|            -3.62E-003|
|    23|            -3.94E-003|            -3.61E-003|
|    24|            -3.64E-003|            -3.60E-003|
|    25|             2.04E-006|            -4.54E-003|
|    26|             1.80E-006|            -4.07E-003|
|    27|             9.00E-007|            -3.03E-003|
|    28|             1.26E-010|            -2.58E-003|
|    29|            -9.00E-007|            -3.03E-003|
|    30|            -1.80E-006|            -4.07E-003|
|    31|            -2.04E-006|            -4.54E-003|
|    32|             4.33E-004|            -4.54E-003|
|    33|             8.33E-004|            -4.56E-003|
|    34|             6.07E-004|            -4.57E-003|
|    35|             2.64E-004|            -4.59E-003|
|    36|             7.24E-005|            -4.60E-003|
|    37|             3.13E-006|            -4.60E-003|
|    38|             2.76E-006|            -4.71E-003|
|    39|             1.38E-006|            -5.16E-003|
|    40|             1.79E-010|            -5.42E-003|
|    41|            -1.38E-006|            -5.16E-003|
|    42|            -2.76E-006|            -4.71E-003|
|    43|            -3.13E-006|            -4.60E-003|
|    44|            -7.24E-005|            -4.60E-003|
|    45|            -2.64E-004|            -4.59E-003|
|    46|            -6.07E-004|            -4.57E-003|
|    47|            -8.33E-004|            -4.56E-003|
|    48|            -4.33E-004|            -4.54E-003|
|    49|             3.29E-003|            -6.09E-003|
```

50	3.29E-003	-5.22E-003
51	3.29E-003	-3.43E-003
52	3.29E-003	-2.43E-003
53	3.29E-003	-2.48E-003
54	3.29E-003	-3.22E-003
55	3.29E-003	-3.59E-003
56	3.64E-003	-3.60E-003
57	3.94E-003	-3.61E-003
58	3.49E-003	-3.62E-003
59	2.41E-003	-3.63E-003
60	8.54E-004	-3.64E-003
61	3.46E-005	-3.65E-003
62	3.44E-005	-4.47E-003
63	3.38E-005	-6.01E-003
64	3.32E-005	-6.72E-003
65	3.27E-005	-6.57E-003
66	3.21E-005	-6.19E-003
67	3.19E-005	-6.16E-003
68	5.75E-005	-6.16E-003
69	2.59E-004	-6.14E-003
70	5.73E-004	-6.13E-003
71	1.17E-003	-6.11E-003
72	2.45E-003	-6.09E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	1.22E-003
2	1.28E-003
3	7.70E-004
4	-7.13E-004
5	-2.30E-003
6	-2.94E-003
7	-2.86E-003
8	-2.70E-003
9	-1.32E-003
10	-6.34E-004
11	-3.85E-004
12	-1.59E-004
13	-1.20E-005
14	1.85E-004
15	6.55E-004
16	-3.46E-004
17	-1.82E-003
18	-2.75E-003
19	-2.75E-003
20	-2.70E-003
21	-2.06E-003
22	-1.21E-003
23	-1.45E-004
24	1.09E-003
25	1.52E-003
26	1.62E-003
27	1.31E-003
28	-1.55E-011
29	-1.31E-003

30	-1.62E-003
31	-1.52E-003
32	-1.35E-003
33	1.15E-005
34	5.27E-004
35	4.48E-004
36	1.91E-004
37	2.81E-004
38	4.28E-004
39	7.16E-004
40	-1.94E-011
41	-7.16E-004
42	-4.28E-004
43	-2.81E-004
44	-1.91E-004
45	-4.48E-004
46	-5.27E-004
47	-1.15E-005
48	1.35E-003
49	2.86E-003
50	2.94E-003
51	2.30E-003
52	7.13E-004
53	-7.70E-004
54	-1.28E-003
55	-1.22E-003
56	-1.09E-003
57	1.45E-004
58	1.21E-003
59	2.06E-003
60	2.70E-003
61	2.75E-003
62	2.75E-003
63	1.82E-003
64	3.46E-004
65	-6.55E-004
66	-1.85E-004
67	1.20E-005
68	1.59E-004
69	3.85E-004
70	6.34E-004
71	1.32E-003
72	2.70E-003

```
#####################################################
#            SOLICITAÇÕES NORMAIS (ELU)             #
#                     VminHmax                      #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|             5.99E-005|            -1.61E-003|
|     2|             5.70E-005|            -1.70E-003|
|     3|             4.63E-005|            -1.65E-003|
|     4|             3.56E-005|            -1.52E-003|
|     5|             2.50E-005|            -1.56E-003|
|     6|             1.43E-005|            -1.67E-003|
|     7|             1.14E-005|            -1.67E-003|
|     8|            -9.20E-006|            -1.67E-003|
|     9|            -6.52E-005|            -1.67E-003|
|    10|            -8.52E-005|            -1.68E-003|
|    11|            -6.96E-005|            -1.68E-003|
|    12|            -1.53E-005|            -1.69E-003|
|    13|             1.58E-005|            -1.69E-003|
|    14|             1.79E-005|            -1.67E-003|
|    15|             2.55E-005|            -1.69E-003|
|    16|             3.32E-005|            -1.67E-003|
|    17|             4.09E-005|            -1.54E-003|
|    18|             4.86E-005|            -1.53E-003|
|    19|             5.07E-005|            -1.64E-003|
|    20|             1.77E-004|            -1.63E-003|
|    21|             5.81E-004|            -1.63E-003|
|    22|             8.04E-004|            -1.62E-003|
|    23|             5.98E-004|            -1.61E-003|
|    24|             1.85E-004|            -1.61E-003|
|    25|             2.41E-005|            -1.85E-003|
|    26|             2.12E-005|            -1.79E-003|
|    27|             1.06E-005|            -1.55E-003|
|    28|             5.94E-012|            -1.42E-003|
|    29|            -1.06E-005|            -1.55E-003|
|    30|            -2.12E-005|            -1.79E-003|
|    31|            -2.41E-005|            -1.85E-003|
|    32|             1.59E-005|            -1.85E-003|
|    33|             6.07E-005|            -1.86E-003|
|    34|             8.12E-005|            -1.86E-003|
|    35|             6.93E-005|            -1.87E-003|
|    36|             2.00E-005|            -1.88E-003|
|    37|            -1.76E-005|            -1.88E-003|
|    38|            -1.55E-005|            -1.93E-003|
|    39|            -7.75E-006|            -2.12E-003|
|    40|             2.56E-011|            -2.23E-003|
|    41|             7.75E-006|            -2.12E-003|
|    42|             1.55E-005|            -1.93E-003|
|    43|             1.76E-005|            -1.88E-003|
|    44|            -2.00E-005|            -1.88E-003|
|    45|            -6.93E-005|            -1.87E-003|
|    46|            -8.12E-005|            -1.86E-003|
|    47|            -6.07E-005|            -1.86E-003|
|    48|            -1.59E-005|            -1.85E-003|
|    49|            -1.14E-005|            -1.67E-003|
```

50	-1.43E-005	-1.67E-003
51	-2.50E-005	-1.56E-003
52	-3.56E-005	-1.52E-003
53	-4.63E-005	-1.65E-003
54	-5.70E-005	-1.70E-003
55	-5.99E-005	-1.61E-003
56	-1.85E-004	-1.61E-003
57	-5.98E-004	-1.61E-003
58	-8.04E-004	-1.62E-003
59	-5.81E-004	-1.63E-003
60	-1.77E-004	-1.63E-003
61	-5.07E-005	-1.64E-003
62	-4.86E-005	-1.53E-003
63	-4.09E-005	-1.54E-003
64	-3.32E-005	-1.67E-003
65	-2.55E-005	-1.69E-003
66	-1.79E-005	-1.67E-003
67	-1.58E-005	-1.69E-003
68	1.53E-005	-1.69E-003
69	6.96E-005	-1.68E-003
70	8.52E-005	-1.68E-003
71	6.52E-005	-1.67E-003
72	9.20E-006	-1.67E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	-3.68E-004
2	-2.46E-004
3	2.46E-004
4	8.41E-005
5	-1.84E-004
6	-2.94E-005
7	4.29E-005
8	9.12E-005
9	5.92E-005
10	2.82E-006
11	-5.03E-005
12	-1.13E-004
13	-8.95E-005
14	-4.31E-005
15	4.14E-005
16	-1.38E-004
17	-1.89E-004
18	2.80E-004
19	3.81E-004
20	4.71E-004
21	6.02E-004
22	2.06E-005
23	-6.00E-004
24	-4.76E-004
25	1.62E-004
26	2.39E-004
27	3.72E-004
28	-6.19E-012
29	-3.72E-004

30	-2.39E-004
31	-1.62E-004
32	-1.06E-004
33	-5.14E-005
34	-9.12E-006
35	4.85E-005
36	1.08E-004
37	1.45E-004
38	2.01E-004
39	2.96E-004
40	-7.53E-012
41	-2.96E-004
42	-2.01E-004
43	-1.45E-004
44	-1.08E-004
45	-4.85E-005
46	9.12E-006
47	5.14E-005
48	1.06E-004
49	-4.29E-005
50	2.94E-005
51	1.84E-004
52	-8.41E-005
53	-2.46E-004
54	2.46E-004
55	3.68E-004
56	4.76E-004
57	6.00E-004
58	-2.06E-005
59	-6.02E-004
60	-4.71E-004
61	-3.81E-004
62	-2.80E-004
63	1.89E-004
64	1.38E-004
65	-4.14E-005
66	4.31E-005
67	8.95E-005
68	1.13E-004
69	5.03E-005
70	-2.82E-006
71	-5.92E-005
72	-9.12E-005

```
#####################################################
#            SOLICITAÇÕES NORMAIS (ELU)             #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -9.47E-004|            -3.83E-003|
|     2|            -9.49E-004|            -3.56E-003|
|     3|            -9.56E-004|            -2.89E-003|
|     4|            -9.64E-004|            -2.70E-003|
|     5|            -9.71E-004|            -3.29E-003|
|     6|            -9.78E-004|            -4.34E-003|
|     7|            -9.80E-004|            -4.76E-003|
|     8|            -5.95E-004|            -4.77E-003|
|     9|            -1.85E-004|            -4.78E-003|
|    10|            -1.07E-004|            -4.80E-003|
|    11|            -2.34E-005|            -4.82E-003|
|    12|             1.23E-005|            -4.83E-003|
|    13|            -1.23E-005|            -4.83E-003|
|    14|            -1.10E-005|            -4.90E-003|
|    15|            -6.13E-006|            -5.34E-003|
|    16|            -1.28E-006|            -5.59E-003|
|    17|             3.57E-006|            -5.18E-003|
|    18|             8.43E-006|            -4.30E-003|
|    19|             9.73E-006|            -3.89E-003|
|    20|            -3.70E-004|            -3.89E-003|
|    21|            -9.08E-004|            -3.88E-003|
|    22|            -1.19E-003|            -3.87E-003|
|    23|            -1.34E-003|            -3.85E-003|
|    24|            -1.18E-003|            -3.84E-003|
|    25|             1.74E-005|            -4.14E-003|
|    26|             1.53E-005|            -3.87E-003|
|    27|             7.65E-006|            -3.13E-003|
|    28|             4.76E-011|            -2.78E-003|
|    29|            -7.65E-006|            -3.13E-003|
|    30|            -1.53E-005|            -3.87E-003|
|    31|            -1.74E-005|            -4.14E-003|
|    32|             2.10E-004|            -4.14E-003|
|    33|             2.99E-004|            -4.16E-003|
|    34|             1.12E-004|            -4.17E-003|
|    35|             2.03E-005|            -4.19E-003|
|    36|             2.03E-006|            -4.20E-003|
|    37|            -1.04E-005|            -4.20E-003|
|    38|            -9.20E-006|            -4.25E-003|
|    39|            -4.60E-006|            -4.62E-003|
|    40|             9.46E-011|            -4.85E-003|
|    41|             4.60E-006|            -4.62E-003|
|    42|             9.20E-006|            -4.25E-003|
|    43|             1.04E-005|            -4.20E-003|
|    44|            -2.03E-006|            -4.20E-003|
|    45|            -2.03E-005|            -4.19E-003|
|    46|            -1.12E-004|            -4.17E-003|
|    47|            -2.99E-004|            -4.16E-003|
|    48|            -2.10E-004|            -4.14E-003|
|    49|             9.80E-004|            -4.76E-003|
```

50	9.78E-004	-4.34E-003
51	9.71E-004	-3.29E-003
52	9.64E-004	-2.70E-003
53	9.56E-004	-2.89E-003
54	9.49E-004	-3.56E-003
55	9.47E-004	-3.83E-003
56	1.18E-003	-3.84E-003
57	1.34E-003	-3.85E-003
58	1.19E-003	-3.87E-003
59	9.08E-004	-3.88E-003
60	3.70E-004	-3.89E-003
61	-9.73E-006	-3.89E-003
62	-8.42E-006	-4.30E-003
63	-3.57E-006	-5.18E-003
64	1.28E-006	-5.59E-003
65	6.13E-006	-5.34E-003
66	1.10E-005	-4.90E-003
67	1.23E-005	-4.83E-003
68	-1.23E-005	-4.83E-003
69	2.34E-005	-4.82E-003
70	1.07E-004	-4.80E-003
71	1.85E-004	-4.78E-003
72	5.95E-004	-4.77E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	8.54E-004
2	9.67E-004
3	8.31E-004
4	-3.04E-004
5	-1.44E-003
6	-1.50E-003
7	-1.36E-003
8	-1.18E-003
9	-2.56E-004
10	-9.56E-005
11	-1.06E-004
12	2.40E-005
13	1.44E-004
14	3.20E-004
15	7.36E-004
16	-7.99E-005
17	-1.12E-003
18	-1.39E-003
19	-1.31E-003
20	-1.20E-003
21	-5.58E-004
22	-3.37E-004
23	-8.89E-005
24	7.09E-004
25	8.33E-004
26	9.73E-004
27	1.02E-003
28	-1.44E-011
29	-1.02E-003

30	-9.73E-004
31	-8.33E-004
32	-6.59E-004
33	2.03E-004
34	2.51E-004
35	7.88E-005
36	-2.44E-006
37	9.43E-005
38	2.51E-004
39	6.27E-004
40	-1.78E-011
41	-6.27E-004
42	-2.51E-004
43	-9.43E-005
44	2.44E-006
45	-7.88E-005
46	-2.51E-004
47	-2.03E-004
48	6.59E-004
49	1.36E-003
50	1.50E-003
51	1.44E-003
52	3.04E-004
53	-8.31E-004
54	-9.67E-004
55	-8.54E-004
56	-7.09E-004
57	8.89E-005
58	3.37E-004
59	5.58E-004
60	1.20E-003
61	1.31E-003
62	1.39E-003
63	1.12E-003
64	7.99E-005
65	-7.36E-004
66	-3.20E-004
67	-1.44E-004
68	-2.40E-005
69	1.06E-004
70	9.56E-005
71	2.56E-004
72	1.18E-003

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                     VmaxHmin                      #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -3.37E-003|            -3.73E-003|
|     2|            -3.37E-003|            -3.30E-003|
|     3|            -3.37E-003|            -2.44E-003|
|     4|            -3.37E-003|            -2.33E-003|
|     5|            -3.37E-003|            -3.36E-003|
|     6|            -3.37E-003|            -5.33E-003|
|     7|            -3.37E-003|            -6.33E-003|
|     8|            -2.41E-003|            -6.34E-003|
|     9|            -1.15E-003|            -6.37E-003|
|    10|            -8.64E-004|            -6.41E-003|
|    11|            -6.98E-004|            -6.44E-003|
|    12|            -5.32E-004|            -6.47E-003|
|    13|            -5.17E-004|            -6.48E-003|
|    14|            -5.17E-004|            -6.52E-003|
|    15|            -5.18E-004|            -6.91E-003|
|    16|            -5.18E-004|            -7.00E-003|
|    17|            -5.18E-004|            -6.22E-003|
|    18|            -5.19E-004|            -4.62E-003|
|    19|            -5.19E-004|            -3.79E-003|
|    20|            -1.35E-003|            -3.78E-003|
|    21|            -2.88E-003|            -3.77E-003|
|    22|            -3.88E-003|            -3.76E-003|
|    23|            -4.21E-003|            -3.75E-003|
|    24|            -3.78E-003|            -3.73E-003|
|    25|             1.73E-006|            -4.64E-003|
|    26|             1.52E-006|            -4.11E-003|
|    27|             7.62E-007|            -2.98E-003|
|    28|            -8.12E-010|            -2.49E-003|
|    29|            -7.63E-007|            -2.99E-003|
|    30|            -1.53E-006|            -4.20E-003|
|    31|            -1.73E-006|            -4.79E-003|
|    32|             5.48E-004|            -4.80E-003|
|    33|             8.66E-004|            -4.83E-003|
|    34|             2.72E-004|            -4.86E-003|
|    35|            -2.43E-004|            -4.89E-003|
|    36|            -4.37E-004|            -4.91E-003|
|    37|            -4.80E-004|            -4.92E-003|
|    38|            -4.80E-004|            -5.01E-003|
|    39|            -4.81E-004|            -5.41E-003|
|    40|            -4.82E-004|            -5.60E-003|
|    41|            -4.84E-004|            -5.28E-003|
|    42|            -4.85E-004|            -4.80E-003|
|    43|            -4.85E-004|            -4.70E-003|
|    44|            -5.49E-004|            -4.70E-003|
|    45|            -6.96E-004|            -4.68E-003|
|    46|            -9.04E-004|            -4.67E-003|
|    47|            -1.01E-003|            -4.66E-003|
|    48|            -4.88E-004|            -4.64E-003|
|    49|             3.39E-003|            -6.32E-003|
```

50	3.39E-003	-5.36E-003
51	3.39E-003	-3.42E-003
52	3.39E-003	-2.33E-003
53	3.39E-003	-2.38E-003
54	3.39E-003	-3.28E-003
55	3.39E-003	-3.78E-003
56	3.86E-003	-3.79E-003
57	4.26E-003	-3.81E-003
58	3.67E-003	-3.83E-003
59	2.32E-003	-3.85E-003
60	4.81E-004	-3.88E-003
61	-4.47E-004	-3.88E-003
62	-4.47E-004	-4.81E-003
63	-4.47E-004	-6.47E-003
64	-4.48E-004	-7.16E-003
65	-4.48E-004	-6.92E-003
66	-4.49E-004	-6.45E-003
67	-4.49E-004	-6.40E-003
68	-4.53E-004	-6.39E-003
69	-2.41E-004	-6.38E-003
70	2.33E-004	-6.36E-003
71	1.00E-003	-6.34E-003
72	2.47E-003	-6.32E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	1.42E-003
2	1.48E-003
3	9.07E-004
4	-6.81E-004
5	-2.44E-003
6	-3.36E-003
7	-3.31E-003
8	-3.06E-003
9	-9.68E-004
10	-1.57E-004
11	-2.97E-004
12	-1.60E-004
13	7.58E-005
14	2.56E-004
15	6.00E-004
16	-4.62E-004
17	-1.93E-003
18	-2.79E-003
19	-2.78E-003
20	-2.72E-003
21	-1.98E-003
22	-1.06E-003
23	5.00E-005
24	1.29E-003
25	1.70E-003
26	1.79E-003
27	1.42E-003
28	6.38E-006
29	-1.46E-003

30	-2.02E-003
31	-1.94E-003
32	-1.67E-003
33	4.78E-004
34	1.07E-003
35	5.37E-004
36	7.88E-005
37	2.32E-004
38	3.72E-004
39	6.15E-004
40	-1.06E-004
41	-7.86E-004
42	-4.21E-004
43	-2.63E-004
44	-1.73E-004
45	-2.79E-004
46	-3.65E-004
47	1.84E-004
48	1.53E-003
49	3.14E-003
50	3.22E-003
51	2.50E-003
52	7.92E-004
53	-8.76E-004
54	-1.68E-003
55	-1.65E-003
56	-1.48E-003
57	2.05E-004
58	1.56E-003
59	2.52E-003
60	3.07E-003
61	3.11E-003
62	3.07E-003
63	1.88E-003
64	2.53E-004
65	-8.08E-004
66	-2.97E-004
67	-9.05E-005
68	6.52E-005
69	5.55E-004
70	8.69E-004
71	1.61E-003
72	2.98E-003

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                     VminHmax                      #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|             5.48E-005|            -1.60E-003|
|     2|             5.20E-005|            -1.70E-003|
|     3|             4.13E-005|            -1.65E-003|
|     4|             3.06E-005|            -1.52E-003|
|     5|             1.99E-005|            -1.56E-003|
|     6|             9.23E-006|            -1.67E-003|
|     7|             6.36E-006|            -1.68E-003|
|     8|            -1.82E-005|            -1.68E-003|
|     9|            -9.66E-005|            -1.69E-003|
|    10|            -1.24E-004|            -1.70E-003|
|    11|            -1.03E-004|            -1.71E-003|
|    12|            -3.17E-005|            -1.72E-003|
|    13|             8.98E-006|            -1.72E-003|
|    14|             1.11E-005|            -1.70E-003|
|    15|             1.87E-005|            -1.71E-003|
|    16|             2.64E-005|            -1.68E-003|
|    17|             3.41E-005|            -1.55E-003|
|    18|             4.18E-005|            -1.53E-003|
|    19|             4.39E-005|            -1.63E-003|
|    20|             1.69E-004|            -1.63E-003|
|    21|             5.72E-004|            -1.63E-003|
|    22|             7.96E-004|            -1.62E-003|
|    23|             5.91E-004|            -1.61E-003|
|    24|             1.79E-004|            -1.61E-003|
|    25|             2.41E-005|            -1.87E-003|
|    26|             2.12E-005|            -1.80E-003|
|    27|             1.06E-005|            -1.55E-003|
|    28|            -1.34E-010|            -1.40E-003|
|    29|            -1.06E-005|            -1.54E-003|
|    30|            -2.12E-005|            -1.80E-003|
|    31|            -2.41E-005|            -1.88E-003|
|    32|             2.42E-005|            -1.88E-003|
|    33|             6.80E-005|            -1.89E-003|
|    34|             9.01E-005|            -1.90E-003|
|    35|             7.68E-005|            -1.92E-003|
|    36|             2.07E-005|            -1.93E-003|
|    37|            -2.39E-005|            -1.93E-003|
|    38|            -2.19E-005|            -1.99E-003|
|    39|            -1.41E-005|            -2.20E-003|
|    40|            -6.35E-006|            -2.30E-003|
|    41|             1.41E-006|            -2.18E-003|
|    42|             9.16E-006|            -1.96E-003|
|    43|             1.12E-005|            -1.90E-003|
|    44|            -3.67E-005|            -1.90E-003|
|    45|            -1.03E-004|            -1.89E-003|
|    46|            -1.19E-004|            -1.89E-003|
|    47|            -9.02E-005|            -1.88E-003|
|    48|            -2.57E-005|            -1.88E-003|
|    49|            -6.63E-006|            -1.65E-003|
```

50	-9.50E-006	-1.66E-003
51	-2.02E-005	-1.56E-003
52	-3.09E-005	-1.53E-003
53	-4.16E-005	-1.66E-003
54	-5.23E-005	-1.69E-003
55	-5.51E-005	-1.57E-003
56	-2.19E-004	-1.57E-003
57	-9.09E-004	-1.59E-003
58	-1.28E-003	-1.60E-003
59	-8.83E-004	-1.62E-003
60	-2.20E-004	-1.63E-003
61	-5.65E-005	-1.63E-003
62	-5.44E-005	-1.51E-003
63	-4.67E-005	-1.49E-003
64	-3.91E-005	-1.61E-003
65	-3.14E-005	-1.66E-003
66	-2.37E-005	-1.65E-003
67	-2.16E-005	-1.68E-003
68	1.57E-005	-1.68E-003
69	7.71E-005	-1.67E-003
70	9.50E-005	-1.67E-003
71	7.44E-005	-1.66E-003
72	1.67E-005	-1.66E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	-3.66E-004
2	-2.44E-004
3	2.46E-004
4	8.25E-005
5	-1.89E-004
6	-4.06E-005
7	3.11E-005
8	1.26E-004
9	8.18E-005
10	3.95E-006
11	-6.58E-005
12	-1.54E-004
13	-1.08E-004
14	-6.11E-005
15	2.72E-005
16	-1.48E-004
17	-1.96E-004
18	2.77E-004
19	3.78E-004
20	4.69E-004
21	6.01E-004
22	2.20E-005
23	-5.98E-004
24	-4.74E-004
25	1.95E-004
26	2.70E-004
27	3.93E-004
28	6.07E-006
29	-3.88E-004

30	-2.87E-004
31	-2.15E-004
32	-1.12E-004
33	-5.31E-005
34	-1.09E-005
35	5.58E-005
36	1.21E-004
37	1.83E-004
38	2.36E-004
39	3.01E-004
40	-1.73E-005
41	-3.27E-004
42	-2.35E-004
43	-1.79E-004
44	-1.43E-004
45	-6.39E-005
46	1.27E-005
47	7.35E-005
48	1.40E-004
49	-5.30E-005
50	1.75E-005
51	1.65E-004
52	-9.46E-005
53	-2.29E-004
54	3.13E-004
55	4.41E-004
56	6.71E-004
57	1.06E-003
58	-3.43E-005
59	-1.05E-003
60	-6.51E-004
61	-4.57E-004
62	-3.50E-004
63	1.71E-004
64	1.53E-004
65	-1.23E-005
66	6.68E-005
67	1.11E-004
68	1.31E-004
69	5.77E-005
70	-2.20E-006
71	-6.13E-005
72	-9.87E-005

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                     VmaxHmax                      #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -1.16E-003|            -3.87E-003|
|     2|            -1.16E-003|            -3.57E-003|
|     3|            -1.17E-003|            -2.85E-003|
|     4|            -1.17E-003|            -2.63E-003|
|     5|            -1.18E-003|            -3.27E-003|
|     6|            -1.19E-003|            -4.46E-003|
|     7|            -1.19E-003|            -5.00E-003|
|     8|            -7.12E-004|            -5.00E-003|
|     9|            -3.33E-004|            -5.04E-003|
|    10|            -3.80E-004|            -5.07E-003|
|    11|            -3.29E-004|            -5.10E-003|
|    12|            -2.67E-004|            -5.12E-003|
|    13|            -2.79E-004|            -5.13E-003|
|    14|            -2.78E-004|            -5.20E-003|
|    15|            -2.73E-004|            -5.61E-003|
|    16|            -2.68E-004|            -5.79E-003|
|    17|            -2.63E-004|            -5.31E-003|
|    18|            -2.58E-004|            -4.35E-003|
|    19|            -2.57E-004|            -3.93E-003|
|    20|            -6.59E-004|            -3.92E-003|
|    21|            -1.23E-003|            -3.91E-003|
|    22|            -1.50E-003|            -3.90E-003|
|    23|            -1.62E-003|            -3.88E-003|
|    24|            -1.42E-003|            -3.87E-003|
|    25|             1.74E-005|            -4.22E-003|
|    26|             1.53E-005|            -3.91E-003|
|    27|             7.66E-006|            -3.09E-003|
|    28|            -5.01E-010|            -2.71E-003|
|    29|            -7.66E-006|            -3.10E-003|
|    30|            -1.53E-005|            -3.97E-003|
|    31|            -1.74E-005|            -4.33E-003|
|    32|             2.86E-004|            -4.34E-003|
|    33|             2.87E-004|            -4.37E-003|
|    34|            -8.72E-005|            -4.40E-003|
|    35|            -2.60E-004|            -4.42E-003|
|    36|            -2.75E-004|            -4.45E-003|
|    37|            -2.75E-004|            -4.46E-003|
|    38|            -2.73E-004|            -4.50E-003|
|    39|            -2.69E-004|            -4.85E-003|
|    40|            -2.64E-004|            -5.04E-003|
|    41|            -2.60E-004|            -4.76E-003|
|    42|            -2.55E-004|            -4.35E-003|
|    43|            -2.54E-004|            -4.28E-003|
|    44|            -2.83E-004|            -4.28E-003|
|    45|            -3.26E-004|            -4.27E-003|
|    46|            -3.85E-004|            -4.25E-003|
|    47|            -4.63E-004|            -4.24E-003|
|    48|            -2.56E-004|            -4.22E-003|
|    49|             1.20E-003|            -4.98E-003|
```

50	1.20E-003	-4.48E-003
51	1.19E-003	-3.30E-003
52	1.19E-003	-2.64E-003
53	1.18E-003	-2.82E-003
54	1.17E-003	-3.54E-003
55	1.17E-003	-3.86E-003
56	1.44E-003	-3.87E-003
57	1.46E-003	-3.89E-003
58	1.10E-003	-3.92E-003
59	7.64E-004	-3.94E-003
60	1.84E-004	-3.97E-003
61	-2.72E-004	-3.97E-003
62	-2.71E-004	-4.46E-003
63	-2.66E-004	-5.46E-003
64	-2.61E-004	-5.89E-003
65	-2.56E-004	-5.61E-003
66	-2.51E-004	-5.13E-003
67	-2.50E-004	-5.05E-003
68	-2.91E-004	-5.04E-003
69	-2.57E-004	-5.03E-003
70	-9.19E-005	-5.01E-003
71	1.56E-004	-5.00E-003
72	7.46E-004	-4.98E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	9.38E-004
2	1.05E-003
3	8.93E-004
4	-3.08E-004
5	-1.57E-003
6	-1.84E-003
7	-1.73E-003
8	-1.43E-003
9	-6.40E-005
10	3.79E-005
11	-1.07E-004
12	-5.39E-005
13	1.50E-004
14	3.16E-004
15	6.57E-004
16	-1.97E-004
17	-1.24E-003
18	-1.48E-003
19	-1.39E-003
20	-1.27E-003
21	-5.75E-004
22	-3.08E-004
23	-2.70E-005
24	7.92E-004
25	9.84E-004
26	1.12E-003
27	1.10E-003
28	-1.04E-006
29	-1.14E-003

30	-1.26E-003
31	-1.14E-003
32	-8.37E-004
33	4.92E-004
34	4.74E-004
35	1.35E-004
36	-7.39E-005
37	9.61E-005
38	2.47E-004
39	5.78E-004
40	-7.37E-005
41	-7.04E-004
42	-3.09E-004
43	-1.50E-004
44	-5.67E-005
45	-7.87E-005
46	-1.36E-004
47	-6.95E-006
48	8.16E-004
49	1.60E-003
50	1.73E-003
51	1.59E-003
52	3.75E-004
53	-8.53E-004
54	-1.12E-003
55	-1.02E-003
56	-7.67E-004
57	4.47E-004
58	5.43E-004
59	5.69E-004
60	1.42E-003
61	1.60E-003
62	1.66E-003
63	1.22E-003
64	6.62E-005
65	-8.01E-004
66	-3.78E-004
67	-1.98E-004
68	-7.68E-005
69	1.65E-004
70	2.98E-004
71	5.49E-004
72	1.43E-003

```
#####################################################
#             VERIFICAÇÃO DA FADIGA (ELS)           #
#                      VmaxHmin                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -7.02E-004|            -2.60E-003|
|     2|            -7.03E-004|            -2.40E-003|
|     3|            -7.07E-004|            -1.93E-003|
|     4|            -7.12E-004|            -1.80E-003|
|     5|            -7.16E-004|            -2.23E-003|
|     6|            -7.21E-004|            -2.97E-003|
|     7|            -7.22E-004|            -3.27E-003|
|     8|            -4.41E-004|            -3.28E-003|
|     9|            -1.34E-004|            -3.29E-003|
|    10|            -7.64E-005|            -3.30E-003|
|    11|            -1.60E-005|            -3.31E-003|
|    12|             7.51E-006|            -3.32E-003|
|    13|            -1.08E-005|            -3.32E-003|
|    14|            -1.02E-005|            -3.37E-003|
|    15|            -7.95E-006|            -3.66E-003|
|    16|            -5.67E-006|            -3.83E-003|
|    17|            -3.39E-006|            -3.55E-003|
|    18|            -1.11E-006|            -2.93E-003|
|    19|            -4.91E-007|            -2.64E-003|
|    20|            -2.83E-004|            -2.63E-003|
|    21|            -7.10E-004|            -2.63E-003|
|    22|            -9.34E-004|            -2.62E-003|
|    23|            -1.03E-003|            -2.61E-003|
|    24|            -8.80E-004|            -2.60E-003|
|    25|             1.05E-005|            -2.81E-003|
|    26|             9.21E-006|            -2.62E-003|
|    27|             4.61E-006|            -2.11E-003|
|    28|             3.41E-011|            -1.87E-003|
|    29|            -4.61E-006|            -2.11E-003|
|    30|            -9.21E-006|            -2.62E-003|
|    31|            -1.05E-005|            -2.81E-003|
|    32|             1.52E-004|            -2.81E-003|
|    33|             2.19E-004|            -2.82E-003|
|    34|             8.08E-005|            -2.83E-003|
|    35|             1.37E-005|            -2.84E-003|
|    36|             1.85E-006|            -2.85E-003|
|    37|            -4.75E-006|            -2.85E-003|
|    38|            -4.19E-006|            -2.88E-003|
|    39|            -2.10E-006|            -3.12E-003|
|    40|             6.61E-011|            -3.26E-003|
|    41|             2.10E-006|            -3.12E-003|
|    42|             4.19E-006|            -2.88E-003|
|    43|             4.75E-006|            -2.85E-003|
|    44|            -1.85E-006|            -2.85E-003|
|    45|            -1.37E-005|            -2.84E-003|
|    46|            -8.08E-005|            -2.83E-003|
|    47|            -2.19E-004|            -2.82E-003|
|    48|            -1.52E-004|            -2.81E-003|
|    49|             7.22E-004|            -3.27E-003|
```

50	7.21E-004	-2.97E-003
51	7.16E-004	-2.23E-003
52	7.12E-004	-1.80E-003
53	7.07E-004	-1.93E-003
54	7.03E-004	-2.40E-003
55	7.02E-004	-2.60E-003
56	8.80E-004	-2.60E-003
57	1.03E-003	-2.61E-003
58	9.34E-004	-2.62E-003
59	7.10E-004	-2.63E-003
60	2.83E-004	-2.63E-003
61	4.91E-007	-2.64E-003
62	1.11E-006	-2.93E-003
63	3.39E-006	-3.55E-003
64	5.67E-006	-3.83E-003
65	7.95E-006	-3.66E-003
66	1.02E-005	-3.37E-003
67	1.08E-005	-3.32E-003
68	-7.51E-006	-3.32E-003
69	1.60E-005	-3.31E-003
70	7.64E-005	-3.30E-003
71	1.34E-004	-3.29E-003
72	4.41E-004	-3.28E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	6.32E-004
2	7.02E-004
3	5.64E-004
4	-2.26E-004
5	-1.01E-003
6	-1.08E-003
7	-9.87E-004
8	-8.68E-004
9	-1.92E-004
10	-6.86E-005
11	-7.60E-005
12	2.21E-005
13	1.03E-004
14	2.18E-004
15	4.93E-004
16	-5.22E-005
17	-7.69E-004
18	-1.01E-003
19	-9.68E-004
20	-9.02E-004
21	-4.65E-004
22	-2.45E-004
23	-9.64E-006
24	5.39E-004
25	5.92E-004
26	6.84E-004
27	6.95E-004
28	-9.76E-012
29	-6.95E-004

30	-6.84E-004
31	-5.92E-004
32	-4.76E-004
33	1.50E-004
34	1.86E-004
35	5.54E-005
36	-6.37E-006
37	5.61E-005
38	1.57E-004
39	4.02E-004
40	-1.21E-011
41	-4.02E-004
42	-1.57E-004
43	-5.61E-005
44	6.37E-006
45	-5.54E-005
46	-1.86E-004
47	-1.50E-004
48	4.76E-004
49	9.87E-004
50	1.08E-003
51	1.01E-003
52	2.26E-004
53	-5.64E-004
54	-7.02E-004
55	-6.32E-004
56	-5.39E-004
57	9.64E-006
58	2.45E-004
59	4.65E-004
60	9.02E-004
61	9.68E-004
62	1.01E-003
63	7.69E-004
64	5.22E-005
65	-4.93E-004
66	-2.18E-004
67	-1.03E-004
68	-2.21E-005
69	7.60E-005
70	6.86E-005
71	1.92E-004
72	8.68E-004

```
#####################################################
#             VERIFICAÇÃO DA FADIGA (ELS)           #
#                      VminHmax                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -8.81E-006|            -1.75E-003|
|     2|            -1.08E-005|            -1.74E-003|
|     3|            -1.84E-005|            -1.57E-003|
|     4|            -2.59E-005|            -1.45E-003|
|     5|            -3.35E-005|            -1.56E-003|
|     6|            -4.10E-005|            -1.77E-003|
|     7|            -4.30E-005|            -1.82E-003|
|     8|            -1.89E-005|            -1.82E-003|
|     9|            -2.85E-005|            -1.83E-003|
|    10|            -2.90E-005|            -1.83E-003|
|    11|            -1.88E-005|            -1.84E-003|
|    12|             1.20E-006|            -1.84E-003|
|    13|             6.43E-006|            -1.84E-003|
|    14|             7.80E-006|            -1.85E-003|
|    15|             1.29E-005|            -1.96E-003|
|    16|             1.79E-005|            -2.02E-003|
|    17|             2.30E-005|            -1.91E-003|
|    18|             2.81E-005|            -1.78E-003|
|    19|             2.95E-005|            -1.78E-003|
|    20|             4.79E-005|            -1.78E-003|
|    21|             2.08E-004|            -1.77E-003|
|    22|             3.11E-004|            -1.76E-003|
|    23|             1.91E-004|            -1.76E-003|
|    24|             7.86E-006|            -1.75E-003|
|    25|             1.71E-005|            -1.84E-003|
|    26|             1.51E-005|            -1.79E-003|
|    27|             7.53E-006|            -1.55E-003|
|    28|             9.16E-012|            -1.42E-003|
|    29|            -7.53E-006|            -1.55E-003|
|    30|            -1.51E-005|            -1.79E-003|
|    31|            -1.71E-005|            -1.84E-003|
|    32|             1.84E-005|            -1.85E-003|
|    33|             2.51E-005|            -1.85E-003|
|    34|             2.50E-005|            -1.86E-003|
|    35|             1.85E-005|            -1.86E-003|
|    36|             3.98E-006|            -1.87E-003|
|    37|            -1.15E-005|            -1.87E-003|
|    38|            -1.02E-005|            -1.90E-003|
|    39|            -5.08E-006|            -2.06E-003|
|    40|             2.91E-011|            -2.16E-003|
|    41|             5.08E-006|            -2.06E-003|
|    42|             1.02E-005|            -1.90E-003|
|    43|             1.15E-005|            -1.87E-003|
|    44|            -3.98E-006|            -1.87E-003|
|    45|            -1.85E-005|            -1.86E-003|
|    46|            -2.50E-005|            -1.86E-003|
|    47|            -2.51E-005|            -1.85E-003|
|    48|            -1.84E-005|            -1.85E-003|
|    49|             4.30E-005|            -1.82E-003|
```

50	4.10E-005	-1.77E-003
51	3.35E-005	-1.56E-003
52	2.59E-005	-1.45E-003
53	1.84E-005	-1.57E-003
54	1.08E-005	-1.74E-003
55	8.81E-006	-1.75E-003
56	-7.86E-006	-1.75E-003
57	-1.91E-004	-1.76E-003
58	-3.11E-004	-1.76E-003
59	-2.08E-004	-1.77E-003
60	-4.79E-005	-1.78E-003
61	-2.95E-005	-1.78E-003
62	-2.81E-005	-1.78E-003
63	-2.30E-005	-1.91E-003
64	-1.79E-005	-2.02E-003
65	-1.29E-005	-1.96E-003
66	-7.80E-006	-1.85E-003
67	-6.43E-006	-1.84E-003
68	-1.20E-006	-1.84E-003
69	1.88E-005	-1.84E-003
70	2.90E-005	-1.83E-003
71	2.85E-005	-1.83E-003
72	1.89E-005	-1.82E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	-1.61E-005
2	7.41E-005
3	3.18E-004
4	1.10E-005
5	-3.30E-004
6	-1.88E-004
7	-1.13E-004
8	-4.36E-005
9	1.19E-005
10	-9.07E-006
11	-2.05E-005
12	-3.31E-005
13	1.59E-006
14	5.89E-005
15	1.87E-004
16	-4.77E-005
17	-2.54E-004
18	-3.88E-005
19	3.07E-005
20	1.00E-004
21	2.82E-004
22	-1.03E-005
23	-3.20E-004
24	-1.05E-004
25	1.52E-004
26	2.29E-004
27	3.68E-004
28	-6.28E-012
29	-3.68E-004

30	-2.29E-004
31	-1.52E-004
32	-8.03E-005
33	-1.07E-006
34	3.21E-006
35	1.86E-005
36	3.43E-005
37	7.19E-005
38	1.31E-004
39	2.62E-004
40	-7.73E-012
41	-2.62E-004
42	-1.31E-004
43	-7.19E-005
44	-3.43E-005
45	-1.86E-005
46	-3.21E-006
47	1.07E-006
48	8.03E-005
49	1.13E-004
50	1.88E-004
51	3.30E-004
52	-1.10E-005
53	-3.18E-004
54	-7.41E-005
55	1.61E-005
56	1.05E-004
57	3.20E-004
58	1.03E-005
59	-2.82E-004
60	-1.00E-004
61	-3.07E-005
62	3.88E-005
63	2.54E-004
64	4.77E-005
65	-1.87E-004
66	-5.89E-005
67	-1.59E-006
68	3.31E-005
69	2.05E-005
70	9.07E-006
71	-1.19E-005
72	4.36E-005

```
#######################################################
#              VERIFICAÇÃO DA FADIGA (ELS)            #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-------------------------------------------------------
| SEÇÃO|          DIREÇÃO X (m)|          DIREÇÃO Y (m)|
-------------------------------------------------------
|     1|             -5.98E-004|             -2.58E-003|
|     2|             -5.99E-004|             -2.41E-003|
|     3|             -6.04E-004|             -1.97E-003|
|     4|             -6.09E-004|             -1.83E-003|
|     5|             -6.15E-004|             -2.22E-003|
|     6|             -6.20E-004|             -2.90E-003|
|     7|             -6.21E-004|             -3.17E-003|
|     8|             -3.76E-004|             -3.17E-003|
|     9|             -1.18E-004|             -3.18E-003|
|    10|             -6.82E-005|             -3.19E-003|
|    11|             -1.53E-005|             -3.20E-003|
|    12|              7.86E-006|             -3.21E-003|
|    13|             -7.58E-006|             -3.22E-003|
|    14|             -6.71E-006|             -3.26E-003|
|    15|             -3.48E-006|             -3.54E-003|
|    16|             -2.48E-007|             -3.70E-003|
|    17|              2.98E-006|             -3.44E-003|
|    18|              6.21E-006|             -2.88E-003|
|    19|              7.08E-006|             -2.62E-003|
|    20|             -2.31E-004|             -2.62E-003|
|    21|             -5.64E-004|             -2.61E-003|
|    22|             -7.37E-004|             -2.60E-003|
|    23|             -8.41E-004|             -2.60E-003|
|    24|             -7.50E-004|             -2.59E-003|
|    25|              1.21E-005|             -2.78E-003|
|    26|              1.07E-005|             -2.60E-003|
|    27|              5.34E-006|             -2.12E-003|
|    28|              3.09E-011|             -1.88E-003|
|    29|             -5.34E-006|             -2.12E-003|
|    30|             -1.07E-005|             -2.60E-003|
|    31|             -1.21E-005|             -2.78E-003|
|    32|              1.34E-004|             -2.78E-003|
|    33|              1.89E-004|             -2.79E-003|
|    34|              7.18E-005|             -2.80E-003|
|    35|              1.34E-005|             -2.81E-003|
|    36|              1.40E-006|             -2.82E-003|
|    37|             -6.97E-006|             -2.82E-003|
|    38|             -6.14E-006|             -2.85E-003|
|    39|             -3.07E-006|             -3.09E-003|
|    40|              6.24E-011|             -3.24E-003|
|    41|              3.07E-006|             -3.09E-003|
|    42|              6.14E-006|             -2.85E-003|
|    43|              6.97E-006|             -2.82E-003|
|    44|             -1.40E-006|             -2.82E-003|
|    45|             -1.34E-005|             -2.81E-003|
|    46|             -7.18E-005|             -2.80E-003|
|    47|             -1.89E-004|             -2.79E-003|
|    48|             -1.34E-004|             -2.78E-003|
|    49|              6.21E-004|             -3.17E-003|
```

50	6.20E-004	-2.90E-003
51	6.15E-004	-2.22E-003
52	6.09E-004	-1.83E-003
53	6.04E-004	-1.97E-003
54	5.99E-004	-2.41E-003
55	5.98E-004	-2.58E-003
56	7.50E-004	-2.59E-003
57	8.41E-004	-2.60E-003
58	7.37E-004	-2.60E-003
59	5.64E-004	-2.61E-003
60	2.31E-004	-2.62E-003
61	-7.08E-006	-2.62E-003
62	-6.21E-006	-2.88E-003
63	-2.98E-006	-3.44E-003
64	2.49E-007	-3.70E-003
65	3.48E-006	-3.54E-003
66	6.71E-006	-3.26E-003
67	7.58E-006	-3.22E-003
68	-7.86E-006	-3.21E-003
69	1.53E-005	-3.20E-003
70	6.82E-005	-3.19E-003
71	1.18E-004	-3.18E-003
72	3.76E-004	-3.17E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	5.49E-004
2	6.27E-004
3	5.54E-004
4	-1.91E-004
5	-9.36E-004
6	-9.61E-004
7	-8.68E-004
8	-7.51E-004
9	-1.61E-004
10	-6.12E-005
11	-6.73E-005
12	1.42E-005
13	9.15E-005
14	2.04E-004
15	4.72E-004
16	-5.09E-005
17	-7.16E-004
18	-8.76E-004
19	-8.24E-004
20	-7.52E-004
21	-3.41E-004
22	-2.16E-004
23	-7.29E-005
24	4.51E-004
25	5.37E-004
26	6.32E-004
27	6.71E-004
28	-9.63E-012
29	-6.71E-004

30	-6.32E-004
31	-5.37E-004
32	-4.22E-004
33	1.29E-004
34	1.58E-004
35	5.05E-005
36	-5.00E-007
37	6.19E-005
38	1.63E-004
39	4.05E-004
40	-1.19E-011
41	-4.05E-004
42	-1.63E-004
43	-6.19E-005
44	5.00E-007
45	-5.05E-005
46	-1.58E-004
47	-1.29E-004
48	4.22E-004
49	8.68E-004
50	9.61E-004
51	9.36E-004
52	1.91E-004
53	-5.54E-004
54	-6.27E-004
55	-5.49E-004
56	-4.51E-004
57	7.29E-005
58	2.16E-004
59	3.41E-004
60	7.52E-004
61	8.24E-004
62	8.76E-004
63	7.16E-004
64	5.09E-005
65	-4.72E-004
66	-2.04E-004
67	-9.15E-005
68	-1.42E-005
69	6.73E-005
70	6.12E-005
71	1.61E-004
72	7.51E-004

```
#####################################################
#             VERIFICAÇÃO DA FADIGA (ELS)           #
#                      VminHmin                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -3.00E-004|            -1.83E-003|
|     2|            -3.01E-004|            -1.73E-003|
|     3|            -3.05E-004|            -1.45E-003|
|     4|            -3.10E-004|            -1.35E-003|
|     5|            -3.14E-004|            -1.58E-003|
|     6|            -3.18E-004|            -1.98E-003|
|     7|            -3.20E-004|            -2.13E-003|
|     8|            -1.88E-004|            -2.13E-003|
|     9|            -6.22E-005|            -2.14E-003|
|    10|            -3.56E-005|            -2.15E-003|
|    11|            -8.20E-006|            -2.15E-003|
|    12|             4.92E-006|            -2.16E-003|
|    13|            -3.29E-006|            -2.16E-003|
|    14|            -2.66E-006|            -2.18E-003|
|    15|            -3.41E-007|            -2.35E-003|
|    16|             1.98E-006|            -2.44E-003|
|    17|             4.30E-006|            -2.30E-003|
|    18|             6.62E-006|            -1.99E-003|
|    19|             7.25E-006|            -1.86E-003|
|    20|            -1.12E-004|            -1.86E-003|
|    21|            -2.57E-004|            -1.85E-003|
|    22|            -3.30E-004|            -1.85E-003|
|    23|            -4.05E-004|            -1.84E-003|
|    24|            -3.83E-004|            -1.84E-003|
|    25|             1.01E-005|            -1.93E-003|
|    26|             8.92E-006|            -1.83E-003|
|    27|             4.46E-006|            -1.53E-003|
|    28|             1.82E-011|            -1.37E-003|
|    29|            -4.46E-006|            -1.53E-003|
|    30|            -8.92E-006|            -1.83E-003|
|    31|            -1.01E-005|            -1.93E-003|
|    32|             7.20E-005|            -1.94E-003|
|    33|             9.56E-005|            -1.94E-003|
|    34|             3.73E-005|            -1.95E-003|
|    35|             7.25E-006|            -1.95E-003|
|    36|             6.35E-007|            -1.96E-003|
|    37|            -5.08E-006|            -1.96E-003|
|    38|            -4.48E-006|            -1.98E-003|
|    39|            -2.24E-006|            -2.13E-003|
|    40|             3.99E-011|            -2.22E-003|
|    41|             2.24E-006|            -2.13E-003|
|    42|             4.48E-006|            -1.98E-003|
|    43|             5.08E-006|            -1.96E-003|
|    44|            -6.35E-007|            -1.96E-003|
|    45|            -7.25E-006|            -1.95E-003|
|    46|            -3.73E-005|            -1.95E-003|
|    47|            -9.56E-005|            -1.94E-003|
|    48|            -7.20E-005|            -1.94E-003|
|    49|             3.20E-004|            -2.13E-003|
```

50	3.18E-004	-1.98E-003
51	3.14E-004	-1.58E-003
52	3.10E-004	-1.35E-003
53	3.05E-004	-1.45E-003
54	3.01E-004	-1.73E-003
55	3.00E-004	-1.83E-003
56	3.83E-004	-1.84E-003
57	4.05E-004	-1.84E-003
58	3.30E-004	-1.85E-003
59	2.57E-004	-1.85E-003
60	1.12E-004	-1.86E-003
61	-7.25E-006	-1.86E-003
62	-6.62E-006	-1.99E-003
63	-4.30E-006	-2.30E-003
64	-1.98E-006	-2.44E-003
65	3.41E-007	-2.35E-003
66	2.66E-006	-2.18E-003
67	3.29E-006	-2.16E-003
68	-4.92E-006	-2.16E-003
69	8.20E-006	-2.15E-003
70	3.56E-005	-2.15E-003
71	6.22E-005	-2.14E-003
72	1.88E-004	-2.13E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	3.09E-004
2	3.69E-004
3	3.74E-004
4	-9.56E-005
5	-5.67E-004
6	-5.41E-004
7	-4.74E-004
8	-3.94E-004
9	-7.91E-005
10	-3.38E-005
11	-3.48E-005
12	5.65E-006
13	5.09E-005
14	1.18E-004
15	2.77E-004
16	-2.72E-005
17	-4.02E-004
18	-4.55E-004
19	-4.18E-004
20	-3.70E-004
21	-1.30E-004
22	-1.15E-004
23	-9.14E-005
24	2.38E-004
25	3.08E-004
26	3.76E-004
27	4.35E-004
28	-6.69E-012
29	-4.35E-004

30	-3.76E-004
31	-3.08E-004
32	-2.29E-004
33	6.74E-005
34	7.82E-005
35	2.72E-005
36	1.78E-006
37	3.96E-005
38	1.01E-004
39	2.46E-004
40	-8.30E-012
41	-2.46E-004
42	-1.01E-004
43	-3.96E-005
44	-1.78E-006
45	-2.72E-005
46	-7.82E-005
47	-6.74E-005
48	2.29E-004
49	4.74E-004
50	5.41E-004
51	5.67E-004
52	9.56E-005
53	-3.74E-004
54	-3.69E-004
55	-3.09E-004
56	-2.38E-004
57	9.14E-005
58	1.15E-004
59	1.30E-004
60	3.70E-004
61	4.18E-004
62	4.55E-004
63	4.02E-004
64	2.72E-005
65	-2.77E-004
66	-1.18E-004
67	-5.09E-005
68	-5.65E-006
69	3.48E-005
70	3.38E-005
71	7.91E-005
72	3.94E-004

```
#####################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)         #
#                      VmaxHmin                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -5.51E-004|            -2.31E-003|
|     2|            -5.52E-004|            -2.15E-003|
|     3|            -5.57E-004|            -1.75E-003|
|     4|            -5.61E-004|            -1.63E-003|
|     5|            -5.65E-004|            -1.98E-003|
|     6|            -5.70E-004|            -2.60E-003|
|     7|            -5.71E-004|            -2.85E-003|
|     8|            -3.46E-004|            -2.85E-003|
|     9|            -1.07E-004|            -2.86E-003|
|    10|            -6.11E-005|            -2.87E-003|
|    11|            -1.31E-005|            -2.87E-003|
|    12|             6.54E-006|            -2.88E-003|
|    13|            -8.01E-006|            -2.88E-003|
|    14|            -7.40E-006|            -2.92E-003|
|    15|            -5.10E-006|            -3.17E-003|
|    16|            -2.80E-006|            -3.31E-003|
|    17|            -5.04E-007|            -3.08E-003|
|    18|             1.79E-006|            -2.58E-003|
|    19|             2.41E-006|            -2.34E-003|
|    20|            -2.19E-004|            -2.34E-003|
|    21|            -5.40E-004|            -2.34E-003|
|    22|            -7.08E-004|            -2.33E-003|
|    23|            -7.93E-004|            -2.32E-003|
|    24|            -6.93E-004|            -2.31E-003|
|    25|             1.03E-005|            -2.48E-003|
|    26|             9.10E-006|            -2.32E-003|
|    27|             4.55E-006|            -1.89E-003|
|    28|             2.81E-011|            -1.68E-003|
|    29|            -4.55E-006|            -1.89E-003|
|    30|            -9.10E-006|            -2.32E-003|
|    31|            -1.03E-005|            -2.48E-003|
|    32|             1.22E-004|            -2.48E-003|
|    33|             1.73E-004|            -2.49E-003|
|    34|             6.45E-005|            -2.50E-003|
|    35|             1.13E-005|            -2.51E-003|
|    36|             1.39E-006|            -2.52E-003|
|    37|            -4.88E-006|            -2.52E-003|
|    38|            -4.30E-006|            -2.54E-003|
|    39|            -2.15E-006|            -2.74E-003|
|    40|             5.63E-011|            -2.87E-003|
|    41|             2.15E-006|            -2.74E-003|
|    42|             4.30E-006|            -2.54E-003|
|    43|             4.88E-006|            -2.52E-003|
|    44|            -1.39E-006|            -2.52E-003|
|    45|            -1.13E-005|            -2.51E-003|
|    46|            -6.45E-005|            -2.50E-003|
|    47|            -1.73E-004|            -2.49E-003|
|    48|            -1.22E-004|            -2.48E-003|
|    49|             5.71E-004|            -2.85E-003|
```

50	5.70E-004	-2.60E-003
51	5.65E-004	-1.98E-003
52	5.61E-004	-1.63E-003
53	5.57E-004	-1.75E-003
54	5.52E-004	-2.15E-003
55	5.51E-004	-2.31E-003
56	6.93E-004	-2.31E-003
57	7.93E-004	-2.32E-003
58	7.08E-004	-2.33E-003
59	5.40E-004	-2.34E-003
60	2.19E-004	-2.34E-003
61	-2.41E-006	-2.34E-003
62	-1.79E-006	-2.58E-003
63	5.05E-007	-3.08E-003
64	2.80E-006	-3.31E-003
65	5.10E-006	-3.17E-003
66	7.40E-006	-2.92E-003
67	8.01E-006	-2.88E-003
68	-6.54E-006	-2.88E-003
69	1.31E-005	-2.87E-003
70	6.11E-005	-2.87E-003
71	1.07E-004	-2.86E-003
72	3.46E-004	-2.85E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	5.11E-004
2	5.77E-004
3	4.93E-004
4	-1.77E-004
5	-8.45E-004
6	-8.75E-004
7	-7.94E-004
8	-6.90E-004
9	-1.50E-004
10	-5.56E-005
11	-6.05E-005
12	1.59E-005
13	8.32E-005
14	1.80E-004
15	4.12E-004
16	-4.28E-005
17	-6.31E-004
18	-8.02E-004
19	-7.62E-004
20	-7.03E-004
21	-3.39E-004
22	-1.96E-004
23	-4.03E-005
24	4.26E-004
25	4.86E-004
26	5.68E-004
27	5.97E-004
28	-8.61E-012
29	-5.97E-004

30	-5.68E-004
31	-4.86E-004
32	-3.83E-004
33	1.19E-004
34	1.46E-004
35	4.48E-005
36	-3.32E-006
37	4.99E-005
38	1.36E-004
39	3.44E-004
40	-1.07E-011
41	-3.44E-004
42	-1.36E-004
43	-4.99E-005
44	3.32E-006
45	-4.48E-005
46	-1.46E-004
47	-1.19E-004
48	3.83E-004
49	7.94E-004
50	8.75E-004
51	8.45E-004
52	1.77E-004
53	-4.93E-004
54	-5.77E-004
55	-5.11E-004
56	-4.26E-004
57	4.03E-005
58	1.96E-004
59	3.39E-004
60	7.03E-004
61	7.62E-004
62	8.02E-004
63	6.31E-004
64	4.28E-005
65	-4.12E-004
66	-1.80E-004
67	-8.32E-005
68	-1.59E-005
69	6.05E-005
70	5.56E-005
71	1.50E-004
72	6.90E-004

```
#####################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)         #
#                      VminHmax                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -3.55E-005|            -1.77E-003|
|     2|            -3.74E-005|            -1.74E-003|
|     3|            -4.45E-005|            -1.55E-003|
|     4|            -5.16E-005|            -1.43E-003|
|     5|            -5.87E-005|            -1.57E-003|
|     6|            -6.58E-005|            -1.80E-003|
|     7|            -6.77E-005|            -1.86E-003|
|     8|            -3.13E-005|            -1.86E-003|
|     9|            -2.72E-005|            -1.86E-003|
|    10|            -2.32E-005|            -1.87E-003|
|    11|            -1.34E-005|            -1.88E-003|
|    12|             2.79E-006|            -1.88E-003|
|    13|             4.60E-006|            -1.88E-003|
|    14|             5.82E-006|            -1.89E-003|
|    15|             1.04E-005|            -2.02E-003|
|    16|             1.49E-005|            -2.08E-003|
|    17|             1.95E-005|            -1.97E-003|
|    18|             2.40E-005|            -1.81E-003|
|    19|             2.52E-005|            -1.79E-003|
|    20|             2.24E-005|            -1.79E-003|
|    21|             1.38E-004|            -1.79E-003|
|    22|             2.19E-004|            -1.78E-003|
|    23|             1.12E-004|            -1.77E-003|
|    24|            -3.49E-005|            -1.77E-003|
|    25|             1.61E-005|            -1.85E-003|
|    26|             1.42E-005|            -1.79E-003|
|    27|             7.11E-006|            -1.55E-003|
|    28|             9.84E-012|            -1.42E-003|
|    29|            -7.11E-006|            -1.55E-003|
|    30|            -1.42E-005|            -1.79E-003|
|    31|            -1.61E-005|            -1.85E-003|
|    32|             2.28E-005|            -1.85E-003|
|    33|             2.70E-005|            -1.86E-003|
|    34|             2.16E-005|            -1.86E-003|
|    35|             1.31E-005|            -1.87E-003|
|    36|             2.46E-006|            -1.88E-003|
|    37|            -1.03E-005|            -1.88E-003|
|    38|            -9.09E-006|            -1.90E-003|
|    39|            -4.55E-006|            -2.06E-003|
|    40|             3.00E-011|            -2.15E-003|
|    41|             4.55E-006|            -2.06E-003|
|    42|             9.09E-006|            -1.90E-003|
|    43|             1.03E-005|            -1.88E-003|
|    44|            -2.46E-006|            -1.88E-003|
|    45|            -1.31E-005|            -1.87E-003|
|    46|            -2.16E-005|            -1.86E-003|
|    47|            -2.70E-005|            -1.86E-003|
|    48|            -2.28E-005|            -1.85E-003|
|    49|             6.77E-005|            -1.86E-003|
```

50	6.58E-005	-1.80E-003
51	5.87E-005	-1.57E-003
52	5.16E-005	-1.43E-003
53	4.45E-005	-1.55E-003
54	3.74E-005	-1.74E-003
55	3.55E-005	-1.77E-003
56	3.49E-005	-1.77E-003
57	-1.12E-004	-1.77E-003
58	-2.19E-004	-1.78E-003
59	-1.38E-004	-1.79E-003
60	-2.24E-005	-1.79E-003
61	-2.52E-005	-1.79E-003
62	-2.40E-005	-1.81E-003
63	-1.95E-005	-1.97E-003
64	-1.49E-005	-2.08E-003
65	-1.04E-005	-2.02E-003
66	-5.82E-006	-1.89E-003
67	-4.60E-006	-1.88E-003
68	-2.79E-006	-1.88E-003
69	1.34E-005	-1.88E-003
70	2.32E-005	-1.87E-003
71	2.72E-005	-1.86E-003
72	3.13E-005	-1.86E-003

DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

SEÇÃO	ROTAÇÃO (rad)
1	3.61E-005
2	1.21E-004
3	3.26E-004
4	-4.55E-006
5	-3.61E-004
6	-2.30E-004
7	-1.54E-004
8	-8.31E-005
9	2.29E-007
10	-1.15E-005
11	-1.77E-005
12	-2.28E-005
13	1.38E-005
14	7.27E-005
15	2.07E-004
16	-3.93E-005
17	-2.73E-004
18	-1.03E-004
19	-3.85E-005
20	2.74E-005
21	2.24E-004
22	-1.54E-005
23	-2.76E-004
24	-4.91E-005
25	1.63E-004
26	2.40E-004
27	3.73E-004
28	-6.33E-012
29	-3.73E-004

30	-2.40E-004
31	-1.63E-004
32	-9.05E-005
33	7.43E-006
34	9.78E-006
35	1.72E-005
36	2.51E-005
37	6.29E-005
38	1.23E-004
39	2.57E-004
40	-7.79E-012
41	-2.57E-004
42	-1.23E-004
43	-6.29E-005
44	-2.51E-005
45	-1.72E-005
46	-9.78E-006
47	-7.43E-006
48	9.05E-005
49	1.54E-004
50	2.30E-004
51	3.61E-004
52	4.55E-006
53	-3.26E-004
54	-1.21E-004
55	-3.61E-005
56	4.91E-005
57	2.76E-004
58	1.54E-005
59	-2.24E-004
60	-2.74E-005
61	3.85E-005
62	1.03E-004
63	2.73E-004
64	3.93E-005
65	-2.07E-004
66	-7.27E-005
67	-1.38E-005
68	2.28E-005
69	1.77E-005
70	1.15E-005
71	-2.29E-007
72	8.31E-005

```
#####################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)         #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
 DESLOCAMENTOS NAS SEÇÕES DE INTERESSE NAS DIR. X E Y
-----------------------------------------------------
| SEÇÃO|         DIREÇÃO X (m)|         DIREÇÃO Y (m)|
-----------------------------------------------------
|     1|            -4.86E-004|            -2.30E-003|
|     2|            -4.87E-004|            -2.16E-003|
|     3|            -4.92E-004|            -1.78E-003|
|     4|            -4.97E-004|            -1.65E-003|
|     5|            -5.02E-004|            -1.98E-003|
|     6|            -5.07E-004|            -2.55E-003|
|     7|            -5.08E-004|            -2.78E-003|
|     8|            -3.05E-004|            -2.78E-003|
|     9|            -9.70E-005|            -2.79E-003|
|    10|            -5.60E-005|            -2.80E-003|
|    11|            -1.27E-005|            -2.81E-003|
|    12|             6.76E-006|            -2.82E-003|
|    13|            -5.97E-006|            -2.82E-003|
|    14|            -5.19E-006|            -2.85E-003|
|    15|            -2.30E-006|            -3.09E-003|
|    16|             5.87E-007|            -3.23E-003|
|    17|             3.48E-006|            -3.01E-003|
|    18|             6.36E-006|            -2.55E-003|
|    19|             7.14E-006|            -2.34E-003|
|    20|            -1.86E-004|            -2.34E-003|
|    21|            -4.49E-004|            -2.33E-003|
|    22|            -5.85E-004|            -2.32E-003|
|    23|            -6.78E-004|            -2.31E-003|
|    24|            -6.12E-004|            -2.31E-003|
|    25|             1.14E-005|            -2.46E-003|
|    26|             1.00E-005|            -2.31E-003|
|    27|             5.01E-006|            -1.90E-003|
|    28|             2.61E-011|            -1.69E-003|
|    29|            -5.01E-006|            -1.90E-003|
|    30|            -1.00E-005|            -2.31E-003|
|    31|            -1.14E-005|            -2.46E-003|
|    32|             1.11E-004|            -2.46E-003|
|    33|             1.54E-004|            -2.47E-003|
|    34|             5.89E-005|            -2.48E-003|
|    35|             1.11E-005|            -2.49E-003|
|    36|             1.11E-006|            -2.50E-003|
|    37|            -6.26E-006|            -2.50E-003|
|    38|            -5.52E-006|            -2.53E-003|
|    39|            -2.76E-006|            -2.73E-003|
|    40|             5.39E-011|            -2.85E-003|
|    41|             2.76E-006|            -2.73E-003|
|    42|             5.52E-006|            -2.53E-003|
|    43|             6.26E-006|            -2.50E-003|
|    44|            -1.11E-006|            -2.50E-003|
|    45|            -1.11E-005|            -2.49E-003|
|    46|            -5.89E-005|            -2.48E-003|
|    47|            -1.54E-004|            -2.47E-003|
|    48|            -1.11E-004|            -2.46E-003|
|    49|             5.08E-004|            -2.78E-003|
```

50	5.07E-004	-2.55E-003
51	5.02E-004	-1.98E-003
52	4.97E-004	-1.65E-003
53	4.92E-004	-1.78E-003
54	4.87E-004	-2.16E-003
55	4.86E-004	-2.30E-003
56	6.12E-004	-2.31E-003
57	6.78E-004	-2.31E-003
58	5.85E-004	-2.32E-003
59	4.49E-004	-2.33E-003
60	1.86E-004	-2.34E-003
61	-7.14E-006	-2.34E-003
62	-6.36E-006	-2.55E-003
63	-3.48E-006	-3.01E-003
64	-5.87E-007	-3.23E-003
65	2.30E-006	-3.09E-003
66	5.19E-006	-2.85E-003
67	5.97E-006	-2.82E-003
68	-6.76E-006	-2.82E-003
69	1.27E-005	-2.81E-003
70	5.60E-005	-2.80E-003
71	9.70E-005	-2.79E-003
72	3.05E-004	-2.78E-003

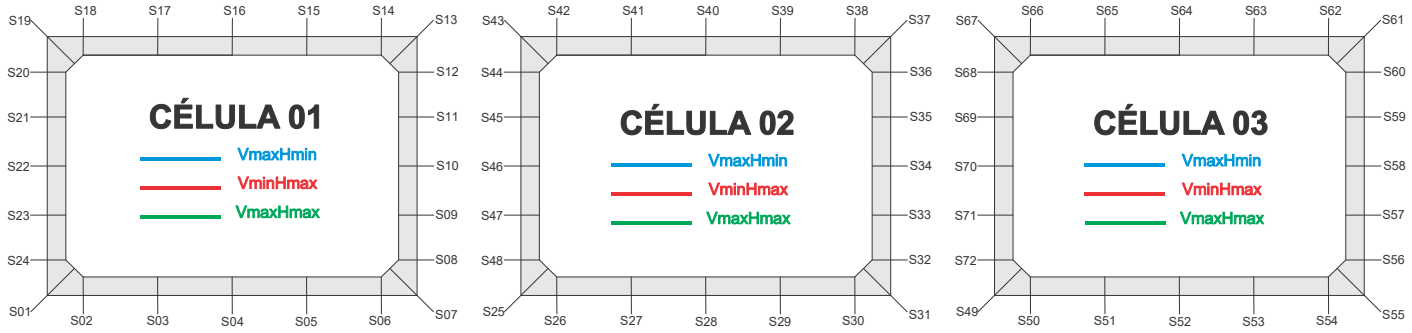
DESLOCAMENTOS NAS SEÇÕES DE INTERESSE (ROTAÇÃO)

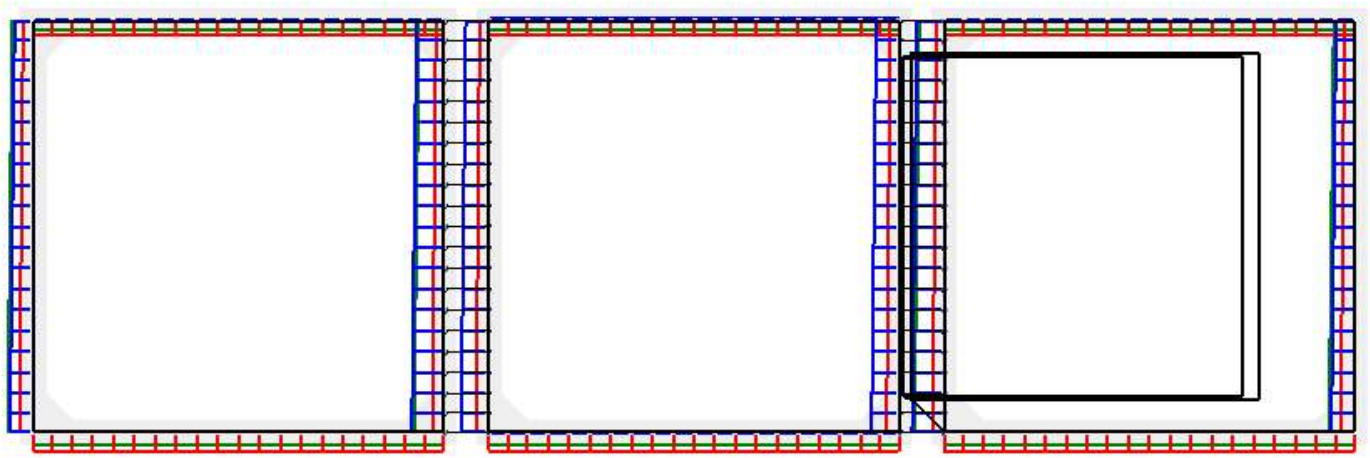
SEÇÃO	ROTAÇÃO (rad)
1	4.59E-004
2	5.30E-004
3	4.86E-004
4	-1.55E-004
5	-7.98E-004
6	-8.03E-004
7	-7.20E-004
8	-6.17E-004
9	-1.30E-004
10	-5.10E-005
11	-5.51E-005
12	1.10E-005
13	7.63E-005
14	1.72E-004
15	3.98E-004
16	-4.20E-005
17	-5.98E-004
18	-7.18E-004
19	-6.72E-004
20	-6.09E-004
21	-2.62E-004
22	-1.78E-004
23	-7.98E-005
24	3.71E-004
25	4.51E-004
26	5.36E-004
27	5.83E-004
28	-8.53E-012
29	-5.83E-004

30	-5.36E-004
31	-4.51E-004
32	-3.50E-004
33	1.06E-004
34	1.28E-004
35	4.18E-005
36	3.53E-007
37	5.35E-005
38	1.39E-004
39	3.45E-004
40	-1.06E-011
41	-3.45E-004
42	-1.39E-004
43	-5.35E-005
44	-3.53E-007
45	-4.18E-005
46	-1.28E-004
47	-1.06E-004
48	3.50E-004
49	7.20E-004
50	8.03E-004
51	7.98E-004
52	1.55E-004
53	-4.86E-004
54	-5.30E-004
55	-4.59E-004
56	-3.71E-004
57	7.98E-005
58	1.78E-004
59	2.62E-004
60	6.09E-004
61	6.72E-004
62	7.18E-004
63	5.98E-004
64	4.20E-005
65	-3.98E-004
66	-1.72E-004
67	-7.63E-005
68	-1.10E-005
69	5.51E-005
70	5.10E-005
71	1.30E-004
72	6.17E-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|                -104.20|                 -0.83|
|      2|                  -0.83|                 -0.83|
|      3|                  -0.83|                 -0.83|
|      4|                  -0.83|                 -0.83|
|      5|                  -0.83|                 -0.83|
|      6|                  -0.83|                 -0.83|
|      7|                  -0.83|               -142.70|
|      8|                -140.42|               -140.42|
|      9|                -136.20|               -136.20|
|     10|                -131.97|               -131.97|
|     11|                -127.75|               -127.75|
|     12|                -123.52|               -123.52|
|     13|                -121.25|                  4.67|
|     14|                   4.67|                  4.67|
|     15|                   4.67|                  4.67|
|     16|                   4.67|                  4.67|
|     17|                   4.67|                  4.67|
|     18|                   4.67|                  4.67|
|     19|                   4.67|                 -82.75|
|     20|                 -85.02|                 -85.02|
|     21|                 -89.25|                 -89.25|
|     22|                 -93.47|                 -93.47|
|     23|                 -97.70|                 -97.70|
|     24|                -101.92|               -101.92|
|     25|                -104.20|                  -7.22|
|     26|                  -7.22|                  -7.22|
|     27|                  -7.22|                  -7.22|
|     28|                  -7.22|                  -7.22|
|     29|                  -7.22|                  -7.22|
|     30|                  -7.22|                  -7.22|
|     31|                  -7.22|               -123.45|
|     32|                -121.17|               -121.17|
|     33|                -116.95|               -116.95|
|     34|                -112.72|               -112.72|
|     35|                -108.50|               -108.50|
|     36|                -104.27|               -104.27|
|     37|                -102.00|                 11.06|
|     38|                  11.06|                 11.06|
|     39|                  11.06|                 11.06|
|     40|                  11.06|                 11.06|
|     41|                  11.06|                 11.06|
|     42|                  11.06|                 11.06|
|     43|                  11.06|               -102.00|
|     44|                -104.27|               -104.27|
|     45|                -108.50|               -108.50|
|     46|                -112.72|               -112.72|
|     47|                -116.95|               -116.95|
|     48|                -121.17|               -121.17|
|     49|                -123.45|                 -0.83|
```

50	-0.83	-0.83
51	-0.83	-0.83
52	-0.83	-0.83
53	-0.83	-0.83
54	-0.83	-0.83
55	-0.83	-104.20
56	-101.92	-101.92
57	-97.70	-97.70
58	-93.47	-93.47
59	-89.25	-89.25
60	-85.02	-85.02
61	-82.75	4.67
62	4.67	4.67
63	4.67	4.67
64	4.67	4.67
65	4.67	4.67
66	4.67	4.67
67	4.67	-121.25
68	-123.52	-123.52
69	-127.75	-127.75
70	-131.97	-131.97
71	-136.20	-136.20
72	-140.42	-140.42

```
#######################################################
#             SOLICITAÇÕES NORMAIS (ELU)              #
#                      VminHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -61.70|                -85.73|
|      2|                 -85.73|                -85.73|
|      3|                 -85.73|                -85.73|
|      4|                 -85.73|                -85.73|
|      5|                 -85.73|                -85.73|
|      6|                 -85.73|                -85.73|
|      7|                 -85.73|                -51.16|
|      8|                 -49.41|                -49.41|
|      9|                 -46.16|                -46.16|
|     10|                 -42.91|                -42.91|
|     11|                 -39.66|                -39.66|
|     12|                 -36.41|                -36.41|
|     13|                 -34.66|                -61.68|
|     14|                 -61.68|                -61.68|
|     15|                 -61.68|                -61.68|
|     16|                 -61.68|                -61.68|
|     17|                 -61.68|                -61.68|
|     18|                 -61.68|                -61.68|
|     19|                 -61.68|                -45.20|
|     20|                 -46.95|                -46.95|
|     21|                 -50.20|                -50.20|
|     22|                 -53.45|                -53.45|
|     23|                 -56.70|                -56.70|
|     24|                 -59.95|                -59.95|
|     25|                 -61.70|                -85.23|
|     26|                 -85.23|                -85.23|
|     27|                 -85.23|                -85.23|
|     28|                 -85.23|                -85.23|
|     29|                 -85.23|                -85.23|
|     30|                 -85.23|                -85.23|
|     31|                 -85.23|                -56.43|
|     32|                 -54.68|                -54.68|
|     33|                 -51.43|                -51.43|
|     34|                 -48.18|                -48.18|
|     35|                 -44.93|                -44.93|
|     36|                 -41.68|                -41.68|
|     37|                 -39.93|                -62.18|
|     38|                 -62.18|                -62.18|
|     39|                 -62.18|                -62.18|
|     40|                 -62.18|                -62.18|
|     41|                 -62.18|                -62.18|
|     42|                 -62.18|                -62.18|
|     43|                 -62.18|                -39.93|
|     44|                 -41.68|                -41.68|
|     45|                 -44.93|                -44.93|
|     46|                 -48.18|                -48.18|
|     47|                 -51.43|                -51.43|
|     48|                 -54.68|                -54.68|
|     49|                 -56.43|                -85.73|
```

50	-85.73	-85.73
51	-85.73	-85.73
52	-85.73	-85.73
53	-85.73	-85.73
54	-85.73	-85.73
55	-85.73	-61.70
56	-59.95	-59.95
57	-56.70	-56.70
58	-53.45	-53.45
59	-50.20	-50.20
60	-46.95	-46.95
61	-45.20	-61.68
62	-61.68	-61.68
63	-61.68	-61.68
64	-61.68	-61.68
65	-61.68	-61.68
66	-61.68	-61.68
67	-61.68	-34.66
68	-36.41	-36.41
69	-39.66	-39.66
70	-42.91	-42.91
71	-46.16	-46.16
72	-49.41	-49.41

```
#######################################################
#             SOLICITAÇÕES NORMAIS (ELU)              #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                -114.08|                -59.34|
|      2|                 -59.34|                -59.34|
|      3|                 -59.34|                -59.34|
|      4|                 -59.34|                -59.34|
|      5|                 -59.34|                -59.34|
|      6|                 -59.34|                -59.34|
|      7|                 -59.34|               -132.81|
|      8|                -130.54|               -130.54|
|      9|                -126.31|               -126.31|
|     10|                -122.09|               -122.09|
|     11|                -117.86|               -117.86|
|     12|                -113.64|               -113.64|
|     13|                -111.36|                -38.93|
|     14|                 -38.93|                -38.93|
|     15|                 -38.93|                -38.93|
|     16|                 -38.93|                -38.93|
|     17|                 -38.93|                -38.93|
|     18|                 -38.93|                -38.93|
|     19|                 -38.93|                -92.63|
|     20|                 -94.91|                -94.91|
|     21|                 -99.13|                -99.13|
|     22|                -103.36|               -103.36|
|     23|                -107.58|               -107.58|
|     24|                -111.81|               -111.81|
|     25|                -114.08|                -61.36|
|     26|                 -61.36|                -61.36|
|     27|                 -61.36|                -61.36|
|     28|                 -61.36|                -61.36|
|     29|                 -61.36|                -61.36|
|     30|                 -61.36|                -61.36|
|     31|                 -61.36|               -123.45|
|     32|                -121.17|               -121.17|
|     33|                -116.95|               -116.95|
|     34|                -112.72|               -112.72|
|     35|                -108.50|               -108.50|
|     36|                -104.27|               -104.27|
|     37|                -102.00|                -36.91|
|     38|                 -36.91|                -36.91|
|     39|                 -36.91|                -36.91|
|     40|                 -36.91|                -36.91|
|     41|                 -36.91|                -36.91|
|     42|                 -36.91|                -36.91|
|     43|                 -36.91|               -102.00|
|     44|                -104.27|               -104.27|
|     45|                -108.50|               -108.50|
|     46|                -112.72|               -112.72|
|     47|                -116.95|               -116.95|
|     48|                -121.17|               -121.17|
|     49|                -123.45|                -59.34|
```

50	-59.34	-59.34
51	-59.34	-59.34
52	-59.34	-59.34
53	-59.34	-59.34
54	-59.34	-59.34
55	-59.34	-114.08
56	-111.81	-111.81
57	-107.58	-107.58
58	-103.36	-103.36
59	-99.13	-99.13
60	-94.91	-94.91
61	-92.63	-38.93
62	-38.93	-38.93
63	-38.93	-38.93
64	-38.93	-38.93
65	-38.93	-38.93
66	-38.93	-38.93
67	-38.93	-111.36
68	-113.64	-113.64
69	-117.86	-117.86
70	-122.09	-122.09
71	-126.31	-126.31
72	-130.54	-130.54

```
#######################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)             #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                -106.88|                  0.43|
|      2|                   0.43|                  0.43|
|      3|                   0.43|                  0.43|
|      4|                   0.43|                  0.43|
|      5|                   0.43|                  0.43|
|      6|                   0.43|                  0.43|
|      7|                   0.43|               -140.02|
|      8|                -137.75|               -137.75|
|      9|                -133.52|               -133.52|
|     10|                -129.30|               -129.30|
|     11|                -125.07|               -125.07|
|     12|                -120.85|               -120.85|
|     13|                -118.57|                  3.41|
|     14|                   3.41|                  3.41|
|     15|                   3.41|                  3.41|
|     16|                   3.41|                  3.41|
|     17|                   3.41|                  3.41|
|     18|                   3.41|                  3.41|
|     19|                   3.41|                 -85.43|
|     20|                 -87.70|                 -87.70|
|     21|                 -91.93|                 -91.93|
|     22|                 -96.15|                 -96.15|
|     23|                -100.38|               -100.38|
|     24|                -104.60|               -104.60|
|     25|                -106.88|                  -6.12|
|     26|                  -6.12|                  -6.12|
|     27|                  -6.12|                  -6.12|
|     28|                  -6.12|                  -6.12|
|     29|                  -6.12|                  -6.12|
|     30|                  -6.12|                  -6.12|
|     31|                  -6.12|               -121.77|
|     32|                -119.49|               -119.49|
|     33|                -115.27|               -115.27|
|     34|                -111.04|               -111.04|
|     35|                -106.82|               -106.82|
|     36|                -102.59|               -102.59|
|     37|                -100.32|                  9.96|
|     38|                   9.96|                  9.96|
|     39|                   9.96|                  9.96|
|     40|                   9.96|                  9.96|
|     41|                   9.96|                  9.96|
|     42|                   9.96|                  9.96|
|     43|                   9.96|               -103.68|
|     44|                -105.95|               -105.95|
|     45|                -110.18|               -110.18|
|     46|                -114.40|               -114.40|
|     47|                -118.63|               -118.63|
|     48|                -122.85|               -122.85|
|     49|                -125.13|                 -0.40|
```

50	-0.40	-0.40
51	-0.40	-0.40
52	-0.40	-0.40
53	-0.40	-0.40
54	-0.40	-0.40
55	-0.40	-100.11
56	-97.84	-97.84
57	-93.61	-93.61
58	-89.39	-89.39
59	-85.16	-85.16
60	-80.94	-80.94
61	-78.66	4.24
62	4.24	4.24
63	4.24	4.24
64	4.24	4.24
65	4.24	4.24
66	4.24	4.24
67	4.24	-125.33
68	-127.61	-127.61
69	-131.83	-131.83
70	-136.06	-136.06
71	-140.28	-140.28
72	-144.51	-144.51

```
#######################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)             #
#                     VminHmax                        #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -61.70|                -85.69|
|      2|                 -85.69|                -85.69|
|      3|                 -85.69|                -85.69|
|      4|                 -85.69|                -85.69|
|      5|                 -85.69|                -85.69|
|      6|                 -85.69|                -85.69|
|      7|                 -85.69|                -51.16|
|      8|                 -49.41|                -49.41|
|      9|                 -46.16|                -46.16|
|     10|                 -42.91|                -42.91|
|     11|                 -39.66|                -39.66|
|     12|                 -36.41|                -36.41|
|     13|                 -34.66|                -61.72|
|     14|                 -61.72|                -61.72|
|     15|                 -61.72|                -61.72|
|     16|                 -61.72|                -61.72|
|     17|                 -61.72|                -61.72|
|     18|                 -61.72|                -61.72|
|     19|                 -61.72|                -45.20|
|     20|                 -46.95|                -46.95|
|     21|                 -50.20|                -50.20|
|     22|                 -53.45|                -53.45|
|     23|                 -56.70|                -56.70|
|     24|                 -59.95|                -59.95|
|     25|                 -61.70|                -85.20|
|     26|                 -85.20|                -85.20|
|     27|                 -85.20|                -85.20|
|     28|                 -85.20|                -85.20|
|     29|                 -85.20|                -85.20|
|     30|                 -85.20|                -85.20|
|     31|                 -85.20|                -56.07|
|     32|                 -54.32|                -54.32|
|     33|                 -51.07|                -51.07|
|     34|                 -47.82|                -47.82|
|     35|                 -44.57|                -44.57|
|     36|                 -41.32|                -41.32|
|     37|                 -39.57|                -62.21|
|     38|                 -62.21|                -62.21|
|     39|                 -62.21|                -62.21|
|     40|                 -62.21|                -62.21|
|     41|                 -62.21|                -62.21|
|     42|                 -62.21|                -62.21|
|     43|                 -62.21|                -40.29|
|     44|                 -42.04|                -42.04|
|     45|                 -45.29|                -45.29|
|     46|                 -48.54|                -48.54|
|     47|                 -51.79|                -51.79|
|     48|                 -55.04|                -55.04|
|     49|                 -56.79|                -85.74|
```

50	-85.74	-85.74
51	-85.74	-85.74
52	-85.74	-85.74
53	-85.74	-85.74
54	-85.74	-85.74
55	-85.74	-62.49
56	-60.74	-60.74
57	-57.49	-57.49
58	-54.24	-54.24
59	-50.99	-50.99
60	-47.74	-47.74
61	-45.99	-61.67
62	-61.67	-61.67
63	-61.67	-61.67
64	-61.67	-61.67
65	-61.67	-61.67
66	-61.67	-61.67
67	-61.67	-33.87
68	-35.62	-35.62
69	-38.87	-38.87
70	-42.12	-42.12
71	-45.37	-45.37
72	-48.62	-48.62

```
#######################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)             #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                -115.58|                -58.85|
|      2|                 -58.85|                -58.85|
|      3|                 -58.85|                -58.85|
|      4|                 -58.85|                -58.85|
|      5|                 -58.85|                -58.85|
|      6|                 -58.85|                -58.85|
|      7|                 -58.85|               -131.32|
|      8|                -129.04|               -129.04|
|      9|                -124.82|               -124.82|
|     10|                -120.59|               -120.59|
|     11|                -116.37|               -116.37|
|     12|                -112.14|               -112.14|
|     13|                -109.87|                -39.43|
|     14|                 -39.43|                -39.43|
|     15|                 -39.43|                -39.43|
|     16|                 -39.43|                -39.43|
|     17|                 -39.43|                -39.43|
|     18|                 -39.43|                -39.43|
|     19|                 -39.43|                -94.13|
|     20|                 -96.40|                -96.40|
|     21|                -100.63|               -100.63|
|     22|                -104.85|               -104.85|
|     23|                -109.08|               -109.08|
|     24|                -113.30|               -113.30|
|     25|                -115.58|                -61.46|
|     26|                 -61.46|                -61.46|
|     27|                 -61.46|                -61.46|
|     28|                 -61.46|                -61.46|
|     29|                 -61.46|                -61.46|
|     30|                 -61.46|                -61.46|
|     31|                 -61.46|               -122.58|
|     32|                -120.30|               -120.30|
|     33|                -116.08|               -116.08|
|     34|                -111.85|               -111.85|
|     35|                -107.63|               -107.63|
|     36|                -103.40|               -103.40|
|     37|                -101.13|                -36.81|
|     38|                 -36.81|                -36.81|
|     39|                 -36.81|                -36.81|
|     40|                 -36.81|                -36.81|
|     41|                 -36.81|                -36.81|
|     42|                 -36.81|                -36.81|
|     43|                 -36.81|               -102.87|
|     44|                -105.14|               -105.14|
|     45|                -109.37|               -109.37|
|     46|                -113.59|               -113.59|
|     47|                -117.82|               -117.82|
|     48|                -122.04|               -122.04|
|     49|                -124.32|                -59.69|
```

50	-59.69	-59.69
51	-59.69	-59.69
52	-59.69	-59.69
53	-59.69	-59.69
54	-59.69	-59.69
55	-59.69	-111.67
56	-109.40	-109.40
57	-105.17	-105.17
58	-100.95	-100.95
59	-96.72	-96.72
60	-92.50	-92.50
61	-90.22	-38.58
62	-38.58	-38.58
63	-38.58	-38.58
64	-38.58	-38.58
65	-38.58	-38.58
66	-38.58	-38.58
67	-38.58	-113.77
68	-116.05	-116.05
69	-120.27	-120.27
70	-124.50	-124.50
71	-128.72	-128.72
72	-132.95	-132.95

```
#######################################################
#              VERIFICAÇÃO DA FADIGA (ELS)            #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -75.22|                -35.45|
|      2|                 -35.45|                -35.45|
|      3|                 -35.45|                -35.45|
|      4|                 -35.45|                -35.45|
|      5|                 -35.45|                -35.45|
|      6|                 -35.45|                -35.45|
|      7|                 -35.45|                -89.38|
|      8|                 -87.63|                -87.63|
|      9|                 -84.38|                -84.38|
|     10|                 -81.13|                -81.13|
|     11|                 -77.88|                -77.88|
|     12|                 -74.63|                -74.63|
|     13|                 -72.88|                -18.31|
|     14|                 -18.31|                -18.31|
|     15|                 -18.31|                -18.31|
|     16|                 -18.31|                -18.31|
|     17|                 -18.31|                -18.31|
|     18|                 -18.31|                -18.31|
|     19|                 -18.31|                -58.72|
|     20|                 -60.47|                -60.47|
|     21|                 -63.72|                -63.72|
|     22|                 -66.97|                -66.97|
|     23|                 -70.22|                -70.22|
|     24|                 -73.47|                -73.47|
|     25|                 -75.22|                -36.95|
|     26|                 -36.95|                -36.95|
|     27|                 -36.95|                -36.95|
|     28|                 -36.95|                -36.95|
|     29|                 -36.95|                -36.95|
|     30|                 -36.95|                -36.95|
|     31|                 -36.95|                -82.30|
|     32|                 -80.55|                -80.55|
|     33|                 -77.30|                -77.30|
|     34|                 -74.05|                -74.05|
|     35|                 -70.80|                -70.80|
|     36|                 -67.55|                -67.55|
|     37|                 -65.80|                -16.81|
|     38|                 -16.81|                -16.81|
|     39|                 -16.81|                -16.81|
|     40|                 -16.81|                -16.81|
|     41|                 -16.81|                -16.81|
|     42|                 -16.81|                -16.81|
|     43|                 -16.81|                -65.80|
|     44|                 -67.55|                -67.55|
|     45|                 -70.80|                -70.80|
|     46|                 -74.05|                -74.05|
|     47|                 -77.30|                -77.30|
|     48|                 -80.55|                -80.55|
|     49|                 -82.30|                -35.45|
```

50	-35.45	-35.45
51	-35.45	-35.45
52	-35.45	-35.45
53	-35.45	-35.45
54	-35.45	-35.45
55	-35.45	-75.22
56	-73.47	-73.47
57	-70.22	-70.22
58	-66.97	-66.97
59	-63.72	-63.72
60	-60.47	-60.47
61	-58.72	-18.31
62	-18.31	-18.31
63	-18.31	-18.31
64	-18.31	-18.31
65	-18.31	-18.31
66	-18.31	-18.31
67	-18.31	-72.88
68	-74.63	-74.63
69	-77.88	-77.88
70	-81.13	-81.13
71	-84.38	-84.38
72	-87.63	-87.63

```
#######################################################
#              VERIFICAÇÃO DA FADIGA (ELS)            #
#                      VminHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -57.62|                -60.47|
|      2|                 -60.47|                -60.47|
|      3|                 -60.47|                -60.47|
|      4|                 -60.47|                -60.47|
|      5|                 -60.47|                -60.47|
|      6|                 -60.47|                -60.47|
|      7|                 -60.47|                -55.24|
|      8|                 -53.49|                -53.49|
|      9|                 -50.24|                -50.24|
|     10|                 -46.99|                -46.99|
|     11|                 -43.74|                -43.74|
|     12|                 -40.49|                -40.49|
|     13|                 -38.74|                -40.72|
|     14|                 -40.72|                -40.72|
|     15|                 -40.72|                -40.72|
|     16|                 -40.72|                -40.72|
|     17|                 -40.72|                -40.72|
|     18|                 -40.72|                -40.72|
|     19|                 -40.72|                -41.12|
|     20|                 -42.87|                -42.87|
|     21|                 -46.12|                -46.12|
|     22|                 -49.37|                -49.37|
|     23|                 -52.62|                -52.62|
|     24|                 -55.87|                -55.87|
|     25|                 -57.62|                -60.41|
|     26|                 -60.41|                -60.41|
|     27|                 -60.41|                -60.41|
|     28|                 -60.41|                -60.41|
|     29|                 -60.41|                -60.41|
|     30|                 -60.41|                -60.41|
|     31|                 -60.41|                -56.43|
|     32|                 -54.68|                -54.68|
|     33|                 -51.43|                -51.43|
|     34|                 -48.18|                -48.18|
|     35|                 -44.93|                -44.93|
|     36|                 -41.68|                -41.68|
|     37|                 -39.93|                -40.79|
|     38|                 -40.79|                -40.79|
|     39|                 -40.79|                -40.79|
|     40|                 -40.79|                -40.79|
|     41|                 -40.79|                -40.79|
|     42|                 -40.79|                -40.79|
|     43|                 -40.79|                -39.93|
|     44|                 -41.68|                -41.68|
|     45|                 -44.93|                -44.93|
|     46|                 -48.18|                -48.18|
|     47|                 -51.43|                -51.43|
|     48|                 -54.68|                -54.68|
|     49|                 -56.43|                -60.47|
```

50	-60.47	-60.47
51	-60.47	-60.47
52	-60.47	-60.47
53	-60.47	-60.47
54	-60.47	-60.47
55	-60.47	-57.62
56	-55.87	-55.87
57	-52.62	-52.62
58	-49.37	-49.37
59	-46.12	-46.12
60	-42.87	-42.87
61	-41.12	-40.72
62	-40.72	-40.72
63	-40.72	-40.72
64	-40.72	-40.72
65	-40.72	-40.72
66	-40.72	-40.72
67	-40.72	-38.74
68	-40.49	-40.49
69	-43.74	-43.74
70	-46.99	-46.99
71	-50.24	-50.24
72	-53.49	-53.49

```
#######################################################
#              VERIFICAÇÃO DA FADIGA (ELS)            #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -76.43|                -41.56|
|      2|                 -41.56|                -41.56|
|      3|                 -41.56|                -41.56|
|      4|                 -41.56|                -41.56|
|      5|                 -41.56|                -41.56|
|      6|                 -41.56|                -41.56|
|      7|                 -41.56|                -88.17|
|      8|                 -86.42|                -86.42|
|      9|                 -83.17|                -83.17|
|     10|                 -79.92|                -79.92|
|     11|                 -76.67|                -76.67|
|     12|                 -73.42|                -73.42|
|     13|                 -71.67|                -25.90|
|     14|                 -25.90|                -25.90|
|     15|                 -25.90|                -25.90|
|     16|                 -25.90|                -25.90|
|     17|                 -25.90|                -25.90|
|     18|                 -25.90|                -25.90|
|     19|                 -25.90|                -59.93|
|     20|                 -61.68|                -61.68|
|     21|                 -64.93|                -64.93|
|     22|                 -68.18|                -68.18|
|     23|                 -71.43|                -71.43|
|     24|                 -74.68|                -74.68|
|     25|                 -76.43|                -42.84|
|     26|                 -42.84|                -42.84|
|     27|                 -42.84|                -42.84|
|     28|                 -42.84|                -42.84|
|     29|                 -42.84|                -42.84|
|     30|                 -42.84|                -42.84|
|     31|                 -42.84|                -82.30|
|     32|                 -80.55|                -80.55|
|     33|                 -77.30|                -77.30|
|     34|                 -74.05|                -74.05|
|     35|                 -70.80|                -70.80|
|     36|                 -67.55|                -67.55|
|     37|                 -65.80|                -24.63|
|     38|                 -24.63|                -24.63|
|     39|                 -24.63|                -24.63|
|     40|                 -24.63|                -24.63|
|     41|                 -24.63|                -24.63|
|     42|                 -24.63|                -24.63|
|     43|                 -24.63|                -65.80|
|     44|                 -67.55|                -67.55|
|     45|                 -70.80|                -70.80|
|     46|                 -74.05|                -74.05|
|     47|                 -77.30|                -77.30|
|     48|                 -80.55|                -80.55|
|     49|                 -82.30|                -41.56|
```

50	-41.56	-41.56
51	-41.56	-41.56
52	-41.56	-41.56
53	-41.56	-41.56
54	-41.56	-41.56
55	-41.56	-76.43
56	-74.68	-74.68
57	-71.43	-71.43
58	-68.18	-68.18
59	-64.93	-64.93
60	-61.68	-61.68
61	-59.93	-25.90
62	-25.90	-25.90
63	-25.90	-25.90
64	-25.90	-25.90
65	-25.90	-25.90
66	-25.90	-25.90
67	-25.90	-71.67
68	-73.42	-73.42
69	-76.67	-76.67
70	-79.92	-79.92
71	-83.17	-83.17
72	-86.42	-86.42

```
#######################################################
#              VERIFICAÇÃO DA FADIGA (ELS)            #
#                      VminHmin                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -53.52|                -35.14|
|      2|                 -35.14|                -35.14|
|      3|                 -35.14|                -35.14|
|      4|                 -35.14|                -35.14|
|      5|                 -35.14|                -35.14|
|      6|                 -35.14|                -35.14|
|      7|                 -35.14|                -59.34|
|      8|                 -57.59|                -57.59|
|      9|                 -54.34|                -54.34|
|     10|                 -51.09|                -51.09|
|     11|                 -47.84|                -47.84|
|     12|                 -44.59|                -44.59|
|     13|                 -42.84|                -18.62|
|     14|                 -18.62|                -18.62|
|     15|                 -18.62|                -18.62|
|     16|                 -18.62|                -18.62|
|     17|                 -18.62|                -18.62|
|     18|                 -18.62|                -18.62|
|     19|                 -18.62|                -37.02|
|     20|                 -38.77|                -38.77|
|     21|                 -42.02|                -42.02|
|     22|                 -45.27|                -45.27|
|     23|                 -48.52|                -48.52|
|     24|                 -51.77|                -51.77|
|     25|                 -53.52|                -35.79|
|     26|                 -35.79|                -35.79|
|     27|                 -35.79|                -35.79|
|     28|                 -35.79|                -35.79|
|     29|                 -35.79|                -35.79|
|     30|                 -35.79|                -35.79|
|     31|                 -35.79|                -56.43|
|     32|                 -54.68|                -54.68|
|     33|                 -51.43|                -51.43|
|     34|                 -48.18|                -48.18|
|     35|                 -44.93|                -44.93|
|     36|                 -41.68|                -41.68|
|     37|                 -39.93|                -17.97|
|     38|                 -17.97|                -17.97|
|     39|                 -17.97|                -17.97|
|     40|                 -17.97|                -17.97|
|     41|                 -17.97|                -17.97|
|     42|                 -17.97|                -17.97|
|     43|                 -17.97|                -39.93|
|     44|                 -41.68|                -41.68|
|     45|                 -44.93|                -44.93|
|     46|                 -48.18|                -48.18|
|     47|                 -51.43|                -51.43|
|     48|                 -54.68|                -54.68|
|     49|                 -56.43|                -35.14|
```

50	-35.14	-35.14
51	-35.14	-35.14
52	-35.14	-35.14
53	-35.14	-35.14
54	-35.14	-35.14
55	-35.14	-53.52
56	-51.77	-51.77
57	-48.52	-48.52
58	-45.27	-45.27
59	-42.02	-42.02
60	-38.77	-38.77
61	-37.02	-18.62
62	-18.62	-18.62
63	-18.62	-18.62
64	-18.62	-18.62
65	-18.62	-18.62
66	-18.62	-18.62
67	-18.62	-42.84
68	-44.59	-44.59
69	-47.84	-47.84
70	-51.09	-51.09
71	-54.34	-54.34
72	-57.59	-57.59

```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -67.08|                -35.33|
|      2|                 -35.33|                -35.33|
|      3|                 -35.33|                -35.33|
|      4|                 -35.33|                -35.33|
|      5|                 -35.33|                -35.33|
|      6|                 -35.33|                -35.33|
|      7|                 -35.33|                -78.11|
|      8|                 -76.36|                -76.36|
|      9|                 -73.11|                -73.11|
|     10|                 -69.86|                -69.86|
|     11|                 -66.61|                -66.61|
|     12|                 -63.36|                -63.36|
|     13|                 -61.61|                -18.43|
|     14|                 -18.43|                -18.43|
|     15|                 -18.43|                -18.43|
|     16|                 -18.43|                -18.43|
|     17|                 -18.43|                -18.43|
|     18|                 -18.43|                -18.43|
|     19|                 -18.43|                -50.58|
|     20|                 -52.33|                -52.33|
|     21|                 -55.58|                -55.58|
|     22|                 -58.83|                -58.83|
|     23|                 -62.08|                -62.08|
|     24|                 -65.33|                -65.33|
|     25|                 -67.08|                -36.52|
|     26|                 -36.52|                -36.52|
|     27|                 -36.52|                -36.52|
|     28|                 -36.52|                -36.52|
|     29|                 -36.52|                -36.52|
|     30|                 -36.52|                -36.52|
|     31|                 -36.52|                -72.60|
|     32|                 -70.85|                -70.85|
|     33|                 -67.60|                -67.60|
|     34|                 -64.35|                -64.35|
|     35|                 -61.10|                -61.10|
|     36|                 -57.85|                -57.85|
|     37|                 -56.10|                -17.24|
|     38|                 -17.24|                -17.24|
|     39|                 -17.24|                -17.24|
|     40|                 -17.24|                -17.24|
|     41|                 -17.24|                -17.24|
|     42|                 -17.24|                -17.24|
|     43|                 -17.24|                -56.10|
|     44|                 -57.85|                -57.85|
|     45|                 -61.10|                -61.10|
|     46|                 -64.35|                -64.35|
|     47|                 -67.60|                -67.60|
|     48|                 -70.85|                -70.85|
|     49|                 -72.60|                -35.33|
```

50	-35.33	-35.33
51	-35.33	-35.33
52	-35.33	-35.33
53	-35.33	-35.33
54	-35.33	-35.33
55	-35.33	-67.08
56	-65.33	-65.33
57	-62.08	-62.08
58	-58.83	-58.83
59	-55.58	-55.58
60	-52.33	-52.33
61	-50.58	-18.43
62	-18.43	-18.43
63	-18.43	-18.43
64	-18.43	-18.43
65	-18.43	-18.43
66	-18.43	-18.43
67	-18.43	-61.61
68	-63.36	-63.36
69	-66.61	-66.61
70	-69.86	-69.86
71	-73.11	-73.11
72	-76.36	-76.36

```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VminHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -56.93|                -56.99|
|      2|                 -56.99|                -56.99|
|      3|                 -56.99|                -56.99|
|      4|                 -56.99|                -56.99|
|      5|                 -56.99|                -56.99|
|      6|                 -56.99|                -56.99|
|      7|                 -56.99|                -55.93|
|      8|                 -54.18|                -54.18|
|      9|                 -50.93|                -50.93|
|     10|                 -47.68|                -47.68|
|     11|                 -44.43|                -44.43|
|     12|                 -41.18|                -41.18|
|     13|                 -39.43|                -36.49|
|     14|                 -36.49|                -36.49|
|     15|                 -36.49|                -36.49|
|     16|                 -36.49|                -36.49|
|     17|                 -36.49|                -36.49|
|     18|                 -36.49|                -36.49|
|     19|                 -36.49|                -40.43|
|     20|                 -42.18|                -42.18|
|     21|                 -45.43|                -45.43|
|     22|                 -48.68|                -48.68|
|     23|                 -51.93|                -51.93|
|     24|                 -55.18|                -55.18|
|     25|                 -56.93|                -57.02|
|     26|                 -57.02|                -57.02|
|     27|                 -57.02|                -57.02|
|     28|                 -57.02|                -57.02|
|     29|                 -57.02|                -57.02|
|     30|                 -57.02|                -57.02|
|     31|                 -57.02|                -56.43|
|     32|                 -54.68|                -54.68|
|     33|                 -51.43|                -51.43|
|     34|                 -48.18|                -48.18|
|     35|                 -44.93|                -44.93|
|     36|                 -41.68|                -41.68|
|     37|                 -39.93|                -36.47|
|     38|                 -36.47|                -36.47|
|     39|                 -36.47|                -36.47|
|     40|                 -36.47|                -36.47|
|     41|                 -36.47|                -36.47|
|     42|                 -36.47|                -36.47|
|     43|                 -36.47|                -39.93|
|     44|                 -41.68|                -41.68|
|     45|                 -44.93|                -44.93|
|     46|                 -48.18|                -48.18|
|     47|                 -51.43|                -51.43|
|     48|                 -54.68|                -54.68|
|     49|                 -56.43|                -56.99|
```

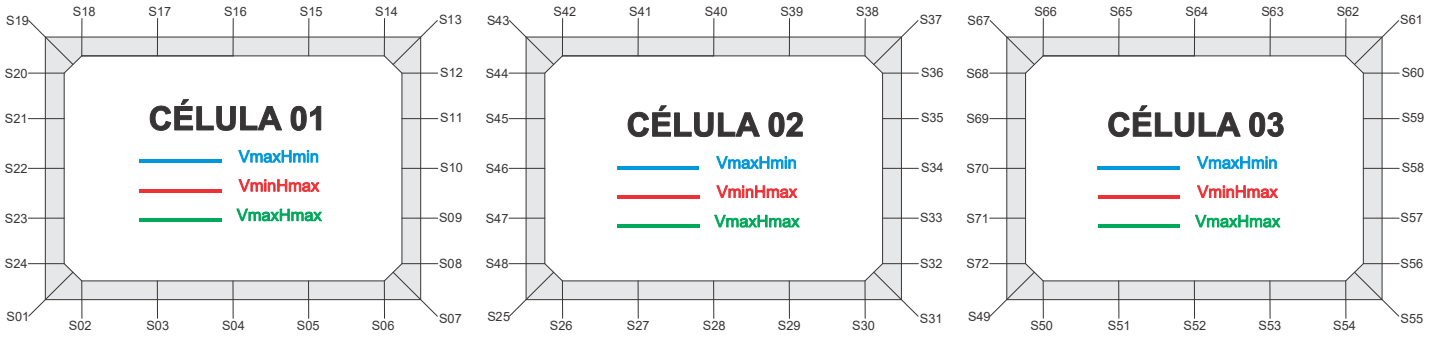
50	-56.99	-56.99
51	-56.99	-56.99
52	-56.99	-56.99
53	-56.99	-56.99
54	-56.99	-56.99
55	-56.99	-56.93
56	-55.18	-55.18
57	-51.93	-51.93
58	-48.68	-48.68
59	-45.43	-45.43
60	-42.18	-42.18
61	-40.43	-36.49
62	-36.49	-36.49
63	-36.49	-36.49
64	-36.49	-36.49
65	-36.49	-36.49
66	-36.49	-36.49
67	-36.49	-39.43
68	-41.18	-41.18
69	-44.43	-44.43
70	-47.68	-47.68
71	-50.93	-50.93
72	-54.18	-54.18

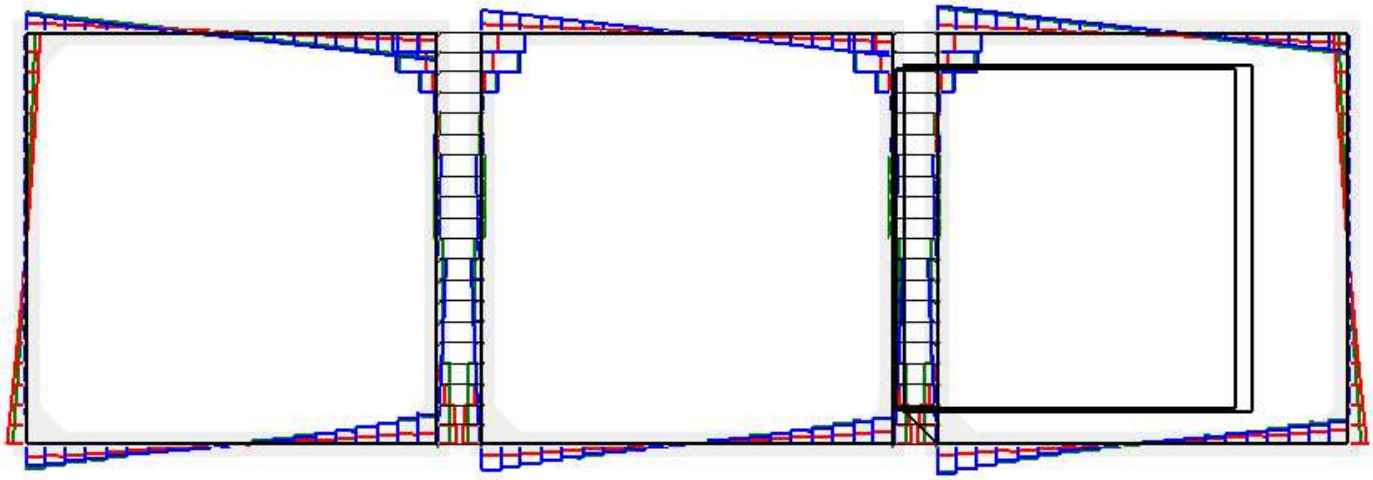
```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
            ESFORÇO NORMAL NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -67.84|                -39.15|
|      2|                 -39.15|                -39.15|
|      3|                 -39.15|                -39.15|
|      4|                 -39.15|                -39.15|
|      5|                 -39.15|                -39.15|
|      6|                 -39.15|                -39.15|
|      7|                 -39.15|                -77.36|
|      8|                 -75.61|                -75.61|
|      9|                 -72.36|                -72.36|
|     10|                 -69.11|                -69.11|
|     11|                 -65.86|                -65.86|
|     12|                 -62.61|                -62.61|
|     13|                 -60.86|                -23.17|
|     14|                 -23.17|                -23.17|
|     15|                 -23.17|                -23.17|
|     16|                 -23.17|                -23.17|
|     17|                 -23.17|                -23.17|
|     18|                 -23.17|                -23.17|
|     19|                 -23.17|                -51.34|
|     20|                 -53.09|                -53.09|
|     21|                 -56.34|                -56.34|
|     22|                 -59.59|                -59.59|
|     23|                 -62.84|                -62.84|
|     24|                 -66.09|                -66.09|
|     25|                 -67.84|                -40.19|
|     26|                 -40.19|                -40.19|
|     27|                 -40.19|                -40.19|
|     28|                 -40.19|                -40.19|
|     29|                 -40.19|                -40.19|
|     30|                 -40.19|                -40.19|
|     31|                 -40.19|                -72.60|
|     32|                 -70.85|                -70.85|
|     33|                 -67.60|                -67.60|
|     34|                 -64.35|                -64.35|
|     35|                 -61.10|                -61.10|
|     36|                 -57.85|                -57.85|
|     37|                 -56.10|                -22.13|
|     38|                 -22.13|                -22.13|
|     39|                 -22.13|                -22.13|
|     40|                 -22.13|                -22.13|
|     41|                 -22.13|                -22.13|
|     42|                 -22.13|                -22.13|
|     43|                 -22.13|                -56.10|
|     44|                 -57.85|                -57.85|
|     45|                 -61.10|                -61.10|
|     46|                 -64.35|                -64.35|
|     47|                 -67.60|                -67.60|
|     48|                 -70.85|                -70.85|
|     49|                 -72.60|                -39.15|
```

50	-39.15	-39.15
51	-39.15	-39.15
52	-39.15	-39.15
53	-39.15	-39.15
54	-39.15	-39.15
55	-39.15	-67.84
56	-66.09	-66.09
57	-62.84	-62.84
58	-59.59	-59.59
59	-56.34	-56.34
60	-53.09	-53.09
61	-51.34	-23.17
62	-23.17	-23.17
63	-23.17	-23.17
64	-23.17	-23.17
65	-23.17	-23.17
66	-23.17	-23.17
67	-23.17	-60.86
68	-62.61	-62.61
69	-65.86	-65.86
70	-69.11	-69.11
71	-72.36	-72.36
72	-75.61	-75.61

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|                   0.83|                -97.46|
|      2|                 -86.94|                -74.37|
|      3|                 -44.32|                -34.27|
|      4|                  -9.85|                  0.01|
|      5|                  30.14|                 44.06|
|      6|                  91.96|                112.34|
|      7|                 131.28|                 -0.84|
|      8|                 -11.13|                -11.13|
|      9|                 -29.96|                -29.96|
|     10|                  -8.50|                 -8.50|
|     11|                 -17.82|                 12.59|
|     12|                  76.03|                179.34|
|     13|                 195.11|               -121.25|
|     14|                -101.86|               -101.86|
|     15|                 -60.56|                -60.56|
|     16|                 -19.25|                -19.25|
|     17|                  22.05|                 22.05|
|     18|                  63.36|                 63.36|
|     19|                  82.75|                  4.67|
|     20|                   6.43|                  6.43|
|     21|                   8.74|                  8.74|
|     22|                   8.99|                  8.99|
|     23|                   7.18|                  7.18|
|     24|                   3.31|                  3.31|
|     25|                   0.83|               -114.94|
|     26|                -101.06|                -85.16|
|     27|                 -46.40|                -34.09|
|     28|                  -5.24|                  5.24|
|     29|                  34.09|                 46.40|
|     30|                  85.16|                101.06|
|     31|                 114.94|                 -7.22|
|     32|                 -17.52|                -17.52|
|     33|                 -36.35|                -36.35|
|     34|                 -14.88|                -14.88|
|     35|                 -24.21|                  6.21|
|     36|                  69.64|                172.95|
|     37|                 188.72|               -102.00|
|     38|                 -82.61|                -82.61|
|     39|                 -41.30|                -41.30|
|     40|                   0.00|                  0.00|
|     41|                  41.30|                 41.30|
|     42|                  82.61|                 82.61|
|     43|                 102.00|               -188.72|
|     44|                -172.95|                -69.64|
|     45|                  -6.21|                 24.21|
|     46|                  14.88|                 14.88|
|     47|                  36.35|                 36.35|
|     48|                  17.52|                 17.52|
|     49|                   7.22|               -131.28|
```

50	-112.34	-91.96
51	-44.06	-30.14
52	-0.01	9.85
53	34.27	44.32
54	74.37	86.94
55	97.46	-0.83
56	-3.31	-3.31
57	-7.18	-7.18
58	-8.99	-8.99
59	-8.74	-8.74
60	-6.43	-6.43
61	-4.67	-82.75
62	-63.36	-63.36
63	-22.05	-22.05
64	19.25	19.25
65	60.56	60.56
66	101.86	101.86
67	121.25	-195.11
68	-179.34	-76.03
69	-12.59	17.82
70	8.50	8.50
71	29.96	29.96
72	11.13	11.13

```
#####################################################
#            SOLICITAÇÕES NORMAIS (ELU)             #
#                     VminHmax                      #
#####################################################
-----------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-----------------------------------------------------
|      1|                 85.73|               -58.69|
|      2|                -54.23|               -47.59|
|      3|                -30.04|               -23.34|
|      4|                 -7.41|                -1.23|
|      5|                 14.08|                20.43|
|      6|                 37.00|                43.52|
|      7|                 48.03|               -85.73|
|      8|                -78.10|               -31.59|
|      9|                  0.14|                 0.14|
|     10|                  0.14|                 0.14|
|     11|                  0.14|                -1.93|
|     12|                 15.22|                47.94|
|     13|                 74.22|               -34.66|
|     14|                -26.97|               -26.97|
|     15|                -10.85|               -10.85|
|     16|                  5.27|                 5.27|
|     17|                 21.39|                21.39|
|     18|                 37.51|                37.51|
|     19|                 45.20|               -61.68|
|     20|                -52.63|               -52.63|
|     21|                -29.64|               -29.64|
|     22|                 -2.01|                -2.01|
|     23|                 30.25|                30.25|
|     24|                 67.14|                67.14|
|     25|                 85.73|               -52.96|
|     26|                -47.88|               -40.88|
|     27|                -23.68|               -17.38|
|     28|                 -2.88|                 2.88|
|     29|                 17.38|                23.68|
|     30|                 40.88|                47.88|
|     31|                 52.96|               -85.23|
|     32|                -77.60|               -31.10|
|     33|                  0.63|                 0.63|
|     34|                  0.63|                 0.63|
|     35|                  0.63|                -1.44|
|     36|                 15.71|                48.43|
|     37|                 74.72|               -39.93|
|     38|                -32.24|               -32.24|
|     39|                -16.12|               -16.12|
|     40|                  0.00|                 0.00|
|     41|                 16.12|                16.12|
|     42|                 32.24|                32.24|
|     43|                 39.93|               -74.72|
|     44|                -48.43|               -15.71|
|     45|                  1.44|                -0.63|
|     46|                 -0.63|                -0.63|
|     47|                 -0.63|                -0.63|
|     48|                 31.10|                77.60|
|     49|                 85.23|               -48.03|
```

50	-43.52	-37.00
51	-20.43	-14.08
52	1.23	7.41
53	23.34	30.04
54	47.59	54.23
55	58.69	-85.73
56	-67.14	-67.14
57	-30.25	-30.25
58	2.01	2.01
59	29.64	29.64
60	52.63	52.63
61	61.68	-45.20
62	-37.51	-37.51
63	-21.39	-21.39
64	-5.27	-5.27
65	10.85	10.85
66	26.97	26.97
67	34.66	-74.22
68	-47.94	-15.22
69	1.93	-0.14
70	-0.14	-0.14
71	-0.14	-0.14
72	31.59	78.10

```
#######################################################
#            SOLICITAÇÕES NORMAIS (ELU)               #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 59.34|               -106.89|
|      2|                -95.28|                -81.37|
|      3|                -46.37|                -34.61|
|      4|                 -5.71|                  5.24|
|      5|                 36.56|                 49.93|
|      6|                 92.12|                109.07|
|      7|                123.88|                -59.34|
|      8|                -59.34|                -59.34|
|      9|                -27.50|                -27.50|
|     10|                -27.50|                 13.42|
|     11|                 13.42|                 -8.09|
|     12|                 66.63|                166.42|
|     13|                196.70|               -111.36|
|     14|                -91.97|                -91.97|
|     15|                -50.67|                -50.67|
|     16|                 -9.36|                 -9.36|
|     17|                 31.94|                 31.94|
|     18|                 73.25|                 73.25|
|     19|                 92.63|                -38.93|
|     20|                -32.90|                -32.90|
|     21|                -17.57|                -17.57|
|     22|                  0.85|                  0.85|
|     23|                 22.35|                 22.35|
|     24|                 46.95|                 46.95|
|     25|                 59.34|               -115.68|
|     26|               -102.92|                -87.80|
|     27|                -49.31|                -36.58|
|     28|                 -5.64|                  5.64|
|     29|                 36.58|                 49.31|
|     30|                 87.80|                102.92|
|     31|                115.68|                -61.36|
|     32|                -61.36|                -61.36|
|     33|                -29.51|                -29.51|
|     34|                -29.51|                 11.40|
|     35|                 11.40|                -10.10|
|     36|                 64.61|                164.40|
|     37|                194.68|               -102.00|
|     38|                -82.61|                -82.61|
|     39|                -41.30|                -41.30|
|     40|                  0.00|                  0.00|
|     41|                 41.30|                 41.30|
|     42|                 82.61|                 82.61|
|     43|                102.00|               -194.68|
|     44|               -164.40|                -64.61|
|     45|                 10.10|                -11.40|
|     46|                -11.40|                 29.51|
|     47|                 29.51|                 29.51|
|     48|                 61.36|                 61.36|
|     49|                 61.36|               -123.88|
```

50	-109.07	-92.12
51	-49.93	-36.56
52	-5.24	5.71
53	34.61	46.37
54	81.37	95.28
55	106.89	-59.34
56	-46.95	-46.95
57	-22.35	-22.35
58	-0.85	-0.85
59	17.57	17.57
60	32.90	32.90
61	38.93	-92.63
62	-73.25	-73.25
63	-31.94	-31.94
64	9.36	9.36
65	50.67	50.67
66	91.97	91.97
67	111.36	-196.70
68	-166.42	-66.63
69	8.09	-13.42
70	-13.42	27.50
71	27.50	27.50
72	59.34	59.34

```
#######################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)             #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 -0.43|                -99.88|
|      2|                -88.97|                -76.10|
|      3|                -45.87|                -35.96|
|      4|                -12.42|                 -2.94|
|      5|                 26.09|                 39.76|
|      6|                 87.73|                108.55|
|      7|                128.15|                  0.42|
|      8|                 -9.87|                 -9.87|
|      9|                -28.70|                -28.70|
|     10|                -35.83|                -35.83|
|     11|                 11.98|                 -2.06|
|     12|                 60.91|                179.87|
|     13|                217.45|               -118.57|
|     14|                -99.18|                -99.18|
|     15|                -57.88|                -57.88|
|     16|                -16.57|                -16.57|
|     17|                 24.73|                 24.73|
|     18|                 66.04|                 66.04|
|     19|                 85.43|                  3.41|
|     20|                  5.17|                  5.17|
|     21|                  7.48|                  7.48|
|     22|                  7.73|                  7.73|
|     23|                  5.92|                  5.92|
|     24|                  2.05|                  2.05|
|     25|                 -0.43|               -116.44|
|     26|               -102.29|                -86.22|
|     27|                -47.54|                -35.43|
|     28|                 -7.48|                  2.64|
|     29|                 30.57|                 42.70|
|     30|                 81.78|                 98.18|
|     31|                112.78|                 -6.12|
|     32|                -16.41|                -16.41|
|     33|                -35.24|                -35.24|
|     34|                -39.02|                -39.02|
|     35|                  7.60|                 -5.96|
|     36|                 53.88|                166.45|
|     37|                201.10|               -100.32|
|     38|                -80.93|                -80.93|
|     39|                -39.62|                -39.62|
|     40|                  1.68|                  1.68|
|     41|                 42.99|                 42.99|
|     42|                 84.29|                 84.29|
|     43|                103.68|               -210.91|
|     44|               -173.33|                -54.37|
|     45|                  8.60|                 -5.44|
|     46|                 42.37|                 42.37|
|     47|                 35.24|                 35.24|
|     48|                 16.41|                 16.41|
|     49|                  6.12|               -134.93|
```

50	-115.29	-94.34
51	-45.67	-31.79
52	-2.45	7.00
53	30.04	39.69
54	69.26	82.06
55	93.03	-0.40
56	-2.88	-2.88
57	-6.75	-6.75
58	-8.56	-8.56
59	-8.31	-8.31
60	-6.00	-6.00
61	-4.24	-78.66
62	-59.28	-59.28
63	-17.97	-17.97
64	23.33	23.33
65	64.64	64.64
66	105.94	105.94
67	125.33	-206.81
68	-172.16	-59.60
69	0.24	-13.31
70	33.31	33.31
71	29.53	29.53
72	10.70	10.70

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                     VminHmax                      #
#####################################################
-----------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-----------------------------------------------------
|      1|                 85.69|               -58.69|
|      2|                -54.23|               -47.60|
|      3|                -30.07|               -23.38|
|      4|                 -7.48|                -1.30|
|      5|                 13.99|                20.34|
|      6|                 36.94|                43.48|
|      7|                 48.02|               -85.69|
|      8|                -79.98|               -27.61|
|      9|                  0.17|                 0.17|
|     10|                  0.17|                 0.17|
|     11|                  0.17|                -1.26|
|     12|                 11.40|                46.11|
|     13|                 77.47|               -34.66|
|     14|                -26.97|               -26.97|
|     15|                -10.85|               -10.85|
|     16|                  5.27|                 5.27|
|     17|                 21.39|                21.39|
|     18|                 37.51|                37.51|
|     19|                 45.20|               -61.72|
|     20|                -52.67|               -52.67|
|     21|                -29.68|               -29.68|
|     22|                 -2.05|                -2.05|
|     23|                 30.21|                30.21|
|     24|                 67.10|                67.10|
|     25|                 85.69|               -53.28|
|     26|                -48.12|               -41.07|
|     27|                -23.81|               -17.53|
|     28|                 -3.13|                 2.57|
|     29|                 16.92|                23.18|
|     30|                 40.36|                47.40|
|     31|                 52.55|               -85.20|
|     32|                -79.04|               -26.97|
|     33|                  0.51|                 0.51|
|     34|                  0.51|                 0.51|
|     35|                  0.51|                -0.92|
|     36|                 11.88|                46.91|
|     37|                 78.42|               -39.57|
|     38|                -31.88|               -31.88|
|     39|                -15.76|               -15.76|
|     40|                  0.36|                 0.36|
|     41|                 16.48|                16.48|
|     42|                 32.60|                32.60|
|     43|                 40.29|               -77.95|
|     44|                -46.59|               -11.88|
|     45|                  0.78|                -0.65|
|     46|                 -0.65|                -0.65|
|     47|                 -0.65|                -0.65|
|     48|                 27.13|                79.49|
|     49|                 85.20|               -47.27|
```

50	-42.80	-36.31
51	-19.80	-13.45
52	1.96	8.19
53	24.28	31.02
54	48.59	55.18
55	59.55	-85.74
56	-67.15	-67.15
57	-30.26	-30.26
58	2.00	2.00
59	29.62	29.62
60	52.62	52.62
61	61.67	-45.99
62	-38.30	-38.30
63	-22.18	-22.18
64	-6.06	-6.06
65	10.06	10.06
66	26.18	26.18
67	33.87	-77.88
68	-46.37	-11.34
69	1.46	0.03
70	0.03	0.03
71	0.03	0.03
72	27.51	79.58

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-----------------------------------------------------
|      1|                 58.85|               -108.33|
|      2|                -96.65|                -82.71|
|      3|                -47.96|                -36.38|
|      4|                 -8.19|                  2.50|
|      5|                 33.16|                 46.43|
|      6|                 89.05|                106.48|
|      7|                121.95|                -58.85|
|      8|                -58.85|                -58.85|
|      9|                -21.20|                -21.20|
|     10|                -21.20|                 11.02|
|     11|                 11.02|                 -6.78|
|     12|                 52.73|                164.38|
|     13|                214.00|               -109.87|
|     14|                -90.48|                -90.48|
|     15|                -49.18|                -49.18|
|     16|                 -7.87|                 -7.87|
|     17|                 33.43|                 33.43|
|     18|                 74.74|                 74.74|
|     19|                 94.13|                -39.43|
|     20|                -33.39|                -33.39|
|     21|                -18.06|                -18.06|
|     22|                  0.35|                  0.35|
|     23|                 21.86|                 21.86|
|     24|                 46.45|                 46.45|
|     25|                 58.85|               -116.41|
|     26|               -103.43|                -88.17|
|     27|                -49.78|                -37.20|
|     28|                 -6.98|                  4.03|
|     29|                 34.28|                 46.89|
|     30|                 85.65|                101.16|
|     31|                114.46|                -61.46|
|     32|                -61.47|                -61.47|
|     33|                -22.86|                -22.86|
|     34|                -22.86|                  9.65|
|     35|                  9.65|                 -8.26|
|     36|                 50.24|                159.61|
|     37|                208.09|               -101.13|
|     38|                -81.74|                -81.74|
|     39|                -40.43|                -40.43|
|     40|                  0.87|                  0.87|
|     41|                 42.17|                 42.17|
|     42|                 83.48|                 83.48|
|     43|                102.87|               -211.38|
|     44|               -161.76|                -50.11|
|     45|                  9.40|                 -8.41|
|     46|                 -8.41|                 23.81|
|     47|                 23.81|                 23.82|
|     48|                 61.47|                 61.47|
|     49|                 61.46|               -125.89|
```

50	-110.42	-92.93
51	-49.86	-36.44
52	-5.46	5.25
53	33.25	44.71
54	78.99	92.82
55	104.43	-59.69
56	-47.30	-47.30
57	-22.71	-22.71
58	-1.20	-1.20
59	17.22	17.22
60	32.54	32.54
61	38.58	-90.22
62	-70.83	-70.83
63	-29.53	-29.53
64	11.78	11.78
65	53.08	53.08
66	94.39	94.39
67	113.77	-209.86
68	-161.38	-52.01
69	6.49	-11.42
70	-11.42	21.09
71	21.09	21.09
72	59.70	59.70

```
#######################################################
#             VERIFICAÇÃO DA FADIGA (ELS)             #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 35.45|               -70.35|
|      2|                -62.72|               -53.36|
|      3|                -30.35|               -22.50|
|      4|                 -3.64|                 3.69|
|      5|                 24.34|                33.38|
|      6|                 61.69|                73.28|
|      7|                 83.24|               -35.45|
|      8|                -35.45|               -35.45|
|      9|                -20.91|               -20.91|
|     10|                -20.91|                10.14|
|     11|                 10.14|                -5.75|
|     12|                 44.32|               109.24|
|     13|                126.59|               -72.88|
|     14|                -60.34|               -60.34|
|     15|                -33.71|               -33.71|
|     16|                 -7.08|                -7.08|
|     17|                 19.55|                19.55|
|     18|                 46.18|                46.18|
|     19|                 58.72|               -18.31|
|     20|                -16.04|               -16.04|
|     21|                 -9.16|                -9.16|
|     22|                  0.41|                 0.41|
|     23|                 12.68|                12.68|
|     24|                 27.64|                27.64|
|     25|                 35.45|               -77.03|
|     26|                -68.59|               -58.36|
|     27|                -32.78|               -24.21|
|     28|                 -3.79|                 3.79|
|     29|                 24.21|                32.78|
|     30|                 58.36|                68.59|
|     31|                 77.03|               -36.95|
|     32|                -36.95|               -36.95|
|     33|                -22.41|               -22.41|
|     34|                -22.41|                 8.64|
|     35|                  8.64|                -7.25|
|     36|                 42.81|               107.74|
|     37|                125.08|               -65.80|
|     38|                -53.26|               -53.26|
|     39|                -26.63|               -26.63|
|     40|                  0.00|                 0.00|
|     41|                 26.63|                26.63|
|     42|                 53.26|                53.26|
|     43|                 65.80|              -125.08|
|     44|               -107.74|               -42.81|
|     45|                  7.25|                -8.64|
|     46|                 -8.64|                22.41|
|     47|                 22.41|                22.41|
|     48|                 36.95|                36.95|
|     49|                 36.95|               -83.24|
```

50	-73.28	-61.69
51	-33.38	-24.34
52	-3.69	3.64
53	22.50	30.35
54	53.36	62.72
55	70.35	-35.45
56	-27.64	-27.64
57	-12.68	-12.68
58	-0.41	-0.41
59	9.16	9.16
60	16.04	16.04
61	18.31	-58.72
62	-46.18	-46.18
63	-19.55	-19.55
64	7.08	7.08
65	33.71	33.71
66	60.34	60.34
67	72.88	-126.59
68	-109.24	-44.32
69	5.75	-10.14
70	-10.14	20.91
71	20.91	20.91
72	35.45	35.45

```
#######################################################
#             VERIFICAÇÃO DA FADIGA (ELS)             #
#                      VminHmax                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 60.47|                -54.34|
|      2|                -49.52|                -42.72|
|      3|                -25.59|                -19.21|
|      4|                 -4.32|                  1.56|
|      5|                 16.38|                 22.73|
|      6|                 39.92|                 46.84|
|      7|                 51.84|                -60.47|
|      8|                -60.47|                -60.47|
|      9|                  0.39|                  0.39|
|     10|                  0.39|                  0.39|
|     11|                  0.39|                 -2.03|
|     12|                 20.32|                 56.29|
|     13|                 76.16|                -38.74|
|     14|                -31.05|                -31.05|
|     15|                -14.93|                -14.93|
|     16|                  1.19|                  1.19|
|     17|                 17.31|                 17.31|
|     18|                 33.43|                 33.43|
|     19|                 41.12|                -40.72|
|     20|                -34.94|                -34.94|
|     21|                -19.79|                -19.79|
|     22|                 -1.04|                 -1.04|
|     23|                 21.32|                 21.32|
|     24|                 47.28|                 47.28|
|     25|                 60.47|                -52.97|
|     26|                -47.90|                -40.92|
|     27|                -23.72|                -17.42|
|     28|                 -2.88|                  2.88|
|     29|                 17.42|                 23.72|
|     30|                 40.92|                 47.90|
|     31|                 52.97|                -60.41|
|     32|                -60.41|                -60.41|
|     33|                  0.46|                  0.46|
|     34|                  0.46|                  0.46|
|     35|                  0.46|                 -1.96|
|     36|                 20.38|                 56.35|
|     37|                 76.22|                -39.93|
|     38|                -32.24|                -32.24|
|     39|                -16.12|                -16.12|
|     40|                  0.00|                  0.00|
|     41|                 16.12|                 16.12|
|     42|                 32.24|                 32.24|
|     43|                 39.93|                -76.22|
|     44|                -56.35|                -20.38|
|     45|                  1.96|                 -0.46|
|     46|                 -0.46|                 -0.46|
|     47|                 -0.46|                 -0.46|
|     48|                 60.41|                 60.41|
|     49|                 60.41|                -51.84|
```

50	-46.84	-39.92
51	-22.73	-16.38
52	-1.56	4.32
53	19.21	25.59
54	42.72	49.52
55	54.34	-60.47
56	-47.28	-47.28
57	-21.32	-21.32
58	1.04	1.04
59	19.79	19.79
60	34.94	34.94
61	40.72	-41.12
62	-33.43	-33.43
63	-17.31	-17.31
64	-1.19	-1.19
65	14.93	14.93
66	31.05	31.05
67	38.74	-76.16
68	-56.29	-20.32
69	2.03	-0.39
70	-0.39	-0.39
71	-0.39	-0.39
72	60.47	60.47

```
#####################################################
#             VERIFICAÇÃO DA FADIGA (ELS)           #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-----------------------------------------------------
|      1|                 41.56|               -71.58|
|      2|                -63.96|               -54.55|
|      3|                -31.19|               -23.19|
|      4|                 -3.89|                 3.56|
|      5|                 24.38|                33.39|
|      6|                 61.27|                72.59|
|      7|                 82.22|               -41.56|
|      8|                -41.56|               -41.56|
|      9|                -17.10|               -17.10|
|     10|                -17.10|                 8.38|
|     11|                  8.38|                -5.11|
|     12|                 42.78|               107.03|
|     13|                126.81|               -71.67|
|     14|                -59.13|               -59.13|
|     15|                -32.50|               -32.50|
|     16|                 -5.87|                -5.87|
|     17|                 20.76|                20.76|
|     18|                 47.39|                47.39|
|     19|                 59.93|               -25.90|
|     20|                -22.05|               -22.05|
|     21|                -11.95|               -11.95|
|     22|                  0.55|                 0.55|
|     23|                 15.46|                15.46|
|     24|                 32.77|                32.77|
|     25|                 41.56|               -77.09|
|     26|                -68.74|               -58.57|
|     27|                -33.02|               -24.41|
|     28|                 -3.83|                 3.83|
|     29|                 24.41|                33.02|
|     30|                 58.57|                68.74|
|     31|                 77.09|               -42.84|
|     32|                -42.84|               -42.84|
|     33|                -18.38|               -18.38|
|     34|                -18.38|                 7.10|
|     35|                  7.10|                -6.39|
|     36|                 41.50|               105.76|
|     37|                125.53|               -65.80|
|     38|                -53.26|               -53.26|
|     39|                -26.63|               -26.63|
|     40|                  0.00|                 0.00|
|     41|                 26.63|                26.63|
|     42|                 53.26|                53.26|
|     43|                 65.80|              -125.53|
|     44|               -105.76|               -41.51|
|     45|                  6.39|                -7.10|
|     46|                 -7.10|                18.38|
|     47|                 18.38|                18.38|
|     48|                 42.84|                42.84|
|     49|                 42.84|               -82.22|
```

50	-72.59	-61.27
51	-33.39	-24.38
52	-3.56	3.89
53	23.19	31.19
54	54.55	63.96
55	71.58	-41.56
56	-32.77	-32.77
57	-15.46	-15.46
58	-0.55	-0.55
59	11.95	11.95
60	22.05	22.05
61	25.90	-59.93
62	-47.39	-47.39
63	-20.76	-20.76
64	5.87	5.87
65	32.50	32.50
66	59.13	59.13
67	71.67	-126.81
68	-107.03	-42.78
69	5.11	-8.38
70	-8.38	17.10
71	17.10	17.10
72	41.56	41.56

```
#######################################################
#             VERIFICAÇÃO DA FADIGA (ELS)             #
#                      VminHmin                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 35.14|                -50.08|
|      2|                -45.14|                -38.36|
|      3|                -22.20|                -16.30|
|      4|                 -2.87|                  2.61|
|      5|                 16.80|                 23.20|
|      6|                 41.64|                 49.37|
|      7|                 55.34|                -35.14|
|      8|                -35.14|                -35.14|
|      9|                 -7.68|                 -7.68|
|     10|                 -7.68|                  3.88|
|     11|                  3.88|                 -2.66|
|     12|                 25.23|                 63.78|
|     13|                 76.69|                -42.84|
|     14|                -35.15|                -35.15|
|     15|                -19.03|                -19.03|
|     16|                 -2.91|                 -2.91|
|     17|                 13.21|                 13.21|
|     18|                 29.33|                 29.33|
|     19|                 37.02|                -18.62|
|     20|                -16.35|                -16.35|
|     21|                 -9.47|                 -9.47|
|     22|                  0.10|                  0.10|
|     23|                 12.37|                 12.37|
|     24|                 27.33|                 27.33|
|     25|                 35.14|                -52.80|
|     26|                -47.48|                -40.32|
|     27|                -23.06|                -16.85|
|     28|                 -2.79|                  2.79|
|     29|                 16.85|                 23.06|
|     30|                 40.32|                 47.48|
|     31|                 52.80|                -35.79|
|     32|                -35.79|                -35.79|
|     33|                 -8.32|                 -8.32|
|     34|                 -8.32|                  3.23|
|     35|                  3.23|                 -3.31|
|     36|                 24.58|                 63.14|
|     37|                 76.05|                -39.93|
|     38|                -32.24|                -32.24|
|     39|                -16.12|                -16.12|
|     40|                  0.00|                  0.00|
|     41|                 16.12|                 16.12|
|     42|                 32.24|                 32.24|
|     43|                 39.93|                -76.05|
|     44|                -63.14|                -24.58|
|     45|                  3.31|                 -3.23|
|     46|                 -3.23|                  8.32|
|     47|                  8.32|                  8.32|
|     48|                 35.79|                 35.79|
|     49|                 35.79|                -55.34|
```

50	-49.37	-41.64
51	-23.20	-16.80
52	-2.61	2.87
53	16.30	22.20
54	38.36	45.14
55	50.08	-35.14
56	-27.33	-27.33
57	-12.37	-12.37
58	-0.10	-0.10
59	9.47	9.47
60	16.35	16.35
61	18.62	-37.02
62	-29.33	-29.33
63	-13.21	-13.21
64	2.91	2.91
65	19.03	19.03
66	35.15	35.15
67	42.84	-76.69
68	-63.78	-25.23
69	2.66	-3.88
70	-3.88	7.68
71	7.68	7.68
72	35.14	35.14

```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 35.33|               -62.75|
|      2|                -56.13|               -47.74|
|      3|                -27.29|               -20.18|
|      4|                 -3.35|                 3.28|
|      5|                 21.51|                29.56|
|      6|                 54.17|                64.31|
|      7|                 72.78|               -35.33|
|      8|                -35.33|               -35.33|
|      9|                -15.95|               -15.95|
|     10|                -15.95|                 7.79|
|     11|                  7.79|                -4.59|
|     12|                 37.16|                92.20|
|     13|                107.88|               -61.61|
|     14|                -50.89|               -50.89|
|     15|                -28.20|               -28.20|
|     16|                 -5.51|                -5.51|
|     17|                 17.17|                17.17|
|     18|                 39.86|                39.86|
|     19|                 50.58|               -18.43|
|     20|                -16.16|               -16.16|
|     21|                 -9.28|                -9.28|
|     22|                  0.29|                 0.29|
|     23|                 12.56|                12.56|
|     24|                 27.52|                27.52|
|     25|                 35.33|               -67.95|
|     26|                -60.67|               -51.60|
|     27|                -29.14|               -21.45|
|     28|                 -3.42|                 3.42|
|     29|                 21.45|                29.14|
|     30|                 51.60|                60.67|
|     31|                 67.95|               -36.52|
|     32|                -36.52|               -36.52|
|     33|                -17.13|               -17.13|
|     34|                -17.13|                 6.61|
|     35|                  6.61|                -5.77|
|     36|                 35.98|                91.01|
|     37|                106.69|               -56.10|
|     38|                -45.38|               -45.38|
|     39|                -22.69|               -22.69|
|     40|                  0.00|                 0.00|
|     41|                 22.69|                22.69|
|     42|                 45.38|                45.38|
|     43|                 56.10|              -106.69|
|     44|                -91.01|               -35.98|
|     45|                  5.77|                -6.61|
|     46|                 -6.61|                17.13|
|     47|                 17.13|                17.13|
|     48|                 36.52|                36.52|
|     49|                 36.52|               -72.78|
```

50	-64.31	-54.17
51	-29.56	-21.51
52	-3.28	3.35
53	20.18	27.29
54	47.74	56.13
55	62.75	-35.33
56	-27.52	-27.52
57	-12.56	-12.56
58	-0.29	-0.29
59	9.28	9.28
60	16.16	16.16
61	18.43	-50.58
62	-39.86	-39.86
63	-17.17	-17.17
64	5.51	5.51
65	28.20	28.20
66	50.89	50.89
67	61.61	-107.88
68	-92.20	-37.16
69	4.59	-7.79
70	-7.79	15.95
71	15.95	15.95
72	35.33	35.33

```
#####################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)         #
#                      VminHmax                     #
#####################################################
-----------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-----------------------------------------------------
|      1|                 56.99|               -53.62|
|      2|                -48.78|               -41.97|
|      3|                -24.96|               -18.65|
|      4|                 -3.96|                 1.86|
|      5|                 16.60|                22.96|
|      6|                 40.31|                47.34|
|      7|                 52.45|               -56.99|
|      8|                -56.99|               -56.99|
|      9|                  0.23|                 0.23|
|     10|                  0.23|                 0.23|
|     11|                  0.23|                -1.62|
|     12|                 21.20|                57.63|
|     13|                 76.18|               -39.43|
|     14|                -31.74|               -31.74|
|     15|                -15.62|               -15.62|
|     16|                  0.50|                 0.50|
|     17|                 16.62|                16.62|
|     18|                 32.74|                32.74|
|     19|                 40.43|               -36.49|
|     20|                -31.61|               -31.61|
|     21|                -18.27|               -18.27|
|     22|                 -1.16|                -1.16|
|     23|                 19.71|                19.71|
|     24|                 44.35|                44.35|
|     25|                 56.99|               -52.96|
|     26|                -47.87|               -40.88|
|     27|                -23.67|               -17.38|
|     28|                 -2.87|                 2.87|
|     29|                 17.38|                23.67|
|     30|                 40.88|                47.87|
|     31|                 52.96|               -57.02|
|     32|                -57.02|               -57.02|
|     33|                  0.21|                 0.21|
|     34|                  0.21|                 0.21|
|     35|                  0.21|                -1.64|
|     36|                 21.18|                57.61|
|     37|                 76.16|               -39.93|
|     38|                -32.24|               -32.24|
|     39|                -16.12|               -16.12|
|     40|                  0.00|                 0.00|
|     41|                 16.12|                16.12|
|     42|                 32.24|                32.24|
|     43|                 39.93|               -76.16|
|     44|                -57.61|               -21.18|
|     45|                  1.64|                -0.21|
|     46|                 -0.21|                -0.21|
|     47|                 -0.21|                -0.21|
|     48|                 57.02|                57.02|
|     49|                 57.02|               -52.45|
```

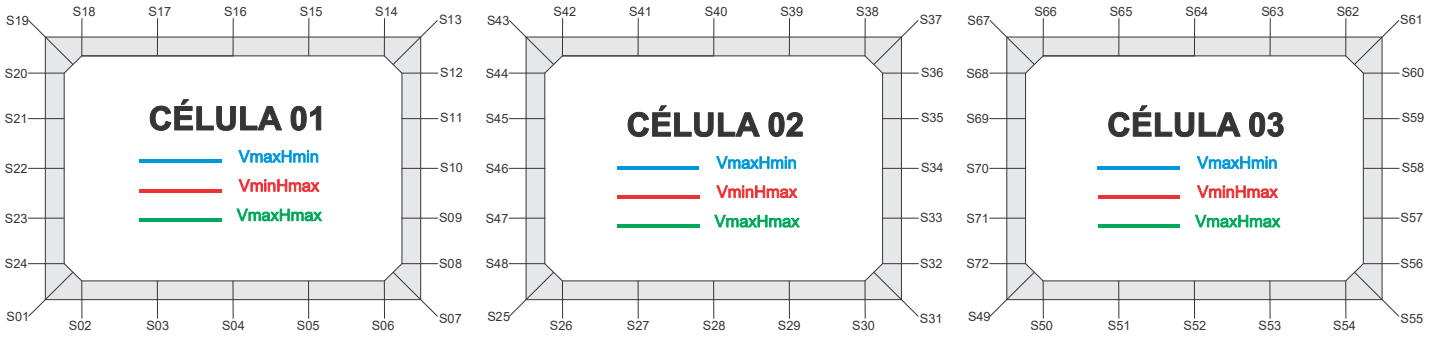
50	-47.34	-40.31
51	-22.96	-16.60
52	-1.86	3.96
53	18.65	24.96
54	41.97	48.78
55	53.62	-56.99
56	-44.35	-44.35
57	-19.71	-19.71
58	1.16	1.16
59	18.27	18.27
60	31.61	31.61
61	36.49	-40.43
62	-32.74	-32.74
63	-16.62	-16.62
64	-0.50	-0.50
65	15.62	15.62
66	31.74	31.74
67	39.43	-76.18
68	-57.63	-21.20
69	1.62	-0.23
70	-0.23	-0.23
71	-0.23	-0.23
72	56.99	56.99

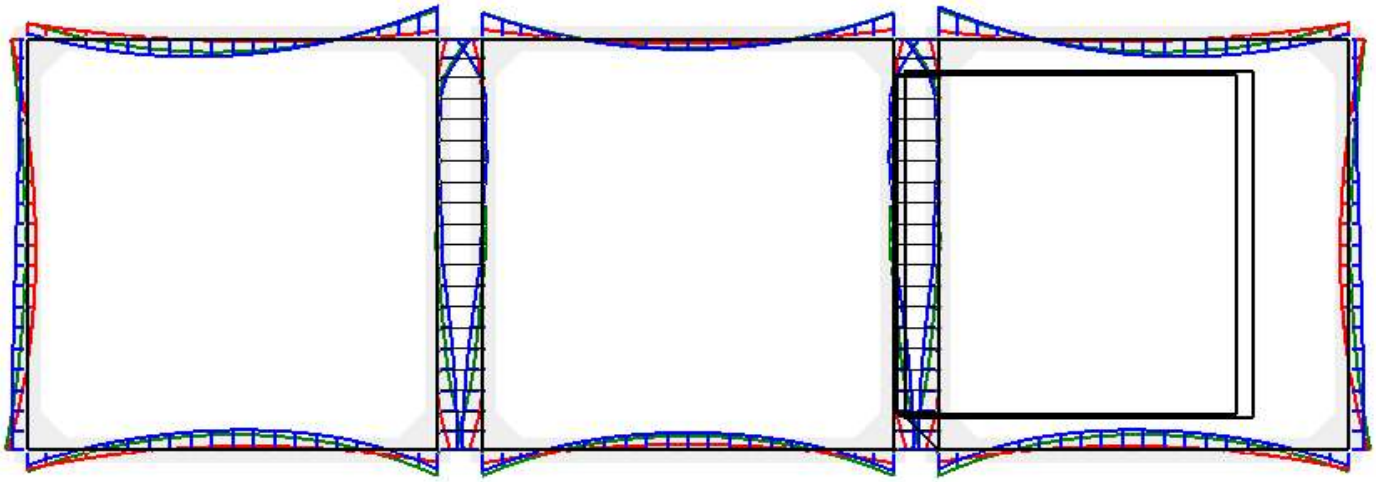
```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VmaxHmax                       #
#######################################################
-------------------------------------------------------
          ESFORÇOS CORTANTE NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|          ESQUERDA (kN)|          DIREITA (kN)|
-------------------------------------------------------
|      1|                 39.15|               -63.52|
|      2|                -56.90|               -48.48|
|      3|                -27.82|               -20.61|
|      4|                 -3.51|                 3.20|
|      5|                 21.53|                29.57|
|      6|                 53.91|                63.88|
|      7|                 72.14|               -39.15|
|      8|                -39.16|               -39.16|
|      9|                -13.57|               -13.57|
|     10|                -13.57|                 6.69|
|     11|                  6.69|                -4.19|
|     12|                 36.20|                90.81|
|     13|                108.01|               -60.86|
|     14|                -50.13|               -50.13|
|     15|                -27.45|               -27.45|
|     16|                 -4.76|                -4.76|
|     17|                 17.93|                17.93|
|     18|                 40.62|                40.62|
|     19|                 51.34|               -23.17|
|     20|                -19.91|               -19.91|
|     21|                -11.02|               -11.02|
|     22|                  0.39|                 0.39|
|     23|                 14.30|                14.30|
|     24|                 30.73|                30.73|
|     25|                 39.15|               -67.98|
|     26|                -60.77|               -51.73|
|     27|                -29.28|               -21.57|
|     28|                 -3.44|                 3.44|
|     29|                 21.57|                29.28|
|     30|                 51.73|                60.77|
|     31|                 67.98|               -40.19|
|     32|                -40.20|               -40.20|
|     33|                -14.61|               -14.61|
|     34|                -14.61|                 5.65|
|     35|                  5.65|                -5.23|
|     36|                 35.16|                89.77|
|     37|                106.98|               -56.10|
|     38|                -45.38|               -45.38|
|     39|                -22.69|               -22.69|
|     40|                  0.00|                 0.00|
|     41|                 22.69|                22.69|
|     42|                 45.38|                45.38|
|     43|                 56.10|              -106.98|
|     44|                -89.77|               -35.16|
|     45|                  5.23|                -5.65|
|     46|                 -5.65|                14.61|
|     47|                 14.61|                14.61|
|     48|                 40.20|                40.20|
|     49|                 40.19|               -72.14|
```

50	-63.88	-53.91
51	-29.57	-21.53
52	-3.20	3.51
53	20.61	27.82
54	48.48	56.90
55	63.52	-39.15
56	-30.73	-30.73
57	-14.30	-14.30
58	-0.39	-0.39
59	11.02	11.02
60	19.91	19.91
61	23.17	-51.34
62	-40.62	-40.62
63	-17.93	-17.93
64	4.76	4.76
65	27.45	27.45
66	50.13	50.13
67	60.86	-108.01
68	-90.81	-36.20
69	4.19	-6.69
70	-6.69	13.57
71	13.57	13.57
72	39.16	39.16

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|                -35.20|                35.20|
|      2|                  7.54|                 7.54|
|      3|                -30.78|               -30.78|
|      4|                -45.10|               -45.10|
|      5|                -35.63|               -35.63|
|      6|                  7.98|                 7.98|
|      7|                 44.52|                44.52|
|      8|                 42.70|                42.70|
|      9|                 29.09|                29.09|
|     10|                 10.55|                10.55|
|     11|                  1.74|                 1.74|
|     12|                 18.54|                18.54|
|     13|                 74.68|               -74.68|
|     14|                -41.21|               -41.21|
|     15|                 11.57|                11.57|
|     16|                 37.51|                37.51|
|     17|                 36.60|                36.60|
|     18|                  8.84|                 8.84|
|     19|                -13.07|               -13.07|
|     20|                -14.75|               -14.75|
|     21|                -19.80|               -19.80|
|     22|                -25.67|               -25.67|
|     23|                -31.04|               -31.04|
|     24|                -34.57|               -34.57|
|     25|                -35.20|                48.04|
|     26|                 15.64|                15.64|
|     27|                -26.76|               -26.76|
|     28|                -39.39|               -39.39|
|     29|                -26.76|               -26.76|
|     30|                 15.64|                15.64|
|     31|                 48.04|                48.04|
|     32|                 44.30|                44.30|
|     33|                 26.54|                26.54|
|     34|                  3.85|                 3.85|
|     35|                 -9.11|                -9.11|
|     36|                  3.54|                 3.54|
|     37|                 57.76|               -57.76|
|     38|                -30.07|               -30.07|
|     39|                 10.20|                10.20|
|     40|                 23.63|                23.63|
|     41|                 10.20|                10.20|
|     42|                -30.07|               -30.07|
|     43|                -57.76|               -57.76|
|     44|                 -3.54|                -3.54|
|     45|                  9.11|                 9.11|
|     46|                 -3.85|                -3.85|
|     47|                -26.54|               -26.54|
|     48|                -44.30|               -44.30|
|     49|                -48.04|                44.52|
```

50	7.98	7.98
51	-35.63	-35.63
52	-45.10	-45.10
53	-30.78	-30.78
54	7.54	7.54
55	35.20	35.20
56	34.57	34.57
57	31.04	31.04
58	25.67	25.67
59	19.80	19.80
60	14.75	14.75
61	13.07	-13.07
62	8.84	8.84
63	36.60	36.60
64	37.51	37.51
65	11.57	11.57
66	-41.21	-41.21
67	-74.68	-74.68
68	-18.54	-18.54
69	-1.74	-1.74
70	-10.55	-10.55
71	-29.09	-29.09
72	-42.70	-42.70

```
#####################################################
#            SOLICITAÇÕES NORMAIS (ELU)             #
#                     VminHmax                      #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -43.92|                43.92|
|      2|                 26.98|                26.98|
|      3|                  1.78|                 1.78|
|      4|                 -8.17|                -8.17|
|      5|                 -4.01|                -4.01|
|      6|                 14.62|                14.62|
|      7|                 28.35|                28.35|
|      8|                  3.77|                 3.77|
|      9|                 -1.55|                -1.55|
|     10|                 -1.46|                -1.46|
|     11|                 -1.38|                -1.38|
|     12|                  0.20|                 0.20|
|     13|                 18.52|               -18.52|
|     14|                 -9.28|                -9.28|
|     15|                  3.01|                 3.01|
|     16|                  4.82|                 4.82|
|     17|                 -3.84|                -3.84|
|     18|                -22.99|               -22.99|
|     19|                -35.39|               -35.39|
|     20|                -18.22|               -18.22|
|     21|                  8.77|                 8.77|
|     22|                 19.31|                19.31|
|     23|                 10.38|                10.38|
|     24|                -21.01|               -21.01|
|     25|                -43.92|                30.36|
|     26|                 15.23|                15.23|
|     27|                 -5.66|                -5.66|
|     28|                -12.20|               -12.20|
|     29|                 -5.66|                -5.66|
|     30|                 15.23|                15.23|
|     31|                 30.36|                30.36|
|     32|                  5.93|                 5.93|
|     33|                  0.93|                 0.93|
|     34|                  1.34|                 1.34|
|     35|                  1.75|                 1.75|
|     36|                  3.64|                 3.64|
|     37|                 22.11|               -22.11|
|     38|                -11.29|               -11.29|
|     39|                  4.43|                 4.43|
|     40|                  9.67|                 9.67|
|     41|                  4.43|                 4.43|
|     42|                -11.29|               -11.29|
|     43|                -22.11|               -22.11|
|     44|                 -3.64|                -3.64|
|     45|                 -1.75|                -1.75|
|     46|                 -1.34|                -1.34|
|     47|                 -0.93|                -0.93|
|     48|                 -5.93|                -5.93|
|     49|                -30.36|                28.35|
```

50	14.62	14.62
51	-4.01	-4.01
52	-8.17	-8.17
53	1.78	1.78
54	26.98	26.98
55	43.92	43.92
56	21.01	21.01
57	-10.38	-10.38
58	-19.31	-19.31
59	-8.77	-8.77
60	18.22	18.22
61	35.39	-35.39
62	-22.99	-22.99
63	-3.84	-3.84
64	4.82	4.82
65	3.01	3.01
66	-9.28	-9.28
67	-18.52	-18.52
68	-0.20	-0.20
69	1.38	1.38
70	1.46	1.46
71	1.55	1.55
72	-3.77	-3.77

```
#####################################################
#            SOLICITAÇÕES NORMAIS (ELU)             #
#                     VmaxHmax                      #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -49.77|                49.77|
|      2|                 19.44|                19.44|
|      3|                -21.84|               -21.84|
|      4|                -34.88|               -34.88|
|      5|                -21.49|               -21.49|
|      6|                 24.32|                24.32|
|      7|                 59.26|                59.26|
|      8|                 41.46|                41.46|
|      9|                 13.24|                13.24|
|     10|                 -4.63|                -4.63|
|     11|                  4.09|                 4.09|
|     12|                 12.57|                12.57|
|     13|                 67.04|               -67.04|
|     14|                -36.54|               -36.54|
|     15|                  9.82|                 9.82|
|     16|                 29.33|                29.33|
|     17|                 21.99|                21.99|
|     18|                -12.20|               -12.20|
|     19|                -37.08|               -37.08|
|     20|                -26.29|               -26.29|
|     21|                 -9.72|                -9.72|
|     22|                 -4.12|                -4.12|
|     23|                -11.49|               -11.49|
|     24|                -33.84|               -33.84|
|     25|                -49.77|                58.82|
|     26|                 26.03|                26.03|
|     27|                -18.28|               -18.28|
|     28|                -31.88|               -31.88|
|     29|                -18.28|               -18.28|
|     30|                 26.03|                26.03|
|     31|                 58.82|                58.82|
|     32|                 40.41|                40.41|
|     33|                 10.87|                10.87|
|     34|                 -8.31|                -8.31|
|     35|                 -0.90|                -0.90|
|     36|                  6.28|                 6.28|
|     37|                 60.14|               -60.14|
|     38|                -32.45|               -32.45|
|     39|                  7.82|                 7.82|
|     40|                 21.25|                21.25|
|     41|                  7.82|                 7.82|
|     42|                -32.45|               -32.45|
|     43|                -60.14|               -60.14|
|     44|                 -6.28|                -6.28|
|     45|                  0.90|                 0.90|
|     46|                  8.31|                 8.31|
|     47|                -10.87|               -10.87|
|     48|                -40.41|               -40.41|
|     49|                -58.82|                59.26|
```

50	24.32	24.32
51	-21.49	-21.49
52	-34.88	-34.88
53	-21.84	-21.84
54	19.44	19.44
55	49.77	49.77
56	33.84	33.84
57	11.49	11.49
58	4.12	4.12
59	9.72	9.72
60	26.29	26.29
61	37.08	-37.08
62	-12.20	-12.20
63	21.99	21.99
64	29.33	29.33
65	9.82	9.82
66	-36.54	-36.54
67	-67.04	-67.04
68	-12.57	-12.57
69	-4.09	-4.09
70	4.63	4.63
71	-13.24	-13.24
72	-41.46	-41.46

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                      VmaxHmin                     #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -34.69|                34.69|
|      2|                  6.36|                 6.36|
|      3|                -32.98|               -32.98|
|      4|                -48.67|               -48.67|
|      5|                -41.48|               -41.48|
|      6|                 -0.71|                -0.71|
|      7|                 34.80|                34.80|
|      8|                 33.35|                33.35|
|      9|                 20.56|                20.56|
|     10|                  0.46|                 0.46|
|     11|                  1.73|                 1.73|
|     12|                 10.06|                10.06|
|     13|                 69.63|               -69.63|
|     14|                -36.97|               -36.97|
|     15|                 14.08|                14.08|
|     16|                 38.27|                38.27|
|     17|                 35.62|                35.62|
|     18|                  6.12|                 6.12|
|     19|                -16.60|               -16.60|
|     20|                -17.90|               -17.90|
|     21|                -22.12|               -22.12|
|     22|                -27.18|               -27.18|
|     23|                -31.73|               -31.73|
|     24|                -34.44|               -34.44|
|     25|                -34.69|                46.98|
|     26|                 14.17|                14.17|
|     27|                -28.92|               -28.92|
|     28|                -42.70|               -42.70|
|     29|                -32.08|               -32.08|
|     30|                  7.97|                 7.97|
|     31|                 39.61|                39.61|
|     32|                 36.21|                36.21|
|     33|                 19.16|                19.16|
|     34|                 -3.56|                -3.56|
|     35|                 -4.93|                -4.93|
|     36|                  0.38|                 0.38|
|     37|                 55.49|               -55.49|
|     38|                -28.30|               -28.30|
|     39|                 10.87|                10.87|
|     40|                 23.20|                23.20|
|     41|                  8.69|                 8.69|
|     42|                -32.68|               -32.68|
|     43|                -60.87|               -60.87|
|     44|                 -3.26|                -3.26|
|     45|                  0.81|                 0.81|
|     46|                 -2.17|                -2.17|
|     47|                -26.52|               -26.52|
|     48|                -43.57|               -43.57|
|     49|                -46.98|                44.14|
```

50	6.61	6.61
51	-38.24	-38.24
52	-49.01	-49.01
53	-36.99	-36.99
54	-1.89	-1.89
55	24.38	24.38
56	23.87	23.87
57	20.63	20.63
58	15.54	15.54
59	9.94	9.94
60	5.18	5.18
61	3.63	-3.63
62	17.06	17.06
63	42.17	42.17
64	40.42	40.42
65	11.83	11.83
66	-43.61	-43.61
67	-78.30	-78.30
68	-21.48	-21.48
69	-12.45	-12.45
70	-10.11	-10.11
71	-29.11	-29.11
72	-42.45	-42.45

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                     VminHmax                      #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -43.89|                43.89|
|      2|                 26.95|                26.95|
|      3|                  1.74|                 1.74|
|      4|                 -8.25|                -8.25|
|      5|                 -4.14|                -4.14|
|      6|                 14.43|                14.43|
|      7|                 28.16|                28.16|
|      8|                  3.31|                 3.31|
|      9|                 -1.10|                -1.10|
|     10|                 -0.99|                -0.99|
|     11|                 -0.88|                -0.88|
|     12|                  0.09|                 0.09|
|     13|                 18.63|               -18.63|
|     14|                 -9.38|                -9.38|
|     15|                  2.91|                 2.91|
|     16|                  4.73|                 4.73|
|     17|                 -3.94|                -3.94|
|     18|                -23.08|               -23.08|
|     19|                -35.48|               -35.48|
|     20|                -18.30|               -18.30|
|     21|                  8.71|                 8.71|
|     22|                 19.28|                19.28|
|     23|                 10.38|                10.38|
|     24|                -21.00|               -21.00|
|     25|                -43.89|                30.21|
|     26|                 15.00|                15.00|
|     27|                 -6.00|                -6.00|
|     28|                -12.67|               -12.67|
|     29|                 -6.38|                -6.38|
|     30|                 14.18|                14.18|
|     31|                 29.17|                29.17|
|     32|                  4.53|                 4.53|
|     33|                  0.40|                 0.40|
|     34|                  0.73|                 0.73|
|     35|                  1.06|                 1.06|
|     36|                  2.27|                 2.27|
|     37|                 21.07|               -21.07|
|     38|                -10.35|               -10.35|
|     39|                  5.13|                 5.13|
|     40|                 10.13|                10.13|
|     41|                  4.66|                 4.66|
|     42|                -11.29|               -11.29|
|     43|                -22.23|               -22.23|
|     44|                 -3.55|                -3.55|
|     45|                 -2.26|                -2.26|
|     46|                 -1.84|                -1.84|
|     47|                 -1.41|                -1.41|
|     48|                 -5.50|                -5.50|
|     49|                -30.21|                27.72|
```

50	14.21	14.21
51	-3.99	-3.99
52	-7.72	-7.72
53	2.79	2.79
54	28.65	28.65
55	45.86	45.86
56	22.95	22.95
57	-8.46	-8.46
58	-17.40	-17.40
59	-6.87	-6.87
60	20.11	20.11
61	37.28	-37.28
62	-24.64	-24.64
63	-4.98	-4.98
64	4.20	4.20
65	2.90	2.90
66	-8.88	-8.88
67	-17.89	-17.89
68	0.75	0.75
69	1.61	1.61
70	1.59	1.59
71	1.57	1.57
72	-2.92	-2.92

```
#####################################################
#          SOLICITAÇÕES TANGENCIAIS (ELU)           #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -50.03|                50.03|
|      2|                 19.28|                19.28|
|      3|                -22.94|               -22.94|
|      4|                -37.35|               -37.35|
|      5|                -25.97|               -25.97|
|      6|                 17.65|                17.65|
|      7|                 51.92|                51.92|
|      8|                 34.27|                34.27|
|      9|                  8.25|                 8.25|
|     10|                 -5.53|                -5.53|
|     11|                  1.64|                 1.64|
|     12|                  7.35|                 7.35|
|     13|                 64.10|               -64.10|
|     14|                -34.05|               -34.05|
|     15|                 11.34|                11.34|
|     16|                 29.88|                29.88|
|     17|                 21.57|                21.57|
|     18|                -13.59|               -13.59|
|     19|                -38.92|               -38.92|
|     20|                -27.98|               -27.98|
|     21|                -11.09|               -11.09|
|     22|                 -5.16|                -5.16|
|     23|                -12.22|               -12.22|
|     24|                -34.25|               -34.25|
|     25|                -50.03|                57.36|
|     26|                 24.38|                24.38|
|     27|                -20.17|               -20.17|
|     28|                -34.40|               -34.40|
|     29|                -22.08|               -22.08|
|     30|                 20.70|                20.70|
|     31|                 53.04|                53.04|
|     32|                 34.60|                34.60|
|     33|                  7.19|                 7.19|
|     34|                 -7.67|                -7.67|
|     35|                 -1.39|                -1.39|
|     36|                  3.22|                 3.22|
|     37|                 58.38|               -58.38|
|     38|                -30.95|               -30.95|
|     39|                  8.76|                 8.76|
|     40|                 21.62|                21.62|
|     41|                  7.63|                 7.63|
|     42|                -33.21|               -33.21|
|     43|                -61.16|               -61.16|
|     44|                 -5.19|                -5.19|
|     45|                 -1.19|                -1.19|
|     46|                  4.28|                 4.28|
|     47|                -11.20|               -11.20|
|     48|                -38.92|               -38.92|
|     49|                -57.36|                57.73|
```

50	22.29	22.29
51	-23.72	-23.72
52	-37.12	-37.12
53	-24.66	-24.66
54	15.29	15.29
55	44.88	44.88
56	28.85	28.85
57	6.26	6.26
58	-1.34	-1.34
59	4.03	4.03
60	20.37	20.37
61	31.05	-31.05
62	-6.89	-6.89
63	25.72	25.72
64	31.49	31.49
65	10.42	10.42
66	-37.51	-37.51
67	-68.73	-68.73
68	-13.05	-13.05
69	-7.28	-7.28
70	0.14	0.14
71	-13.57	-13.57
72	-39.83	-39.83

```
#####################################################
#             VERIFICAÇÃO DA FADIGA (ELS)           #
#                      VmaxHmin                     #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -31.41|                31.41|
|      2|                 11.45|                11.45|
|      3|                -15.59|               -15.59|
|      4|                -24.04|               -24.04|
|      5|                -15.08|               -15.08|
|      6|                 15.57|                15.57|
|      7|                 39.05|                39.05|
|      8|                 28.41|                28.41|
|      9|                 10.10|                10.10|
|     10|                 -3.50|                -3.50|
|     11|                  3.10|                 3.10|
|     12|                  8.68|                 8.68|
|     13|                 44.05|               -44.05|
|     14|                -24.07|               -24.07|
|     15|                  6.50|                 6.50|
|     16|                 19.75|                19.75|
|     17|                 15.70|                15.70|
|     18|                 -5.66|                -5.66|
|     19|                -21.40|               -21.40|
|     20|                -16.23|               -16.23|
|     21|                 -7.89|                -7.89|
|     22|                 -4.90|                -4.90|
|     23|                 -9.01|                -9.01|
|     24|                -21.97|               -21.97|
|     25|                -31.41|                38.64|
|     26|                 16.80|                16.80|
|     27|                -12.65|               -12.65|
|     28|                -21.67|               -21.67|
|     29|                -12.65|               -12.65|
|     30|                 16.80|                16.80|
|     31|                 38.64|                38.64|
|     32|                 27.56|                27.56|
|     33|                  8.26|                 8.26|
|     34|                 -6.31|                -6.31|
|     35|                 -0.69|                -0.69|
|     36|                  3.91|                 3.91|
|     37|                 38.84|               -38.84|
|     38|                -20.98|               -20.98|
|     39|                  4.98|                 4.98|
|     40|                 13.64|                13.64|
|     41|                  4.98|                 4.98|
|     42|                -20.98|               -20.98|
|     43|                -38.84|               -38.84|
|     44|                 -3.91|                -3.91|
|     45|                  0.69|                 0.69|
|     46|                  6.31|                 6.31|
|     47|                 -8.26|                -8.26|
|     48|                -27.56|               -27.56|
|     49|                -38.64|                39.05|
```

50	15.57	15.57
51	-15.08	-15.08
52	-24.04	-24.04
53	-15.59	-15.59
54	11.45	11.45
55	31.41	31.41
56	21.97	21.97
57	9.01	9.01
58	4.90	4.90
59	7.89	7.89
60	16.23	16.23
61	21.40	-21.40
62	-5.66	-5.66
63	15.70	15.70
64	19.75	19.75
65	6.50	6.50
66	-24.07	-24.07
67	-44.05	-44.05
68	-8.68	-8.68
69	-3.10	-3.10
70	3.50	3.50
71	-10.10	-10.10
72	-28.41	-28.41

```
#######################################################
#             VERIFICAÇÃO DA FADIGA (ELS)             #
#                      VminHmax                       #
#######################################################
-------------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-------------------------------------------------------
|      1|                -34.37|                34.37|
|      2|                 18.79|                18.79|
|      3|                 -3.35|                -3.35|
|      4|                -10.95|               -10.95|
|      5|                 -5.16|                -5.16|
|      6|                 15.13|                15.13|
|      7|                 29.93|                29.93|
|      8|                 11.79|                11.79|
|      9|                 -0.69|                -0.69|
|     10|                 -0.43|                -0.43|
|     11|                 -0.18|                -0.18|
|     12|                  2.38|                 2.38|
|     13|                 22.24|               -22.24|
|     14|                -11.77|               -11.77|
|     15|                  3.17|                 3.17|
|     16|                  7.64|                 7.64|
|     17|                  1.63|                 1.63|
|     18|                -14.86|               -14.86|
|     19|                -26.04|               -26.04|
|     20|                -14.67|               -14.67|
|     21|                  3.31|                 3.31|
|     22|                 10.27|                10.27|
|     23|                  3.88|                 3.88|
|     24|                -18.22|               -18.22|
|     25|                -34.37|                30.52|
|     26|                 15.39|                15.39|
|     27|                 -5.53|                -5.53|
|     28|                -12.09|               -12.09|
|     29|                 -5.53|                -5.53|
|     30|                 15.39|                15.39|
|     31|                 30.52|                30.52|
|     32|                 12.40|                12.40|
|     33|                 -0.03|                -0.03|
|     34|                  0.26|                 0.26|
|     35|                  0.56|                 0.56|
|     36|                  3.16|                 3.16|
|     37|                 23.04|               -23.04|
|     38|                -12.22|               -12.22|
|     39|                  3.50|                 3.50|
|     40|                  8.74|                 8.74|
|     41|                  3.50|                 3.50|
|     42|                -12.22|               -12.22|
|     43|                -23.04|               -23.04|
|     44|                 -3.16|                -3.16|
|     45|                 -0.56|                -0.56|
|     46|                 -0.26|                -0.26|
|     47|                  0.03|                 0.03|
|     48|                -12.40|               -12.40|
|     49|                -30.52|                29.93|
```

50	15.13	15.13
51	-5.16	-5.16
52	-10.95	-10.95
53	-3.35	-3.35
54	18.79	18.79
55	34.37	34.37
56	18.22	18.22
57	-3.88	-3.88
58	-10.27	-10.27
59	-3.31	-3.31
60	14.67	14.67
61	26.04	-26.04
62	-14.86	-14.86
63	1.63	1.63
64	7.64	7.64
65	3.17	3.17
66	-11.77	-11.77
67	-22.24	-22.24
68	-2.38	-2.38
69	0.18	0.18
70	0.43	0.43
71	0.69	0.69
72	-11.79	-11.79

```
#####################################################
#             VERIFICAÇÃO DA FADIGA (ELS)           #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -33.86|                33.86|
|      2|                 13.53|                13.53|
|      3|                -14.19|               -14.19|
|      4|                -22.94|               -22.94|
|      5|                -13.99|               -13.99|
|      6|                 16.54|                16.54|
|      7|                 39.76|                39.76|
|      8|                 27.29|                27.29|
|      9|                  8.23|                 8.23|
|     10|                 -2.89|                -2.89|
|     11|                  2.56|                 2.56|
|     12|                  8.03|                 8.03|
|     13|                 43.10|               -43.10|
|     14|                -23.48|               -23.48|
|     15|                  6.29|                 6.29|
|     16|                 18.76|                18.76|
|     17|                 13.92|                13.92|
|     18|                 -8.23|                -8.23|
|     19|                -24.32|               -24.32|
|     20|                -17.12|               -17.12|
|     21|                 -5.94|                -5.94|
|     22|                 -2.11|                -2.11|
|     23|                 -7.18|                -7.18|
|     24|                -22.72|               -22.72|
|     25|                -33.86|                39.50|
|     26|                 17.63|                17.63|
|     27|                -11.97|               -11.97|
|     28|                -21.06|               -21.06|
|     29|                -11.97|               -11.97|
|     30|                 17.63|                17.63|
|     31|                 39.50|                39.50|
|     32|                 26.65|                26.65|
|     33|                  6.76|                 6.76|
|     34|                 -5.19|                -5.19|
|     35|                 -0.57|                -0.57|
|     36|                  4.07|                 4.07|
|     37|                 38.76|               -38.76|
|     38|                -20.91|               -20.91|
|     39|                  5.06|                 5.06|
|     40|                 13.71|                13.71|
|     41|                  5.06|                 5.06|
|     42|                -20.91|               -20.91|
|     43|                -38.76|               -38.76|
|     44|                 -4.07|                -4.07|
|     45|                  0.57|                 0.57|
|     46|                  5.19|                 5.19|
|     47|                 -6.76|                -6.76|
|     48|                -26.65|               -26.65|
|     49|                -39.50|                39.76|
```

50	16.54	16.54
51	-13.99	-13.99
52	-22.94	-22.94
53	-14.19	-14.19
54	13.53	13.53
55	33.86	33.86
56	22.72	22.72
57	7.18	7.18
58	2.11	2.11
59	5.94	5.94
60	17.12	17.12
61	24.32	-24.32
62	-8.23	-8.23
63	13.92	13.92
64	18.76	18.76
65	6.29	6.29
66	-23.48	-23.48
67	-43.10	-43.10
68	-8.03	-8.03
69	-2.56	-2.56
70	2.89	2.89
71	-8.23	-8.23
72	-27.29	-27.29

```
#######################################################
#             VERIFICAÇÃO DA FADIGA (ELS)             #
#                      VminHmin                       #
#######################################################
-------------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-------------------------------------------------------
|      1|                -25.35|                25.35|
|      2|                 11.07|                11.07|
|      3|                 -8.52|                -8.52|
|      4|                -14.71|               -14.71|
|      5|                 -8.48|                -8.48|
|      6|                 12.46|                12.46|
|      7|                 28.16|                28.16|
|      8|                 17.62|                17.62|
|      9|                  3.70|                 3.70|
|     10|                 -1.29|                -1.29|
|     11|                  1.24|                 1.24|
|     12|                  4.55|                 4.55|
|     13|                 25.62|               -25.62|
|     14|                -13.92|               -13.92|
|     15|                  3.68|                 3.68|
|     16|                 10.81|                10.81|
|     17|                  7.46|                 7.46|
|     18|                 -6.37|                -6.37|
|     19|                -16.32|               -16.32|
|     20|                -11.06|               -11.06|
|     21|                 -2.52|                -2.52|
|     22|                  0.67|                 0.67|
|     23|                 -3.24|                -3.24|
|     24|                -16.00|               -16.00|
|     25|                -25.35|                28.07|
|     26|                 13.03|                13.03|
|     27|                 -7.47|                -7.47|
|     28|                -13.80|               -13.80|
|     29|                 -7.47|                -7.47|
|     30|                 13.03|                13.03|
|     31|                 28.07|                28.07|
|     32|                 17.33|                17.33|
|     33|                  3.00|                 3.00|
|     34|                 -2.42|                -2.42|
|     35|                 -0.31|                -0.31|
|     36|                  2.58|                 2.58|
|     37|                 23.45|               -23.45|
|     38|                -12.63|               -12.63|
|     39|                  3.09|                 3.09|
|     40|                  8.33|                 8.33|
|     41|                  3.09|                 3.09|
|     42|                -12.63|               -12.63|
|     43|                -23.45|               -23.45|
|     44|                 -2.58|                -2.58|
|     45|                  0.31|                 0.31|
|     46|                  2.42|                 2.42|
|     47|                 -3.00|                -3.00|
|     48|                -17.33|               -17.33|
|     49|                -28.07|                28.16|
```

50	12.46	12.46
51	-8.48	-8.48
52	-14.71	-14.71
53	-8.52	-8.52
54	11.07	11.07
55	25.35	25.35
56	16.00	16.00
57	3.24	3.24
58	-0.67	-0.67
59	2.52	2.52
60	11.06	11.06
61	16.32	-16.32
62	-6.37	-6.37
63	7.46	7.46
64	10.81	10.81
65	3.68	3.68
66	-13.92	-13.92
67	-25.62	-25.62
68	-4.55	-4.55
69	-1.24	-1.24
70	1.29	1.29
71	-3.70	-3.70
72	-17.62	-17.62

```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VmaxHmin                       #
#######################################################
-------------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-------------------------------------------------------
|      1|                -29.14|                29.14|
|      2|                 11.31|                11.31|
|      3|                -12.94|               -12.94|
|      4|                -20.54|               -20.54|
|      5|                -12.60|               -12.60|
|      6|                 14.40|                14.40|
|      7|                 34.97|                34.97|
|      8|                 24.37|                24.37|
|      9|                  7.70|                 7.70|
|     10|                 -2.67|                -2.67|
|     11|                  2.40|                 2.40|
|     12|                  7.13|                 7.13|
|     13|                 37.14|               -37.14|
|     14|                -20.26|               -20.26|
|     15|                  5.44|                 5.44|
|     16|                 16.40|                16.40|
|     17|                 12.61|                12.61|
|     18|                 -5.93|                -5.93|
|     19|                -19.50|               -19.50|
|     20|                -14.29|               -14.29|
|     21|                 -5.88|                -5.88|
|     22|                 -2.81|                -2.81|
|     23|                 -6.85|                -6.85|
|     24|                -19.73|               -19.73|
|     25|                -29.14|                34.68|
|     26|                 15.38|                15.38|
|     27|                -10.70|               -10.70|
|     28|                -18.71|               -18.71|
|     29|                -10.70|               -10.70|
|     30|                 15.38|                15.38|
|     31|                 34.68|                34.68|
|     32|                 23.72|                23.72|
|     33|                  6.29|                 6.29|
|     34|                 -4.85|                -4.85|
|     35|                 -0.55|                -0.55|
|     36|                  3.41|                 3.41|
|     37|                 33.07|               -33.07|
|     38|                -17.85|               -17.85|
|     39|                  4.27|                 4.27|
|     40|                 11.65|                11.65|
|     41|                  4.27|                 4.27|
|     42|                -17.85|               -17.85|
|     43|                -33.07|               -33.07|
|     44|                 -3.41|                -3.41|
|     45|                  0.55|                 0.55|
|     46|                  4.85|                 4.85|
|     47|                 -6.29|                -6.29|
|     48|                -23.72|               -23.72|
|     49|                -34.68|                34.97|
```

50	14.40	14.40
51	-12.60	-12.60
52	-20.54	-20.54
53	-12.94	-12.94
54	11.31	11.31
55	29.14	29.14
56	19.73	19.73
57	6.85	6.85
58	2.81	2.81
59	5.88	5.88
60	14.29	14.29
61	19.50	-19.50
62	-5.93	-5.93
63	12.61	12.61
64	16.40	16.40
65	5.44	5.44
66	-20.26	-20.26
67	-37.14	-37.14
68	-7.13	-7.13
69	-2.40	-2.40
70	2.67	2.67
71	-7.70	-7.70
72	-24.37	-24.37

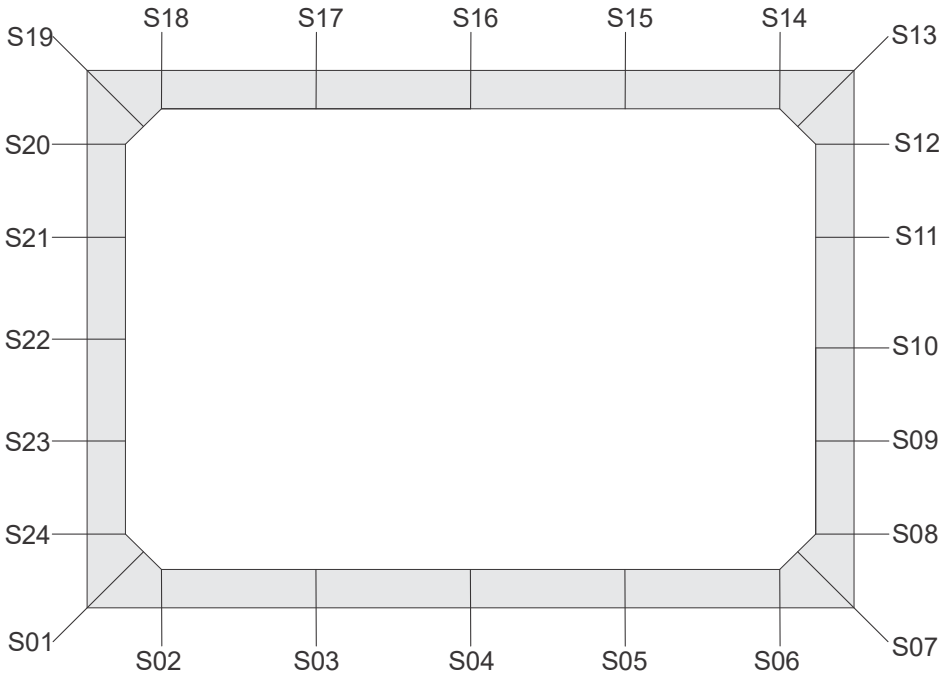
```
#######################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)           #
#                      VminHmax                       #
#######################################################
-------------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-------------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-------------------------------------------------------
|      1|                -32.88|                32.88|
|      2|                 17.52|                17.52|
|      3|                 -4.16|                -4.16|
|      4|                -11.47|               -11.47|
|      5|                 -5.51|                -5.51|
|      6|                 14.97|                14.97|
|      7|                 29.93|                29.93|
|      8|                 12.84|                12.84|
|      9|                 -0.39|                -0.39|
|     10|                 -0.24|                -0.24|
|     11|                 -0.09|                -0.09|
|     12|                  2.75|                 2.75|
|     13|                 22.82|               -22.82|
|     14|                -12.15|               -12.15|
|     15|                  3.24|                 3.24|
|     16|                  8.16|                 8.16|
|     17|                  2.59|                 2.59|
|     18|                -13.45|               -13.45|
|     19|                -24.43|               -24.43|
|     20|                -14.19|               -14.19|
|     21|                  2.22|                 2.22|
|     22|                  8.74|                 8.74|
|     23|                  2.92|                 2.92|
|     24|                -17.70|               -17.70|
|     25|                -32.88|                30.34|
|     26|                 15.21|                15.21|
|     27|                 -5.68|                -5.68|
|     28|                -12.21|               -12.21|
|     29|                 -5.68|                -5.68|
|     30|                 15.21|                15.21|
|     31|                 30.34|                30.34|
|     32|                 13.23|                13.23|
|     33|                  0.00|                 0.00|
|     34|                  0.13|                 0.13|
|     35|                  0.27|                 0.27|
|     36|                  3.09|                 3.09|
|     37|                 23.16|               -23.16|
|     38|                -12.33|               -12.33|
|     39|                  3.39|                 3.39|
|     40|                  8.63|                 8.63|
|     41|                  3.39|                 3.39|
|     42|                -12.33|               -12.33|
|     43|                -23.16|               -23.16|
|     44|                 -3.09|                -3.09|
|     45|                 -0.27|                -0.27|
|     46|                 -0.13|                -0.13|
|     47|                  0.00|                 0.00|
|     48|                -13.23|               -13.23|
|     49|                -30.34|                29.93|
```

50	14.97	14.97
51	-5.51	-5.51
52	-11.47	-11.47
53	-4.16	-4.16
54	17.52	17.52
55	32.88	32.88
56	17.70	17.70
57	-2.92	-2.92
58	-8.74	-8.74
59	-2.22	-2.22
60	14.19	14.19
61	24.43	-24.43
62	-13.45	-13.45
63	2.59	2.59
64	8.16	8.16
65	3.24	3.24
66	-12.15	-12.15
67	-22.82	-22.82
68	-2.75	-2.75
69	0.09	0.09
70	0.24	0.24
71	0.39	0.39
72	-12.84	-12.84

```
#####################################################
#           VERIFICAÇÃO DA FISSURAÇÃO (ELS)         #
#                      VmaxHmax                     #
#####################################################
-----------------------------------------------------
            MOMENTO FLETOR NAS SEÇÕES DE INTERESSE
-----------------------------------------------------
|  SEÇÃO|       ESQUERDA (kN.m)|       DIREITA (kN.m)|
-----------------------------------------------------
|      1|                -30.67|                30.67|
|      2|                 12.61|                12.61|
|      3|                -12.06|               -12.06|
|      4|                -19.86|               -19.86|
|      5|                -11.93|               -11.93|
|      6|                 15.01|                15.01|
|      7|                 35.41|                35.41|
|      8|                 23.67|                23.67|
|      9|                  6.53|                 6.53|
|     10|                 -2.29|                -2.29|
|     11|                  2.06|                 2.06|
|     12|                  6.72|                 6.72|
|     13|                 36.55|               -36.55|
|     14|                -19.90|               -19.90|
|     15|                  5.32|                 5.32|
|     16|                 15.78|                15.78|
|     17|                 11.50|                11.50|
|     18|                 -7.53|                -7.53|
|     19|                -21.32|               -21.32|
|     20|                -14.85|               -14.85|
|     21|                 -4.66|                -4.66|
|     22|                 -1.07|                -1.07|
|     23|                 -5.70|                -5.70|
|     24|                -20.20|               -20.20|
|     25|                -30.67|                35.22|
|     26|                 15.90|                15.90|
|     27|                -10.28|               -10.28|
|     28|                -18.34|               -18.34|
|     29|                -10.28|               -10.28|
|     30|                 15.90|                15.90|
|     31|                 35.22|                35.22|
|     32|                 23.16|                23.16|
|     33|                  5.35|                 5.35|
|     34|                 -4.15|                -4.15|
|     35|                 -0.47|                -0.47|
|     36|                  3.51|                 3.51|
|     37|                 33.02|               -33.02|
|     38|                -17.80|               -17.80|
|     39|                  4.32|                 4.32|
|     40|                 11.69|                11.69|
|     41|                  4.32|                 4.32|
|     42|                -17.80|               -17.80|
|     43|                -33.02|               -33.02|
|     44|                 -3.51|                -3.51|
|     45|                  0.47|                 0.47|
|     46|                  4.15|                 4.15|
|     47|                 -5.35|                -5.35|
|     48|                -23.16|               -23.16|
|     49|                -35.22|                35.41|
```

50	15.01	15.01
51	-11.93	-11.93
52	-19.86	-19.86
53	-12.06	-12.06
54	12.61	12.61
55	30.67	30.67
56	20.20	20.20
57	5.70	5.70
58	1.07	1.07
59	4.66	4.66
60	14.85	14.85
61	21.32	-21.32
62	-7.53	-7.53
63	11.50	11.50
64	15.78	15.78
65	5.32	5.32
66	-19.90	-19.90
67	-36.55	-36.55
68	-6.72	-6.72
69	-2.06	-2.06
70	2.29	2.29
71	-6.53	-6.53
72	-23.67	-23.67

ARMADURAS P/ SOLICITAÇÕES NORMAIS



Seção	As-CA60ext(cm²/m)	As-CA50ext(cm²/m)	As-CA60int(cm²/m)	As-CA50int(cm²/m)
1	6.57	7.88	1.26	1.26
2	3.35	4.02	3.10	3.72
3	3.10	3.72	3.84	4.61
4	3.10	3.72	5.71	6.85
5	3.10	3.72	4.47	5.36
6	3.10	3.72	3.10	3.72
7	6.57	7.88	1.26	1.26
8	4.46	5.35	3.10	3.72
9	3.10	3.72	3.10	3.72
10	3.10	3.72	3.10	3.72
11	3.10	3.72	3.10	3.72
12	3.10	3.72	3.10	3.72
13	6.57	7.88	1.26	1.26
14	5.30	6.36	3.10	3.72
15	3.10	3.72	3.10	3.72
16	3.10	3.72	4.82	5.78
17	3.10	3.72	4.70	5.64
18	3.10	3.72	3.10	3.72
19	6.57	7.88	1.26	1.26
20	3.10	3.72	3.10	3.72
21	3.10	3.72	3.10	3.72
22	3.10	3.72	3.10	3.72
23	3.10	3.72	3.10	3.72
24	3.19	3.83	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

Seção	Nsdmax(kN)	Msdmax(kN.m)	Nsdmin(kN)	Msdmin(kN.m)	DSs(MPa)	Asad(cm²/m)
12	-73.42	8.03	-44.59	4.55	17.87	0.00
13	-71.67	43.10	-18.62	25.62	46.03	0.00
14	-25.90	23.48	-18.62	13.92	81.03	0.00
16	-18.31	19.75	-40.72	7.64	159.13	0.00
18	-25.90	8.23	-18.62	6.37	13.14	0.00
19	-59.93	24.32	-18.62	16.32	13.50	0.00
20	-61.68	17.12	-38.77	11.06	43.19	0.00

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(cm²/m)	ro	Vsd(kN)	Vrd1(kN)	Vrd2(kN)	Asw(cm²/m/m)
1	7.88	2.19E-003	97.82	212.54	0.00	0.00
2	4.02	2.51E-003	91.98	106.55	0.00	0.00
6	3.72	2.32E-003	100.71	105.86	0.00	0.00
7	7.88	2.19E-003	110.51	205.21	0.00	0.00
13	7.88	2.19E-003	111.01	208.10	0.00	0.00
14	6.36	3.98E-003	51.87	114.68	0.00	0.00
18	3.72	2.32E-003	66.98	108.74	0.00	0.00
19	7.88	2.19E-003	76.68	211.40	0.00	0.00

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

VERIFICAÇÃO DA FISSURAÇÃO

VmaxHmin

Seção	As(cm²/m)	Nsd(kN)	Msd(kN.m)	Ø(mm)	w(mm)
1	7.88	-17.67	29.14	6.30	0.013
2	4.02	-35.33	11.31	6.30	0.030
3	4.61	-35.33	12.94	6.30	0.031
4	6.85	-35.33	20.54	6.30	0.040
5	5.36	-35.33	12.60	6.30	0.022
6	3.72	-35.33	14.40	6.30	0.061
7	7.88	-56.72	34.97	6.30	0.014
8	5.35	-76.36	24.37	6.30	0.078
9	3.72	-73.11	7.70	6.30	0.006
10	3.72	-69.86	2.67	6.30	0.000
11	3.72	-66.61	2.40	6.30	0.000
12	3.72	-63.36	7.13	6.30	0.006
13	7.88	-40.02	37.14	6.30	0.019
14	6.36	-18.43	20.26	6.30	0.049
15	3.72	-18.43	5.44	8.00	0.010
16	5.78	-18.43	16.40	8.00	0.048
17	5.64	-18.43	12.61	8.00	0.029
18	3.72	-18.43	5.93	6.30	0.010
19	7.88	-34.51	19.50	6.30	0.004
20	3.72	-52.33	14.29	6.30	0.052
21	3.72	-55.58	5.88	6.30	0.004
22	3.72	-58.83	2.81	6.30	0.000
23	3.72	-62.08	6.85	6.30	0.005
24	3.83	-65.33	19.73	6.30	0.098

VminHmax

Seção	As(cm²/m)	Nsd(kN)	Msd(kN.m)	Ø(mm)	w(mm)
1	7.88	-28.50	32.88	6.30	0.015
2	4.02	-56.99	17.52	6.30	0.071
3	4.61	-56.99	4.16	6.30	0.000
4	6.85	-56.99	11.47	6.30	0.008
5	5.36	-56.99	5.51	6.30	0.001
6	3.72	-56.99	14.97	6.30	0.056
7	7.88	-56.46	29.93	6.30	0.010
8	5.35	-54.18	12.84	6.30	0.019
9	3.72	-50.93	0.39	6.30	0.000
10	3.72	-47.68	0.24	6.30	0.000
11	3.72	-44.43	0.09	6.30	0.000
12	3.72	-41.18	2.75	6.30	0.000
13	7.88	-37.96	22.82	6.30	0.006
14	6.36	-36.49	12.15	6.30	0.014
15	3.72	-36.49	3.24	8.00	0.001
16	5.78	-36.49	8.16	8.00	0.008
17	5.64	-36.49	2.59	8.00	0.000
18	3.72	-36.49	13.45	6.30	0.052
19	7.88	-38.46	24.43	6.30	0.007
20	3.72	-42.18	14.19	6.30	0.056
21	3.72	-45.43	2.22	6.30	0.000
22	3.72	-48.68	8.74	6.30	0.015
23	3.72	-51.93	2.92	6.30	0.000
24	3.83	-55.18	17.70	6.30	0.081

VERIFICAÇÃO DA FISSURAÇÃO (CONT.)

VmaxHmax

Seção	As(cm²/m)	Nsd(kN)	Msd(kN.m)	Ø(mm)	w(mm)
1	7.88	-19.58	30.67	6.30	0.014
2	4.02	-39.15	12.61	6.30	0.037
3	4.61	-39.15	12.06	6.30	0.026
4	6.85	-39.15	19.86	6.30	0.036
5	5.36	-39.15	11.93	6.30	0.018
6	3.72	-39.15	15.01	6.30	0.066
7	7.88	-58.26	35.41	6.30	0.015
8	5.35	-75.61	23.67	6.30	0.073
9	3.72	-72.36	6.53	6.30	0.003
10	3.72	-69.11	2.29	6.30	0.000
11	3.72	-65.86	2.06	6.30	0.000
12	3.72	-62.61	6.72	6.30	0.005
13	7.88	-42.01	36.55	6.30	0.018
14	6.36	-23.17	19.90	6.30	0.046
15	3.72	-23.17	5.32	8.00	0.008
16	5.78	-23.17	15.78	8.00	0.043
17	5.64	-23.17	11.50	8.00	0.023
18	3.72	-23.17	7.53	6.30	0.016
19	7.88	-37.26	21.32	6.30	0.005
20	3.72	-53.09	14.85	6.30	0.057
21	3.72	-56.34	4.66	6.30	0.001
22	3.72	-59.59	1.07	6.30	0.000
23	3.72	-62.84	5.70	6.30	0.002
24	3.83	-66.09	20.20	6.30	0.103

NOTA:
* Seção com aumento na armadura devido à fissuração.