METRÔ - DF	ENGEVIX	CODIFICAÇÃO ENGEVIX P00160/00-NF-MC-1015

SETOR	SAMAMBAIA – RA XII
ENDEREÇO	QN 103 – CONJ 1 – LOTE 1
PROPRIETÁRIO	METRÔ - DF
AUTOR DO PROJETO	RICARDO LIMA DE MELLO
RESPONSÁVEL TÉCNICO	

METRÔ - DF

RICARDO LIMA DE MELLO CREA N° 0601856341/SP

METRÔ - DF

UNIDADE DE CONSTRUÇÃO	SUBESTAÇÃO RETIFICADORA – SR 63
LOCAL	SAMAMBAIA
ESPECIALIDADE / SUBESPECIALIDADE	ESTRUTURA/ ESTRUTURA DE CONCRETO
TIPO/ ESPECIFICAÇÃO DO DOCUMENTO	MEMORIAL DE CÁLCULO
AREA DE CONST.	
CODIFICAÇÃO	MC.4/91.7G/H1.003
REVISÃO	0A

VISTO	
DATA	29/08/2013
APROVADO	
DATA	18/12/2013
ESCALA	
ETAPA DO PROJ.	BÁSICO
N MICROFILME	
FOLHA	01/26

0A	APROVADO CONFORME PARECER Nº0311/13-TEN	18/12/13	FDV	PAF	RLM		
0A	ATENDENDO PARECER Nº0520/13-TEN	21/11/13	FDV	PAF	RLM		
0	EMISSÃO INICIAL	29/08/13	FDV	PAF	RLM		
N°	MODIFICAÇÃO	DATA	FEITO	VISTO	APROVO	DATA	APROVO
		CONTRATADA				**METRÔ - DF**	
R E V I S Õ E S							

METRÔ DF

DIMENSIONAMENTO DA SUBESTAÇÃO RETIFICADORA – SR 63

PROJETO DE ESTRUTURA
PROJETO BÁSICO

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1 INTRODUÇÃO

Este documento tem por finalidade apresentar o dimensionamento das estruturas de concreto da Subestação Retificadora – SR 63 do MDF.

2 MATERIAIS E CARGAS RECOMENDADAS

2.1 Materiais

Classe de agressividade ambiental conforme NBR6118/2003 → Classe II

Concreto estrutural:

fck ≥ 30 MPa

Concreto magro: fck ≥ 10 MPa

Aço CA50: fyk ≥ 500 MPa

Aço CA60: fyk ≥ 600 MPa

Cobrimento das armaduras: C.A. (lajes): 2,5 cm

C.A. (vigas/pilares/laje fundo): 3,0 cm

C.A. (blocos): 4,0 cm

OBS: C.A. = Componentes e elementos de concreto armado.

2.2 Cargas

As cargas utilizadas estão de acordo com a tabela abaixo:

Pavimento	Carga Permanente [tf/m²] / [kN/m²]	Carga Acidental [tf/m²] / [kN/m²]
Subestação	1,30 / 13,00	2,00 / 20,00
Barrilete	0,65 / 6,50	0,15 / 1,50
Cobertura	0,16 / 1,60	0,10 / 1,00

2.3 Peso específico dos materiais utilizados:

$\gamma_{alv.}$ = 14,0 kN/m³ - Alvenaria

γ_c = 25,0 kN/m³ - Concreto Armado

γ_s = 78,5 kN/m³ - Aço

γ_{solo} = 18,0 kN/m³ - Solo

3 NORMAS, BIBLIOGRAFIA E SOFTWARES

Os projetos de estrutura de concreto deverão atender às seguintes Normas, práticas complementares e bibliografias:

3.1 Normas:

NBR-6118/2003 – Projeto de Estruturas de Concreto – Procedimento.

NBR-6120/1980 – Cargas para o cálculo de estruturas de edifícios - Procedimento;

NBR-6123/1988 – Forças devidas ao vento em edificações.

NBR-6122/1996 – Projeto e Execução de Fundações;

NBR-7480/1980 – Barras e Fios de Aço Destinados a Armaduras para Concreto Armado.

NBR-9062/1980 – Projeto e Execução de Estruturas em Concreto Pré-Moldado.

3.2 Bibliografias:

Montoya, P. J. – “Hormigon Armado”;

Sussekind, J. C. – “Curso de Concreto”.

Carvalho, R. C. e Figueiredo Filho, J. R. – “Cálculo e Detalhamento de Estruturas Usuais de Concreto Armando Segundo a NBR 6118:2003.”

Hachich, W., Falconi F.F., Saes, J. L., Frota, R. G. Q, Carvalho C. S. e Niyama S. – Fundações – Teoria e Prática.

3.3 Softwares:

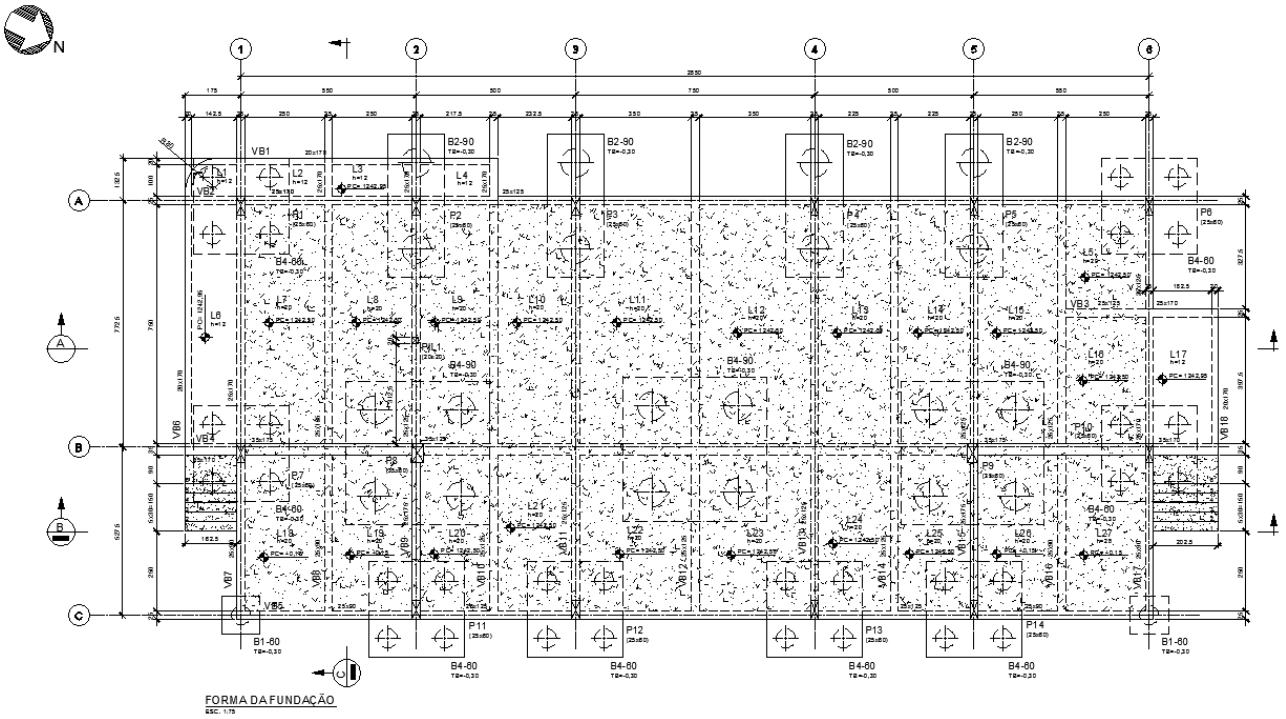
CAD/TQS – Versão 15.9

Ftool – Two Dimensional Frame Analysis Tool – Versão 2.11

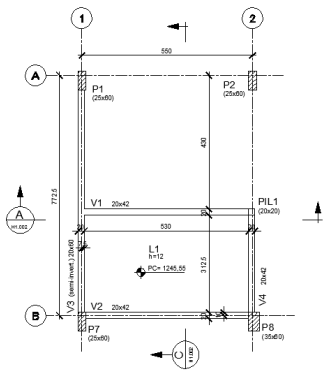
STRAP – Structural Analysis Programs 2012

4 DIMENSIONAMENTO DA SUBESTAÇÃO

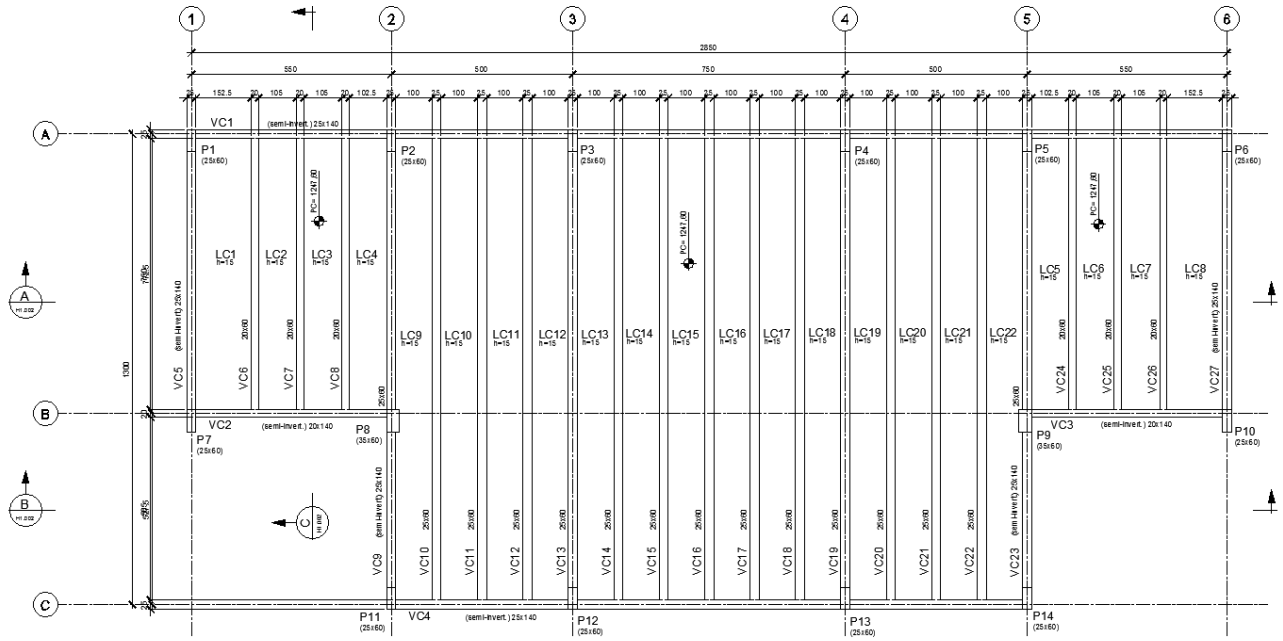
A seguir serão apresentados croquis da estrutura e o dimensionamento das principais peças estruturais:



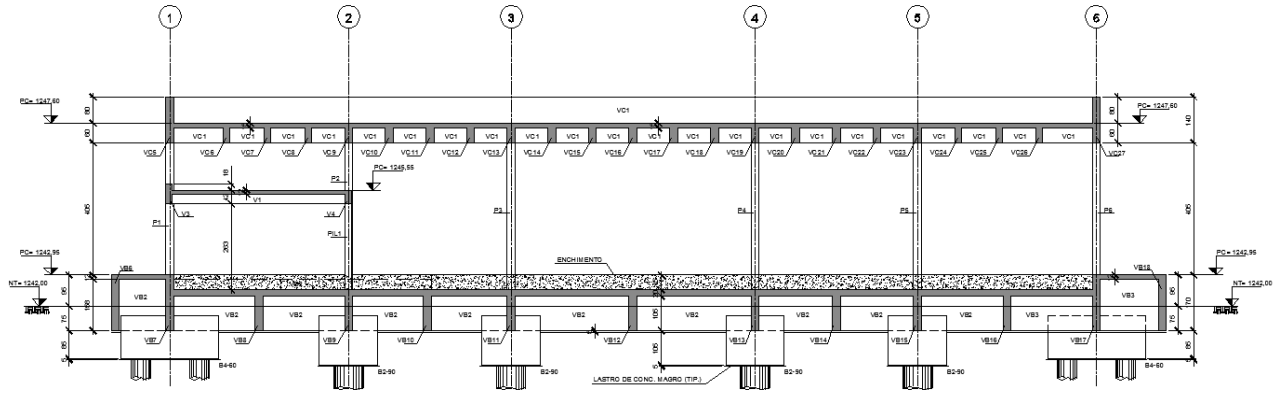
FORMA DA FUNDAÇÃO
ESC. 1:75



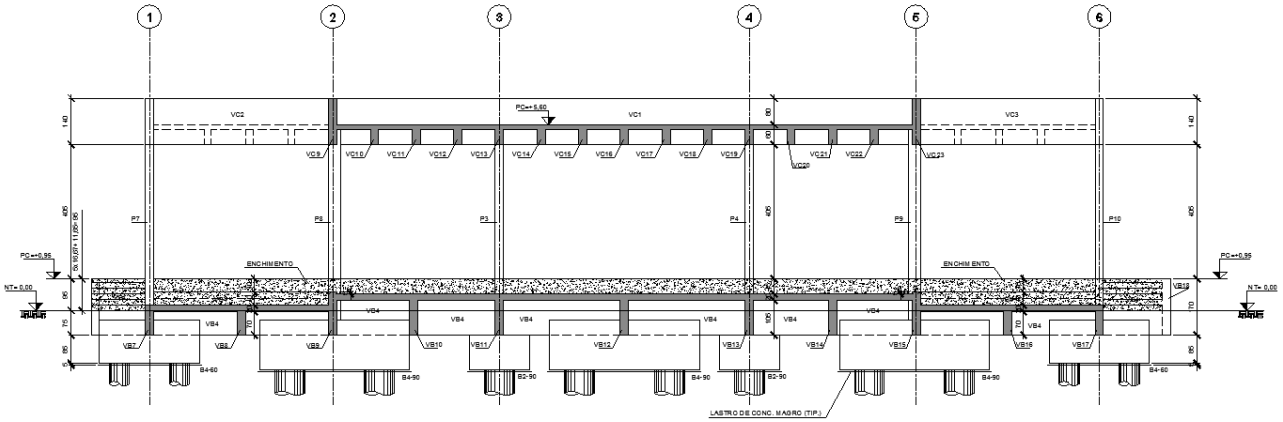
FORMA DO BARRILETE
ESC. 1:75



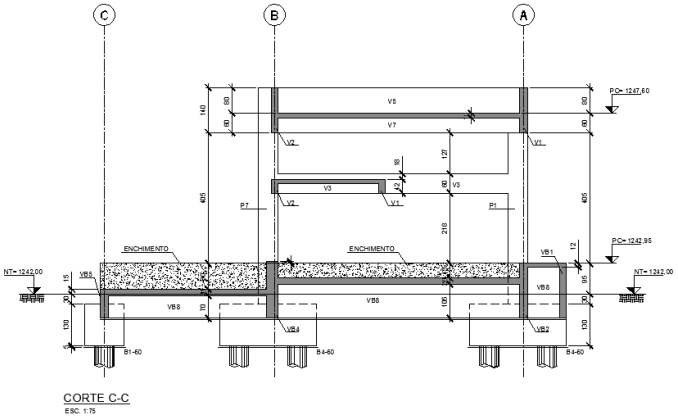
FORMA DA COBERTURA - NÍVEL +5,60
ESC. 1:75



CORTE A-A
ESC. 1:75



CORTE B-B
ESC. 1:75



CORTE C-C
ESC. 1:75

4.1 Fundação

4.1.1 Vigas

```
Viga=    1  VB1                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 1B /L=  1.75 /B=  .25 /H=  1.70  /BCs=  .95 /BCi=  .00 /TpS=  2 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E   C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO  | M[-]=    28.90 tf* m              | As =   8.81   -SRAS-       [   3 B 20.0mm]     | Flecha     =   .0
BAL.ESQ | Grampo ESQ = 2 B   8.0mm  x/d = .06 | AsL=    .00   -Arm.Lat.=[ 2 X  9 B  8.0mm]     | Flecha Adm.=  1.2
[tf,cm] | M[-]Min= 4412.3      -  x/dMx =1.00 |                                               | % Baric.Armad.= 1

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 163.  11.61 211.30   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   1.7

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 163.    .19  23.05  25 10.9  14.1 159.1     .1      .0    .0    .0    .06   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 2  /L=  5.50 /B=  .25 /H=  1.70  /BCs=  .58 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E   C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =     28.9 tf* m              | M.[+] Max=     53.0 tf* m - Abcis.= 274 | M.[-] =     35.1  tf* m
[tf,cm]| As =   8.81  -SRAS-   [  3 B 20.0mm] | AsL=    .00   ------     Flecha=   .3   | As =   6.97  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .06 | As =  10.46   -STAS-  [  6 B 16.0mm ]   | AsL=    .00  ------      x/d  = .05
       |                           x/dMx= .33 | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  5.4   |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 1.8    |
[tf,cm]| M[-]Min =  3468.1                    | M[+]Min =  2959.1                       | M[-]Min =  3468.1
[cm2  ]| Asapo[+]=  7.14                      |                                         | Asapo[+]=  6.06

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 167.  39.98 211.30   2  45.     .7    2.9      2.9  5.0 10.0  2    .0    .0
             167.- 358.  43.31 211.30   2  45.    1.3    2.9      6.9  8.0 10.0  2    .0   6.9
             358.- 525.  56.17 211.30   2  45.    3.7    2.9      3.7  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 167.   1.12  23.05  25 10.9  14.1 159.1     .6      .0    .0    .0    .24   N
             167.- 358.   1.15  23.05  25 10.9  14.1 159.1     .6      .0    .0    .0    .25   N
             358.- 525.   1.15  23.05  25 10.9  14.1 159.1     .6      .0    .0    .0    .32   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 3  /L=  5.00 /B=  .25 /H=  1.70  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E   C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =     34.9 tf* m              | M.[+] Max=     19.3 tf* m - Abcis.= 250 | M.[-] =     35.9  tf* m
[tf,cm]| As =   6.93  -SRAS-   [  4 B 16.0mm] | AsL=    .00   ------     Flecha=   .1   | As =   7.14  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .05 | As =   6.38   -SRAS-  [  2 B 20.0mm ]   | AsL=    .00  ------      x/d  = .05
       |                           x/dMx= .33 | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  6.8   |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 1.7    |
[tf,cm]| M[-]Min =  2614.8                    | M[+]Min =  2614.8                       | M[-]Min =  2614.8
[cm2  ]| Asapo[+]=  6.06                      |                                         | Asapo[+]=  6.06

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 135.  39.48 211.30   2  45.     .6    2.9      2.9  6.3 20.0  2    .0    .0
             135.- 326.  30.72 211.30   2  45.     .0    2.9      5.7  6.3 10.0  2    .0   5.7
             326.- 475.  36.80 211.30   2  45.     .1    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 135.   1.27  23.05  25 10.9  14.1 159.1     .7      .0    .0    .0    .24   N
             135.- 326.   1.27  23.05  25 10.9  14.1 159.1     .7      .0    .0    .0    .20   N
             326.- 475.   1.18  23.05  25 10.9  14.1 159.1     .6      .0    .0    .0    .23   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 4  /L=  7.50 /B=  .25 /H=  1.25  /BCs=  .70 /BCi=  .00 /TpS=  5 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E   C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =     36.1 tf* m              | M.[+] Max=     45.7 tf* m - Abcis.= 375 | M.[-] =     30.4  tf* m
[tf,cm]| As =  10.08  -SRAS-   [  5 B 16.0mm] | AsL=    .00   ------     Flecha=   .8   | As =   8.41  -SRAS- [  3 B 20.0mm]
       | AsL=    .00  ------       x/d  = .10 | As =  12.45   -STAS-  [  4 B 20.0mm ]   | AsL=    .00  ------      x/d  = .08
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  5.3   |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 2.5    |
[tf,cm]| M[-]Min =  2577.3                    | M[+]Min =  1762.2                       | M[-]Min =  2577.3
[cm2  ]| Asapo[+]=  4.45                      |                                         | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 145.  40.95 154.02   2  45.    3.7    2.9      3.7  6.3 15.0  2    .0    .0
             145.- 290.  33.13 154.02   2  45.    1.7    2.9      2.9  6.3 20.0  2    .0    .0
             290.- 436.  23.74 154.02   2  45.     .0    2.9      5.5  6.3 10.0  2    .0   5.5
             436.- 580.  30.67 154.02   2  45.    1.1    2.9      2.9  6.3 20.0  2    .0    .0
             580.- 725.  38.74 154.02   2  45.    3.2    2.9      3.2  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 145.    .09  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .27   N
             145.- 290.    .09  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .22   N
             290.- 436.    .09  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .16   N
             436.- 580.    .08  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .20   N
             580.- 725.    .08  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .26   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 5  /L=  5.00 /B=  .25 /H=  1.25  /BCs=  .55 /BCi=  .00 /TpS=  5 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E   C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =     30.1 tf* m              | M.[+] Max=     17.3 tf* m - Abcis.= 250 | M.[-] =     27.7  tf* m
[tf,cm]| As =   8.32  -SRAS-   [  3 B 20.0mm] | AsL=    .00   ------     Flecha=   .1   | As =   7.65  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .08 | As =   5.59   -STAS-  [  3 B 16.0mm ]   | AsL=    .00  ------      x/d  = .08
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.5   |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 1.7    |
[tf,cm]| M[-]Min =  2200.4                    | M[+]Min =  1675.9                       | M[-]Min =  2200.4
[cm2  ]| Asapo[+]=  4.45                      |                                         | Asapo[+]=  4.45
```

```
CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 165.  31.86 154.02   2  45.    1.4    2.9      2.9  6.3 20.0  2    .0    .0
             165.- 311.  24.43 154.02   2  45.     .0    2.9      6.2  6.3 10.0  2    .0   6.2
             311.- 475.  30.28 154.02   2  45.    1.0    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 165.    .87  16.41  25 10.4  14.6 114.6     .6      .0    .0    .0    .26   N
             165.- 311.    .87  16.41  25 10.4  14.6 114.6     .6      .0    .0    .0    .21   N
             311.- 475.    .86  16.41  25 10.4  14.6 114.6     .6      .0    .0    .0    .25   N

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 6  /L=  5.50 /B=  .25 /H=  1.25  /BCs=  .66 /BCi=  .00 /TpS=  5 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =     28.0 tf* m              | M.[+] Max=     42.6 tf* m - Abcis.= 275    | M.[-] =       .7  tf* m
[tf,cm]| As =   7.73  -SRAS-   [  4 B 16.0mm]  | AsL=    .00  ------     Flecha=   .5      | As =   4.96  -SRAS- [  4 B 12.5mm]
       | AsL=    .00  ------       x/d  = .08  | As =  11.60   -STAS-  [  6 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  5.2      | Grampos Dir.= 1B  6.3mm x/dMx= .33
       |                                       |                        Fle.Adm.= 1.8       |
[tf,cm]| M[-]Min =  2484.1                     | M[+]Min =  1742.5                          | M[-]Min =  1658.9
[cm2  ]| Asapo[+]=  4.45                       |                                            | Asapo[+]=  5.92

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 190.  43.13 154.02   2  45.    4.3    2.9      4.3  6.3 10.0  2    .0    .0
             190.- 336.  34.00 154.02   2  45.    2.0    2.9      6.8  8.0 10.0  2    .0   6.8
             336.- 525.  26.26 154.02   2  45.     .0    2.9      2.9  5.0 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 190.    .77  16.41  25 10.4  14.6 114.6     .5      .0    .0    .0    .33   N
             190.- 336.    .77  16.41  25 10.4  14.6 114.6     .5      .0    .0    .0    .27   N
             336.- 525.    .64  16.41  25 10.4  14.6 114.6     .4      .0    .0    .0    .21   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    36.810    34.554       .25      .00      4   P1          .00    .00      1      0      0      0      0      0
              2    68.304    63.429       .25      .00      4   P2          .00    .00      2      0      0      0      0      0
              3    55.515    51.708       .25      .00      4   P3          .00    .00      3      0      0      0      0      0
              4    50.409    46.847       .25      .00      4   P4          .00    .00      4      0      0      0      0      0
              5    52.398    48.234       .25      .00      4   P5          .00    .00      5      0      0      0      0      0
              6    18.755    17.183       .25      .00      4   P6          .00    .00      6      0      0      0      0      0
================================================================================================================================

Viga=    2  VB2                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 1  /L=  2.75 /B=  .25 /H=  1.25  /BCs=  .66 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =       .0 tf* m              | M.[+] Max=      2.7 tf* m - Abcis.=  91    | M.[-] =     15.6  tf* m
[tf,cm]| As =    .00  -SRAS-   [  0 B  8.0mm]  | AsL=    .00  ------     Flecha=   .0      | As =   7.41  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .00  | As =   5.93   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .05
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.1      |                          x/dMx= .33
       |                                       |                        Fle.Adm.=  .9       |
[tf,cm]| M[-]Min =  1413.7                     | M[+]Min =  1742.6                          | M[-]Min =  2484.4
[cm2  ]| Asapo[+]=  5.93                       |                                            | Asapo[+]=  1.48

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 250.  16.12 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 250.    .08  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .11   N

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 2B /L=  2.15 /B=  .25 /H=  1.70  /BCs=  .68 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO  | M[-]=    15.63 tf* m              | As =   7.41   -SRAS-      [   4 B 16.0mm]     | Flecha     =   .0
BAL.DIR |                        x/d = .05 | AsL=    .00   -Arm.Lat.=[ 2 X  9 B  8.0mm]     | Flecha Adm.=  1.4
[tf,cm] | M[-]Min= 3724.8      -  x/dMx =1.00 |                                              | % Baric.Armad.= 0

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 203.   7.24 211.30   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .8

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 203.    .60  23.05  25 10.9  14.1 159.1     .3      .0    .0    .0    .06   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     5.332     4.618       .25      .00      2   V16         .00    .00      0      0      0      0      0      0
              2    16.679    15.626       .25      .00      2   V17         .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=    3  VB3                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 1B /L=  1.75 /B=  .35 /H=  1.70  /BCs=  .70 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .17   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO  | M[-]=    21.88 tf* m              | As =   9.55   -SRAS-      [   3 B 20.0mm]     | Flecha     =   .0
BAL.ESQ |                        x/d = .05 | AsL=    .00   -Arm.Lat.=[ 2 X 12 B  8.0mm]     | Flecha Adm.=  1.2
[tf,cm] | M[-]Min= 4567.3      -  x/dMx =1.00 |                                              | % Baric.Armad.= 0

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 163.  10.47 295.81   2  45.     .0    4.1      4.1  6.3 15.0  2    .0   1.5

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 163.    .27  43.59  25 14.5  20.5 155.5     .1      .0    .0    .0    .04   N

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 2  /L=  5.55 /B=  .35 /H=  1.25  /BCs=  .68 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .17   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =     21.9 tf* m              | M.[+] Max=     79.8 tf* m - Abcis.= 277    | M.[-] =     88.4  tf* m
[tf,cm]| As =   9.55  -SRAS-   [  5 B 16.0mm]  | AsL=    .00  ------     Flecha=   .5      | As =  25.87  -SRAS- [  6 B 25.0mm]
       | AsL=    .00  ------       x/d  = .05  | As =  22.06   -STAS-  [  7 B 20.0mm ]      | AsL=    .00  ------     x/d  = .19
       |                           x/dMx= .33  | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  9.6      |                          x/dMx= .33
       |                                       |                        Fle.Adm.= 1.9       |
[tf,cm]| M[-]Min =  2857.5                     | M[+]Min =  2286.6                          | M[-]Min =  2857.5
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```
[cm2  ]| Asapo[+]=  7.35                      |                                      | Asapo[+]=  6.23

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 190.  57.19 215.62   2  45.    5.2    4.1     5.2  5.0 15.0  4    .0    .0
             190.- 525. 100.97 215.62   2  45.   16.3    4.1    16.4  8.0 10.0  4    .0  16.4

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 190.    .58  30.61  25 13.7  21.3 111.3     .3      .0    .0    .0    .28   N
             190.- 525.    .58  30.61  25 13.7  21.3 111.3     .3      .0    .0    .0    .48   N

--------------------------------  G E O M E T R I A      E     C A R G A S   --------------------------------
Vao= 3  /L=  6.83 /B=  .35 /H=  1.25  /BCs= 1.17 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .17   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =     89.4 tf* m                | M.[+] Max=     77.4 tf* m - Abcis.= 289    | M.[-] =    119.7  tf* m
[tf,cm]| As =  26.16  -SRAS-   [  6 B 25.0mm]   | AsL=    .00  ------     Flecha=  1.1      | As =  36.65  -SRAS- [  8 B 25.0mm]
       | AsL=    .00  ------       x/d  = .19   | As =  21.06   -STAS-  [  7 B 20.0mm ]      | AsL=    .00  ------     x/d  = .27
       |                           x/dMx= .33   | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  5.4      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 2.3     |
[tf,cm]| M[-]Min =  4070.9                      | M[+]Min =  2554.8                          | M[-]Min =  4070.9
[cm2  ]| Asapo[+]=  6.23                        |                                            | Asapo[+]=  6.23

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 293. 107.38 215.62   2  45.   18.0    4.1    18.0  8.0 10.0  4    .0  14.3
             293.- 405.  14.96 215.62   2  45.    .0    4.1     4.1  5.0 15.0  4    .0    .0
             405.- 627. 148.08 215.62   2  45.   28.3    4.1    28.3 10.0 10.0  4    .0  16.5

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 293.    .08  30.61  25 13.7  21.3 111.3     .0      .0    .0    .0    .50   N
             293.- 405.    .07  30.61  25 13.7  21.3 111.3     .0      .0    .0    .0    .07   N
             405.- 627.   1.01  30.61  25 13.7  21.3 111.3     .5      .0    .0    .0    .72   N

--------------------------------  G E O M E T R I A      E     C A R G A S   --------------------------------
Vao= 4  /L=  6.83 /B=  .35 /H=  1.25  /BCs= 1.17 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .17   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =    118.8 tf* m                | M.[+] Max=     78.6 tf* m - Abcis.= 579    | M.[-] =     87.1  tf* m
[tf,cm]| As =  36.33  -SRAS-   [  8 B 25.0mm]   | AsL=    .00  ------     Flecha=  1.1      | As =  25.28  -SRAS- [  5 B 25.0mm]
       | AsL=    .00  ------       x/d  = .26   | As =  21.40   -STAS-  [  7 B 20.0mm ]      | AsL=    .00  ------     x/d  = .18
       |                           x/dMx= .33   | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  5.5      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 2.3     |
[tf,cm]| M[-]Min =  4070.9                      | M[+]Min =  2554.8                          | M[-]Min =  4070.9
[cm2  ]| Asapo[+]=  6.23                        |                                            | Asapo[+]=  6.23

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 224. 146.42 215.62   2  45.   27.9    4.1    27.9 10.0 10.0  4    .0  16.0
             224.- 328.  16.69 215.62   2  45.    .0    4.1     4.1  5.0 15.0  4    .0    .0
             328.- 627. 104.54 215.62   2  45.   17.3    4.1    17.3  8.0 10.0  4    .0  14.1

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 224.    .96  30.61  25 13.7  21.3 111.3     .5      .0    .0    .0    .71   N
             224.- 328.    .07  30.61  25 13.7  21.3 111.3     .0      .0    .0    .0    .08   N
             328.- 627.    .10  30.61  25 13.7  21.3 111.3     .0      .0    .0    .0    .49   N

--------------------------------  G E O M E T R I A      E     C A R G A S   --------------------------------
Vao= 5  /L=  5.55 /B=  .35 /H=  1.25  /BCs=  .68 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .17   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =     86.2 tf* m                | M.[+] Max=     76.7 tf* m - Abcis.= 277    | M.[-] =     21.9  tf* m
[tf,cm]| As =  25.00  -SRAS-   [  5 B 25.0mm]   | AsL=    .00  ------     Flecha=   .5      | As =   9.70  -SRAS- [  5 B 16.0mm]
       | AsL=    .00  ------       x/d  = .18   | As =  21.16   -STAS-  [  7 B 20.0mm ]      | AsL=    .00  ------     x/d  = .05
       |                           x/dMx= .33   | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  9.2      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 1.9     |
[tf,cm]| M[-]Min =  2857.5                      | M[+]Min =  2286.6                          | M[-]Min =  2857.5
[cm2  ]| Asapo[+]=  6.23                        |                                            | Asapo[+]=  7.05

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 336.  97.79 215.62   2  45.   15.5    4.1    15.8  8.0 10.0  4    .0  15.8
             336.- 525.  54.78 215.62   2  45.    4.6    4.1     4.6  5.0 15.0  4    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 336.    .50  30.61  25 13.7  21.3 111.3     .2      .0    .0    .0    .46   N
             336.- 525.    .50  30.61  25 13.7  21.3 111.3     .2      .0    .0    .0    .27   N

--------------------------------  G E O M E T R I A      E     C A R G A S   --------------------------------
Vao= 6B /L=  2.15 /B=  .35 /H=  1.70  /BCs=  .78 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .17   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO  | M[-]=    21.88 tf* m                | As =   9.70   -SRAS-      [   3 B 20.0mm]     | Flecha     =   .0
BAL.DIR |                        x/d = .05 | AsL=    .00   -Arm.Lat.=[ 2 X 12 B  8.0mm]     | Flecha Adm.=  1.4
[tf,cm] | M[-]Min= 4773.3      -  x/dMx =1.00 |                                               | % Baric.Armad.= 0

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 203.   9.13 295.81   2  45.    .0    4.1     4.1  6.3 15.0  2    .0    .9

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 203.   1.03  43.59  25 14.5  20.5 155.5     .4      .0    .0    .0    .05   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    48.263    44.716       .25      .00      4   P7          .00    .00      7      0      0      0      0      0
              2   148.728   135.385       .35      .00      4   P8          .00    .00      8      0      0      0      0      0
              3   207.207   187.757      4.50     1.88      1   B201        .00    .00   8201      0      0      0      0      0
              4   144.425   130.862       .35      .00      4   P9          .00    .00      9      0      0      0      0      0
              5    45.640    42.009       .25      .00      4   P10         .00    .00     10      0      0      0      0      0
=============================================================================================================================

Viga=    4  VB4                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

--------------------------------  G E O M E T R I A      E     C A R G A S   --------------------------------
Vao= 1  /L=  5.17 /B=  .25 /H=   .90  /BCs=  .64 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .45 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =       .0 tf* m                | M.[+] Max=     18.3 tf* m - Abcis.= 215    | M.[-] =     17.0  tf* m
[tf,cm]| As =   1.15  -SRAS-   [  2 B 10.0mm]   | AsL=    .00  ------     Flecha=   .5      | As =   6.68  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .00   | As =   7.01   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .09
       |                           x/dMx= .33   | Arm.Lat.=[2 X  5 B  8.0mm] - LN=  3.3      |                          x/dMx= .33
```

```
      |                                 |                                 |
[tf,cm]| M[-]Min =   732.9               | M[+]Min =   905.7               | M[-]Min =  1357.1
[cm2  ]| Asapo[+]=  4.54                 |                                 | Asapo[+]=  3.21

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 160.  12.66 109.47   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0
             160.- 271.  17.33 109.47   2  45.     .0    2.9      4.3  6.3 10.0  2    .0   4.3
             271.- 478.  23.07 109.47   2  45.    1.6    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 160.    .17  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .13   N
             160.- 271.    .22  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .18   N
             271.- 478.    .22  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .23   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 2  /L=  5.00 /B=  .25 /H=  1.25  /BCs=  .55 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .80 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                 | M E I O   D O   V A O                 | D I R E I T A
       | M.[-] =     16.9 tf* m          | M.[+] Max=      8.9 tf* m - Abcis.= 250    | M.[-] =     17.5  tf* m
[tf,cm]| As =   6.03  -SRAS-   [  3 B 16.0mm]   | AsL=    .00  ------     Flecha=   .0      | As =   6.03  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .06   | As =   5.59   -STAS-  [  3 B 16.0mm ]     | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.5     |                          x/dMx= .33
       |                                        |                      Fle.Adm.= 1.7      |
[tf,cm]| M[-]Min =  2200.5                      | M[+]Min =  1675.9                       | M[-]Min =  2200.5
[cm2  ]| Asapo[+]=  4.45                        |                                         | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 475.  19.12 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   2.9

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 475.    .37  16.41  25 10.4  14.6 114.6     .3      .0    .0    .0    .15   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 3  /L=  7.50 /B=  .25 /H=  1.25  /BCs=  .70 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .80 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                 | M E I O   D O   V A O                 | D I R E I T A
       | M.[-] =     17.7 tf* m          | M.[+] Max=     23.0 tf* m - Abcis.= 375    | M.[-] =     17.8  tf* m
[tf,cm]| As =   7.09  -SRAS-   [  4 B 16.0mm]   | AsL=    .00  ------     Flecha=   .7      | As =   7.09  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .07   | As =   6.22   -STAS-  [  3 B 16.0mm ]     | AsL=    .00  ------     x/d  = .07
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.7     |                          x/dMx= .33
       |                                        |                      Fle.Adm.= 2.5      |
[tf,cm]| M[-]Min =  2577.3                      | M[+]Min =  1762.2                       | M[-]Min =  2577.3
[cm2  ]| Asapo[+]=  4.45                        |                                         | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 725.  24.18 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   1.3

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 725.    .11  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .16   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 4  /L=  5.00 /B=  .25 /H=  1.25  /BCs=  .55 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .80 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                 | M E I O   D O   V A O                 | D I R E I T A
       | M.[-] =     17.6 tf* m          | M.[+] Max=      9.4 tf* m - Abcis.= 249    | M.[-] =     17.0  tf* m
[tf,cm]| As =   6.03  -SRAS-   [  3 B 16.0mm]   | AsL=    .00  ------     Flecha=   .0      | As =   6.03  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .06   | As =   5.59   -STAS-  [  3 B 16.0mm ]     | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.5     |                          x/dMx= .33
       |                                        |                      Fle.Adm.= 1.7      |
[tf,cm]| M[-]Min =  2200.2                      | M[+]Min =  1675.9                       | M[-]Min =  2200.2
[cm2  ]| Asapo[+]=  4.45                        |                                         | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 475.  19.27 154.02   2  45.     .0    2.9      3.0  6.3 20.0  2    .0   3.0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 475.    .39  16.41  25 10.4  14.6 114.6     .3      .0    .0    .0    .15   N

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 5  /L=  5.17 /B=  .25 /H=   .90  /BCs=  .64 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .45 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                 | M E I O   D O   V A O                 | D I R E I T A
       | M.[-] =     17.1 tf* m          | M.[+] Max=     18.4 tf* m - Abcis.= 301    | M.[-] =       .0  tf* m
[tf,cm]| As =   6.70  -SRAS-   [  4 B 16.0mm]   | AsL=    .00  ------     Flecha=   .5      | As =   1.15  -SRAS- [  2 B 10.0mm]
       | AsL=    .00  ------       x/d  = .09   | As =   7.05   -STAS-  [  4 B 16.0mm ]     | AsL=    .00  ------     x/d  = .00
       |                           x/dMx= .33   | Arm.Lat.=[2 X  5 B  8.0mm] - LN=  3.3     |                          x/dMx= .33
       |                                        |                      Fle.Adm.= 1.7      |
[tf,cm]| M[-]Min =  1356.8                      | M[+]Min =   905.7                       | M[-]Min =   732.9
[cm2  ]| Asapo[+]=  3.21                        |                                         | Asapo[+]=  4.54

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 207.  23.27 109.47   2  45.    1.6    2.9      2.9  6.3 20.0  2    .0    .0
             207.- 318.  17.33 109.47   2  45.     .0    2.9      4.3  6.3 10.0  2    .0   4.3
             318.- 478.  12.78 109.47   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 207.    .21  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .23   N
             207.- 318.    .21  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .18   N
             318.- 478.    .20  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .13   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     9.032     8.175      1.20      .33      1   B202         .00    .00   8202      0      0      0      0      0
              2    30.127    27.500       .25      .00      4   P11          .00    .00     11      0      0      0      0      0
              3    30.884    28.827       .25      .00      4   P12          .00    .00     12      0      0      0      0      0
              4    31.007    28.946       .25      .00      4   P13          .00    .00     13      0      0      0      0      0
              5    30.044    27.469       .25      .00      4   P14          .00    .00     14      0      0      0      0      0
              6     9.126     8.275      1.20      .33      1   B203         .00    .00   8203      0      0      0      0      0
==========================================================================================================================

Viga=    5  VB5                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A       E     C A R G A S   ------------------------------
Vao= 1  /L=  7.80 /B=  .20 /H=  1.70  /BCs=  .98 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .85 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                 | M E I O   D O   V A O                 | D I R E I T A
```

```
       | M.[-] =       .0 tf* m                | M.[+] Max=      9.3 tf* m - Abcis.= 390    | M.[-] =       .0  tf* m
[tf,cm]| As =    .00  -SRAS-   [  0 B  6.3mm]   | AsL=    .00   ------     Flecha=   .2      | As =    .00  -SRAS- [  0 B  6.3mm]
       | AsL=    .00  ------       x/d  = .00   | As =   6.50   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .00
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  1.6      | Grampos Dir.= 2B  6.3mm x/dMx= .33
       |                                        |                          Fle.Adm.= 2.6     |
[tf,cm]| M[-]Min =  2429.1                      | M[+]Min =  2719.3                          | M[-]Min =  2091.8
[cm2  ]| Asapo[+]=  6.50                        |                                            | Asapo[+]=  6.50

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 750.   6.61 169.04   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 750.    .08  15.02  25  8.9  11.1 161.1     .0      .0    .0    .0    .04   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     4.712     4.580       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              2     4.721     4.582       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=    6  VB6                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------  G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  2.53 /B=  .20 /H=  1.70  /BCs=  .39 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .85 /FLt.Ex=  .01   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =       .0 tf* m                | M.[+] Max=       .7 tf* m - Abcis.=  84    | M.[-] =       .9  tf* m
[tf,cm]| As =    .00  -SRAS-   [  0 B  6.3mm]   | AsL=    .00   ------     Flecha=   .0      | As =   5.44  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .00   | As =   5.44   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .05
       | Grampos Esq.= 2B  6.3mm   x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.5      |                           x/dMx= .33
       |                                        |                          Fle.Adm.=  .8     |
[tf,cm]| M[-]Min =  2091.8                      | M[+]Min =  2298.4                          | M[-]Min =  2582.7
[cm2  ]| Asapo[+]=  5.44                        |                                            | Asapo[+]=  4.84

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 228.   2.51 169.04   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 228.    .68  15.02  25  8.9  11.1 161.1     .4      .0    .0    .0    .05   N

-------------------------------  G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 2  /L=  2.75 /B=  .20 /H=  1.70  /BCs=  .36 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .85 /FLt.Ex=  .01   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =       .9 tf* m                | M.[+] Max=       .2 tf* m - Abcis.= 137    | M.[-] =      1.0  tf* m
[tf,cm]| As =   5.40  -SRAS-   [  3 B 16.0mm]   | AsL=    .00   ------     Flecha=   .0      | As =   5.40  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .05   | As =   5.40   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .05
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.7      |                           x/dMx= .33
       |                                        |                          Fle.Adm.=  .9     |
[tf,cm]| M[-]Min =  2519.4                      | M[+]Min =  2274.3                          | M[-]Min =  2519.4
[cm2  ]| Asapo[+]=  4.84                        |                                            | Asapo[+]=  4.84

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 250.   2.26 169.04   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 250.    .34  15.02  25  8.9  11.1 161.1     .2      .0    .0    .0    .04   N

-------------------------------  G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 3  /L=  2.75 /B=  .20 /H=  1.70  /BCs=  .36 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .85 /FLt.Ex=  .01   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =      1.0 tf* m                | M.[+] Max=      3.0 tf* m - Abcis.= 274    | M.[-] =       .0  tf* m
[tf,cm]| As =   5.40  -SRAS-   [  3 B 16.0mm]   | AsL=    .00   ------     Flecha=   .0      | As =   5.40  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .05   | As =   5.40   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .05
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.7      |                           x/dMx= .33
       |                                        |                          Fle.Adm.=  .9     |
[tf,cm]| M[-]Min =  2519.4                      | M[+]Min =  2274.3                          | M[-]Min =  2519.4
[cm2  ]| Asapo[+]=  4.84                        |                                            | Asapo[+]=  5.23

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 250.   4.17 169.04   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 250.    .17  15.02  25  8.9  11.1 161.1     .1      .0    .0    .0    .04   N

-------------------------------  G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 4  /L=  2.43 /B=  .20 /H=  1.70  /BCs=  .38 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .85 /FLt.Ex=  .01   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =       .0 tf* m                | M.[+] Max=      3.2 tf* m - Abcis.=   0    | M.[-] =       .2  tf* m
[tf,cm]| As =   5.43  -SRAS-   [  3 B 16.0mm]   | AsL=    .00   ------     Flecha=   .0      | As =   5.17  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .05   | As =   5.43   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.5      | Grampos Dir.= 2B  6.3mm x/dMx= .33
       |                                        |                          Fle.Adm.=  .8     |
[tf,cm]| M[-]Min =  2563.3                      | M[+]Min =  2291.1                          | M[-]Min =  2197.0
[cm2  ]| Asapo[+]=  5.26                        |                                            | Asapo[+]=  5.43

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 218.   3.75 169.04   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 218.    .19  15.02  25  8.9  11.1 161.1     .1      .0    .0    .0    .03   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1      .811      .715       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
              2     3.221     3.027       .25      .00      2   V7          .00    .00      0      0      0      0      0      0
              3     4.556     4.216       .25      .00      2   V8          .00    .00      0      0      0      0      0      0
              4      .083     -.148       .25      .00      2   V9          .00    .00      0      0      0      0      0      0
              5     2.677     2.498       .25      .00      2   V10         .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=    7  VB7                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------  G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  4.75 /B=  .25 /H=   .90  /BCs=  .61 /BCi=  .00 /TpS=  5 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .45 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------
```

```
-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                    | D I R E I T A
       | M.[-] =       .0 tf* m             | M.[+] Max=      3.9 tf* m - Abcis.= 118   | M.[-] =     15.1  tf* m
[tf,cm]| As =    .70  -SRAS-   [  2 B  8.0mm]  | AsL=    .00   ------     Flecha=   .1     | As =   5.91  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .00  | As =   4.44   -STAS-  [  4 B 12.5mm ]     | AsL=    .00  ------     x/d  = .08
       |                           x/dMx= .33  | Arm.Lat.=[2 X  5 B  8.0mm] - LN=  1.7     |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 1.6    |
[tf,cm]| M[-]Min =   732.9                     | M[+]Min =   896.5                         | M[-]Min =  1309.0
[cm2  ]| Asapo[+]=  4.44                       |                                           | Asapo[+]=  3.21

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 418.  16.23 109.47   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 418.    .17  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .16   N

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 2  /L=  7.75 /B=  .25 /H=  1.70  /BCs=  .71 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.25 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                    | D I R E I T A
       | M.[-] =     16.9 tf* m               | M.[+] Max=     42.5 tf* m - Abcis.= 387   | M.[-] =     28.9  tf* m
[tf,cm]| As =   7.59  -SRAS-   [  4 B 16.0mm]  | AsL=    .00   ------     Flecha=   .7     | As =   8.35  -SRAS- [  3 B 20.0mm]
       | AsL=    .00  ------       x/d  = .05  | As =   8.34   -STAS-  [  3 B 20.0mm ]     | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33  | Arm.Lat.=[2 X  9 B  8.0mm] - LN=  3.5     |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6    |
[tf,cm]| M[-]Min =  3814.3                     | M[+]Min =  3071.6                         | M[-]Min =  3814.3
[cm2  ]| Asapo[+]=  6.06                       |                                           | Asapo[+]=  7.21

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 715.  40.29 211.30   2  45.     .8    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 715.    .03  23.05  25 10.9  14.1 159.1     .0      .0    .0    .0    .19   N

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 3B /L=  1.52 /B=  .25 /H=  1.70  /BCs=  .86 /BCi=  .00 /TpS=  2 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.25 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO  | M[-]=    28.90 tf* m                | As =   8.35   -SRAS-       [   3 B 20.0mm]     | Flecha     =   .0
BAL.DIR | Grampo DIR = 2 B   6.3mm  x/d = .06 | AsL=    .00   -Arm.Lat.=[ 2 X  9 B  8.0mm]     | Flecha Adm.=  1.0
[tf,cm] | M[-]Min= 4183.9      -  x/dMx =1.00 |                                                | % Baric.Armad.= 1

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 123.   7.55 211.30   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   1.0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 123.    .39  23.05  25 10.9  14.1 159.1     .2      .0    .0    .0    .05   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     3.544     3.187      1.20      .33      1   B202        .00    .00   8202      0      0      0      0      0
              2    40.363    37.255       .60      .00      4   P7          .00    .00      7      0      0      0      0      0
              3    32.227    30.367       .60      .00      4   P1          .00    .00      1      0      0      0      0      0
================================================================================================================================

Viga=    8  VB8                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  5.20 /B=  .25 /H=   .90  /BCs= 1.03 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .45 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                    | D I R E I T A
       | M.[-] =       .3 tf* m             | M.[+] Max=     14.3 tf* m - Abcis.= 173   | M.[-] =     36.1  tf* m
[tf,cm]| As =   3.94  -SRAS-   [  2 B 16.0mm]  | AsL=    .00   ------     Flecha=   .3     | As =  14.96  -SRAS- [  5 B 20.0mm]
       | AsL=    .00  ------       x/d  = .06  | As =   5.72   -STAS-  [  3 B 16.0mm ]     | AsL=    .00  ------     x/d  = .21
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33  | Arm.Lat.=[2 X  5 B  8.0mm] - LN=  1.6     |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 1.7    |
[tf,cm]| M[-]Min =  1022.1                     | M[+]Min =   987.9                         | M[-]Min =  1911.1
[cm2  ]| Asapo[+]=  5.72                       |                                           | Asapo[+]=  3.21

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 327.  21.21 109.47   2  45.     .9    2.9      2.9  5.0 10.0  2    .0    .0
             327.- 490.  43.70 109.47   2  45.    9.0    2.9      9.0  8.0 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 327.    .01  11.26  25  9.8  15.2  80.2     .0      .0    .0    .0    .19   N
             327.- 490.    .01  11.26  25  9.8  15.2  80.2     .0      .0    .0    .0    .40   N

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 2  /L=  7.80 /B=  .25 /H=  1.25  /BCs= 1.19 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .80 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                    | D I R E I T A
       | M.[-] =     36.6 tf* m               | M.[+] Max=     52.7 tf* m - Abcis.= 455   | M.[-] =     15.6  tf* m
[tf,cm]| As =  10.47  -SRAS-   [  6 B 16.0mm]  | AsL=    .00   ------     Flecha=  1.0     | As =  10.47  -SRAS- [  6 B 16.0mm]
       | AsL=    .00  ------       x/d  = .10  | As =  14.31   -STAS-  [  5 B 20.0mm ]     | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.6     |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6    |
[tf,cm]| M[-]Min =  3730.3                     | M[+]Min =  1944.5                         | M[-]Min =  3730.3
[cm2  ]| Asapo[+]=  4.45                       |                                           | Asapo[+]=  3.58

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 150.  60.36 154.02   2  45.    8.7    2.9      8.7  8.0 10.0  2    .0    .0
             150.- 600.  37.07 154.02   2  45.    2.7    2.9      2.9  5.0 10.0  2    .0    .0
             600.- 750.  47.80 154.02   2  45.    5.5    2.9      5.5  6.3 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 150.    .04  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .39   N
             150.- 600.    .04  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .24   N
             600.- 750.    .04  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .31   N

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 3B /L=  1.35 /B=  .25 /H=  1.70  /BCs=  .79 /BCi=  .00 /TpS=  2 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.25 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO  | M[-]=    15.63 tf* m                | As =   7.98   -SRAS-       [   4 B 16.0mm]     | Flecha     =   .0
BAL.DIR |                        x/d = .06 | AsL=    .00   -Arm.Lat.=[ 2 X  9 B  8.0mm]     | Flecha Adm.=   .9
[tf,cm] | M[-]Min= 4005.7      -  x/dMx =1.00 |                                                | % Baric.Armad.= 0

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
```

```
[tf,cm]        0.- 123.   9.12 211.30   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   1.4

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 123.    .10  23.05  25 10.9  14.1 159.1     .1      .0    .0    .0    .05   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    14.975    13.438       .25      .00      2   V4          .00    .00      0      0      0      0      0      0
              2    74.323    67.584       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              3    40.650    37.422       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=    9  VB9                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  4.90 /B=  .25 /H=  1.25  /BCs=  .62 /BCi=  .00 /TpS=  5 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =     1.8 tf* m               | M.[+] Max=      8.8 tf* m - Abcis.= 163    | M.[-] =    39.7  tf* m
[tf,cm]| As =   4.93  -SRAS-   [  4 B 12.5mm]  | AsL=    .00  ------     Flecha=   .0      | As =  11.19  -SRAS- [  6 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04  | As =   5.79   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .11
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.2      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 1.6     |
[tf,cm]| M[-]Min =  1632.3                     | M[+]Min =  1717.3                          | M[-]Min =  2371.3
[cm2  ]| Asapo[+]=  5.79                       |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 287.  22.16 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0
            287.- 430.  41.55 154.02   2  45.    3.9    2.9      3.9  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 287.    .00  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .14   N
            287.- 430.    .00  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .27   N

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 2  /L=  7.75 /B=  .25 /H=  1.25  /BCs= 1.18 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =    39.8 tf* m               | M.[+] Max=     46.3 tf* m - Abcis.= 387    | M.[-] =    16.6  tf* m
[tf,cm]| As =  11.21  -SRAS-   [  6 B 16.0mm]  | AsL=    .00  ------     Flecha=   .9      | As =  10.43  -SRAS- [  6 B 16.0mm]
       | AsL=    .00  ------       x/d  = .11  | As =  12.51   -STAS-  [  4 B 20.0mm ]      | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.2      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6     |
[tf,cm]| M[-]Min =  3716.7                     | M[+]Min =  1942.9                          | M[-]Min =  3716.7
[cm2  ]| Asapo[+]=  4.45                       |                                            | Asapo[+]=  3.13

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 179.  56.90 154.02   2  45.    7.8    2.9      7.8  8.0 10.0  2    .0    .0
            179.- 536.  31.26 154.02   2  45.    1.3    2.9      2.9  5.0 10.0  2    .0    .0
            536.- 715.  45.36 154.02   2  45.    4.9    2.9      4.9  6.3 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 179.    .20  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .38   N
            179.- 536.    .20  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .21   N
            536.- 715.    .15  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .30   N

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 3B /L=  1.52 /B=  .25 /H=  1.70  /BCs=  .86 /BCi=  .00 /TpS=  2 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO  | M[-]=    15.63 tf* m              | As =   8.35   -SRAS-       [   3 B 20.0mm]     | Flecha     =   .0
BAL.DIR |                        x/d = .06 | AsL=    .00   -Arm.Lat.=[ 2 X  9 B  8.0mm]     | Flecha Adm.=  1.0
[tf,cm] | M[-]Min= 4183.9      -  x/dMx =1.00 |                                               | % Baric.Armad.= 0

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 123.   2.55 211.30   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .1

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 123.    .22  23.05  25 10.9  14.1 159.1     .1      .0    .0    .0    .02   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    11.792    10.538       .60      .00      4   P11         .00    .00     11      0      0      0      0      0
              2    70.287    64.011       .60      .00      4   P8          .00    .00      8      0      0      0      0      0
              3    33.940    31.411       .60      .00      4   P2          .00    .00      2      0      0      0      0      0
================================================================================================================================

Viga=   10  VB10                         Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  5.20 /B=  .25 /H=  1.25  /BCs= 1.03 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =      .5 tf* m               | M.[+] Max=     12.4 tf* m - Abcis.= 173    | M.[-] =    31.5  tf* m
[tf,cm]| As =   5.21  -SRAS-   [  3 B 16.0mm]  | AsL=    .00  ------     Flecha=   .1      | As =   9.36  -SRAS- [  3 B 20.0mm]
       | AsL=    .00  ------       x/d  = .05  | As =   7.03   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .09
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  1.5      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 1.7     |
[tf,cm]| M[-]Min =  1873.7                     | M[+]Min =  1897.5                          | M[-]Min =  3371.1
[cm2  ]| Asapo[+]=  7.03                       |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 490.  38.12 154.02   2  45.    3.0    2.9      3.0  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 490.    .14  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .26   N

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 2  /L=  7.80 /B=  .25 /H=  1.25  /BCs= 1.19 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =    31.5 tf* m               | M.[+] Max=     46.7 tf* m - Abcis.= 455    | M.[-] =    15.6  tf* m
[tf,cm]| As =  10.41  -SRAS-   [  4 B 20.0mm]  | AsL=    .00  ------     Flecha=  1.0      | As =  10.47  -SRAS- [  6 B 16.0mm]
       | AsL=    .00  ------       x/d  = .10  | As =  12.63   -STAS-  [  4 B 20.0mm ]      | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.2      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6     |
[tf,cm]| M[-]Min =  3730.3                     | M[+]Min =  1944.5                          | M[-]Min =  3730.3
[cm2  ]| Asapo[+]=  4.45                       |                                            | Asapo[+]=  7.50
```

```
CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 150.  52.43 154.02   2  45.    6.7    2.9      6.7  8.0 15.0  2    .0    .0
             150.- 600.  32.40 154.02   2  45.    1.6    2.9      2.9  5.0 10.0  2    .0    .0
             600.- 750.  41.30 154.02   2  45.    3.8    2.9      3.8  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 150.    .10  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .35   N
             150.- 600.    .10  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .22   N
             600.- 750.    .10  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .27   N

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 3B /L=  1.35 /B=  .25 /H=  1.70  /BCs=  .52 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex= 1.08 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO  | M[-]=    15.63 tf* m                | As =   6.86   -SRAS-       [   4 B 16.0mm]     | Flecha     =   .0
BAL.DIR |                        x/d = .05 | AsL=    .00   -Arm.Lat.=[ 2 X  9 B  8.0mm]     | Flecha Adm.=   .9
[tf,cm] | M[-]Min= 3313.9      -  x/dMx =1.00 |                                                | % Baric.Armad.= 0

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 123.   5.86 211.30   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .8

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 123.    .28  23.05  25 10.9  14.1 159.1     .1      .0    .0    .0    .04   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    13.197    11.918       .25      .00      2   V4          .00    .00      0      0      0      0      0      0
              2    64.677    58.649       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              3    33.681    30.825       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=   11  VB11                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-----------------------------   G E O M E T R I A      E     C A R G A S   -----------------------------
Vao= 1  /L=  5.03 /B=  .25 /H=  1.25  /BCs= 1.00 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                  | D I R E I T A
       | M.[-] =      4.4 tf* m              | M.[+] Max=     10.7 tf* m - Abcis.= 167    | M.[-] =     36.5  tf* m
[tf,cm]| As =   5.19  -SRAS-   [  3 B 16.0mm]  | AsL=    .00   ------     Flecha=   .1      | As =  10.19  -SRAS- [  5 B 16.0mm]
       | AsL=    .00  ------       x/d  = .05 | As =   6.95   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  1.5      |                          x/dMx= .33
       |                                      |                      Fle.Adm.= 1.7         |
[tf,cm]| M[-]Min =  1858.5                    | M[+]Min =  1888.7                          | M[-]Min =  3309.7
[cm2  ]| Asapo[+]=  6.95                      |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 303.  21.74 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0
             303.- 455.  42.91 154.02   2  45.    4.2    2.9      4.2  6.3 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 303.    .25  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .16   N
             303.- 455.    .25  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .29   N

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 2  /L=  7.63 /B=  .25 /H=  1.25  /BCs= 1.39 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                  | D I R E I T A
       | M.[-] =     37.2 tf* m              | M.[+] Max=     52.3 tf* m - Abcis.= 381    | M.[-] =     12.2  tf* m
[tf,cm]| As =  11.84  -SRAS-   [  6 B 16.0mm]  | AsL=    .00   ------     Flecha=   .9      | As =   5.70  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .12 | As =  14.18   -STAS-  [  5 B 20.0mm ]      | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.0      |                          x/dMx= .33
       |                                      |                      Fle.Adm.= 2.5         |
[tf,cm]| M[-]Min =  4193.7                    | M[+]Min =  1996.2                          | M[-]Min =  2083.1
[cm2  ]| Asapo[+]=  4.45                      |                                            | Asapo[+]=  3.55

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 179.  62.01 154.02   2  45.    9.1    2.9      9.1  8.0 10.0  2    .0    .0
             179.- 536.  33.05 154.02   2  45.    1.7    2.9      2.9  5.0 10.0  2    .0    .0
             536.- 715.  51.07 154.02   2  45.    6.3    2.9      6.3  8.0 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 179.    .17  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .41   N
             179.- 536.    .17  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .22   N
             536.- 715.    .17  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .34   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    15.509    13.906       .60      .00      4   P12         .00    .00     12      0      0      0      0      0
              2    74.874    67.750       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              3    36.476    33.034       .60      .00      4   P3          .00    .00      3      0      0      0      0      0
================================================================================================================================

Viga=   12  VB12                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  3.33 /B=  .25 /H=  1.25  /BCs=  .75 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                  | D I R E I T A
       | M.[-] =      .0 tf* m               | M.[+] Max=      2.6 tf* m - Abcis.=  86    | M.[-] =     32.9  tf* m
[tf,cm]| As =    .00  -SRAS-   [  0 B  8.0mm]  | AsL=    .00   ------     Flecha=   .0      | As =   9.12  -SRAS- [  3 B 20.0mm]
       | AsL=    .00  ------       x/d  = .00 | As =   6.18   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .09
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  1.9      |                          x/dMx= .33
       |                                      |                      Fle.Adm.= 1.1         |
[tf,cm]| M[-]Min =  1413.7                    | M[+]Min =  1786.3                          | M[-]Min =  2697.6
[cm2  ]| Asapo[+]=  6.18                      |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 141.  14.28 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0
             141.- 283.  40.79 154.02   2  45.    3.7    2.9      3.7  6.3 15.0  2    .0    .0

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 2  /L=  5.92 /B=  .25 /H=  1.25  /BCs= 1.14 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                  | D I R E I T A
       | M.[-] =     59.5 tf* m              | M.[+] Max=     28.4 tf* m - Abcis.= 585    | M.[-] =       .1  tf* m
[tf,cm]| As =  17.24  -SRAS-   [  6 B 20.0mm]  | AsL=    .00   ------     Flecha=   .6      | As =   5.74  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .17 | As =   7.64   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .06
```

```
      |                          x/dMx= .33    | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.0      | Grampos Dir.= 2B  8.0mm x/dMx= .33
      |                                        |                        Fle.Adm.= 2.0       |
[tf,cm]| M[-]Min =  3622.5                     | M[+]Min =  1931.1                          | M[-]Min =  2098.1
[cm2  ]| Asapo[+]=  4.45                       |                                            | Asapo[+]=  7.35

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 181.  68.92 154.02   2  45.   10.9    2.9     10.9 10.0 10.0  2    .0    .0
             181.- 543.  35.14 154.02   2  45.    2.3    2.9      2.9  5.0 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 181.    .01  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .45   N
             181.- 543.    .01  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .23   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     5.756     4.940       .25      .00      2   V4          .00    .00      0      0      0      0      0      0
              2    77.202    70.177      4.50     1.88      1   B201        .00    .00   8201      0      0      0      0      0
              3    25.102    22.722       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=   13  VB13                         Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------  G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  5.03 /B=  .25 /H=  1.25  /BCs= 1.00 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                     | M E I O   D O    V A O                     | D I R E I T A
       | M.[-] =      4.5 tf* m               | M.[+] Max=     10.9 tf* m - Abcis.= 167    | M.[-] =     35.0  tf* m
[tf,cm]| As =   5.19  -SRAS-   [  3 B 16.0mm] | AsL=    .00   ------     Flecha=   .1      | As =   9.77  -SRAS-  [  5 B 16.0mm]
       | AsL=    .00  ------       x/d  = .05 | As =   6.95   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  1.5      |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 1.7       |
[tf,cm]| M[-]Min =  1858.5                    | M[+]Min =  1888.7                          | M[-]Min =  3309.7
[cm2  ]| Asapo[+]=  6.95                      |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 303.  22.00 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0
             303.- 455.  42.14 154.02   2  45.    4.0    2.9      4.0  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 303.    .26  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .16   N
             303.- 455.    .26  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .29   N

------------------------------  G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 2  /L=  7.63 /B=  .25 /H=  1.25  /BCs= 1.39 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                     | M E I O   D O    V A O                     | D I R E I T A
       | M.[-] =     35.7 tf* m               | M.[+] Max=     50.0 tf* m - Abcis.= 444    | M.[-] =     11.7  tf* m
[tf,cm]| As =  11.84  -SRAS-   [  6 B 16.0mm] | AsL=    .00   ------     Flecha=   .9      | As =   5.70  -SRAS-  [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .12 | As =  13.57   -STAS-  [  5 B 20.0mm ]      | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.9      |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 2.5       |
[tf,cm]| M[-]Min =  4193.7                    | M[+]Min =  1996.2                          | M[-]Min =  2083.1
[cm2  ]| Asapo[+]=  4.45                      |                                            | Asapo[+]=  3.39

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 179.  59.54 154.02   2  45.    8.5    2.9      8.5  8.0 10.0  2    .0    .0
             179.- 536.  31.61 154.02   2  45.    1.4    2.9      2.9  5.0 10.0  2    .0    .0
             536.- 715.  49.08 154.02   2  45.    5.8    2.9      5.8  6.3 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 179.    .17  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .40   N
             179.- 536.    .17  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .22   N
             536.- 715.    .17  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .33   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    15.695    14.101       .60      .00      4   P13         .00    .00     13      0      0      0      0      0
              2    72.555    65.501       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              3    35.056    31.644       .60      .00      4   P4          .00    .00      4      0      0      0      0      0
================================================================================================================================

Viga=   14  VB14                         Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------  G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  5.20 /B=  .25 /H=  1.25  /BCs= 1.03 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                     | M E I O   D O    V A O                     | D I R E I T A
       | M.[-] =       .5 tf* m               | M.[+] Max=     12.8 tf* m - Abcis.= 173    | M.[-] =     30.5  tf* m
[tf,cm]| As =   5.21  -SRAS-   [  3 B 16.0mm] | AsL=    .00   ------     Flecha=   .1      | As =   9.36  -SRAS-  [  3 B 20.0mm]
       | AsL=    .00  ------       x/d  = .05 | As =   7.03   -STAS-  [  4 B 16.0mm ]      | AsL=    .00  ------     x/d  = .09
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  1.5      |                           x/dMx= .33
       |                                      |                        Fle.Adm.= 1.7       |
[tf,cm]| M[-]Min =  1873.7                    | M[+]Min =  1897.5                          | M[-]Min =  3371.1
[cm2  ]| Asapo[+]=  7.03                      |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 490.  37.92 154.02   2  45.    3.0    2.9      3.0  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 490.    .14  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .25   N

------------------------------  G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 2  /L=  7.80 /B=  .25 /H=  1.25  /BCs= 1.42 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                     | M E I O   D O    V A O                     | D I R E I T A
       | M.[-] =     30.5 tf* m               | M.[+] Max=     47.8 tf* m - Abcis.= 455    | M.[-] =      1.2  tf* m
[tf,cm]| As =  11.93  -SRAS-   [  4 B 20.0mm] | AsL=    .00   ------     Flecha=  1.0      | As =   5.74  -SRAS-  [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .12 | As =  12.89   -STAS-  [  4 B 20.0mm ]      | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.7      | Grampos Dir.= 1B  6.3mm x/dMx= .33
       |                                      |                        Fle.Adm.= 2.6       |
[tf,cm]| M[-]Min =  4251.1                    | M[+]Min =  2002.0                          | M[-]Min =  2098.1
[cm2  ]| Asapo[+]=  4.45                      |                                            | Asapo[+]=  8.20

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 150.  51.56 154.02   2  45.    6.4    2.9      6.4  8.0 15.0  2    .0    .0
             150.- 600.  32.09 154.02   2  45.    1.5    2.9      2.9  5.0 10.0  2    .0    .0
             600.- 750.  39.12 154.02   2  45.    3.3    2.9      3.3  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 150.    .09  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .34   N
```

```
            150.- 600.    .09  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .21   N
            600.- 750.    .09  16.41  25 10.4  14.6 114.6     .1      .0    .0    .0    .26   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    13.499    12.217       .25      .00      2   V4          .00    .00      0      0      0      0      0      0
              2    63.911    57.813       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              3    27.944    25.261       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
================================================================================================================================

Viga=   15  VB15                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  4.90 /B=  .25 /H=  1.25  /BCs=  .62 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =     1.9 tf* m                | M.[+] Max=     9.9 tf* m - Abcis.= 163     | M.[-] =    37.3  tf* m
[tf,cm]| As =   4.93  -SRAS-   [  4 B 12.5mm]  | AsL=    .00  ------     Flecha=   .1       | As =  10.47  -SRAS- [  6 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04  | As =   5.79  -STAS-  [  3 B 16.0mm ]       | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.2      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 1.6     |
[tf,cm]| M[-]Min =  1632.3                     | M[+]Min =  1717.3                          | M[-]Min =  2371.3
[cm2  ]| Asapo[+]=  5.79                       |                                            | Asapo[+]=  4.45

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 287.  21.46 154.02   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0
             287.- 430.  41.04 154.02   2  45.    3.8    2.9      3.8  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 287.    .03  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .14   N
             287.- 430.    .03  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .27   N

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 2  /L=  7.75 /B=  .25 /H=  1.25  /BCs= 1.41 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .63 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =    36.7 tf* m                | M.[+] Max=    42.5 tf* m - Abcis.= 452     | M.[-] =     8.8  tf* m
[tf,cm]| As =  11.96  -SRAS-   [  6 B 16.0mm]  | AsL=    .00  ------     Flecha=   .9       | As =   5.73  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .12  | As =  11.46  -STAS-  [  6 B 16.0mm ]       | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.4      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6     |
[tf,cm]| M[-]Min =  4234.7                     | M[+]Min =  2000.4                          | M[-]Min =  2093.8
[cm2  ]| Asapo[+]=  4.45                       |                                            | Asapo[+]=  2.87

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 179.  52.85 154.02   2  45.    6.8    2.9      6.8  8.0 10.0  2    .0    .0
             179.- 536.  27.63 154.02   2  45.     .3    2.9      2.9  5.0 10.0  2    .0    .0
             536.- 715.  40.95 154.02   2  45.    3.7    2.9      3.7  6.3 15.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 179.    .01  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .34   N
             179.- 536.    .01  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .18   N
             536.- 715.    .01  16.41  25 10.4  14.6 114.6     .0      .0    .0    .0    .27   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    12.607    11.274       .60      .00      4   P14         .00    .00     14      0      0      0      0      0
              2    66.946    60.534       .60      .00      4   P9          .00    .00      9      0      0      0      0      0
              3    29.249    26.300       .60      .00      4   P5          .00    .00      5      0      0      0      0      0
================================================================================================================================

Viga=   16  VB16                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  5.20 /B=  .25 /H=   .90  /BCs= 1.03 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .45 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =     .3 tf* m                 | M.[+] Max=    14.1 tf* m - Abcis.= 173     | M.[-] =    36.4  tf* m
[tf,cm]| As =   3.94  -SRAS-   [  2 B 16.0mm]  | AsL=    .00  ------     Flecha=   .3       | As =  15.10  -SRAS- [  5 B 20.0mm]
       | AsL=    .00  ------       x/d  = .06  | As =   5.72  -STAS-  [  3 B 16.0mm ]       | AsL=    .00  ------     x/d  = .21
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33  | Arm.Lat.=[2 X  5 B  8.0mm] - LN=  1.6      |                          x/dMx= .33
       |                                       |                          Fle.Adm.= 1.7     |
[tf,cm]| M[-]Min =  1022.1                     | M[+]Min =   987.9                          | M[-]Min =  1911.1
[cm2  ]| Asapo[+]=  5.72                       |                                            | Asapo[+]=  3.21

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 327.  21.30 109.47   2  45.     .9    2.9      2.9  5.0 10.0  2    .0    .0
             327.- 490.  43.79 109.47   2  45.    9.0    2.9      9.0  8.0 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 327.    .01  11.26  25  9.8  15.2  80.2     .0      .0    .0    .0    .20   N
             327.- 490.    .01  11.26  25  9.8  15.2  80.2     .0      .0    .0    .0    .40   N

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 2  /L=  7.80 /B=  .25 /H=  1.25  /BCs= 1.42 /BCi=  .00 /TpS=  2 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .80 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =    36.9 tf* m                | M.[+] Max=    55.8 tf* m - Abcis.= 455     | M.[-] =     1.0  tf* m
[tf,cm]| As =  12.01  -SRAS-   [  6 B 16.0mm]  | AsL=    .00  ------     Flecha=  1.0       | As =   5.74  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .12  | As =  15.15  -STAS-  [  5 B 20.0mm ]       | AsL=    .00  ------     x/d  = .06
       |                           x/dMx= .33  | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  3.2      | Grampos Dir.= 1B  6.3mm x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6     |
[tf,cm]| M[-]Min =  4251.1                     | M[+]Min =  2002.0                          | M[-]Min =  2098.1
[cm2  ]| Asapo[+]=  4.45                       |                                            | Asapo[+]=  8.20

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 169.  56.38 154.02   2  45.    7.7    2.9      7.7  8.0 10.0  2    .0    .0
             169.- 617.  34.96 154.02   2  45.    2.2    2.9      2.9  5.0 10.0  2    .0   1.2
             617.- 750.  43.22 154.02   2  45.    4.3    2.9      4.3  6.3 10.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 169.    .29  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .38   N
             169.- 617.    .30  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .24   N
             617.- 750.    .30  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .30   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1    14.904    13.420       .25      .00      2   V4          .00    .00      0      0      0      0      0      0
              2    71.542    64.505       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              3    30.872    27.821       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
================================================================================================================================
```

```
Viga=   17  VB17                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  4.75 /B=  .25 /H=   .90  /BCs=  .61 /BCi=  .00 /TpS=  8 /Esp.LS=  .20 /Esp.LI=  .00 FSp.Ex=  .45 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                 | D I R E I T A
       | M.[-] =       .0 tf* m             | M.[+] Max=      2.8 tf* m - Abcis.= 118    | M.[-] =    18.5  tf* m
[tf,cm]| As =    .70  -SRAS-   [  2 B  8.0mm]   | AsL=    .00   ------     Flecha=   .0      | As =   7.29  -SRAS- [  4 B 16.0mm]
       | AsL=    .00  ------       x/d  = .00   | As =   4.44   -STAS-  [  4 B 12.5mm ]      | AsL=    .00  ------     x/d  = .10
       |                           x/dMx= .33   | Arm.Lat.=[2 X  5 B  8.0mm] - LN=  1.7      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 1.6     |
[tf,cm]| M[-]Min =   732.9                      | M[+]Min =   896.4                          | M[-]Min =  1308.5
[cm2  ]| Asapo[+]=  4.44                        |                                            | Asapo[+]=  3.21

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 418.  17.31 109.47   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 418.    .16  11.26  25  9.8  15.2  80.2     .2      .0    .0    .0    .17   N

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 2  /L=  7.75 /B=  .25 /H=  1.25  /BCs=  .83 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .80 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                 | D I R E I T A
       | M.[-] =     22.1 tf* m               | M.[+] Max=     58.4 tf* m - Abcis.= 452    | M.[-] =     8.7  tf* m
[tf,cm]| As =   6.74  -SRAS-   [  4 B 16.0mm]   | AsL=    .00   ------     Flecha=  1.1      | As =   4.92  -SRAS- [  4 B 12.5mm]
       | AsL=    .00  ------       x/d  = .07   | As =  15.99   -STAS-  [  5 B 20.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  5.7      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 2.6     |
[tf,cm]| M[-]Min =  2453.8                      | M[+]Min =  1758.9                          | M[-]Min =  1648.5
[cm2  ]| Asapo[+]=  5.33                        |                                            | Asapo[+]=  5.33

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 169.  44.68 154.02   2  45.    4.7    2.9      4.7  6.3 10.0  2    .0    .0
           169.- 337.  29.28 154.02   2  45.     .8    2.9      2.9  6.3 20.0  2    .0    .0
           337.- 483.  22.80 154.02   2  45.     .0    2.9      3.7  6.3 15.0  2  11.7   3.7
           483.- 715.  36.71 154.02   2  45.    2.7    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 169.    .25  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .31   N
           169.- 337.    .25  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .21   N
           337.- 483.    .27  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .16   N
           483.- 715.    .27  16.41  25 10.4  14.6 114.6     .2      .0    .0    .0    .25   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     2.744     2.418      1.20      .33      1   B203        .00    .00   8203      0      0      0      0      0
              2    44.269    41.120       .60      .00      4   P10         .00    .00     10      0      0      0      0      0
              3    26.220    24.470       .60      .00      4   P6          .00    .00      6      0      0      0      0      0
================================================================================================================================

Viga=   18  VB18                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

-------------------------------   G E O M E T R I A      E     C A R G A S   -------------------------------
Vao= 1  /L=  4.28 /B=  .20 /H=  1.70  /BCs=  .63 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .85 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                 | D I R E I T A
       | M.[-] =       .7 tf* m             | M.[+] Max=      2.8 tf* m - Abcis.= 249    | M.[-] =       .0  tf* m
[tf,cm]| As =   5.23  -SRAS-   [  3 B 16.0mm]   | AsL=    .00   ------     Flecha=   .0      | As =    .00  -SRAS- [  0 B  6.3mm]
       | AsL=    .00  ------       x/d  = .04   | As =   5.87   -STAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .00
       | Grampos Esq.= 1B  6.3mm   x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  2.3      | Grampos Dir.= 2B  8.0mm x/dMx= .33
       |                                        |                          Fle.Adm.= 1.4     |
[tf,cm]| M[-]Min =  2277.0                      | M[+]Min =  2499.5                          | M[-]Min =  2091.8
[cm2  ]| Asapo[+]=  5.87                        |                                            | Asapo[+]=  5.87

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 398.   4.16 169.04   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla        M E N S A G E M
[tf,cm]        0.- 398.    .06  15.02  25  8.9  11.1 161.1     .0      .0    .0    .0    .03   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     2.968     2.859       .35      .00      2   V3          .00    .00      0      0      0      0      0      0
              2     2.466     2.365       .25      .00      2   V2          .00    .00      0      0      0      0      0      0
================================================================================================================================
```

4.1.2 Lajes

LAJE ARMADA EM 1 DIREÇÃO (h=12cm) – TÍPICA

```
LX=  165.0   LY=  780.0     H=12.

Armad     Momen       AS         Bit      Espac
          tfcm/m      cm2         mm       cm

 X         14.4      1.80         6.3      15.0
 Y          6.6      1.80         5.0      15.0  Arm. secundaria
AP 1         .0       .00         6.3      20.0
AP 2     -206.1      8.43        10.0       9.5
AP 3      -14.1      1.44         6.3      20.0
AP 4         .0       .00         6.3      20.0



LX=  205.0   LY=  427.5     H=12.

Armad     Momen         AS         Bit     Espac
```

	tfcm/m	cm2	mm	cm	
X	22.2	1.80	6.3	15.0	
Y	7.4	1.80	5.0	15.0	Arm. secundaria
AP 1	.0	.00	6.3	20.0	
AP 2	.0	.00	6.3	20.0	
AP 3	.0	.00	6.3	20.0	
AP 4	-177.2	6.99	10.0	10.0	

LAJE ARMADA EM 2 DIREÇÕES (h=12cm) – TÍPICA

LX= 242.6 LY= 125.0 H=12.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm
X	2.9	1.80	6.3	15.0
Y	6.8	1.80	6.3	15.0
AP 1	-106.1	3.96	8.0	12.5
AP 2	.0	.00	6.3	20.0
AP 3	.0	.00	6.3	20.0
AP 4	-9.7	1.44	6.3	20.0

LAJE ARMADA EM 2 DIREÇÕES (h=20cm) – TÍPICA

LX= 275 LY= 427.5 H=20.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm
X	128.1	3.00	6.3	10.0
Y	49.9	3.00	6.3	10.0
AP 1	-200.0	3.90	10.0	20.0
AP 2	-177.2	6.99	10.0	10.0
AP 3	-194.2	3.78	10.0	20.0
AP 4	-230.6	4.51	8.0	10.0

LX= 275 LY= 520.0 H=20.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm
X	132.9	3.00	6.3	10.0
Y	54.7	3.00	6.3	10.0
AP 1	.0	.00	6.3	20.0
AP 2	-212.8	4.15	10.0	17.5
AP 3	-174.9	3.39	10.0	20.0
AP 4	-288.2	5.73	12.5	20.0

LX= 375.0 LY= 520.0 H=20.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm
X	239.7	4.70	10.0	15.0
Y	111.2	3.00	6.3	10.0
AP 1	.0	.00	6.3	20.0
AP 2	-419.0	8.51	12.5	12.5
AP 3	-311.4	6.17	10.0	12.5
AP 4	-335.2	6.66	10.0	10.0

LAJE ARMADA EM 1 DIREÇÃO (h=20cm) – TÍPICA

LX= 275.0 LY= 780.0 H=20.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm	
X	158.0	3.02	6.3	10.0	
Y	81.0	3.00	5.0	15.0	Arm. secundaria
AP 1	-174.9	3.39	10.0	20.0	
AP 2	-232.1	4.51	8.0	10.0	
AP 3	-148.5	5.85	12.5	20.0	
AP 4	-264.2	5.19	10.0	15.0	

LX= 375.0 LY= 780.0 H=20.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm	
X	277.8	5.52	12.5	20.0	
Y	105.9	3.00	5.0	15.0	Arm. secundaria
AP 1	-311.4	6.17	10.0	12.5	
AP 2	-465.3	9.52	12.5	12.5	
AP 3	.0	.00	6.3	20.0	
AP 4	-370.4	7.40	1	10.0	

LX= 257.5 LY= 520.0 H=20.

Armad	Momen tfcm/m	AS cm2	Bit mm	Espac cm	
X	110.9	3.00	6.3	10.0	
Y	46.6	3.00	5.0	15.0	Arm. secundaria
AP 1	.0	.00	6.3	20.0	
AP 2	-335.2	6.66	10.0	10.0	
AP 3	-146.7	2.75	8.0	17.5	
AP 4	-198.2	3.86	10.0	20.0	

4.1.3 Blocos de Apoio

BLOCO: B2-90

GEOMETRIA[cm,m3]	CARGAS[tf,m]	TENSOES[kgf/cm2]	VERIF.[cm,graus]
Estacas= 2 fi = 90.0	FN= 189.0	TensLimP= 270.0	dmin = 120.0
DisX= 270.0		TensPil = 381.2	dmax = 170.4
Xbl = 450.0 Ybl = 180.0	MY= .0		dutil = 134.1
Alt = 150.0 Vol =12.150		TensLimE= 270.0	AnguloX= 48.2
Xpil= 60.0 Ypil= 25.0	FE= 219.4	TensEst = 52.2	AnguloY= 48.2
Formas: 18.90 m2	F1= 109.7		
**********	****	****	

ARMADURAS [cm2,cm]	Peso Próprio: 30.4 tf (x1)		
Prin.X: 37.9 = 18 {20.0 C/ 10.0	SecndY: 6.3 = 23 {10.0 C/ 20.0		
P.Estr: 4.7 = 9 {10.0 C/ 20.0	Laterl: 6.3 = 10 {10.0 C/ 15.0		

BLOCO: B4-60

GEOMETRIA[cm,m3]	CARGAS[tf,m]	TENSOES[kgf/cm2]	VERIF.[cm,graus]
Estacas= 4 fi = 60.0	FN= 130.0	TensLimP= 405.0	dmin = 106.5
DisX= 180.0 DisY= 180.0	MX= .0	TensPil = 297.1	dmax = 167.5
Xbl = 300.0 Ybl = 300.0	MY= .0		dutil = 116.1
Alt = 130.0 Vol =11.700		TensLimE= 405.0	AnguloX= 44.4
Xpil= 25.0 Ypil= 60.0	FE= 159.3	TensEst = 48.3	AnguloY= 47.6
Formas: 15.60 m2	F1= 39.8		
**********		****	

ARMADURAS [cm2,cm]	Peso Próprio: 29.3 tf (x1)		
Prin.X: 11.1 = 6 {16.0 C/ 12.0	Prin.Y: 9.9 = 5 {16.0 C/ 15.0		
SecndX: 4.6 = 15 {10.0 C/ 20.0	SecndY: 4.1 = 15 {10.0 C/ 20.0		
Laterl: 1.6 = 7 {10.0 C/ 20.0			

BLOCO: B4-90

GEOMETRIA[cm,m3]	CARGAS[tf,m]	TENSOES[kgf/cm2]	VERIF.[cm,graus]
Estacas= 4 fi = 90.0	FN= 364.0	TensLimP= 405.0	dmin = 170.4
DisX= 270.0 DisY= 270.0	MX= .0	TensPil = 807.4	dmax = 252.5
Xbl = 450.0 Ybl = 450.0	MY= .0		dutil = 134.1
Alt = 150.0 Vol =30.375		TensLimE= 405.0	AnguloX= 36.9
Xpil= 60.0 Ypil= 35.0	FE= 439.9	TensEst = 80.5	AnguloY= 38.3
Formas: 27.00 m2	F1= 110.0		
**********	****	****	

ARMADURAS [cm2,cm]	Peso Próprio: 75.9 tf (x1)		
Prin.X: 38.0 = 8 {25.0 C/ 12.9	Prin.Y: 40.0 = 13 {20.0 C/ 7.5		
SecndX: 15.8 = 23 {10.0 C/ 20.0	SecndY: 16.7 = 23 {10.0 C/ 20.0		
Laterl: 4.8 = 8 {10.0 C/ 20.0			

```
BLOCO: B1-60
.--------------------------.-------------.------------------.------------------.
| GEOMETRIA[cm,m3]         | CARGAS[tf,m]| TENSOES[kgf/cm2] | VERIF.[cm,graus] |
.--------------------------.-------------.------------------.------------------.
| Estacas=  1  fi  =  60.0 | FN=    35.0 | TensLimP=  707.1 |                  |
|                          |             | TensPil =  588.0 |                  |
| Xbl = 120.0  Ybl = 120.0 |             |                  | dutil  =  116.1  |
| Alt = 130.0  Vol = 1.872 |-------------| TensLimE=  270.0 | AnguloX=   82.6  |
| Xpil=    .0  Ypil=    .0 | FE=    39.7 | TensEst =   24.0 | AnguloY=   82.6  |
| Formas:      6.24 m2     | F1=    39.7 |                  |                  |
.--------------------------.-------------.------------------.------------------.
| ARMADURAS [cm2,cm]       | Peso Próprio:        4.7 tf (x1)                  |
.-----------------------------------------------------------------------------.
| Prin.X:    2.0 =   6 {10.0 C/  20.0    Prin.Y:    2.0 =   6 {10.0 C/  20.0   |
| AsXfdZ:    3.9                         AsYfdZ:    3.9                         |
| AsCin :     .0                         Laterl:    1.5 =   7 {10.0 C/  20.0   |
.-----------------------------------------------------------------------------.
- Armaduras para fendilhamento e cintamento detalhadas nas armaduras principais
  e lateral, repectivamente.
```

4.2 Barrilete

4.2.1 Vigas

```
Viga=    1  V1                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  5.50 /B=  .20 /H=   .42  /BCs=  .75 /BCi=  .00 /TpS=  5 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .21 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =       .1 tf* m             | M.[+] Max=      5.6 tf* m - Abcis.= 274 | M.[-] =       .6  tf* m
[tf,cm]| As =   1.46  -SRAS-   [  2 B 10.0mm] | AsL=    .00   ------     Flecha=  1.9    | As =   1.46  -SRAS- [  2 B 10.0mm]
       | AsL=    .00  ------      x/d  = .06 | As =   4.94   -STAS-  [  4 B 12.5mm ]    | AsL=    .00  ------     x/d  = .06
       |                          x/dMx= .33 |                                          |                          x/dMx= .33
       |                                     |                  Fle.Adm= 1.8 < Fl.Calc ***|
[tf,cm]| M[-]Min =   165.3                    | M[+]Min =   168.8                        | M[-]Min =   165.3
[cm2  ]| Asapo[+]=  2.25                      |                                          | Asapo[+]=  2.25

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 530.   5.15  38.70   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 530.    .25   2.36  25  6.8  11.1  33.1     .8      .0    .0    .0    .24   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     3.676     3.569       .20      .00      2   V3          .00    .00      0      0      0      0      0      0
              2     3.364     3.267       .20      .00      1   P201        .00    .00    201      0      0      0      0      0
================================================================================================================================

Viga=    2  V2                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  5.50 /B=  .20 /H=   .42  /BCs=  .75 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .21 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =      2.4 tf* m               | M.[+] Max=      3.2 tf* m - Abcis.= 275 | M.[-] =      3.2  tf* m
[tf,cm]| As =   2.35  -SRAS-   [  3 B 10.0mm] | AsL=    .00   ------     Flecha=  1.4    | As =   3.10  -SRAS- [  4 B 10.0mm]
       | AsL=    .00  ------      x/d  = .08 | As =   3.08   -STAS-  [  4 B 10.0mm ]    | AsL=    .00  ------     x/d  = .11
       |                          x/dMx= .33 | Arm.Lat.=[2 X  2 B  8.0mm] - LN=  1.1    |                          x/dMx= .33
       |                                     |                  Fle.Adm.= 1.8           |
[tf,cm]| M[-]Min =   200.7                    | M[+]Min =   168.8                        | M[-]Min =   234.1
[cm2  ]| Asapo[+]=   .77                      |                                          | Asapo[+]=   .77

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 175.   5.79  38.70   2  45.     .0    2.3      4.4  6.3 10.0  2    .0    .0
             175.- 525.   4.80  38.70   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 175.    .70   2.36  25  6.8  11.1  33.1    2.2      1.6    .2    .7    .45   N
             175.- 525.    .38   2.36  25  6.8  11.1  33.1    1.2      .0    .0    .0    .29   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     4.132     3.838       .25      .00      0   P7          .00    .00      7      0      0      0      0      0
              2     3.397     3.120       .35      .05      0   P8          .00    .00      8      0      0      0      0      0
================================================================================================================================

Viga=    3  V3                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E     C A R G A S   ------------------------------
Vao= 1  /L=  7.51 /B=  .20 /H=   .60  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .30 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O   V A O                  | D I R E I T A
       | M.[-] =      5.8 tf* m               | M.[+] Max=      5.7 tf* m - Abcis.= 312 | M.[-] =      5.0  tf* m
[tf,cm]| As =   3.47  -SRAS-   [  3 B 12.5mm] | AsL=    .00   ------     Flecha=  1.9    | As =   2.99  -SRAS- [  4 B 10.0mm]
       | AsL=    .00  ------      x/d  = .09 | As =   3.47   -SRAS-  [  3 B 12.5mm ]    | AsL=    .00  ------     x/d  = .08
       |                          x/dMx= .33 | Arm.Lat.=[2 X  3 B  8.0mm] - LN=  5.2    |                          x/dMx= .33
       |                                     |                  Fle.Adm.= 2.5           |
[tf,cm]| M[-]Min =   260.6                    | M[+]Min =   260.6                        | M[-]Min =   260.6
[cm2  ]| Asapo[+]=   .87                      |                                          | Asapo[+]=   .87

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 715.   7.22  57.02   2  45.     .0    2.3      2.3  6.3 20.0  2    .0   1.6

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 715.    .91   4.03  25  7.5  11.1  51.1    1.8      .0    .0    .0    .35   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
```

```
             1     5.088     4.898       .60      .12      0   P7          .00    .00      7      0      0      0      0      0
             2     3.302     3.159       .60      .12      0   P1          .00    .00      1      0      0      0      0      0
=============================================================================================================================

Viga=    4  V4                          Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0  .0 CM

------------------------------   G E O M E T R I A      E      C A R G A S    ------------------------------
Vao= 1  /L=  3.35 /B=  .20 /H=   .42  /BCs=  .54 /BCi=  .00 /TpS=  8 /Esp.LS=  .12 /Esp.LI=  .00 FSp.Ex=  .21 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E    C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =       2.7 tf* m             | M.[+] Max=       .9 tf* m - Abcis.= 223    | M.[-] =       .0  tf* m
[tf,cm]| As =   2.71  -SRAS-   [  3 B 12.5mm] | AsL=    .00   ------     Flecha=   .1      | As =    .34  -SRAS- [  2 B  6.3mm]
       | AsL=    .00  ------       x/d  = .10 | As =   2.13   -STAS-  [  3 B 10.0mm ]      | AsL=    .00  ------     x/d  = .00
       |                           x/dMx= .33 | Arm.Lat.=[2 X  2 B  8.0mm] - LN=   .8      | Grampos Dir.= 1B  6.3mm x/dMx= .33
       |                                      |                          Fle.Adm.= 1.1     |
[tf,cm]| M[-]Min =   235.6                    | M[+]Min =   159.1                          | M[-]Min =   127.7
[cm2  ]| Asapo[+]=   .53                      |                                            | Asapo[+]=  2.13

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 104.   4.42  38.70   2  45.     .0    2.3      4.8  6.3 10.0  2    .0    .0
             104.- 313.   2.19  38.70   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 104.    .78   2.36  25  6.8  11.1  33.1    2.4     1.6    .3    .8    .44   N
             104.- 313.    .30   2.36  25  6.8  11.1  33.1     .9      .0    .0    .0    .18   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn         Pilares:
              1     3.156     2.963       .60      .17      0   P8          .00    .00      8      0      0      0      0      0
              2     1.334     1.225       .20      .00      1   P201        .00    .00    201      0      0      0      0      0
=============================================================================================================================
```

4.2.2 Lajes

```
Laje    1     LX=  550.0   LY=  332.5     H=12.

Armad      Momen     AS          N.Fer Bit    Compr    Espac
           tfcm/m    cm2               mm       cm       cm

 X          51.7    1.86            22    6.3      564    15.0
 Y         106.0    3.96            43    8.0      346    12.5
AP 1          .0     .00                  6.3             20.0
AP 2          .0     .00                  6.3             20.0
AP 3          .0     .00                  6.3             20.0
AP 4          .0     .00                  6.3             20.0
```

4.3 Cobertura

4.3.1 Vigas

VIGA DE BORDA (25x140) – LONGITUDINAL TÍPICA

```
Vao= 1  /L=  5.50 /B=  .25 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E    C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =       .5 tf* m              | M.[+] Max=     10.5 tf* m - Abcis.= 229    | M.[-] =      8.8  tf* m
[tf,cm]| As =   5.25  -SRAS-   [  3 B 16.0mm] | AsL=    .00   ------     Flecha=   .2      | As =   5.25  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04 | As =   5.25   -SRAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       | Grampos Esq.= 2B  6.3mm   x/dMx= .33 | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  5.7      |                           x/dMx= .33
       |                                      |                          Fle.Adm.= 1.8     |
[tf,cm]| M[-]Min =  1773.3                    | M[+]Min =  1773.3                          | M[-]Min =  1773.3
[cm2  ]| Asapo[+]=  5.25                      |                                            | Asapo[+]=  4.99

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 525.  15.25 173.11   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   1.0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 525.   1.78  18.62  25 10.6  14.4 129.4    1.1      .0    .0    .0    .18   N

------------------------------   G E O M E T R I A      E      C A R G A S    ------------------------------
Vao= 2  /L=  5.00 /B=  .25 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S   ( F L E X A O   E    C I S A L H A M E N T O )   -    -    -    -    -
FLEXAO-| E S Q U E R D A                    | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =      8.7 tf* m             | M.[+] Max=      4.8 tf* m - Abcis.= 250    | M.[-] =     20.2  tf* m
[tf,cm]| As =   5.82  -SRAS-   [  3 B 16.0mm] | AsL=    .00   ------     Flecha=   .0      | As =   5.82  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04 | As =   5.82   -SRAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33 | Arm.Lat.=[2 X 11 B  8.0mm] - LN=  5.7      |                           x/dMx= .33
       |                                      |                          Fle.Adm.= 1.7     |
[tf,cm]| M[-]Min =  1773.3                    | M[+]Min =  1773.3                          | M[-]Min =  1773.3
[cm2  ]| Asapo[+]=  5.56                      |                                            | Asapo[+]=  5.56

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus           M E N S A G E M
[tf,cm]        0.- 175.  13.26 173.11   2  45.     .0    2.9      9.2  8.0 10.0  2    .0   1.3
             175.- 300.   9.21 173.11   2  45.     .0    2.9      2.9  5.0 10.0  2    .0   1.3
             300.- 475.  20.82 173.11   2  45.     .0    2.9      8.2  8.0 10.0  2    .0   1.3

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 175.   6.41  18.62  25 10.6  14.4 129.4    4.0     2.5    .6   5.1    .42   N
             175.- 300.   1.31  18.62  25 10.6  14.4 129.4     .8      .0    .0    .0    .12   N
             300.- 475.   5.60  18.62  25 10.6  14.4 129.4    3.5     2.5    .5   4.5    .42   N

------------------------------   G E O M E T R I A      E      C A R G A S    ------------------------------
Vao= 3  /L=  7.50 /B=  .25 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------
```

```
-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =     20.3 tf* m                | M.[+] Max=     22.9 tf* m - Abcis.= 375    | M.[-] =     20.3  tf* m
[tf,cm]| As =   5.76  -SRAS-   [  3 B 16.0mm]   | AsL=    .00  ------     Flecha=   .7      | As =   5.76  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04   | As =   6.07   -SRAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33   | Arm.Lat.=[2 X 10 B  8.0mm] - LN=  6.6      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 2.5     |
[tf,cm]| M[-]Min =  1773.3                      | M[+]Min =  1773.3                          | M[-]Min =  1773.3
[cm2  ]| Asapo[+]=  5.50                        |                                            | Asapo[+]=  5.50

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 175.  27.77 173.11   2  45.     .0    2.9      8.4  8.0 10.0  2    .0   1.3
           175.- 550.  16.18 173.11   2  45.     .0    2.9      2.9  5.0 10.0  2    .0   1.3
           550.- 725.  27.76 173.11   2  45.     .0    2.9      8.3  8.0 10.0  2    .0   1.3

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 175.   5.72  18.62  25 10.6  14.4 129.4    3.5     2.5    .5   4.6    .47   N
           175.- 550.   1.43  18.62  25 10.6  14.4 129.4     .9      .0    .0    .0    .17   N
           550.- 725.   5.71  18.62  25 10.6  14.4 129.4    3.5     2.5    .5   4.6    .47   N

-------------------------------  G E O M E T R I A      E     C A R G A S  -------------------------------
Vao= 4  /L=  5.00 /B=  .25 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =     20.1 tf* m                | M.[+] Max=      4.8 tf* m - Abcis.= 250    | M.[-] =      8.7  tf* m
[tf,cm]| As =   5.82  -SRAS-   [  3 B 16.0mm]   | AsL=    .00  ------     Flecha=   .0      | As =   5.82  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04   | As =   5.82   -SRAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33   | Arm.Lat.=[2 X 11 B  8.0mm] - LN=  5.7      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 1.7     |
[tf,cm]| M[-]Min =  1773.3                      | M[+]Min =  1773.3                          | M[-]Min =  1773.3
[cm2  ]| Asapo[+]=  5.55                        |                                            | Asapo[+]=  5.55

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 175.  20.76 173.11   2  45.     .0    2.9      8.2  8.0 10.0  2    .0   1.3
           175.- 300.   9.17 173.11   2  45.     .0    2.9      2.9  5.0 10.0  2    .0   1.3
           300.- 475.  13.19 173.11   2  45.     .0    2.9      9.1  8.0 10.0  2    .0   1.3

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 175.   5.59  18.62  25 10.6  14.4 129.4    3.5     2.5    .5   4.5    .42   N
           175.- 300.   1.35  18.62  25 10.6  14.4 129.4     .8      .0    .0    .0    .13   N
           300.- 475.   6.36  18.62  25 10.6  14.4 129.4    3.9     2.5    .6   5.1    .42   N

-------------------------------  G E O M E T R I A      E     C A R G A S  -------------------------------
Vao= 5  /L=  5.50 /B=  .25 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =      8.8 tf* m                | M.[+] Max=     10.5 tf* m - Abcis.= 320    | M.[-] =       .5  tf* m
[tf,cm]| As =   5.25  -SRAS-   [  3 B 16.0mm]   | AsL=    .00  ------     Flecha=   .2      | As =   5.25  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04   | As =   5.25   -SRAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  5.7      | Grampos Dir.= 2B  6.3mm x/dMx= .33
       |                                        |                          Fle.Adm.= 1.8     |
[tf,cm]| M[-]Min =  1773.3                      | M[+]Min =  1773.3                          | M[-]Min =  1773.3
[cm2  ]| Asapo[+]=  4.99                        |                                            | Asapo[+]=  5.25

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 525.  15.26 173.11   2  45.     .0    2.9      2.9  6.3 20.0  2    .0   1.0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 525.   1.81  18.62  25 10.6  14.4 129.4    1.1      .0    .0    .0    .18   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     6.702     6.391       .25      .00      1   P1          .00    .00      1      0      0      0      0      0
              2    20.259    19.865       .25      .00      1   P2          .00    .00      2      0      0      0      0      0
              3    34.643    34.019       .25      .00      1   P3          .00    .00      3      0      0      0      0      0
              4    34.597    33.974       .25      .00      1   P4          .00    .00      4      0      0      0      0      0
              5    20.217    19.828       .25      .00      1   P5          .00    .00      5      0      0      0      0      0
              6     6.735     6.425       .25      .00      1   P6          .00    .00      6      0      0      0      0      0
```

VIGA DE BORDA (20x140) – LONGITUDINAL TÍPICA

```
Vao= 1  /L=  5.55 /B=  .20 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =       .6 tf* m               | M.[+] Max=     13.7 tf* m - Abcis.= 277    | M.[-] =      1.3  tf* m
[tf,cm]| As =   4.20  -SRAS-   [  4 B 12.5mm]   | AsL=    .00  ------     Flecha=   .4      | As =   4.20  -SRAS- [  4 B 12.5mm]
       | AsL=    .00  ------       x/d  = .04   | As =   4.20   -SRAS-  [  4 B 12.5mm ]      | AsL=    .00  ------     x/d  = .04
       | Grampos Esq.= 1B  6.3mm   x/dMx= .33   | Arm.Lat.=[2 X  6 B  8.0mm] - LN=  5.7      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 1.9     |
[tf,cm]| M[-]Min =  1418.7                      | M[+]Min =  1418.7                          | M[-]Min =  1418.7
[cm2  ]| Asapo[+]=  4.20                        |                                            | Asapo[+]=  4.20

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 525.  11.90 138.49   2  45.     .0    2.3      2.3  6.3 20.0  2    .0   .9

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 525.   1.01  12.05  25  8.8  11.1 131.1     .8      .0    .0    .0    .17   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     7.998     7.462       .25      .00      1   P7          .00    .00      7      0      0      0      0      0
              2     8.503     7.960       .35      .00      1   P8          .00    .00      8      0      0      0      0      0
```

VIGA DE BORDA (25x140) – TRANSVERSAL TÍPICA

```
Vao= 1  /L=  7.75 /B=  .25 /H=  1.40  /BCs=  .00 /BCi=  .00 /TpS=  1 /Esp.LS=  .00 /Esp.LI=  .00 FSp.Ex=  .70 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-   -   -   -   -   -   A R M A D U R A S  ( F L E X A O  E   C I S A L H A M E N T O )  -   -   -   -   -
FLEXAO-| E S Q U E R D A                      | M E I O   D O   V A O                      | D I R E I T A
       | M.[-] =       .9 tf* m               | M.[+] Max=      8.2 tf* m - Abcis.= 387    | M.[-] =      2.2  tf* m
[tf,cm]| As =   5.25  -SRAS-   [  3 B 16.0mm]   | AsL=    .00  ------     Flecha=   .4      | As =   5.25  -SRAS- [  3 B 16.0mm]
       | AsL=    .00  ------       x/d  = .04   | As =   5.25   -SRAS-  [  3 B 16.0mm ]      | AsL=    .00  ------     x/d  = .04
       |                           x/dMx= .33   | Arm.Lat.=[2 X  7 B  8.0mm] - LN=  5.7      |                          x/dMx= .33
       |                                        |                          Fle.Adm.= 2.6     |
```

```
[tf,cm]| M[-]Min =  1773.3                    | M[+]Min =  1773.3                       | M[-]Min =  1773.3
[cm2  ]| Asapo[+]=  5.25                      |                                         | Asapo[+]=  5.25

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 715.   7.04 173.11   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 715.    .01  18.62  25 10.6  14.4 129.4     .0      .0    .0    .0    .04   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     4.651     4.231       .60      .00      1   P7          .00    .00      7      0      0      0      0      0
              2     5.028     4.607       .60      .00      1   P1          .00    .00      1      0      0      0      0      0
```

VIGA (20x60) – TRANSVERSAL TÍPICA

```
Vao= 1  /L=  7.72 /B=  .20 /H=   .60  /BCs= 1.75 /BCi=  .00 /TpS=  2 /Esp.LS=  .15 /Esp.LI=  .00 FSp.Ex=  .30 /FLt.Ex=  .10   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =       .7 tf* m               | M.[+] Max=      7.8 tf* m - Abcis.= 386   | M.[-] =      1.3  tf* m
[tf,cm]| As =   2.73  -SRAS-   [  4 B 10.0mm]  | AsL=    .00  ------     Flecha=  1.6      | As =   2.73  -SRAS- [  4 B 10.0mm]
       | AsL=    .00  ------       x/d  = .07  | As =   5.28   -STAS-  [  3 B 16.0mm ]     | AsL=    .00  ------     x/d  = .07
       | Grampos Esq.= 2B  8.0mm   x/dMx= .33  | Arm.Lat.=[2 X  3 B  8.0mm] - LN=   .8     | Grampos Dir.= 2B  6.3mm x/dMx= .33
       |                                       |                          Fle.Adm.= 2.6    |
[tf,cm]| M[-]Min =   456.2                      | M[+]Min =   389.3                         | M[-]Min =   456.2
[cm2  ]| Asapo[+]=  5.28                       |                                           | Asapo[+]=  5.28

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.- 750.   6.53  57.02   2  45.     .0    2.3      2.3  6.3 20.0  2    .0    .0

T O R C A O-   Xi    Xf    Tsd   TRd2 %dT   he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla       M E N S A G E M
[tf,cm]        0.- 750.    .01   4.03  25  7.5  11.1  51.1     .0      .0    .0    .0    .12   N

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     4.496     4.374       .20      .00      2   V2          .00    .00      0      0      0      0      0      0
              2     4.663     4.537       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
```

VIGA (25x60) – TRANSVERSAL TÍPICA

```
Vao= 1  /L= 13.00 /B=  .25 /H=   .60  /BCs= 2.85 /BCi=  .00 /TpS=  2 /Esp.LS=  .15 /Esp.LI=  .00 FSp.Ex=  .30 /FLt.Ex=  .13   [M]

-------Solicitacoes provenientes de modelo de grelha e/ou portico espacial -------

-    -    -    -    -    -   A R M A D U R A S  ( F L E X A O  E  C I S A L H A M E N T O )  -    -    -    -    -
FLEXAO-| E S Q U E R D A                      | M E I O   D O    V A O                    | D I R E I T A
       | M.[-] =       .4 tf* m               | M.[+] Max=     20.7 tf* m - Abcis.= 650   | M.[-] =      .4  tf* m
[tf,cm]| As =   3.89  -SRAS-   [  2 B 16.0mm]  | AsL=    .00  ------     Flecha=  6.2      | As =   3.89  -SRAS- [  2 B 16.0mm]
       | AsL=    .00  ------       x/d  = .08  | As =  12.16   -STAS-  [  6 B 16.0mm ]     | AsL=    .00  ------     x/d  = .08
       | Grampos Esq.= 3B  8.0mm   x/dMx= .33  | Arm.Lat.=[2 X  3 B  8.0mm] - LN=  1.3     | Grampos Dir.= 3B  8.0mm x/dMx= .33
       |                                       |                Fle.Adm= 4.3 < Fl.Calc ***|
[tf,cm]| M[-]Min =   647.5                      | M[+]Min =   503.1                         | M[-]Min =   647.5
[cm2  ]| Asapo[+]=  8.10                       |                                           | Asapo[+]=  8.10

CISALHAMENTO-  Xi    Xf    Vsd   VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T]  Bit  Esp NR AsTrt AsSus          M E N S A G E M
[tf,cm]        0.-1275.   9.09  71.28   2  45.     .0    2.9      2.9  6.3 20.0  2    .0    .0

REAC. APOIO - No.   Maximos   Minimos   Largura    DEPEV  Morte    Nome     M.I.Mx M.I.Mn          Pilares:
              1     6.481     6.353       .25      .00      2   V4          .00    .00      0      0      0      0      0      0
              2     6.481     6.353       .25      .00      2   V1          .00    .00      0      0      0      0      0      0
```

4.3.2 Lajes

LAJE ARMADA EM 1 DIREÇÃO (h=15cm) – TÍPICA DE BORDA

```
LX=  175.0   LY=  772.5     H=15.

Armad     Momen      AS        Bit       Espac
          tfcm/m     cm2        mm        cm

 X         16.1     2.25        8.0       20.0
 Y          4.6     2.25        5.0       15.0  Arm. secundaria
AP 1         .0      .00        6.3       20.0
AP 2      -19.4     1.8         6.3       15.0
AP 3         .0      .00        6.3       20.0
AP 4         .0      .00        6.3       20.0
```

LAJE ARMADA EM 1 DIREÇÃO (h=15cm) – TÍPICA

```
LX=  125.0   LY=  772.5     H=15.

Armad     Momen      AS         Bit      Espac
          tfcm/m     cm2         mm       cm

 X          4.1     2.25         8.0      20.0
 Y          2.1     2.25         5.0      15.0  Arm. secundaria
AP 1         .0      .00         6.3      20.0
AP 2       -8.3     1.80         6.3      15.0
AP 3         .0      .00         6.3      20.0
AP 4      -19.4     1.80         6.3      15.0
```

4.4 Pilares

P (25x60) – TÍPICO

Lance	Título	Seção [cm]	Área [cm2]	NFer	Bitola [mm]	PDD x y	As [cm2]	Taxa [%]	Estr [mm]	C/ [cm]	PP	fck (MPa)	Cobr (cm)	T	Lbd	Ni	2OrdM
1	Cobertura	25.x 60.	1500.0	16	16.0	N N	32.2	2.14	6.3	15.0	N	30.0	3.0	126.0	78.	.5881	ELOL KAPA

P (35x60) – TÍPICO

Lance	Título	Seção [cm]	Área [cm2]	NFer	Bitola [mm]	PDD x y	As [cm2]	Taxa [%]	Estr [mm]	C/ [cm]	PP	fck (MPa)	Cobr (cm)	T	Lbd	Ni	2OrdM
1	Cobertura	35.x 60.	2100.0	10	20.0	N N	31.4	1.50	8.0	20.0	N	30.0	3.0	158.1	58.	.7378	ELOL KAPA

PIL (20x20) – TÍPICO

Lance	Título	Seção [cm]	Área [cm2]	NFer	Bitola [mm]	PDD x y	As [cm2]	Taxa [%]	Estr [mm]	C/ [cm]	PP	fck (MPa)	Cobr (cm)	T	Lbd	Ni	2OrdM
1	Barrilete	20.x 20.	400.0	4	10.0	N N	3.1	.79	5.0	12.0	N	30.0	3.0	17.3	60.	.0805	ELOL KAPA