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|      |             |      |           |            |          |
| Rev. | Modificação | Data | Elaborado | Verificado | Aprovado |



**SEMINFRA**

|                    |      |                             |  |
|--------------------|------|-----------------------------|--|
| Coord. Do Projeto  | CREA | Autor Proj. / Resp. Técnico |  |
| Coord. Do Contrato | CREA |                             |  |

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| Cliente<br><b>PREFEITURA DE MACEIÓ</b> | Secretaria<br><b>SAÚDE</b> |
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| Projeto<br><b>REDE DE FRIO</b> |
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| Localização<br>ÁREA DE EQUIP. COMUNITÁRIO II, LOTEAMENTO DURVILLE, RUA EM PROJETO M, Nº10 CLIMA BOM, MACEIÓ - AL |
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|-------------------------|----------------------|---|--|
| Formato<br>A4           | Data<br>OUTUBRO/2017 | Especialidade / Subespecialidade<br><b>ESTRUTURA</b>    |  |
| Coord. Projeto          | Rubrica              | Especificação do documento<br><b>MEMÓRIA DE CÁLCULO</b> |  |
| Coord. Contrato         | Rubrica              | Tipo de obra<br><b>CONSTRUÇÃO</b>                       | Classe geral do projeto<br><b>PROJETO BÁSICO</b> |
| Autor Projeto           | Rubrica              | Substitui a   | Substituída por                                  |
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## 1. INTRODUÇÃO

O presente documento tem por objetivo descrever todo o procedimento utilizado para o dimensionamento da estrutura em concreto armado do projeto em questão. A listagem do dimensionamento emitida pelo software CAD/TQS® foi agrupada por elemento estrutural, ou seja, sapatas, pilares, vigas e lajes. Vale ressaltar que o CAD/TQS® emite vários relatórios de extração de esforços internos, bem como dimensionamento, porém coube inserir nesta memória de cálculo apenas os principais.

## 2. Dimensionamento das Sapatas

### ----- LEGENDA

#### GEOMETRIA

Xpil, Ypil: dimensões em X e Y  
 ColarX, Colar Y: larguras do colar em X e Y  
 Xsap, Ysap: dimensões em X e Y  
 H0x, H0y: altura do rodapé em X e Y  
 ExcX, ExcY: excentricidade em X e Y em relação ao CG do pilar

#### CARREGAMENTO:

Caso: caso de carregamento da sapata onde a situação de esforço ocorre  
 Comb: combinação onde a situação de esforço ocorre  
 Fzmin, Fzmax: situação de força vertical mínima e máxima  
 Fxmin, Fxmax: situação de força horizontal em X mínima e máxima  
 Fymin, Fymax: situação de força horizontal em Y mínima e máxima  
 Mxmin, Mxmax: situação de momento vetorial em torno de X mínimo e máximo  
 Mymin, Mymax: situação de momento vetorial em torno de Y mínimo e máximo  
 N: força vertical para a combinação indicada  
 Mx, My: momento vetorial em torno de X e Y para a combinação indicada  
 Fx, Fy: esforço cortante em X e Y para a combinação indicada

#### RESULTADOS

Caso: caso de carregamento da sapata onde a situação de esforço ocorre  
 Msd: momento fletor de cálculo  
 rho: porcentagem mínima de armadura  
 As,calc: área de armadura calculada com o momento atuante na seção  
 As,calc,corr: área de armadura corrigida no caso de sapatas retangulares  
 Area,sec: área da seção de cálculo  
 As,min,rho: área de armadura mínima calculada com rho  
 As,min,crit: área de armadura mínima imposto pelo arquivo de critérios  
 As,det: área de armadura utilizada para o detalhamento  
 As,det/m: área de armadura por metro  
 nf, bit, esp: número de ferros, bitola e espaçamento  
 Vsd: esforço cortante de cálculo  
 ds: altura útil da seção S

bs: largura da seção S

Sapata: S1 Número = 1 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 19.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 1    | 9    | 8.52 | .0 | .0 | .43 | -.05 |
| FzMin | 3    | 15   | 8.51 | .0 | .0 | .43 | -.05 |
| FxMax | 1    | 9    | 8.52 | .0 | .0 | .43 | -.05 |
| FxMin | 1    | 9    | 8.52 | .0 | .0 | .43 | -.05 |
| FyMax | 1    | 9    | 8.52 | .0 | .0 | .43 | -.05 |
| FyMin | 1    | 9    | 8.52 | .0 | .0 | .43 | -.05 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.16 | 1    |            |
| -X      | .96  | 1    |            |
| +Y      | 1.47 | 1    |            |
| -Y      | 1.50 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.17 | 1    | 43.39  |            |
| -X      | 2.63 | 1    | 43.39  |            |
| +Y      | 2.72 | 1    | 43.39  |            |
| -Y      | 2.77 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.40 | 1    | 15.89  |            |
| -X      | 1.12 | 1    | 15.89  |            |
| +Y      | 2.97 | 1    | 26.35  |            |
| -Y      | 3.04 | 1    | 26.35  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm



|    |      |   |       |
|----|------|---|-------|
| -X | 1.82 | 3 | 43.39 |
| +Y | 1.75 | 3 | 43.39 |
| -Y | 1.83 | 3 | 43.39 |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | .61  | 3    | 10.54  |            |
| -X      | .66  | 3    | 10.54  |            |
| +Y      | 1.71 | 3    | 24.06  |            |
| -Y      | 1.80 | 3    | 24.06  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .59 | .39     | .39          | 3285.0   | 3.94       | 1.50        | 4.3    |
| Y       | .86 | .56     | .56          | 3600.0   | 4.32       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |
| Y       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 3.4 | 25.0   |            |
| Y       | 4.1 | 28.5   |            |

Sapata: S3 Número = 3 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 6.41 | .0 | .0 | .02 | .28 |
| FzMin | 3    | 15   | 6.40 | .0 | .0 | .02 | .28 |
| FxMax | 1    | 9    | 6.41 | .0 | .0 | .02 | .28 |
| FxMin | 1    | 9    | 6.41 | .0 | .0 | .02 | .28 |

|       |   |   |      |    |    |     |     |
|-------|---|---|------|----|----|-----|-----|
| FyMax | 1 | 9 | 6.41 | .0 | .0 | .02 | .28 |
| FyMin | 1 | 9 | 6.41 | .0 | .0 | .02 | .28 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | MsD  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.06 | 1    |            |
| -X      | 1.05 | 1    |            |
| +Y      | .73  | 1    |            |
| -Y      | .61  | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.26 | 1    | 43.39  |            |
| -X      | 2.24 | 1    | 43.39  |            |
| +Y      | 2.66 | 1    | 43.39  |            |
| -Y      | 2.22 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.37 | 1    | 25.11  |            |
| -X      | 2.34 | 1    | 25.11  |            |
| +Y      | .75  | 1    | 9.51   |            |
| -Y      | .60  | 1    | 9.51   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | MsD  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.06 | .70     | .70          | 3600.0   | 4.32       | 1.50        | 4.3    |
| Y       | .73  | .49     | .49          | 3210.0   | 3.85       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |
| Y       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.9 | 28.5   |            |
| Y       | 4.1 | 25.0   |            |

-----







Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.27 | 1    | 26.92  |            |
| -X      | 4.31 | 1    | 26.92  |            |
| +Y      | 2.16 | 1    | 18.65  |            |
| -Y      | 2.18 | 1    | 18.65  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.28 | 1.50    | 1.50         | 4200.0   | 5.04       | 1.50        | 5.0    |
| Y       | 1.69 | 1.13    | 1.13         | 3885.0   | 4.66       | 1.50        | 5.0    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |
| Y       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 8.7 | 31.7   |            |
| Y       | 7.5 | 28.2   |            |

Sapata: S6 Número = 6 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 9.84 | .0 | .0 | .06 | .02 |
| FzMin | 1    | 9    | 9.84 | .0 | .0 | .06 | .02 |
| FxMax | 1    | 9    | 9.84 | .0 | .0 | .06 | .02 |
| FxMin | 1    | 9    | 9.84 | .0 | .0 | .06 | .02 |
| FyMax | 1    | 9    | 9.84 | .0 | .0 | .06 | .02 |
| FyMin | 1    | 9    | 9.84 | .0 | .0 | .06 | .02 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.47 | 1    |            |
| -X      | 1.44 | 1    |            |
| +Y      | 1.85 | 1    |            |
| -Y      | 1.84 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 5.21 | 1    | 43.39  |            |
| -X      | 5.09 | 1    | 43.39  |            |
| +Y      | 4.14 | 1    | 43.39  |            |
| -Y      | 4.11 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.01 | 1    | 16.82  |            |
| -X      | 1.96 | 1    | 16.82  |            |
| +Y      | 3.61 | 1    | 23.41  |            |
| -Y      | 3.58 | 1    | 23.41  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
 Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.47 | .98     | .98          | 3510.0   | 4.21       | 1.50        | 4.5    |
| Y       | 1.85 | 1.22    | 1.22         | 3750.0   | 4.50       | 1.50        | 4.5    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |
| Y       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 6.8 | 28.2   |            |
| Y       | 7.5 | 28.5   |            |

Sapata: S7

Número = 7 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 3    | 15   | 8.70 | .0 | .0 | .06 | .00 |
| FzMin | 1    | 9    | 8.69 | .0 | .0 | .06 | .00 |
| FxMax | 1    | 9    | 8.69 | .0 | .0 | .06 | .00 |
| FxMin | 1    | 9    | 8.69 | .0 | .0 | .06 | .00 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.12 | 3    |            |
| -X      | 1.09 | 3    |            |
| +Y      | 1.45 | 3    |            |
| -Y      | 1.45 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.37 | 3    | 43.39  |            |
| -X      | 4.25 | 3    | 43.39  |            |
| +Y      | 3.69 | 3    | 43.39  |            |
| -Y      | 3.69 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.51 | 3    | 14.44  |            |
| -X      | 1.46 | 3    | 14.44  |            |
| +Y      | 3.03 | 3    | 22.24  |            |
| -Y      | 3.03 | 3    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.12 | .75     | .75          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.45 | .96     | .96          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.9 | 25.0   |            |
| Y       | 6.7 | 25.4   |            |

Sapata: S8                      Número = 8    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 140.00 Ysap: 140.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy  |
|-------|------|------|-------|----|----|------|-----|
| FzMax | 1    | 9    | 15.36 | .0 | .0 | -.01 | .59 |
| FzMin | 3    | 15   | 15.35 | .0 | .0 | -.01 | .59 |
| FxMax | 1    | 9    | 15.36 | .0 | .0 | -.01 | .59 |
| FxMin | 1    | 9    | 15.36 | .0 | .0 | -.01 | .59 |
| FyMax | 1    | 9    | 15.36 | .0 | .0 | -.01 | .59 |
| FyMin | 1    | 9    | 15.36 | .0 | .0 | -.01 | .59 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 3.86 | 1    |            |
| -X      | 3.87 | 1    |            |
| +Y      | 3.01 | 1    |            |
| -Y      | 2.70 | 1    |            |

Compressão Diagonal [kgf/cm<sup>2</sup>]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 5.09 | 1    | 43.39  |            |
| -X      | 5.10 | 1    | 43.39  |            |
| +Y      | 7.74 | 1    | 43.39  |            |
| -Y      | 6.94 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 6.75 | 1    | 30.39  |            |
| -X      | 6.76 | 1    | 30.39  |            |
| +Y      | 3.44 | 1    | 18.17  |            |
| -Y      | 3.04 | 1    | 18.17  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 3.87 | 2.55    | 2.55         | 4800.0   | 5.76       | 1.50        | 5.8    |
| Y       | 3.01 | 2.01    | 2.01         | 4410.0   | 5.29       | 1.50        | 5.8    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.8    | 4.1      | 11 | 8.0 | 12.0 |            |
| Y       | 5.8    | 4.1      | 11 | 8.0 | 12.0 |            |

Aderência [tf]:

| Sentido | Vsd  | Limite | Observação |
|---------|------|--------|------------|
| X       | 12.0 | 34.9   |            |
| Y       | 10.7 | 34.4   |            |

Sapata: S9 Número = 9 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 130.00 Ysap: 130.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx  | Fy  |
|-------|------|------|-------|----|----|-----|-----|
| FzMax | 1    | 9    | 13.89 | .0 | .0 | .30 | .16 |
| FzMin | 3    | 15   | 13.88 | .0 | .0 | .30 | .16 |
| FxMax | 1    | 9    | 13.89 | .0 | .0 | .30 | .16 |
| FxMin | 1    | 9    | 13.89 | .0 | .0 | .30 | .16 |
| FyMax | 1    | 9    | 13.89 | .0 | .0 | .30 | .16 |
| FyMin | 1    | 9    | 13.89 | .0 | .0 | .30 | .16 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 2.72 | 1    |            |
| -X      | 2.54 | 1    |            |
| +Y      | 3.26 | 1    |            |
| -Y      | 3.15 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 7.91 | 1    | 43.39  |            |
| -X      | 7.42 | 1    | 43.39  |            |
| +Y      | 5.82 | 1    | 43.39  |            |
| -Y      | 5.64 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.54 | 1    | 18.82  |            |
| -X      | 3.30 | 1    | 18.82  |            |
| +Y      | 5.64 | 1    | 25.41  |            |
| -Y      | 5.44 | 1    | 25.41  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.72 | 1.81    | 1.81         | 4110.0   | 4.93       | 1.50        | 5.2    |
| Y       | 3.26 | 2.15    | 2.15         | 4350.0   | 5.22       | 1.50        | 5.2    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.2    | 4.0      | 10 | 8.0 | 12.0 |            |
| Y       | 5.2    | 4.0      | 10 | 8.0 | 12.0 |            |

Aderência [tf]:

| Sentido | Vsd  | Limite | Observação |
|---------|------|--------|------------|
| X       | 10.0 | 31.3   |            |
| Y       | 11.0 | 31.7   |            |

Sapata: S10 Número = 10 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome | Caso | Comb | N | Mx | My | Fx | Fy |
|------|------|------|---|----|----|----|----|
|------|------|------|---|----|----|----|----|

|       |   |    |      |    |    |      |     |
|-------|---|----|------|----|----|------|-----|
| FzMax | 3 | 15 | 8.45 | .0 | .0 | -.14 | .00 |
| FzMin | 1 | 9  | 8.44 | .0 | .0 | -.14 | .00 |
| FxMax | 1 | 9  | 8.44 | .0 | .0 | -.14 | .00 |
| FxMin | 1 | 9  | 8.44 | .0 | .0 | -.14 | .00 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.04 | 3    |            |
| -X      | 1.11 | 3    |            |
| +Y      | 1.40 | 3    |            |
| -Y      | 1.40 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.05 | 3    | 43.39  |            |
| -X      | 4.32 | 3    | 43.39  |            |
| +Y      | 3.59 | 3    | 43.39  |            |
| -Y      | 3.59 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.38 | 3    | 14.44  |            |
| -X      | 1.50 | 3    | 14.44  |            |
| +Y      | 2.94 | 3    | 22.24  |            |
| -Y      | 2.94 | 3    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.11 | .74     | .74          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.40 | .93     | .93          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.8 | 25.0   |            |
| Y       | 6.5 | 25.4   |            |

-----







Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.55 | 3    | 18.22  |            |
| -X      | 2.69 | 1    | 18.22  |            |
| +Y      | 4.45 | 1    | 24.19  |            |
| -Y      | 4.14 | 1    | 24.19  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.95 | 1.30    | 1.30         | 3810.0   | 4.57       | 1.50        | 4.9    |
| Y       | 2.44 | 1.61    | 1.61         | 4050.0   | 4.86       | 1.50        | 4.9    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |
| Y       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 8.1 | 28.2   |            |
| Y       | 8.9 | 31.7   |            |

Sapata: S13 Número = 13 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 120.00 Ysap: 120.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy  |
|-------|------|------|-------|----|----|------|-----|
| FzMax | 1    | 9    | 10.96 | .0 | .0 | -.06 | .44 |
| FzMin | 1    | 9    | 10.96 | .0 | .0 | -.06 | .44 |
| FxMax | 1    | 9    | 10.96 | .0 | .0 | -.06 | .44 |
| FxMin | 1    | 9    | 10.96 | .0 | .0 | -.06 | .44 |
| FyMax | 1    | 9    | 10.96 | .0 | .0 | -.06 | .44 |
| FyMin | 1    | 9    | 10.96 | .0 | .0 | -.06 | .44 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.58 | 1    |            |
| -X      | 1.61 | 1    |            |
| +Y      | 2.44 | 1    |            |
| -Y      | 2.14 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.90 | 1    | 43.39  |            |
| -X      | 4.99 | 1    | 43.39  |            |
| +Y      | 3.93 | 1    | 43.39  |            |
| -Y      | 3.50 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.91 | 1    | 17.18  |            |
| -X      | 1.95 | 1    | 17.18  |            |
| +Y      | 4.73 | 1    | 27.38  |            |
| -Y      | 4.13 | 1    | 27.38  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.61 | 1.07    | 1.07         | 3810.0   | 4.57       | 1.50        | 5.0    |
| Y       | 2.44 | 1.61    | 1.61         | 4200.0   | 5.04       | 1.50        | 5.0    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |
| Y       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.2 | 28.2   |            |
| Y       | 8.8 | 31.7   |            |

Sapata: S14

Número = 14 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 6.17 | .0 | .0 | .40 | .05 |
| FzMin | 1    | 9    | 6.17 | .0 | .0 | .40 | .05 |
| FxMax | 1    | 9    | 6.17 | .0 | .0 | .40 | .05 |
| FxMin | 1    | 9    | 6.17 | .0 | .0 | .40 | .05 |
| FyMax | 1    | 9    | 6.17 | .0 | .0 | .40 | .05 |
| FyMin | 1    | 9    | 6.17 | .0 | .0 | .40 | .05 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | .88  | 1    |            |
| -X      | .67  | 1    |            |
| +Y      | 1.03 | 1    |            |
| -Y      | 1.00 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.45 | 1    | 43.39  |            |
| -X      | 2.66 | 1    | 43.39  |            |
| +Y      | 2.66 | 1    | 43.39  |            |
| -Y      | 2.58 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.21 | 1    | 14.44  |            |
| -X      | .89  | 1    | 14.44  |            |
| +Y      | 2.18 | 1    | 22.24  |            |
| -Y      | 2.11 | 1    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | .88  | .59     | .59          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.03 | .68     | .68          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp | Observação |
|---------|--------|----------|----|-----|-----|------------|
|---------|--------|----------|----|-----|-----|------------|



|    |      |   |       |
|----|------|---|-------|
| +Y | 2.32 | 1 | 18.65 |
| -Y | 2.23 | 1 | 18.65 |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm<sup>2</sup>]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho( % ) : .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.46 | 1.63    | 1.63         | 4200.0   | 5.04       | 1.50        | 5.0    |
| Y       | 1.79 | 1.20    | 1.20         | 3885.0   | 4.66       | 1.50        | 5.0    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |
| Y       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| x       | 9.3 | 31.7   |            |
| y       | 8.0 | 28.2   |            |

Sapata: S16                      Número = 16    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 3    | 15   | 6.80 | .0 | .0 | -.03 | -.06 |
| FzMin | 1    | 9    | 6.79 | .0 | .0 | -.03 | -.06 |
| FxMax | 1    | 9    | 6.79 | .0 | .0 | -.03 | -.06 |
| FxMin | 1    | 9    | 6.79 | .0 | .0 | -.03 | -.06 |
| FyMax | 1    | 9    | 6.79 | .0 | .0 | -.03 | -.06 |
| FyMin | 1    | 9    | 6.79 | .0 | .0 | -.03 | -.06 |

## RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.11 | 3    |            |
| -X      | 1.13 | 3    |            |

|    |     |   |
|----|-----|---|
| +Y | .84 | 3 |
| -Y | .87 | 3 |

Compressão Diagonal [kgf/cm<sup>2</sup>]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.87 | 3    | 43.39  |            |
| -X      | 2.91 | 3    | 43.39  |            |
| +Y      | 3.31 | 3    | 43.39  |            |
| -Y      | 3.43 | 3    | 43.39  |            |

## Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.34 | 3    | 22.24  |            |
| -X      | 2.39 | 3    | 22.24  |            |
| +Y      | 1.14 | 3    | 14.44  |            |
| -Y      | 1.18 | 3    | 14.44  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm<sup>2</sup>]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho( % ): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.13 | .75     | .75          | 3450.0   | 4.14       | 1.50        | 4.1    |
| Y       | .87  | .58     | .58          | 3210.0   | 3.85       | 1.50        | 4.1    |

Armaduras Detalhadas [cm<sup>2</sup>, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.2 | 25.4   |            |
| Y       | 4.6 | 25.0   |            |

Sapata: S17                      Número = 17    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

|       |        |       |        |         |       |       |     |
|-------|--------|-------|--------|---------|-------|-------|-----|
| Xsap: | 100.00 | Ysap: | 100.00 | Altura: | 45.00 |       |     |
| H0x:  | 15.00  | H0y:  | 15.00  | ExcX:   | .00   | ExcY: | .00 |

Método de cálculo: Sapata Rígida



CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 1    | 9    | 6.87 | .0 | .0 | .24 | -.29 |
| FzMin | 1    | 9    | 6.87 | .0 | .0 | .24 | -.29 |
| FxMax | 1    | 9    | 6.87 | .0 | .0 | .24 | -.29 |
| FxMin | 1    | 9    | 6.87 | .0 | .0 | .24 | -.29 |
| FyMax | 1    | 9    | 6.87 | .0 | .0 | .24 | -.29 |
| FyMin | 1    | 9    | 6.87 | .0 | .0 | .24 | -.29 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Ms   | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.21 | 1    |            |
| -X      | 1.06 | 1    |            |
| +Y      | .79  | 1    |            |
| -Y      | .94  | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.10 | 1    | 43.39  |            |
| -X      | 2.74 | 1    | 43.39  |            |
| +Y      | 3.12 | 1    | 43.39  |            |
| -Y      | 3.69 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.57 | 1    | 22.24  |            |
| -X      | 2.21 | 1    | 22.24  |            |
| +Y      | 1.06 | 1    | 14.44  |            |
| -Y      | 1.29 | 1    | 14.44  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Ms   | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.21 | .80     | .80          | 3450.0   | 4.14       | 1.50        | 4.1    |
| Y       | .94  | .63     | .63          | 3210.0   | 3.85       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
|---------|-----|--------|------------|

|   |     |      |
|---|-----|------|
| X | 5.5 | 25.4 |
| Y | 4.9 | 25.0 |

Sapata: S18                      Número = 18    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 6.69 | .0 | .0 | .01 | .12 |
| FzMin | 1    | 9    | 6.69 | .0 | .0 | .01 | .12 |
| FxMax | 1    | 9    | 6.69 | .0 | .0 | .01 | .12 |
| FxMin | 1    | 9    | 6.69 | .0 | .0 | .01 | .12 |
| FyMax | 1    | 9    | 6.69 | .0 | .0 | .01 | .12 |
| FyMin | 1    | 9    | 6.69 | .0 | .0 | .01 | .12 |

RESULTADOS:

## Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.11 | 1    |            |
| -X      | 1.10 | 1    |            |
| +Y      | .87  | 1    |            |
| -Y      | .81  | 1    |            |

Compressão Diagonal [kgf/cm<sup>2</sup>]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.85 | 1    | 43.39  |            |
| -X      | 2.83 | 1    | 43.39  |            |
| +Y      | 3.43 | 1    | 43.39  |            |
| -Y      | 3.19 | 1    | 43.39  |            |

## Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.34 | 1    | 22.24  |            |
| -X      | 2.32 | 1    | 22.24  |            |
| +Y      | 1.19 | 1    | 14.44  |            |
| -Y      | 1.09 | 1    | 14.44  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.11 | .73     | .73          | 3450.0   | 4.14       | 1.50        | 4.1    |
| Y       | .87  | .58     | .58          | 3210.0   | 3.85       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.1 | 25.4   |            |
| Y       | 4.6 | 25.0   |            |

Sapata: S19 Número = 19 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 1    | 9    | 8.46 | .0 | .0 | -.72 | -.06 |
| FzMin | 1    | 9    | 8.46 | .0 | .0 | -.72 | -.06 |
| FxMax | 1    | 9    | 8.46 | .0 | .0 | -.72 | -.06 |
| FxMin | 1    | 9    | 8.46 | .0 | .0 | -.72 | -.06 |
| FyMax | 1    | 9    | 8.46 | .0 | .0 | -.72 | -.06 |
| FyMin | 1    | 9    | 8.46 | .0 | .0 | -.72 | -.06 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.05 | 1    |            |
| -X      | 1.45 | 1    |            |
| +Y      | 1.56 | 1    |            |
| -Y      | 1.60 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd | Caso | Limite | Observação |
|---------|-----|------|--------|------------|
|---------|-----|------|--------|------------|

|    |      |   |       |
|----|------|---|-------|
| +X | 3.76 | 1 | 43.39 |
| -X | 5.10 | 1 | 43.39 |
| +Y | 3.51 | 1 | 43.39 |
| -Y | 3.59 | 1 | 43.39 |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.41 | 1    | 16.82  |            |
| -X      | 2.00 | 1    | 16.82  |            |
| +Y      | 3.05 | 1    | 23.41  |            |
| -Y      | 3.13 | 1    | 23.41  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.45 | .97     | .97          | 3510.0   | 4.21       | 1.50        | 4.5    |
| Y       | 1.60 | 1.06    | 1.06         | 3750.0   | 4.50       | 1.50        | 4.5    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |
| Y       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 6.5 | 28.2   |            |
| Y       | 6.5 | 28.5   |            |

Sapata: S20 Número = 20 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 140.00 Ysap: 140.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx  | Fy  |
|-------|------|------|-------|----|----|-----|-----|
| FzMax | 1    | 9    | 14.96 | .0 | .0 | .28 | .15 |
| FzMin | 3    | 15   | 14.95 | .0 | .0 | .28 | .15 |
| FxMax | 1    | 9    | 14.96 | .0 | .0 | .28 | .15 |

|       |   |   |       |    |    |     |     |
|-------|---|---|-------|----|----|-----|-----|
| FxMin | 1 | 9 | 14.96 | .0 | .0 | .28 | .15 |
| FyMax | 1 | 9 | 14.96 | .0 | .0 | .28 | .15 |
| FyMin | 1 | 9 | 14.96 | .0 | .0 | .28 | .15 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 3.22 | 1    |            |
| -X      | 3.06 | 1    |            |
| +Y      | 3.81 | 1    |            |
| -Y      | 3.71 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 8.86 | 1    | 43.39  |            |
| -X      | 8.42 | 1    | 43.39  |            |
| +Y      | 6.09 | 1    | 43.39  |            |
| -Y      | 5.94 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.12 | 1    | 19.13  |            |
| -X      | 3.89 | 1    | 19.13  |            |
| +Y      | 6.20 | 1    | 26.36  |            |
| -Y      | 6.03 | 1    | 26.36  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 3.22 | 2.15    | 2.15         | 4410.0   | 5.29       | 1.50        | 5.6    |
| Y       | 3.81 | 2.52    | 2.52         | 4650.0   | 5.58       | 1.50        | 5.6    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.6    | 4.0      | 11 | 8.0 | 12.0 |            |
| Y       | 5.6    | 4.0      | 11 | 8.0 | 12.0 |            |

Aderência [tf]:

| Sentido | Vsd  | Limite | Observação |
|---------|------|--------|------------|
| X       | 10.9 | 34.4   |            |
| Y       | 11.8 | 34.9   |            |

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 130.00 Ysap: 130.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy   |
|-------|------|------|-------|----|----|------|------|
| FzMax | 1    | 9    | 15.35 | .0 | .0 | -.03 | -.05 |
| FzMin | 3    | 15   | 15.24 | .0 | .0 | -.02 | -.06 |
| FxMax | 3    | 15   | 15.24 | .0 | .0 | -.02 | -.06 |
| FxMin | 1    | 9    | 15.35 | .0 | .0 | -.03 | -.05 |
| FyMax | 1    | 9    | 15.35 | .0 | .0 | -.03 | -.05 |
| FyMin | 3    | 15   | 15.24 | .0 | .0 | -.02 | -.06 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 2.54 | 1    |            |
| -X      | 2.55 | 1    |            |
| +Y      | 3.53 | 1    |            |
| -Y      | 3.56 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 6.96 | 1    | 43.39  |            |
| -X      | 7.00 | 1    | 43.39  |            |
| +Y      | 5.18 | 1    | 43.39  |            |
| -Y      | 5.22 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.92 | 1    | 17.82  |            |
| -X      | 2.94 | 1    | 17.82  |            |
| +Y      | 6.51 | 1    | 29.01  |            |
| -Y      | 6.57 | 1    | 29.01  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.55 | 1.71    | 1.71         | 4110.0   | 4.93       | 1.50        | 5.4    |

|   |      |      |      |        |      |      |     |
|---|------|------|------|--------|------|------|-----|
| Y | 3.56 | 2.35 | 2.35 | 4500.0 | 5.40 | 1.50 | 5.4 |
|---|------|------|------|--------|------|------|-----|

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.4    | 4.2      | 11 | 8.0 | 11.0 |            |
| Y       | 5.4    | 4.2      | 11 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd  | Limite | Observação |
|---------|------|--------|------------|
| X       | 10.2 | 31.3   |            |
| Y       | 12.0 | 34.9   |            |

Sapata: S22                      Número = 22    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 19.00 ColarX: .00 ColarY: .00

Sapata (cm):

|       |        |       |        |         |       |
|-------|--------|-------|--------|---------|-------|
| Xsap: | 100.00 | Ysap: | 100.00 | Altura: | 45.00 |
| H0x:  | 15.00  | H0y:  | 15.00  | ExcX:   | .00   |
|       |        |       |        | ExcY:   | .00   |

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy  |
|-------|------|------|------|----|----|------|-----|
| FzMax | 3    | 15   | 6.52 | .0 | .0 | -.18 | .05 |
| FzMin | 1    | 9    | 6.48 | .0 | .0 | -.18 | .05 |
| FxMax | 1    | 9    | 6.48 | .0 | .0 | -.18 | .05 |
| FxMin | 1    | 9    | 6.48 | .0 | .0 | -.18 | .05 |
| FyMax | 1    | 9    | 6.48 | .0 | .0 | -.18 | .05 |
| FyMin | 1    | 9    | 6.48 | .0 | .0 | -.18 | .05 |

## RESULTADOS:

## Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | .64  | 3    |            |
| -X      | .72  | 3    |            |
| +Y      | 1.01 | 3    |            |
| -Y      | .98  | 3    |            |

Compressão Diagonal [kgf/cm<sup>2</sup>]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.96 | 3    | 43.39  |            |
| -X      | 2.20 | 3    | 43.39  |            |
| +Y      | 2.14 | 3    | 43.39  |            |
| -Y      | 2.09 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | .70  | 3    | 10.54  |            |
| -X      | .80  | 3    | 10.54  |            |
| +Y      | 2.11 | 3    | 24.06  |            |
| -Y      | 2.04 | 3    | 24.06  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | .72  | .48     | .48          | 3285.0   | 3.94       | 1.50        | 4.3    |
| Y       | 1.01 | .66     | .66          | 3600.0   | 4.32       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |
| Y       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.1 | 25.0   |            |
| Y       | 4.8 | 28.5   |            |

Sapata: S23 Número = 23 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 1    | 9    | 7.71 | .0 | .0 | .04 | -.09 |
| FzMin | 3    | 15   | 7.70 | .0 | .0 | .04 | -.09 |
| FxMax | 1    | 9    | 7.71 | .0 | .0 | .04 | -.09 |
| FxMin | 1    | 9    | 7.71 | .0 | .0 | .04 | -.09 |
| FyMax | 1    | 9    | 7.71 | .0 | .0 | .04 | -.09 |
| FyMin | 1    | 9    | 7.71 | .0 | .0 | .04 | -.09 |

RESULTADOS:





Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00  
Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 1    | 9    | 7.00 | .0 | .0 | -.35 | -.04 |
| FzMin | 1    | 9    | 7.00 | .0 | .0 | -.35 | -.04 |
| FxMax | 1    | 9    | 7.00 | .0 | .0 | -.35 | -.04 |
| FxMin | 3    | 15   | 7.00 | .0 | .0 | -.36 | -.04 |
| FyMax | 1    | 9    | 7.00 | .0 | .0 | -.35 | -.04 |
| FyMin | 1    | 9    | 7.00 | .0 | .0 | -.35 | -.04 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | .79  | 1    |            |
| -X      | .98  | 3    |            |
| +Y      | 1.14 | 1    |            |
| -Y      | 1.17 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.12 | 1    | 43.39  |            |
| -X      | 3.82 | 3    | 43.39  |            |
| +Y      | 2.94 | 1    | 43.39  |            |
| -Y      | 3.00 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.05 | 1    | 14.44  |            |
| -X      | 1.34 | 3    | 14.44  |            |
| +Y      | 2.41 | 1    | 22.24  |            |
| -Y      | 2.47 | 1    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | .98  | .65     | .65          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.17 | .77     | .77          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Y 4.1 4.1 9 8.0 11.0

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.0 | 25.0   |            |
| Y       | 5.4 | 25.4   |            |

Sapata: S25 Número = 25 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 1    | 9    | 8.91 | .0 | .0 | -.09 | -.06 |
| FzMin | 1    | 9    | 8.91 | .0 | .0 | -.09 | -.06 |
| FxMax | 1    | 9    | 8.91 | .0 | .0 | -.09 | -.06 |
| FxMin | 1    | 9    | 8.91 | .0 | .0 | -.09 | -.06 |
| FyMax | 1    | 9    | 8.91 | .0 | .0 | -.09 | -.06 |
| FyMin | 1    | 9    | 8.91 | .0 | .0 | -.09 | -.06 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.29 | 1    |            |
| -X      | 1.34 | 1    |            |
| +Y      | 1.65 | 1    |            |
| -Y      | 1.69 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.58 | 1    | 43.39  |            |
| -X      | 4.75 | 1    | 43.39  |            |
| +Y      | 3.69 | 1    | 43.39  |            |
| -Y      | 3.77 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.76 | 1    | 16.82  |            |
| -X      | 1.83 | 1    | 16.82  |            |
| +Y      | 3.21 | 1    | 23.41  |            |

-Y 3.30 1 23.41

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.34 | .89     | .89          | 3510.0   | 4.21       | 1.50        | 4.5    |
| Y       | 1.69 | 1.12    | 1.12         | 3750.0   | 4.50       | 1.50        | 4.5    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |
| Y       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 6.2 | 28.2   |            |
| Y       | 6.9 | 28.5   |            |

Sapata: S26 Número = 26 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 1    | 9    | 8.85 | .0 | .0 | .04 | -.21 |
| FzMin | 1    | 9    | 8.85 | .0 | .0 | .04 | -.21 |
| FxMax | 1    | 9    | 8.85 | .0 | .0 | .04 | -.21 |
| FxMin | 1    | 9    | 8.85 | .0 | .0 | .04 | -.21 |
| FyMax | 1    | 9    | 8.85 | .0 | .0 | .04 | -.21 |
| FyMin | 1    | 9    | 8.85 | .0 | .0 | .04 | -.21 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.32 | 1    |            |
| -X      | 1.29 | 1    |            |
| +Y      | 1.59 | 1    |            |

-Y 1.73 1

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.67 | 1    | 43.39  |            |
| -X      | 4.59 | 1    | 43.39  |            |
| +Y      | 3.57 | 1    | 43.39  |            |
| -Y      | 3.85 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.80 | 1    | 16.82  |            |
| -X      | 1.77 | 1    | 16.82  |            |
| +Y      | 3.09 | 1    | 23.41  |            |
| -Y      | 3.38 | 1    | 23.41  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.32 | .88     | .88          | 3510.0   | 4.21       | 1.50        | 4.5    |
| Y       | 1.73 | 1.14    | 1.14         | 3750.0   | 4.50       | 1.50        | 4.5    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |
| Y       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 6.1 | 28.2   |            |
| Y       | 7.0 | 28.5   |            |

Sapata: S27 Número = 27 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy   |
|-------|------|------|-------|----|----|------|------|
| FzMax | 1    | 9    | 10.28 | .0 | .0 | -.27 | -.05 |
| FzMin | 3    | 15   | 10.27 | .0 | .0 | -.27 | -.05 |
| FxMax | 1    | 9    | 10.28 | .0 | .0 | -.27 | -.05 |
| FxMin | 1    | 9    | 10.28 | .0 | .0 | -.27 | -.05 |
| FyMax | 1    | 9    | 10.28 | .0 | .0 | -.27 | -.05 |
| FyMin | 1    | 9    | 10.28 | .0 | .0 | -.27 | -.05 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.45 | 1    |            |
| -X      | 1.59 | 1    |            |
| +Y      | 1.91 | 1    |            |
| -Y      | 1.95 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 5.13 | 1    | 43.39  |            |
| -X      | 5.63 | 1    | 43.39  |            |
| +Y      | 4.28 | 1    | 43.39  |            |
| -Y      | 4.34 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.96 | 1    | 16.82  |            |
| -X      | 2.18 | 1    | 16.82  |            |
| +Y      | 3.72 | 1    | 23.41  |            |
| -Y      | 3.79 | 1    | 23.41  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.59 | 1.06    | 1.06         | 3510.0   | 4.21       | 1.50        | 4.5    |
| Y       | 1.95 | 1.28    | 1.28         | 3750.0   | 4.50       | 1.50        | 4.5    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |
| Y       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.3 | 28.2   |            |

Y 7.9 28.5

Sapata: S28 Número = 28 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 120.00 Ysap: 120.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx  | Fy   |
|-------|------|------|-------|----|----|-----|------|
| FzMax | 1    | 9    | 10.13 | .0 | .0 | .82 | -.39 |
| FzMin | 1    | 9    | 10.13 | .0 | .0 | .82 | -.39 |
| FxMax | 1    | 9    | 10.13 | .0 | .0 | .82 | -.39 |
| FxMin | 1    | 9    | 10.13 | .0 | .0 | .82 | -.39 |
| FyMax | 1    | 9    | 10.13 | .0 | .0 | .82 | -.39 |
| FyMin | 1    | 9    | 10.13 | .0 | .0 | .82 | -.39 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.93 | 1    |            |
| -X      | 1.47 | 1    |            |
| +Y      | 1.98 | 1    |            |
| -Y      | 2.24 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 6.28 | 1    | 43.39  |            |
| -X      | 4.83 | 1    | 43.39  |            |
| +Y      | 3.95 | 1    | 43.39  |            |
| -Y      | 4.41 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.70 | 1    | 18.22  |            |
| -X      | 2.00 | 1    | 18.22  |            |
| +Y      | 3.60 | 1    | 24.19  |            |
| -Y      | 4.10 | 1    | 24.19  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.93 | 1.29    | 1.29         | 3810.0   | 4.57       | 1.50        | 4.9    |
| Y       | 2.24 | 1.48    | 1.48         | 4050.0   | 4.86       | 1.50        | 4.9    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |
| Y       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.8 | 28.2   |            |
| Y       | 8.1 | 31.7   |            |

Sapata: S29 Número = 29 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy  |
|-------|------|------|------|----|----|------|-----|
| FzMax | 3    | 15   | 7.01 | .0 | .0 | -.44 | .07 |
| FzMin | 1    | 9    | 6.89 | .0 | .0 | -.44 | .07 |
| FxMax | 1    | 9    | 6.89 | .0 | .0 | -.44 | .07 |
| FxMin | 1    | 9    | 6.89 | .0 | .0 | -.44 | .07 |
| FyMax | 1    | 9    | 6.89 | .0 | .0 | -.44 | .07 |
| FyMin | 1    | 9    | 6.89 | .0 | .0 | -.44 | .07 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | .63  | 3    |            |
| -X      | .83  | 3    |            |
| +Y      | 1.18 | 3    |            |
| -Y      | 1.14 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.32 | 3    | 43.39  |            |



|    |      |   |       |
|----|------|---|-------|
| -X | 3.02 | 3 | 43.39 |
| +Y | 2.50 | 3 | 43.39 |
| -Y | 2.42 | 3 | 43.39 |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | .63  | 3    | 9.51   |            |
| -X      | .85  | 3    | 9.51   |            |
| +Y      | 2.63 | 3    | 25.11  |            |
| -Y      | 2.52 | 3    | 25.11  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | .83  | .56     | .56          | 3210.0   | 3.85       | 1.50        | 4.3    |
| Y       | 1.18 | .78     | .78          | 3600.0   | 4.32       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |
| Y       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.7 | 25.0   |            |
| Y       | 5.4 | 28.5   |            |

Sapata: S30 Número = 30 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 19.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 120.00 Ysap: 120.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy   |
|-------|------|------|-------|----|----|------|------|
| FzMax | 1    | 9    | 10.46 | .0 | .0 | -.10 | -.02 |
| FzMin | 3    | 15   | 10.45 | .0 | .0 | -.10 | -.02 |
| FxMax | 1    | 9    | 10.46 | .0 | .0 | -.10 | -.02 |
| FxMin | 1    | 9    | 10.46 | .0 | .0 | -.10 | -.02 |

|       |   |   |       |    |    |      |      |
|-------|---|---|-------|----|----|------|------|
| FyMax | 1 | 9 | 10.46 | .0 | .0 | -.10 | -.02 |
| FyMin | 1 | 9 | 10.46 | .0 | .0 | -.10 | -.02 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Ms   | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.49 | 1    |            |
| -X      | 1.54 | 1    |            |
| +Y      | 2.04 | 1    |            |
| -Y      | 2.05 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.72 | 1    | 43.39  |            |
| -X      | 3.84 | 1    | 43.39  |            |
| +Y      | 3.29 | 1    | 43.39  |            |
| -Y      | 3.31 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.93 | 1    | 18.65  |            |
| -X      | 2.00 | 1    | 18.65  |            |
| +Y      | 3.87 | 1    | 26.92  |            |
| -Y      | 3.89 | 1    | 26.92  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Ms   | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.54 | 1.03    | 1.03         | 3885.0   | 4.66       | 1.50        | 5.0    |
| Y       | 2.05 | 1.35    | 1.35         | 4200.0   | 5.04       | 1.50        | 5.0    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |
| Y       | 5.0    | 4.2      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 6.9 | 28.2   |            |
| Y       | 7.8 | 31.7   |            |

GEOMETRIA:

Pilar:

Xpil: 72.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 120.00 Ysap: 120.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy  |
|-------|------|------|-------|----|----|------|-----|
| FzMax | 3    | 15   | 10.23 | .0 | .0 | -.28 | .08 |
| FzMin | 1    | 9    | 10.22 | .0 | .0 | -.28 | .08 |
| FxMax | 1    | 9    | 10.22 | .0 | .0 | -.28 | .08 |
| FxMin | 1    | 9    | 10.22 | .0 | .0 | -.28 | .08 |
| FyMax | 1    | 9    | 10.22 | .0 | .0 | -.28 | .08 |
| FyMin | 1    | 9    | 10.22 | .0 | .0 | -.28 | .08 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Ms   | Caso | Observação |
|---------|------|------|------------|
| +X      | .80  | 3    |            |
| -X      | .88  | 3    |            |
| +Y      | 2.16 | 3    |            |
| -Y      | 2.11 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.79 | 3    | 43.39  |            |
| -X      | 1.99 | 3    | 43.39  |            |
| +Y      | 2.39 | 3    | 43.39  |            |
| -Y      | 2.34 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | .23  | 3    | 3.67   |            |
| -X      | .26  | 3    | 3.67   |            |
| +Y      | 4.64 | 3    | 37.26  |            |
| -Y      | 4.53 | 3    | 37.26  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Ms   | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | .88  | .67     | .67          | 3810.0   | 4.57       | 1.50        | 5.6    |
| Y       | 2.16 | 1.43    | 1.43         | 4680.0   | 5.62       | 1.50        | 5.6    |



| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.47 | 1    | 18.22  |            |
| -X      | 2.30 | 1    | 18.22  |            |
| +Y      | 4.08 | 1    | 24.19  |            |
| -Y      | 3.73 | 1    | 24.19  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.79 | 1.19    | 1.19         | 3810.0   | 4.57       | 1.50        | 4.9    |
| Y       | 2.24 | 1.48    | 1.48         | 4050.0   | 4.86       | 1.50        | 4.9    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |
| Y       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.4 | 28.2   |            |
| Y       | 8.1 | 31.7   |            |

Sapata: S34 Número = 34 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy  |
|-------|------|------|------|----|----|------|-----|
| FzMax | 3    | 15   | 8.76 | .0 | .0 | -.03 | .04 |
| FzMin | 1    | 9    | 8.75 | .0 | .0 | -.03 | .04 |
| FxMax | 1    | 9    | 8.75 | .0 | .0 | -.03 | .04 |
| FxMin | 1    | 9    | 8.75 | .0 | .0 | -.03 | .04 |
| FyMax | 1    | 9    | 8.75 | .0 | .0 | -.03 | .04 |
| FyMin | 1    | 9    | 8.75 | .0 | .0 | -.03 | .04 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.11 | 3    |            |
| -X      | 1.12 | 3    |            |
| +Y      | 1.47 | 3    |            |
| -Y      | 1.44 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.31 | 3    | 43.39  |            |
| -X      | 4.37 | 3    | 43.39  |            |
| +Y      | 3.75 | 3    | 43.39  |            |
| -Y      | 3.69 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.48 | 3    | 14.44  |            |
| -X      | 1.51 | 3    | 14.44  |            |
| +Y      | 3.08 | 3    | 22.24  |            |
| -Y      | 3.02 | 3    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.12 | .75     | .75          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.47 | .97     | .97          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.9 | 25.0   |            |
| Y       | 6.7 | 25.4   |            |

Sapata: S35 Número = 35 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 8.48 | .0 | .0 | .06 | .06 |
| FzMin | 1    | 9    | 8.48 | .0 | .0 | .06 | .06 |
| FxMax | 1    | 9    | 8.48 | .0 | .0 | .06 | .06 |
| FxMin | 1    | 9    | 8.48 | .0 | .0 | .06 | .06 |
| FyMax | 1    | 9    | 8.48 | .0 | .0 | .06 | .06 |
| FyMin | 1    | 9    | 8.48 | .0 | .0 | .06 | .06 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | MsD  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.09 | 1    |            |
| -X      | 1.06 | 1    |            |
| +Y      | 1.43 | 1    |            |
| -Y      | 1.39 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.26 | 1    | 43.39  |            |
| -X      | 4.14 | 1    | 43.39  |            |
| +Y      | 3.65 | 1    | 43.39  |            |
| -Y      | 3.56 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.47 | 1    | 14.44  |            |
| -X      | 1.42 | 1    | 14.44  |            |
| +Y      | 3.00 | 1    | 22.24  |            |
| -Y      | 2.91 | 1    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | MsD  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.09 | .73     | .73          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.43 | .94     | .94          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |





VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%) : .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | .96  | .64     | .64          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.27 | .84     | .84          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.0 | 25.0   |            |
| Y       | 5.8 | 25.4   |            |

Sapata: S37                      Número        =    37    Repetições:    1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 7.78 | .0 | .0 | .07 | .27 |
| FzMin | 1    | 9    | 7.78 | .0 | .0 | .07 | .27 |
| FxMax | 1    | 9    | 7.78 | .0 | .0 | .07 | .27 |
| FxMin | 1    | 9    | 7.78 | .0 | .0 | .07 | .27 |
| FyMax | 1    | 9    | 7.78 | .0 | .0 | .07 | .27 |
| FyMin | 1    | 9    | 7.78 | .0 | .0 | .07 | .27 |

## RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.00 | 1    |            |
| -X      | .97  | 1    |            |
| +Y      | 1.38 | 1    |            |
| -Y      | 1.20 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.92 | 1    | 43.39  |            |
| -X      | 3.78 | 1    | 43.39  |            |
| +Y      | 3.51 | 1    | 43.39  |            |
| -Y      | 3.10 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.35 | 1    | 14.44  |            |
| -X      | 1.30 | 1    | 14.44  |            |
| +Y      | 2.91 | 1    | 22.24  |            |
| -Y      | 2.51 | 1    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
 Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.00 | .67     | .67          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.38 | .91     | .91          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.3 | 25.0   |            |
| Y       | 6.3 | 25.4   |            |

Sapata: S38 Número = 38 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 30.00 Ypil: 14.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
 H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 1    | 9    | 7.36 | .0 | .0 | .35 | -.10 |

|       |   |   |      |    |    |     |      |
|-------|---|---|------|----|----|-----|------|
| FzMin | 1 | 9 | 7.36 | .0 | .0 | .35 | -.10 |
| FxMax | 1 | 9 | 7.36 | .0 | .0 | .35 | -.10 |
| FxMin | 1 | 9 | 7.36 | .0 | .0 | .35 | -.10 |
| FyMax | 1 | 9 | 7.36 | .0 | .0 | .35 | -.10 |
| FyMin | 1 | 9 | 7.36 | .0 | .0 | .35 | -.10 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.02 | 1    |            |
| -X      | .84  | 1    |            |
| +Y      | 1.19 | 1    |            |
| -Y      | 1.25 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.99 | 1    | 43.39  |            |
| -X      | 3.30 | 1    | 43.39  |            |
| +Y      | 3.05 | 1    | 43.39  |            |
| -Y      | 3.20 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.39 | 1    | 14.44  |            |
| -X      | 1.12 | 1    | 14.44  |            |
| +Y      | 2.49 | 1    | 22.24  |            |
| -Y      | 2.63 | 1    | 22.24  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.02 | .68     | .68          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.25 | .83     | .83          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.3 | 25.0   |            |
| Y       | 5.7 | 25.4   |            |





-Y 6.04 1 43.39

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.86 | 1    | 24.19  |            |
| -X      | 3.94 | 1    | 24.19  |            |
| +Y      | 2.18 | 1    | 18.22  |            |
| -Y      | 2.58 | 1    | 18.22  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.16 | 1.43    | 1.43         | 4050.0   | 4.86       | 1.50        | 4.9    |
| Y       | 1.86 | 1.24    | 1.24         | 3810.0   | 4.57       | 1.50        | 4.9    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |
| Y       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.9 | 31.7   |            |
| Y       | 7.6 | 28.2   |            |

Sapata: S41 Número = 41 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 110.00 Ysap: 110.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 9.11 | .0 | .0 | .12 | .15 |
| FzMin | 3    | 15   | 9.03 | .0 | .0 | .12 | .15 |
| FxMax | 1    | 9    | 9.11 | .0 | .0 | .12 | .15 |
| FxMin | 1    | 9    | 9.11 | .0 | .0 | .12 | .15 |
| FyMax | 1    | 9    | 9.11 | .0 | .0 | .12 | .15 |
| FyMin | 1    | 9    | 9.11 | .0 | .0 | .12 | .15 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.75 | 1    |            |
| -X      | 1.67 | 1    |            |
| +Y      | 1.18 | 1    |            |
| -Y      | 1.10 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.18 | 1    | 43.39  |            |
| -X      | 3.06 | 1    | 43.39  |            |
| +Y      | 3.99 | 1    | 43.39  |            |
| -Y      | 3.75 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.60 | 1    | 26.79  |            |
| -X      | 3.43 | 1    | 26.79  |            |
| +Y      | 1.31 | 1    | 14.73  |            |
| -Y      | 1.22 | 1    | 14.73  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.75 | 1.15    | 1.15         | 3900.0   | 4.68       | 1.50        | 4.7    |
| Y       | 1.18 | .79     | .79          | 3510.0   | 4.21       | 1.50        | 4.7    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.7    | 4.3      | 10 | 8.0 | 11.0 |            |
| Y       | 4.7    | 4.3      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.1 | 28.5   |            |
| Y       | 5.9 | 28.2   |            |

Sapata: S42

Número = 42 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00  
 Sapata (cm):  
 Xsap: 100.00 Ysap: 100.00 Altura: 45.00  
 H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00  
 Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 3    | 15   | 5.72 | .0 | .0 | .02 | -.06 |
| FzMin | 1    | 9    | 5.71 | .0 | .0 | .02 | -.06 |
| FxMax | 1    | 9    | 5.71 | .0 | .0 | .02 | -.06 |
| FxMin | 1    | 9    | 5.71 | .0 | .0 | .02 | -.06 |
| FyMax | 1    | 9    | 5.71 | .0 | .0 | .02 | -.06 |
| FyMin | 1    | 9    | 5.71 | .0 | .0 | .02 | -.06 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | MsD | Caso | Observação |
|---------|-----|------|------------|
| +X      | .95 | 3    |            |
| -X      | .93 | 3    |            |
| +Y      | .58 | 3    |            |
| -Y      | .61 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.02 | 3    | 43.39  |            |
| -X      | 2.00 | 3    | 43.39  |            |
| +Y      | 2.13 | 3    | 43.39  |            |
| -Y      | 2.23 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.12 | 3    | 25.11  |            |
| -X      | 2.09 | 3    | 25.11  |            |
| +Y      | .59  | 3    | 9.51   |            |
| -Y      | .62  | 3    | 9.51   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | MsD | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .95 | .62     | .62          | 3600.0   | 4.32       | 1.50        | 4.3    |
| Y       | .61 | .41     | .41          | 3210.0   | 3.85       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:





|    |      |   |       |
|----|------|---|-------|
| -X | 1.97 | 1 | 22.24 |
| +Y | .88  | 1 | 14.44 |
| -Y | .97  | 1 | 14.44 |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho( % ) : .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .92 | .61     | .61          | 3450.0   | 4.14       | 1.50        | 4.1    |
| Y       | .70 | .47     | .47          | 3210.0   | 3.85       | 1.50        | 4.1    |

Armaduras Detalhadas [cm<sup>2</sup>, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.3 | 25.4   |            |
| Y       | 3.7 | 25.0   |            |

Sapata: S44                      Número = 44    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 1    | 9    | 6.16 | .0 | .0 | -.09 | -.21 |
| FzMin | 1    | 9    | 6.16 | .0 | .0 | -.09 | -.21 |
| FxMax | 1    | 9    | 6.16 | .0 | .0 | -.09 | -.21 |
| FxMin | 1    | 9    | 6.16 | .0 | .0 | -.09 | -.21 |
| FyMax | 1    | 9    | 6.16 | .0 | .0 | -.09 | -.21 |
| FyMin | 1    | 9    | 6.16 | .0 | .0 | -.09 | -.21 |

## RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd | Caso | Observação |
|---------|-----|------|------------|
| +X      | .98 | 1    |            |



CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 1    | 9    | 9.75 | .0 | .0 | -.05 | -.07 |
| FzMin | 3    | 15   | 9.74 | .0 | .0 | -.05 | -.07 |
| FxMax | 1    | 9    | 9.75 | .0 | .0 | -.05 | -.07 |
| FxMin | 1    | 9    | 9.75 | .0 | .0 | -.05 | -.07 |
| FyMax | 1    | 9    | 9.75 | .0 | .0 | -.05 | -.07 |
| FyMin | 1    | 9    | 9.75 | .0 | .0 | -.05 | -.07 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.81 | 1    |            |
| -X      | 1.84 | 1    |            |
| +Y      | 1.42 | 1    |            |
| -Y      | 1.46 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.05 | 1    | 43.39  |            |
| -X      | 4.12 | 1    | 43.39  |            |
| +Y      | 5.04 | 1    | 43.39  |            |
| -Y      | 5.17 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.53 | 1    | 23.41  |            |
| -X      | 3.60 | 1    | 23.41  |            |
| +Y      | 1.94 | 1    | 16.82  |            |
| -Y      | 1.99 | 1    | 16.82  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.84 | 1.22    | 1.22         | 3750.0   | 4.50       | 1.50        | 4.5    |
| Y       | 1.46 | .97     | .97          | 3510.0   | 4.21       | 1.50        | 4.5    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |
| Y       | 4.5    | 4.1      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:



Armaduras Calculadas [tf.m, cm<sup>2</sup>]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.06 | .71     | .71          | 3210.0   | 3.85       | 1.50        | 4.1    |
| Y       | 1.41 | .93     | .93          | 3450.0   | 4.14       | 1.50        | 4.1    |

Armaduras Detalhadas [cm<sup>2</sup>, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |
| Y       | 4.1    | 4.1      | 9  | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.6 | 25.0   |            |
| Y       | 6.5 | 25.4   |            |

Sapata: S47 Número = 47 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 120.00 Ysap: 120.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy   |
|-------|------|------|-------|----|----|------|------|
| FzMax | 1    | 9    | 11.97 | .0 | .0 | -.13 | -.04 |
| FzMin | 3    | 15   | 11.96 | .0 | .0 | -.13 | -.04 |
| FxMax | 1    | 9    | 11.97 | .0 | .0 | -.13 | -.04 |
| FxMin | 1    | 9    | 11.97 | .0 | .0 | -.13 | -.04 |
| FyMax | 1    | 9    | 11.97 | .0 | .0 | -.13 | -.04 |
| FyMin | 1    | 9    | 11.97 | .0 | .0 | -.13 | -.04 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 2.46 | 1    |            |
| -X      | 2.55 | 1    |            |
| +Y      | 2.01 | 1    |            |
| -Y      | 2.03 | 1    |            |

Compressão Diagonal [kgf/cm<sup>2</sup>]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.86 | 1    | 43.39  |            |
| -X      | 5.02 | 1    | 43.39  |            |
| +Y      | 6.53 | 1    | 43.39  |            |
| -Y      | 6.60 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.46 | 1    | 24.19  |            |
| -X      | 4.63 | 1    | 24.19  |            |
| +Y      | 2.76 | 1    | 18.22  |            |
| -Y      | 2.79 | 1    | 18.22  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.55 | 1.68    | 1.68         | 4050.0   | 4.86       | 1.50        | 4.9    |
| Y       | 2.03 | 1.36    | 1.36         | 3810.0   | 4.57       | 1.50        | 4.9    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |
| Y       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 9.3 | 31.7   |            |
| Y       | 8.4 | 28.2   |            |

Sapata: S48 Número = 48 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 120.00 Ysap: 120.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 3    | 15   | 9.62 | .0 | .0 | .25 | -.34 |
| FzMin | 1    | 9    | 9.61 | .0 | .0 | .25 | -.34 |

|       |   |   |      |    |    |     |      |
|-------|---|---|------|----|----|-----|------|
| FxMax | 1 | 9 | 9.61 | .0 | .0 | .25 | -.34 |
| FxMin | 1 | 9 | 9.61 | .0 | .0 | .25 | -.34 |
| FyMax | 1 | 9 | 9.61 | .0 | .0 | .25 | -.34 |
| FyMin | 1 | 9 | 9.61 | .0 | .0 | .25 | -.34 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 2.09 | 3    |            |
| -X      | 1.92 | 3    |            |
| +Y      | 1.52 | 3    |            |
| -Y      | 1.71 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.12 | 3    | 43.39  |            |
| -X      | 3.82 | 3    | 43.39  |            |
| +Y      | 4.97 | 3    | 43.39  |            |
| -Y      | 5.58 | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 3.82 | 3    | 24.19  |            |
| -X      | 3.49 | 3    | 24.19  |            |
| +Y      | 2.08 | 3    | 18.22  |            |
| -Y      | 2.37 | 3    | 18.22  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
 Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.09 | 1.38    | 1.38         | 4050.0   | 4.86       | 1.50        | 4.9    |
| Y       | 1.71 | 1.14    | 1.14         | 3810.0   | 4.57       | 1.50        | 4.9    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |
| Y       | 4.9    | 4.0      | 10 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 7.6 | 31.7   |            |
| Y       | 7.0 | 28.2   |            |

-----



| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .62 | .41     | .41          | 3450.0   | 4.14       | 1.50        | 4.1    |
| Y       | .49 | .32     | .32          | 3210.0   | 3.85       | 1.50        | 4.1    |



| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.64 | 3    | 25.11  |            |
| -X      | 1.72 | 3    | 25.11  |            |
| +Y      | .51  | 3    | 9.51   |            |
| -Y      | .45  | 3    | 9.51   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .76 | .50     | .50          | 3600.0   | 4.32       | 1.50        | 4.3    |
| Y       | .49 | .33     | .33          | 3210.0   | 3.85       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |
| Y       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 3.6 | 28.5   |            |
| Y       | 2.9 | 25.0   |            |

Sapata: S51 Número = 51 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 40.00 Ypil: 19.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 130.00 Ysap: 130.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N     | Mx | My | Fx   | Fy  |
|-------|------|------|-------|----|----|------|-----|
| FzMax | 1    | 9    | 12.48 | .0 | .0 | -.58 | .01 |
| FzMin | 3    | 15   | 12.47 | .0 | .0 | -.58 | .01 |
| FxMax | 1    | 9    | 12.48 | .0 | .0 | -.58 | .01 |
| FxMin | 1    | 9    | 12.48 | .0 | .0 | -.58 | .01 |
| FyMax | 1    | 9    | 12.48 | .0 | .0 | -.58 | .01 |
| FyMin | 1    | 9    | 12.48 | .0 | .0 | -.58 | .01 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.91 | 1    |            |
| -X      | 2.21 | 1    |            |
| +Y      | 2.71 | 1    |            |
| -Y      | 2.70 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.23 | 1    | 43.39  |            |
| -X      | 4.88 | 1    | 43.39  |            |
| +Y      | 3.98 | 1    | 43.39  |            |
| -Y      | 3.97 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.33 | 1    | 19.47  |            |
| -X      | 2.74 | 1    | 19.47  |            |
| +Y      | 4.91 | 1    | 28.53  |            |
| -Y      | 4.90 | 1    | 28.53  |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 2.21 | 1.48    | 1.48         | 4185.0   | 5.02       | 1.50        | 5.4    |
| Y       | 2.71 | 1.79    | 1.79         | 4500.0   | 5.40       | 1.50        | 5.4    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 5.4    | 4.2      | 11 | 8.0 | 11.0 |            |
| Y       | 5.4    | 4.2      | 11 | 8.0 | 11.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 8.8 | 31.3   |            |
| Y       | 9.3 | 34.9   |            |

Sapata: S52 Número = 52 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 100.00 Ysap: 100.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 6.86 | .0 | .0 | .22 | .09 |
| FzMin | 1    | 9    | 6.86 | .0 | .0 | .22 | .09 |
| FxMax | 1    | 9    | 6.86 | .0 | .0 | .22 | .09 |
| FxMin | 1    | 9    | 6.86 | .0 | .0 | .22 | .09 |
| FyMax | 1    | 9    | 6.86 | .0 | .0 | .22 | .09 |
| FyMin | 1    | 9    | 6.86 | .0 | .0 | .22 | .09 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Ms   | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.21 | 1    |            |
| -X      | 1.06 | 1    |            |
| +Y      | .74  | 1    |            |
| -Y      | .70  | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.54 | 1    | 43.39  |            |
| -X      | 2.27 | 1    | 43.39  |            |
| +Y      | 2.69 | 1    | 43.39  |            |
| -Y      | 2.54 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.69 | 1    | 25.11  |            |
| -X      | 2.35 | 1    | 25.11  |            |
| +Y      | .75  | 1    | 9.51   |            |
| -Y      | .70  | 1    | 9.51   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Ms   | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.21 | .80     | .80          | 3600.0   | 4.32       | 1.50        | 4.3    |
| Y       | .74  | .49     | .49          | 3210.0   | 3.85       | 1.50        | 4.3    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |
| Y       | 4.3    | 4.3      | 9  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 5.5 | 28.5   |            |
| Y       | 4.2 | 25.0   |            |

Listagem dos critérios de projeto utilizados

\* MATERIAIS \*

fck do concreto (kgf/cm<sup>2</sup>) = 250.

GamaC = 1.40

GamaS = 1.15

Tipo de aço para armadura principal: CA-50A

Critérios de cálculo e dimensionamento

GamaF = 1.40

GamaN = 1.20

Coefficiente de atrito solo-concreto = .30

Porcentagem mínima de área comprimida = 75.

Coef multiplic tensão max p/ dimensionam = .0

Cálculo da arm principal: 1 - teoria bloco rígido

Método de calc do momento: CONVENCIONAL

Coefficiente de segurança ao tombamento = 1.50

Coefficiente de segurança ao deslizamento = 1.50

Tensão admissível do solo (kgf/cm<sup>2</sup>) = 1.00

Tensão máxima de compressão (kgf/cm<sup>2</sup>) = 2.20

Dimensão mínima da sapata (cm) = 60.00

Altura mínima da sapata (cm) = 20.00

Altura h0 mínima da sapata (cm) = 12.00

Arm mínima p/ armadura principal (cm<sup>2</sup>/m) = 1.50

Porcentagem mínima de armadura principal (PorcMin) = .12 %

Armadura mínima AsMin = PorcMin\*(Area da secao tranv)

Cobrimento (cm) = 4.0

Cobrimento do pilar (cm) = 2.5

Diferença cobrimento entre Asx e Asy (cm) = .5

Norma de referência para verificações (Cisalhamento, punção, etc): 2003

NBR 2003: Verificação de Cortante limite: CEB

NBR 2003: Coeficiente de majoração para Flexo-Compressões (Normal/Obliqua): 1.300

Critérios de detalhamento

```

-----
Espaçamento mínimo entre bitolas (cm) = 10.0
Espaçamento máximo entre bitolas (cm) = 30.0
Bitola a partir da qual indica raio de dobramento(mm)      = 16.0
Bitola a partir da qual indica reforço nos cantos(mm)        = 16.0
Bitola para reforço de extremidade (mm) = 8.0
Comprimento horizontal do reforço (cm) = 40.0
    
```

### 3. Dimensionamento dos Pilares

```

ESFORÇOS FINAIS DE CALCULO                                OBS:**** Lambda > limite                                LAMB= Indice de
Esbeltez LAMBDA                                           : T Esforços no TOPO                                LE =
-----
Comprimento de Flambagem LE                               : M Esf. no pto MEDIO                                VC = Força
(Momentos Vetoriais no Sistema Local)                   : B Esforços na BASE                                Cmaj=
Normal Inicial Calculo                                     : N Majoracao da VC com ni < 0.7
Coef.Majoracao da VC p/DIMENS.COMPRESSAO
Vd = Força Normal Final Calculo                           : N Majoracao da VC com ni < 0.7
Mdx = Mom.Final Calculo direcao x                         MCx = Mom.Inic. Calculo direcao x                     M2x =
Mom.Segunda Ordem direcao x                               MCy = Mom.Inic. Calculo direcao y                     M2y =
Mdy = Mom.Final Calculo direcao y                         Mlx = Mom.PrimeiraOrdem direcao x                     MOx =
Mom.Segunda Ordem direcao y                               Mly = Mom.PrimeiraOrdem direcao y                     MOy =
Mom.Obliquo antes da Normaliz.
Mom.Obliquo antes da Normaliz.

PILAR:P1
num. 1                                                     Valores Intermediarios de
Calculo
LANC      Vd (tf)   Mdx (tf,cm)  Mdy (tf,cm) | | OBS |  MCx |  MCy |  Mlx |  Mly |LAMB|LBLM|  M2x |
M2y |  MOx |  MOy |  VC |Cmaj|
.-----
| 3o Andar .....|.....|.....|
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|
|L 3                                     *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***
|
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS
|
| Cobrimento[cm]   fck[MPa] GamaAço  GamaConcreto  AsMax[%]  AsMin[%]  GmapN  GmapM  GmavN  Gmavm
|
|      2.5           25.0      1.15      1.40          8.00      .50        1.40   1.40    1.40   1.40
|
| TipoAço  ClasseAço  ExcMin  ExcMax  K12  K37
    
```

\_\_\_\_\_

\_\_\_\_\_

PILAR:P2

num. 2

Calculo

Valores Intermediarios de

|      |         |     |             |      |             |  |     |     |     |     |     |      |      |     |
|------|---------|-----|-------------|------|-------------|--|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) |     | Mdx (tf,cm) |      | Mdy (tf,cm) |  | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy | VC          | Cmaj |             |  |     |     |     |     |     |      |      |     |

\_\_\_\_\_

\_\_\_\_\_

30 Andar .....|.....|.....|  
 |.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

L 3 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |

|  | TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|--|---------|-----------|--------|--------|-----|-----|
|--|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

2o Andar . . . . | . . . . . | . . . . . |



|   |   |             |              |          |          |       |       |       |       |            |
|---|---|-------------|--------------|----------|----------|-------|-------|-------|-------|------------|
| L 2   | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                   |             |              |          |          |       |       |       |       |            |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS    |   |             |              |          |          |       |       |       |       |            |
| Cobrimento[cm]                                  | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |            |
| 2.5   | 25.0  | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |            |
| TipoAço   | ClasseAço   | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |            |
| 50  | B   | 2.0         | 15.0         | 1        | 1        |       |       |       |       |            |
| TERREO  | ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |             |              |          |          |       |       |       |       |            |
| L 1   |   |             |              |          |          |       |       |       |       |            |
| *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |   |             |              |          |          |       |       |       |       |            |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS    |   |             |              |          |          |       |       |       |       |            |
| Cobrimento[cm]                                  | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |            |
| 2.5   | 25.0  | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |            |
| TipoAço   | ClasseAço   | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |            |
| 50  | B   | 2.0         | 15.0         | 1        | 1        |       |       |       |       |            |
| Fundacao  |   |             |              |          |          |       |       |       |       |            |
| .....   |   |             |              |          |          |       |       |       |       |            |
| .....   |   |             |              |          |          |       |       |       |       |            |
| PILAR:P3  |   |             |              |          |          |       |       |       |       |            |
| num. 3  | Valores Intermediarios de   |             |              |          |          |       |       |       |       |            |
| Calculo   |   |             |              |          |          |       |       |       |       |            |
| LANC  | Vd (tf)   | Mdx (tf,cm) | Mdy (tf,cm)  |          | OBS      |       | MCx   |       | MCy   |            |
| M2y   | MOx   | MOy         | VC  Cmaj     |          |          |       | M1x   |       | M1y   |            |
|   |   |             |              |          |          |       | LAMB  |       | LBLM  |            |
|   |   |             |              |          |          |       | M2x   |       |       |            |
| .....   |   |             |              |          |          |       |       |       |       |            |
| .....   |   |             |              |          |          |       |       |       |       |            |
| 3o Andar  | ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |             |              |          |          |       |       |       |       |            |
| L 3   | 6.5   | 15.6        | .0           |          | T        | 3.    | -130. | 3.    | -130. | 0. 0. 0.   |
| 0.  | 0.  | 0.          | 7. 1.250     |          |          |       |       |       |       |            |
| L 3   | 6.5   | -15.6       | .0           |          | M        | -7.   | -79.  | -7.   | -79.  | 0. 35. -2. |
| 0.  | 0.  | 0.          | 7. 1.250     |          |          |       |       |       |       |            |
| L 3   | 6.5   | .0          | 17.7         |          | B        | -7.   | 14.   | -7.   | 14.   | 0. 0. 0.   |
| 0.  | 0.  | 0.          | 7. 1.250     |          |          |       |       |       |       |            |
| L 3   | 6.5   | .0          | -130.7       |          | T        | 3.    | -130. | 3.    | -130. | 0. 0. 0.   |
| 0.  | 3.  | -130.       | 7. 1.250     |          |          |       |       |       |       |            |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS    |   |             |              |          |          |       |       |       |       |            |
| Cobrimento[cm]                                  | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |            |
| 2.5   | 25.0  | 1.15        | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |            |
| TipoAço   | ClasseAço   | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |            |
| 50  | B   | 2.0         | 15.0         | 1        | 1        |       |       |       |       |            |



|  |           |             |              |          |          |       |       |       |       |      |
|--|-----------|-------------|--------------|----------|----------|-------|-------|-------|-------|------|
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                               |           |             |              |          |          |       |       |       |       |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |      |
| 2.5  | 25.0      | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |      |
| TipoAço  | ClasseAço | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |      |
| 50   | B         | 2.0         | 15.0         | 1        | 1        |       |       |       |       |      |
| 2o Andar ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |           |             |              |          |          |       |       |       |       |      |
| L 2 *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                        |           |             |              |          |          |       |       |       |       |      |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                               |           |             |              |          |          |       |       |       |       |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |      |
| 2.5  | 25.0      | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |      |
| TipoAço  | ClasseAço | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |      |
| 50   | B         | 2.0         | 15.0         | 1        | 1        |       |       |       |       |      |
| TERREO ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....   |           |             |              |          |          |       |       |       |       |      |
| L 1 *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                        |           |             |              |          |          |       |       |       |       |      |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                               |           |             |              |          |          |       |       |       |       |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |      |
| 2.5  | 25.0      | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |      |
| TipoAço  | ClasseAço | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |      |
| 50   | B         | 2.0         | 15.0         | 1        | 1        |       |       |       |       |      |
| Fundacao   |           |             |              |          |          |       |       |       |       |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |       |       |       |       |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |       |       |       |       |      |
| PILAR:P5   |           |             |              |          |          |       |       |       |       |      |
| num. 5   |           |             |              |          |          |       |       |       |       |      |
| Calculo  |           |             |              |          |          |       |       |       |       |      |
| LANC   | Vd (tf)   | Mdx (tf,cm) | Mdy (tf,cm)  | OBS      | MCx      | MCy   | Mlx   | Mly   | LAMB  | LBLM |
| M2y  | MOx       | MOy         | VC           | Cmaj     |          |       |       |       |       |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |       |       |       |       |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |       |       |       |       |      |
| 3o Andar ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |           |             |              |          |          |       |       |       |       |      |
| L 3 *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                        |           |             |              |          |          |       |       |       |       |      |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                               |           |             |              |          |          |       |       |       |       |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |      |

|  |   |             |              |          |          |       |       |       |       |       |
|--|---|-------------|--------------|----------|----------|-------|-------|-------|-------|-------|
|  | 2.5   | 25.0        | 1.15         | 1.40     | 8.00     | .50   | 1.40  | 1.40  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço                                       | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |       |
| 50   | B   | 2.0         | 15.0         | 1        | 1        |       |       |       |       |       |
| 2o Andar                                     | .....   | .....       | .....        | .....    | .....    | ..... | ..... | ..... | ..... | ..... |
| L 2  | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |             |              |          |          |       |       |       |       |       |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |   |             |              |          |          |       |       |       |       |       |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |       |
| 2.5  | 25.0  | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |       |
| TipoAço                                      | ClasseAço                                       | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |       |
| 50   | B   | 2.0         | 15.0         | 1        | 1        |       |       |       |       |       |
| TERREO                                       | .....   | .....       | .....        | .....    | .....    | ..... | ..... | ..... | ..... | ..... |
| L 1  | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |             |              |          |          |       |       |       |       |       |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |   |             |              |          |          |       |       |       |       |       |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |       |
| 2.5  | 25.0  | 1.15        | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |       |
| TipoAço                                      | ClasseAço                                       | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |       |
| 50   | B   | 2.0         | 15.0         | 1        | 1        |       |       |       |       |       |
| Fundacao                                     |   |             |              |          |          |       |       |       |       |       |
| .....  |   |             |              |          |          |       |       |       |       |       |
| .....  |   |             |              |          |          |       |       |       |       |       |
| PILAR:P6                                     |   |             |              |          |          |       |       |       |       |       |
| num. 6                                       | Valores Intermediarios de                       |             |              |          |          |       |       |       |       |       |
| Calculo                                      |   |             |              |          |          |       |       |       |       |       |
| LANC   | Vd (tf)   | Mdx (tf,cm) | Mdy (tf,cm)  |          | OBS      |       | MCx   |       | MCy   |       |
| M2y  | MOx   | MOy         | VC           |          | Cmaj     |       | M1x   |       | M1y   |       |
|  |   |             |              |          |          |       |       |       |       |       |
| .....  |   |             |              |          |          |       |       |       |       |       |
| .....  |   |             |              |          |          |       |       |       |       |       |
| 2o Andar                                     | .....   | .....       | .....        | .....    | .....    | ..... | ..... | ..... | ..... | ..... |
| L 2  | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |             |              |          |          |       |       |       |       |       |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |   |             |              |          |          |       |       |       |       |       |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |       |
| 2.5  | 25.0  | 1.15        | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |       |
| TipoAço                                      | ClasseAço                                       | ExcMin      | ExcMax       | K12      | K37      |       |       |       |       |       |

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

[illegible]

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

Fundacao

PILAR:P7

num. 7  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x | M2y |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |     |

[illegible]

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

[illegible]

|L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

Fundacao

.....  
.....

PILAR:P8

num. 8  
Calculo

Valores Intermediarios de

|      |         |             |             |      |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

.....  
.....

| 3o Andar .....|.....|.....|  
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

|     |      |       |           |   |      |       |      |       |    |     |    |
|-----|------|-------|-----------|---|------|-------|------|-------|----|-----|----|
| L 3 | 17.5 | 132.9 | .0        | T | 100. | -251. | 100. | -251. | 0. | 0.  | 0. |
| 0.  | 100. | -251. | 17. 1.250 |   |      |       |      |       |    |     |    |
| L 3 | 17.5 | -43.6 | .0        | M | 68.  | -142. | 68.  | -142. | 0. | 44. | 0. |
| 0.  | 0.   | 0.    | 17. 1.250 |   |      |       |      |       |    |     |    |
| L 3 | 17.5 | .0    | 77.2      | B | -14. | 66.   | -14. | 66.   | 0. | 0.  | 0. |
| 0.  | -14. | 66.   | 17. 1.250 |   |      |       |      |       |    |     |    |
| L 3 | 17.5 | .0    | -47.2     | T | 100. | -249. | 100. | -249. | 0. | 0.  | 0. |
| 0.  | 0.   | 0.    | 17. 1.250 |   |      |       |      |       |    |     |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |          |         |              |          |          |       |       |       |       |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço ClasseAço ExcMin ExcMax K12 K37

| 50 B 2.0 15.0 1 1

| 2o Andar .....|.....|.....|  
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

|     |      |       |           |   |     |      |     |      |    |     |      |
|-----|------|-------|-----------|---|-----|------|-----|------|----|-----|------|
| L 2 | 21.0 | 98.4  | .0        | T | -2. | -50. | -2. | -50. | 0. | 0.  | 0.   |
| 0.  | 0.   | 0.    | 21. 1.250 |   |     |      |     |      |    |     |      |
| L 2 | 21.0 | -98.4 | .0        | M | -2. | 38.  | -2. | 38.  | 0. | 35. | -37. |
| 0.  | 0.   | 0.    | 21. 1.250 |   |     |      |     |      |    |     |      |
| L 2 | 20.9 | .0    | 59.1      | B | -2. | 59.  | -2. | 59.  | 0. | 0.  | 0.   |
| 0.  | -2.  | 59.   | 21. 1.250 |   |     |      |     |      |    |     |      |
| L 2 | 21.0 | .0    | -56.6     | T | -2. | -50. | -2. | -50. | 0. | 0.  | 0.   |
| 0.  | 0.   | 0.    | 21. 1.250 |   |     |      |     |      |    |     |      |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |          |         |              |          |          |       |       |       |       |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço ClasseAço ExcMin ExcMax K12 K37

| 50 B 2.0 15.0 1 1

| TERREO .....|.....|.....|  
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

|     |      |       |           |   |    |      |    |      |    |     |    |
|-----|------|-------|-----------|---|----|------|----|------|----|-----|----|
| L 1 | 26.9 | .0    | .0        | B | 0. | 0.   | 0. | 0.   | 0. | 0.  | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |   |    |      |    |      |    |     |    |
| L 1 | 26.9 | 51.6  | .0        | M | 1. | -45. | 1. | -45. | 0. | 35. | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |   |    |      |    |      |    |     |    |
| L 1 | 26.9 | -51.6 | .0        | B | 0. | 0.   | 0. | 0.   | 0. | 0.  | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |   |    |      |    |      |    |     |    |

|    |   |    |       |     |       |        |   |    |       |    |       |    |    |    |
|----|---|----|-------|-----|-------|--------|---|----|-------|----|-------|----|----|----|
| L  | 1 |    | 26.9  | .0  |       | 72.6   | T | 1. | -113. | 1. | -113. | 0. | 0. | 0. |
| 0. |   | 0. | 0.    | 27. | 1.250 |        |   |    |       |    |       |    |    |    |
| L  | 1 |    | 26.9  | .0  |       | -114.0 | T | 1. | -114. | 1. | -114. | 0. | 0. | 0. |
| 0. |   | 1. | -114. | 27. | 1.250 |        |   |    |       |    |       |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |
| Fundacao       |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |

PILAR:P9

num. 9  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC   Cmaj   |     |     |     |     |     |      |      |     |

| 2o Andar ..... | ..... | ..... |  
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

|         |           |               |                    |        |   |      |       |      |       |     |     |      |
|---------|-----------|---------------|--------------------|--------|---|------|-------|------|-------|-----|-----|------|
| L<br>0. | 2<br>0.   | 14.2<br>0.    | 71.8<br>14. 1.250  | .0     | T | -17. | -273. | -17. | -273. | 0.  | 0.  | 0.   |
| L<br>0. | 2<br>-72. | 14.2<br>-117. | -90.0<br>14. 1.250 | .0     | M | -27. | -117. | -27. | -117. | 82. | 35. | -44. |
| L<br>0. | 2<br>-27. | 14.2<br>153.  | .0<br>14. 1.250    | 163.6  | B | -27. | 153.  | -27. | 153.  | 0.  | 0.  | 0.   |
| L<br>0. | 2<br>-17. | 14.2<br>-274. | .0<br>14. 1.250    | -276.5 | T | -17. | -274. | -17. | -274. | 0.  | 0.  | 0.   |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |

[illegible]

|         |         |            |                    |       |   |     |      |     |      |    |     |    |
|---------|---------|------------|--------------------|-------|---|-----|------|-----|------|----|-----|----|
| L<br>0. | 1<br>0. | 24.3<br>0. | .0<br>24. 1.250    | .0    | B | 0.  | 0.   | 0.  | 0.   | 0. | 0.  | 0. |
| L<br>0. | 1<br>0. | 24.3<br>0. | 46.7<br>24. 1.250  | .0    | M | 31. | -58. | 31. | -58. | 0. | 35. | 0. |
| L<br>0. | 1<br>0. | 24.3<br>0. | -46.7<br>24. 1.250 | .0    | B | 0.  | 0.   | 0.  | 0.   | 0. | 0.  | 0. |
| L<br>0. | 1<br>0. | 24.3<br>0. | .0<br>24. 1.250    | 58.3  | T | 31. | -58. | 31. | -58. | 0. | 0.  | 0. |
| L<br>0. | 1<br>0. | 24.3<br>0. | .0<br>24. 1.250    | -58.3 | M | 31. | -58. | 31. | -58. | 0. | 35. | 0. |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |       |       |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |       |       |

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PILAR:P10

num. 10

Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....    | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 2

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|        |       |       |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TERREO | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....  | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 1

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

Fundacao

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PILAR:P11

num. 11

Calculo

Valores Intermediarios de



LANC Vd (tf) Mdx (tf,cm) Mdy (tf,cm) | | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |  
M2y | MOx | MOy | VC | Cmaj |

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| 2o Andar ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

| L 2 11.6 54.6 .0 | | T -4. 28. -4. 28. 0. 0. 0.  
0. 0. 0. 12. 1.250

| L 2 11.6 -59.3 .0 | | M -24. 28. -24. 28. 78. 35. -33.  
8. -57. 36. 12. 1.250

| L 2 11.6 .0 36.1 | | B -25. -14. -25. -14. 0. 0. 0.  
0. 0. 0. 12. 1.250

| L 2 11.6 .0 -36.1 | | T -4. 28. -4. 28. 0. 0. 0.  
0. 0. 0. 12. 1.250

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmavN Gmavm  
| 2.5 25.0 1.15 1.40 8.00 .50 1.75 1.75 1.40 1.40

| TipoAço ClasseAço ExcMin ExcMax K12 K37  
| 50 B 2.0 15.0 1 1

| TERREO ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

| L 1 20.2 .0 .0 | | B 0. 0. 0. 0. 0. 0. 0.  
0. 0. 0. 20. 1.250

| L 1 20.2 38.8 .0 | | M 34. -3. 34. -3. 0. 35. 0.  
0. 0. 0. 20. 1.250

| L 1 20.2 -38.8 .0 | | B 0. 0. 0. 0. 0. 0. 0.  
0. 0. 0. 20. 1.250

| L 1 20.2 .0 48.5 | | T 34. -3. 34. -3. 0. 0. 0.  
0. 0. 0. 20. 1.250

| L 1 20.2 .0 -48.5 | | M 34. -3. 34. -3. 0. 35. 0.  
0. 0. 0. 20. 1.250

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmavN Gmavm  
| 2.5 25.0 1.15 1.40 8.00 .50 1.75 1.75 1.40 1.40

| TipoAço ClasseAço ExcMin ExcMax K12 K37  
| 50 B 2.0 15.0 1 1

| Fundacao

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PILAR:P12

num. 12  
Calculo

Valores Intermediarios de

LANC Vd (tf) Mdx (tf,cm) Mdy (tf,cm) | | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |  
M2y | MOx | MOy | VC | Cmaj |

.....  
.....

[illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Dados de Projeto |           |          |         |              |     |          |          |       |       |       |       |
|------------------|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]   |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5              |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço          | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50               | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |

TERREO . . . . . | . . . . . | . . . . . |

|         |          |             |                    |       |   |     |     |     |     |    |     |    |
|---------|----------|-------------|--------------------|-------|---|-----|-----|-----|-----|----|-----|----|
| L<br>0. | 1<br>0.  | 19.8<br>0.  | .0<br>20. 1.250    | .0    | B | 0.  | 0.  | 0.  | 0.  | 0. | 0.  | 0. |
| L<br>0. | 1<br>47. | 19.8<br>32. | 48.9<br>20. 1.250  | .0    | T | 47. | 32. | 47. | 32. | 0. | 0.  | 0. |
| L<br>0. | 1<br>0.  | 19.8<br>0.  | -38.0<br>20. 1.250 | .0    | B | 0.  | 0.  | 0.  | 0.  | 0. | 0.  | 0. |
| L<br>0. | 1<br>0.  | 19.8<br>0.  | .0<br>20. 1.250    | 47.4  | T | 47. | 32. | 47. | 32. | 0. | 0.  | 0. |
| L<br>0. | 1<br>0.  | 19.8<br>0.  | .0<br>20. 1.250    | -47.4 | M | 43. | 32. | 43. | 32. | 0. | 35. | 0. |

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |  |        |  |     |     |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--|--------|--|-----|-----|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |  |        |  |     |     | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |  |        |  |     |     | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin |  | ExcMax |  | K12 | K37 |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    |  | 15.0   |  | 1   | 1   |          |         |              |  |          |          |       |       |       |       |

## Fundacao

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PILAR:P13

num. 13  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC   Cma    |     |     |     |     |     |      |      |     |

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| 2o Andar .....|.....|.....|
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|
|L 2          9.3          46.9          .0 | |          T  -29.  98.  -29.  98.  0.  0.  0.
0.    0.    0.    9. 1.250

```



[illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

[illegible][illegible][illegible]

|    |   |    |      |           |    |   |    |    |    |    |    |    |    |
|----|---|----|------|-----------|----|---|----|----|----|----|----|----|----|
| L  | 1 |    | 10.8 | -20.7     | .0 | B | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 0. |   | 0. | 0.   | 11. 1.250 |    |   |    |    |    |    |    |    |    |

[illegible][illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao

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PILAR:P15

| num. 15 | Valores Intermediarios de |
|---------|---------------------------|
| Calculo |                           |

|      |     |         |             |             |     |     |     |     |     |            |     |
|------|-----|---------|-------------|-------------|-----|-----|-----|-----|-----|------------|-----|
| LANC |     | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB LBLEM | M2x |
| M2y  | MOx | MOy     | VC  Cmaj    |             |     |     |     |     |     |            |     |

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| 3o Andar .....|.....|.....|  
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

L 3 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

L

2

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmavN Gmavm

2.5 25.0 1.15 1.40 8.00 .50 1.40 1.40 1.40 1.40

TipoAço ClasseAço ExcMin ExcMax K12 K37

50 B 2.0 15.0 1 1

TERREO

L

1

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmavN Gmavm

2.5 25.0 1.15 1.40 8.00 .50 1.40 1.40 1.40 1.40

TipoAço ClasseAço ExcMin ExcMax K12 K37

50 B 2.0 15.0 1 1

Fundacao

PILAR:P16  
num. 16  
CalculoValores Intermediarios de

LANC Vd (tf) Mdx (tf, cm) Mdy (tf, cm)

M2y MOx MOy VC Cmaj

OBS MCx MCy Mlx Mly LAMB LB LM M2x

L

2

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmavN Gmavm

2.5 25.0 1.15 1.40 8.00 .50 1.75 1.75 1.40 1.40

TipoAço ClasseAço ExcMin ExcMax K12 K37

50 B 2.0 15.0 1 1

TERREO

[illegible]

|   |           |          |           |              |     |          |          |       |       |       |       |
|---|-----------|----------|-----------|--------------|-----|----------|----------|-------|-------|-------|-------|
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                            |           |          |           |              |     |          |          |       |       |       |       |
| Cobrimento[cm]  |           | fck[MPa] | GamaAço   | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5   |           | 25.0     | 1.15      | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço   | ClasseAço | ExcMin   | ExcMax    | K12          | K37 |          |          |       |       |       |       |
| 50  | B         | 2.0      | 15.0      | 1            | 1   |          |          |       |       |       |       |
| TERREO  |           |          |           |              |     |          |          |       |       |       |       |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |           |          |           |              |     |          |          |       |       |       |       |
| L 1   | 12.0      | .0       |           | .0           |     | B        | 0.       | 0.    | 0.    | 0.    | 0.    |
| 0.  | 0.        | 0.       | 12. 1.250 |              |     |          |          |       |       |       |       |
| L 1   | 12.0      | 23.1     |           | .0           |     | M        | -18.     | 45.   | -18.  | 45.   | 0.    |
| 0.  | 0.        | 0.       | 12. 1.250 |              |     |          |          |       |       | 71.   | 0.    |
| L 1   | 12.0      | -52.9    |           | .0           |     | T        | -46.     | 55.   | -46.  | 55.   | 0.    |
| 0.  | -46.      | 55.      | 12. 1.250 |              |     |          |          |       |       | 0.    | 0.    |
| L 1   | 12.0      | .0       |           | 28.9         |     | T        | -46.     | 55.   | -46.  | 55.   | 0.    |
| 0.  | 0.        | 0.       | 12. 1.250 |              |     |          |          |       |       | 0.    | 0.    |
| L 1   | 12.0      | .0       |           | -28.9        |     | M        | -18.     | 45.   | -18.  | 45.   | 0.    |
| 0.  | 0.        | 0.       | 12. 1.250 |              |     |          |          |       |       | 71.   | 0.    |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                            |           |          |           |              |     |          |          |       |       |       |       |

|  |                |           |         |              |     |          |          |       |       |       |       |
|--|----------------|-----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
|  | Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
|  | 2.5            | 25.0      | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
|  | TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12 | K37      |          |       |       |       |       |
|  | 50             | B         | 2.0     | 15.0         | 1   | 1        |          |       |       |       |       |
|  | Fundacao       |           |         |              |     |          |          |       |       |       |       |

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PILAR:P18

| num. 18 | Valores Intermediarios de |
|---------|---------------------------|
| Calculo |                           |

|      |         |             |             |     |     |     |     |     |      |      |     |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x | M2y |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |     |

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2o Andar . . . . | . . . . . | . . . . . |

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS AROUIVO CRITÉRIOS

|  |                |           |         |              |     |          |          |       |       |       |       |
|--|----------------|-----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
|  | Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
|  | 2.5            | 25.0      | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
|  | TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12 | K37      |          |       |       |       |       |
|  | 50             | B         | 2.0     | 15.0         | 1   | 1        |          |       |       |       |       |

[illegible]

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|  |                |           |         |              |     |          |          |       |       |       |       |
|--|----------------|-----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
|  | Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
|  | 2.5            | 25.0      | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
|  | TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12 | K37      |          |       |       |       |       |
|  | 50             | B         | 2.0     | 15.0         | 1   | 1        |          |       |       |       |       |

Fundacao

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PILAR:P19

num. 19  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC   Cmaj   |     |     |     |     |     |      |      |     |

[illegible]

VALORES CÁLCULOS DEFINIDOS AROUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |          |         |              |  |          |          |       |       |       |       |

[illegible]

## VALORES CÁLCULOS DEFINIDOS AROUIVO CRITÉRIOS

|                |           |          |         |              |     |          |          |       |       |       |       |
|----------------|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50             | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |

## Fundacao

PILAR:P20

num. 20  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC   Cmaj   |     |     |     |     |     |      |      |     |

2o Andar .....|.....|.....|





|     |      |     |           |  |  |   |      |      |      |      |    |    |    |
|-----|------|-----|-----------|--|--|---|------|------|------|------|----|----|----|
| L 3 | 12.4 | .0  | 105.4     |  |  | B | 19.  | 90.  | 19.  | 90.  | 0. | 0. | 0. |
| 0.  | 19.  | 90. | 12. 1.250 |  |  |   |      |      |      |      |    |    |    |
| L 3 | 12.4 | .0  | -33.6     |  |  | T | -34. | -90. | -34. | -90. | 0. | 0. | 0. |
| 0.  | 0.   | 0.  | 12. 1.250 |  |  |   |      |      |      |      |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

2o Andar .....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

|     |      |       |           |  |  |   |    |    |    |    |    |     |     |
|-----|------|-------|-----------|--|--|---|----|----|----|----|----|-----|-----|
| L 2 | 17.8 | 83.5  | .0        |  |  | T | 4. | 3. | 4. | 3. | 0. | 0.  | 0.  |
| 0.  | 0.   | 0.    | 18. 1.250 |  |  |   |    |    |    |    |    |     |     |
| L 2 | 17.8 | -83.5 | .0        |  |  | M | 4. | 4. | 4. | 4. | 0. | 35. | 34. |
| 0.  | 0.   | 0.    | 18. 1.250 |  |  |   |    |    |    |    |    |     |     |
| L 2 | 17.8 | .0    | 48.0      |  |  | B | 3. | 4. | 3. | 4. | 0. | 0.  | 0.  |
| 0.  | 0.   | 0.    | 18. 1.250 |  |  |   |    |    |    |    |    |     |     |
| L 2 | 17.8 | .0    | -48.0     |  |  | T | 4. | 3. | 4. | 3. | 0. | 0.  | 0.  |
| 0.  | 0.   | 0.    | 18. 1.250 |  |  |   |    |    |    |    |    |     |     |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

TERREO .....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

|     |      |       |           |  |  |   |      |    |      |    |    |     |    |
|-----|------|-------|-----------|--|--|---|------|----|------|----|----|-----|----|
| L 1 | 26.7 | .0    | .0        |  |  | B | 0.   | 0. | 0.   | 0. | 0. | 0.  | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |  |  |   |      |    |      |    |    |     |    |
| L 1 | 26.9 | 51.6  | .0        |  |  | M | -11. | 5. | -11. | 5. | 0. | 35. | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |  |  |   |      |    |      |    |    |     |    |
| L 1 | 26.9 | -51.6 | .0        |  |  | B | 0.   | 0. | 0.   | 0. | 0. | 0.  | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |  |  |   |      |    |      |    |    |     |    |
| L 1 | 26.9 | .0    | 72.5      |  |  | T | -11. | 5. | -11. | 5. | 0. | 0.  | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |  |  |   |      |    |      |    |    |     |    |
| L 1 | 26.9 | .0    | -72.5     |  |  | M | -11. | 5. | -11. | 5. | 0. | 35. | 0. |
| 0.  | 0.   | 0.    | 27. 1.250 |  |  |   |      |    |      |    |    |     |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao

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 .....

PILAR:P22

num. 22  
 Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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 .....

|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 3o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

L 3 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

|          |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

|        |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TERREO | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

|          |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Fundacao | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

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PILAR:P23

Valores Intermediarios de

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|    3o Andar ..... | ..... | ..... |  
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

|    |   |    |     |    |       |    |   |      |     |      |     |    |    |    |
|----|---|----|-----|----|-------|----|---|------|-----|------|-----|----|----|----|
| L  | 3 |    | 7.7 |    | 18.2  | .0 | T | -17. | 20. | -17. | 20. | 0. | 0. | 0. |
| 0. |   | 0. | 0.  | 8. | 1.250 |    |   |      |     |      |     |    |    |    |

|    |      |     |     |       |          |      |     |      |     |    |    |    |
|----|------|-----|-----|-------|----------|------|-----|------|-----|----|----|----|
| L  | 3    |     | 7.6 | -18.9 | .0     T | -17. | 22. | -17. | 22. | 0. | 0. | 0. |
| 0. | -17. | 22. | 8.  | 1.250 |          |      |     |      |     |    |    |    |

|    |    |    |     |       |      |   |    |     |    |     |    |    |    |
|----|----|----|-----|-------|------|---|----|-----|----|-----|----|----|----|
| L  | 3  |    | 7.7 | .0    | 20.7 | B | 8. | 13. | 8. | 13. | 0. | 0. | 0. |
| 0. | 0. | 0. | 8.  | 1.250 |      |   |    |     |    |     |    |    |    |

[illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAco | ClasseAco | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

|    2o Andar   .... | ..... | ..... |  
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | .....

[illegible]

|    |   |    |     |          |    |   |    |     |    |     |    |     |     |
|----|---|----|-----|----------|----|---|----|-----|----|-----|----|-----|-----|
| L  | 2 |    | 9.1 | -42.6    | .0 | M | 5. | 11. | 5. | 11. | 0. | 35. | 20. |
| 0. |   | 0. | 0.  | 9. 1.250 |    |   |    |     |    |     |    |     |     |

[illegible]

|    |   |    |     |    |       |       |   |    |    |    |    |    |    |    |
|----|---|----|-----|----|-------|-------|---|----|----|----|----|----|----|----|
| L  | 2 |    | 9.1 |    | .0    | -24.5 | T | 2. | 6. | 2. | 6. | 0. | 0. | 0. |
| 0. |   | 0. | 0.  | 9. | 1.250 |       |   |    |    |    |    |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

|        |       |       |       |       |
|--------|-------|-------|-------|-------|
| TERREO | ..... | ..... | ..... |       |
| .....  | ..... | ..... | ..... | ..... |

[illegible][illegible]

|    |    |    |      |       |    |   |    |    |    |    |    |    |    |
|----|----|----|------|-------|----|---|----|----|----|----|----|----|----|
| L  | 1  |    | 13.5 | -25.9 | .0 | B | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 13.  | 1.250 |    |   |    |    |    |    |    |    |    |

[illegible][illegible]

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |       |       |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |       |       |

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PILAR:P24

num. 24  
Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....    | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|        |       |       |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TERREO | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....  | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

Fundacao

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PILAR:P25

num. 25  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

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[illegible]

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

[illegible]

L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao

• \_\_\_\_\_ • \_\_\_\_\_ • \_\_\_\_\_ • \_\_\_\_\_ •

PILAR:P26

num. 26  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

[illegible]

|    2o Andar     .... | ..... | ..... |  
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

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[illegible][illegible]

|    |    |    |     |       |      |   |     |      |     |      |    |    |    |
|----|----|----|-----|-------|------|---|-----|------|-----|------|----|----|----|
| L  | 2  |    | 7.2 | .0    | 22.4 | B | 14. | -10. | 14. | -10. | 0. | 0. | 0. |
| 0. | 0. | 0. | 7.  | 1.250 |      |   |     |      |     |      |    |    |    |

[illegible]

| VALORES | CÁLCULOS | DEFINIDOS | ARQUIVO | CRITÉRIOS |
|---------|----------|-----------|---------|-----------|
|---------|----------|-----------|---------|-----------|

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmapV | GmapVn |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|--------|
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|--------|

[illegible]

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |       |       |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |       |       |

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PILAR:P28

num. 28  
 Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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 .....

|          |       |          |        |   |     |       |     |       |     |     |     |
|----------|-------|----------|--------|---|-----|-------|-----|-------|-----|-----|-----|
| 2o Andar |       |          |        |   |     |       |     |       |     |     |     |
| L 2      | 9.0   | 54.5     | .0     | M | 19. | -69.  | 19. | -69.  | 78. | 35. | 25. |
| 0. 44.   | -69.  | 9. 1.250 |        |   |     |       |     |       |     |     |     |
| L 2      | 9.0   | -42.1    | .0     | M | 19. | -69.  | 19. | -69.  | 0.  | 35. | 25. |
| 0. 0.    | 0.    | 9. 1.250 |        |   |     |       |     |       |     |     |     |
| L 2      | 9.0   | .0       | 140.7  | B | 24. | 131.  | 24. | 131.  | 0.  | 0.  | 0.  |
| 0. 24.   | 131.  | 9. 1.250 |        |   |     |       |     |       |     |     |     |
| L 2      | 9.0   | .0       | -173.9 | T | -6. | -173. | -6. | -173. | 0.  | 0.  | 0.  |
| 0. -6.   | -173. | 9. 1.250 |        |   |     |       |     |       |     |     |     |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|         |       |           |       |   |      |       |      |       |    |     |    |
|---------|-------|-----------|-------|---|------|-------|------|-------|----|-----|----|
| TERREO  |       |           |       |   |      |       |      |       |    |     |    |
| L 1     | 17.7  | .0        | .0    | B | 0.   | 0.    | 0.   | 0.    | 0. | 0.  | 0. |
| 0. 0.   | 0.    | 18. 1.250 |       |   |      |       |      |       |    |     |    |
| L 1     | 17.7  | 34.1      | .0    | M | -31. | -77.  | -31. | -77.  | 0. | 69. | 0. |
| 0. 0.   | 0.    | 18. 1.250 |       |   |      |       |      |       |    |     |    |
| L 1     | 17.7  | -104.7    | .0    | T | -75. | -157. | -75. | -157. | 0. | 0.  | 0. |
| 0. -75. | -157. | 18. 1.250 |       |   |      |       |      |       |    |     |    |
| L 1     | 17.7  | .0        | 42.6  | T | -75. | -157. | -75. | -157. | 0. | 0.  | 0. |
| 0. 0.   | 0.    | 18. 1.250 |       |   |      |       |      |       |    |     |    |
| L 1     | 17.7  | .0        | -42.6 | M | -31. | -77.  | -31. | -77.  | 0. | 69. | 0. |
| 0. 0.   | 0.    | 18. 1.250 |       |   |      |       |      |       |    |     |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |          |         |              |          |          |       |       |       |       |  |
|--|----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |



|          |           |        |        |      |     |      |      |      |      |
|----------|-----------|--------|--------|------|-----|------|------|------|------|
| 2.5      | 25.0      | 1.15   | 1.40   | 8.00 | .50 | 1.75 | 1.75 | 1.40 | 1.40 |
| TipoAço  | ClasseAço | ExcMin | ExcMax | K12  | K37 |      |      |      |      |
| 50       | B         | 2.0    | 15.0   | 1    | 1   |      |      |      |      |
| Fundacao |           |        |        |      |     |      |      |      |      |

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PILAR:P29

num. 29  
Calculo

Valores Intermediarios de

|      |         |             |             |      |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 3o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

|     |     |      |          |   |     |      |     |      |    |     |    |
|-----|-----|------|----------|---|-----|------|-----|------|----|-----|----|
| L 3 | 3.4 | 8.0  | .0       | T | 16. | 191. | 16. | 191. | 0. | 0.  | 0. |
| 0.  | 0.  | 0.   | 3. 1.250 |   |     |      |     |      |    |     |    |
| L 3 | 3.4 | -8.0 | .0       | M | 10. | 112. | 10. | 112. | 0. | 46. | 0. |
| 0.  | 0.  | 0.   | 3. 1.250 |   |     |      |     |      |    |     |    |
| L 3 | 3.4 | .0   | 195.9    | T | 15. | 191. | 15. | 191. | 0. | 0.  | 0. |
| 0.  | 15. | 191. | 3. 1.250 |   |     |      |     |      |    |     |    |
| L 3 | 3.4 | .0   | -19.0    | B | -4. | -14. | -4. | -14. | 0. | 0.  | 0. |
| 0.  | -4. | -14. | 3. 1.250 |   |     |      |     |      |    |     |    |
| L 3 | 3.2 | .0   | 196.3    | T | 16. | 191. | 16. | 191. | 0. | 0.  | 0. |
| 0.  | 16. | 191. | 3. 1.250 |   |     |      |     |      |    |     |    |
| L 3 | 3.2 | .0   | -19.9    | B | -5. | -14. | -5. | -14. | 0. | 0.  | 0. |
| 0.  | -5. | -14. | 3. 1.250 |   |     |      |     |      |    |     |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |          |         |              |          |          |       |       |       |       |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

|         |           |        |        |     |     |
|---------|-----------|--------|--------|-----|-----|
| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

|     |     |       |          |   |     |      |     |      |     |     |     |
|-----|-----|-------|----------|---|-----|------|-----|------|-----|-----|-----|
| L 2 | 8.0 | 37.5  | .0       | T | 9.  | -29. | 9.  | -29. | 0.  | 0.  | 0.  |
| 0.  | 0.  | 0.    | 8. 1.250 |   |     |      |     |      |     |     |     |
| L 2 | 8.0 | -37.5 | .0       | M | 9.  | -26. | 9.  | -26. | 0.  | 35. | 19. |
| 0.  | 0.  | 0.    | 8. 1.250 |   |     |      |     |      |     |     |     |
| L 2 | 7.8 | 29.6  | .0       | M | 9.  | -26. | 9.  | -26. | 78. | 35. | 19. |
| 0.  | 28. | -26.  | 8. 1.250 |   |     |      |     |      |     |     |     |
| L 2 | 7.8 | -10.7 | .0       | B | -8. | -20. | -8. | -20. | 0.  | 0.  | 0.  |
| 0.  | -8. | -20.  | 8. 1.250 |   |     |      |     |      |     |     |     |
| L 2 | 8.0 | .0    | 21.5     | B | -8. | -20. | -8. | -20. | 0.  | 0.  | 0.  |
| 0.  | 0.  | 0.    | 8. 1.250 |   |     |      |     |      |     |     |     |
| L 2 | 8.0 | .0    | -38.4    | T | 9.  | -30. | 9.  | -30. | 0.  | 0.  | 0.  |
| 0.  | 9.  | -30.  | 8. 1.250 |   |     |      |     |      |     |     |     |
| L 2 | 7.8 | .0    | -38.3    | T | 9.  | -29. | 9.  | -29. | 0.  | 0.  | 0.  |
| 0.  | 9.  | -29.  | 8. 1.250 |   |     |      |     |      |     |     |     |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |           |              |          |          |       |       |       |       |     |    |
|--|-----------|-----------|--------------|----------|----------|-------|-------|-------|-------|-----|----|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço   | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |     |    |
| 2.5  | 25.0      | 1.15      | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |     |    |
| TipoAço                                      | ClasseAço | ExcMin    | ExcMax       | K12      | K37      |       |       |       |       |     |    |
| 50   | B         | 2.0       | 15.0         | 1        | 1        |       |       |       |       |     |    |
| TERREO                                       |           |           |              |          |          |       |       |       |       |     |    |
| L 1  | 12.3      | .0        | .0           | B        | 0.       | 0.    | 0.    | 0.    | 0.    | 0.  | 0. |
| 0.   | 0.        | 12. 1.250 |              |          |          |       |       |       |       |     |    |
| L 1  | 12.3      | 23.6      | .0           | M        | 13.      | 64.   | 13.   | 64.   | 0.    | 35. | 0. |
| 0.   | 0.        | 12. 1.250 |              |          |          |       |       |       |       |     |    |
| L 1  | 12.3      | -23.6     | .0           | B        | 0.       | 0.    | 0.    | 0.    | 0.    | 0.  | 0. |
| 0.   | 0.        | 12. 1.250 |              |          |          |       |       |       |       |     |    |
| L 1  | 12.3      | .0        | 92.7         | T        | 13.      | 85.   | 13.   | 85.   | 0.    | 0.  | 0. |
| 0.   | 13.       | 85.       | 12. 1.250    |          |          |       |       |       |       |     |    |
| L 1  | 12.3      | .0        | -33.1        | M        | 13.      | 64.   | 13.   | 64.   | 0.    | 35. | 0. |
| 0.   | 0.        | 12. 1.250 |              |          |          |       |       |       |       |     |    |
| L 1  | 12.1      | .0        | 93.0         | T        | 13.      | 85.   | 13.   | 85.   | 0.    | 0.  | 0. |
| 0.   | 13.       | 85.       | 12. 1.250    |          |          |       |       |       |       |     |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |  |
| Fundacao                                     |           |         |              |          |          |       |       |       |       |  |  |

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|           |         |     |             |      |             |                           |     |  |     |     |     |     |      |      |     |  |
|-----------|---------|-----|-------------|------|-------------|---------------------------|-----|--|-----|-----|-----|-----|------|------|-----|--|
| PILAR:P30 |         |     |             |      |             |                           |     |  |     |     |     |     |      |      |     |  |
| num. 30   |         |     |             |      |             | Valores Intermediarios de |     |  |     |     |     |     |      |      |     |  |
| Calculo   |         |     |             |      |             |                           |     |  |     |     |     |     |      |      |     |  |
| LANC      | Vd (tf) |     | Mdx (tf,cm) |      | Mdy (tf,cm) |                           | OBS |  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |  |
| M2y       | MOx     | MOy | VC          | Cmaj |             |                           |     |  |     |     |     |     |      |      |     |  |

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|          |   |  |  |  |  |  |  |  |  |  |  |
|----------|---|--|--|--|--|--|--|--|--|--|--|
| 3o Andar |   |  |  |  |  |  |  |  |  |  |  |
| .....    |   |  |  |  |  |  |  |  |  |  |  |
| L 3      | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |  |  |  |  |  |  |  |  |  |  |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |  |

|  |           |             |              |          |          |                           |       |       |       |      |      |
|--|-----------|-------------|--------------|----------|----------|---------------------------|-------|-------|-------|------|------|
| 50   | B         | 2.0         | 15.0         | 1        | 1        |                           |       |       |       |      |      |
| 2o Andar ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |           |             |              |          |          |                           |       |       |       |      |      |
| L 2 *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                              |           |             |              |          |          |                           |       |       |       |      |      |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                                     |           |             |              |          |          |                           |       |       |       |      |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN                     | GmapM | GmavN | Gmavm |      |      |
| 2.5  | 25.0      | 1.15        | 1.40         | 8.00     | .50      | 1.40                      | 1.40  | 1.40  | 1.40  |      |      |
| TipoAço  | ClasseAço | ExcMin      | ExcMax       | K12      | K37      |                           |       |       |       |      |      |
| 50   | B         | 2.0         | 15.0         | 1        | 1        |                           |       |       |       |      |      |
| TERREO ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....   |           |             |              |          |          |                           |       |       |       |      |      |
| L 1 *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                              |           |             |              |          |          |                           |       |       |       |      |      |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                                     |           |             |              |          |          |                           |       |       |       |      |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN                     | GmapM | GmavN | Gmavm |      |      |
| 2.5  | 25.0      | 1.15        | 1.40         | 8.00     | .50      | 1.40                      | 1.40  | 1.40  | 1.40  |      |      |
| TipoAço  | ClasseAço | ExcMin      | ExcMax       | K12      | K37      |                           |       |       |       |      |      |
| 50   | B         | 2.0         | 15.0         | 1        | 1        |                           |       |       |       |      |      |
| Fundacao   |           |             |              |          |          |                           |       |       |       |      |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |                           |       |       |       |      |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |                           |       |       |       |      |      |
| PILAR:P31  |           |             |              |          |          |                           |       |       |       |      |      |
| num. 31  |           |             |              |          |          | Valores Intermediarios de |       |       |       |      |      |
| Calculo  |           |             |              |          |          |                           |       |       |       |      |      |
| LANC   | Vd (tf)   | Mdx (tf,cm) | Mdy (tf,cm)  |          | OBS      | MCx                       | MCy   | M1x   | M1y   | LAMB | LBLM |
| M2y  | MOx       | MOy         | VC           | Cmaj     |          |                           |       |       |       |      |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |                           |       |       |       |      |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....          |           |             |              |          |          |                           |       |       |       |      |      |
| L 3  | 5.1       | 12.2        | .0           |          | T        | 9.                        | -130. | 9.    | -130. | 0.   | 0.   |
| 0.   | 0.        | 0.          | 5.1.250      |          |          |                           |       |       |       |      | 0.   |
| L 3  | 5.1       | -12.2       | .0           |          | M        | 9.                        | -77.  | 9.    | -77.  | 0.   | 35.  |
| 0.   | 0.        | 0.          | 5.1.250      |          |          |                           |       |       |       |      | 2.   |
| L 3  | 5.1       | .0          | 18.0         |          | B        | -1.                       | 18.   | -1.   | 18.   | 0.   | 0.   |
| 0.   | -1.       | 18.         | 5.1.250      |          |          |                           |       |       |       |      | 0.   |
| L 3  | 5.1       | .0          | -133.0       |          | T        | 9.                        | -131. | 9.    | -131. | 0.   | 0.   |
| 0.   | 9.        | -131.       | 5.1.250      |          |          |                           |       |       |       |      | 0.   |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                                     |           |             |              |          |          |                           |       |       |       |      |      |
| Cobrimento[cm]   | fck[MPa]  | GamaAço     | GamaConcreto | AsMax[%] | AsMin[%] | GmapN                     | GmapM | GmavN | Gmavm |      |      |
| 2.5  | 25.0      | 1.15        | 1.40         | 8.00     | .50      | 1.75                      | 1.75  | 1.40  | 1.40  |      |      |



|  |   |         |              |          |          |       |       |       |       |  |
|--|---|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| L 2  | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL ***                   |         |              |          |          |       |       |       |       |  |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |   |         |              |          |          |       |       |       |       |  |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0  | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço   | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B   | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |
| TERREO                                       | ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |         |              |          |          |       |       |       |       |  |

|   |   |         |              |          |          |       |       |       |       |  |
|---|---|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| L 1   | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |         |              |          |          |       |       |       |       |  |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS                      |   |         |              |          |          |       |       |       |       |  |
| Cobrimento[cm]  | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5   | 25.0  | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço   | ClasseAço                                       | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50  | B   | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |
| Fundacao  |   |         |              |          |          |       |       |       |       |  |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |   |         |              |          |          |       |       |       |       |  |

|   |                           |             |             |      |     |     |     |     |      |      |
|---|---------------------------|-------------|-------------|------|-----|-----|-----|-----|------|------|
| PILAR:P33   |                           |             |             |      |     |     |     |     |      |      |
| num. 33   | Valores Intermediarios de |             |             |      |     |     |     |     |      |      |
| Calculo   |                           |             |             |      |     |     |     |     |      |      |
| LANC  | Vd (tf)                   | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM |
| M2y   | MOx                       | MOy         | VC          | Cmaj |     |     |     |     |      |      |
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |                           |             |             |      |     |     |     |     |      |      |

|          |   |       |          |   |      |    |      |    |    |      |
|----------|---|-------|----------|---|------|----|------|----|----|------|
| 2o Andar | ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |       |          |   |      |    |      |    |    |      |
| L 2      | 8.5   | 43.4  | .0       | T | 10.  | 2. | 10.  | 2. | 0. | 0.   |
| 0.       | 0.  | 0.    | 8. 1.250 |   |      |    |      |    |    |      |
| L 2      | 8.5   | -43.4 | .0       | M | -15. | 2. | -15. | 2. | 0. | 35.  |
| 1.       | 0.  | 0.    | 8. 1.250 |   |      |    |      |    |    | -27. |
| L 2      | 8.5   | .0    | 26.4     | B | -15. | 2. | -15. | 2. | 0. | 0.   |
| 0.       | 0.  | 0.    | 8. 1.250 |   |      |    |      |    |    |      |
| L 2      | 8.5   | .0    | -26.4    | T | 10.  | 2. | 10.  | 2. | 0. | 0.   |
| 0.       | 0.  | 0.    | 8. 1.250 |   |      |    |      |    |    |      |

|  |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|        |      |       |          |  |  |   |     |      |     |      |    |
|--------|------|-------|----------|--|--|---|-----|------|-----|------|----|
| TERREO |      |       |          |  |  |   |     |      |     |      |    |
| L 1    | 18.0 | .0    | .0       |  |  | B | 0.  | 0.   | 0.  | 0.   | 0. |
| 0.     | 0.   | 0.    | 18.1.250 |  |  |   |     |      |     |      | 0. |
| L 1    | 18.0 | 55.6  | .0       |  |  | T | 52. | -41. | 52. | -41. | 0. |
| 0.     | 52.  | -41.  | 18.1.250 |  |  |   |     |      |     |      | 0. |
| L 1    | 18.0 | -34.6 | .0       |  |  | B | 0.  | 0.   | 0.  | 0.   | 0. |
| 0.     | 0.   | 0.    | 18.1.250 |  |  |   |     |      |     |      | 0. |
| L 1    | 18.0 | .0    | 43.2     |  |  | T | 52. | -41. | 52. | -41. | 0. |
| 0.     | 0.   | 0.    | 18.1.250 |  |  |   |     |      |     |      | 0. |
| L 1    | 18.0 | .0    | -43.2    |  |  | M | 45. | -41. | 45. | -41. | 0. |
| 0.     | 0.   | 0.    | 18.1.250 |  |  |   |     |      |     | 35.  | 0. |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |         |              |          |          |       |       |       |       |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |
| Fundacao       |           |         |              |          |          |       |       |       |       |

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PILAR:P34

num. 34  
Calculo

Valores Intermediarios de

|      |         |             |             |  |     |  |     |  |     |  |     |  |     |  |      |  |      |  |     |  |     |  |     |  |     |  |    |  |      |
|------|---------|-------------|-------------|--|-----|--|-----|--|-----|--|-----|--|-----|--|------|--|------|--|-----|--|-----|--|-----|--|-----|--|----|--|------|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) |  | OBS |  | MCx |  | MCy |  | Mlx |  | Mly |  | LAMB |  | LBLM |  | M2x |  | M2y |  | MOx |  | MOy |  | VC |  | Cmaj |
|------|---------|-------------|-------------|--|-----|--|-----|--|-----|--|-----|--|-----|--|------|--|------|--|-----|--|-----|--|-----|--|-----|--|----|--|------|

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|          |  |  |  |  |  |  |  |  |  |  |  |
|----------|--|--|--|--|--|--|--|--|--|--|--|
| 2o Andar |  |  |  |  |  |  |  |  |  |  |  |
|----------|--|--|--|--|--|--|--|--|--|--|--|

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |         |              |          |          |       |       |       |       |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |

|        |  |  |  |  |  |  |  |  |  |  |  |
|--------|--|--|--|--|--|--|--|--|--|--|--|
| TERREO |  |  |  |  |  |  |  |  |  |  |  |
|--------|--|--|--|--|--|--|--|--|--|--|--|

L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |          |         |              |          |          |       |       |       |       |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

Fundacao

Valores Intermediarios de

• \_\_\_\_\_ • \_\_\_\_\_ • \_\_\_\_\_ • \_\_\_\_\_ •

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

Fundacao

Valores Intermediarios de

• \_\_\_\_\_ • \_\_\_\_\_ • \_\_\_\_\_ • \_\_\_\_\_ •

2o Andar .....|.....|.....|

|  |   |         |              |          |          |       |       |       |       |       |
|--|---|---------|--------------|----------|----------|-------|-------|-------|-------|-------|
| L 2  | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |         |              |          |          |       |       |       |       |       |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |   |         |              |          |          |       |       |       |       |       |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |       |
| 2.5  | 25.0  | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |       |
| TipoAço                                      | ClasseAço                                       | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |       |
| 50   | B   | 2.0     | 15.0         | 1        | 1        |       |       |       |       |       |
| TERREO                                       | .....   | .....   | .....        | .....    | .....    | ..... | ..... | ..... | ..... | ..... |

|  |   |         |              |          |          |       |       |       |       |  |
|--|---|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| L 1  | *** MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL *** |         |              |          |          |       |       |       |       |  |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |   |         |              |          |          |       |       |       |       |  |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0  | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço                                       | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B   | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |
| Fundacao                                     |   |         |              |          |          |       |       |       |       |  |
| .....  |   |         |              |          |          |       |       |       |       |  |

|           |                           |             |             |       |       |       |       |       |       |       |
|-----------|---------------------------|-------------|-------------|-------|-------|-------|-------|-------|-------|-------|
| PILAR:P37 |                           |             |             |       |       |       |       |       |       |       |
| num. 37   | Valores Intermediarios de |             |             |       |       |       |       |       |       |       |
| Calculo   |                           |             |             |       |       |       |       |       |       |       |
| LANC      | Vd (tf)                   | Mdx (tf,cm) | Mdy (tf,cm) |       | OBS   |       | MCx   |       | MCy   |       |
| M2y       | MOx                       | MOy         | VC          | Cmaj  |       |       |       |       |       |       |
| .....     | .....                     | .....       | .....       | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

|          |       |       |          |       |       |       |       |       |       |          |
|----------|-------|-------|----------|-------|-------|-------|-------|-------|-------|----------|
| 2o Andar | ..... | ..... | .....    | ..... | ..... | ..... | ..... | ..... | ..... | .....    |
| L 2      | 7.9   | 37.2  | .0       |       | T     | 0.    | -53.  | 0.    | -53.  | 0.       |
| 0.       | 0.    | 0.    | 8. 1.250 |       |       |       |       |       |       | 0.       |
| L 2      | 7.9   | -37.2 | .0       |       | M     | -12.  | -31.  | -12.  | -31.  | 0.       |
| 0.       | 0.    | 0.    | 8. 1.250 |       |       |       |       |       |       | 35. -21. |
| L 2      | 7.9   | .0    | -53.0    |       | T     | 0.    | -53.  | 0.    | -53.  | 0.       |
| 0.       | 0.    | 0.    | 8. 1.250 |       |       |       |       |       |       | 0.       |
| L 2      | 7.9   | .0    | 24.6     |       | T     | 0.    | -53.  | 0.    | -53.  | 0.       |
| 0.       | 0.    | 0.    | 8. 1.250 |       |       |       |       |       |       | 0.       |

|  |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |



[illegible]

VALORES CÁLCULOS DEFINIDOS AROUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |
| Fundacao       |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |

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num. 38  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

\_\_\_\_\_

\_\_\_\_\_

[illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |          |         |              |     |          |          |       |       |       |       |
|----------------|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50             | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |

| TERREO | . . . . | . . . . . . . . . . | . . . . . . . . . . |

|    |   |    |      |           |    |   |    |    |    |    |    |    |
|----|---|----|------|-----------|----|---|----|----|----|----|----|----|
| L  | 1 |    | 12.9 | .0        | .0 | B | 0. | 0. | 0. | 0. | 0. | 0. |
| 0. |   | 0. | 0.   | 13. 1.250 |    |   |    |    |    |    |    |    |

[illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |
| Fundacao       |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |

PILAR:P39

num. 39  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

| 2o Andar |      |     |          | 3o Andar |      |     |          | 4o Andar |      |     |          | 5o Andar |      |     |          |
|----------|------|-----|----------|----------|------|-----|----------|----------|------|-----|----------|----------|------|-----|----------|
| L        | 2    | 5.5 | 68.7     | L        | 2    | 5.5 | 68.7     | L        | 2    | 5.5 | 68.7     | L        | 2    | 5.5 | 68.7     |
| 0.       | 69.  | 3.  | 5. 1.000 | 0.       | 69.  | 3.  | 5. 1.000 | 0.       | 69.  | 3.  | 5. 1.000 | 0.       | 69.  | 3.  | 5. 1.000 |
|          |      |     |          |          |      |     |          |          |      |     |          |          |      |     |          |
| L        | 2    | 5.5 | -75.6    | L        | 2    | 5.5 | -75.6    | L        | 2    | 5.5 | -75.6    | L        | 2    | 5.5 | -75.6    |
| 0.       | -75. | -8. | 6. 1.000 | 0.       | -75. | -8. | 6. 1.000 | 0.       | -75. | -8. | 6. 1.000 | 0.       | -75. | -8. | 6. 1.000 |
|          |      |     |          |          |      |     |          |          |      |     |          |          |      |     |          |
| L        | 2    | 5.5 | .0       | L        | 2    | 5.5 | .0       | L        | 2    | 5.5 | .0       | L        | 2    | 5.5 | .0       |
| 0.       | 0.   | 0.  | 5. 1.000 | 0.       | 0.   | 0.  | 5. 1.000 | 0.       | 0.   | 0.  | 5. 1.000 | 0.       | 0.   | 0.  | 5. 1.000 |
|          |      |     |          |          |      |     |          |          |      |     |          |          |      |     |          |
| L        | 2    | 5.5 | .0       | L        | 2    | 5.5 | .0       | L        | 2    | 5.5 | .0       | L        | 2    | 5.5 | .0       |
| 0.       | 0.   | 0.  | 5. 1.000 | 0.       | 0.   | 0.  | 5. 1.000 | 0.       | 0.   | 0.  | 5. 1.000 | 0.       | 0.   | 0.  | 5. 1.000 |

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |

TERREO      . . . . . | . . . . . | . . . . . |

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|      |   |    |     |          |       |   |      |    |      |    |    |     |    |
|------|---|----|-----|----------|-------|---|------|----|------|----|----|-----|----|
| L    | 1 |    | 9.0 | .0       | 18.7  | T | -74. | 5. | -74. | 5. | 0. | 0.  | 0. |
| 0.   |   | 0. | 0.  | 9. 1.000 |       |   |      |    |      |    |    |     |    |
| <br> |   |    |     |          |       |   |      |    |      |    |    |     |    |
| L    | 1 |    | 9.0 | .0       | -18.7 | M | -37. | 5. | -37. | 5. | 0. | 61. | 0. |
| 0.   |   | 0. | 0.  | 9. 1.000 |       |   |      |    |      |    |    |     |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |
| Fundacao       |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |

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PILAR:P40

num. 40  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC   Cmaj   |     |     |     |     |     |      |      |     |

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| 2o Andar .....|.....|.....|  
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

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VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |

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|         |          |             |                    |       |   |     |     |     |     |    |     |    |
|---------|----------|-------------|--------------------|-------|---|-----|-----|-----|-----|----|-----|----|
| L<br>0. | 1<br>0.  | 17.9<br>0.  | .0<br>18. 1.250    | .0    | B | 0.  | 0.  | 0.  | 0.  | 0. | 0.  | 0. |
| L<br>0. | 1<br>0.  | 18.0<br>0.  | 34.5<br>18. 1.250  | .0    | M | 11. | 71. | 11. | 71. | 0. | 35. | 0. |
| L<br>0. | 1<br>0.  | 18.0<br>0.  | -34.5<br>18. 1.250 | .0    | B | 0.  | 0.  | 0.  | 0.  | 0. | 0.  | 0. |
| L<br>0. | 1<br>11. | 17.9<br>90. | .0<br>18. 1.250    | 92.9  | T | 11. | 90. | 11. | 90. | 0. | 0.  | 0. |
| L<br>0. | 1<br>0.  | 18.0<br>0.  | .0<br>18. 1.250    | -43.1 | M | 11. | 71. | 11. | 71. | 0. | 35. | 0. |

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num. 41  
Calculo

Valores Intermediarios de

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[illegible]

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |             |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40 1.40   |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |             |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |             |

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## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

TERREO . . . . . | . . . . . | . . . . . |

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## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

## Fundacao

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## PILAR:P42

num. 42

Valores Intermediarios de

Calculo

|      |         |             |             |     |     |     |     |     |      |      |     |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x | M2y |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |     |

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3o Andar .....|.....|.....|

L 3 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

## VALORES CÁLCULOS DEFINIDOS AROUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAco | ClasseAco | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
|---------|-----------|--------|--------|-----|-----|

| 2o Andar       |           |         |              |          |          |       |       |       |       |  |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| 2o Andar       |           |         |              |          |          |       |       |       |       |  |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

\*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Fundacao       |           |         |              |          |          |       |       |       |       |  |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

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PILAR:P43

num. 43

Calculo

Valores Intermediarios de

| LANC     | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy  | Mlx | Mly  | LAMB | LBLM | M2x  | M2y |
|----------|---------|-------------|-------------|-----|-----|------|-----|------|------|------|------|-----|
| MOx      | MOy     | VC          | Cmaj        |     |     |      |     |      |      |      |      |     |
| 2o Andar |         |             |             |     |     |      |     |      |      |      |      |     |
| 2        | 6.0     | 28.1        | .0          | T   | -2. | 17.  | -2. | 17.  | 0.   | 0.   | 0.   | 0.  |
| 0.       | 0.      | 6. 1.250    |             |     |     |      |     |      |      |      |      |     |
| 2        | 6.0     | -28.1       | .0          | M   | -9. | -28. | -9. | -28. | 0.   | 35.  | -16. |     |
| 0.       | 0.      | 6. 1.250    |             |     |     |      |     |      |      |      |      |     |
| 2        | 6.0     | .0          | 18.6        | B   | -9. | -49. | -9. | -49. | 0.   | 0.   | 0.   |     |
| 0.       | 0.      | 6. 1.250    |             |     |     |      |     |      |      |      |      |     |
| 2        | 6.0     | .0          | -52.5       | B   | -9. | -49. | -9. | -49. | 0.   | 0.   | 0.   |     |
| 0.       | -9.     | -49.        | 6. 1.250    |     |     |      |     |      |      |      |      |     |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |

| TipoAço | ClasseAço | ExcMin | ExcMax   | K12   | K37 |   |     |     |     |     |    |     |    |
|---------|-----------|--------|----------|-------|-----|---|-----|-----|-----|-----|----|-----|----|
| 50      | B         | 2.0    | 15.0     | 1     | 1   |   |     |     |     |     |    |     |    |
| TERREO  |           |        |          |       |     |   |     |     |     |     |    |     |    |
| L 1     | 9.5       | .0     |          | .0    |     | B | 0.  | 0.  | 0.  | 0.  | 0. | 0.  | 0. |
| 0.      | 0.        | 0.     | 9. 1.250 |       |     |   |     |     |     |     |    |     |    |
| L 1     | 9.5       | 22.9   |          | .0    |     | T | 21. | 21. | 21. | 21. | 0. | 0.  | 0. |
| 0.      | 21.       | 21.    | 9. 1.250 |       |     |   |     |     |     |     |    |     |    |
| L 1     | 9.5       | -18.2  |          | .0    |     | B | 0.  | 0.  | 0.  | 0.  | 0. | 0.  | 0. |
| 0.      | 0.        | 0.     | 9. 1.250 |       |     |   |     |     |     |     |    |     |    |
| L 1     | 9.5       | .0     |          | 22.8  |     | T | 21. | 21. | 21. | 21. | 0. | 0.  | 0. |
| 0.      | 0.        | 0.     | 9. 1.250 |       |     |   |     |     |     |     |    |     |    |
| L 1     | 9.5       | .0     |          | -22.8 |     | M | 20. | 21. | 20. | 21. | 0. | 35. | 0. |
| 0.      | 0.        | 0.     | 9. 1.250 |       |     |   |     |     |     |     |    |     |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao

PILAR:P44

num. 44  
Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

|          |      |       |          |       |  |   |      |      |      |      |     |
|----------|------|-------|----------|-------|--|---|------|------|------|------|-----|
| 2o Andar |      |       |          |       |  |   |      |      |      |      |     |
| L 2      | 6.0  | 28.4  |          | .0    |  | T | 7.   | -36. | 7.   | -36. | 0.  |
| 0.       | 0.   | 0.    | 6. 1.250 |       |  |   |      |      |      |      | 0.  |
| L 2      | 6.0  | -34.1 |          | .0    |  | M | -11. | -35. | -11. | -35. | 78. |
| -7.      | -28. | -41.  | 6. 1.250 |       |  |   |      |      |      |      | 35. |
| L 2      | 6.0  | .0    |          | 18.8  |  | B | -11. | -33. | -11. | -33. | 0.  |
| 0.       | 0.   | 0.    | 6. 1.250 |       |  |   |      |      |      |      | 0.  |
| L 2      | 6.0  | .0    |          | -38.7 |  | T | 7.   | -36. | 7.   | -36. | 0.  |
| 0.       | 7.   | -36.  | 6. 1.250 |       |  |   |      |      |      |      | 0.  |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

[illegible]

## VALORES CÁLCULOS DEFINIDOS AROUIVO CRITÉRIOS

|                |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--------|-----|-----|--|--|--|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |        |     |     |  |  |  | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |        |     |     |  |  |  | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin | ExcMax | K12 | K37 |  |  |  |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    | 15.0   | 1   | 1   |  |  |  |          |         |              |  |          |          |       |       |       |       |
| Fundacao       |  |           |  |        |        |     |     |  |  |  |          |         |              |  |          |          |       |       |       |       |

PILAR:P45

num. 45  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

[illegible]

## VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |  |           |  |        |  |        |  |     |     |          |         |              |  |          |          |       |       |       |       |
|----------------|--|-----------|--|--------|--|--------|--|-----|-----|----------|---------|--------------|--|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] |  |           |  |        |  |        |  |     |     | fck[MPa] | GamaAço | GamaConcreto |  | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | GmavM |
| 2.5            |  |           |  |        |  |        |  |     |     | 25.0     | 1.15    | 1.40         |  | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        |  | ClasseAço |  | ExcMin |  | ExcMax |  | K12 | K37 |          |         |              |  |          |          |       |       |       |       |
| 50             |  | B         |  | 2.0    |  | 15.0   |  | 1   | 1   |          |         |              |  |          |          |       |       |       |       |

[illegible]





[illegible]

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |             |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40 1.40   |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |             |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |             |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |             |

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PILAR:P48

num. 48  
Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |      |       |           |   |     |      |     |      |    |     |     |
|----------|------|-------|-----------|---|-----|------|-----|------|----|-----|-----|
| 2o Andar |      |       |           |   |     |      |     |      |    |     |     |
| L 2      | 11.2 | 59.8  | .0        | T | -4. | -4.  | -4. | -4.  | 0. | 0.  | 0.  |
| 0.       | 0.   | 0.    | 11. 1.250 |   |     |      |     |      |    |     |     |
| L 2      | 11.2 | -59.8 | .0        | M | 18. | -41. | 18. | -41. | 0. | 35. | 37. |
| 10.      | 0.   | 0.    | 11. 1.250 |   |     |      |     |      |    |     |     |
| L 2      | 11.2 | .0    | 34.7      | B | 18. | -50. | 18. | -50. | 0. | 0.  | 0.  |
| 0.       | 0.   | 0.    | 11. 1.250 |   |     |      |     |      |    |     |     |
| L 2      | 11.2 | .0    | -34.7     | T | -4. | -4.  | -4. | -4.  | 0. | 0.  | 0.  |
| 0.       | 0.   | 0.    | 11. 1.250 |   |     |      |     |      |    |     |     |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

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|        |      |       |           |   |      |     |      |     |    |     |    |
|--------|------|-------|-----------|---|------|-----|------|-----|----|-----|----|
| TERREO |      |       |           |   |      |     |      |     |    |     |    |
| L 1    | 16.8 | .0    | .0        | B | 0.   | 0.  | 0.   | 0.  | 0. | 0.  | 0. |
| 0.     | 0.   | 0.    | 17. 1.250 |   |      |     |      |     |    |     |    |
| L 1    | 16.8 | 32.3  | .0        | M | -19. | 56. | -19. | 56. | 0. | 69. | 0. |
| 0.     | 0.   | 0.    | 17. 1.250 |   |      |     |      |     |    |     |    |
| L 1    | 16.8 | -57.6 | .0        | T | -49. | 66. | -49. | 66. | 0. | 0.  | 0. |
| 0.     | -49. | 66.   | 17. 1.250 |   |      |     |      |     |    |     |    |
| L 1    | 16.8 | .0    | 40.4      | T | -49. | 66. | -49. | 66. | 0. | 0.  | 0. |
| 0.     | 0.   | 0.    | 17. 1.250 |   |      |     |      |     |    |     |    |
| L 1    | 16.8 | .0    | -40.4     | M | -19. | 56. | -19. | 56. | 0. | 69. | 0. |
| 0.     | 0.   | 0.    | 17. 1.250 |   |      |     |      |     |    |     |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |          |         |              |          |          |       |       |       |       |  |
|--|----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |

|          |           |        |        |      |     |      |      |      |      |
|----------|-----------|--------|--------|------|-----|------|------|------|------|
| 2.5      | 25.0      | 1.15   | 1.40   | 8.00 | .50 | 1.75 | 1.75 | 1.40 | 1.40 |
| TipoAço  | ClasseAço | ExcMin | ExcMax | K12  | K37 |      |      |      |      |
| 50       | B         | 2.0    | 15.0   | 1    | 1   |      |      |      |      |
| Fundacao |           |        |        |      |     |      |      |      |      |

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PILAR:P49

num. 49  
Calculo

Valores Intermediarios de

|      |         |             |             |      |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....    | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |         |              |          |          |       |       |       |       |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |

|        |       |       |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TERREO | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....  | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |         |              |          |          |       |       |       |       |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |

Fundacao

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PILAR:P50

num. 50  
Calculo

Valores Intermediarios de

|      |         |             |             |      |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|  |           |         |              |          |          |       |       |       |       |     |     |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|-----|-----|
| 3o Andar .....                               |           |         |              |          |          |       |       |       |       |     |     |
| L 3  | 4.4       | 21.3    | .0           |          | B        | 19.   | -30.  | 19.   | -30.  | 0.  | 0.  |
| 0.   | 19.       | -30.    | 4. 1.250     |          |          |       |       |       |       |     |     |
| L 3  | 4.4       | -45.8   | .0           |          | T        | -45.  | -23.  | -45.  | -23.  | 0.  | 0.  |
| 0.   | -45.      | -23.    | 4. 1.250     |          |          |       |       |       |       |     |     |
| L 3  | 4.4       | .0      | 12.0         |          | B        | 19.   | -28.  | 19.   | -28.  | 0.  | 0.  |
| 0.   | 0.        | 0.      | 4. 1.250     |          |          |       |       |       |       |     |     |
| L 3  | 4.4       | .0      | -12.0        |          | T        | -45.  | -23.  | -45.  | -23.  | 0.  | 0.  |
| 0.   | 0.        | 0.      | 4. 1.250     |          |          |       |       |       |       |     |     |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |     |     |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |     |     |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |     |     |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |     |     |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |     |     |
| 2o Andar .....                               |           |         |              |          |          |       |       |       |       |     |     |
| L 2  | 5.8       | 27.1    | .0           |          | T        | 18.   | -37.  | 18.   | -37.  | 0.  | 0.  |
| 0.   | 0.        | 0.      | 6. 1.250     |          |          |       |       |       |       |     |     |
| L 2  | 5.8       | -27.1   | .0           |          | M        | 10.   | -20.  | 10.   | -20.  | 0.  | 51. |
| 0.   | 0.        | 0.      | 6. 1.250     |          |          |       |       |       |       | 15. |     |
| L 2  | 5.7       | 25.9    | .0           |          | M        | 10.   | -20.  | 10.   | -20.  | 78. | 51. |
| 0.   | 25.       | -20.    | 6. 1.250     |          |          |       |       |       |       | 15. |     |
| L 2  | 5.7       | -15.3   | .0           |          | B        | -13.  | 21.   | -13.  | 21.   | 0.  | 0.  |
| 0.   | -13.      | 21.     | 6. 1.250     |          |          |       |       |       |       |     |     |
| L 2  | 5.8       | .0      | 15.6         |          | B        | -13.  | 21.   | -13.  | 21.   | 0.  | 0.  |
| 0.   | 0.        | 0.      | 6. 1.250     |          |          |       |       |       |       |     |     |
| L 2  | 5.8       | .0      | -15.6        |          | T        | 18.   | -37.  | 18.   | -37.  | 0.  | 0.  |
| 0.   | 0.        | 0.      | 6. 1.250     |          |          |       |       |       |       |     |     |
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |     |     |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |     |     |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |     |     |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |     |     |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |     |     |
| TERREO .....                                 |           |         |              |          |          |       |       |       |       |     |     |
| L 1  | 8.0       | .0      | .0           |          | B        | 0.    | 0.    | 0.    | 0.    | 0.  | 0.  |
| 0.   | 0.        | 0.      | 8. 1.250     |          |          |       |       |       |       |     |     |
| L 1  | 8.0       | 15.3    | .0           |          | M        | 10.   | -9.   | 10.   | -9.   | 0.  | 35. |
| 0.   | 0.        | 0.      | 8. 1.250     |          |          |       |       |       |       | 0.  |     |
| L 1  | 8.0       | -15.3   | .0           |          | B        | 0.    | 0.    | 0.    | 0.    | 0.  | 0.  |
| 0.   | 0.        | 0.      | 8. 1.250     |          |          |       |       |       |       |     |     |
| L 1  | 7.9       | 12.2    | .0           |          | T        | 10.   | -21.  | 10.   | -21.  | 0.  | 0.  |
| 0.   | 10.       | -21.    | 8. 1.250     |          |          |       |       |       |       |     |     |
| L 1  | 8.0       | .0      | 21.6         |          | T        | 10.   | -21.  | 10.   | -21.  | 0.  | 0.  |
| 0.   | 0.        | 0.      | 8. 1.250     |          |          |       |       |       |       |     |     |
| L 1  | 8.0       | .0      | -21.6        |          | M        | 10.   | -9.   | 10.   | -9.   | 0.  | 35. |
| 0.   | 0.        | 0.      | 8. 1.250     |          |          |       |       |       |       | 0.  |     |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |       |       |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |       |       |

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PILAR:P51

num. 51 Valores Intermediarios de

Calculo

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 3o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....    | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 3 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|          |       |       |       |       |       |       |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....    | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 2 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|        |       |       |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TERREO | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| .....  | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

L 1 \*\*\* MÉTODO GERAL: ESFORÇOS PÓRTICO ESPACIAL \*\*\*

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.40  | 1.40  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |

|          |           |        |        |      |      |     |      |      |      |      |
|----------|-----------|--------|--------|------|------|-----|------|------|------|------|
|          | 2.5       | 25.0   | 1.15   | 1.40 | 8.00 | .50 | 1.40 | 1.40 | 1.40 | 1.40 |
| TipoAço  | ClasseAço | ExcMin | ExcMax | K12  | K37  |     |      |      |      |      |
| 50       | B         | 2.0    | 15.0   | 1    | 1    |     |      |      |      |      |
| Fundacao |           |        |        |      |      |     |      |      |      |      |
| .....    |           |        |        |      |      |     |      |      |      |      |
| .....    |           |        |        |      |      |     |      |      |      |      |

PILAR:P52

num. 52  
Calculo

Valores Intermediarios de

|      |         |             |             |      |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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|          |       |       |          |       |       |       |       |       |       |       |
|----------|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|
| 3o Andar | ..... | ..... | .....    | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| L 3      | 7.3   | 29.1  | .0       | B     | 29.   | 11.   | 29.   | 11.   | 0.    | 0.    |
| 0.       | 29.   | 11.   | 7. 1.250 |       |       |       |       |       |       | 0.    |
| L 3      | 7.3   | -69.3 | .0       | T     | -67.  | -46.  | -67.  | -46.  | 0.    | 0.    |
| 0.       | -67.  | -46.  | 7. 1.250 |       |       |       |       |       |       | 0.    |
| L 3      | 7.3   | .0    | 19.7     | B     | 29.   | 11.   | 29.   | 11.   | 0.    | 0.    |
| 0.       | 0.    | 0.    | 7. 1.250 |       |       |       |       |       |       | 0.    |
| L 3      | 7.3   | .0    | -19.7    | T     | -67.  | -46.  | -67.  | -46.  | 0.    | 0.    |
| 0.       | 0.    | 0.    | 7. 1.250 |       |       |       |       |       |       | 0.    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |         |              |          |          |       |       |       |       |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |

|          |       |       |          |       |       |       |       |       |       |
|----------|-------|-------|----------|-------|-------|-------|-------|-------|-------|
| 2o Andar | ..... | ..... | .....    | ..... | ..... | ..... | ..... | ..... | ..... |
| L 2      | 8.6   | 40.3  | .0       | T     | 9.    | -9.   | 9.    | -9.   | 0.    |
| 0.       | 0.    | 0.    | 9. 1.250 |       |       |       |       |       | 0.    |
| L 2      | 8.6   | -40.3 | .0       | M     | 9.    | -9.   | 9.    | -9.   | 0.    |
| 0.       | 0.    | 0.    | 9. 1.250 |       |       |       |       |       | 35.   |
| L 2      | 8.6   | .0    | 23.2     | B     | 9.    | 9.    | 9.    | 9.    | 0.    |
| 0.       | 0.    | 0.    | 9. 1.250 |       |       |       |       |       | 0.    |
| L 2      | 8.6   | .0    | -23.2    | T     | 9.    | -9.   | 9.    | -9.   | 0.    |
| 0.       | 0.    | 0.    | 9. 1.250 |       |       |       |       |       | 0.    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |           |         |              |          |          |       |       |       |       |
|----------------|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço        | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |
| 50             | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |

|        |      |       |           |  |   |      |      |      |      |    |     |
|--------|------|-------|-----------|--|---|------|------|------|------|----|-----|
| TERREO |      |       |           |  |   |      |      |      |      |    |     |
| L 1    | 12.0 | .0    | .0        |  | B | 0.   | 0.   | 0.   | 0.   | 0. | 0.  |
| 0.     | 0.   | 0.    | 12. 1.250 |  |   |      |      |      |      |    |     |
| L 1    | 12.0 | 23.1  | .0        |  | M | -17. | -16. | -17. | -16. | 0. | 70. |
| 0.     | 0.   | 0.    | 12. 1.250 |  |   |      |      |      |      |    | 0.  |
| L 1    | 12.0 | -41.9 | .0        |  | T | -41. | -16. | -41. | -16. | 0. | 0.  |
| 0.     | -41. | -16.  | 12. 1.250 |  |   |      |      |      |      |    | 0.  |
| L 1    | 12.0 | .0    | 32.4      |  | T | -41. | -16. | -41. | -16. | 0. | 0.  |
| 0.     | 0.   | 0.    | 12. 1.250 |  |   |      |      |      |      |    | 0.  |
| L 1    | 12.0 | .0    | -32.4     |  | M | -17. | -16. | -17. | -16. | 0. | 70. |
| 0.     | 0.   | 0.    | 12. 1.250 |  |   |      |      |      |      |    | 0.  |

|  |           |         |              |          |          |       |       |       |       |  |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|--|
| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |  |
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |  |
| Fundacao                                     |           |         |              |          |          |       |       |       |       |  |  |

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#### LEGENDA

Seção : Dimensões da seção tansversal (seção retangular)  
Nome da seção (seção qualquer)

Área : Área de concreto da seção transversal

NFer : Número de ferros

PDD : Pé-Direito Duplo (direções "x" e "y")  
S: Sim N: Não

As : Área total de armadura utilizada

Taxa : Taxa de Armadura da seção

Estr : Bitola do estribo

C/ : Espaçamento do estribo

fck : fck utilizado no lance

Cobr : Cobrimento utilizado no lance

PP : Pilar-Parede: (S) Sim (N)Não

PP : S\* :Pilar-Parede (Sim), mas Ast não atende o item 18.5 da NBR6118:2003

T : Tensão de Cálculo (Carga Vertical: Combinação 1 CAD/PILAR) (kgf/cm2)

Lbd : Índice de Esbeltez (Maior Lambda)

Ni : Força Normal Admensional (Nsd / Ac\*Fcd) (Carga Vertical: Combinação 1 CAD/PILAR)

2OrdM : Método utilizado cálculo momento 2ªOrdem

ELOL : Efeito Local (15.8.3)

ELZD : Efeito Localizado (15.9.3)



KAPA : Pilar Padrão com Rigidez Kapa Aproximada (15.8.3.3.3)  
 CURV : Pilar Padrão com Curvatura Aproximada (15.8.3.3.2)  
 N,M,1/R : Pilar Padrão Acoplado ao Diagrama N,M,1/r (15.8.3.3.4)  
 MetGerl : Método Geral (15.8.3.2)

\*\*\*\* PROJETO 1 \*\*\*\*

PILAR:P1

num: 1 Lances: 1 à 3

| Lance<br>T | Título<br>Lbd Ni 2OrdM  | Seção<br>[cm] | Área<br>[cm2] | NFer | Bitola<br>[mm] | PDD<br>x y | As<br>[cm2] | Taxa<br>[%] | Estr<br>[mm] | C/<br>[cm] | PP | fck<br>(MPa) | Cobr<br>(cm) |
|------------|-------------------------|---------------|---------------|------|----------------|------------|-------------|-------------|--------------|------------|----|--------------|--------------|
| 3          | 3o Andar                | 19.x 40.      | 760.0         | 6    | 10.0           | N N        | 4.7         | .62         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 8.3        | 104. .0464 ELOL N,M,1/r |               |               |      |                |            |             |             |              |            |    |              |              |
| 2          | 2o Andar                | 19.x 40.      | 760.0         | 6    | 10.0           | N S        | 4.7         | .62         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 10.3       | 104. .0577 ELOL N,M,1/r |               |               |      |                |            |             |             |              |            |    |              |              |
| 1          | TERREO                  | 19.x 40.      | 760.0         | 6    | 10.0           | N S        | 4.7         | .62         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 15.7       | 104. .0879 ELOL N,M,1/r |               |               |      |                |            |             |             |              |            |    |              |              |

PILAR:P2

num: 2 Lances: 1 à 3

| Lance<br>T | Título<br>Lbd Ni 2OrdM  | Seção<br>[cm] | Área<br>[cm2] | NFer | Bitola<br>[mm] | PDD<br>x y | As<br>[cm2] | Taxa<br>[%] | Estr<br>[mm] | C/<br>[cm] | PP | fck<br>(MPa) | Cobr<br>(cm) |
|------------|-------------------------|---------------|---------------|------|----------------|------------|-------------|-------------|--------------|------------|----|--------------|--------------|
| 3          | 3o Andar                | 19.x 40.      | 760.0         | 6    | 10.0           | N N        | 4.7         | .62         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 4.5        | 104. .0250 ELOL N,M,1/r |               |               |      |                |            |             |             |              |            |    |              |              |
| 2          | 2o Andar                | 19.x 40.      | 760.0         | 6    | 10.0           | N S        | 4.7         | .62         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 6.3        | 104. .0353 ELOL N,M,1/r |               |               |      |                |            |             |             |              |            |    |              |              |
| 1          | TERREO                  | 19.x 40.      | 760.0         | 6    | 10.0           | N S        | 4.7         | .62         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 10.1       | 104. .0567 ELOL N,M,1/r |               |               |      |                |            |             |             |              |            |    |              |              |

PILAR:P3

num: 3 Lances: 1 à 3

| Lance<br>T | Título<br>Lbd Ni 2OrdM | Seção<br>[cm] | Área<br>[cm2] | NFer | Bitola<br>[mm] | PDD<br>x y | As<br>[cm2] | Taxa<br>[%] | Estr<br>[mm] | C/<br>[cm] | PP | fck<br>(MPa) | Cobr<br>(cm) |
|------------|------------------------|---------------|---------------|------|----------------|------------|-------------|-------------|--------------|------------|----|--------------|--------------|
| 3          | 3o Andar               | 14.x 40.      | 560.0         | 6    | 10.0           | N N        | 4.7         | .84         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 11.7       | 37. .0655 ELOL KAPA    |               |               |      |                |            |             |             |              |            |    |              |              |
| 2          | 2o Andar               | 14.x 40.      | 560.0         | 6    | 10.0           | N N        | 4.7         | .84         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 14.1       | 78. .0792 ELOL KAPA    |               |               |      |                |            |             |             |              |            |    |              |              |
| 1          | TERREO                 | 14.x 40.      | 560.0         | 6    | 10.0           | N N        | 4.7         | .84         | 5.0          | 12.0       | N  | 25.0         | 2.5          |
| 20.0       | 22. .1121 ----         |               |               |      |                |            |             |             |              |            |    |              |              |

PILAR:P4

num: 4 Lances: 1 à 3

PILAR:P5  
num: 5 Lances: 1 à 3

PILAR:P6  
num: 6 Lances: 1 à 2

PILAR:P7  
num: 7 Lances: 1 à 2

PILAR:P8  
num: 8 Lances: 1 à 3

| Lance<br>T | Título<br>Lbd | Ni       | 2OrdM     | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|------------|---------------|----------|-----------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
|            |               |          |           | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 31.2       | 3             | 3o Andar | 41. .1749 | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 37.4       | 2             | 2o Andar | 78. .2097 | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 48.0       | 1             | TERREO   | 22. .2689 | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |

PILAR:P9

num: 9 Lances: 1 à 2

| Lance<br>T | Título<br>Lbd | Ni       | 2OrdM     | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|------------|---------------|----------|-----------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
|            |               |          |           | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 33.9       | 2             | 2o Andar | 82. .1896 | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 57.9       | 1             | TERREO   | 22. .3240 | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |

PILAR:P10

num: 10 Lances: 1 à 2

| Lance<br>T | Título<br>Lbd | Ni       | 2OrdM      | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|------------|---------------|----------|------------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
|            |               |          |            | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 16.4       | 2             | 2o Andar | 104. .0920 | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 35.1       | 1             | TERREO   | 104. .1968 | 14.x 30. | 420.0 | 4    | 10.0   | N S | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |

PILAR:P11

num: 11 Lances: 1 à 2

| Lance<br>T | Título<br>Lbd | Ni       | 2OrdM     | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|------------|---------------|----------|-----------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
|            |               |          |           | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 27.7       | 2             | 2o Andar | 78. .1550 | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 48.1       | 1             | TERREO   | 22. .2696 | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |

PILAR:P12

num: 12 Lances: 1 à 2

| Lance<br>T | Título<br>Lbd | Ni | 2OrdM | Seção | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|------------|---------------|----|-------|-------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
|            |               |    |       | [cm]  | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |

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PILAR:P13  
num: 13 Lances: 1 à 2

PILAR:P14  
num: 14 Lances: 1 à 2

PILAR:P15  
num: 15 Lances: 1 à 3

PILAR:P16  
num: 16 Lances: 1 à 2

[illegible]

num: 17 Lances: 1 à 2

| Lance     | Título   |       | Seção                           | Área  | NFcr | Bitola | PDD | As    | Taxa | Estr. | C/ PP  | fck   | Cobr |
|-----------|----------|-------|---------------------------------|-------|------|--------|-----|-------|------|-------|--------|-------|------|
| T Lbd     | Ni       | 2OrdM |                                 |       |      |        |     |       |      |       |        |       |      |
|           |          |       | [cm]                            | [cm²] |      | [mm]   | x y | [cm²] | [%]  | [mm]  | [cm]   | (MPa) | (cm) |
| 2<br>17.4 | 2o Andar |       | 14.x 30.<br>85. .0972 ELOL KAPA | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0   | 12.0 N | 25.0  | 2.5  |
| 1<br>28.6 | TERREO   |       | 14.x 30.<br>22. .1603 ----      | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0   | 12.0 N | 25.0  | 2.5  |

num: 18 Lances: 1 à 2

[illegible]

num: 19 Lances: 1 à 2

| Lance     | Título                          |       | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/ PP  | fck   | Cobr |
|-----------|---------------------------------|-------|----------|-------|------|--------|-----|-------|------|------|--------|-------|------|
| T Lbd     | Ni                              | 2OrdM |          |       |      |        |     |       |      |      |        |       |      |
|           |                                 |       | [cm]     | [cm²] |      | [mm]   | x y | [cm²] | [%]  | [mm] | [cm]   | (MPa) | (cm) |
| 2<br>21.5 | 2o Andar<br>78. .1207 ELOL KAPA |       | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 N | 25.0  | 2.5  |
| 1<br>35.2 | TERREO<br>22. .1974 ----        |       | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 N | 25.0  | 2.5  |

num: 20 Lances: 1 à 2

[illegible]

num: 21 Lances: 1 à 3

| Lance | Título              | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|-------|---------------------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
| T Lbd | Ni 2OrdM            |          |       |      |        |     |       |      |      |      |    |       |      |
|       |                     | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 3     | 3o Andar            | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 22.2  | 37. .1244 ----      |          |       |      |        |     |       |      |      |      |    |       |      |
| 2     | 2o Andar            | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 31.8  | 78. .1778 ELOL KAPA |          |       |      |        |     |       |      |      |      |    |       |      |
| 1     | TERREO              | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 48.0  | 22. .2686 ----      |          |       |      |        |     |       |      |      |      |    |       |      |

PILAR:P22

num: 22 Lances: 1 à 3

| Lance | Título                  | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|-------|-------------------------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
| T Lbd | Ni 2OrdM                |          |       |      |        |     |       |      |      |      |    |       |      |
|       |                         | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 3     | 3o Andar                | 19.x 40. | 760.0 | 6    | 10.0   | N N | 4.7   | .62  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 5.0   | 104. .0280 ELOL N,M,1/r |          |       |      |        |     |       |      |      |      |    |       |      |
| 2     | 2o Andar                | 19.x 40. | 760.0 | 6    | 10.0   | N S | 4.7   | .62  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 6.9   | 104. .0388 ELOL N,M,1/r |          |       |      |        |     |       |      |      |      |    |       |      |
| 1     | TERREO                  | 19.x 40. | 760.0 | 6    | 10.0   | N S | 4.7   | .62  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 11.9  | 104. .0669 ELOL N,M,1/r |          |       |      |        |     |       |      |      |      |    |       |      |

PILAR:P23

num: 23 Lances: 1 à 3

| Lance | Título              | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|-------|---------------------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
| T Lbd | Ni 2OrdM            |          |       |      |        |     |       |      |      |      |    |       |      |
|       |                     | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 3     | 3o Andar            | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 13.7  | 37. .0766 ELOL KAPA |          |       |      |        |     |       |      |      |      |    |       |      |
| 2     | 2o Andar            | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 16.2  | 78. .0908 ELOL KAPA |          |       |      |        |     |       |      |      |      |    |       |      |
| 1     | TERREO              | 14.x 40. | 560.0 | 6    | 10.0   | N N | 4.7   | .84  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 24.1  | 22. .1349 ----      |          |       |      |        |     |       |      |      |      |    |       |      |

PILAR:P24

num: 24 Lances: 1 à 2

| Lance | Título                  | Seção    | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|-------|-------------------------|----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
| T Lbd | Ni 2OrdM                |          |       |      |        |     |       |      |      |      |    |       |      |
|       |                         | [cm]     | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 2     | 2o Andar                | 14.x 30. | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 15.2  | 104. .0850 ELOL N,M,1/r |          |       |      |        |     |       |      |      |      |    |       |      |
| 1     | TERREO                  | 14.x 30. | 420.0 | 4    | 10.0   | N S | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 29.2  | 104. .1634 ELOL N,M,1/r |          |       |      |        |     |       |      |      |      |    |       |      |

PILAR:P25

num: 25 Lances: 1 à 2

PILAR:P26  
num: 26 Lances: 1 à 2

PILAR:P27  
num: 27 Lances: 1 à 2

PILAR:P28  
num: 28 Lances: 1 à 2

PILAR:P29  
num: 29 Lances: 1 à 3

[illegible]

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PILAR:P30  
num: 30 Lances: 1 à 3

PILAR:P31  
num: 31 Lances: 1 à 3

PILAR:P32  
num: 32 Lances: 1 à 2

PILAR:P33  
num: 33 Lances: 1 à 2

[illegible]



PILAR:P34  
num: 34 Lances: 1 à 2

[illegible]

PILAR:P35  
num: 35 Lances: 1 à 2

[illegible]

PILAR:P36  
num: 36 Lances: 1 à 2

[illegible]

PILAR:P37  
num: 37 Lances: 1 à 2

| Lance     | Título   |       |  | Seção                 | Área               | NFer | Bitola | PDD | As                 | Taxa | Estr. | C/ PP  | fck   | Cobr |
|-----------|----------|-------|--|-----------------------|--------------------|------|--------|-----|--------------------|------|-------|--------|-------|------|
| T Lbd     | Ni       | 2OrdM |  | [cm]                  | [cm <sup>2</sup> ] |      | [mm]   | x y | [cm <sup>2</sup> ] | [%]  | [mm]  | [cm]   | (MPa) | (cm) |
| 2<br>18.9 | 2o Andar |       |  | 14.x 30.<br>ELOL KAPA | 420.0              | 4    | 10.0   | N N | 3.1                | .75  | 5.0   | 12.0 N | 25.0  | 2.5  |
| 1<br>32.4 | TERREO   |       |  | 14.x 30.<br>----      | 420.0              | 4    | 10.0   | N N | 3.1                | .75  | 5.0   | 12.0 N | 25.0  | 2.5  |

PILAR:P38  
num: 38 Lances: 1 à 2

PILAR:P39  
num: 39 Lances: 1 à 2

PILAR:P40  
num: 40 Lances: 1 à 2

PILAR:P41  
num: 41 Lances: 1 à 3

PILAR:P42  
num: 42 Lances: 1 à 3

[illegible]

## FL 131/297

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num: 43 Lances: 1 à 2

---

num: 44 Lances: 1 à 2

---

num: 45 Lances: 1 à 2

num: 46 Lances: 1 à 2

[illegible]

num: 47 Lances: 1 à 2

[illegible]

num: 48 Lances: 1 à 2

```

1  TERREO      14.x  30.      420.0    4    10.0  N N      3.1    .75    5.0  12.0 N  25.0    2.5
40.0  22.  .2243 ----

```

num: 49 Lances: 1 à 2

```

1  TERREO          14.x 30.      420.0    4    10.0  N S      3.1   .75   5.0  12.0 N  25.0    2.5
15.1 107. .0846 ELOL N.M.1/r

```

num: 50 Lances: 1 à 3

[illegible]

num: 51 Lances: 1 à 3

[illegible]

num: 52 Lances: 1 à 3

[illegible]

## Pavimento Térreo

R E L G E R - Relatorio geral de vigas

MACEIO 57035-690 AL

08:49:48

$f_{ck}=250 \text{ kgf/cm}^2$  - Aco: CA-60B CA-50A

- Esforços

## Característicos

## LEGENDA

G E O M E T R I A

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :  
Repeticoes

Nand : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :  
Fator de Alternancia de Cargas

Cob : Cobrimento / TpS : Tipo da Secao / BCs :  
Mesa Colaborante Superior

BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :  
Espessura Laje Inferior

FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S :  
Cobrim/Cobr.superior adicional

C A R G A S

MEsq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q :  
Cortante Adicional (valor unico)

A R M A D U R A S - F L E X A O

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS :  
Secao Te Armadura Simples

STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx :  
Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :  
Armadura e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :  
Armad.transv.minima-cisalhamento

Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :  
Espacamento selecionado

NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus :  
Armadura transversal-Suspensao

A R M A D U R A S - T O R C A O

%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de  
torcao

b-nuc : Largura do nucleo / h-nuc : Altura do nucleo

Asw-lR : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-  
torcao p/NR estribos selecionado

Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal  
de torcao no lado h

ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao  
plastica no vao - S[sim] N[nao]

R E A C O E S D E A P O I O

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre /  
segue / vigas

M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

=====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= 2.23 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 1.57 tf\* m | As = 1.47 -SRAS- [ 2 B 10.0mm] |  
Flecha = .8

BAL.ESQ | x/d = .10 | AsL= .00 - |  
Flecha Adm.= 1.5

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 195. 2.14 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.93 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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.= 175 | M.[-]  
= .4 tf\* m

[tf,cm]| As = 1.47 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .10 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
|

| Fle.Adm.= 1.0 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .21 |  
Asapo[+]= .80

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.- 269. 1.68 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 2.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .2 tf\* m - Abcis.= 121 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| Fle.Adm.= .7 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80  
Asapo[+]= .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.- 181. 1.27 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 2.721 2.719 .40 .08 0 P1 .00 .00 1 0  
0 0 2 1.870 1.867 .40 .08 0 P2 .00 .00 2 0  
0 0 3 .586 .585 .14 .00 0 P3 .00 .00 3 0

Viga= 2 V2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 2.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf\* m - Abcis.= 203 | M.[-]  
= 1.1 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
1.00 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .07  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37  
| Fle.Adm.= .7 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .28  
Asapo[+]= .80

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. 1.89 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.98 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---



- - - - - 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.[-] = 1.1 tf\* m | M.[+] Max= .6 tf\* m - Abcis.= 202 | M.[-]  
= .7 tf\* m

[tf,cm]| As = .98 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .07 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37

| | Fle.Adm.= 1.3 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80 | |  
Asapo[+]= .80

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.- 374. 2.23 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 2.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .2 tf\* m - Abcis.= 135 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.14 -SRAS- [ 2 B 6.3mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| | Fle.Adm.= .7 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80 | |  
Asapo[+]= .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.- 181. 1.50 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

|   |   |   |       |       |     |     |   |     |     |     |   |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|---|---|
| 0 | 0 | 1 | .148  | .147  | .14 | .00 | 2 | V13 | .00 | .00 | 0 | 0 |
| 0 | 0 | 2 | 2.906 | 2.904 | .30 | .03 | 0 | P6  | .00 | .00 | 6 | 0 |
| 0 | 0 | 3 | 2.427 | 2.424 | .30 | .03 | 0 | P7  | .00 | .00 | 7 | 0 |
| 0 | 0 | 4 | .428  | .426  | .14 | .00 | 0 | P8  | .00 | .00 | 8 | 0 |

=====

Viga= 3 V3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= 1.61 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 2.76 tf\* m | As = 2.79 -SRAS- [ 4 B 10.0mm] |  
Flecha = .7

BAL.ESQ | x/d = .21 | AsL= .00 - |  
Flecha Adm.= 1.1

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
Baric.Armad.= 5

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.- 143. 3.38 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 1.3

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.42 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= .7 tf\* m - Abcis.= 229 | M.[-]  
= 1.0 tf\* m

[tf,cm] | As = 2.79 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.96 -SRAS- [ 2 B 10.0mm]

| AsL= .00 ----- x/d = .21 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .07

| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |

| Fle.Adm.= 1.1 |

[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .21  
Asapo[+]= .80

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.- 318. 2.93 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.74 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.4 tf\* m | M.[+] Max= .9 tf\* m - Abcis.= 158 | M.[-]  
= 1.0 tf\* m  
[tf,cm]| As = 1.34 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.95 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .10 | As = .87 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .07  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.2 |  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80  
Asapo[+]= .80

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.- 350. 3.30 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 4.44 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.2 tf\* m | M.[+] Max= .7 tf\* m - Abcis.= 225 | M.[-]  
= 1.1 tf\* m  
[tf,cm]| As = 1.11 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.98 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .08 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .07  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.5 |

|                     |      |           |      |     |
|---------------------|------|-----------|------|-----|
| [tf,cm]   M[-]Min = | 70.4 | M[+]Min = | 70.4 | M[- |
| Min =               | 70.4 |           |      |     |
| [cm2 ]   Asapo[+]=  | .80  |           |      |     |
| Asapo[+]=           | .80  |           |      |     |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 420. | 2.38 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----

Vao= 5 /L= 3.36 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.3 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 173   | M.[-]                 |
|                            | 1.2 tf* m         |                                      |                       |
| [tf,cm]   As = 1.20 -SRAS- | [ 2 B 10.0mm]     | AsL= .00 ----- Flecha= .1            | As =                  |
| 1.08 -SRAS-                | [ 2 B 10.0mm]     |                                      |                       |
| AsL= .00 -----             | x/d = .09         | As = 1.06 -SRAS-                     | [ 2 B 10.0mm ]   AsL= |
| .00 -----                  | x/d = .08         |                                      |                       |
|                            | x/dMx= .37        | Arm.Lat.=[2 X -- B --- mm] - LN= 2.7 |                       |
| x/dMx= .37                 |                   |                                      |                       |
|                            |                   | Fle.Adm.= 1.1                        |                       |
| [tf,cm]   M[-]Min = 70.4   |                   | M[+]Min = 70.4                       | M[-                   |
| Min = 70.4                 |                   |                                      |                       |
| [cm2 ]   Asapo[+]= .80     |                   |                                      |                       |
| Asapo[+]= .80              |                   |                                      |                       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 312. | 2.96 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | 1.0   |

----- G E O M E T R I A E C A R G A S -----

Vao= 6 /L= 4.37 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.7 tf* m | M.[+] Max= .9 tf* m - Abcis.= 222 | M.[-]                |
|                            | .7 tf* m          |                                   |                      |
| [tf,cm]   As = 1.62 -SRAS- | [ 2 B 10.0mm]     | AsL= .00 ----- Flecha= .1         | As =                 |
| .84 -SRAS-                 | [ 2 B 8.0mm]      |                                   |                      |
| AsL= .00 -----             | x/d = .12         | As = .84 -SRAS-                   | [ 2 B 8.0mm ]   AsL= |
| .00 -----                  | x/d = .05         |                                   |                      |

x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 | Fle.Adm.= 1.5 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4 |  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 413. 3.32 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

| REAC. | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0    | 1   | 4.221   | 4.219   | .30     | .03   | 0     | P9   | .00    | .00    | 9  | 0 |
| 0     | 0    | 2   | 4.382   | 4.379   | .30     | .03   | 0     | P10  | .00    | .00    | 10 | 0 |
| 0     | 0    | 3   | 3.370   | 3.369   | .30     | .03   | 0     | P11  | .00    | .00    | 11 | 0 |
| 0     | 0    | 4   | 3.692   | 3.691   | .30     | .03   | 0     | P12  | .00    | .00    | 12 | 0 |
| 0     | 0    | 5   | 4.345   | 4.344   | .40     | .08   | 0     | P13  | .00    | .00    | 13 | 0 |
| 0     | 0    | 6   | 1.547   | 1.547   | .30     | .03   | 0     | P14  | .00    | .00    | 14 | 0 |

Viga= 4 V4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.1 tf\* m - Abcis.= 150 | M.[-]  
 = .3 tf\* m  
 [tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .00 | As = 1.04 -SRAS- [ 2 B 10.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.7 |  
 | Fle.Adm.= 1.0 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .84 |  
 Asapo[+]= .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.- 286. 2.17 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.297 1.297 .14 .00 2 V30 .00 .00 0 0  
0 0 2 1.550 1.550 .14 .00 0 P17 .00 .00 17 0

Viga= 5 V5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /Nand= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 4.44 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.5 tf\* m | M.[+] Max= 1.7 tf\* m - Abcis.= 223 | M.[-]  
= 1.7 tf\* m  
[tf,cm] | As = 1.44 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .3 | As =  
1.62 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .10 | As = 1.59 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .12  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 4.1 |  
x/dMx= .37  
| Fle.Adm.= 1.5 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .40 |  
Asapo[+]= .80

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.- 420. 3.34 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .9

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 2 /L= 3.54 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.1 tf* m                       | M.[+] Max= .4 tf* m - Abcis.= 212    | M.[-] |
| = .4 tf* m                              |                                      |       |
| [tf,cm]  As = 1.04 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1            | As =  |
| .84 -SRAS- [ 2 B 8.0mm]                 |                                      |       |
| AsL= .00 ----- x/d = .07                | As = .84 -SRAS- [ 2 B 8.0mm ]        | AsL=  |
| .00 ----- x/d = .05                     |                                      |       |
| x/dMx= .37                              | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |       |
|   |                                      |       |
| [tf,cm]  M[-]Min = 70.4                 | M[+]Min = 70.4                       | M[-]  |
| ]Min = 70.4                             |                                      |       |
| [cm2 ]  Asapo[+]= .80                   |                                      |       |
| Asapo[+]= .80                           |                                      |       |

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.- 330. 2.17 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf* m - Abcis.= 174    | M.[-] |
| = .5 tf* m                            |                                      |       |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1            | As =  |
| .84 -SRAS- [ 2 B 8.0mm]               |                                      |       |
| AsL= .00 ----- x/d = .05              | As = .84 -SRAS- [ 2 B 8.0mm ]        | AsL=  |
| .00 ----- x/d = .05                   |                                      |       |
| x/dMx= .37                            | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |       |
|                                       |                                      |       |
| [tf,cm]  M[-]Min = 70.4               | M[+]Min = 70.4                       | M[-]  |
| ]Min = 70.4                           |                                      |       |
| [cm2 ]  Asapo[+]= .80                 |                                      |       |
| Asapo[+]= .80                         |                                      |       |

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.- 310. 1.86 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .4 tf\* m - Abcis.= 174 | M.[-]  
 = .4 tf\* m  
 [tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 | | Fle.Adm.= 1.1 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .80 |  
 Asapo[+]= .80

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.- 310. 1.92 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 5 /L= 1.11 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf\* m - Abcis.= 122 | M.[-]  
 = .4 tf\* m  
 [tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 | | Fle.Adm.= .4 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .80 |  
 Asapo[+]= .80

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.- 87. .78 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 6 /L= 3.04 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]



--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .8 tf\* m - Abcis.= 180 | M.[-]  
= 1.2 tf\* m  
[tf,cm]| As = .89 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
1.08 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .06 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .08  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 280. 3.83 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .9

----- G E O M E T R I A E C A R G A S -----  
Vao= 7 /L= 3.63 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.5 tf\* m | M.[+] Max= .9 tf\* m - Abcis.= 153 | M.[-]  
= .9 tf\* m  
[tf,cm]| As = 1.38 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .10 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .06  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 339. 3.42 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 8 /L= 3.45 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .7 tf\* m - Abcis.= 204 | M.[-]  
= 1.3 tf\* m  
[tf,cm]| As = .95 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
1.23 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .07 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .09  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 321. 3.12 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 9 /L= 4.97 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 2.0 tf\* m | M.[+] Max= 1.7 tf\* m - Abcis.= 291 | M.[-]  
= 1.6 tf\* m  
[tf,cm]| As = 1.95 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- Flecha= .3 | As =  
1.49 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .14 | As = 1.55 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .11  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 4.0 |  
| Fle.Adm.= 1.7 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 473. 3.57 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

| REAC.    | APOIO | - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|-------|-------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |       |       |         |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 1     | 2.359   | 2.357   | .30     | .03   | 0     | P19  | .00    | .00    | 19 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 2     | 3.879   | 3.877   | .30     | .03   | 0     | P20  | .00    | .00    | 20 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 3     | 2.401   | 2.398   | .40     | .08   | 0     | P21  | .00    | .00    | 21 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 4     | 2.518   | 2.513   | .40     | .08   | 0     | P22  | .00    | .00    | 22 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 5     | 1.397   | 1.392   | .40     | .08   | 0     | P23  | .00    | .00    | 23 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 6     | 3.245   | 3.239   | .30     | .03   | 0     | P24  | .00    | .00    | 24 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 7     | 4.542   | 4.541   | .30     | .03   | 0     | P25  | .00    | .00    | 25 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 8     | 3.206   | 3.206   | .30     | .03   | 0     | P26  | .00    | .00    | 26 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 9     | 4.539   | 4.538   | .30     | .03   | 0     | P27  | .00    | .00    | 27 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 10    | 2.547   | 2.546   | .30     | .03   | 0     | P28  | .00    | .00    | 28 | 0 |
|          |       | 0     | 0       |         |         |       |       |      |        |        |    |   |

=====

Viga= 6 V6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 170 | M.[-] = .6 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As = .84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= 2.1 |

| Fle.Adm.= 1.1 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]Min = 70.4

[cm2 ]| Asapo[+]= .21 | Asapo[+]= .80

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.- 310. 1.77 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .4 tf\* m - Abcis.= 199 | M.[-]  
= .4 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 310. 1.92 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| 0 0 1             | 1.225   | 1.225   | .40     | .08   | 0     | P29  | .00    | .00    |
| 0 0 2             | 2.593   | 2.592   | .40     | .08   | 0     | P30  | .00    | .00    |
| 0 0 3             | 1.118   | 1.118   | .40     | .08   | 0     | P31  | .00    | .00    |

=====

Viga= 7 V7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.28 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.2 tf\* m | M.[+] Max= 1.2 tf\* m - Abcis.= 251 | M.[-]  
= 1.4 tf\* m

|   |                                      |                                 |
|---|--------------------------------------|---------------------------------|
| [tf,cm]   As = 1.09 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- Flecha= .2            | As = 1.34 -SRAS- [ 2 B 10.0mm ] |
| AsL= .00 ----- x/d = .10                  | As = 1.07 -SRAS- [ 2 B 10.0mm ]      | AsL= .00 ----- x/d = .08        |
| x/dMx= .37                                | Arm.Lat.=[2 X -- B --- mm] - LN= 2.7 |                                 |
|   | Fle.Adm.= 1.4                        |                                 |
| [tf,cm]   M[-]Min = 70.4                  | M[+]Min = 70.4                       | M[-]Min = 70.4                  |
| [cm2 ]   Asapo[+]= .27                    |                                      |                                 |
| Asapo[+]= .80                             |                                      |                                 |

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.- 404. | 3.18 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .6 |
|---------|----------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.79 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.3 tf* m                         | M.[+] Max= .7 tf* m - Abcis.= 224    | M.[-] = 1.1 tf* m               |
| [tf,cm]   As = 1.23 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- Flecha= .1            | As = 1.02 -SRAS- [ 2 B 10.0mm ] |
| AsL= .00 ----- x/d = .07                  | As = .84 -SRAS- [ 2 B 8.0mm ]        | AsL= .00 ----- x/d = .09        |
| x/dMx= .37                                | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |                                 |
|   | Fle.Adm.= 1.3                        |                                 |
| [tf,cm]   M[-]Min = 70.4                  | M[+]Min = 70.4                       | M[-]Min = 70.4                  |
| [cm2 ]   Asapo[+]= .80                    |                                      |                                 |
| Asapo[+]= .80                             |                                      |                                 |

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.- 355. | 3.14 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .7 |
|---------|----------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.79 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] =              | 1.3 tf* m                 | M.[+] Max= | .9 tf* m - Abcis.= 256      | M.[-] |
|           |                      | 1.2 tf* m                 |            |                             |       |
| [tf,cm]   | As =                 | 1.22 -SRAS- [ 2 B 10.0mm] | AsL=       | .00 ----- Flecha= .1        | As =  |
| 1.11      | -SRAS- [ 2 B 10.0mm] |                           |            |                             |       |
|           | AsL=                 | .00 ----- x/d = .09       | As =       | .86 -SRAS- [ 2 B 8.0mm ]    | AsL=  |
| .00       | ----- x/d = .08      |                           |            |                             |       |
|           |                      | x/dMx= .37                | Arm.Lat.=  | [2 X -- B --- mm] - LN= 2.2 |       |
| x/dMx=    | .37                  |                           |            |                             |       |
|           |                      |                           |            | Fle.Adm.= 1.3               |       |
| [tf,cm]   | M[-]Min =            | 70.4                      | M[+]Min =  | 70.4                        | M[-   |
| ]Min =    | 70.4                 |                           |            |                             |       |
| [cm2 ]    | Asapo[+]=            | .80                       |            |                             |       |
| Asapo[+]= | .80                  |                           |            |                             |       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 355. | 3.20 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .8    |

----- G E O M E T R I A E C A R G A S -----

Vao= 4 /L= 3.24 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00

FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---

DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] =             | 1.2 tf* m                 | M.[+] Max= | .8 tf* m - Abcis.= 192      | M.[-] |
| =         | .8 tf* m            |                           |            |                             |       |
| [tf,cm]   | As =                | 1.10 -SRAS- [ 2 B 10.0mm] | AsL=       | .00 ----- Flecha= .1        | As =  |
| .84       | -SRAS- [ 2 B 8.0mm] |                           |            |                             |       |
|           | AsL=                | .00 ----- x/d = .08       | As =       | .84 -SRAS- [ 2 B 8.0mm ]    | AsL=  |
| .00       | ----- x/d = .05     |                           |            |                             |       |
|           |                     | x/dMx= .37                | Arm.Lat.=  | [2 X -- B --- mm] - LN= 2.1 |       |
| x/dMx=    | .37                 |                           |            |                             |       |
|           |                     |                           |            | Fle.Adm.= 1.1               |       |
| [tf,cm]   | M[-]Min =           | 70.4                      | M[+]Min =  | 70.4                        | M[-   |
| ]Min =    | 70.4                |                           |            |                             |       |
| [cm2 ]    | Asapo[+]=           | .80                       |            |                             |       |
| Asapo[+]= | .80                 |                           |            |                             |       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 300. | 2.55 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .7    |

----- G E O M E T R I A E C A R G A S -----

Vao= 5 /L= 3.47 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00

FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---

DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .5 tf\* m - Abcis.= 204 | M.[-]  
.3 tf\* m

[tf,cm]| As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .06 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37

| Fle.Adm.= 1.2 |  
|

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 323. 2.13 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| Pilares:          |         |         |         |       |       |      |        |        |
| 0 0 1             | 1.857   | 1.856   | .30     | .03   | 0     | P32  | .00    | .00    |
| 0 0 2             | 3.978   | 3.976   | .30     | .03   | 0     | P33  | .00    | .00    |
| 0 0 3             | 4.038   | 4.037   | .30     | .03   | 0     | P34  | .00    | .00    |
| 0 0 4             | 3.994   | 3.993   | .30     | .03   | 0     | P35  | .00    | .00    |
| 0 0 5             | 3.294   | 3.293   | .30     | .03   | 0     | P36  | .00    | .00    |
| 0 0 6             | 1.071   | 1.071   | .30     | .03   | 0     | P37  | .00    | .00    |

Viga= 8 V8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .8 tf\* m - Abcis.= 145 | M.[-]  
.7 tf\* m

[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

|                                   |                |                                      |  |      |
|-----------------------------------|----------------|--------------------------------------|--|------|
| Grampos Esq.= 1B 6.3mm x/dMx= .37 |                | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  |      |
| x/dMx= .37                        |                |                                      |  |      |
|                                   |                | Fle.Adm.= 1.2                        |  |      |
| [tf,cm]                           | M[-]Min = 70.4 | M[+]Min = 70.4                       |  | M[-] |
|                                   | Min = 70.4     |                                      |  |      |
| [cm2 ]                            | Asapo[+]= .84  |                                      |  |      |
|                                   | Asapo[+]= .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.- | 330. | 2.12 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

|                   |         |         |         |       |       |      |        |        |    |   |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
| Pilares:          |         |         |         |       |       |      |        |        |    |   |
| 0 0 1             | 1.069   | 1.069   | .14     | .00   | 2     | V32  | .00    | .00    | 0  | 0 |
| 0 0 2             | 1.514   | 1.514   | .30     | .03   | 0     | P38  | .00    | .00    | 38 | 0 |

Viga= 9 V9 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 2.27 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .2 tf\* m - Abcis.= 75 | M.[-]  
= .7 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37 | Fle.Adm.= .8 |  
|  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .80

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 211. | 1.62 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----  
-----



Vao= 2 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .7 tf\* m - Abcis.= 210 | M.[-]  
= .2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 346. 2.13 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0    | 1   | .528    | .526    | .19     | .00   | 0     | P39  | .00    | .00    | 39 | 0 |
| 0     | 0    | 2   | 2.676   | 2.673   | .14     | .00   | 0     | P40  | .00    | .00    | 40 | 0 |
| 0     | 0    | 3   | 1.146   | 1.145   | .14     | .00   | 0     | P41  | .00    | .00    | 41 | 0 |

Viga= 10 V10 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 1.50 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .1 tf\* m - Abcis.= 87 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.00 -SRAS- [ 0 B 6.3mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .00  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 | Fle.Adm.= .5 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .28 |  
 Asapo[+]= .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.- 136. .94 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 0 0 1 .669 .669 .14 .00 0 P43 .00 .00 43 0  
 0 0 2 .441 .441 .14 .00 2 V22 .00 .00 0 0

Viga= 11 V11 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 125 | M.[-]  
 = .7 tf\* m  
 [tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm ]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 x/dMx= .37  
 | Fle.Adm.= 1.0 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .84 |  
 Asapo[+]= .80

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.- 286. 1.85 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

[tf,cm] 0.- 308. 2.00 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 4.80 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.4 tf\* m | M.[+] Max= 1.3 tf\* m - Abcis.= 280 | M.[-]  
= .3 tf\* m

[tf,cm]| As = 1.32 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .09 | As = 1.19 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.0 |  
x/dMx= .37

| | Fle.Adm.= 1.6 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 466. 2.83 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares:          |         |         |         |       |       |      |        |        |    |   |
| 0 0 1 0           | .901    | .900    | .14     | .00   | 0     | P44  | .00    | .00    | 44 | 0 |
| 0 0 2 0           | 2.747   | 2.745   | .14     | .00   | 0     | P45  | .00    | .00    | 45 | 0 |
| 0 0 3 0           | 2.210   | 2.208   | .30     | .03   | 0     | P46  | .00    | .00    | 46 | 0 |
| 0 0 4 0           | 3.451   | 3.449   | .14     | .00   | 0     | P47  | .00    | .00    | 47 | 0 |
| 0 0 5 0           | 1.529   | 1.528   | .14     | .00   | 0     | P48  | .00    | .00    | 48 | 0 |

=====

Viga= 12 V12 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 2.59 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .3 tf\* m - Abcis.= 111 | M.[-]  
 = .5 tf\* m  
 [tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 10.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 | | Fle.Adm.= .9 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .28 |  
 Asapo[+]= .80

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.- 240. 1.60 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 2 /L= 4.50 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= 1.0 tf\* m - Abcis.= 267 | M.[-]  
 = .3 tf\* m  
 [tf,cm]| As = 1.46 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .10 | As = .94 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.4 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 | | Fle.Adm.= 1.5 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .80 |  
 Asapo[+]= .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.- 431. 2.81 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 0 0 1 .790 .788 .14 .00 0 P50 .00 .00 50 0  
 0 0 0 0

|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 2 | 3.109 | 3.106 | .40 | .08 | 0 | P51 | .00 | .00 | 51 | 0 |
| 0 | 0 | 3 | 1.350 | 1.350 | .14 | .00 | 0 | P52 | .00 | .00 | 52 | 0 |

=====

Viga= 13 V13 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.04 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD=1.00 ---

- - - - - 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= .4 tf\* m - Abcis.= 101 | M.[-]  
= 1.0 tf\* m  
[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
1.23 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .09  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .45  
|  
| Fle.Adm.= 1.0 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .84 |  
Asapo[+]= .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.- 285. 2.01 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2B /L= 1.83 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 1.32 tf\* m | As = 1.23 -SRAS- [ 2 B 10.0mm] |  
Flecha = .6  
BAL.DIR | x/d = .09 | AsL= .00 - |  
Flecha Adm.= 1.2  
[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 165. 1.97 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 .811 .811 .14 .00 0 P19 .00 .00 19 0  
0 0 2 2.845 2.844 .30 .03 0 P16 .00 .00 16 0

=====

Viga= 14 V14 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.47 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.4 tf\* m - Abcis.= 261 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .86 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .2 | As =  
.00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .06 | As = 1.31 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .00  
x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= 3.4 |  
| | Fle.Adm.= 1.5 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .33 |  
Asapo[+]= .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.- 431. 2.64 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.885 1.885 .19 .00 0 P39 .00 .00 39 0  
0 0 2 1.426 1.426 .14 .00 2 V5 .00 .00 0 0

=====

Viga= 15 V15 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.39 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.2 tf\* m | M.[+] Max= 1.0 tf\* m - Abcis.= 256 | M.[-]  
= .3 tf\* m

[tf,cm]| As = 1.09 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .08 | As = .96 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.5 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| | Fle.Adm.= 1.5 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .24 |  
Asapo[+]= .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.- 420. 2.57 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

1 1.835 1.834 .30 .03 0 P40 .00 .00 40 0  
0 0 0 0

2 1.414 1.414 .14 .00 0 P20 .00 .00 20 0  
0 0 0 0

=====

Viga= 16 V16 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 1.94 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 50 | M.[-]  
= .6 tf\* m



|                                       |                               |                                      |
|---------------------------------------|-------------------------------|--------------------------------------|
| [tf,cm]  As = .14 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0     | As =                                 |
| .84 -SRAS- [ 2 B 8.0mm]               |                               |                                      |
| AsL= .00 ----- x/d = .00              | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=                                 |
| .00 ----- x/d = .05                   |                               |                                      |
|                                       | x/dMx= .37                    | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
| x/dMx= .37                            |                               |                                      |
|                                       |                               | Fle.Adm.= .6                         |
| [tf,cm]  M[-]Min = 70.4               | M[+]Min = 70.4                | M[-                                  |
| ]Min = 70.4                           |                               |                                      |
| [cm2 ]  Asapo[+]= .84                 |                               |                                      |
| Asapo[+]= .80                         |                               |                                      |

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.- 170. | 1.59 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|----------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.79 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf* m - Abcis.= 143 | M.[-]                                |
| = .3 tf* m                            |                                   |                                      |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1         | As =                                 |
| .84 -SRAS- [ 2 B 8.0mm]               |                                   |                                      |
| AsL= .00 ----- x/d = .05              | As = .84 -SRAS- [ 2 B 8.0mm ]     | AsL=                                 |
| .00 ----- x/d = .05                   |                                   |                                      |
|                                       | x/dMx= .37                        | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
| x/dMx= .37                            |                                   |                                      |
|                                       |                                   | Fle.Adm.= .9                         |
| [tf,cm]  M[-]Min = 70.4               | M[+]Min = 70.4                    | M[-                                  |
| ]Min = 70.4                           |                                   |                                      |
| [cm2 ]  Asapo[+]= .80                 |                                   |                                      |
| Asapo[+]= .80                         |                                   |                                      |

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.- 260. | 1.54 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|----------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 1.50 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf* m |                              | M.[+] Max= .0 tf* m - Abcis.= 150 |                                      | M.[-]                         |      |
| = .8 tf* m       |                              |                                   |                                      |                               |      |
| [tf,cm]          | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00                          | -----                                | Flecha= .0                    | As = |
| .84              | -SRAS- [ 2 B 8.0mm]          |                                   |                                      |                               |      |
|                  | AsL= .00                     | -----                             | x/d = .05                            | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= |
| .00              | -----                        | x/d = .05                         |                                      |                               |      |
|                  |                              | x/dMx= .37                        | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |                               |      |
| x/dMx= .37       |                              |                                   |                                      |                               |      |
|                  |                              |                                   | Fle.Adm.= .5                         |                               |      |
| [tf,cm]          | M[-]Min = 70.4               | M[+]Min = 70.4                    |                                      | M[-                           |      |
| ]Min = 70.4      |                              |                                   |                                      |                               |      |
| [cm2 ]           | Asapo[+]= .80                |                                   |                                      |                               |      |
| Asapo[+]= .80    |                              |                                   |                                      |                               |      |

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.- 136. 1.45 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 4.59 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .9 tf* m - Abcis.= 233 |  | M.[-] |  |
| =                | 1.3 tf* m |                                   |  |       |  |

|         |                              |          |       |            |      |
|---------|------------------------------|----------|-------|------------|------|
| [tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 | ----- | Flecha= .1 | As = |
| 1.22    | -SRAS- [ 2 B 10.0mm]         |          |       |            |      |

|     |          |           |           |                               |      |
|-----|----------|-----------|-----------|-------------------------------|------|
|     | AsL= .00 | -----     | x/d = .06 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= |
| .00 | -----    | x/d = .09 |           |                               |      |

|            |  |            |                                      |  |  |
|------------|--|------------|--------------------------------------|--|--|
|            |  | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  |  |
| x/dMx= .37 |  |            |                                      |  |  |

|  |  |  |               |  |  |
|--|--|--|---------------|--|--|
|  |  |  | Fle.Adm.= 1.5 |  |  |
|--|--|--|---------------|--|--|

|             |                |                |  |     |  |
|-------------|----------------|----------------|--|-----|--|
| [tf,cm]     | M[-]Min = 70.4 | M[+]Min = 70.4 |  | M[- |  |
| ]Min = 70.4 |                |                |  |     |  |

|               |               |  |  |  |  |
|---------------|---------------|--|--|--|--|
| [cm2 ]        | Asapo[+]= .80 |  |  |  |  |
| Asapo[+]= .80 |               |  |  |  |  |

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.- 440. 2.56 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 5 /L= 3.09 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 )  
) - - - - -

| REAC. | APOIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|-------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0     | 1   | .323    | .315    | .40     | .08   | 0     | P50  | .00    | .00    | 50 | 0 |
| 0     | 0     | 2   | 2.206   | 2.193   | .40     | .08   | 0     | P41  | .00    | .00    | 41 | 0 |

|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 3 | 1.071 | 1.054 | .14 | .00 | 0 | P29 | .00 | .00 | 29 | 0 |
| 0 | 0 | 4 | 2.631 | 2.618 | .14 | .00 | 0 | P21 | .00 | .00 | 21 | 0 |
| 0 | 0 | 5 | 2.800 | 2.799 | .40 | .08 | 0 | P8  | .00 | .00 | 8  | 0 |
| 0 | 0 | 6 | 2.724 | 2.722 | .40 | .08 | 0 | P4  | .00 | .00 | 4  | 0 |
| 0 | 0 | 7 | .046  | .045  | .14 | .00 | 2 | V1  | .00 | .00 | 0  | 0 |

=====

Viga= 17 V17 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 1.94 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 67 | M.[-]  
= .5 tf\* m

[tf,cm]| As = .14 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37

| Fle.Adm.= .6 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .84 |  
Asapo[+]= .80

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.- 170. 1.39 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 2.79 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 167 | M.[-]  
 = .1 tf\* m  
 [tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 | Fle.Adm.= .9 |  
 [tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 260. 1.68 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. | APOIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|-------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0     | 1   | .458    | .456    | .40     | .08   | 0     | P52  | .00    | .00    | 52 | 0 |
| 0     | 0     | 2   | 2.164   | 2.163   | .40     | .08   | 0     | P42  | .00    | .00    | 42 | 0 |
| 0     | 0     | 3   | .874    | .871    | .14     | .00   | 0     | P31  | .00    | .00    | 31 | 0 |

Viga= 18 V18 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----  
 Vao= 1 /L= 3.28 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]  
 --Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .6 tf\* m - Abcis.= 140 | M.[-]  
 = .8 tf\* m  
 [tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .06  
 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 x/dMx= .37  
 | Fle.Adm.= 1.1 |  
 [tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .84 |  
 Asapo[+]= .80

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.- 309. 2.07 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.12 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .3 tf\* m - Abcis.= 164 | M.[-]  
= .6 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 288. 1.68 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.07 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 157 | M.[-]  
= .5 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80  
Asapo[+]= .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.- 283. 1.61 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|---------------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares:      |     |         |         |         |       |       |      |        |        |    |   |
| 0 0 1         | 0   | .970    | .969    | .14     | .00   | 0     | P23  | .00    | .00    | 23 | 0 |
| 0 0 2         | 0   | 2.562   | 2.557   | .40     | .08   | 0     | P15  | .00    | .00    | 15 | 0 |
| 0 0 3         | 0   | 2.312   | 2.310   | .40     | .08   | 0     | P5   | .00    | .00    | 5  | 0 |
| 0 0 4         | 0   | 1.140   | 1.140   | .40     | .08   | 0     | P3   | .00    | .00    | 3  | 0 |

Viga= 19 V19 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.2 tf\* m - Abcis.= 180 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .05 | As = 1.10 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .00  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.8 |  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84  
Asapo[+]= .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.- 346. 1.88 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |   |   |
|---------------|-----|---------|---------|---------|-------|-------|------|--------|--------|---|---|
| Pilares:      |     |         |         |         |       |       |      |        |        |   |   |
| 0 0 1         | 0   | 1.339   | 1.339   | .14     | .00   | 2     | V5   | .00    | .00    | 0 | 0 |

0 0 0 2 1.325 1.325 .14 .00 2 V3 .00 .00 0 0

Viga= 20 V20 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 2.89 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .6 tf\* m - Abcis.= 168 | M.[-]  
= .0 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]

.00 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
x/d = .00

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| | Fle.Adm.= 1.0 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ] | Asapo[+]= .28 |  
Asapo[+]= .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.- 270. 1.70 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

0 0 0 1 1.213 1.213 .30 .03 0 P43 .00 .00 43 0

0 0 0 2 .926 .925 .14 .00 2 V7 .00 .00 0 0

Viga= 21 V21 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---



- - - - - 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= 1.1 tf\* m - Abcis.= 180 | M.[-]  
 = .3 tf\* m  
 [tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .00 | As = .97 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.5 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 | | Fle.Adm.= 1.2 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .84 | |  
 Asapo[+]= .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.- 346. 1.99 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 0 0 1 1.241 1.241 .14 .00 2 V5 .00 .00 0 0  
 0 0 2 1.423 1.423 .14 .00 0 P9 .00 .00 9 0

Viga= 22 V22 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----  
 Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]  
 --Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .9 tf\* m - Abcis.= 174 | M.[-]  
 = .3 tf\* m  
 [tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 x/dMx= .37  
 | | Fle.Adm.= 1.2 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4

[cm2 ]| Asapo[+]= .84  
Asapo[+]= .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.- 330. 2.37 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .3

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.687 1.686 .30 .03 0 P44 .00 .00 44 0  
0 0 2 1.337 1.336 .14 .00 0 P33 .00 .00 33 0  
=====

Viga= 23 V23 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.2 tf\* m - Abcis.= 180 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .00 | As = 1.10 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .00  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.8 |  
| | Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84  
Asapo[+]= .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.- 346. 1.87 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.331 1.331 .14 .00 2 V5 .00 .00 0 0  
0 0 2 1.333 1.333 .14 .00 2 V3 .00 .00 0 0  
=====

Viga= 24 V24 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .9 tf\* m - Abcis.= 203 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| Fle.Adm.= 1.2 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .21 |  
Asapo[+]= .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.- 330. 2.02 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

0 0 0 1 1.438 1.438 .30 .03 0 P45 .00 .00 45 0

0 0 0 2 1.144 1.144 .14 .00 2 V7 .00 .00 0 0

=====

Viga= 25 V25 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.1 tf\* m - Abcis.= 180 | M.[-]  
 = .0 tf\* m  
 [tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 .00 -SRAS- [ 0 B 6.3mm]  
 | AsL= .00 ----- x/d = .05 | As = .98 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .00  
 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.5 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 |  
 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .84 |  
 Asapo[+]= .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.- 346. 1.98 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 0 0 1 1.414 1.414 .14 .00 0 P26 .00 .00 26 0  
 0 0 2 1.250 1.250 .14 .00 2 V3 .00 .00 0 0

Viga= 26 V26 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----  
 Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]  
 --Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.0 tf\* m - Abcis.= 180 | M.[-]  
 = .3 tf\* m  
 [tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .00 | As = .96 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.5 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 |  
 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .84 |  
 Asapo[+]= .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.- 346. 1.99 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.240 1.240 .14 .00 2 V5 .00 .00 0 0  
0 0 2 1.424 1.424 .14 .00 0 P11 .00 .00 11 0

=====

Viga= 27 V27 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= 1.1 tf\* m - Abcis.= 180 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .05 | As = 1.01 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.6 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| | Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 |  
Asapo[+]= .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.- 346. 1.95 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.391 1.391 .14 .00 0 P46 .00 .00 46 0  
0 0 2 1.273 1.273 .14 .00 2 V7 .00 .00 0 0

=====

Viga= 28 V28 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .9 tf\* m - Abcis.= 203 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| | Fle.Adm.= 1.2 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .21 |  
Asapo[+]= .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.- 330. 2.03 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

1 1.446 1.446 .30 .03 0 P47 .00 .00 47 0  
0 0 0 0

2 1.137 1.136 .14 .00 2 V7 .00 .00 0 0  
0 0 0 0

=====

Viga= 29 V29 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.0 tf\* m - Abcis.= 180 | M.[-]  
= .4 tf\* m

[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm ] | AsL= .00 ----- Flecha= .1 | As =  
 .84 -SRAS- [ 2 B 8.0mm ] |  
 | AsL= .00 ----- x/d = .00 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05 |  
 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.4 |  
 x/dMx= .37 |  
 | | Fle.Adm.= 1.2 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4 |  
 [cm2 ] | Asapo[+]= .84 | |  
 Asapo[+]= .31 |

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.- 346. 2.03 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 1 | 1.214 | 1.214 | .14 | .00 | 2 | V5  | .00 | .00 | 0  | 0 |
| 0 | 0 | 2 | 1.450 | 1.450 | .14 | .00 | 0 | P12 | .00 | .00 | 12 | 0 |

=====

Viga= 30 V30 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.8 tf\* m - Abcis.= 150 | M.[-]  
 = .0 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .2 | As =  
 .00 -SRAS- [ 0 B 6.3mm ] |

| AsL= .00 ----- x/d = .05 | As = 1.69 -SRAS- [ 3 B 10.0mm ] | AsL=  
 .00 ----- x/d = .00 |

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 4.3 |  
 x/dMx= .37 |

| | Fle.Adm.= 1.2 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4 |

[cm2 ] | Asapo[+]= .56 | |  
 Asapo[+]= .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.- 346. 3.30 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

| REAC.    | APOIO | - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|-------|-------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |       |       |         |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 1     | 2.353   | 2.353   | .14     | .00   | 0     | P28  | .00    | .00    | 28 | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 2     | 1.608   | 1.608   | .14     | .00   | 2     | V3   | .00    | .00    | 0  | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |    |   |
| =====    |       |       |         |         |         |       |       |      |        |        |    |   |
| =====    |       |       |         |         |         |       |       |      |        |        |    |   |

Viga= 31 V31 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 2.40 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 80 | M.[-]  
= .6 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37  
| | Fle.Adm.= .8 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 | |  
Asapo[+]= .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.- 228. 1.61 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC.    | APOIO | - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|-------|-------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |       |       |         |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 1     | .627    | .627    | .14     | .00   | 2     | V4   | .00    | .00    | 0  | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 2     | 1.149   | 1.149   | .10     | .00   | 0     | P13  | .00    | .00    | 13 | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |    |   |
| =====    |       |       |         |         |         |       |       |      |        |        |    |   |
| =====    |       |       |         |         |         |       |       |      |        |        |    |   |

Viga= 32 V32 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----



Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.0 tf\* m - Abcis.= 203 | M.[-]  
= .3 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .92 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.3 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .23 |  
Asapo[+]= .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.- 330. 2.90 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .7

| REAC. | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0    | 1   | 1.578   | 1.578   | .30     | .03   | 0     | P48  | .00    | .00    | 48 | 0 |
| 0     | 0    | 2   | 2.074   | 2.073   | .14     | .00   | 0     | P37  | .00    | .00    | 37 | 0 |

Viga= 33 V33 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 2.29 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .3 tf\* m - Abcis.= 133 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00

|                          |                |                                      |
|--------------------------|----------------|--------------------------------------|
| Grampos Dir.= 1B 6.3mm   | x/dMx= .37     | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
|                          |                | Fle.Adm.= .8                         |
| [tf,cm]   M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]                                 |
| Min = 70.4               |                |                                      |
| [cm2 ]   Asapo[+]= .28   |                |                                      |
| Asapo[+]= .84            |                |                                      |

|                                  |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|----------------------------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf   | Vsd  | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
| [tf,cm]                          | 0.- | 210. | 1.46 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

|                   |         |         |         |       |       |      |        |          |
|-------------------|---------|---------|---------|-------|-------|------|--------|----------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn   |
| Pilares:          |         |         |         |       |       |      |        |          |
| 0 0 1 0           | 1.043   | 1.042   | .30     | .03   | 0     | P17  | .00    | .00 17 0 |
| 0 0 2 0           | .652    | .652    | .14     | .00   | 2     | V3   | .00    | .00 0 0  |

Viga= 34 V34 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 3.35 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .6 tf\* m - Abcis.= 140 | M.[-]  
= .8 tf\* m  
[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37  
|  
|  
|  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
Min = 70.4  
[cm2 ] | Asapo[+]= .84 |  
Asapo[+]= .80

|                                  |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|----------------------------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf   | Vsd  | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
| [tf,cm]                          | 0.- | 316. | 2.07 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.29 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .2 tf\* m - Abcis.= 154 | M.[-]  
= .0 tf\* m  
[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| Fle.Adm.= .8 |  
[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .80 |  
Asapo[+]= .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.- 210. 1.53 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.019 1.019 .14 .00 0 P38 .00 .00 38 0  
0 0 2 2.540 2.540 .30 .03 0 P18 .00 .00 18 0  
0 0 3 .615 .614 .14 .00 0 P14 .00 .00 14 0  
0 0 0 0  
=====

## Pavimento Coberta – N1

fck=250.kgf/cm2 - Aco: CA-60B CA-50A

- Esforços

Caracteristicos

L E G E N D A

G E O M E T R I A

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :  
Repeticoes

NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :  
Fator de Alternancia de Cargas

Cob : Cobrimento / TpS : Tipo da Secao / BCs :  
Mesa Colaborante Superior

BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :  
Espessura Laje Inferior

FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S :  
Cobrim/Cobr.superior adicional

C A R G A S

MESq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q :  
Cortante Adicional (valor unico)

A R M A D U R A S - F L E X A O

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS :  
Secao Te Armadura Simples

STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx :  
Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :  
Armadura e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :  
Armad.transv.minima-cisalhamento

Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :  
Espacamento selecionado

NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus :  
Armadura transversal-Suspensao

A R M A D U R A S - T O R C A O

%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de  
torcao

b-nuc : Largura do nucleo / h-nuc : Altura do nucleo

Asw-lR : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-  
torcao p/NR estribos selecionado

Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal  
de torcao no lado h

ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao  
plastica no vao - S[sim] N[nao]

R E A C O E S D E A P O I O

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre /  
segue / vigas

M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

=====

Viga= 101 V101 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= 2.23 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .2

BAL.ESQ | x/d = .06 | AsL= .00 - |  
Flecha Adm.= 1.5

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 195. .40 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.93 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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= .1 tf* m - Abcis.= 150 | M.[-]                                |
| = .1 tf* m                            |                                   |                                      |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1         | As =                                 |
| .84 -SRAS- [ 2 B 8.0mm]               |                                   |                                      |
| AsL= .00 ----- x/d = .06              | As = .84 -SRAS- [ 2 B 8.0mm ]     | AsL=                                 |
| .00 ----- x/d = .05                   |                                   |                                      |
|                                       | x/dMx= .45                        | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
| x/dMx= .37                            |                                   |                                      |
|                                       |                                   | Fle.Adm.= 1.0                        |
| [tf,cm]  M[-]Min = 70.4               | M.[+]Min = 70.4                   | M[-]                                 |
| ]Min = 70.4                           |                                   |                                      |
| [cm2 ]  Asapo[+]= .28                 |                                   |                                      |
| Asapo[+]= .80                         |                                   |                                      |

|                  |          |     |       |     |      |        |        |          |     |        |       |       |
|------------------|----------|-----|-------|-----|------|--------|--------|----------|-----|--------|-------|-------|
| 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.- 269. | .30 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0   | 2     | .0 .0 |

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 2.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf* m - Abcis.= 208 | M.[-]                                |
| = .0 tf* m                            |                                   |                                      |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0         | As =                                 |
| .14 -SRAS- [ 2 B 6.3mm]               |                                   |                                      |
| AsL= .00 ----- x/d = .05              | As = .84 -SRAS- [ 2 B 8.0mm ]     | AsL=                                 |
| .00 ----- x/d = .00                   |                                   |                                      |
|                                       | x/dMx= .37                        | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
| x/dMx= .37                            |                                   |                                      |
|                                       |                                   | Fle.Adm.= .7                         |
| [tf,cm]  M[-]Min = 70.4               | M.[+]Min = 70.4                   | M[-]                                 |
| ]Min = 70.4                           |                                   |                                      |
| [cm2 ]  Asapo[+]= .80                 |                                   |                                      |
| Asapo[+]= .28                         |                                   |                                      |

| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf   | Vsd | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
|----------------------------------|-----|------|-----|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| [tf,cm]                          | 0.- | 181. | .30 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| 0 0 1             | .503    | .500    | .40     | .08   | 0     | P1   | .00    | .00    |
| 0 0 2             | .409    | .400    | .40     | .08   | 0     | P2   | .00    | .00    |
| 0 0 3             | .075    | .069    | .14     | .00   | 0     | P3   | .00    | .00    |

Viga= 102 V102 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1B /L= 2.13 /B= .14 /H= .40 /BCs= .99 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 2.52 tf\* m | As = 2.43 -SRAS- [ 2 B 12.5mm] |  
Flecha = 1.1

BAL.ESQ | x/d = .17 | AsL= .00 - |  
Flecha Adm.= 1.4

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
Baric.Armad.= 1

| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf   | Vsd  | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
|----------------------------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| [tf,cm]                          | 0.- | 195. | 3.20 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .8    |

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.98 /B= .14 /H= .40 /BCs= .62 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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.[-] = 2.5 tf\* m | M.[+] Max= 1.2 tf\* m - Abcis.= 233 | M.[-]  
= 1.5 tf\* m

[tf,cm] | As = 2.43 -SRAS- [ 2 B 12.5mm] | AsL= .00 ----- Flecha= .1 | As =  
1.35 -SRAS- [ 2 B 10.0mm]

| AsL= .00 ----- x/d = .17 | As = 1.11 -STAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .10

|                          |            |                                     |      |
|--------------------------|------------|-------------------------------------|------|
| x/dMx= .37               | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |      |
|                          |            | Fle.Adm.= 1.3                       |      |
| [tf,cm]   M[-]Min = 70.4 |            | M[+]Min = 70.4                      | M[-] |
| Min = 70.4               |            |                                     |      |
| [cm2 ]   Asapo[+]= .28   |            |                                     |      |
| Asapo[+]= .80            |            |                                     |      |

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.- | 374. | 4.74 | 22.17 | 1 | 45. | .6 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|-----|------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 2.00 /B= .14 /H= .40 /BCs= .44 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.4 tf* m | M.[+] Max= .3 tf* m - Abcis.= 135 | M.[-] |
| = .0 tf* m        |                                   |       |

|  |                           |      |
|--|---------------------------|------|
| [tf,cm]   As = 1.30 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .0 | As = |
| .14 -SRAS- [ 2 B 6.3mm]                  |                           |      |

|                          |                               |      |
|--------------------------|-------------------------------|------|
| AsL= .00 ----- x/d = .09 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL= |
| .00 ----- x/d = .00      |                               |      |

|                        |            |                                     |  |
|------------------------|------------|-------------------------------------|--|
|                        | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  |
| Grampos Dir.= 1B 6.3mm | x/dMx= .37 |                                     |  |

|  |  |              |  |
|--|--|--------------|--|
|  |  | Fle.Adm.= .7 |  |
|--|--|--------------|--|

|                          |                |      |
|--------------------------|----------------|------|
| [tf,cm]   M[-]Min = 70.4 | M[+]Min = 70.4 | M[-] |
| Min = 70.4               |                |      |

|                        |  |  |
|------------------------|--|--|
| [cm2 ]   Asapo[+]= .80 |  |  |
| Asapo[+]= .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.- | 181. | 3.03 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|-----|------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |   |   |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|---|---|
| Pilares:          |         |         |         |       |       |      |        |        |   |   |
| 0 0 1 0           | 5.204   | 5.197   | .30     | .03   | 1     | P6   | .00    | .00    | 6 | 0 |
| 0 0 2 0           | 4.858   | 4.848   | .30     | .03   | 1     | P7   | .00    | .00    | 7 | 0 |
| 0 0 3 0           | .376    | .369    | .14     | .00   | 0     | P8   | .00    | .00    | 8 | 0 |

=====

Viga= 103 V103 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1B /L= 1.61 /B= .14 /H= .40 /BCs= .78 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 5.05 tf\* m | As = 5.53 -SRAS- [ 3 B 16.0mm] |  
Flecha = .8

BAL.ESQ | x/d = .40 | AsL= .00 - |  
Flecha Adm.= 1.1

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
Baric.Armad.= 4

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.- 143. 5.12 22.17 1 45. .8 1.4 1.4 5.0 20.0 2 .0 .7

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.42 /B= .14 /H= .40 /BCs= .55 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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.[-] = 3.9 tf\* m | M.[+] Max= .1 tf\* m - Abcis.= 229 | M.[-]  
= .4 tf\* m

[tf,cm] | As = 5.53 -SRAS- [ 3 B 16.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .37 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | x/dMx= .45 | Arm.Lat.= [2 X -- B --- mm] - LN= .5 |

| Fle.Adm.= 1.1 |

[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ] | Asapo[+]= .21 |  
Asapo[+]= .80

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.- 318. 4.35 22.17 1 45. .3 1.4 1.4 5.0 20.0 2 .0 .2

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.74 /B= .14 /H= .40 /BCs= .59 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---



- - - - - 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 tf\* m | M.[+] Max= 1.0 tf\* m - Abcis.= 189 | M.[-]  
 = 1.8 tf\* m  
 [tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 1.76 -SRAS- [ 3 B 10.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .93 -STAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .13  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |  
 | Fle.Adm.= 1.2 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .80 |  
 Asapo[+]= .80

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.- 350. 3.66 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 4 /L= 4.44 /B= .14 /H= .40 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 2.0 tf\* m | M.[+] Max= 1.5 tf\* m - Abcis.= 225 | M.[-]  
 = 1.7 tf\* m  
 [tf,cm]| As = 1.96 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
 1.56 -SRAS- [ 2 B 10.0mm]  
 | AsL= .00 ----- x/d = .14 | As = 1.31 -STAS- [ 2 B 10.0mm ] | AsL=  
 .00 ----- x/d = .11  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  
 | Fle.Adm.= 1.5 |  
 [tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ]| Asapo[+]= .80 |  
 Asapo[+]= .80

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.- 420. 3.93 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 5 /L= 3.36 /B= .14 /H= .40 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= .7 tf\* m - Abcis.= 173 | M.[-]  
= 1.2 tf\* m  
[tf,cm]| As = 1.46 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .0 | As =  
1.07 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .10 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .08  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 312. 3.47 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .3

----- G E O M E T R I A E C A R G A S -----  
Vao= 6 /L= 4.37 /B= .14 /H= .40 /BCs= .47 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= 1.2 tf\* m - Abcis.= 259 | M.[-]  
= .6 tf\* m  
[tf,cm]| As = 1.49 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .11 | As = 1.04 -STAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |  
| Fle.Adm.= 1.5 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .26

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.- 413. 3.27 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

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

|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 1 | 6.040 | 6.036 | .30 | .03 | 1 | P9  | .00 | .00 | 9  | 0 |
|   |   | 0 | 0     |       |     |     |   |     |     |     |    |   |
| 0 | 0 | 2 | 2.979 | 2.971 | .30 | .03 | 1 | P10 | .00 | .00 | 10 | 0 |
|   |   | 0 | 0     |       |     |     |   |     |     |     |    |   |
| 0 | 0 | 3 | 5.347 | 5.343 | .30 | .03 | 1 | P11 | .00 | .00 | 11 | 0 |
|   |   | 0 | 0     |       |     |     |   |     |     |     |    |   |
| 0 | 0 | 4 | 4.817 | 4.816 | .30 | .03 | 1 | P12 | .00 | .00 | 12 | 0 |
|   |   | 0 | 0     |       |     |     |   |     |     |     |    |   |
| 0 | 0 | 5 | 4.256 | 4.253 | .40 | .08 | 1 | P13 | .00 | .00 | 13 | 0 |
|   |   | 0 | 0     |       |     |     |   |     |     |     |    |   |
| 0 | 0 | 6 | 1.774 | 1.774 | .30 | .03 | 1 | P14 | .00 | .00 | 14 | 0 |
|   |   | 0 | 0     |       |     |     |   |     |     |     |    |   |

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Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .74 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.2 tf\* m - Abcis.= 150 | M.[-]  
= .2 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .00 | As = 1.11 -STAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= .5 |  
| Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 |  
Asapo[+]= .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.- 286. 2.27 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.560 1.560 .14 .00 2 V130 .00 .00 0 0  
0 0 2 1.625 1.625 .14 .00 1 P17 .00 .00 17 0

=====

Viga= 105 V105 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.30 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= 1.5 tf\* m - Abcis.= 165 | M.[-]  
= .3 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = 1.43 -SRAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.7 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 |  
Asapo[+]= .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.- 316. 2.77 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO | No. | Maximos | Minimos    | Largura | DEPEV | Morte | Nome  | M.I.Mx | M.I.Mn   |
|-------------|-----|---------|------------|---------|-------|-------|-------|--------|----------|
| 0           | 0   | 1<br>0  | 1.973<br>0 | 1.973   | .14   | .00   | 1 P17 | .00    | .00 17 0 |
| 0           | 0   | 2<br>0  | 1.903<br>0 | 1.903   | .14   | .00   | 1 P18 | .00    | .00 18 0 |

=====

Viga= 106 V106 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.44 /B= .14 /H= .40 /BCs= .47 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] =              | 1.4 tf* m                 | M.[+] Max=                        | 2.8 tf* m - Abcis.= 223    | M.[-] |
|            |                      | 2.7 tf* m                 |                                   |                            |       |
| [tf,cm]    | As =                 | 1.33 -SRAS- [ 2 B 10.0mm] | AsL=                              | .00 ----- Flecha= .3       | As =  |
| 2.68       | -SRAS- [ 4 B 10.0mm] |                           |                                   |                            |       |
|            | AsL=                 | .00 ----- x/d = .09       | As =                              | 2.65 -STAS- [ 4 B 10.0mm ] | AsL=  |
| .00        | ----- x/d = .20      |                           |                                   |                            |       |
|            |                      | x/dMx= .37                | Arm.Lat.= [2 X -- B --- mm] - LN= | 2.0                        |       |
| x/dMx= .37 |                      |                           |                                   |                            |       |
|            |                      |                           |                                   | Fle.Adm.= 1.5              |       |
| [tf,cm]    | M[-]Min =            | 70.4                      | M[+]Min =                         | 70.4                       | M[-   |
| ]Min =     | 70.4                 |                           |                                   |                            |       |
| [cm2 ]     | Asapo[+]=            | .66                       |                                   |                            |       |
| Asapo[+]=  | .80                  |                           |                                   |                            |       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 420. | 4.88 | 22.17 | 1   | 45.  | .7     | 1.4    | 1.7      | 5.0 | 20.0 | 2  | .0    | 1.7   |

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.54 /B= .14 /H= .40 /BCs= .56 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00

FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---

DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] =             | 2.3 tf* m                 | M.[+] Max=                        | .7 tf* m - Abcis.= 212   | M.[-] |
| =          |                     | .5 tf* m                  |                                   |                          |       |
| [tf,cm]    | As =                | 2.22 -SRAS- [ 3 B 10.0mm] | AsL=                              | .00 ----- Flecha= .1     | As =  |
| .84        | -SRAS- [ 2 B 8.0mm] |                           |                                   |                          |       |
|            | AsL=                | .00 ----- x/d = .16       | As =                              | .84 -STAS- [ 2 B 8.0mm ] | AsL=  |
| .00        | ----- x/d = .05     |                           |                                   |                          |       |
|            |                     | x/dMx= .37                | Arm.Lat.= [2 X -- B --- mm] - LN= | .5                       |       |
| x/dMx= .37 |                     |                           |                                   |                          |       |
|            |                     |                           |                                   | Fle.Adm.= 1.2            |       |
| [tf,cm]    | M[-]Min =           | 70.4                      | M[+]Min =                         | 70.4                     | M[-   |
| ]Min =     | 70.4                |                           |                                   |                          |       |
| [cm2 ]     | Asapo[+]=           | .80                       |                                   |                          |       |
| Asapo[+]=  | .80                 |                           |                                   |                          |       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 330. | 3.79 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----

Vao= 3 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00

FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---

DeltaE= .90 DeltaD= .90 ---

- - - - - 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 ) - - - - -

| REAC. | APOIO | - No.  | Maximos    | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|-------|--------|------------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0     | 1<br>0 | 3.126<br>0 | 3.123   | .30     | .03   | 1     | P19  | .00    | .00    | 19 | 0 |
| 0     | 0     | 2<br>0 | 6.099<br>0 | 6.094   | .30     | .03   | 1     | P20  | .00    | .00    | 20 | 0 |

|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 3 | 1.479 | 1.472 | .40 | .08 | 0 | P21 | .00 | .00 | 21 | 0 |
| 0 | 0 | 4 | .462  | .446  | .40 | .08 | 0 | P22 | .00 | .00 | 22 | 0 |
| 0 | 0 | 5 | .193  | .187  | .40 | .08 | 0 | P23 | .00 | .00 | 23 | 0 |

=====

Viga= 107 V107 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= 1.03 /B= .14 /H= .40 /BCs= .55 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .1

BAL.ESQ | x/d = .06 | AsL= .00 - |  
Flecha Adm.= .7

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 85. 1.67 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.04 /B= .14 /H= .40 /BCs= .50 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 153 | M.[-]  
= .9 tf\* m

[tf,cm] | As = .93 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .07 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .06

| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |

| Fle.Adm.= 1.0 |

[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ] | Asapo[+]= .21 |  
Asapo[+]= .80

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.- 280. 2.51 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.63 /B= .14 /H= .40 /BCs= .58 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.1 tf\* m | M.[+] Max= .8 tf\* m - Abcis.= 184 | M.[-]  
= .9 tf\* m  
[tf,cm]| As = 1.02 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .07 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .06  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 339. 2.90 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 3.45 /B= .14 /H= .40 /BCs= .55 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 146 | M.[-]  
= 1.7 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
1.57 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .06 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .11  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4



[cm2 ]| Asapo[+]= .80  
Asapo[+]= .80

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.- 321. 3.17 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 5 /L= 4.97 /B= .14 /H= .40 /BCs= .89 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 2.2 tf\* m | M.[+] Max= 1.8 tf\* m - Abcis.= 291 | M.[-]  
= 1.0 tf\* m  
[tf,cm]| As = 2.15 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =  
.93 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .15 | As = 1.67 -STAS- [ 3 B 10.0mm ] | AsL=  
.00 ----- x/d = .07  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  
| | Fle.Adm.= 1.7 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80  
Asapo[+]= .42

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.- 473. 4.34 22.17 1 45. .3 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 2.795 2.794 .30 .03 1 P24 .00 .00 24 0  
0 0 2 3.807 3.805 .30 .03 1 P25 .00 .00 25 0  
0 0 3 3.439 3.436 .30 .03 1 P26 .00 .00 26 0  
0 0 4 5.292 5.290 .30 .03 1 P27 .00 .00 27 0  
0 0 5 2.433 2.433 .30 .03 1 P28 .00 .00 28 0  
=====

Viga= 108 V108 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 256 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .80

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.- 310. .50 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.34 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .1 tf\* m - Abcis.= 199 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 310. .40 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC.    | POIO | - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|------|-------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |      |       |         |         |         |       |       |      |        |        |    |   |
| 0        | 0    | 1     | .355    | .352    | .40     | .08   | 0     | P29  | .00    | .00    | 29 | 0 |
| 0        | 0    | 2     | .398    | .394    | .40     | .08   | 0     | P30  | .00    | .00    | 30 | 0 |
| 0        | 0    | 3     | .185    | .183    | .40     | .08   | 0     | P31  | .00    | .00    | 31 | 0 |
| =====    |      |       |         |         |         |       |       |      |        |        |    |   |
| =====    |      |       |         |         |         |       |       |      |        |        |    |   |

Viga= 109 V109 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 4.28 /B= .14 /H= .40 /BCs= .78 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.1 tf\* m - Abcis.= 215 | M.[-]  
= 1.4 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
1.32 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .05 | As = .97 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .09  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .4 |  
| Fle.Adm.= 1.4 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .24 |  
Asapo[+]= .80

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.- 404. 2.86 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .2

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 2 /L= 3.79 /B= .14 /H= .40 /BCs= .60 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.4 tf\* m | M.[+] Max= .8 tf\* m - Abcis.= 192 | M.[-]  
= 1.1 tf\* m

|   |                                     |                                 |
|---|-------------------------------------|---------------------------------|
| [tf,cm]   As = 1.33 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- Flecha= .1           | As = 1.06 -SRAS- [ 2 B 10.0mm ] |
| AsL= .00 ----- x/d = .09                  | As = .84 -STAS- [ 2 B 8.0mm ]       | AsL= .00 ----- x/d = .08        |
| x/dMx= .37                                | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |                                 |
|   | Fle.Adm.= 1.3                       |                                 |
| [tf,cm]   M[-]Min = 70.4                  | M[+]Min = 70.4                      | M[-]Min = 70.4                  |
| [cm2 ]   Asapo[+]= .80                    |                                     |                                 |
| Asapo[+]= .80                             |                                     |                                 |

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.- 355. 2.94 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.79 /B= .14 /H= .40 /BCs= .60 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.3 tf\* m | M.[+] Max= .9 tf\* m - Abcis.= 192 | M.[-] = 1.1 tf\* m

[tf,cm] | As = 1.22 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- Flecha= .1 | As = .97 -SRAS- [ 2 B 8.0mm ]

| AsL= .00 ----- x/d = .09 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL= .00 ----- x/d = .07

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |

| Fle.Adm.= 1.3 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]Min = 70.4

[cm2 ] | Asapo[+]= .80 | Asapo[+]= .80

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.- 356. 2.96 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 3.24 /B= .14 /H= .40 /BCs= .53 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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=                       | .4 tf* m - Abcis.= 165   | M.[-] |
|           | .9 tf* m             |                         |                                  |                          |       |
| [tf,cm]   | As =                 | .96 -SRAS- [ 2 B 8.0mm] | AsL=                             | .00 ----- Flecha= .0     | As =  |
| .86       | -SRAS- [ 2 B 10.0mm] |                         |                                  |                          |       |
|           | AsL=                 | .00 ----- x/d = .07     | As =                             | .84 -STAS- [ 2 B 8.0mm ] | AsL=  |
| .00       | ----- x/d = .06      |                         |                                  |                          |       |
|           |                      | x/dMx= .37              | Arm.Lat.=[2 X -- B --- mm] - LN= | .5                       |       |
| x/dMx=    | .37                  |                         |                                  |                          |       |
|           |                      |                         |                                  | Fle.Adm.= 1.1            |       |
| [tf,cm]   | M[-]Min =            | 70.4                    | M[+]Min =                        | 70.4                     | M[-   |
| ]Min =    | 70.4                 |                         |                                  |                          |       |
| [cm2 ]    | Asapo[+]=            | .80                     |                                  |                          |       |
| Asapo[+]= | .80                  |                         |                                  |                          |       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 300. | 2.43 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .1    |

----- G E O M E T R I A E C A R G A S -----

Vao= 5 /L= 3.47 /B= .14 /H= .40 /BCs= .66 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00

FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---

DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] =             | 1.2 tf* m                 | M.[+] Max=                       | 1.1 tf* m - Abcis.= 204   | M.[-] |
| =         | .4 tf* m            |                           |                                  |                           |       |
| [tf,cm]   | As =                | 1.12 -SRAS- [ 2 B 10.0mm] | AsL=                             | .00 ----- Flecha= .1      | As =  |
| .84       | -SRAS- [ 2 B 8.0mm] |                           |                                  |                           |       |
|           | AsL=                | .00 ----- x/d = .08       | As =                             | 1.00 -STAS- [ 2 B 8.0mm ] | AsL=  |
| .00       | ----- x/d = .05     |                           |                                  |                           |       |
|           |                     | x/dMx= .37                | Arm.Lat.=[2 X -- B --- mm] - LN= | .5                        |       |
| x/dMx=    | .37                 |                           |                                  |                           |       |
|           |                     |                           |                                  | Fle.Adm.= 1.2             |       |
| [tf,cm]   | M[-]Min =           | 70.4                      | M[+]Min =                        | 70.4                      | M[-   |
| ]Min =    | 70.4                |                           |                                  |                           |       |
| [cm2 ]    | Asapo[+]=           | .80                       |                                  |                           |       |
| Asapo[+]= | .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.- | 323. | 2.83 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .4    |

|                   |         |         |         |       |       |      |        |        |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
| Pilares:          |         |         |         |       |       |      |        |        |
| 0 0 1             | 1.840   | 1.839   | .30     | .03   | 1     | P32  | .00    | .00    |
| 0 0 0             | 0       |         |         |       |       |      |        |        |
| 0 0 2             | 4.083   | 4.080   | .30     | .03   | 1     | P33  | .00    | .00    |
| 0 0 0             | 0       |         |         |       |       |      |        |        |
| 0 0 3             | 3.937   | 3.935   | .30     | .03   | 1     | P34  | .00    | .00    |
| 0 0 0             | 0       |         |         |       |       |      |        |        |

|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 4 | 3.692 | 3.691 | .30 | .03 | 1 | P35 | .00 | .00 | 35 | 0 |
| 0 | 0 | 5 | 3.700 | 3.696 | .30 | .03 | 1 | P36 | .00 | .00 | 36 | 0 |
| 0 | 0 | 6 | 1.994 | 1.994 | .30 | .03 | 1 | P37 | .00 | .00 | 37 | 0 |

=====

Viga= 110 V110 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .84 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.8 tf\* m - Abcis.= 145 | M.[-]  
1.0 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.92 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .00 | As = 1.60 -STAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .07  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 |  
Asapo[+]= .40

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.- 330. 3.59 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC.    | APOIO | - No.  | Maximos    | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|-------|--------|------------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |       |        |            |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 1<br>0 | 1.968<br>0 | 1.968   | .14     | .00   | 2     | V131 | .00    | .00    | 0  | 0 |
| 0        | 0     | 2<br>0 | 2.567<br>0 | 2.567   | .30     | .03   | 1     | P38  | .00    | .00    | 38 | 0 |

=====

Viga= 111 V111 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= .65 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .1  
BAL.ESQ | x/d = .06 | AsL= .00 - |  
Flecha Adm.= .4  
[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 58. 1.39 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .2

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 .993 .993 .14 .00 1 P38 .00 .00 38 0

Viga= 112 V112 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 2.27 /B= .14 /H= .40 /BCs= .31 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

\* \* \* \* \*  
Diagrama M[-] nao usual. Verificar apoios com M[-] Max.  
\* \* \* \* \*

- - - - - 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 tf\* m | M.[+] Max= .2 tf\* m - Abcis.= 18 | M.[-]  
= .5 tf\* m  
[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  
x/dMx= .37  
| Fle.Adm.= .8 |  
[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .84 |  
Asapo[+]= .80

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.- 211. 1.60 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.60 /B= .14 /H= .40 /BCs= .68 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .7 tf\* m - Abcis.= 210 | M.[-]  
.2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .4 |  
| | Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 346. 2.19 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC.    | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |      |     |         |         |         |       |       |      |        |        |    |   |
| 0        | 0    | 1   | 1.138   | 1.136   | .19     | .00   | 1     | P39  | .00    | .00    | 39 | 0 |
| 0        | 0    | 2   | 2.151   | 2.147   | .14     | .00   | 1     | P40  | .00    | .00    | 40 | 0 |
| 0        | 0    | 3   | .673    | .671    | .14     | .00   | 0     | P41  | .00    | .00    | 41 | 0 |

=====

Viga= 113 V113 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 1.50 /B= .14 /H= .40 /BCs= .29 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---



```

- - - - - 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= .2 tf* m - Abcis.= 50 | M.[-]
= .0 tf* m
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =
.00 -SRAS- [ 0 B 6.3mm]
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .00
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.0 |
x/dMx= .37
| | | Fle.Adm.= .5 |
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]
]Min = 70.4
[cm2 ]| Asapo[+]= .84 | |
Asapo[+]= .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.- 136. 1.59 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

```

```

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
0 0 1 1.133 1.133 .14 .00 1 P43 .00 .00 43 0
0 0 2 -.066 -.066 .14 .00 2 V125 .00 .00 0 0

```

```

=====
=====

```

```

Viga= 114 V114 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

```

```

----- G E O M E T R I A E C A R G A S -----
-----

```

```

Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .36 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .07 [M]

```

```

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---
DeltaE= .90 DeltaD= .90 ---

```

```

- - - - - 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= .7 tf* m - Abcis.= 150 | M.[-]
= 1.4 tf* m
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =
1.26 -SRAS- [ 2 B 10.0mm]
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .09
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |
x/dMx= .37
| | | Fle.Adm.= 1.0 |
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]
]Min = 70.4

```

[cm2 ]| Asapo[+]= .84  
Asapo[+]= .80

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.- 286. 3.37 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.57 /B= .14 /H= .40 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.4 tf\* m | M.[+] Max= 1.0 tf\* m - Abcis.= 179 | M.[-]  
= .9 tf\* m  
[tf,cm]| As = 1.29 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.86 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .09 | As = .91 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .06  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |  
| | Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 338. 3.70 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.27 /B= .14 /H= .40 /BCs= .53 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .3 tf\* m - Abcis.= 137 | M.[-]  
= 2.2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
2.13 -SRAS- [ 3 B 10.0mm]  
| AsL= .00 ----- x/d = .06 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .15  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
x/dMx= .37 | | Fle.Adm.= 1.1 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .80

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.- 308. 2.96 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 4 /L= 4.80 /B= .14 /H= .40 /BCs= .86 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 2.3 tf\* m | M.[+] Max= 2.4 tf\* m - Abcis.= 280 | M.[-]  
 = .4 tf\* m

[tf,cm] | As = 2.25 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =  
 .84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .16 | As = 2.23 -STAS- [ 3 B 10.0mm ] | AsL=  
 .00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  
 |

| Fle.Adm.= 1.6 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4

[cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 466. 4.36 22.17 1 45. .3 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn   |
|-------------------|---------|---------|---------|-------|-------|------|--------|----------|
| Pilares:          |         |         |         |       |       |      |        |          |
| 0 0 1             | 2.086   | 2.084   | .14     | .00   | 1     | P44  | .00    | .00 44 0 |
| 0 0 2             | 4.796   | 4.791   | .14     | .00   | 1     | P45  | .00    | .00 45 0 |
| 0 0 3             | 4.293   | 4.287   | .30     | .03   | 1     | P46  | .00    | .00 46 0 |
| 0 0 4             | 5.061   | 5.057   | .14     | .00   | 1     | P47  | .00    | .00 47 0 |
| 0 0 5             | 2.815   | 2.814   | .14     | .00   | 1     | P48  | .00    | .00 48 0 |

=====

Viga= 115 V115 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.10 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD=1.00 ---

- - - - - 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= 2.3 tf\* m - Abcis.= 205 | M.[-]  
= .9 tf\* m  
[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .3 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = 2.19 -SRAS- [ 3 B 10.0mm ] | AsL=  
.00 ----- x/d = .06  
x/dMx= .45 x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= 5.6 |  
| Fle.Adm.= 1.4 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .84 |  
Asapo[+]= .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.- 396. 3.60 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2B /L= .16 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .0  
BAL.DIR | x/d = .06 | AsL= .00 - |  
Flecha Adm.= .1  
[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 9. 1.44 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .2

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 2.569 2.568 .14 .00 1 P48 .00 .00 48 0  
0 0 2 3.027 3.027 .14 .00 1 P49 .00 .00 49 0  
0 0 0 0

=====

Viga= 116 V116 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 2.59 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 133 | M.[-]  
= .0 tf\* m

[tf,cm] | As = .14 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37

| Fle.Adm.= .9 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ] | Asapo[+]= .28 |  
Asapo[+]= .80

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.- 240. .27 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 4.50 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .2 tf\* m - Abcis.= 267 | M.[-]  
= .1 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37

| Fle.Adm.= 1.5 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 431. .52 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 0 0 1 .175 .170 .14 .00 0 P50 .00 .00 50 0  
 0 0 2 .560 .554 .40 .08 0 P51 .00 .00 51 0  
 0 0 3 .264 .263 .14 .00 0 P52 .00 .00 52 0

=====

Viga= 117 V117 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.04 /B= .14 /H= .40 /BCs= .37 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 127 | M.[-]  
 = 1.3 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 1.24 -SRAS- [ 2 B 10.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .09

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |

| Fle.Adm.= 1.0 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4

[cm2 ] | Asapo[+]= .28 |  
 Asapo[+]= .80

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.- 285. 1.68 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 1.70 /B= .14 /H= .40 /BCs= .40 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.7 tf\* m | M.[+] Max= .0 tf\* m - Abcis.= 173 | M.[-]  
= .1 tf\* m  
[tf,cm]| As = 1.58 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .11 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  
| Fle.Adm.= .6 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 151. 2.48 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|-------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| 0     | 0    | 1   | .153    | .152    | .14     | .00   | 1     | P19  | .00    | .00    | 19 | 0 |
| 0     | 0    | 2   | 2.926   | 2.921   | .30     | .03   | 1     | P16  | .00    | .00    | 16 | 0 |
| 0     | 0    | 3   | -.818   | -.821   | .14     | .00   | 2     | V102 | .00    | .00    | 0  | 0 |

Viga= 118 V118 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 4.47 /B= .14 /H= .40 /BCs= .59 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.7 tf\* m - Abcis.= 223 | M.[-]  
= .1 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = 1.59 -STAS- [ 2 B 10.0mm ] | AsL=  
.00 ----- x/d = .05

|                          |            |                                       |      |
|--------------------------|------------|---------------------------------------|------|
| x/dMx= .37               | x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= 1.0 |      |
|                          |            | Fle.Adm.= 1.5                         |      |
| [tf,cm]   M[-]Min = 70.4 |            | M[+]Min = 70.4                        | M[-] |
| Min = 70.4               |            |                                       |      |
| [cm2 ]   Asapo[+]= .53   |            |                                       |      |
| Asapo[+]= .84            |            |                                       |      |

|                                  |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|----------------------------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf   | Vsd  | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
| [tf,cm]                          | 0.- | 431. | 3.74 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

|                   |         |         |         |       |       |      |        |        |    |   |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
| Pilares:          |         |         |         |       |       |      |        |        |    |   |
| 0 0 1 0           | 2.507   | 2.507   | .19     | .00   | 1     | P39  | .00    | .00    | 39 | 0 |
| 0 0 2 0           | 2.671   | 2.671   | .14     | .00   | 2     | V106 | .00    | .00    | 0  | 0 |

Viga= 119 V119 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 4.39 /B= .14 /H= .40 /BCs= 1.02 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.4 tf\* m | M.[+] Max= 2.6 tf\* m - Abcis.= 219 | M.[-]  
= .3 tf\* m  
[tf,cm] | As = 1.33 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .09 | As = 2.40 -STAS- [ 3 B 10.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= .8 |  
| Fle.Adm.= 1.5 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
Min = 70.4  
[cm2 ] | Asapo[+]= .60 |  
Asapo[+]= .84

|                                  |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|----------------------------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf   | Vsd  | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
| [tf,cm]                          | 0.- | 420. | 4.42 | 22.17 | 1   | 45.  | .3     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

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



|   |   |   |       |       |     |     |   |     |     |     |    |   |
|---|---|---|-------|-------|-----|-----|---|-----|-----|-----|----|---|
| 0 | 0 | 1 | 3.154 | 3.153 | .30 | .03 | 1 | P40 | .00 | .00 | 40 | 0 |
| 0 | 0 | 2 | 2.538 | 2.538 | .14 | .00 | 1 | P20 | .00 | .00 | 20 | 0 |

=====

Viga= 120 V120 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 1.94 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf* m - Abcis.= 101    | M.[-] = .4 tf* m             |
| [tf,cm]  As = .14 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0            | As = .84 -SRAS- [ 2 B 8.0mm] |
| .00 -----   AsL= .00 ----- x/d = .05  | As = .84 -SRAS- [ 2 B 8.0mm ]        | AsL= .00 ----- x/d = .05     |
| x/dMx= .37                            | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |                              |
|                                       |                                      |                              |
| [tf,cm]  M[-]Min = 70.4               | M.[+]Min = 70.4                      | M[-]Min = 70.4               |
| [cm2 ]  Asapo[+]= .84                 |                                      |                              |
| Asapo[+]= .80                         |                                      |                              |

|   |
|---|
| 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.- 170. .89 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0                        |

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 2.79 /B= .14 /H= .40 /BCs= .31 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf* m - Abcis.= 143 | M.[-] = .4 tf* m             |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0         | As = .84 -SRAS- [ 2 B 8.0mm] |
| .00 -----   AsL= .00 ----- x/d = .05  | As = .84 -STAS- [ 2 B 8.0mm ]     | AsL= .00 ----- x/d = .05     |

|                          |  |                |  |                                      |  |
|--------------------------|--|----------------|--|--------------------------------------|--|
| x/dMx= .37               |  | x/dMx= .37     |  | Arm.Lat.= [2 X -- B --- mm] - LN= .9 |  |
|                          |  |                |  | Fle.Adm.= .9                         |  |
| [tf,cm]   M[-]Min = 70.4 |  | M[+]Min = 70.4 |  | M[-                                  |  |
| ]Min = 70.4              |  |                |  |                                      |  |
| [cm2 ]   Asapo[+]= .80   |  |                |  |                                      |  |
| Asapo[+]= .80            |  |                |  |                                      |  |

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.- | 260. | 1.60 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|-----|------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 1.50 /B= .14 /H= .40 /BCs= .23 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf* m - Abcis.= 150 |  | M.[-] |
| = .4 tf* m       |  |                                   |  |       |

|  |  |                           |  |      |
|--|--|---------------------------|--|------|
| [tf,cm]   As = .84 -SRAS- [ 2 B 8.0mm] |  | AsL= .00 ----- Flecha= .0 |  | As = |
| .84 -SRAS- [ 2 B 8.0mm]                |  |                           |  |      |

|                          |  |                               |  |      |
|--------------------------|--|-------------------------------|--|------|
| AsL= .00 ----- x/d = .05 |  | As = .84 -STAS- [ 2 B 8.0mm ] |  | AsL= |
| .00 ----- x/d = .05      |  |                               |  |      |

|            |  |            |  |                                       |  |
|------------|--|------------|--|---------------------------------------|--|
| x/dMx= .37 |  | x/dMx= .37 |  | Arm.Lat.= [2 X -- B --- mm] - LN= 1.3 |  |
|            |  |            |  | Fle.Adm.= .5                          |  |

|                          |  |                |  |     |
|--------------------------|--|----------------|--|-----|
| [tf,cm]   M[-]Min = 70.4 |  | M[+]Min = 70.4 |  | M[- |
| ]Min = 70.4              |  |                |  |     |

|                        |  |  |  |  |
|------------------------|--|--|--|--|
| [cm2 ]   Asapo[+]= .80 |  |  |  |  |
| Asapo[+]= .80          |  |  |  |  |

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.- | 136. | .61 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|-----|------|-----|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 4.59 /B= .14 /H= .40 /BCs= .42 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf* m - Abcis.= 155 |  | M.[-] |
| = .7 tf* m       |  |                                   |  |       |

|  |  |                           |  |      |
|--|--|---------------------------|--|------|
| [tf,cm]   As = .84 -SRAS- [ 2 B 8.0mm] |  | AsL= .00 ----- Flecha= .1 |  | As = |
| .84 -SRAS- [ 2 B 8.0mm]                |  |                           |  |      |

|                        |            |                               |                      |      |
|------------------------|------------|-------------------------------|----------------------|------|
| AsL= .00               | x/d = .05  | As = .84                      | -STAS- [ 2 B 8.0mm ] | AsL= |
| x/d = .05              |            |                               |                      |      |
| x/dMx= .37             | x/dMx= .37 | Arm.Lat.= [ 2 X -- B --- mm ] | LN= .7               |      |
|                        |            |                               | Fle.Adm.= 1.5        |      |
| [tf,cm] M[-]Min = 70.4 |            | M[+]Min = 70.4                |                      | M[-] |
| Min = 70.4             |            |                               |                      |      |
| [cm2 ] Asapo[+]= .80   |            |                               |                      |      |
| Asapo[+]= .80          |            |                               |                      |      |

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.- 440. 1.21 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 5 /L= 3.09 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 135 | M.[-]  
= .2 tf\* m

[tf,cm] As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
x/d = .05

x/dMx= .37 x/dMx= .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= 2.1 |  
|

| Fle.Adm.= 1.0 |

[tf,cm] M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
Min = 70.4

[cm2 ] Asapo[+]= .80 |  
Asapo[+]= .80

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.- 285. .46 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 6 /L= 2.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .0 tf\* m - Abcis.= 208 | M.[-]  
= .0 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .0 | As =  
 .00 -SRAS- [ 0 B 6.3mm ]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .00  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 | Fle.Adm.= .7 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 181. .39 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC.    | APOIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|-------|-----|---------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |       |     |         |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 1   | .141    | .122    | .40     | .08   | 0     | P50  | .00    | .00    | 50 | 0 |
| 0        | 0     | 2   | 1.748   | 1.715   | .40     | .08   | 0     | P41  | .00    | .00    | 41 | 0 |
| 0        | 0     | 3   | 1.360   | 1.315   | .14     | .00   | 0     | P29  | .00    | .00    | 29 | 0 |
| 0        | 0     | 4   | 1.131   | 1.097   | .14     | .00   | 0     | P21  | .00    | .00    | 21 | 0 |
| 0        | 0     | 5   | 1.170   | 1.165   | .40     | .08   | 0     | P8   | .00    | .00    | 8  | 0 |
| 0        | 0     | 6   | .525    | .517    | .40     | .08   | 0     | P4   | .00    | .00    | 4  | 0 |
| 0        | 0     | 7   | .008    | .007    | .14     | .00   | 2     | V101 | .00    | .00    | 0  | 0 |

=====

Viga= 121 V121 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 1.94 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 16 | M.[-]  
 = .1 tf\* m

[tf,cm] | As = .14 -SRAS- [ 2 B 6.3mm ] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm ]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 x/dMx= .37

|                         |  |                |              |     |
|-------------------------|--|----------------|--------------|-----|
|                         |  |                | Fle.Adm.= .6 |     |
| [tf,cm]  M[-]Min = 70.4 |  | M[+]Min = 70.4 |              | M[- |
| ]Min = 70.4             |  |                |              |     |
| [cm2 ]  Asapo[+]= .84   |  |                |              |     |
| Asapo[+]= .80           |  |                |              |     |

|                 |     |      |     |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|-----|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 170. | .37 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 2.79 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf* m - Abcis.= 167 |                   | M.[-]                                 |       |
| = .0 tf* m                            |                 |                                   |                   |                                       |       |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] |                 | AsL= .00 ----- Flecha= .1         |                   | As =                                  |       |
| .84 -SRAS- [ 2 B 8.0mm]               |                 |                                   |                   |                                       |       |
| AsL= .00 ----- x/d = .05              |                 | As = .84 -SRAS- [ 2 B 8.0mm ]     |                   | AsL=                                  |       |
| .00 ----- x/d = .05                   |                 |                                   |                   |                                       |       |
|                                       |                 | x/dMx= .37                        |                   | Arm.Lat.= [2 X -- B --- mm] - LN= 2.1 |       |
| x/dMx= .37                            |                 |                                   |                   |                                       |       |
|                                       |                 |                                   |                   | Fle.Adm.= .9                          |       |
| [tf,cm]  M[-]Min = 70.4               |                 | M[+]Min = 70.4                    |                   | M[-                                   |       |
| ]Min = 70.4                           |                 |                                   |                   |                                       |       |
| [cm2 ]  Asapo[+]= .80                 |                 |                                   |                   |                                       |       |
| Asapo[+]= .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.- | 260. | .31 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

|                   |         |         |         |       |       |      |        |          |
|-------------------|---------|---------|---------|-------|-------|------|--------|----------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn   |
| Pilares:          |         |         |         |       |       |      |        |          |
| 0 0 1 0           | .019    | .015    | .40     | .08   | 0     | P52  | .00    | .00 52 0 |
| 0 0 2 0           | .478    | .472    | .40     | .08   | 0     | P42  | .00    | .00 42 0 |
| 0 0 3 0           | .172    | .170    | .14     | .00   | 0     | P31  | .00    | .00 31 0 |

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Viga= 122 V122 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.28 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 140 | M.[-]  
= .2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .80

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.- 309. .40 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.12 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 136 | M.[-]  
= .2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .80

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.- 288. .36 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.07 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 131 | M.[-]  
= .2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 283. .38 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| 0 0 1             | .182    | .180    | .14     | .00   | 0     | P23  | .00    | .00    |
| 0 0 2             | .463    | .462    | .40     | .08   | 0     | P15  | .00    | .00    |
| 0 0 3             | .413    | .410    | .40     | .08   | 0     | P5   | .00    | .00    |
| 0 0 4             | .273    | .270    | .40     | .08   | 0     | P3   | .00    | .00    |

=====

Viga= 123 V123 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .86 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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=      .4 tf* m - Abcis.= 180      | M.[-]
      .5 tf* m

[tf,cm]| As =      .84 -SRAS- [ 2 B 8.0mm] | AsL=      .00 ----- Flecha=      .0      | As =
.84 -SRAS- [ 2 B 8.0mm]

      | AsL=      .00 ----- x/d = .05      | As =      .84 -STAS- [ 2 B 8.0mm ]      | AsL=
.00 ----- x/d = .05

      | x/dMx= .37      | Arm.Lat.=[2 X -- B --- mm] - LN=      .3      |
x/dMx= .37

      |
      | Fle.Adm.= 1.2      |
[tf,cm]| M[-]Min =      70.4      | M.[+]Min =      70.4      | M[-]
]Min =      70.4

[cm2 ]| Asapo[+]=      .28      |
Asapo[+]=      .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.- 346.      .98 22.17 1 45.      .0 1.4 1.4 5.0 20.0 2 .0 .0

```

```

REAC. APOIO - No.      Maximos      Minimos      Largura      DEPEV      Morte      Nome      M.I.Mx M.I.Mn
Pilares:
0      0      1      .155      .155      .14      .00      2      V107      .00      .00      0      0
0      0      2      .691      .691      .14      .00      2      V103      .00      .00      0      0

```

```

Viga= 124 V124      Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

```

```

----- G E O M E T R I A      E      C A R G A S -----
-----
Vao= 1 /L= 2.89 /B= .14 /H= .40 /BCs= .43 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .07 [M]
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---
DeltaE= .90 DeltaD= .90 ---

```

```

* * * * *
Diagrama M[-] nao usual. Verificar apoios com M[-] Max.
* * * * *

```

```

- - - - - 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 tf* m      | M.[+] Max=      .3 tf* m - Abcis.= 216      | M.[-]
=      .0 tf* m

[tf,cm]| As =      .84 -SRAS- [ 2 B 8.0mm] | AsL=      .00 ----- Flecha=      .0      | As =
.00 -SRAS- [ 0 B 6.3mm]

      | AsL=      .00 ----- x/d = .05      | As =      .84 -STAS- [ 2 B 8.0mm ]      | AsL=
.00 ----- x/d = .00

      | x/dMx= .37      | Arm.Lat.=[2 X -- B --- mm] - LN=      .7      |
Grampos Dir.= 1B 6.3mm x/dMx= .37

      |
      | Fle.Adm.= 1.0      |
[tf,cm]| M[-]Min =      70.4      | M.[+]Min =      70.4      | M[-]
]Min =      70.4

```



[cm2 ]| Asapo[+]= .34  
Asapo[+]= .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.- 270. 2.75 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 1.960 1.959 .30 .03 1 P43 .00 .00 43 0  
0 0 2 .347 .347 .14 .00 2 V109 .00 .00 0 0  
=====

Viga= 125 V125 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1B /L= .51 /B= .14 /H= .40 /BCs= .24 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .0  
BAL.ESQ | x/d = .06 | AsL= .00 - |  
Flecha Adm.= .3  
[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 44. .09 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .1

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 .028 .028 .14 .00 1 P44 .00 .00 44 0  
=====

Viga= 126 V126 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .86 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

```

- - - - - 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 tf* m - Abcis.= 150 | M.[-]
= .1 tf* m
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =
.84 -SRAS- [ 2 B 8.0mm]
| AsL= .00 ----- x/d = .00 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .05
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .3 |
x/dMx= .37
| | | Fle.Adm.= 1.2 |
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]
]Min = 70.4
[cm2 ]| Asapo[+]= .84 | |
Asapo[+]= .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.- 346. .40 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

```

```

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
0 0 1 .219 .219 .14 .00 2 V107 .00 .00 0 0
0 0 2 .285 .285 .14 .00 2 V103 .00 .00 0 0
0 0 0 0

```

=====

Viga= 127 V127 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----

```

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .84 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

```

- - - - - 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 tf* m | M.[+] Max= .1 tf* m - Abcis.= 232 | M.[-]
= .0 tf* m
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =
.00 -SRAS- [ 0 B 6.3mm]
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .00
| | | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .3 |
Grampos Dir.= 1B 6.3mm x/dMx= .37
| | | Fle.Adm.= 1.2 |
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]
]Min = 70.4

```

[cm2 ]| Asapo[+]= .28  
Asapo[+]= .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.- 330. .45 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
1 .321 .320 .30 .03 1 P45 .00 .00 45 0  
0 0 0 0  
2 .168 .168 .14 .00 2 V109 .00 .00 0 0  
0 0 0 0  
=====

Viga= 128 V128 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.60 /B= .14 /H= .40 /BCs= .86 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 150 | M.[-]  
= .1 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .00 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .3 |  
x/dMx= .37  
| | | Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 | |  
Asapo[+]= .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.- 346. .41 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
1 .212 .212 .14 .00 2 V107 .00 .00 0 0  
0 0 0 0  
2 .292 .292 .14 .00 1 P11 .00 .00 11 0  
0 0 0 0  
=====

Viga= 129 V129 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .84 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf\* m - Abcis.= 349 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .3 |  
| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .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.- 330. .51 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 0 0 .362 .362 .30 .03 1 P47 .00 .00 47 0  
0 0 0 0 .127 .126 .14 .00 2 V109 .00 .00 0 0

Viga= 130 V130 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 1.50 /B= .14 /H= .40 /BCs= .36 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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=                       | .0 tf* m - Abcis.= 150   | M.[-] |
|           |                     | 1.0 tf* m               |                                  |                          |       |
| [tf,cm]   | As =                | .84 -SRAS- [ 2 B 8.0mm] | AsL=                             | .00 ----- Flecha= .0     | As =  |
| .90       | -SRAS- [ 2 B 8.0mm] |                         |                                  |                          |       |
|           | AsL=                | .00 ----- x/d = .05     | As =                             | .84 -STAS- [ 2 B 8.0mm ] | AsL=  |
| .00       | ----- x/d = .06     |                         |                                  |                          |       |
|           |                     | x/dMx= .37              | Arm.Lat.=[2 X -- B --- mm] - LN= | .8                       |       |
| x/dMx=    | .37                 |                         |                                  |                          |       |
|           |                     |                         |                                  | Fle.Adm.= .5             |       |
| [tf,cm]   | M[-]Min =           | 70.4                    | M[+]Min =                        | 70.4                     | M[-   |
| ]Min =    | 70.4                |                         |                                  |                          |       |
| [cm2 ]    | Asapo[+]=           | .28                     |                                  |                          |       |
| Asapo[+]= | .80                 |                         |                                  |                          |       |

|                 |     |      |      |       |     |      |        |        |          |     |      |    |       |       |
|-----------------|-----|------|------|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| 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.- | 136. | 1.12 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.60 /B= .14 /H= .40 /BCs= .68 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00

FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---

DeltaE= .90 DeltaD= .90 ---

- - - - - 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=                       | .7 tf* m - Abcis.= 120   | M.[-] |
| =         |                     | .2 tf* m                |                                  |                          |       |
| [tf,cm]   | As =                | .91 -SRAS- [ 2 B 8.0mm] | AsL=                             | .00 ----- Flecha= .0     | As =  |
| .84       | -SRAS- [ 2 B 8.0mm] |                         |                                  |                          |       |
|           | AsL=                | .00 ----- x/d = .07     | As =                             | .84 -STAS- [ 2 B 8.0mm ] | AsL=  |
| .00       | ----- x/d = .05     |                         |                                  |                          |       |
|           |                     | x/dMx= .37              | Arm.Lat.=[2 X -- B --- mm] - LN= | .4                       |       |
| x/dMx=    | .37                 |                         |                                  |                          |       |
|           |                     |                         |                                  | Fle.Adm.= 1.2            |       |
| [tf,cm]   | M[-]Min =           | 70.4                    | M[+]Min =                        | 70.4                     | M[-   |
| ]Min =    | 70.4                |                         |                                  |                          |       |
| [cm2 ]    | Asapo[+]=           | .80                     |                                  |                          |       |
| Asapo[+]= | .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.- | 346. | 2.17 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | 1.0   |

|                   |         |         |         |       |       |      |        |          |
|-------------------|---------|---------|---------|-------|-------|------|--------|----------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn   |
| Pilares:          |         |         |         |       |       |      |        |          |
| 0 0 1             | -.591   | -.593   | .14     | .00   | 2     | V109 | .00    | .00 0 0  |
| 0 0 2             | 2.355   | 2.351   | .14     | .00   | 1     | P28  | .00    | .00 28 0 |
| 0 0 3             | .514    | .513    | .14     | .00   | 2     | V103 | .00    | .00 0 0  |
| 0 0 0             | 0       |         |         |       |       |      |        |          |

=====

Viga= 131 V131 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.49 /B= .14 /H= .40 /BCs= .84 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .9 tf\* m - Abcis.= 290 | M.[-]  
= .1 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .3 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| Fle.Adm.= 1.2 |  
[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]

]Min = 70.4 |  
[cm2 ]| Asapo[+]= .28 |

Asapo[+]= .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.- 330. 2.49 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 1.3

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

1 .679 .678 .30 .03 1 P48 .00 .00 48 0  
0 0 0 0

2 1.778 1.777 .14 .00 1 P37 .00 .00 37 0  
0 0 0 0

=====

Viga= 132 V132 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 2.29 /B= .14 /H= .40 /BCs= .60 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf* m          | M.[+] Max=          .0 tf* m - Abcis.= 229 | M.[-]
      | .1 tf* m
[tf,cm]| As =          .84 -SRAS- [ 2 B 8.0mm] | AsL=          .00 ----- Flecha=          .0 | As =
.84 -SRAS- [ 2 B 8.0mm]
      | AsL=          .00 ----- x/d = .05 | As =          .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .05
      | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN=          .5 |
      | | | Fle.Adm.=          .8 |
[tf,cm]| M[-]Min =          70.4 | M[+]Min =          70.4 | M[-]
]Min =          70.4
[cm2 ]| Asapo[+]=          .28 |
Asapo[+]=          .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.- 210.      .33 22.17 1 45.      .0 1.4 1.4 5.0 20.0 2 .0 .0
  
```

```

REAC. APOIO - No.      Maximos      Minimios      Largura      DEPEV      Morte      Nome      M.I.Mx M.I.Mn
Pilares:
0      0      1      .237      .237      .30      .03      1      P17      .00      .00      17      0
0      0      2      .084      .084      .14      .00      2      V103      .00      .00      0      0
  
```

```

Viga= 133 V133 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM
  
```

```

----- G E O M E T R I A          E          C A R G A S -----
-----
  
```

```

Vao= 1 /L= 3.35 /B= .14 /H= .40 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .07 [M]
  
```

```

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---
DeltaE= .90 DeltaD= .90 ---
  
```

```

- - - - - 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=          .4 tf* m - Abcis.= 140 | M.[-]
      | .3 tf* m
[tf,cm]| As =          .84 -SRAS- [ 2 B 8.0mm] | AsL=          .00 ----- Flecha=          .0 | As =
.84 -SRAS- [ 2 B 8.0mm]
      | AsL=          .00 ----- x/d = .05 | As =          .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .05
      | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN=          .5 |
x/dMx= .37
      | | | Fle.Adm.= 1.1 |
[tf,cm]| M[-]Min =          70.4 | M[+]Min =          70.4 | M[-]
]Min =          70.4
[cm2 ]| Asapo[+]=          .84 |
Asapo[+]=          .80
  
```

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.- 316. .94 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.29 /B= .14 /H= .40 /BCs= .31 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

\* \* \* \* \*

Diagrama M[-] nao usual. Verificar apoios com M[-] Max.

\* \* \* \* \*

- - - - - 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= .0 tf\* m - Abcis.= 232 | M.[-]  
= .1 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  
| | Fle.Adm.= .8 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 210. .52 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| 0 0 1             | .456    | .456    | .14     | .00   | 1     | P38  | .00    | .00    |
| 0 0 2             | 1.033   | 1.033   | .30     | .03   | 1     | P18  | .00    | .00    |
| 0 0 3             | .291    | .291    | .14     | .00   | 1     | P14  | .00    | .00    |

Viga= 134 V134 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----



Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf\* m - Abcis.= 300 | M.[-]  
= .2 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .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.- 286. .32 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 .226 .226 .14 .00 2 V115 .00 .00 0 0  
0 0 2 .194 .194 .14 .00 2 V111 .00 .00 0 0

Viga= 151 C1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 1.11 /B= .12 /H= .25 /BCs= .23 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .13 /FLt.Ex= .06 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 74 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .45 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.45 -SRAS- [ 2 B 6.3mm]  
| AsL= .00 ----- x/d = .05 | As = .46 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

|                          |  |                |  |                                      |  |
|--------------------------|--|----------------|--|--------------------------------------|--|
| x/dMx= .37               |  | x/dMx= .37     |  | Arm.Lat.= [2 X -- B --- mm] - LN= .7 |  |
|                          |  |                |  | Fle.Adm.= .4                         |  |
| [tf,cm]   M[-]Min = 23.6 |  | M[+]Min = 23.6 |  | M[-                                  |  |
| ]Min = 23.6              |  |                |  |                                      |  |
| [cm2 ]   Asapo[+]= .15   |  |                |  |                                      |  |
| Asapo[+]= .15            |  |                |  |                                      |  |

|                                  |     |     |     |       |     |      |        |        |          |     |      |    |       |       |
|----------------------------------|-----|-----|-----|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf  | Vsd | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
| [tf,cm]                          | 0.- | 96. | .78 | 11.20 | 1   | 45.  | .0     | 1.2    | 1.2      | 5.0 | 12.5 | 2  | .0    | .0    |

|                   |         |         |         |       |       |      |        |           |
|-------------------|---------|---------|---------|-------|-------|------|--------|-----------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn    |
| Pilares:          |         |         |         |       |       |      |        |           |
| 0 0 1 0           | .555    | .554    | .25     | .05   | 1     | PA3  | .00    | .00 903 0 |
| 0 0 2 0           | .490    | .490    | .25     | .05   | 1     | PA1  | .00    | .00 901 0 |

Viga= 152 C2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 1.11 /B= .12 /H= .25 /BCs= .23 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .13 /FLt.Ex= .06 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 74 | M.[-]  
= .0 tf\* m  
[tf,cm] | As = .45 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.45 -SRAS- [ 2 B 6.3mm]  
| AsL= .00 ----- x/d = .05 | As = .46 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= .7 |  
| | Fle.Adm.= .4 |  
[tf,cm] | M[-]Min = 23.6 | M[+]Min = 23.6 | M[-  
]Min = 23.6  
[cm2 ] | Asapo[+]= .15 |  
Asapo[+]= .15

|                                  |     |     |     |       |     |      |        |        |          |     |      |    |       |       |
|----------------------------------|-----|-----|-----|-------|-----|------|--------|--------|----------|-----|------|----|-------|-------|
| CISALHAMENTO-<br>M E N S A G E M | Xi  | Xf  | Vsd | VRd2  | MdC | Ang. | Asw[C] | Aswmin | Asw[C+T] | Bit | Esp  | NR | AsTrt | AsSus |
| [tf,cm]                          | 0.- | 96. | .75 | 11.20 | 1   | 45.  | .0     | 1.2    | 1.2      | 5.0 | 12.5 | 2  | .0    | .0    |

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

|       |   |   |      |      |     |     |   |     |     |     |     |   |
|-------|---|---|------|------|-----|-----|---|-----|-----|-----|-----|---|
| 0     | 0 | 1 | .532 | .531 | .25 | .05 | 1 | PA4 | .00 | .00 | 904 | 0 |
| 0     | 0 | 2 | .477 | .477 | .25 | .05 | 1 | PA2 | .00 | .00 | 902 | 0 |
| ===== |   |   |      |      |     |     |   |     |     |     |     |   |
| ===== |   |   |      |      |     |     |   |     |     |     |     |   |

## Pavimento Coberta – N2

fck=250.kgf/cm2 - Aco: CA-60B CA-50A - Esforços

Caracteristicos

L E G E N D A

G E O M E T R I A

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :  
Repeticoes

NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :  
Fator de Alternancia de Cargas

Cob : Cobrimento / TpS : Tipo da Secao / BCs :  
Mesa Colaborante Superior

BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :  
Espessura Laje Inferior

FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S :  
Cobrim/Cobr.superior adicional

C A R G A S

MEsq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q :  
Cortante Adicional (valor unico)

A R M A D U R A S - F L E X A O

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS :  
Secao Te Armadura Simples

STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx :  
Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :  
Armadura e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :  
Armad.transv.minima-cisalhamento

Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :  
Espacamento selecionado

NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus :  
Armadura transversal-Suspensao

A R M A D U R A S - T O R C A O

%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de  
torcao

b-nuc : Largura do nucleo / h-nuc : Altura do nucleo

Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-  
torcao p/NR estribos selecionado

Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal  
de torcao no lado h

ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao  
plastica no vao - S[sim] N[nao]

R E A C O E S D E A P O I O

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre /  
segue / vigas

M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

=====

Viga= 201 V201 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1B /L= 2.23 /B= .14 /H= .40 /BCs= 1.03 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 2.19 tf\* m | As = 2.12 -SRAS- [ 3 B 10.0mm] |  
Flecha = 1.1

BAL.ESQ | x/d = .15 | AsL= .00 - |  
Flecha Adm.= 1.5

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
Baric.Armad.= 3

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.- 195. 1.91 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.93 /B= .14 /H= .40 /BCs= .49 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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.[-] = 1.3 tf\* m | M.[+] Max= .2 tf\* m - Abcis.= 225 | M.[-]  
= .2 tf\* m

[tf,cm] | As = 2.12 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .15 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |

| | Fle.Adm.= 1.0 |

[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ] | Asapo[+]= .21 |  
Asapo[+]= .80

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.- 269. 3.02 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 2.00 /B= .14 /H= .40 /BCs= .29 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .2 tf\* m - Abcis.= 173 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.14 -SRAS- [ 2 B 6.3mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.0 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37

| Fle.Adm.= .7 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80 |  
Asapo[+]= .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.- 181. 1.01 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |   |   |
|-------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|---|---|
| 0     | 0    | 1   | 3.450   | 3.445   | .40     | .08   | 1     | P1   | .00    | .00    | 1 | 0 |
| 0     | 0    | 2   | 1.570   | 1.559   | .40     | .08   | 1     | P2   | .00    | .00    | 2 | 0 |
| 0     | 0    | 3   | .719    | .712    | .14     | .00   | 1     | P3   | .00    | .00    | 3 | 0 |

=====

Viga= 202 V202 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.34 /B= .14 /H= .40 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 199 | M.[-]  
= .7 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
 | Fle.Adm.= 1.1 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .21 |  
 Asapo[+]= .80

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.- 310. 1.70 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 2 /L= 3.34 /B= .14 /H= .40 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 142 | M.[-]  
 = .4 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
 | Fle.Adm.= 1.1 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4

[cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 310. 1.69 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 0 0 1 1.027 1.016 .40 .08 1 P21 .00 .00 21 0  
 0 0 2 2.388 2.370 .40 .08 1 P22 .00 .00 22 0  
 0 0 3 1.007 1.001 .40 .08 1 P23 .00 .00 23 0  
 0 0 0 0

=====

Viga= 203 V203 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 3.34 /B= .14 /H= .40 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.0 tf\* m - Abcis.= 170 | M.[-]  
= 1.5 tf\* m  
[tf,cm]| As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
1.42 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .06 | As = .90 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .10  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .22 |  
Asapo[+]= .80

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.- 310. 4.21 22.17 1 45. .2 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 3.34 /B= .14 /H= .40 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= 1.0 tf\* m - Abcis.= 199 | M.[-]  
= .8 tf\* m  
[tf,cm]| As = 1.51 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .11 | As = .86 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
| Fle.Adm.= 1.1 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80  
Asapo[+]= .22

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.- 310. 3.52 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 2.190 2.186 .40 .08 1 P29 .00 .00 29 0  
0 0 2 5.443 5.437 .40 .08 1 P30 .00 .00 30 0  
0 0 3 1.949 1.947 .40 .08 1 P31 .00 .00 31 0

Viga= 204 V204 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 2.59 /B= .14 /H= .40 /BCs= .33 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 111 | M.[-]  
= 1.7 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
1.60 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .11  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  
x/dMx= .37  
| | Fle.Adm.= .9 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84  
Asapo[+]= .80

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.- 240. 3.78 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 4.50 /B= .14 /H= .40 /BCs= .48 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---



```

- - - - - 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= 2.1 tf* m - Abcis.= 267 | M.[-]
= .4 tf* m

[tf,cm]| As = 2.69 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- Flecha= .2 | As =
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .20 | As = 1.92 -STAS- [ 3 B 10.0mm ] | AsL=
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
| Fle.Adm.= 1.5 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]
]Min = 70.4

[cm2 ]| Asapo[+]= .80 |
Asapo[+]= .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.- 431. 4.42 22.17 1 45. .3 1.4 1.4 5.0 20.0 2 .0 .0

```

```

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

0 0 1 .719 .714 .14 .00 1 P50 .00 .00 50 0
0 0 2 5.630 5.625 .40 .08 1 P51 .00 .00 51 0
0 0 3 2.543 2.542 .14 .00 1 P52 .00 .00 52 0
0 0 0 0

```

```

Viga= 205 V205 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

```

```

----- G E O M E T R I A E C A R G A S -----
-----

Vao= 1 /L= 1.94 /B= .14 /H= .40 /BCs= .29 /BCi= .00 /TpS= 5 /Esp.LS= .05 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---
DeltaE= .90 DeltaD= .90 ---

```

```

- - - - - 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 tf* m | M.[+] Max= .1 tf* m - Abcis.= 117 | M.[-]
= .4 tf* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.0 |
x/dMx= .37

```

|           |                |  |                |     |
|-----------|----------------|--|----------------|-----|
|           |                |  | Fle.Adm.= .6   |     |
| [tf,cm]   | M[-]Min = 70.4 |  | M[+]Min = 70.4 |     |
| ]         | Min = 70.4     |  |                | M[- |
| [cm2 ]    | Asapo[+]= .28  |  |                |     |
| Asapo[+]= | .80            |  |                |     |

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.- 170. 1.21 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 2.79 /B= .14 /H= .40 /BCs= .47 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .5 tf\* m - Abcis.= 143 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |  
x/dMx= .37

| | | Fle.Adm.= .9 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .80 | |  
Asapo[+]= .81

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.- 260. 1.26 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 1.50 /B= .14 /H= .40 /BCs= .32 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 0 | M.[-]  
= 2.0 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
1.94 -SRAS- [ 3 B 10.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .14

|                          |  |            |  |                                     |  |
|--------------------------|--|------------|--|-------------------------------------|--|
| x/dMx= .37               |  | x/dMx= .37 |  | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  |
|                          |  |            |  | Fle.Adm.= .5                        |  |
| [tf,cm]   M[-]Min = 70.4 |  |            |  | M[+]Min = 70.4                      |  |
| ]Min = 70.4              |  |            |  |                                     |  |
| [cm2 ]   Asapo[+]= .81   |  |            |  |                                     |  |
| Asapo[+]= .80            |  |            |  |                                     |  |

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.- | 136. | 2.25 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|-----|------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 4.59 /B= .14 /H= .40 /BCs= .69 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 2.2 tf* m |  |  | M.[+] Max= 2.4 tf* m - Abcis.= 233 |  |  | M.[-] |
| = 3.6 tf* m       |  |  |                                    |  |  |       |

|  |  |  |                           |  |  |      |
|--|--|--|---------------------------|--|--|------|
| [tf,cm]   As = 2.15 -SRAS- [ 3 B 10.0mm] |  |  | AsL= .00 ----- Flecha= .2 |  |  | As = |
| 3.65 -SRAS- [ 3 B 12.5mm]                |  |  |                           |  |  |      |

|                          |  |  |                                 |  |  |      |
|--------------------------|--|--|---------------------------------|--|--|------|
| AsL= .00 ----- x/d = .15 |  |  | As = 2.21 -STAS- [ 3 B 10.0mm ] |  |  | AsL= |
| .00 ----- x/d = .26      |  |  |                                 |  |  |      |

|            |  |            |  |                                      |  |
|------------|--|------------|--|--------------------------------------|--|
|            |  | x/dMx= .37 |  | Arm.Lat.=[2 X -- B --- mm] - LN= 1.1 |  |
| x/dMx= .37 |  |            |  |                                      |  |

|  |  |  |  |               |  |
|--|--|--|--|---------------|--|
|  |  |  |  | Fle.Adm.= 1.5 |  |
|--|--|--|--|---------------|--|

|                          |  |  |                |  |  |      |
|--------------------------|--|--|----------------|--|--|------|
| [tf,cm]   M[-]Min = 70.4 |  |  | M[+]Min = 70.4 |  |  | M[-] |
| ]Min = 70.4              |  |  |                |  |  |      |

|                        |  |  |  |  |  |
|------------------------|--|--|--|--|--|
| [cm2 ]   Asapo[+]= .80 |  |  |  |  |  |
| Asapo[+]= .80          |  |  |  |  |  |

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.  | 4.69 | 22.17 | 1     | 45. | .5  | 1.4 | 1.4 | 5.0 | 20.0 | 2    | .0 | .0 |
|         |     | 293.- | 440. | 8.24  | 22.17 | 1   | 45. | 3.0 | 1.4 | 3.0 | 5.0  | 12.5 | 2  | .0 |

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 5 /L= 3.09 /B= .14 /H= .40 /BCs= .51 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 2.3 tf* m |  |  | M.[+] Max= .9 tf* m - Abcis.= 162 |  |  | M.[-] |
| = 1.7 tf* m       |  |  |                                   |  |  |       |

| REAC.    | APOIO | - No.  | Maximos    | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |    |   |
|----------|-------|--------|------------|---------|---------|-------|-------|------|--------|--------|----|---|
| Pilares: |       |        |            |         |         |       |       |      |        |        |    |   |
| 0        | 0     | 1<br>0 | .399<br>0  | .381    | .40     | .08   | 1     | P50  | .00    | .00    | 50 | 0 |
| 0        | 0     | 2<br>0 | 1.739<br>0 | 1.704   | .40     | .08   | 1     | P41  | .00    | .00    | 41 | 0 |
| 0        | 0     | 3<br>0 | -.485<br>0 | -.538   | .14     | .00   | 1     | P29  | .00    | .00    | 29 | 0 |
| 0        | 0     | 4<br>0 | 4.955<br>0 | 4.915   | .14     | .00   | 1     | P21  | .00    | .00    | 21 | 0 |

|   |   |   |        |        |     |     |   |      |     |     |   |   |
|---|---|---|--------|--------|-----|-----|---|------|-----|-----|---|---|
| 0 | 0 | 5 | 10.461 | 10.456 | .40 | .08 | 1 | P8   | .00 | .00 | 8 | 0 |
| 0 | 0 | 6 | 6.204  | 6.196  | .40 | .08 | 1 | P4   | .00 | .00 | 4 | 0 |
| 0 | 0 | 7 | -.439  | -.439  | .14 | .00 | 2 | V201 | .00 | .00 | 0 | 0 |

=====

Viga= 206 V206 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 1.94 /B= .14 /H= .40 /BCs= .29 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 117 | M.[-]  
= .4 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.0 |  
x/dMx= .37

| Fle.Adm.= .6 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .80

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.- 170. 1.24 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 2.79 /B= .14 /H= .40 /BCs= .47 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 143 | M.[-]  
= .2 tf\* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

|                        |            |                               |                      |      |
|------------------------|------------|-------------------------------|----------------------|------|
| AsL= .00               | x/d = .05  | As = .84                      | -STAS- [ 2 B 8.0mm ] | AsL= |
| x/d = .05              |            |                               |                      |      |
| x/dMx= .37             | x/dMx= .37 | Arm.Lat.= [ 2 X -- B --- mm ] | LN= .6               |      |
|                        |            |                               | Fle.Adm.= .9         |      |
| [tf,cm] M[-]Min = 70.4 |            | M[+]Min = 70.4                |                      | M[-] |
| Min = 70.4             |            |                               |                      |      |
| [cm2 ] Asapo[+]= .80   |            |                               |                      |      |
| Asapo[+]= .80          |            |                               |                      |      |

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.- 260. .95 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 1.50 /B= .14 /H= .40 /BCs= .32 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .0 tf\* m - Abcis.= 150 | M.[-]  
= .7 tf\* m

[tf,cm] As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

AsL= .00 ----- x/d = .05 | As = .84 -STAS- [ 2 B 8.0mm ] | AsL=  
x/d = .05

x/dMx= .37 x/dMx= .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= .9 |  
|

| Fle.Adm.= .5 |

[tf,cm] M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
Min = 70.4

[cm2 ] Asapo[+]= .80 |  
Asapo[+]= .80

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.- 136. .77 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 3.28 /B= .14 /H= .40 /BCs= .53 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= 1.1 tf\* m - Abcis.= 168 | M.[-]  
= 1.9 tf\* m

|   |                                     |                                 |
|---|-------------------------------------|---------------------------------|
| [tf,cm]   As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .1           | As = 1.81 -SRAS- [ 3 B 10.0mm ] |
| AsL= .00 ----- x/d = .05                | As = .97 -STAS- [ 2 B 8.0mm ]       | AsL= .00 ----- x/d = .13        |
| x/dMx= .37                              | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |                                 |
|   | Fle.Adm.= 1.1                       |                                 |
| [tf,cm]   M[-]Min = 70.4                | M[+]Min = 70.4                      | M[-]Min = 70.4                  |
| [cm2 ]   Asapo[+]= .80                  |                                     |                                 |
| Asapo[+]= .80                           |                                     |                                 |

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.- 309. 4.80 22.17 1 45. .6 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 5 /L= 3.12 /B= .14 /H= .40 /BCs= .51 /BCi= .00 /TpS= 2 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.2 tf\* m - Abcis.= 164 | M.[-] = 1.9 tf\* m

[tf,cm] | As = 1.67 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- Flecha= .1 | As = 1.82 -SRAS- [ 3 B 10.0mm ]

| AsL= .00 ----- x/d = .12 | As = 1.08 -STAS- [ 2 B 10.0mm ] | AsL= .00 ----- x/d = .13

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |

| Fle.Adm.= 1.0 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]Min = 70.4

[cm2 ] | Asapo[+]= .80 | Asapo[+]= .80

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.- 288. 5.94 22.17 1 45. 1.4 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 6 /L= 3.07 /B= .14 /H= .40 /BCs= .37 /BCi= .00 /TpS= 8 /Esp.LS= .05 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= 1.0 tf\* m - Abcis.= 157 | M.[-]  
 .7 tf\* m  
 [tf,cm] | As = 1.70 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .12 | As = .89 -STAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  
 | | Fle.Adm.= 1.0 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .22

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.- 283. 5.45 22.17 1 45. 1.1 1.4 1.4 5.0 20.0 2 .0 .0

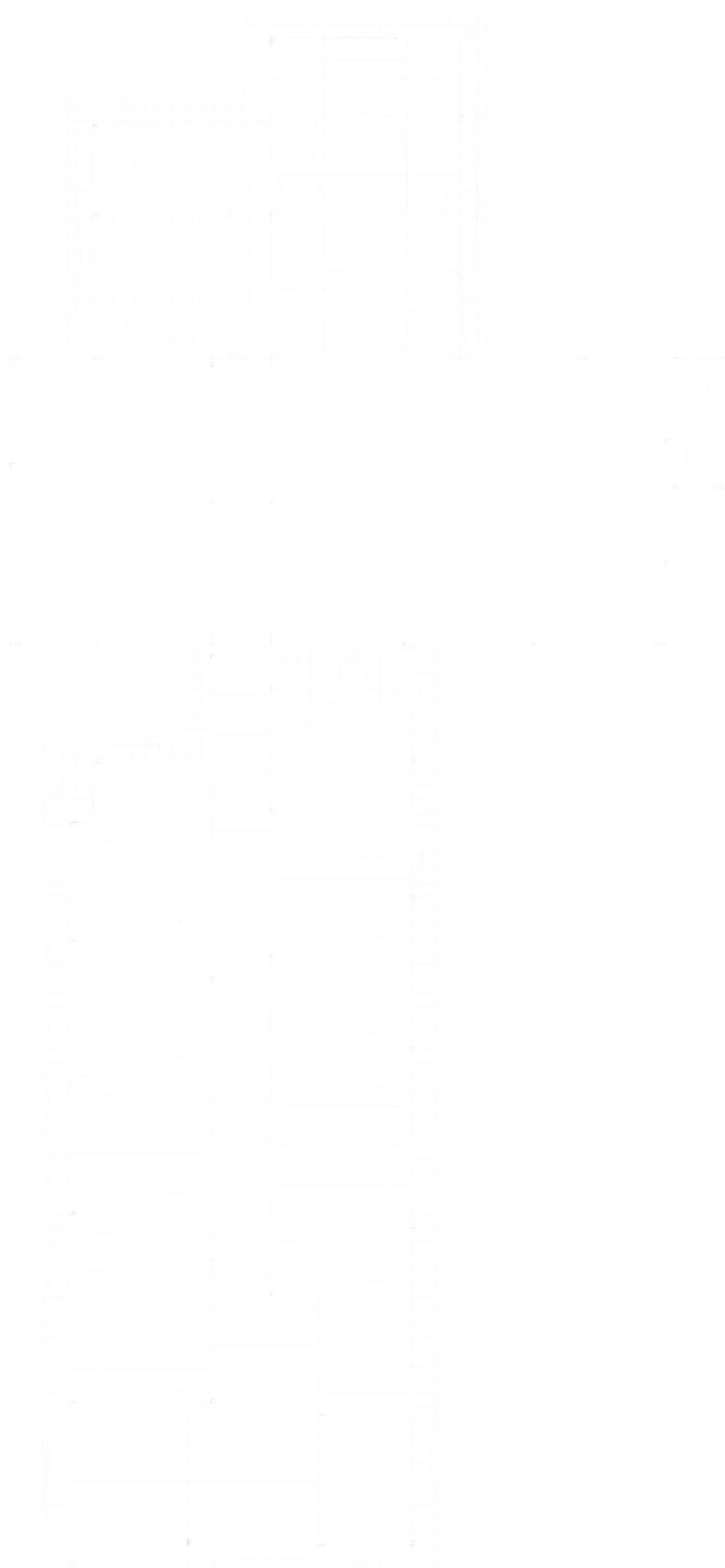
| REAC. APOIO - No. |   | Maximos | Minimos | Largura | DEPEV | Morte | Nome  | M.I.Mx | M.I.Mn |    |   |
|-------------------|---|---------|---------|---------|-------|-------|-------|--------|--------|----|---|
| Pilares:          |   |         |         |         |       |       |       |        |        |    |   |
| 0                 | 0 | 1       | .284    | .280    | .40   | .08   | 1 P52 | .00    | .00    | 52 | 0 |
| 0                 | 0 | 2       | 1.548   | 1.543   | .40   | .08   | 1 P42 | .00    | .00    | 42 | 0 |
| 0                 | 0 | 3       | .777    | .772    | .14   | .00   | 1 P31 | .00    | .00    | 31 | 0 |
| 0                 | 0 | 4       | 2.345   | 2.340   | .14   | .00   | 1 P23 | .00    | .00    | 23 | 0 |
| 0                 | 0 | 5       | 6.437   | 6.437   | .40   | .08   | 1 P15 | .00    | .00    | 15 | 0 |
| 0                 | 0 | 6       | 8.023   | 8.019   | .40   | .08   | 1 P5  | .00    | .00    | 5  | 0 |
| 0                 | 0 | 7       | 1.570   | 1.567   | .40   | .08   | 1 P3  | .00    | .00    | 3  | 0 |

=====

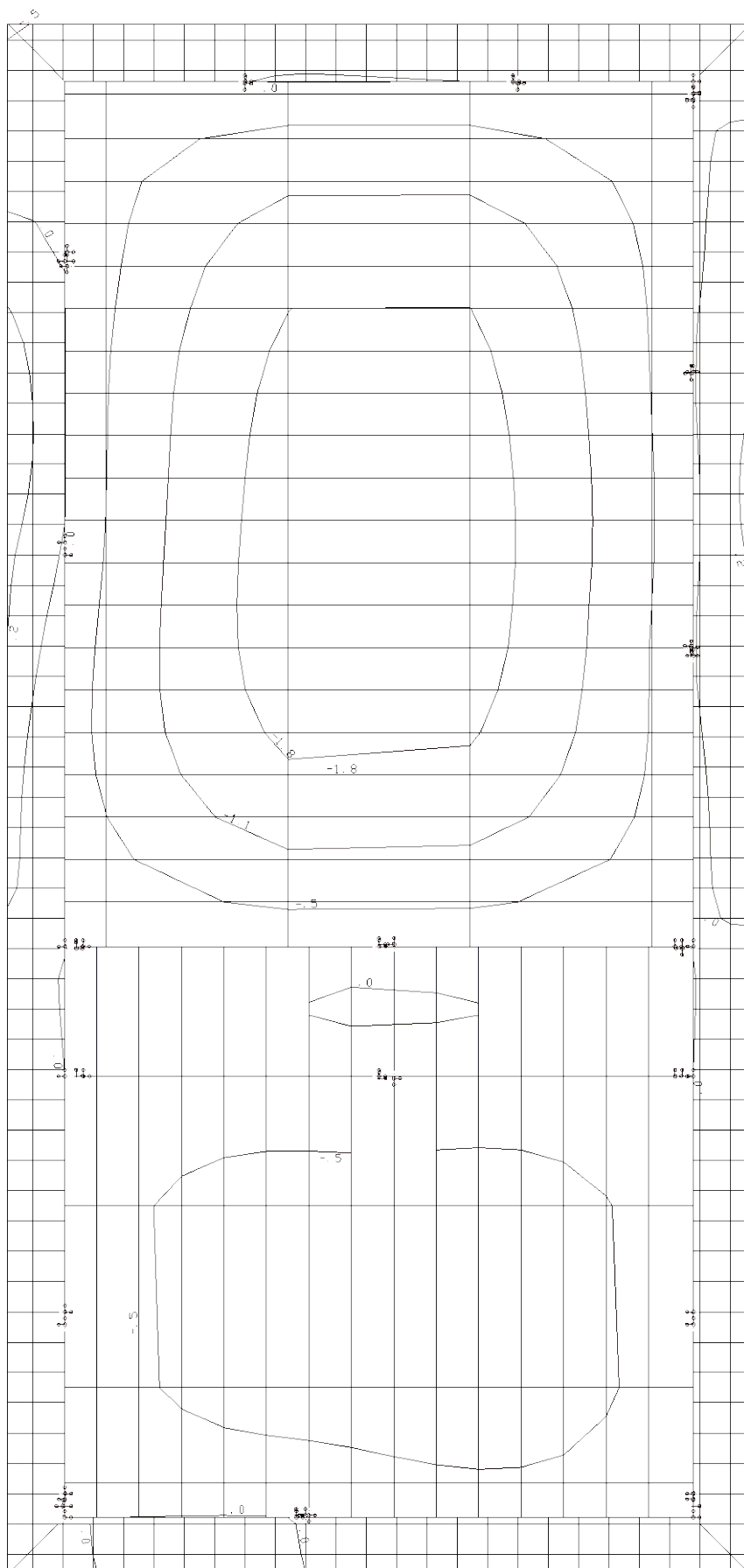


## 5. Dimensionamento de Lajes

### Pavimento Coberta – N1



**Pavimento Coberta – N2**



## 6. CASA DO GERADOR

## Dimensionamento das Sapatas

## LEGENDA

## LEGENDA

GEOMETRIA

|                  |   |
|------------------|---|
| Xpil, Ypil:      | dimensões em X e Y                                |
| ColarX, Colar Y: | larguras do colar em X e Y                        |
| Xsap, Ysap:      | dimensões em X e Y                                |
| H0x, H0y:        | altura do rodapé em X e Y                         |
| ExcX, ExcY:      | excentricidade em X e Y em relação ao CG do pilar |

CARREGAMENTO:

|               |  |
|---------------|--|
| Caso:         | caso de carregamento da sapata onde a situação de esforço ocorre |
| Comb:         | combinação onde a situação de esforço ocorre                     |
| Fzmin, Fzmax: | situação de força vertical mínima e máxima                       |
| Fxmin, Fxmax: | situação de força horizontal em X mínima e máxima                |
| Fymin, Fymax: | situação de força horizontal em Y mínima e máxima                |
| Mxmin, Mxmax: | situação de momento vetorial em torno de X mínimo e máximo       |
| Mymin, Mymax: | situação de momento vetorial em torno de Y mínimo e máximo       |
| N:            | força vertical para a combinação indicada                        |
| Mx, My:       | momento vetorial em torno de X e Y para a combinação indicada    |
| Fx, Fy:       | esforço cortante em X e Y para a combinação indicada             |

## RESULTADOS

|               |  |
|---------------|--|
| Caso:         | caso de carregamento da sapata onde a situação de esforço ocorre |
| Msd:          | momento fletor de cálculo  |
| rho:          | porcentagem mínima de armadura                                   |
| As,calc:      | área de armadura calculada com o momento atuante na seção        |
| As,calc,corr: | área de armadura corrigida no caso de sapatas retangulares       |
| Area,sec:     | área da seção de cálculo   |
| As,min,rho:   | área de armadura mínima calculada com rho                        |
| As,min,crit:  | área de armadura mínima imposto pelo arquivo de critérios        |
| As,det:       | área de armadura utilizada para o detalhamento                   |
| As,det/m:     | área de armadura por metro                                       |
| nf, bit, esp: | número de ferros, bitola e espaçamento                           |
| Vsd:          | esforço cortante de cálculo                                      |
| ds:           | altura útil da seção S   |
| bs:           | largura da seção S   |

Sapata: S1                      Número = 1    Repetições: 1

Sapata: S1                      Número = 1    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 80.00 Ysap: 110.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: -33.00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy  |
|-------|------|------|------|----|----|------|-----|
| FzMax | 1    | 9    | 6.20 | .0 | .0 | -.22 | .13 |
| FzMin | 1    | 9    | 6.20 | .0 | .0 | -.22 | .13 |
| FxMax | 1    | 9    | 6.20 | .0 | .0 | -.22 | .13 |
| FxMin | 1    | 9    | 6.20 | .0 | .0 | -.22 | .13 |
| FyMax | 1    | 9    | 6.20 | .0 | .0 | -.22 | .13 |
| FyMin | 1    | 9    | 6.20 | .0 | .0 | -.22 | .13 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 2.79 | 1    |            |
| -X      | .00  | 1    |            |
| +Y      | .79  | 1    |            |
| -Y      | .73  | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 4.22 | 1    | 43.39  |            |
| -X      | .00  | 1    | 43.39  |            |
| +Y      | 2.52 | 1    | 43.39  |            |
| -Y      | 2.35 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 5.41 | 1    | 30.03  |            |
| -X      | .00  | 1    | 14.15  |            |
| +Y      | .77  | 1    | 9.03   |            |
| -Y      | .71  | 1    | 9.03   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

| rho(%): .120 |      |         |              |          |            |             |        |  |
|--------------|------|---------|--------------|----------|------------|-------------|--------|--|
| Sentido      | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |  |
| X            | 2.79 | 1.84    | 1.84         | 3900.0   | 4.68       | 1.50        | 4.7    |  |
| Y            | .79  | .53     | .53          | 2610.0   | 3.13       | 1.50        | 3.1    |  |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 4.7    | 4.3      | 10 | 8.0 | 11.0 |            |
| Y       | 3.1    | 3.9      | 6  | 8.0 | 12.0 |            |



VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .40 | .26     | .26          | 2700.0   | 3.24       | 1.50        | 3.2    |
| Y       | .20 | .24     | .24          | 2310.0   | 2.77       | 1.50        | 3.2    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.2    | 4.6      | 6  | 8.0 | 10.0 |            |
| Y       | 3.2    | 4.6      | 6  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 2.8 | 19.0   |            |
| Y       | 2.1 | 10.4   |            |

Sapata: S3 Número = 3 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 60.00 Ysap: 90.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: -23.00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 3.02 | .0 | .0 | .15 | .12 |
| FzMin | 1    | 9    | 3.02 | .0 | .0 | .15 | .12 |
| FxMax | 1    | 9    | 3.02 | .0 | .0 | .15 | .12 |
| FxMin | 1    | 9    | 3.02 | .0 | .0 | .15 | .12 |
| FyMax | 1    | 9    | 3.02 | .0 | .0 | .15 | .12 |
| FyMin | 1    | 9    | 3.02 | .0 | .0 | .15 | .12 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.01 | 1    |            |
| +Y      | .33  | 1    |            |
| -Y      | .27  | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.68 | 1    | 43.39  |            |
| -X      | .00  | 1    | 43.39  |            |
| +Y      | 1.41 | 1    | 43.39  |            |
| -Y      | 1.16 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.35 | 1    | 22.63  |            |
| -X      | .00  | 1    | 11.58  |            |
| +Y      | .37  | 1    | 6.01   |            |
| -Y      | .29  | 1    | 6.01   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.01 | .67     | .67          | 3150.0   | 3.78       | 1.50        | 3.8    |
| Y       | .33  | .22     | .22          | 2010.0   | 2.41       | 1.50        | 2.4    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.8    | 4.2      | 8  | 8.0 | 10.0 |            |
| Y       | 2.4    | 4.0      | 5  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.2 | 25.4   |            |
| Y       | 2.1 | 15.7   |            |

Sapata: S4 Número = 4 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 90.00 Ysap: 90.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 6.22 | .0 | .0 | .03 | .15 |
| FzMin | 3    | 15   | 6.21 | .0 | .0 | .03 | .15 |
| FxMax | 1    | 9    | 6.22 | .0 | .0 | .03 | .15 |
| FxMin | 1    | 9    | 6.22 | .0 | .0 | .03 | .15 |

|       |   |   |      |    |    |     |     |
|-------|---|---|------|----|----|-----|-----|
| FyMax | 1 | 9 | 6.22 | .0 | .0 | .03 | .15 |
| FyMin | 1 | 9 | 6.22 | .0 | .0 | .03 | .15 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Ms  | Caso | Observação |
|---------|-----|------|------------|
| +X      | .90 | 1    |            |
| -X      | .89 | 1    |            |
| +Y      | .70 | 1    |            |
| -Y      | .62 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.67 | 1    | 43.39  |            |
| -X      | 2.62 | 1    | 43.39  |            |
| +Y      | 3.22 | 1    | 43.39  |            |
| -Y      | 2.89 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.96 | 1    | 20.64  |            |
| -X      | 1.91 | 1    | 20.64  |            |
| +Y      | .88  | 1    | 9.49   |            |
| -Y      | .77  | 1    | 9.49   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Ms  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .90 | .60     | .60          | 3150.0   | 3.78       | 1.50        | 3.8    |
| Y       | .70 | .46     | .46          | 2910.0   | 3.49       | 1.50        | 3.8    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.8    | 4.2      | 8  | 8.0 | 10.0 |            |
| Y       | 3.8    | 4.2      | 8  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.7 | 25.4   |            |
| Y       | 4.2 | 21.9   |            |

Sapata: S5

Número = 5 Repetições: 1



GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 60.00 Ysap: 90.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: -23.00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy   |
|-------|------|------|------|----|----|-----|------|
| FzMax | 1    | 9    | 3.01 | .0 | .0 | .15 | -.13 |
| FzMin | 1    | 9    | 3.01 | .0 | .0 | .15 | -.13 |
| FxMax | 1    | 9    | 3.01 | .0 | .0 | .15 | -.13 |
| FxMin | 1    | 9    | 3.01 | .0 | .0 | .15 | -.13 |
| FyMax | 1    | 9    | 3.01 | .0 | .0 | .15 | -.13 |
| FyMin | 1    | 9    | 3.01 | .0 | .0 | .15 | -.13 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 1.01 | 1    |            |
| +Y      | .27  | 1    |            |
| -Y      | .33  | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.68 | 1    | 43.39  |            |
| -X      | .00  | 1    | 43.39  |            |
| +Y      | 1.15 | 1    | 43.39  |            |
| -Y      | 1.41 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 2.34 | 1    | 22.63  |            |
| -X      | .00  | 1    | 11.58  |            |
| +Y      | .29  | 1    | 6.01   |            |
| -Y      | .37  | 1    | 6.01   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

rho(%): .120

| Sentido | Msd  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|------|---------|--------------|----------|------------|-------------|--------|
| X       | 1.01 | .67     | .67          | 3150.0   | 3.78       | 1.50        | 3.8    |
| Y       | .33  | .22     | .22          | 2010.0   | 2.41       | 1.50        | 2.4    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp | Observação |
|---------|--------|----------|----|-----|-----|------------|
|---------|--------|----------|----|-----|-----|------------|



|    |     |   |      |
|----|-----|---|------|
| +Y | .78 | 1 | 9.49 |
| -Y | .88 | 1 | 9.49 |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm<sup>2</sup>]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%) : .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .91 | .60     | .60          | 3150.0   | 3.78       | 1.50        | 3.8    |
| Y       | .70 | .47     | .47          | 2910.0   | 3.49       | 1.50        | 3.8    |

Armaduras Detalhadas [cm<sup>2</sup>, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.8    | 4.2      | 8  | 8.0 | 10.0 |            |
| Y       | 3.8    | 4.2      | 8  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 4.7 | 25.4   |            |
| Y       | 4.2 | 21.9   |            |

Sapata: S7                      Número = 7    Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 40.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 80.00 Ysap: 110.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: -33.00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy   |
|-------|------|------|------|----|----|------|------|
| FzMax | 1    | 9    | 6.07 | .0 | .0 | -.21 | -.13 |
| FzMin | 1    | 9    | 6.07 | .0 | .0 | -.21 | -.13 |
| FxMax | 1    | 9    | 6.07 | .0 | .0 | -.21 | -.13 |
| FxMin | 1    | 9    | 6.07 | .0 | .0 | -.21 | -.13 |
| FyMax | 1    | 9    | 6.07 | .0 | .0 | -.21 | -.13 |
| FyMin | 1    | 9    | 6.07 | .0 | .0 | -.21 | -.13 |

## RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd  | Caso | Observação |
|---------|------|------|------------|
| +X      | 2.73 | 1    |            |
| -X      | .00  | 1    |            |



|       |   |   |      |    |    |     |     |
|-------|---|---|------|----|----|-----|-----|
| FzMin | 1 | 9 | 3.69 | .0 | .0 | .03 | .11 |
| FxMax | 1 | 9 | 3.69 | .0 | .0 | .03 | .11 |
| FxMin | 1 | 9 | 3.69 | .0 | .0 | .03 | .11 |
| FyMax | 1 | 9 | 3.69 | .0 | .0 | .03 | .11 |
| FyMin | 1 | 9 | 3.69 | .0 | .0 | .03 | .11 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd | Caso | Observação |
|---------|-----|------|------------|
| +X      | .37 | 3    |            |
| -X      | .36 | 3    |            |
| +Y      | .19 | 3    |            |
| -Y      | .15 | 3    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.36 | 3    | 43.39  |            |
| -X      | 1.31 | 3    | 43.39  |            |
| +Y      | 1.08 | 3    | 43.39  |            |
| -Y      | .89  | 3    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd | Caso | Limite | Observação |
|---------|-----|------|--------|------------|
| +X      | .70 | 3    | 9.68   |            |
| -X      | .66 | 3    | 9.68   |            |
| +Y      | .00 | 1    | 9.01   |            |
| -Y      | .00 | 1    | 9.01   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .37 | .25     | .25          | 2700.0   | 3.24       | 1.50        | 3.2    |
| Y       | .19 | .23     | .23          | 2310.0   | 2.77       | 1.50        | 3.2    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.2    | 4.6      | 6  | 8.0 | 10.0 |            |
| Y       | 3.2    | 4.6      | 6  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 2.7 | 19.0   |            |
| Y       | 2.0 | 10.4   |            |

Listagem dos critérios de projeto utilizados

-----

\* MATERIAIS \*

-----

fck do concreto (kgf/cm2) = 250.

GamaC = 1.40

GamaS = 1.15

Tipo de aço para armadura principal: CA-50A

Critérios de cálculo e dimensionamento

-----

GamaF = 1.40

GamaN = 1.20

Coeficiente de atrito solo-concreto = .30

Porcentagem mínima de área comprimida = 75.

Coef multiplic tensão max p/ dimensionam = .0

Cálculo da arm principal: 1 - teoria bloco rígido

Método de calc do momento: CONVENCIONAL

Coeficiente de segurança ao tombamento = 1.50

Coeficiente de segurança ao deslizamento = 1.50

Tensão admissível do solo (kgf/cm2) = 1.00

Tensão máxima de compressão (kgf/cm2) = 2.20

Dimensão mínima da sapata (cm) = 60.00

Altura mínima da sapata (cm) = 20.00

Altura h0 mínima da sapata (cm) = 12.00

Arm mínima p/ armadura principal (cm2/m) = 1.50

Porcentagem mínima de armadura principal (PorcMin) = .12 %

Armadura mínima AsMin = PorcMin\*(Area da secao tranv)

Cobrimento (cm) = 4.0

Cobrimento do pilar (cm) = 2.5

Diferença cobrimento entre Asx e Asy (cm) = .5

Norma de referência para verificações (Cisalhamento, punção, etc): 2003

NBR 2003: Verificação de Cortante limite: CEB

NBR 2003: Coeficiente de majoração para Flexo-Compressões (Normal/Obliqua): 1.300

Critérios de detalhamento

-----

Espaçamento mínimo entre bitolas (cm) = 10.0

Espaçamento máximo entre bitolas (cm) = 30.0

Bitola a partir da qual indica raio de dobramento(mm) = 16.0

Bitola a partir da qual indica reforço nos cantos(mm) = 16.0

Bitola para reforço de extremidade (mm) = 8.0

Comprimento horizontal do reforço (cm) = 40.0

## Dimensionamento dos Pilares

ESFORCOS FINAIS DE CALCULO  
Esbeltez LAMBDA

OBS:\*\*\*\* Lambda > limite

LAMB= Indice de

-----

Comprimento de Flambagem LE

(Momentos Vetoriais no Sistema Local)

Normal Inicial Calculo

Coef.Majoracao da VC p/DIMENS.COMPRESSAO

Vd = Forca Normal Final Calculo

Mdx = Mom.Final Calculo direcao x

Mom.Segunda Ordem direcao x

Mdy = Mom.Final Calculo direcao y

Mom.Segunda Ordem direcao y

Mom.Obliquo antes da Normaliz.

Mom.Obliquo antes da Normaliz.

: T Esforcos no TOPO

: M Esf. no pto MEDIO

: B Esforcos na BASE

: N Majoracao da VC com ni < 0.7

MCx = Mom.Inic. Calculo direcao x

MCy = Mom.Inic. Calculo direcao y

Mlx = Mom.PrimeiraOrdem direcao x

Mly = Mom.PrimeiraOrdem direcao y

LE =

VC = Forca

Cmaj=

M2x =

M2y =

MOx =

MOy =

PILAR:P1

num. 1

Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

-----

-----

| COBERTA | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .....   | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

|     |     |       |          |   |     |       |     |       |    |    |    |
|-----|-----|-------|----------|---|-----|-------|-----|-------|----|----|----|
| L 1 | 4.9 | 63.6  | .0       | T | 50. | -114. | 50. | -114. | 0. | 0. | 0. |
| 0.  | 50. | -114. | 5. 1.250 |   |     |       |     |       |    |    |    |

|     |      |       |          |   |      |      |      |      |    |    |    |
|-----|------|-------|----------|---|------|------|------|------|----|----|----|
| L 1 | 4.9  | -83.4 | .0       | B | -62. | 158. | -62. | 158. | 0. | 0. | 0. |
| 0.  | -62. | 158.  | 5. 1.250 |   |      |      |      |      |    |    |    |

|     |     |    |          |   |      |      |      |      |    |    |    |
|-----|-----|----|----------|---|------|------|------|------|----|----|----|
| L 1 | 4.9 | .0 | 13.2     | B | -62. | 158. | -62. | 158. | 0. | 0. | 0. |
| 0.  | 0.  | 0. | 5. 1.250 |   |      |      |      |      |    |    |    |

|     |     |    |          |   |     |       |     |       |    |    |    |
|-----|-----|----|----------|---|-----|-------|-----|-------|----|----|----|
| L 1 | 4.9 | .0 | -13.2    | T | 50. | -114. | 50. | -114. | 0. | 0. | 0. |
| 0.  | 0.  | 0. | 5. 1.250 |   |     |       |     |       |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

|    |   |     |      |   |   |
|----|---|-----|------|---|---|
| 50 | B | 2.0 | 15.0 | 1 | 1 |
|----|---|-----|------|---|---|

Fundacao

-----

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PILAR:P2

num. 2

Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

.....

|         |       |       |       |       |       |       |       |       |       |       |       |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| COBERTA | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

|    |    |     |          |    |   |     |     |     |     |    |    |    |
|----|----|-----|----------|----|---|-----|-----|-----|-----|----|----|----|
| L  | 1  | 4.4 | 19.1     | .0 | T | -6. | 43. | -6. | 43. | 0. | 0. | 0. |
| 0. | 0. | 0.  | 4. 1.250 |    |   |     |     |     |     |    |    |    |

|    |    |     |          |    |   |     |     |     |     |    |     |      |
|----|----|-----|----------|----|---|-----|-----|-----|-----|----|-----|------|
| L  | 1  | 4.4 | -19.1    | .0 | M | -6. | 24. | -6. | 24. | 0. | 35. | -10. |
| 0. | 0. | 0.  | 4. 1.250 |    |   |     |     |     |     |    |     |      |

|    |     |     |          |      |   |     |     |     |     |    |    |    |
|----|-----|-----|----------|------|---|-----|-----|-----|-----|----|----|----|
| L  | 1   | 4.4 | .0       | 46.0 | T | -6. | 43. | -6. | 43. | 0. | 0. | 0. |
| 0. | -6. | 43. | 4. 1.250 |      |   |     |     |     |     |    |    |    |

|    |     |      |          |       |   |     |      |     |      |    |    |    |
|----|-----|------|----------|-------|---|-----|------|-----|------|----|----|----|
| L  | 1   | 4.4  | .0       | -17.3 | B | -3. | -15. | -3. | -15. | 0. | 0. | 0. |
| 0. | -3. | -15. | 4. 1.250 |       |   |     |      |     |      |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |          |         |              |          |          |       |       |       |       |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

|         |           |        |        |     |     |
|---------|-----------|--------|--------|-----|-----|
| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao

.....

PILAR:P3

num. 3  
Calculo

Valores Intermediarios de

|      |         |             |             |     |     |     |     |     |      |      |     |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

.....

|         |       |       |       |       |       |       |       |       |       |       |       |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| COBERTA | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

|    |      |      |          |    |   |      |      |      |      |    |    |    |
|----|------|------|----------|----|---|------|------|------|------|----|----|----|
| L  | 1    | 3.2  | 125.6    | .0 | B | 111. | 126. | 111. | 126. | 0. | 0. | 0. |
| 0. | 111. | 126. | 3. 1.250 |    |   |      |      |      |      |    |    |    |

|    |    |     |          |    |   |     |     |     |     |    |     |    |
|----|----|-----|----------|----|---|-----|-----|-----|-----|----|-----|----|
| L  | 1  | 3.2 | -14.7    | .0 | M | 75. | 51. | 75. | 51. | 0. | 84. | 0. |
| 0. | 0. | 0.  | 3. 1.250 |    |   |     |     |     |     |    |     |    |

|    |    |     |          |     |   |      |      |      |      |    |    |    |
|----|----|-----|----------|-----|---|------|------|------|------|----|----|----|
| L  | 1  | 3.2 | .0       | 9.9 | B | 111. | 126. | 111. | 126. | 0. | 0. | 0. |
| 0. | 0. | 0.  | 3. 1.250 |     |   |      |      |      |      |    |    |    |

|    |     |      |          |        |   |     |      |     |      |    |    |    |
|----|-----|------|----------|--------|---|-----|------|-----|------|----|----|----|
| L  | 1   | 3.2  | .0       | -101.3 | T | 20. | -92. | 20. | -92. | 0. | 0. | 0. |
| 0. | 20. | -92. | 3. 1.250 |        |   |     |      |     |      |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

|                |          |         |              |          |          |       |       |       |       |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

|         |           |        |        |     |     |
|---------|-----------|--------|--------|-----|-----|
| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao



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 .....  
 .....

PILAR:P4

num. 4  
 Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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 .....  
 .....

| COBERTA |      |          |          |   |      |      |      |      |     |     |      |
|---------|------|----------|----------|---|------|------|------|------|-----|-----|------|
| .....   |      |          |          |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | 33.8     | .0       | T | -19. | -47. | -19. | -47. | 0.  | 0.  | 0.   |
| 0.      | 0.   | 7. 1.250 |          |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | -39.1    | .0       | M | -17. | -21. | -17. | -21. | 77. | 35. | -21. |
| 0.      | -38. | -21.     | 7. 1.250 |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | .0       | 36.2     | B | 0.   | 36.  | 0.   | 36.  | 0.  | 0.  | 0.   |
| 0.      | 0.   | 7. 1.250 |          |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | .0       | -62.7    | T | -19. | -47. | -19. | -47. | 0.  | 0.  | 0.   |
| 0.      | -19. | -47.     | 7. 1.250 |   |      |      |      |      |     |     |      |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm]                          | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|---|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5                                     | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TuboAço ClasseAço ExcMin ExcMax K12 K37 |          |         |              |          |          |       |       |       |       |
| 50                                      | B        | 2.0     | 15.0         | 1        | 1        |       |       |       |       |
| Fundacao                                |          |         |              |          |          |       |       |       |       |

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 .....

PILAR:P5

num. 5  
 Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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 .....  
 .....

| COBERTA |      |       |          |   |      |       |      |       |    |     |    |
|---------|------|-------|----------|---|------|-------|------|-------|----|-----|----|
| .....   |      |       |          |   |      |       |      |       |    |     |    |
| L 1     | 3.2  | 125.9 | .0       | B | 111. | -128. | 111. | -128. | 0. | 0.  | 0. |
| 0.      | 111. | -128. | 3. 1.250 |   |      |       |      |       |    |     |    |
| L 1     | 3.2  | -14.7 | .0       | M | 74.  | -51.  | 74.  | -51.  | 0. | 84. | 0. |
| 0.      | 0.   | 0.    | 3. 1.250 |   |      |       |      |       |    |     |    |
| L 1     | 3.2  | .0    | 104.5    | T | 20.  | 96.   | 20.  | 96.   | 0. | 0.  | 0. |
| 0.      | 20.  | 96.   | 3. 1.250 |   |      |       |      |       |    |     |    |
| L 1     | 3.2  | .0    | -9.9     | T | 20.  | 96.   | 20.  | 96.   | 0. | 0.  | 0. |
| 0.      | 0.   | 0.    | 3. 1.250 |   |      |       |      |       |    |     |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço  | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|----------|-----------|--------|--------|-----|-----|
| 50       | B         | 2.0    | 15.0   | 1   | 1   |
| Fundacao |           |        |        |     |     |

PILAR:P6

num. 6  
Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

|         |      |       |          |   |      |      |      |      |     |     |      |
|---------|------|-------|----------|---|------|------|------|------|-----|-----|------|
| COBERTA |      |       |          |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | 34.1  | .0       | T | -18. | 48.  | -18. | 48.  | 0.  | 0.  | 0.   |
| 0.      | 0.   | 0.    | 7. 1.250 |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | -38.7 | .0       | M | -17. | 21.  | -17. | 21.  | 77. | 35. | -21. |
| 0.      | -37. | 21.   | 7. 1.250 |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | .0    | -35.7    | B | 0.   | -36. | 0.   | -36. | 0.  | 0.  | 0.   |
| 0.      | 0.   | 0.    | 7. 1.250 |   |      |      |      |      |     |     |      |
| L 1     | 7.3  | .0    | 62.3     | T | -18. | 48.  | -18. | 48.  | 0.  | 0.  | 0.   |
| 0.      | -18. | 48.   | 7. 1.250 |   |      |      |      |      |     |     |      |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço  | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|----------|-----------|--------|--------|-----|-----|
| 50       | B         | 2.0    | 15.0   | 1   | 1   |
| Fundacao |           |        |        |     |     |

PILAR:P7

num. 7  
Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

|         |      |       |          |   |      |       |      |       |    |    |    |
|---------|------|-------|----------|---|------|-------|------|-------|----|----|----|
| COBERTA |      |       |          |   |      |       |      |       |    |    |    |
| L 1     | 4.7  | 57.4  | .0       | T | 43.  | 110.  | 43.  | 110.  | 0. | 0. | 0. |
| 0.      | 43.  | 110.  | 5. 1.250 |   |      |       |      |       |    |    |    |
| L 1     | 4.7  | -82.5 | .0       | B | -61. | -157. | -61. | -157. | 0. | 0. | 0. |
| 0.      | -61. | -157. | 5. 1.250 |   |      |       |      |       |    |    |    |
| L 1     | 4.7  | .0    | 12.6     | B | -61. | -157. | -61. | -157. | 0. | 0. | 0. |
| 0.      | 0.   | 0.    | 5. 1.250 |   |      |       |      |       |    |    |    |
| L 1     | 4.7  | .0    | -12.6    | T | 43.  | 110.  | 43.  | 110.  | 0. | 0. | 0. |
| 0.      | 0.   | 0.    | 5. 1.250 |   |      |       |      |       |    |    |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |       |       |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |       |       |

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PILAR:P8

num. 8

Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

.....

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| COBERTA | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| .....   | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

|     |     |      |          |   |    |      |    |      |    |    |    |
|-----|-----|------|----------|---|----|------|----|------|----|----|----|
| L 1 | 4.1 | 17.9 | .0       | T | 2. | -43. | 2. | -43. | 0. | 0. | 0. |
| 0.  | 0.  | 0.   | 4. 1.250 |   |    |      |    |      |    |    |    |

|     |     |       |          |   |     |      |     |      |    |     |     |
|-----|-----|-------|----------|---|-----|------|-----|------|----|-----|-----|
| L 1 | 4.1 | -17.9 | .0       | M | -5. | -24. | -5. | -24. | 0. | 35. | -9. |
| 0.  | 0.  | 0.    | 4. 1.250 |   |     |      |     |      |    |     |     |

|     |     |     |          |   |     |     |     |     |    |    |    |
|-----|-----|-----|----------|---|-----|-----|-----|-----|----|----|----|
| L 1 | 4.1 | .0  | 22.1     | B | -5. | 17. | -5. | 17. | 0. | 0. | 0. |
| 0.  | -5. | 17. | 4. 1.250 |   |     |     |     |     |    |    |    |

|     |     |      |          |   |    |      |    |      |    |    |    |
|-----|-----|------|----------|---|----|------|----|------|----|----|----|
| L 1 | 4.1 | .0   | -43.6    | T | 2. | -43. | 2. | -43. | 0. | 0. | 0. |
| 0.  | 2.  | -43. | 4. 1.250 |   |    |      |    |      |    |    |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |          |         |              |     |          |          |       |       |       |       |
|--|-----------|----------|---------|--------------|-----|----------|----------|-------|-------|-------|-------|
| Cobrimento[cm]                               |           | fck[MPa] | GamaAço | GamaConcreto |     | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
| 2.5  |           | 25.0     | 1.15    | 1.40         |     | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |
| TipoAço                                      | ClasseAço | ExcMin   | ExcMax  | K12          | K37 |          |          |       |       |       |       |
| 50   | B         | 2.0      | 15.0    | 1            | 1   |          |          |       |       |       |       |
| Fundacao                                     |           |          |         |              |     |          |          |       |       |       |       |

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#### LEGENDA

Seção : Dimensões da seção tansversal (seção retangular)

Nome da seção (seção qualquer)

Área : Área de concreto da seção transversal

NFer : Número de ferros

PDD : Pé-Direito Duplo (direções "x" e "y")

S: Sim N: Não

As : Área total de armadura utilizada

|         |   |  |
|---------|---|--|
| Taxa    | : | Taxa de Armadura da seção  |
| Estr    | : | Bitola do estribo  |
| C/      | : | Espaçamento do estribo   |
| fck     | : | fck utilizado no lance   |
| Cobr    | : | Cobrimento utilizado no lance  |
| PP      | : | Pilar-Parede: (S) Sim (N)Não   |
| PP      | : | S* :Pilar-Parede (Sim), mas Ast não atende o item 18.5 da NBR6118:2003           |
| T       | : | Tensão de Cálculo (Carga Vertical: Combinação 1 CAD/PILAR) (kgf/cm2)             |
| Lbd     | : | Índice de Esbeltez (Maior Lambda)  |
| Ni      | : | Força Normal Admensional (Nsd / Ac*Fcd) (Carga Vertical: Combinação 1 CAD/PILAR) |
| 2OrdM   | : | Método utilizado cálculo momento 2ªOrdem   |
| ELOL    | : | Efeito Local (15.8.3)  |
| ELZD    | : | Efeito Localizado (15.9.3)   |
| KAPA    | : | Pilar Padrão com Rigidez Kapa Aproximada (15.8.3.3.3)                            |
| CURV    | : | Pilar Padrão com Curvatura Aproximada (15.8.3.3.2)                               |
| N,M,1/R | : | Pilar Padrão Acoplado ao Diagrama N,M,1/r (15.8.3.3.4)                           |
| MetGerl | : | Método Geral (15.8.3.2)  |

\*\*\*\* PROJETO 1 \*\*\*\*

PILAR:P1

num: 1 Lances: 1 à 1

[illegible]

PILAR:P2

num: 2 Lances: 1 à 1

[illegible]

PILAR:P3

num: 3 Lances: 1 à 1

[illegible]

num: 4 Lances: 1 à 1

[illegible]

num: 5 Lances: 1 à 1

[illegible]

num: 6 Lances: 1 à 1

[illegible]

num: 7 Lances: 1 à 1

[illegible]

num: 8 Lances: 1 à 1

[illegible]

## Dimensionamento das Vigas

### Pavimento Térreo

fck=250.kgf/cm2 - Aco: CA-60B CA-50A - Esforços

Caracteristicos

L E G E N D A

G E O M E T R I A

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :  
Repeticoes

NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :  
Fator de Alternancia de Cargas

Cob : Cobrimento / TpS : Tipo da Secao / BCs :  
Mesa Colaborante Superior

BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :  
Espessura Laje Inferior

FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S :  
Cobrim/Cobr.superior adicional

C A R G A S

MEsq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q :  
Cortante Adicional (valor unico)

A R M A D U R A S - F L E X A O

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS :  
Secao Te Armadura Simples

STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx :  
Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :  
Armadura e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :  
Armad.transv.minima-cisalhamento

Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :  
Espacamento selecionado

NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus :  
Armadura transversal-Suspensao

A R M A D U R A S - T O R C A O

%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de  
torcao

b-nuc : Largura do nucleo / h-nuc : Altura do nucleo

Asw-lR : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-  
torcao p/NR estribos selecionado

Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal  
de torcao no lado h

ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao  
plastica no vao - S[sim] N[nao]

R E A C O E S D E A P O I O

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre /  
segue / vigas

M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

=====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.18 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= .9 tf\* m - Abcis.= 279 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = 1.53 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.14 -SRAS- [ 2 B 6.3mm]  
| AsL= .00 ----- x/d = .11 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| Fle.Adm.= 1.4 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .21 |  
Asapo[+]= .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.- 405. 2.78 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC. | POIO | No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |      |   |
|-------|------|-----|---------|---------|---------|-------|-------|------|--------|--------|------|---|
| 0     | 0    | 1   | 1.984   | 1.984   | .14     | .00   | 0     | S1   | .00    | .00    | 8001 | 0 |
| 0     | 0    | 2   | 1.113   | 1.113   | .14     | .00   | 0     | S2   | .00    | .00    | 8002 | 0 |

Viga= 2 V2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.18 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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.[-] = 1.6 tf\* m | M.[+] Max= .9 tf\* m - Abcis.= 244 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = 1.49 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.14 -SRAS- [ 2 B 6.3mm]

| AsL= .00 ----- x/d = .11 | As = .85 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .00  
 | x/dMx= .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= 2.2 |  
 Grampos Dir.= 1B 6.3mm x/dMx= .37  
 | Fle.Adm.= 1.4 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .21 |  
 Asapo[+]= .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.- 405. 2.77 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

|   |   |   |       |       |     |     |   |    |     |     |      |   |
|---|---|---|-------|-------|-----|-----|---|----|-----|-----|------|---|
| 0 | 0 | 1 | 1.978 | 1.978 | .14 | .00 | 0 | S7 | .00 | .00 | 8007 | 0 |
| 0 | 0 | 2 | 1.119 | 1.119 | .14 | .00 | 0 | S8 | .00 | .00 | 8008 | 0 |

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 =====

Viga= 3 V3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 1 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf\* m - Abcis.= 172 | M.[-]  
 = .0 tf\* m

[tf,cm] | As = .86 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm ]

| AsL= .00 ----- x/d = .06 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= 2.1 |  
 x/dMx= .37

| Fle.Adm.= .6 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-  
 ]Min = 70.4

[cm2 ] | Asapo[+]= .21 |  
 Asapo[+]= .81

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.- 146. 2.05 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0



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

[tf,cm] 0.- 146. 2.05 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

| REAC.    | APOIO | - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |      |   |
|----------|-------|-------|---------|---------|---------|-------|-------|------|--------|--------|------|---|
| Pilares: |       |       |         |         |         |       |       |      |        |        |      |   |
| 0        | 0     | 1     | 1.464   | 1.464   | .40     | .08   | 0     | S7   | .00    | .00    | 8007 | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |      |   |
| 0        | 0     | 2     | 1.001   | 1.001   | .30     | .03   | 0     | S5   | .00    | .00    | 8005 | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |      |   |
| 0        | 0     | 3     | 1.003   | 1.003   | .30     | .03   | 0     | S3   | .00    | .00    | 8003 | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |      |   |
| 0        | 0     | 4     | 1.462   | 1.462   | .40     | .08   | 0     | S1   | .00    | .00    | 8001 | 0 |
| 0        | 0     | 0     | 0       |         |         |       |       |      |        |        |      |   |

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Viga= 4 V4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 57 | M.[-]  
= .4 tf\* m

[tf,cm]| As = .14 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.= [2 X -- B --- mm] - LN= 2.1 |

| Fle.Adm.= .6 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .28 |  
Asapo[+]= .80

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.- 146. 1.22 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.27 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .4 tf* m - Abcis.= 166    | M.[-] |
| .6 tf* m                              |                                      |       |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1            | As =  |
| .84 -SRAS- [ 2 B 8.0mm]               |                                      |       |
| AsL= .00 ----- x/d = .05              | As = .84 -SRAS- [ 2 B 8.0mm ]        | AsL=  |
| .00 ----- x/d = .05                   |                                      |       |
| x/dMx= .37                            | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |       |
|                                       |                                      |       |
|                                       | Fle.Adm.= 1.1                        |       |
| [tf,cm]  M[-]Min = 70.4               | M[+]Min = 70.4                       | M[-   |
| ]Min = 70.4                           |                                      |       |
| [cm2 ]  Asapo[+]= .80                 |                                      |       |
| Asapo[+]= .80                         |                                      |       |

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. 1.72 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .1 tf* m - Abcis.= 115    | M.[-] |
| .0 tf* m                              |                                      |       |
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0            | As =  |
| .84 -SRAS- [ 2 B 8.0mm]               |                                      |       |
| AsL= .00 ----- x/d = .05              | As = .84 -SRAS- [ 2 B 8.0mm ]        | AsL=  |
| .00 ----- x/d = .05                   |                                      |       |
| x/dMx= .37                            | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |       |
|                                       |                                      |       |
|                                       | Fle.Adm.= .6                         |       |
| [tf,cm]  M[-]Min = 70.4               | M[+]Min = 70.4                       | M[-   |
| ]Min = 70.4                           |                                      |       |
| [cm2 ]  Asapo[+]= .80                 |                                      |       |
| Asapo[+]= .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.- 146. 1.21 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

|                   |         |         |         |       |       |      |        |        |        |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|--------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |        |
| Pilares:          |         |         |         |       |       |      |        |        |        |
| 0 0 1             | .396    | .394    | .40     | .08   | 0     | S8   | .00    | .00    | 8008 0 |
| 0 0 0             | 0       |         |         |       |       |      |        |        |        |
| 0 0 2             | 2.071   | 2.069   | .30     | .03   | 0     | S6   | .00    | .00    | 8006 0 |
| 0 0 0             | 0       |         |         |       |       |      |        |        |        |

|   |   |   |       |       |     |     |   |    |     |     |      |   |
|---|---|---|-------|-------|-----|-----|---|----|-----|-----|------|---|
| 0 | 0 | 3 | 2.063 | 2.062 | .30 | .03 | 0 | S4 | .00 | .00 | 8004 | 0 |
|   |   | 0 | 0     |       |     |     |   |    |     |     |      |   |
| 0 | 0 | 4 | .402  | .400  | .40 | .08 | 0 | S2 | .00 | .00 | 8002 | 0 |
|   |   | 0 | 0     |       |     |     |   |    |     |     |      |   |

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## Pavimento Coberta

fck=250.kgf/cm2 - Aco: CA-60B CA-50A

- Esforços

Caracteristicos

L E G E N D A

G E O M E T R I A

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :  
Repeticoes

NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :  
Fator de Alternancia de Cargas

Cob : Cobrimento / TpS : Tipo da Secao / BCs :  
Mesa Colaborante Superior

BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :  
Espessura Laje Inferior

FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S :  
Cobrim/Cobr.superior adicional

C A R G A S

MESq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q :  
Cortante Adicional (valor unico)

A R M A D U R A S - F L E X A O

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS :  
Secao Te Armadura Simples

STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx :  
Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :  
Armadura e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :  
Armad.transv.minima-cisalhamento

Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :  
Espacamento selecionado

NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus :  
Armadura transversal-Suspensao

A R M A D U R A S - T O R C A O

%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de  
torcao

b-nuc : Largura do nucleo / h-nuc : Altura do nucleo

Asw-lR : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-  
torcao p/NR estribos selecionado

Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal  
de torcao no lado h

ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao  
plastica no vao - S[sim] N[nao]

R E A C O E S D E A P O I O

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre /  
segue / vigas

M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

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Viga= 101 V101 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1 /L= 4.20 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD=1.00 ---

- - - - - 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= .4 tf\* m - Abcis.= 210 | M.[-]  
= .9 tf\* m

[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .06

| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .45

| | | Fle.Adm.= 1.4 |

[tf,cm]| M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ]| Asapo[+]= .84 | |  
Asapo[+]= .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.- 406. .70 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2B /L= .67 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .0

BAL.DIR | x/d = .06 | AsL= .00 - |  
Flecha Adm.= .4

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 60. .42 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .2

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

|   |   |   |      |      |     |     |   |      |     |     |   |   |
|---|---|---|------|------|-----|-----|---|------|-----|-----|---|---|
| 0 | 0 | 1 | .413 | .413 | .14 | .00 | 2 | V105 | .00 | .00 | 0 | 0 |
| 0 | 0 | 2 | .803 | .803 | .14 | .00 | 2 | V106 | .00 | .00 | 0 | 0 |

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Viga= 102 V102 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 4.18 /B= .14 /H= .30 /BCs= .98 /BCi= .00 /TpS= 2 /Esp.LS= .04 /Esp.LI= .00  
FSp.Ex= .15 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .3 tf\* m - Abcis.= 244 | M.[-]  
= .0 tf\* m

[tf,cm]| As = .63 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.14 -SRAS- [ 2 B 6.3mm]

| AsL= .00 ----- x/d = .05 | As = .63 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .2 |  
x/dMx= .37

| Fle.Adm.= 1.4 |  
[tf,cm]| M[-]Min = 39.6 | M[+]Min = 39.6 | M[-]  
]Min = 39.6

[cm2 ]| Asapo[+]= .21 |  
Asapo[+]= .63

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.- 405. .59 16.10 1 45. .0 1.4 1.4 5.0 15.0 2 .0 .0

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

|   |   |   |      |      |     |     |   |    |     |     |   |   |
|---|---|---|------|------|-----|-----|---|----|-----|-----|---|---|
| 0 | 0 | 1 | .422 | .422 | .14 | .00 | 1 | P1 | .00 | .00 | 1 | 0 |
|---|---|---|------|------|-----|-----|---|----|-----|-----|---|---|

|   |   |   |      |      |     |     |   |    |     |     |   |   |
|---|---|---|------|------|-----|-----|---|----|-----|-----|---|---|
| 0 | 0 | 2 | .333 | .333 | .14 | .00 | 1 | P2 | .00 | .00 | 2 | 0 |
|---|---|---|------|------|-----|-----|---|----|-----|-----|---|---|

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Viga= 103 V103 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 4.18 /B= .14 /H= .30 /BCs= .98 /BCi= .00 /TpS= 2 /Esp.LS= .04 /Esp.LI= .00  
FSp.Ex= .15 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m | M.[+] Max= .3 tf\* m - Abcis.= 244 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .63 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.14 -SRAS- [ 2 B 6.3mm]  
| AsL= .00 ----- x/d = .05 | As = .63 -STAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .2 |  
| Fle.Adm.= 1.4 |  
[tf,cm]| M[-]Min = 39.6 | M[+]Min = 39.6 | M[-]  
]Min = 39.6  
[cm2 ]| Asapo[+]= .21 |  
Asapo[+]= .63

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.- 405. .59 16.10 1 45. .0 1.4 1.4 5.0 15.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 .424 .424 .14 .00 1 P7 .00 .00 7 0  
0 0 2 .334 .334 .14 .00 1 P8 .00 .00 8 0  
0 0 0 0

Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAND= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 4.20 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD=1.00 ---

- - - - - 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= .4 tf\* m - Abcis.= 210 | M.[-]  
= .9 tf\* m  
[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .06  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .45

|                     |      |           |               |     |
|---------------------|------|-----------|---------------|-----|
|                     |      |           | Fle.Adm.= 1.4 |     |
| [tf,cm]   M[-]Min = | 70.4 | M[+]Min = | 70.4          | M[- |
| Min =               | 70.4 |           |               |     |
| [cm2 ]   Asapo[+]=  | .84  |           |               |     |
| Asapo[+]=           | .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.- | 406. | .69 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .0    |

----- G E O M E T R I A E C A R G A S -----

Vao= 2B /L= .67 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= | .90 tf* m | As = | .84 -SRAS- | [ 2 B 8.0mm] |  |
| Flecha         | = .0      |      |            |              |  |

|              |           |      |       |  |
|--------------|-----------|------|-------|--|
| BAL.DIR      | x/d = .06 | AsL= | .00 - |  |
| Flecha Adm.= | .4        |      |       |  |

|                    |      |           |     |  |   |
|--------------------|------|-----------|-----|--|---|
| [tf,cm]   M[-]Min= | 70.4 | - x/dMx = | .50 |  | % |
| 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.- | 60. | .36 | 22.17 | 1   | 45.  | .0     | 1.4    | 1.4      | 5.0 | 20.0 | 2  | .0    | .2    |

|                   |         |         |         |       |       |      |        |         |
|-------------------|---------|---------|---------|-------|-------|------|--------|---------|
| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn  |
| Pilares:          |         |         |         |       |       |      |        |         |
| 0 0 1 0           | .419    | .419    | .14     | .00   | 2     | V105 | .00    | .00 0 0 |
| 0 0 2 0           | .754    | .754    | .14     | .00   | 2     | V106 | .00    | .00 0 0 |

=====

Viga= 105 V105 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= .88 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= | .90 tf* m | As = | .84 -SRAS- | [ 2 B 8.0mm] |  |
| Flecha         | = .0      |      |            |              |  |

|              |           |      |       |  |
|--------------|-----------|------|-------|--|
| BAL.ESQ      | x/d = .06 | AsL= | .00 - |  |
| Flecha Adm.= | .6        |      |       |  |



[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | %  
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.- 60. .71 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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.= 172 | M.[-]  
= .0 tf\* m

[tf,cm] | As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .06 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
|

| Fle.Adm.= .6 |

[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4

[cm2 ] | Asapo[+]= .21 |  
Asapo[+]= .81

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.- 146. 1.83 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.27 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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= .8 tf\* m - Abcis.= 166 | M.[-]  
= .3 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

| x/dMx= .37 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
x/dMx= .37

| Fle.Adm.= 1.1 |

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .80

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. 1.85 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 4 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD=1.00 ---

- - - - - 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 tf\* m - Abcis.= 0 | M.[-]  
 = .9 tf\* m  
 [tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
 .84 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .06  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 x/dMx= .45  
 | Fle.Adm.= .6 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .81 |  
 Asapo[+]= .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.- 146. 1.53 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 5B /L= .88 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
 Flecha = .0  
 BAL.DIR | x/d = .06 | AsL= .00 - |  
 Flecha Adm.= .6  
 [tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
 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.- 60. .71 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |   |   |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|---|---|
| Pilares:          |         |         |         |       |       |      |        |        |   |   |
| 0 0 1             | 1.812   | 1.812   | .40     | .08   | 1     | P7   | .00    | .00    | 7 | 0 |
| 0 0 2             | 1.134   | 1.133   | .30     | .03   | 1     | P5   | .00    | .00    | 5 | 0 |
| 0 0 3             | 1.132   | 1.131   | .30     | .03   | 1     | P3   | .00    | .00    | 3 | 0 |
| 0 0 4             | 1.597   | 1.597   | .40     | .08   | 1     | P1   | .00    | .00    | 1 | 0 |

=====

Viga= 106 V106 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1B /L= .88 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm] |  
Flecha = .1

BAL.ESQ | x/d = .06 | AsL= .00 - |  
Flecha Adm.= .6

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 60. 1.18 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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= .0 tf\* m - Abcis.= 172 | M.[-]  
= .7 tf\* m

[tf,cm] | As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .06 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05

|                         |            |                                      |     |
|-------------------------|------------|--------------------------------------|-----|
|                         | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |     |
| x/dMx= .37              |            |                                      |     |
|                         |            | Fle.Adm.= .6                         |     |
| [tf,cm]  M[-]Min = 70.4 |            | M[+]Min = 70.4                       | M[- |
| ]Min = 70.4             |            |                                      |     |
| [cm2 ]  Asapo[+]= .28   |            |                                      |     |
| Asapo[+]= .80           |            |                                      |     |

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.- 146. | 1.60 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|----------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 3 /L= 3.27 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf* m | M.[+] Max= .9 tf* m - Abcis.= 166 | M.[-] |
| = .8 tf* m       |                                   |       |

|                                       |                           |      |
|---------------------------------------|---------------------------|------|
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As = |
| .84 -SRAS- [ 2 B 8.0mm]               |                           |      |

|                          |                               |      |
|--------------------------|-------------------------------|------|
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL= |
| .00 ----- x/d = .05      |                               |      |

|            |            |                                      |  |
|------------|------------|--------------------------------------|--|
|            | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  |
| x/dMx= .37 |            |                                      |  |

|  |  |               |  |
|--|--|---------------|--|
|  |  | Fle.Adm.= 1.1 |  |
|--|--|---------------|--|

|                         |                |     |
|-------------------------|----------------|-----|
| [tf,cm]  M[-]Min = 70.4 | M[+]Min = 70.4 | M[- |
| ]Min = 70.4             |                |     |

|                       |  |  |
|-----------------------|--|--|
| [cm2 ]  Asapo[+]= .80 |  |  |
| Asapo[+]= .80         |  |  |

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. | 2.77 | 22.17 | 1 | 45. | .0 | 1.4 | 1.4 | 5.0 | 20.0 | 2 | .0 | .0 |
|---------|----------|------|-------|---|-----|----|-----|-----|-----|------|---|----|----|

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 4 /L= 1.70 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD=1.00 ---

- - - - - 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= .0 tf* m - Abcis.= 172 | M.[-] |
| = .9 tf* m       |                                   |       |

|                                       |                           |      |
|---------------------------------------|---------------------------|------|
| [tf,cm]  As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As = |
| .84 -SRAS- [ 2 B 8.0mm]               |                           |      |

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
 .00 ----- x/d = .06  
 |  
 x/dMx= .45 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
 |  
 | Fle.Adm.= .6 |  
 [tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .80 |  
 Asapo[+]= .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.- 146. 1.32 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 5B /L= .88 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= .90 tf\* m | As = .84 -SRAS- [ 2 B 8.0mm ] |  
 Flecha = .1

BAL.DIR | x/d = .06 | AsL= .00 - |  
 Flecha Adm.= .6

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
 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.- 60. 1.32 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .8

| REAC. APOIO - No. | Maximos | Minimos | Largura | DEPEV | Morte | Nome | M.I.Mx | M.I.Mn |
|-------------------|---------|---------|---------|-------|-------|------|--------|--------|
| Pilares:          |         |         |         |       |       |      |        |        |
| 0 0 1             | 1.533   | 1.526   | .40     | .08   | 1     | P8   | .00    | .00    |
| 0 0 0             |         |         |         |       |       |      |        |        |
| 0 0 2             | 2.917   | 2.909   | .30     | .03   | 1     | P6   | .00    | .00    |
| 0 0 0             |         |         |         |       |       |      |        |        |
| 0 0 3             | 2.874   | 2.867   | .30     | .03   | 1     | P4   | .00    | .00    |
| 0 0 0             |         |         |         |       |       |      |        |        |
| 0 0 4             | 1.387   | 1.380   | .40     | .08   | 1     | P2   | .00    | .00    |
| 0 0 0             |         |         |         |       |       |      |        |        |

=====

Viga= 107 V107 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
 /Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----

Vao= 1 /L= 3.27 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
 FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
 DeltaE= .90 DeltaD= .90 ---

```

- - - - - 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= .3 tf* m - Abcis.= 163 | M.[-]
= .1 tf* m

[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =
.84 -SRAS- [ 2 B 8.0mm]

| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .05

| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
x/dMx= .37

| | Fle.Adm.= 1.1 |

[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]
]Min = 70.4

[cm2 ]| Asapo[+]= .28 |
Asapo[+]= .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.- 303. .78 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

```

```

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

0 0 1 .552 .551 .30 .03 1 P6 .00 .00 6 0
0 0 0 0

0 0 2 .560 .560 .30 .03 1 P4 .00 .00 4 0
0 0 0 0

```

```

Viga= 109 V109 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

```

```

----- G E O M E T R I A E C A R G A S -----
-----

Vao= 1 /L= 8.40 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---
DeltaE= .90 DeltaD= .90 ---

```

```

- - - - - 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= .1 tf* m - Abcis.= 630 | M.[-]
= .0 tf* m

[tf,cm]| As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .5 | As =
.00 -SRAS- [ 0 B 6.3mm]

| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=
.00 ----- x/d = .00

| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |
Grampos Dir.= 1B 6.3mm x/dMx= .37

| | Fle.Adm.= 2.8 |

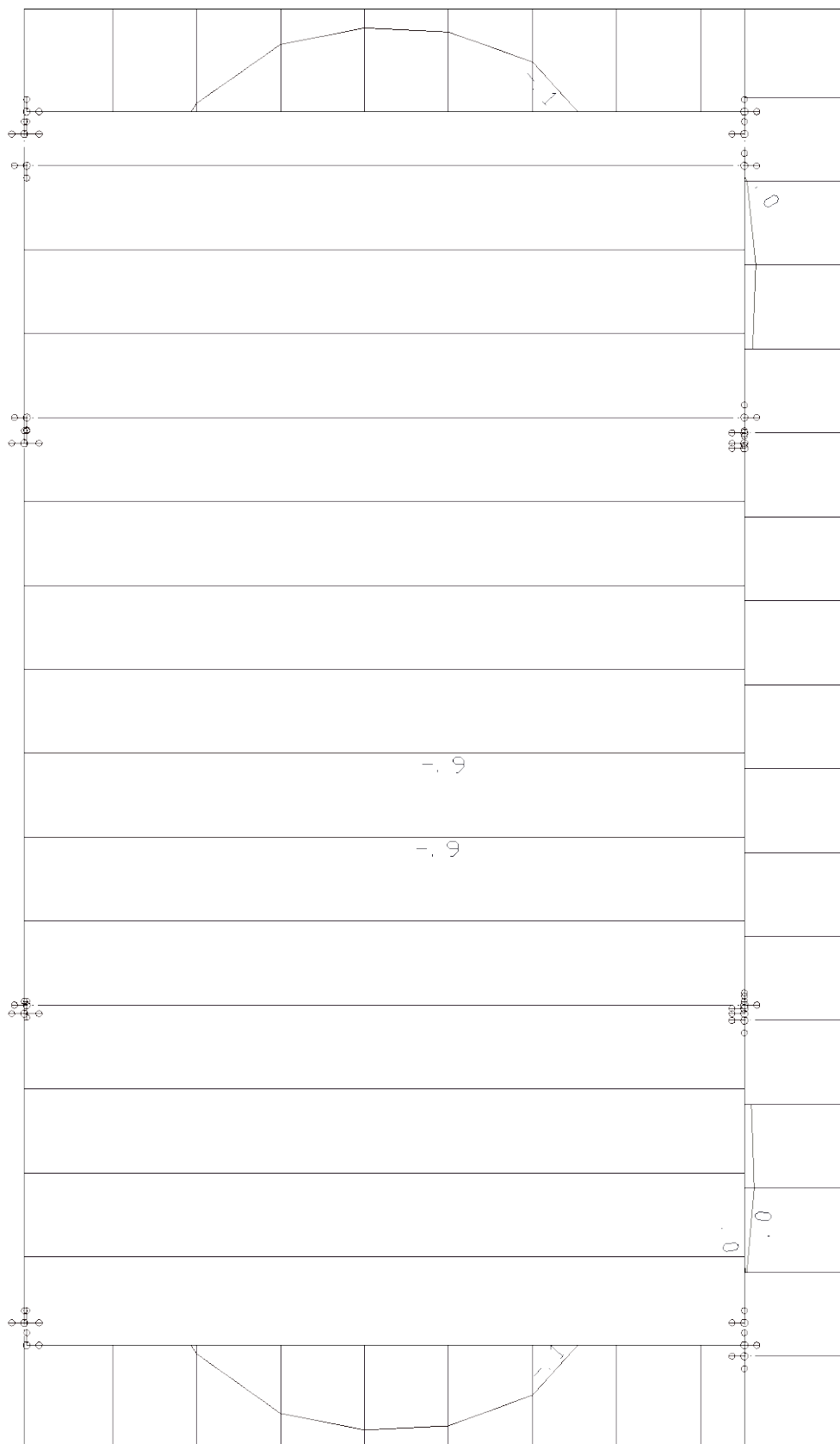
```

[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
 ]Min = 70.4  
 [cm2 ] | Asapo[+]= .84 |  
 Asapo[+]= .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.- 826. .31 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
 Pilares:  
 1 .175 .175 .14 .00 2 V104 .00 .00 0 0  
 0 0 0 0  
 2 .218 .218 .14 .00 2 V101 .00 .00 0 0  
 0 0 0 0  
 =====  
 =====

## Dimensionamento das Lajes





## 7. GUARITA

### Dimensionamento das Sapatas

---

#### LEGENDA

##### GEOMETRIA

Xpil, Ypil: dimensões em X e Y  
ColarX, Colar Y: larguras do colar em X e Y  
Xsap, Ysap: dimensões em X e Y  
H0x, H0y: altura do rodapé em X e Y  
ExcX, ExcY: excentricidade em X e Y em relação ao CG do pilar

##### CARREGAMENTO:

Caso: caso de carregamento da sapata onde a situação de esforço ocorre  
Comb: combinação onde a situação de esforço ocorre  
Fzmin, Fzmax: situação de força vertical mínima e máxima  
Fxmin, Fxmax: situação de força horizontal em X mínima e máxima  
Fymin, Fymax: situação de força horizontal em Y mínima e máxima  
Mxmin, Mxmax: situação de momento vetorial em torno de X mínimo e máximo  
Mymin, Mymax: situação de momento vetorial em torno de Y mínimo e máximo  
N: força vertical para a combinação indicada  
Mx, My: momento vetorial em torno de X e Y para a combinação indicada  
Fx, Fy: esforço cortante em X e Y para a combinação indicada

##### RESULTADOS

Caso: caso de carregamento da sapata onde a situação de esforço ocorre  
Msd: momento fletor de cálculo  
rho: porcentagem mínima de armadura  
As,calc: área de armadura calculada com o momento atuante na seção  
As,calc,corr: área de armadura corrigida no caso de sapatas retangulares  
Area,sec: área da seção de cálculo  
As,min,rho: área de armadura mínima calculada com rho  
As,min,crit: área de armadura mínima imposto pelo arquivo de critérios  
As,det: área de armadura utilizada para o detalhamento  
As,det/m: área de armadura por metro  
nf, bit, esp: número de ferros, bitola e espaçamento  
Vsd: esforço cortante de cálculo  
ds: altura útil da seção S  
bs: largura da seção S

---

Sapata: S1    Número        =        1        Repetições:    1

##### GEOMETRIA:

##### Pilar:

Xpil: 14.00    Ypil: 30.00    ColarX: .00    ColarY: .00

##### Sapata (cm):

Xsap: 70.00    Ysap: 70.00    Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N   | Mx | My | Fx   | Fy   |
|-------|------|------|-----|----|----|------|------|
| FzMax | 1    | 9    | .39 | .0 | .0 | -.04 | -.12 |
| FzMin | 1    | 9    | .39 | .0 | .0 | -.04 | -.12 |
| FxMax | 1    | 9    | .39 | .0 | .0 | -.04 | -.12 |
| FxMin | 1    | 9    | .39 | .0 | .0 | -.04 | -.12 |
| FyMax | 1    | 9    | .39 | .0 | .0 | -.04 | -.12 |
| FyMin | 1    | 9    | .39 | .0 | .0 | -.04 | -.12 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd | Caso | Observação |
|---------|-----|------|------------|
| +X      | .01 | 1    |            |
| -X      | .03 | 1    |            |
| -Y      | .03 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd | Caso | Limite | Observação |
|---------|-----|------|--------|------------|
| +X      | .12 | 1    | 43.39  |            |
| -X      | .21 | 1    | 43.39  |            |
| +Y      | .02 | 1    | 43.39  |            |
| -Y      | .31 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd | Caso | Limite | Observação |
|---------|-----|------|--------|------------|
| +X      | .05 | 1    | 9.68   |            |
| -X      | .10 | 1    | 9.68   |            |
| +Y      | .00 | 1    | 9.01   |            |
| -Y      | .00 | 1    | 9.01   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .03 | .02     | .02          | 2550.0   | 3.06       | 1.50        | 3.1    |
| Y       | .03 | .03     | .03          | 2310.0   | 2.77       | 1.50        | 3.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |
| Y       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |



Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Ms  | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .03 | .02     | .02          | 2550.0   | 3.06       | 1.50        | 3.1    |
| Y       | .03 | .02     | .02          | 2310.0   | 2.77       | 1.50        | 3.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |
| Y       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | .3  | 18.8   |            |
| Y       | .4  | 13.9   |            |

Sapata: S3 Número = 3 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 70.00 Ysap: 70.00 Altura: 45.00  
H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx   | Fy  |
|-------|------|------|------|----|----|------|-----|
| FzMax | 1    | 9    | 3.36 | .0 | .0 | -.03 | .12 |
| FzMin | 1    | 9    | 3.36 | .0 | .0 | -.03 | .12 |
| FxMax | 1    | 9    | 3.36 | .0 | .0 | -.03 | .12 |
| FxMin | 1    | 9    | 3.36 | .0 | .0 | -.03 | .12 |
| FyMax | 1    | 9    | 3.36 | .0 | .0 | -.03 | .12 |
| FyMin | 1    | 9    | 3.36 | .0 | .0 | -.03 | .12 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Ms  | Caso | Observação |
|---------|-----|------|------------|
| +X      | .32 | 1    |            |
| -X      | .34 | 1    |            |
| +Y      | .24 | 1    |            |
| -Y      | .19 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.43 | 1    | 43.39  |            |
| -X      | 1.49 | 1    | 43.39  |            |
| +Y      | 1.52 | 1    | 43.39  |            |
| -Y      | 1.23 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd | Caso | Limite | Observação |
|---------|-----|------|--------|------------|
| +X      | .60 | 1    | 9.68   |            |
| -X      | .63 | 1    | 9.68   |            |
| +Y      | .00 | 1    | 9.01   |            |
| -Y      | .00 | 1    | 9.01   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm

Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .34 | .22     | .22          | 2550.0   | 3.06       | 1.50        | 3.1    |
| Y       | .24 | .21     | .21          | 2310.0   | 2.77       | 1.50        | 3.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |
| Y       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 2.5 | 19.0   |            |
| Y       | 2.1 | 13.9   |            |

Sapata: S4 Número = 4 Repetições: 1

GEOMETRIA:

Pilar:

Xpil: 14.00 Ypil: 30.00 ColarX: .00 ColarY: .00

Sapata (cm):

Xsap: 70.00 Ysap: 70.00 Altura: 45.00

H0x: 15.00 H0y: 15.00 ExcX: .00 ExcY: .00

Método de cálculo: Sapata Rígida

CARREGAMENTOS:

| Nome  | Caso | Comb | N    | Mx | My | Fx  | Fy  |
|-------|------|------|------|----|----|-----|-----|
| FzMax | 1    | 9    | 3.34 | .0 | .0 | .03 | .12 |
| FzMin | 1    | 9    | 3.34 | .0 | .0 | .03 | .12 |
| FxMax | 1    | 9    | 3.34 | .0 | .0 | .03 | .12 |

|       |   |   |      |    |    |     |     |
|-------|---|---|------|----|----|-----|-----|
| FxMin | 1 | 9 | 3.34 | .0 | .0 | .03 | .12 |
| FyMax | 1 | 9 | 3.34 | .0 | .0 | .03 | .12 |
| FyMin | 1 | 9 | 3.34 | .0 | .0 | .03 | .12 |

RESULTADOS:

Flexão [tf, m]:

| Sentido | Msd | Caso | Observação |
|---------|-----|------|------------|
| +X      | .34 | 1    |            |
| -X      | .32 | 1    |            |
| +Y      | .24 | 1    |            |
| -Y      | .19 | 1    |            |

Compressão Diagonal [kgf/cm2]:

| Sentido | Tsd  | Caso | Limite | Observação |
|---------|------|------|--------|------------|
| +X      | 1.49 | 1    | 43.39  |            |
| -X      | 1.42 | 1    | 43.39  |            |
| +Y      | 1.52 | 1    | 43.39  |            |
| -Y      | 1.22 | 1    | 43.39  |            |

Força Cortante [tf]:

| Sentido | Vsd | Caso | Limite | Observação |
|---------|-----|------|--------|------------|
| +X      | .63 | 1    | 9.68   |            |
| -X      | .59 | 1    | 9.68   |            |
| +Y      | .00 | 1    | 9.01   |            |
| -Y      | .00 | 1    | 9.01   |            |

VERIFICAÇÕES:

Armaduras Calculadas [tf.m, cm2]:

\*\*\* AVISO: Sapata considerada "Quadrada" (diferença de dimensões): .0 <= 9.0 cm  
Armaduras igualadas pela maior.

rho(%): .120

| Sentido | Msd | As,calc | As,calc,corr | Area,sec | As,min,rho | As,min,crit | As,det |
|---------|-----|---------|--------------|----------|------------|-------------|--------|
| X       | .34 | .22     | .22          | 2550.0   | 3.06       | 1.50        | 3.1    |
| Y       | .24 | .21     | .21          | 2310.0   | 2.77       | 1.50        | 3.1    |

Armaduras Detalhadas [cm2, cm]:

| Sentido | As,det | As,det/m | nf | bit | esp  | Observação |
|---------|--------|----------|----|-----|------|------------|
| X       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |
| Y       | 3.1    | 4.4      | 6  | 8.0 | 10.0 |            |

Aderência [tf]:

| Sentido | Vsd | Limite | Observação |
|---------|-----|--------|------------|
| X       | 2.4 | 19.0   |            |
| Y       | 2.1 | 13.9   |            |

-----

Listagem dos critérios de projeto utilizados

-----

\* MATERIAIS \*

-----

fck do concreto (kgf/cm<sup>2</sup>) = 250.

GamaC = 1.40

GamaS = 1.15

Tipo de aço para armadura principal: CA-50A

Critérios de cálculo e dimensionamento

-----

GamaF = 1.40

GamaN = 1.20

Coeficiente de atrito solo-concreto = .30

Porcentagem mínima de área comprimida = 75.

Coef multiplic tensão max p/ dimensionam = .0

Cálculo da arm principal: 1 - teoria bloco rígido

Método de calc do momento: CONVENCIONAL

Coeficiente de segurança ao tombamento = 1.50

Coeficiente de segurança ao deslizamento = 1.50

Tensão admissível do solo (kgf/cm<sup>2</sup>) = 1.00

Tensão máxima de compressão (kgf/cm<sup>2</sup>) = 2.20

Dimensão mínima da sapata (cm) = 60.00

Altura mínima da sapata (cm) = 20.00

Altura h0 mínima da sapata (cm) = 12.00

Arm mínima p/ armadura principal (cm<sup>2</sup>/m) = 1.50

Porcentagem mínima de armadura principal (PorcMin) = .12 %

Armadura mínima AsMin = PorcMin\*(Area da secao tranv)

Cobrimento (cm) = 4.0

Cobrimento do pilar (cm) = 2.5

Diferença cobrimento entre Asx e Asy (cm) = .5

Norma de referência para verificações (Cisalhamento, punção, etc): 2003

NBR 2003: Verificação de Cortante limite: CEB

NBR 2003: Coeficiente de majoração para Flexo-Compressões (Normal/Obliqua): 1.300

Critérios de detalhamento

-----

Espaçamento mínimo entre bitolas (cm) = 10.0

Espaçamento máximo entre bitolas (cm) = 30.0

Bitola a partir da qual indica raio de dobramento(mm) = 16.0

Bitola a partir da qual indica reforço nos cantos(mm) = 16.0

Bitola para reforço de extremidade (mm) = 8.0

Comprimento horizontal do reforço (cm) = 40.0

## Dimensionamento dos Pilares

ESFORÇOS FINAIS DE CALCULO  
Esbeltez LAMBDA

OBS:\*\*\*\* Lambda > limite

LAMB= Indice de

----- : T Esforços no TOPO LE =

Comprimento de Flambagem LE

(Momentos Vetoriais no Sistema Local) : M Esf. no pto MEDIO VC = Força

Normal Inicial Calculo

: B Esforços na BASE Cmaj=

Coef.Majoracao da VC p/DIMENS.COMPRESSAO

Vd = Força Normal Final Calculo : N Majoracao da VC com ni < 0.7

Mdx = Mom.Final Calculo direcao x MCx = Mom.Inic. Calculo direcao x M2x =

Mom.Segunda Ordem direcao x

Mdy = Mom.Final Calculo direcao y MCy = Mom.Inic. Calculo direcao y M2y =

Mom.Segunda Ordem direcao y

Mlx = Mom.PrimeiraOrdem direcao x MOx =

Mom.Obliquo antes da Normaliz.

Mly = Mom.PrimeiraOrdem direcao y MOy =

Mom.Obliquo antes da Normaliz.

PILAR:P1

num. 1 Valores Intermediarios de  
Calculo

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx  | MCy  | Mlx  | Mly  | LAMB | LBLM | M2x | M2y | MOx | MOy | VC       | Cmaj |
|------|---------|-------------|-------------|-----|------|------|------|------|------|------|-----|-----|-----|-----|----------|------|
| 0.   | 0.      | 0.          | 1. 1.250    | T   | 8.   | 29.  | 8.   | 29.  | 0.   | 0.   | 0.  | 0.  | 0.  | 0.  | 1. 1.250 |      |
| 0.   | -12.    | -26.        | 1. 1.250    | B   | -12. | -26. | -12. | -26. | 0.   | 0.   | 0.  | 0.  | 0.  | 0.  | 1. 1.250 |      |
| 0.   | 8.      | 29.         | 1. 1.250    | T   | 8.   | 29.  | 8.   | 29.  | 0.   | 0.   | 0.  | 0.  | 0.  | 0.  | 1. 1.250 |      |
| 0.   | 0.      | 0.          | 1. 1.250    | T   | 8.   | 29.  | 8.   | 29.  | 0.   | 0.   | 0.  | 0.  | 0.  | 0.  | 1. 1.250 |      |

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| COBERTA | ..... | ..... | .....    | ..... | ..... | ..... | .....    | ..... | ..... | ..... | .....    | ..... | ..... | ..... | .....    | ..... |
|---------|-------|-------|----------|-------|-------|-------|----------|-------|-------|-------|----------|-------|-------|-------|----------|-------|
| 0.      | 0.    | 0.    | 1. 1.250 | 0.    | 0.    | 0.    | 1. 1.250 | 0.    | 0.    | 0.    | 1. 1.250 | 0.    | 0.    | 0.    | 1. 1.250 | 0.    |

|     |      |       |          |   |      |      |      |      |    |    |    |
|-----|------|-------|----------|---|------|------|------|------|----|----|----|
| L 1 | .9   | 3.3   | .0       | T | 8.   | 29.  | 8.   | 29.  | 0. | 0. | 0. |
| 0.  | 0.   | 0.    | 1. 1.250 |   |      |      |      |      |    |    |    |
| L 1 | .9   | -17.0 | .0       | B | -12. | -26. | -12. | -26. | 0. | 0. | 0. |
| 0.  | -12. | -26.  | 1. 1.250 |   |      |      |      |      |    |    |    |
| L 1 | .9   | .0    | 33.0     | T | 8.   | 29.  | 8.   | 29.  | 0. | 0. | 0. |
| 0.  | 8.   | 29.   | 1. 1.250 |   |      |      |      |      |    |    |    |
| L 1 | .9   | .0    | -2.1     | T | 8.   | 29.  | 8.   | 29.  | 0. | 0. | 0. |
| 0.  | 0.   | 0.    | 1. 1.250 |   |      |      |      |      |    |    |    |

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

| Cobrimento[cm] | fck[MPa] | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |
|----------------|----------|---------|--------------|----------|----------|-------|-------|-------|-------|
| 2.5            | 25.0     | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |

| TipoAço | ClasseAço | ExcMin | ExcMax | K12 | K37 |
|---------|-----------|--------|--------|-----|-----|
| 50      | B         | 2.0    | 15.0   | 1   | 1   |

Fundacao

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PILAR:P2

num. 2 Valores Intermediarios de  
Calculo



| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

|         |     |      |          |   |     |      |     |      |    |     |    |
|---------|-----|------|----------|---|-----|------|-----|------|----|-----|----|
| COBERTA |     |      |          |   |     |      |     |      |    |     |    |
| L 1     | .9  | 17.0 | .0       | B | 12. | -26. | 12. | -26. | 0. | 0.  | 0. |
| 0.      | 12. | -26. | 1. 1.250 |   |     |      |     |      |    |     |    |
| L 1     | .9  | -3.3 | .0       | M | 5.  | 11.  | 5.  | 11.  | 0. | 90. | 0. |
| 0.      | 0.  | 0.   | 1. 1.250 |   |     |      |     |      |    |     |    |
| L 1     | .9  | .0   | 33.3     | T | -8. | 29.  | -8. | 29.  | 0. | 0.  | 0. |
| 0.      | -8. | 29.  | 1. 1.250 |   |     |      |     |      |    |     |    |
| L 1     | .9  | .0   | -2.1     | T | -8. | 29.  | -8. | 29.  | 0. | 0.  | 0. |
| 0.      | 0.  | 0.   | 1. 1.250 |   |     |      |     |      |    |     |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |       |       |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|-------|-------|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmapV | GmapW | GmapX | GmapY |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |       |       |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |       |       |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |       |       |
| Fundacao                                     |           |         |              |          |          |       |       |       |       |       |       |

PILAR:P3

num. 3

Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS | MCx | MCy | Mlx | Mly | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|-----|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC  Cmaj    |     |     |     |     |     |      |      |     |

|         |      |       |          |   |      |      |      |      |     |     |     |
|---------|------|-------|----------|---|------|------|------|------|-----|-----|-----|
| COBERTA |      |       |          |   |      |      |      |      |     |     |     |
| L 1     | 4.4  | 16.0  | .0       | T | 4.   | -26. | 4.   | -26. | 0.  | 0.  | 0.  |
| 0.      | 0.   | 0.    | 4. 1.250 |   |      |      |      |      |     |     |     |
| L 1     | 4.4  | -17.0 | .0       | M | -9.  | 11.  | -9.  | 11.  | 65. | 37. | -8. |
| 0.      | -16. | 11.   | 4. 1.250 |   |      |      |      |      |     |     |     |
| L 1     | 4.4  | .0    | 37.4     | B | -12. | 28.  | -12. | 28.  | 0.  | 0.  | 0.  |
| 0.      | -12. | 28.   | 4. 1.250 |   |      |      |      |      |     |     |     |
| L 1     | 4.4  | .0    | -27.9    | T | 4.   | -26. | 4.   | -26. | 0.  | 0.  | 0.  |
| 0.      | 4.   | -26.  | 4. 1.250 |   |      |      |      |      |     |     |     |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |       |       |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|-------|-------|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmapV | GmapW | GmapX | GmapY |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |       |       |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |       |       |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |       |       |
| Fundacao                                     |           |         |              |          |          |       |       |       |       |       |       |

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PILAR:P4

num. 4  
 Calculo

Valores Intermediarios de

| LANC | Vd (tf) | Mdx (tf,cm) | Mdy (tf,cm) | OBS  | MCx | MCy | M1x | M1y | LAMB | LBLM | M2x |
|------|---------|-------------|-------------|------|-----|-----|-----|-----|------|------|-----|
| M2y  | MOx     | MOy         | VC          | Cmaj |     |     |     |     |      |      |     |

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 .....  
 .....

| COBERTA   |     |       |          |   |     |      |     |      |     |     |    |
|---|-----|-------|----------|---|-----|------|-----|------|-----|-----|----|
| ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... |     |       |          |   |     |      |     |      |     |     |    |
| L 1   | 4.4 | 16.9  | .0       | M | 8.  | 11.  | 8.  | 11.  | 65. | 37. | 8. |
| 0.  | 16. | 11.   | 4. 1.250 |   |     |      |     |      |     |     |    |
| L 1   | 4.4 | -16.0 | .0       | M | 8.  | 11.  | 8.  | 11.  | 0.  | 37. | 8. |
| 0.  | 0.  | 0.    | 4. 1.250 |   |     |      |     |      |     |     |    |
| L 1   | 4.4 | .0    | 37.0     | B | 11. | 28.  | 11. | 28.  | 0.  | 0.  | 0. |
| 0.  | 11. | 28.   | 4. 1.250 |   |     |      |     |      |     |     |    |
| L 1   | 4.4 | .0    | -27.9    | T | -4. | -26. | -4. | -26. | 0.  | 0.  | 0. |
| 0.  | -4. | -26.  | 4. 1.250 |   |     |      |     |      |     |     |    |

| VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS |           |         |              |          |          |       |       |       |       |  |
|--|-----------|---------|--------------|----------|----------|-------|-------|-------|-------|--|
| Cobrimento[cm]                               | fck[MPa]  | GamaAço | GamaConcreto | AsMax[%] | AsMin[%] | GmapN | GmapM | GmavN | Gmavm |  |
| 2.5  | 25.0      | 1.15    | 1.40         | 8.00     | .50      | 1.75  | 1.75  | 1.40  | 1.40  |  |
| TipoAço                                      | ClasseAço | ExcMin  | ExcMax       | K12      | K37      |       |       |       |       |  |
| 50   | B         | 2.0     | 15.0         | 1        | 1        |       |       |       |       |  |
| Fundacao                                     |           |         |              |          |          |       |       |       |       |  |

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 .....

|                                      |           |  |          |
|--------------------------------------|-----------|--|----------|
| CAD/Pilar                            | V18.19.1  | SELEC - Seleção autom. de bitolas de pilares | Pg 1     |
| FELIPE DA SILVA OLIVEIRA             | 57035-690 | AL   | 32311988 |
| AV. HAMILTON DE BARROS SOUTINHO, 673 |           |  | MACEIO   |
| 0001                                 |           |  | 02/11/17 |
|                                      |           |  | 15:43:28 |

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 LEGENDA

Seção : Dimensões da seção tansversal (seção retangular)  
 Nome da seção (seção qualquer)  
 Área : Área de concreto da seção transversal  
 NFer : Número de ferros  
 PDD : Pé-Direito Duplo (direções "x" e "y")  
 S: Sim N: Não  
 As : Área total de armadura utilizada  
 Taxa : Taxa de Armadura da seção  
 Estr : Bitola do estribo  
 C/ : Espaçamento do estribo  
 fck : fck utilizado no lance

|         |   |
|---------|---|
| Cobr    | : Cobrimento utilizado no lance   |
| PP      | : Pilar-Parede: (S) Sim (N)Não  |
| PP      | : S* :Pilar-Parede (Sim), mas Ast não atende o item 18.5 da NBR6118:2003            |
| T       | : Tensão de Cálculo (Carga Vertical: Combinação 1 CAD/PILAR) (kgf/cm2)              |
| Lbd     | : Índice de Esbeltez (Maior Lambda)   |
| Ni      | : Força Normal Adimensional (Nsd / Ac*Fcd) (Carga Vertical: Combinação 1 CAD/PILAR) |
| 2ordM   | : Método utilizado cálculo momento 2ªOrdem  |
| ELOL    | : Efeito Local (15.8.3)   |
| ELZD    | : Efeito Localizado (15.9.3)  |
| KAPA    | : Pilar Padrão com Rigidez Kapa Aproximada (15.8.3.3.3)                             |
| CURV    | : Pilar Padrão com Curvatura Aproximada (15.8.3.3.2)                                |
| N,M,1/R | : Pilar Padrão Acoplado ao Diagrama N,M,1/r (15.8.3.3.4)                            |
| MetGerl | : Método Geral (15.8.3.2)   |

\*\*\*\*\* PROJETO 1 \*\*\*\*\*

PILAR:P1

num: 1 Lances: 1 à 1

[illegible]

PILAR:P2

num: 2 Lances: 1 à 1

[illegible]

PILAR:P3

num: 3 Lances: 1 à 1

[illegible]

PILAR:P4

num: 4 Lances: 1 à 1

| Lance | Título    | Seção     | Área  | NFer | Bitola | PDD | As    | Taxa | Estr | C/   | PP | fck   | Cobr |
|-------|-----------|-----------|-------|------|--------|-----|-------|------|------|------|----|-------|------|
| T Lbd | Ni 2OrdM  |           |       |      |        |     |       |      |      |      |    |       |      |
|       |           | [cm]      | [cm2] |      | [mm]   | x y | [cm2] | [%]  | [mm] | [cm] |    | (MPa) | (cm) |
| 1     | COBERTA   | 14.x 30.  | 420.0 | 4    | 10.0   | N N | 3.1   | .75  | 5.0  | 12.0 | N  | 25.0  | 2.5  |
| 10.4  | 65. .0582 | ELOL KAPA |       |      |        |     |       |      |      |      |    |       |      |

## Dimensionamento das Vigas

### Pavimento Coberta

|   |   |   |      |     |               |   |   |  |   |         |   |  |  |
|---|---|---|------|-----|---------------|---|---|--|---|---------|---|--|--|
| fck=250.kgf/cm2 - Aco: CA-60B CA-50A - Esforços |   |   |      |     |               |   |   |  |   |         |   |  |  |
| Caracteristicos                                 |   |   |      |     |               |   |   |  |   |         |   |  |  |
| L E G E N D A                                   |   |   |      |     |               |   |   |  |   |         |   |  |  |
| G E O M E T R I A                               |   |   |      |     |               |   |   |  |   |         |   |  |  |
| Eng.E   | : | Engastamento a Esquerda                             |      | /   | Eng.D         | : | Engastamento a Direita                                |  | / | Repet   | : |  |  |
| Repeticoes                                      |   |   |      |     |               |   |   |  |   |         |   |  |  |
| NAnd  | : | N.de Andares  |      | /   | Red V Ext     | : | Reducao de Cortante no Extremo                        |  | / | Fat.Alt | : |  |  |
| Fator de Alternancia de Cargas                  |   |   |      |     |               |   |   |  |   |         |   |  |  |
| Cob   | : | Cobrimento  |      | /   | TpS           | : | Tipo da Secao   |  | / | BCs     | : |  |  |
| Mesa Colaborante Superior                       |   |   |      |     |               |   |   |  |   |         |   |  |  |
| BCi   | : | Mesa Colaborante Inferior                           |      | /   | Esp.LS        | : | Espessura Laje Superior                               |  | / | Esp.LI  | : |  |  |
| Espessura Laje Inferior                         |   |   |      |     |               |   |   |  |   |         |   |  |  |
| FSp.Ex  | : | Distancia Face Superior                             | Eixo | /   | FLt.Ex        | : | Distancia Face Lateral ao Eixo                        |  | / | Cob/S   | : |  |  |
| Cobrim/Cobr.superior adicional                  |   |   |      |     |               |   |   |  |   |         |   |  |  |
| C A R G A S                                     |   |   |      |     |               |   |   |  |   |         |   |  |  |
| MEsq  | : | Momento Adicional a Esquerda                        |      | /   | MDir          | : | Momento Adicional a Direita                           |  | / | Q       | : |  |  |
| Cortante Adicional (valor unico)                |   |   |      |     |               |   |   |  |   |         |   |  |  |
| A R M A D U R A S - F L E X A O                 |   |   |      |     |               |   |   |  |   |         |   |  |  |
| SRAS  | : | Secao Retangular Armad.Simples                      |      | /   | SRAD          | : | Secao Retangular Armad.Dupla                          |  | / | STAS    | : |  |  |
| Secao Te Armadura Simples                       |   |   |      |     |               |   |   |  |   |         |   |  |  |
| STAD  | : | Secao Te Armadura Dupla                             |      | /   | x/d           | : | Profund. relativa da Linha Neutra                     |  | / | x/dMx   | : |  |  |
| Profund. relativa da LN Maxima                  |   |   |      |     |               |   |   |  |   |         |   |  |  |
| AsL   | : | Armadura de Compressao                              |      | /   | Bit.de Fiss.: | : | Bitola de fissuracao                                  |  | / | Asapo   | : |  |  |
| Armadura e/d que chega no extremo               |   |   |      |     |               |   |   |  |   |         |   |  |  |
| A R M A D U R A S - C I S A L H A M E N T O     |   |   |      |     |               |   |   |  |   |         |   |  |  |
| MdC   | : | Modelo de Calculo (I ou II)                         |      | /   | Ang.          | : | Angulo da biela de compressao                         |  | / | Aswmin  | : |  |  |
| Arm.ad.transv.minima-cisalhamento               |   |   |      |     |               |   |   |  |   |         |   |  |  |
| Asw[C+T]:                                       | : | Arm.tran.calculada cisalh+torcao                    | /    | Bit | :             | : | Bitola selecionada                                    |  | / | Esp     | : |  |  |
| Espacamento selecionado                         |   |   |      |     |               |   |   |  |   |         |   |  |  |
| NR  | : | Numero de ramos do estribo                          |      | /   | AsTrt         | : | Armadura transversal de Tirante                       |  | / | AsSus   | : |  |  |
| Armadura transversal-Suspensao                  |   |   |      |     |               |   |   |  |   |         |   |  |  |
| A R M A D U R A S - T O R C A O                 |   |   |      |     |               |   |   |  |   |         |   |  |  |
| %dT   | : | % limite de TRd2 para desprezar o M de torcao (Tsd) |      | /   | he            | : | Espessura do nucleo de torcao                         |  |   |         |   |  |  |
| b-nuc   | : | Largura do nucleo                                   |      | /   | h-nuc         | : | Altura do nucleo                                      |  |   |         |   |  |  |
| Asw-1R  | : | Armadura de torcao calculada para 1 Ramo de estribo |      | /   | AswmnNR       | : | Arm.ad.transv.minima-torcao p/NR estribos selecionado |  |   |         |   |  |  |
| Asl-b   | : | Armadura longitudinal de torcao no lado b           |      | /   | Asl-h         | : | Armadura longitudinal de torcao no lado h             |  |   |         |   |  |  |
| ComDia  | : | Valor da compressao diagonal (cisalhamento+torcao)  |      | /   | AdPla         | : | Capacida/ adaptacao plastica no vao - S[sim] N[nao]   |  |   |         |   |  |  |

R E A C O E S D E A P O I O

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre / segue / vigas

M.I.Mx : Momento Imposto Maximo

/ M.I.Mn : Momento Imposto Minimo

=====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 150 | M.[-]  
= .0 tf\* m  
[tf,cm]| As = .84 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .1 | As =  
.84 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .05 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .05  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| | | Fle.Adm.= 1.0 |  
[tf,cm]| M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ]| Asapo[+]= .84 | |  
Asapo[+]= .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.- 286. .51 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

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

|   |   |   |      |      |     |     |   |    |     |     |   |   |
|---|---|---|------|------|-----|-----|---|----|-----|-----|---|---|
| 0 | 0 | 1 | .359 | .359 | .14 | .00 | 1 | P1 | .00 | .00 | 1 | 0 |
| 0 | 0 | 2 | .361 | .361 | .14 | .00 | 1 | P2 | .00 | .00 | 2 | 0 |

=====

Viga= 2 V2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 3.00 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE= .90 DeltaD= .90 ---

- - - - - 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 tf\* m - Abcis.= 150 | M.[-]  
= .0 tf\* m  
[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- Flecha= .1 | As =  
.00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .00 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00  
| Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
Grampos Dir.= 1B 6.3mm x/dMx= .37  
| | | Fle.Adm.= 1.0 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .84 | |  
Asapo[+]= .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.- 286. .50 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 .360 .360 .14 .00 2 V3 .00 .00 0 0  
0 0 2 .360 .360 .14 .00 2 V4 .00 .00 0 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=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1B /L= 1.68 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 1.01 tf\* m | As = .93 -SRAS- [ 2 B 8.0mm] |  
Flecha = .4  
BAL.ESQ | x/d = .07 | AsL= .00 - |  
Flecha Adm.= 1.1  
[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | | %  
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.- 150. 1.31 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= .98 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 98 | M.[-]  
= .0 tf\* m  
[tf,cm] | As = .93 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.14 -SRAS- [ 2 B 6.3mm]  
| AsL= .00 ----- x/d = .07 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00  
| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | | Fle.Adm.= .3 |  
[tf,cm] | M[-]Min = 70.4 | M[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .21 |  
Asapo[+]= .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.- 74. 1.66 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 2.120 2.116 .30 .03 1 P3 .00 .00 3 0  
0 0 2 -.843 -.847 .30 .03 1 P1 .00 .00 1 0  
0 0 0 0

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Viga= 4 V4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao  
/Fat.Alt=1.00 /Cob/S=2.5 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 1B /L= 1.68 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD=1.00 ---

- - - - - 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[-]= 1.01 tf\* m | As = .93 -SRAS- [ 2 B 8.0mm] |  
Flecha = .4  
BAL.ESQ | x/d = .07 | AsL= .00 - |  
Flecha Adm.= 1.1

[tf,cm] | M[-]Min= 70.4 - x/dMx = .50 | %  
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.- 150. 1.31 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .4

----- G E O M E T R I A E C A R G A S -----  
-----

Vao= 2 /L= .98 /B= .14 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00  
FSp.Ex= .20 /FLt.Ex= .07 [M]

--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS ---  
DeltaE=1.00 DeltaD= .90 ---

- - - - - 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= .1 tf\* m - Abcis.= 98 | M.[-]  
= .0 tf\* m  
[tf,cm] | As = .93 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- Flecha= .0 | As =  
.14 -SRAS- [ 2 B 6.3mm]  
| AsL= .00 ----- x/d = .07 | As = .84 -SRAS- [ 2 B 8.0mm ] | AsL=  
.00 ----- x/d = .00  
| x/dMx= .37 | x/dMx= .45 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |  
| | Fle.Adm.= .3 |  
[tf,cm] | M[-]Min = 70.4 | M.[+]Min = 70.4 | M[-]  
]Min = 70.4  
[cm2 ] | Asapo[+]= .21 |  
Asapo[+]= .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.- 74. 1.66 22.17 1 45. .0 1.4 1.4 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn  
Pilares:  
0 0 1 2.119 2.116 .30 .03 1 P4 .00 .00 4 0  
0 0 2 -.842 -.846 .30 .03 1 P2 .00 .00 2 0  
0 0 0 0

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FIM.