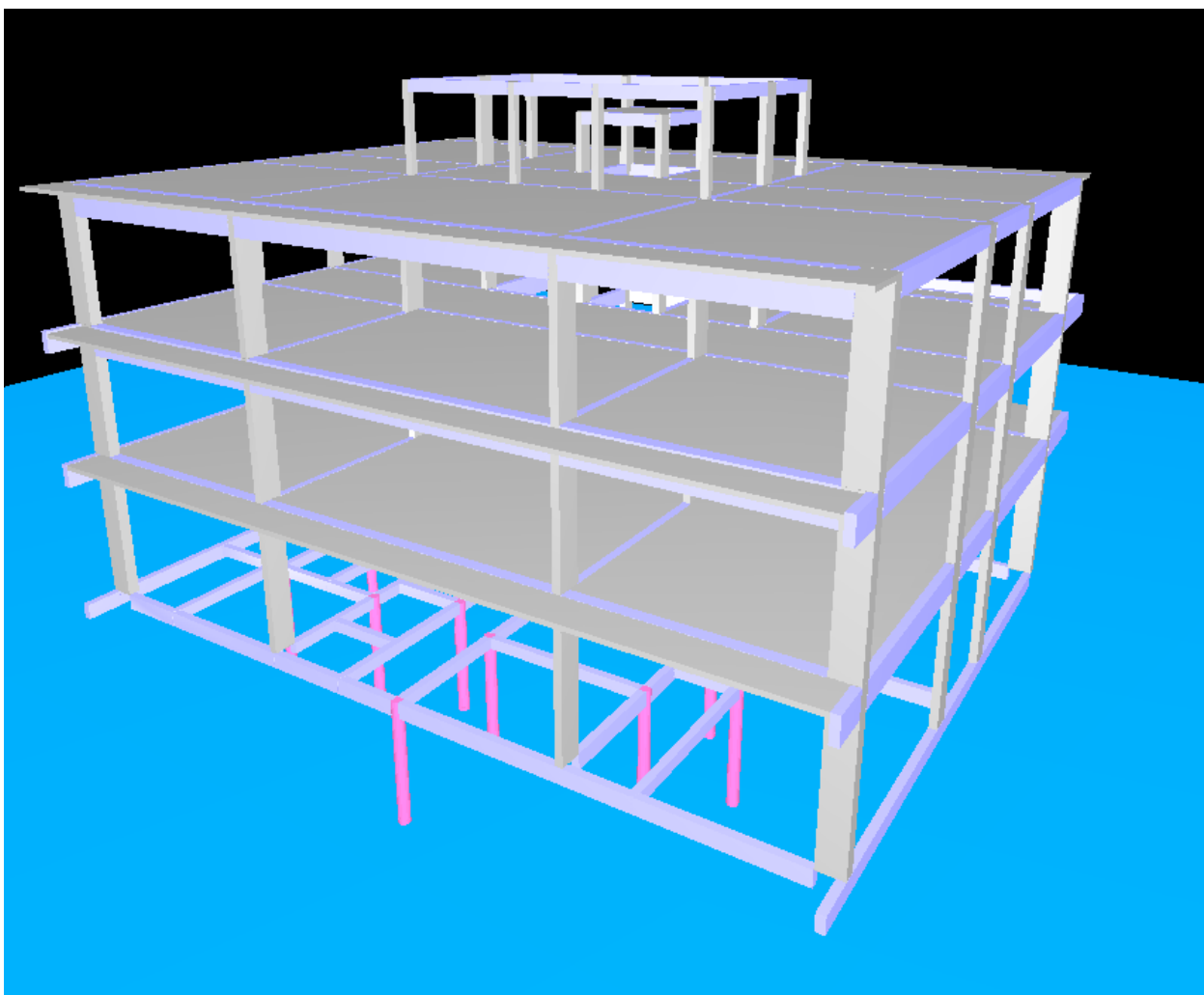


**MEMORIAL DE CÁLCULO – PROJETO ESTRUTURAL**  
**PROJETO PADRÃO EDIF 2019 - CEI 8 SALAS**

## DESCRIÇÃO DO EDIFÍCIO

Trata-se de edificação para fins escolares.

<b>Pavimentos</b>	<b>Piso a Piso (m)</b>
<i>torre</i>	0,80
<i>Laje Elevador</i>	1,50
<i>cobertura</i>	3,40
<i>pav2</i>	3,40
<i>pav1</i>	3,85
<i>baldrames</i>	0,80
<i>elevador</i>	0,00



## NORMA EM USO

Na análise, dimensionamento e detalhamento dos elementos estruturais deste edifício foram utilizadas as prescrições indicadas pelas seguintes normas:

- NBR6118 - Projeto de estruturas de concreto - Procedimentos;
- NBR6120 - Cargas para o cálculo de estruturas de edificações - Procedimentos;
- NBR6123 - Forças devidas ao vento em edificações – Procedimentos;
- NBR8681 - Ações e segurança nas estruturas – Procedimentos.

## SOFTWARE UTILIZADO

Para a análise estrutural e dimensionamento e detalhamento estrutural foi utilizado o sistema CAD/TQS na versão V18.12.64.

## MATERIAIS

### Concreto

A seguir são apresentados os valores de  $f_{ck}$ , em MPa, utilizados para cada um dos elementos estruturais, para cada um dos pavimentos:

<b>Pavimento</b>	<b>Lajes</b>	<b>Vigas</b>	<b>Fundações</b>
<b>torre</b>	30	30	30
<b>Laje Elevador</b>	30	30	30
<b>cobertura</b>	30	30	30
<b>pav2</b>	30	30	30
<b>pav1</b>	30	30	30
<b>baldrames</b>	30	30	30
<b>elevador</b>	30	30	30

<b>Piso</b>	<b>Pavimento</b>	<b><math>f_{ck}</math> do pilar (MPa)</b>
<b>6</b>	torre	30
<b>5</b>	Laje Elevador	30
<b>4</b>	cobertura	30
<b>3</b>	pav2	30
<b>2</b>	pav1	30
<b>1</b>	baldrames	30
<b>0</b>	elevador	30

### Módulo de elasticidade

O módulo de elasticidade, em  $\text{tf/m}^2$ , utilizado para cada um dos concretos utilizados é listado a seguir:

	<b>AlfaE</b>	<b>Ecs</b>	<b>Eci</b>	<b>Gc</b>
<b>C30</b>	1	2607159	3067246	0

## Aço de armadura passiva

Foram utilizadas as seguintes características para o aço estrutural utilizado no projeto:

<i>Tipo de barra</i>	<i>Ecs(GPa)</i>	<i>f<sub>yk</sub>(MPa)</i>	<i>Massa específica(kg/m<sup>3</sup>)</i>	<i>n1</i>
<b>CA-25</b>	210	250	7.850	1,00
<b>CA-50</b>	210	500	7.850	2,25
<b>CA-60</b>	210	600	7.850	1,40

## PARÂMETRO DE DURABILIDADE

### Classe de agressividade

Para o dimensionamento e detalhamento dos elementos estruturais foi considerada a seguinte Classe de Agressividade Ambiental no projeto: **II - Moderada**, conforme definido pelo item 6 da NBR6118.

### Cobrimentos gerais

A definição dos cobrimentos foi feita com base na Classe de Agressividade Ambiental definida anteriormente e de acordo com o item 7.4.7 e seus subitens.

A seguir são apresentados os valores de cobertura utilizados para os diversos elementos estruturais existentes no projeto:

<i>Elemento Estrutural</i>	<i>Cobramento (cm)</i>
<b>Lajes convencionais (superior / inferior)</b>	2,5 / 2,5
<b>Lajes protendidas (superior / inferior)</b>	3,0 / 3,0
<b>Vigas</b>	3,0
<b>Pilares</b>	3,0
<b>Fundações</b>	3,0

## AÇÕES E COMBINAÇÕES

### Carga vertical

Na análise estrutural do edifício não foi considerada a redução de sobrecarga definida no item 2.2.1.8 da NBR 6120.

### Vento

A seguir são apresentados os fatores de cálculo utilizados para definição das ações de vento incidentes sobre a estrutura.

- Velocidade básica (m/s): 45,0;
- Fator topográfico (S1): 1,0;
- Categoria de rugosidade (S2): IV - Terrenos com obstáculos numerosos e pouco espaçados. zona florestal, industrial, urbanizada, parques, subúrbios densos;
- Classe da edificação (S2): A - Maior dimensão horizontal ou vertical < 20m;

- Fator estatístico (S3): 1,00 - Edificações em geral. Hotéis, residências, comércio e indústria com alta taxa de ocupação.

Na tabela que se segue são apresentados os valores de coeficiente de arrasto, área de projeção do edifício e pressão calculada com os fatores apresentados anteriormente:

<b>Caso</b>	<b>Ângulo (°)</b>	<b>Coef. arrasto</b>	<b>Área (m2)</b>	<b>Pressão (tf/m2)</b>
5	90	1,09	251,0	0,087
6	270	1,09	251,0	0,087
7	0	1,04	207,3	0,083
8	180	1,04	207,3	0,083

### Desaprumo global

Nenhum caso de desaprumo global foi considerado na análise estrutural do edifício.

### Empuxo

Nenhum caso de empuxo foi considerado na análise estrutural do edifício.

### Incêndio

TRRF: 120,0

### Cargas adicionais

Nenhum caso adicional foi considerado na análise estrutural do edifício.

### Carregamentos nos pavimentos

Outros carregamentos considerados nos modelos dos pavimentos são apresentados a seguir:

<b>Pavimento</b>	<b>Temperatura</b>	<b>Retração</b>	<b>Protensão</b>	<b>Dinâmica</b>
<b>torre</b>	Não	Não	Não	Não
<b>Laje Elevador</b>	Não	Não	Não	Não
<b>cobertura</b>	Não	Não	Não	Não
<b>pav2</b>	Não	Não	Não	Não
<b>pav1</b>	Não	Não	Não	Não
<b>baldrames</b>	Não	Não	Não	Não
<b>elevador</b>	Não	Não	Não	Não

### Resumo de combinações no modelo global

No modelo estrutural global foram consideradas as seguintes combinações:

<b>Tipo</b>	<b>Descrição</b>	<b>N. Combinações</b>
<b>ELU1</b>	Verificações de estado limite último - Vigas e lajes	18
<b>ELU2</b>	Verificações de estado limite último - Pilares e fundações	18
<b>FOGO</b>	Verificações em situação de incêndio	2
<b>ELS</b>	Verificações de estado limite de serviço	12
<b>COMBFLU</b>	Cálculo de fluência (método geral)	2

## Lista de combinações no modelo global

No modelo estrutural global foram consideradas as seguintes combinações: Combinações de ELU para vigas e lajes

```
=====
Caso Prefixo Título
14 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT1
15 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT2
16 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT3
17 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT4
18 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT1
19 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT2
20 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT3
21 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT4
25 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT1
26 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT2
27 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT3
28 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT4
29 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT1
30 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT2
31 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT3
32 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT4
```

Combinações de ELU para pilares e fundações

```
=====
Caso Prefixo Título
14 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT1
15 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT2
16 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT3
17 ELU1/ACIDCOMB/PP+PERM+ACID+0.6VENT4
18 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT1
19 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT2
20 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT3
21 ELU1/ACIDCOMB/PP+PERM+0.8ACID+VENT4
25 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT1
26 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT2
27 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT3
28 ELU1/ACIDCOMB/PP_V+PERM_V+ACID_V+0.6VENT4
29 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT1
30 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT2
31 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT3
32 ELU1/ACIDCOMB/PP_V+PERM_V+0.8ACID_V+VENT4
```

## MODELO ESTRUTURAL

### Explicações

Na análise estrutural do edifício foi utilizado o 'Modelo 4' do sistema CAD/TQS. Este modelo consiste em dois modelos de cálculo:

- Modelo de grelha para os pavimentos;
- Modelo de pórtico espacial para a análise global.

O edifício será modelado por um único pórtico espacial mais os modelos dos pavimentos. O pórtico será composto apenas por barras que simulam as vigas e pilares da estrutura, com o efeito de diafragma rígido das lajes devidamente incorporado ao modelo. Os efeitos oriundos das ações verticais e horizontais nas vigas e pilares serão calculados com o pórtico espacial.

Nas lajes, somente os efeitos gerados pelas ações verticais serão calculados. Nos pavimentos simulados por grelha de lajes, os esforços resultantes das barras de lajes sobre as vigas serão transferidas como cargas para o pórtico espacial, ou seja, há uma 'certa' integração entre ambos os modelos (pórtico e grelha). Para os demais tipos de modelos de pavimentos, as cargas das lajes serão transferidas para o pórtico por meio de quinhos de carga.

Tratamento especial para vigas de transição e que suportam tirantes pode ter sido considerado e são apontados no item 'Critérios de projeto'. A flexibilização das ligações viga-pilar, a separação de modelos específicos para análises ELU e ELS e os coeficientes de não-linearidade física também são apontados a seguir.

## Modelo estrutural dos pavimentos

A análise do comportamento estrutural dos pavimentos foi realizada através de modelos de grelha ou pórtico plano. Nestes modelos as lajes foram integralmente consideradas, junto com as vigas e os apoios formados pelos pilares existentes.

A seguir são apresentados o tipo de modelo estrutural utilizado em cada um dos pavimentos:

<b>Pavimento</b>	<b>Descrição do Modelo</b>	<b>Modelo Estrutural</b>
<b>torre</b>	Modelo de lajes planas	Grelha (3 graus de liberdade)
<b>Laje Elevador</b>	Modelo de lajes planas	Grelha (3 graus de liberdade)
<b>cobertura</b>	Modelo de lajes planas	Grelha (3 graus de liberdade)
<b>pav2</b>	Modelo de lajes planas	Pórtico (6 graus de liberdade)
<b>pav1</b>	Modelo de lajes planas	Pórtico (6 graus de liberdade)
<b>baldrames</b>	Modelo somente de vigas	Grelha (3 graus de liberdade)
<b>elevador</b>	Modelo somente de vigas	Grelha (3 graus de liberdade)

Para a avaliação das deformações dos pavimentos em serviço, também foram realizadas análises considerando a não-linearidade física, onde através de incrementos de carga, as inércias reais das seções são estimadas considerando as armaduras de projeto e a fissuração nos estádios I, II ou III.

Os esforços obtidos dos modelos estruturais dos pavimentos foram utilizados para o dimensionamento das lajes à flexão e cisalhamento.

Nestes modelos foi utilizado o módulo de elasticidade secante do concreto. A seguir são apresentados os valores utilizados para cada um dos pavimentos:

<b>Pavimento</b>	<b>Módulo de elasticidade adotado (tf/m<sup>2</sup>)</b>
<b>torre</b>	2607159
<b>Laje Elevador</b>	2607159
<b>cobertura</b>	2607159
<b>pav2</b>	2607159
<b>pav1</b>	2607159
<b>baldrames</b>	2607159
<b>elevador</b>	2607159

## Modelo estrutural global

No modelo de pórtico foram incluídos todos os elementos principais da estrutura, ou seja, pilares e vigas, além da consideração do diafragma rígido formado nos planos de cada pavimento (lajes). A rigidez à flexão das lajes foi desprezada na análise de esforços horizontais (vento).

Os pórticos espaciais foram modelados com todos os pavimentos do edifício, para a avaliação dos efeitos das ações horizontais e os efeitos de redistribuição de esforços em toda a estrutura devido aos carregamentos verticais.

As cargas verticais atuantes nas vigas e pilares do pórtico foram extraídas de modelos de grelha de cada um dos pavimentos.

Foram utilizados dois modelos de pórtico espacial: um específico para análises de Estado Limite Último - ELU e outro para o Estado Limite de Serviço - ELS. As características de cada um destes modelos são apresentadas a seguir.

### Critérios de projeto

A seguir são apresentadas algumas considerações de projeto utilizadas para a análise estrutura do edifício em questão:

- Flexibilização das ligações viga/pilar : Sim;
- Modelo enrijecido para viga de transição: Sim
- Método para análise de 2ª. Ordem global: P-Delta
- Análise por efeito incremental: Sim
- Análise com interação fundação-estrutura: Não

### Modelo ELU

O modelo ELU foi utilizado para obtenção dos esforços necessários para o dimensionamento e detalhamento dos elementos estruturais.

Apenas no neste modelo foram utilizados os coeficientes de não linearidade física conforme indicados pelo item 15.7.3 da NBR6118. A seguir são apresentados estes valores:

<b>Elemento estrutural</b>	<b>Coef. NLF</b>
<b>Pilares</b>	0,80
<b>Vigas</b>	0,40
<b>Lajes</b>	0,30

O módulo de elasticidade utilizado no modelo foi de secante, de acordo com o fck do elemento estrutural (já apresentado anteriormente).

### Modelo ELS

O modelo ELS foi utilizado para análise de deslocamento do edifício.

Neste modelo a inércia utilizada para os elementos estruturais foi a bruta.

### Esforços de cálculo

Os esforços obtidos na análise de pórtico foram utilizados para o dimensionamento de vigas e pilares, onde um conjunto de combinações conciliando os esforços de cargas verticais e de vento são agrupados e ponderados segundo as prescrições das normas NBR8681 e NBR6118.

No dimensionamento das armaduras das vigas é utilizada uma envoltória de esforços solicitantes de todas as combinações pertencentes ao grupo ELU1. Para o dimensionamento de armaduras dos pilares são utilizadas todas as hipóteses de solicitações (combinações do grupo ELU2); neste conjunto de combinações são aplicadas as reduções de sobrecarga previstas na NBR6120, caso o projeto esteja utilizando este método.



**ESTABILIDADE GLOBAL**

A seguir são apresentados os principais parâmetros de instabilidade obtidos da análise estrutural do edifício.

<b>Parâmetro</b>	<b>Valor</b>
<b>GamaZ</b>	1,05
<b>FAVt</b>	1,06
<b>Alfa</b>	0,65

Na tabela anterior são apresentados somente os valores máximos obtidos para os coeficientes.

GamaZ é o parâmetro para avaliação da estabilidade de uma estrutura. Ele NÃO considera os deslocamentos horizontais provocados pelas cargas verticais (calculado p/ casos de vento), conforme definido no item 15.5.3 da NBR 6118.

FAVt é o fator de amplificação de esforços horizontais que pode considerar os deslocamentos horizontais gerados pelas cargas verticais (calculado p/ combinações ELU com a mesma formulação do GamaZ).

Alfa é o parâmetro de instabilidade de uma estrutura reticulada conforme definido pelo item 15.5.2 da NBR 6118.

**Listagem completa dos parâmetros de instabilidade**

A seguir são apresentados a listagem completa dos parâmetros de instabilidade para as combinações apresentadas anteriormente:

Parâmetro de estabilidade (GamaZ) para os carregamentos simples de vento

Caso	Ang	CTot	M2	CHor	M1	Mig	GamaZ	Alfa	Obs
5	90.	1961.8	3.3	21.9	158.1	28.0	1.028	.450	
6	270.	1961.8	3.3	21.9	158.1	28.0	1.028	.450	
7	0.	1961.8	4.9	17.2	121.5	28.0	1.054	.625	B
8	180.	1961.8	4.9	17.2	121.5	28.0	1.054	.625	B

Parâmetro de estabilidade (RM2M1) para combinações de ELU - vigas e lajes

Caso	Ang	CTot	M2	CHor	M1	MultH	RM2M1	Alfa	Obs
14	90.	1961.8	3.4	13.2	94.9	1.000	1.046	.593	
15	270.	1961.8	.7	13.2	94.9	1.000	1.010	.258	
16	0.	1961.8	3.3	10.3	72.9	1.000	1.057	.654	B
17	180.	1961.8	3.0	10.3	72.9	1.000	1.053	.635	B
18	90.	1961.8	4.7	21.9	158.1	1.000	1.038	.537	
19	270.	1961.8	2.2	21.9	158.1	1.000	1.018	.360	
20	0.	1961.8	5.4	17.2	121.5	1.000	1.056	.649	B
21	180.	1961.8	5.1	17.2	121.5	1.000	1.054	.639	B
25	90.	1961.8	3.5	13.2	94.9	1.000	1.046	.647	B
26	270.	1961.8	.7	13.2	94.9	1.000	1.009	.028	
27	0.	1961.8	3.3	10.3	72.9	1.000	1.057	.635	B
28	180.	1961.8	3.0	10.3	72.9	1.000	1.053	.655	B
29	90.	1961.8	4.7	21.9	158.1	1.000	1.038	.573	
30	270.	1961.8	2.2	21.9	158.1	1.000	1.018	.299	
31	0.	1961.8	5.3	17.2	121.5	1.000	1.056	.638	B
32	180.	1961.8	5.1	17.2	121.5	1.000	1.054	.650	B

Parâmetro de estabilidade (RM2M1) para combinações de ELU - pilares e fundações

=

Caso	Ang	CTot	M2	CHor	M1	MultH	RM2M1	Alfa	Obs
14	90.	1961.8	3.4	13.2	94.9	1.000	1.046	.593	
15	270.	1961.8	.7	13.2	94.9	1.000	1.010	.258	
16	0.	1961.8	3.3	10.3	72.9	1.000	1.057	.654	B
17	180.	1961.8	3.0	10.3	72.9	1.000	1.053	.635	B
18	90.	1961.8	4.7	21.9	158.1	1.000	1.038	.537	
19	270.	1961.8	2.2	21.9	158.1	1.000	1.018	.360	
20	0.	1961.8	5.4	17.2	121.5	1.000	1.056	.649	B
21	180.	1961.8	5.1	17.2	121.5	1.000	1.054	.639	B
25	90.	1961.8	3.5	13.2	94.9	1.000	1.046	.647	B
26	270.	1961.8	.7	13.2	94.9	1.000	1.009	.028	
27	0.	1961.8	3.3	10.3	72.9	1.000	1.057	.635	B
28	180.	1961.8	3.0	10.3	72.9	1.000	1.053	.655	B
29	90.	1961.8	4.7	21.9	158.1	1.000	1.038	.573	
30	270.	1961.8	2.2	21.9	158.1	1.000	1.018	.299	
31	0.	1961.8	5.3	17.2	121.5	1.000	1.056	.638	B
32	180.	1961.8	5.1	17.2	121.5	1.000	1.054	.650	B

#### Observações IMPORTANTES

Este edifício foi calculado com processo P-Delta. Os esforços obtidos já consideram os efeitos de 2ª ordem. Os valores de GamaZ nesta listagem servem para referência de quanto aproximadamente os esforços foram majorados em relação a uma análise linear, para consideração de efeitos globais de 2ª ordem. Eles não multiplicarão os esforços devido a cargas horizontais passadas para dimensionamento e detalhamento de vigas e pilares.

Observações para os casos com Obs="B":

O parâmetro Alfa deste edifício indica que a estrutura é de nós móveis.

Para efeito de verificação da capacidade de rotação dos elementos estruturais, este edifício será considerado indeslocável.

## Classificação da estrutura

Baseado nos valores apresentados acima, a estrutura pode ser avaliada da seguinte forma:

- Parâmetro adotado na análise do edifício (GamaZ): 1,05;
- Tipo da estrutura (Alfa): 0,65.

## COMPORTAMENTO EM SERVIÇO - ELS

### Deslocamentos do modelo estrutural global

Para o edifício em questão os temos os seguintes valores:

- Altura total do edifício - H (m): 13,75;
- Altura entre pisos - Hi (m): 1,50.

### Listagem completa dos deslocamentos do modelo global do edifício

A seguir são apresentados a listagem completa dos parâmetros de instabilidade para as combinações apresentadas anteriormente:

Legenda para a tabela de deslocamentos máximos

ENGENHARIA E COMÉRCIO LTDA.

Legenda Valor  
 Caso Caso de carregamento de ELS  
 DeslH Máximo deslocamento horizontal absoluto (cm)  
 Relat1 Valor relativo à altura total do edifício  
 Piso Piso de deslocamento máximo relativo  
 DeslHp Máximo deslocamento horizontal entre pisos (cm)  
 Relat3 Valor relativo ao pé-direito do pavimento  
 Obs Observações (A/B/C..). Quando definidas, ver significado a seguir.

Deslocamentos máximos

=====

Caso	DeslH	Relat1	Obs
5	.15	H/9261.	D
6	.15	H/9261.	
7	.13	H/10550.	
8	.13	H/10550.	

Deslocamentos máximos entre pisos

=====

Caso	Piso	DeslHp	Relat3	Obs
5	5	.05	Hi/3238.	E
6	5	.05	Hi/3238.	
7	2	.05	Hi/7475.	D
8	2	.05	Hi/7475.	

Observações IMPORTANTES

=====

Observações para os casos com Obs="D":

Caso de carregamento com deslocamento absoluto máximo

Observações para os casos com Obs="E":

Caso de carregamento com deslocamento relativo máximo

Com os resultados obtidos pela análise estrutural obteve-se os seguintes valores de deslocamentos horizontais do modelo estrutural global:

Deslocamento	Valor máximo	Referência
Topo do edifício (cm)	(H / 9261) 0,15	(H / 1700) 0,81
Entre pisos (cm)	(Hi / 3238) 0,05	(Hi / 850) 0,18

Os valores de referência utilizados são prescritos pelo NBR 6118 através do item 13.3.

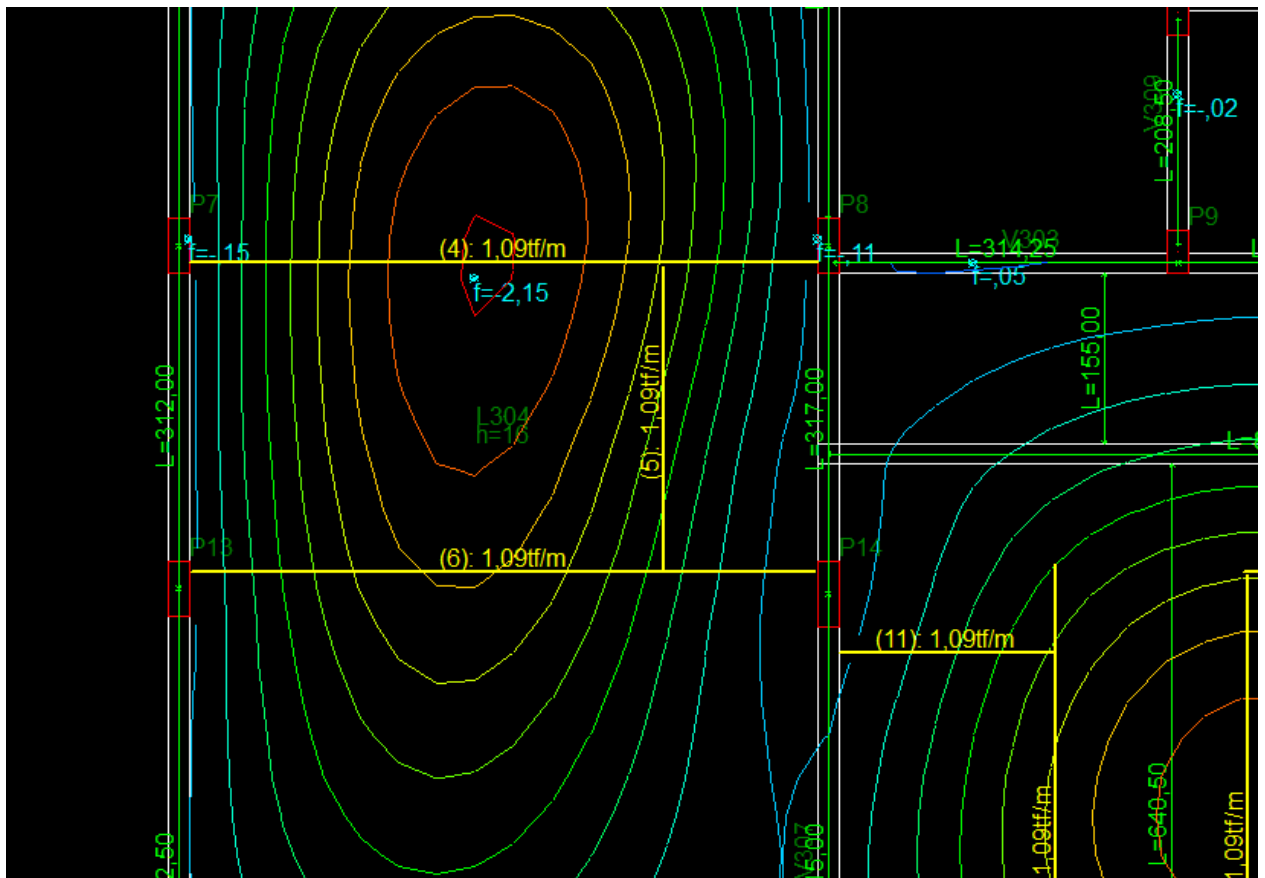
### Flecha máxima dos pavimentos

A seguir são apresentadas as flechas máximas de todas as lajes e vigas em todos os pavimentos:

Flechas nas lajes do Primeiro Pavimento:

Laje	Vão (cm)	Espessura (cm)	C.A. (kgf/m²)	C.P. (kgf/m²)	Flecha (cm)	Flecha Adm. ( cm)	Contra Flecha (cm)	Status
L301	574,00	25,00	400,00	150,00	-0,55	2,30	0,00	OK
L302	802,00	25,00	400,00	150,00	-1,88	3,21	1,50	OK
L303	574,00	25,00	400,00	150,00	-0,44	2,30	0,00	OK
L304	574,00	16,00	300,00	150,00	-2,15	2,30	1,50	OK
L305	574,00	16,00	300,00	150,00	-1,86	2,30	1,50	OK
L306	155,00	16,00	300,00	150,00	-0,61	0,62		OK
L307	641,00	20,00	300,00	150,00	-2,06	2,56	1,50	OK
L308	93,00	12,00	200,00	150,00	0,28	0,74		OK

## Flecha na laje L304:



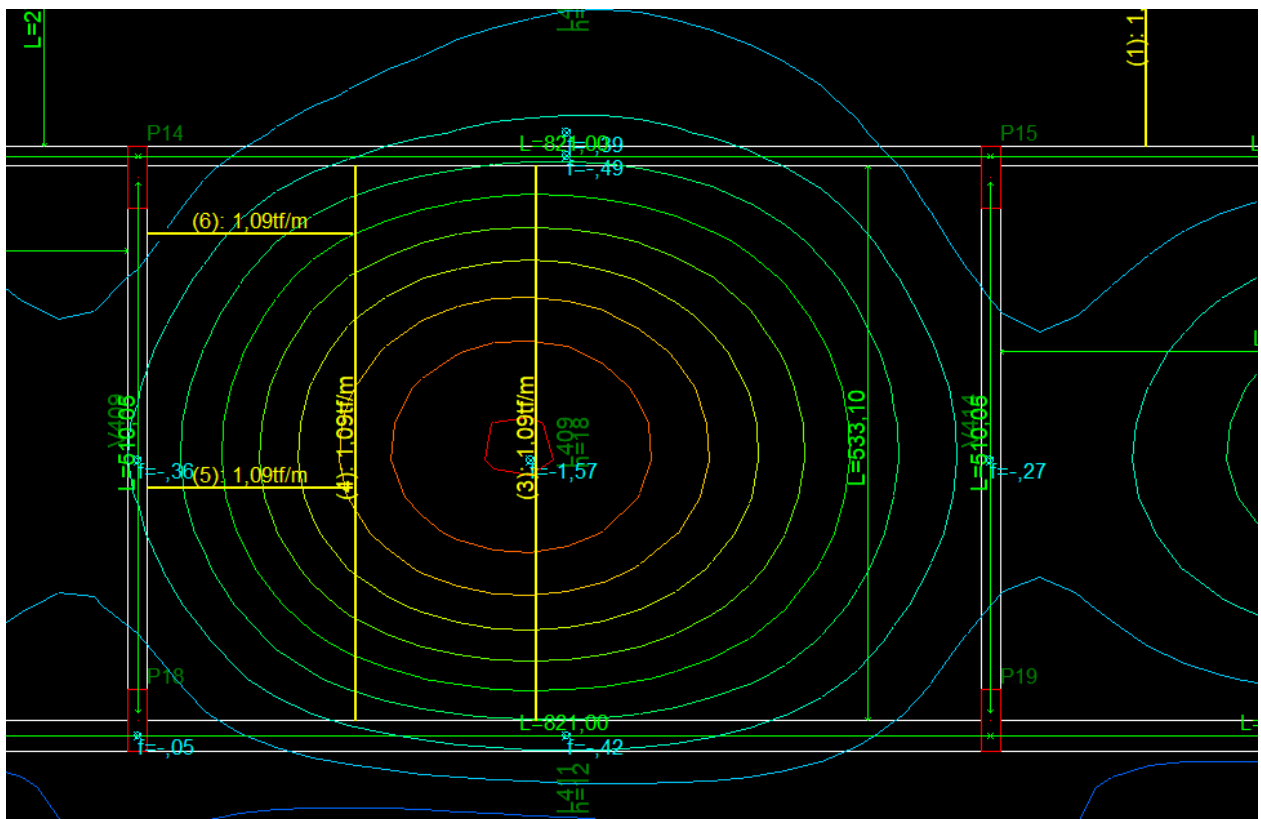
Flechas nas vigas do Primeiro Pavimento:

Viga	Tramo	Vão (cm)	Flecha (cm)	Flecha Adm. ( cm)	Contra Flecha (cm)	Status
V301	1	562,00	-0,15	2,25	0,00	OK
V301	2	832,00	-0,18	3,33	0,00	OK
V301	3	562,00	-0,13	2,25	0,00	OK
V302	1	225,00	-0,02	0,90	0,00	OK
V302	2	272,00	-0,15	1,09	0,00	OK
V303	1	314,00	0,05	1,26	0,00	OK
V303	2	225,00	-0,04	0,90	0,00	OK
V304	1	821,00	-0,76	3,28	0,00	OK
V305	1	567,00	-0,06	2,27	0,00	OK
V305	2	821,00	-0,46	3,28	0,00	OK
V305	3	567,00	-0,03	2,27	0,00	OK
V306	1	108,00	0,07	0,86	0,00	OK
V306	2	542,00	-0,15	2,17	0,00	OK
V306	3	312,00	-0,15	1,25	0,00	OK
V306	4	542,00	-0,10	2,17	0,00	OK
V306	5	268,00	-0,03	2,14	0,00	OK
V307	1	515,00	-0,28	2,06	0,00	OK
V307	2	317,00	-0,11	2,54	0,00	OK
V307	3	528,00	-0,35	2,11	0,00	OK
V307	4	283,00	-0,67	1,13	0,00	OK
V309	1	209,00	0,00	0,84	0,00	OK
V310	1	209,00	-0,02	0,84	0,00	OK
V311	1	515,00	-0,27	2,06	0,00	OK
V311	2	317,00	-0,12	2,54	0,00	OK
V311	3	528,00	-0,14	2,11	0,00	OK
V311	4	283,00	-0,47	1,13	0,00	OK
V312	1	108,00	0,07	0,86	0,00	OK
V312	2	543,00	-0,15	2,17	0,00	OK
V312	3	312,00	-0,14	1,25	0,00	OK
V312	4	543,00	-0,10	2,17	0,00	OK
V312	5	268,00	-0,03	2,14	0,00	OK

## Flechas nas lajes do Segundo Pavimento:

Laje	Vão (cm)	Espessura (cm)	C.A. (kgf/m²)	C.P. (kgf/m²)	Flecha (cm)	Flecha Adm. (cm)	Contra Flecha (cm)	Status
L401	574,00	10,00	200,00	150,00	-0,11	2,30		OK
L402	802,00	10,00	200,00	150,00	-0,39	3,21		OK
L403	574,00	10,00	200,00	150,00	-0,05	2,30		OK
L404	534,00	15,00	300,00	150,00	-1,00	2,14		OK
L405	534,00	15,00	300,00	200,00	-0,95	2,14		OK
L406	220,00	12,00	300,00	150,00	-0,16	0,88		OK
L407	272,00	12,00	300,00	150,00	-0,39	1,09		OK
L408	574,00	15,00	300,00	150,00	-0,61	2,30		OK
L409	533,00	18,00	300,00	150,00	-1,57	2,13	1,00	OK
L410	574,00	15,00	300,00	150,00	-0,63	2,30		OK
L411	93,00	12,00	200,00	150,00	0,19	0,74		OK

### Flecha na Laje L409:



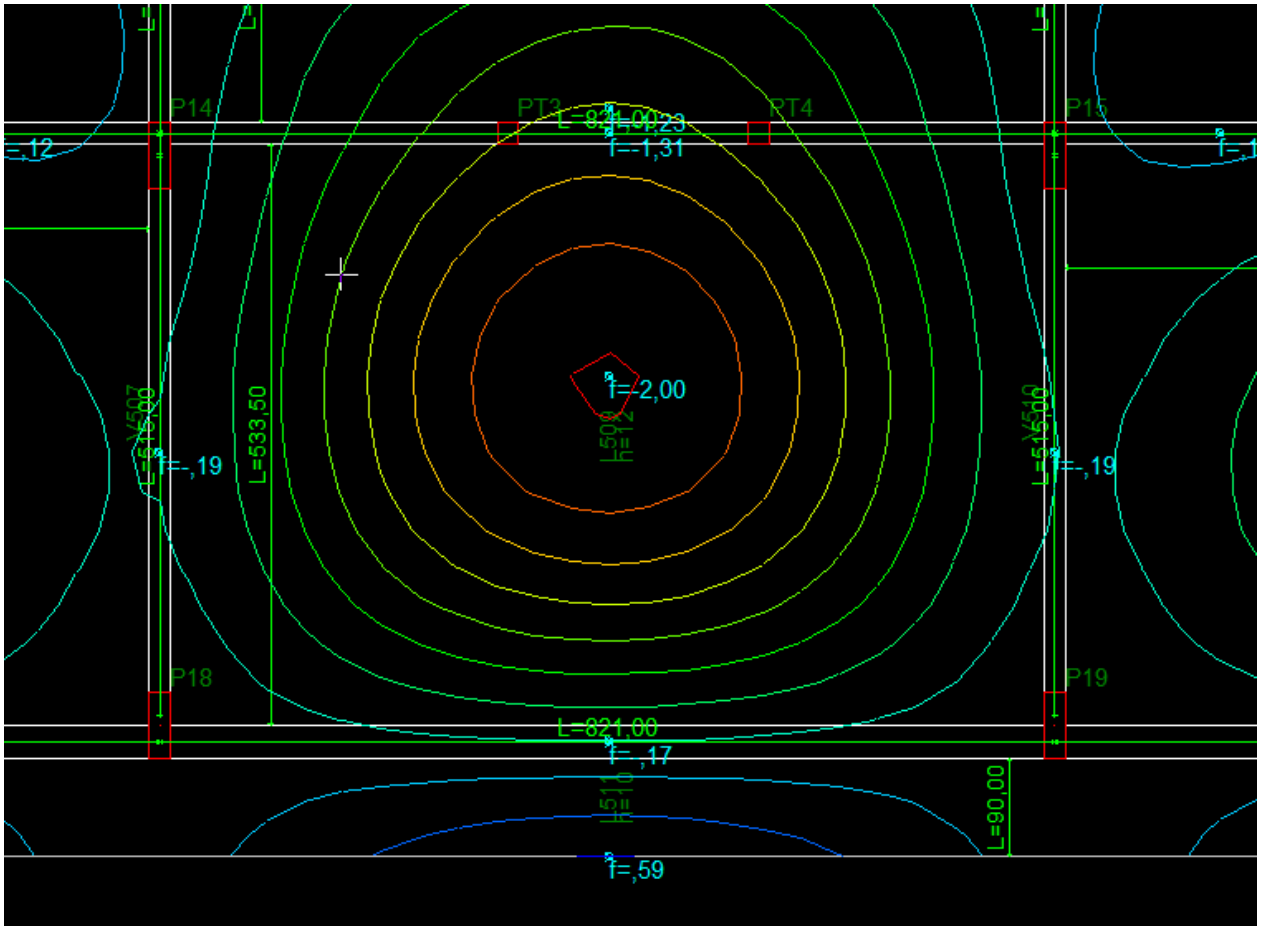
Flechas nas vigas do Segundo Pavimento:

Viga	Tramo	Vão (cm)	Flecha (cm)	Flecha Adm. ( cm)	Contra Flecha (cm)	Status
V401	1	593,00	-0,90	2,37	0,00	OK
V401	2	821,00	-1,12	3,28	0,00	OK
V401	3	593,00	-0,57	2,37	0,00	OK
V402	1	593,00	-0,24	2,37	0,00	OK
V402	2	821,00	-0,56	3,28	0,00	OK
V402	3	593,00	-0,12	2,37	0,00	OK
V403	1	562,00	-0,12	2,25	0,00	OK
V403	2	832,00	-0,14	3,33	0,00	OK
V403	3	562,00	-0,11	2,25	0,00	OK
V404	1	225,00	-0,01	0,90	0,00	OK
v404	2	272,00	-0,22	1,09	0,00	OK
V405	1	588,00	-0,24	2,35	0,00	OK
V405	2	319,00	-0,03	1,28	0,00	OK
V405	3	230,00	-0,01	0,92	0,00	OK
V405	4	272,00	-0,05	1,09	0,00	OK
V405	5	588,00	-0,23	2,35	0,00	OK
V406	1	588,00	-0,08	2,35	0,00	OK
V406	2	821,00	-0,49	3,28	0,00	OK
V406	3	588,00	0,09	2,35	0,00	OK
V407	1	568,00	-0,05	2,27	0,00	OK
V407	2	821,00	-0,42	3,28	0,00	OK
V407	3	567,00	-0,04	2,27	0,00	OK
V408	1	108,00	0,06	0,86	0,00	OK
V408	2	543,00	-0,13	2,17	0,00	OK
V408	3	312,00	-0,04	1,25	0,00	OK
V408	4	543,00	-0,10	2,17	0,00	OK
V408	5	258,00	-0,08	2,06	0,00	OK
V409	1	510,00	-0,36	2,04	0,00	OK
V411	1	503,00	-0,02	2,01	0,00	OK
V411	2	274,00	-0,55	2,19	0,00	OK
V412	1	209,00	-0,02	0,84	0,00	OK
V413	1	209,00	-0,02	0,84	0,00	OK
V414	1	510,00	-0,27	2,04	0,00	OK
V415	1	523,00	-0,23	2,09	0,00	OK
V415	2	273,00	-0,36	2,18	0,00	OK
V416	1	108,00	0,06	0,86	0,00	OK
V416	2	543,00	-0,13	2,17	0,00	OK
V416	3	312,00	-0,04	1,25	0,00	OK
V416	4	453,00	-0,10	1,81	0,00	OK
V416	5	258,00	-0,06	2,06	0,00	OK

### Flechas nas lajes da Cobertura:

Laje	Vão (cm)	Espessura (cm)	C.A. (kgf/m²)	C.P. (kgf/m²)	Flecha (cm)	Flecha Adm. (cm)	Contra Flecha (cm)	Status
L501	90,00	10,00	50,00	150,00	-0,46	0,72		OK
L502	534,00	12,00	50,00	150,00	-0,99	2,14		OK
L503	295,00	12,00	50,00	600,00	-0,59	1,18		OK
L504	534,00	12,00	50,00	150,00	-0,96	2,14		OK
L505	262,00	10,00	50,00	150,00	-0,21	1,05		OK
L506	262,00	12,00	50,00	600,00	-1,23	1,05		OK
L507	262,00	10,00	50,00	150,00	-0,21	1,05		OK
L508	574,00	12,00	50,00	500,00	-0,83	2,30		OK
L509	534,00	12,00	50,00	500,00	-2,00	2,14	1,00	OK
L510	574,00	12,00	50,00	500,00	-0,79	2,30		OK
L511	90,00	10,00	50,00	3000/7tf	0,59	0,72		OK

### Flecha na laje L509:





Flechas nas vigas da Cobertura:

Viga	Tramo	Vão (cm)	Flecha (cm)	Flecha Adm. ( cm)	Contra Flecha (cm)	Status
V501	1	562,00	-0,03	2,25	0,00	OK
V501	2	832,00	-0,35	3,33	0,00	OK
V501	3	562,00	-0,02	2,25	0,00	OK
V502	1	221,00	-0,08	0,88	0,00	OK
V503	1	588,00	-0,26	2,35	0,00	OK
V503	2	319,00	-0,03	1,28	0,00	OK
V503	3	230,00	-0,05	0,92	0,00	OK
V503	4	272,00	-0,02	1,09	0,00	OK
V503	5	588,00	-0,26	2,35	0,00	OK
V504	1	588,00	0,12	2,35	0,00	OK
V504	2	821,00	-1,31	3,28	0,00	OK
V504	3	588,00	0,13	2,35	0,00	OK
V505	1	567,00	-0,04	2,27	0,00	OK
V505	2	821,00	-0,17	3,28	0,00	OK
V505	3	567,00	-0,04	2,27	0,00	OK
V506	1	535,00	-0,06	2,14	0,00	OK
V506	2	312,00	-0,03	1,25	0,00	OK
V506	3	535,00	-0,06	2,14	0,00	OK
V507	1	515,00	-0,19	2,06	0,00	OK
V507	2	317,00	-0,04	1,27	0,00	OK
V507	3	520,00	-0,31	2,08	0,00	OK
V508	1	209,00	-0,08	0,84	0,00	OK
V509	1	209,00	-0,05	0,84	0,00	OK
V510	1	515,00	-0,19	2,06	0,00	OK
V510	2	317,00	-0,04	1,27	0,00	OK
V510	3	520,00	-0,27	2,08	0,00	OK
V511	1	535,00	-0,07	2,14	0,00	OK
V511	2	312,00	-0,03	1,25	0,00	OK
V511	3	535,00	-0,05	2,14	0,00	OK

## MEMORIAL DE CÁLCULO DAS VIGAS

A seguir são apresentados os dados e resultados do cálculo/dimensionamento das vigas:

### Relatório geral de vigas

#### Legenda

G E O M E T R I A  
 Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet : Repeticões  
 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  
 Infetior  
 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.transv.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 / AswmNR : 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

### elevador

#### V101

Viga= 101 V101 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 2.29 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 114 | M.[-] = .2 tf*
m
[tf,cm]| As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .90 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- | x/d = .05 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx = .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
|
x/dMx= .37 |
|
[tf,cm] | M[-]Min = 65.1 | | M[-]Min = 65.1
[cm2 ] | Asapo[+]= .31 | | M[+]Min = 65.1 | 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.- 211. .95 26.48 1 45. .0 2.3 2.3 5.0 15.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .678 .678 .19 .01 4 P5 .00 .00 5 0 0 0
0 0
2 .678 .678 .19 .01 4 P6 .00 .00 6 0 0 0
0 0
    
```

## V102

Viga= 102 V102 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.29 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 114 | M.[-] = .2 tf*
m
[tf,cm] | As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .90 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- x/d = .05 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
|
[tf,cm] | M[-]Min = 65.1 | | M[+]Min = 65.1 | |
[cm2 ] | Asapo[+]= .31 | | | M[-]Min = 65.1 |
| 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.- 211. .95 26.48 1 45. .0 2.3 2.3 5.0 15.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .678 .678 .19 .01 4 P9 .00 .00 9 0 0 0
0 0 2 .678 .678 .19 .01 4 P10 .00 .00 10 0 0 0
0 0

```

## V103

Viga= 103 V103 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.96 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 98 | M.[-] = .2 tf*
m
[tf,cm] | As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .90 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- x/d = .05 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
|
[tf,cm] | M[-]Min = 65.1 | | M[+]Min = 65.1 | |
[cm2 ] | Asapo[+]= .31 | | | M[-]Min = 65.1 |
| 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.- 178. .80 26.48 1 45. .0 2.3 2.3 5.0 15.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .574 .574 .40 .11 4 P9 .00 .00 9 0 0 0
0 0 2 .574 .574 .40 .11 4 P5 .00 .00 5 0 0 0
0 0

```

## V104

Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.96 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 98 | M.[-] = .2 tf*
m
[tf,cm] | As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .90 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- x/d = .05 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05

```

ENGENHARIA E COMÉRCIO LTDA.

x/dMx= .37	x/dMx= .37			Arm.Lat.=[2 X -- B --- mm] - LN= 1.4						
[tf,cm]   M[-]Min = 65.1			M[+]Min = 65.1		M[-]Min = 65.1					
[cm2 ]   Asapo[+]= .31					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.- 178.	.80	26.48	1 45.	.0 2.3 2.3 5.0 15.0 2 .0 .0					
REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:	
1	.574	.574	.40	.11	4	P10	.00	.00	10	0 0 0
0 0	2	.574	.574	.40	.11	4	P6	.00	.00	6 0 0 0
0 0										

## baldrame

### V201

Viga= 201 V201  
/Cob/S=3.0 .0 CM

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00

----- G E O M E T R I A E C A R G A S -----  
 Vao= 1 /L= 5.54 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  E S Q U E R D A	M E I O D O	V A O	D I R E I T A
M.[-] = 4.4 tf* m	M.[+] Max=	2.6 tf* m - Abcis.= 323	M.[-] = 4.8 tf*
m			
[tf,cm]   As = 4.38 -SRAS- [ 4 B 12.5mm]	AsL= .00 -----		As = 4.81 -SRAS- [ 4 B 12.5mm]
AsL= .00 -----	x/d = .19	As = 2.43 -SRAS- [ 3 B 10.0mm ]	AsL= .00 -----
x/d = .20			
x/dMx= .37	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 3.6	
[tf,cm]   M[-]Min = 115.8	M[+]Min = 115.8		M[-]Min = 115.8
[cm2 ]   Asapo[+]= .61			Asapo[+]= 1.14

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.- 533.	7.26	36.66	1 45.	.7 2.3 2.3 6.3 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 2 /L= 5.46 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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.[-] = 3.8 tf* m	M.[+] Max=	1.7 tf* m - Abcis.= 274	M.[-] = 3.1 tf*
m			
[tf,cm]   As = 3.73 -SRAS- [ 3 B 12.5mm]	AsL= .00 -----		As = 2.99 -SRAS- [ 4 B 10.0mm]
AsL= .00 -----	x/d = .16	As = 1.58 -SRAS- [ 2 B 10.0mm ]	AsL= .00 -----
x/d = .13			
x/dMx= .37	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 2.4	
[tf,cm]   M[-]Min = 115.8	M[+]Min = 115.8		M[-]Min = 115.8
[cm2 ]   Asapo[+]= 1.14			Asapo[+]= 1.14

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus	M E N S A G				
E M					
[tf,cm]	0.- 525.	5.49	36.66	1 45.	.0 2.3 2.3 6.3 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 3 /L= 2.69 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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 tf* m - Abcis.= 113	M.[-] = 1.6 tf*
m			
[tf,cm]   As = 1.20 -SRAS- [ 2 B 10.0mm]	AsL= .00 -----		As = 1.45 -SRAS- [ 2 B 10.0mm]
AsL= .00 -----	x/d = .05	As = 1.20 -SRAS- [ 2 B 10.0mm ]	AsL= .00 -----
x/d = .06			
x/dMx= .37	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.8	
[tf,cm]   M[-]Min = 115.8	M[+]Min = 115.8		M[-]Min = 115.8
[cm2 ]   Asapo[+]= 1.14			Asapo[+]= 1.14

ENGENHARIA E COMÉRCIO LTDA.

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.- 248. 2.99 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

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

Vao= 4 /L= 5.54 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 3.1 tf\* m | M.[+] Max= 1.9 tf\* m - Abcis.= 277 | M.[-] = 3.7 tf\* m  
[tf,cm] | As = 2.97 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.62 -SRAS- [ 3 B 12.5mm]  
| AsL= .00 ----- x/d = .13 | As = 1.78 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .15  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.6 |  
x/dMx= .37  
[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
[cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= .44

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.- 533. 5.53 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	4.400	4.399	.60	.18	4	P1	.00	.00	1	0	0	0
0	0	2	9.103	9.102	.19	.00	4	P2	.00	.00	2	0	0	0
0	0	3	5.220	5.220	.30	.03	1	T1	.00	.00	8001	0	0	0
0	0	4	5.858	5.858	.19	.00	4	P3	.00	.00	3	0	0	0
0	0	5	3.948	3.948	.60	.18	4	P4	.00	.00	4	0	0	0

## V202

Viga= 202 V202 Eng.E=Nao /Eng.D=Nao /Repet= 1 /Nand= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 2.29 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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.= 76 | M.[-] = 1.2 tf\* m  
[tf,cm] | As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 1.62 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .05 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----  
x/d = .10  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |  
x/dMx= .37  
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
[cm2 ] | Asapo[+]= .22 | | 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.- 211. 2.88 25.15 1 45. .0 2.2 2.2 5.0 15.0 2 .0 .0

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

Vao= 2 /L= 2.71 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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= .6 tf\* m - Abcis.= 180 | M.[-] = .0 tf\* m  
[tf,cm] | As = 2.08 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = .00 -SRAS- [ 0 B 6.3mm]  
| AsL= .00 ----- x/d = .13 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----  
x/d = .00  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |  
x/dMx= .37  
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
[cm2 ] | Asapo[+]= .81 | | Asapo[+]= .85

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.- 253. 3.36 25.15 1 45. .0 2.2 2.2 5.0 15.0 2 .0 .0

ENGENHARIA E COMÉRCIO LTDA.

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	1.341	.985	.19	.01	0	P5	.00	.00	5 0 0 0
0	0	2	4.366	4.063	.19	.01	0	P6	.00	.00	6 0 0 0
0	0	3	1.293	1.236	.20	.01	2	V223	.00	.00	0 0 0 0

## V203

Viga= 203 V203 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 4.00 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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= 1.9 tf\* m - Abcis.= 166 | M.[-] = 3.9 tf\* m  
[tf,cm] | As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 5.64 -SRAS- [ 3 B 16.0mm]  
| AsL= .00 ----- x/d = .05 | As = 2.57 -SRAS- [ 4 B 10.0mm ] | AsL= .00 -----  
x/d = .33 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.8 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1  
[cm2 ] | Asapo[+]= .90 | | Asapo[+]= .64

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.- 383. 6.39 26.48 1 45. 1.8 2.3 2.3 5.0 15.0 2 .0 1.0

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	2.276	2.276	.20	.01	2	V213	.00	.00	0 0 0 0
0	0	2	4.567	4.567	.30	.06	1	T2	.00	.00	8002 0 0 0

## V204

Viga= 204 V204 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 3.19 /B= .19 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 2.9 tf\* m | M.[+] Max= 2.5 tf\* m - Abcis.= 159 | M.[-] = 3.3 tf\* m  
[tf,cm] | As = 2.75 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.19 -SRAS- [ 4 B 10.0mm]  
| AsL= .00 ----- x/d = .12 | As = 2.41 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.8 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0  
[cm2 ] | Asapo[+]= .60 | | Asapo[+]= 1.08

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. 9.59 34.83 1 45. 2.6 2.2 2.6 6.3 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
Vao= 2 /L= 2.30 /B= .19 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = 2.4 tf\* m | M.[+] Max= .4 tf\* m - Abcis.= 191 | M.[-] = .1 tf\* m  
[tf,cm] | As = 2.23 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .10 | As = 1.14 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0  
[cm2 ] | Asapo[+]= 1.08 | | Asapo[+]= 1.14

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	211.	3.83	34.83	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	
REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:					
0	0	1	6.584	6.519	.19	.00	4 P8	.00	.00	8	0	0	0		
0	0	2	9.528	9.238	.19	.00	0 P9	.00	.00	9	0	0	0		
0	0	3	.764	.423	.19	.00	0 P10	.00	.00	10	0	0	0		

## V205

Viga= 205 V205 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 2.50 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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 | M.[-] = .0 tf\* m | M.[+] Max= .5 tf\* m - Abcis.= 84 | M.[-] = 1.4 tf\*  
[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = 1.31 -SRAS- [ 2 B 12.5mm]  
| AsL= .00 ----- x/d = .00 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
x/d = .06 | | | | |  
x/dMx= .37 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 | |  
[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
[cm2 ] | Asapo[+]= 1.20 | | | Asapo[+]= 1.14

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	228.	3.24	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.0	
----- G E O M E T R I A E C A R G A S -----															
-----															
Vao= 2 /L= 3.37 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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   M.[-] = 2.6 tf* m   M.[+] Max= 1.6 tf* m - Abcis.= 170   M.[-] = 1.8 tf*															
[tf,cm]   As = 2.48 -SRAS- [ 2 B 12.5mm]   AsL= .00 -----   As = 1.68 -SRAS- [ 3 B 10.0mm]															
AsL= .00 ----- x/d = .10   As = 1.52 -SRAS- [ 2 B 10.0mm ]   AsL= .00 -----															
x/d = .07															
x/dMx= .37   x/dMx= .37   Arm.Lat.=[2 X -- B --- mm] - LN= 2.3															
[tf,cm]   M[-]Min = 115.8   M[+]Min = 115.8   M[-]Min = 115.8															
[cm2 ]   Asapo[+]= 1.14       Asapo[+]= 1.14															

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	315.	5.22	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.0	
----- G E O M E T R I A E C A R G A S -----															
-----															
Vao= 3 /L= 3.80 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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   M.[-] = 1.8 tf* m   M.[+] Max= 1.1 tf* m - Abcis.= 191   M.[-] = 2.3 tf*															
[tf,cm]   As = 1.68 -SRAS- [ 3 B 10.0mm]   AsL= .00 -----   As = 2.16 -SRAS- [ 3 B 10.0mm]															
AsL= .00 ----- x/d = .07   As = 1.20 -SRAS- [ 2 B 10.0mm ]   AsL= .00 -----															
x/d = .09															
x/dMx= .37   x/dMx= .37   Arm.Lat.=[2 X -- B --- mm] - LN= 1.8															
[tf,cm]   M[-]Min = 115.8   M[+]Min = 115.8   M[-]Min = 115.8															
[cm2 ]   Asapo[+]= 1.14       Asapo[+]= 1.14															

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	358.	4.51	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.4	
----- G E O M E T R I A E C A R G A S -----															
-----															
Vao= 4 /L= 4.35 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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 | M.[-] = 1.4 tf* m | M.[+] Max= .6 tf* m - Abcis.= 182 | M.[-] = 4.4 tf*
[tf,cm]| As = 1.27 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 4.35 -SRAS- [
4 B 12.5mm] | AsL= .00 ----- x/d = .05 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .18 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |
x/dMx= .37 |
[tf,cm]| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ]| Asapo[+]= 1.14 | | Asapo[+]= 1.14

```

```

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. 5.20 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

```

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

```

Vao= 5 /L= 5.92 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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 | M.[-] = 4.5 tf* m | M.[+] Max= 4.0 tf* m - Abcis.= 345 | M.[-] = .1 tf*
[tf,cm]| As = 4.45 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 1.20 -SRAS- [
2 B 10.0mm] | AsL= .00 ----- x/d = .19 | As = 3.88 -SRAS- [ 2 B 16.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 5.8 |
x/dMx= .37 |
[tf,cm]| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ]| Asapo[+]= 1.14 | | Asapo[+]= 1.29

```

```

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.- 573. 6.78 36.66 1 45. .4 2.3 2.3 6.3 20.0 2 .0 .0

```

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	1.173	1.173	.20	.00	2	V213	.00	.00	0 0 0
0	0	2	5.957	5.957	.30	.03	1	T3	.00	.00	8003 0 0 0
0	0	3	6.099	6.099	.20	.00	2	V218	.00	.00	0 0 0 0
0	0	4	5.482	5.482	.30	.03	1	T5	.00	.00	8005 0 0 0
0	0	5	8.561	8.561	.20	.00	2	V223	.00	.00	0 0 0 0
0	0	6	3.354	3.354	.20	.00	2	V225	.00	.00	0 0 0 0

## V206

Viga= 206 V206 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

```

Vao= 1 /L= 4.38 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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 | M.[-] = .1 tf* m | M.[+] Max= 3.2 tf* m - Abcis.= 219 | M.[-] = .2 tf*
[tf,cm]| As = 1.20 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.20 -SRAS- [
2 B 10.0mm] | AsL= .00 ----- x/d = .05 | As = 3.08 -SRAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 4.6 |
x/dMx= .37 |
[tf,cm]| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ]| Asapo[+]= 1.20 | | Asapo[+]= 1.20

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 418. 4.27 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

```

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	3.009	3.009	.20	.00	2	V221	.00	.00	0 0 0 0
0	0	2	3.053	3.053	.20	.00	2	V223	.00	.00	0 0 0 0



## V207

Viga= 207 V207 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.62 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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 | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 67 | M.[-] = .4 tf*
m
[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = .90 -SRAS- [
2 B 8.0mm] | AsL= .00 ----- x/d = .00 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1
[cm2 ] | Asapo[+]= .90 | | Asapo[+]= .23

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 144. 1.86 26.48 1 45. .0 2.3 2.3 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 .842 .842 .20 .01 2 V223 .00 .00 0 0 0 0
0 0 2 1.326 1.326 .30 .06 1 T7 .00 .00 8007 0 0 0 0
    
```

## V208

Viga= 208 V208 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.02 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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 | M.[-] = .0 tf* m | M.[+] Max= .4 tf* m - Abcis.= 84 | M.[-] = .6 tf*
m
[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = .90 -SRAS- [
2 B 8.0mm] | AsL= .00 ----- x/d = .00 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1
[cm2 ] | Asapo[+]= .90 | | Asapo[+]= .23

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 184. 2.33 26.48 1 45. .0 2.3 2.3 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 1.041 1.041 .20 .01 2 V218 .00 .00 0 0 0 0
0 0 2 1.667 1.667 .30 .06 1 T8 .00 .00 8008 0 0 0 0
    
```

## V209

Viga= 209 V209 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.46 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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 | M.[-] = .0 tf* m | M.[+] Max= .4 tf* m - Abcis.= 83 | M.[-] = 2.2 tf*
m
[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = 3.15 -SRAS- [
4 B 10.0mm] | AsL= .00 ----- x/d = .00 | As = 1.01 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .18 | Grampos Esq.= 1B 6.3mm x/dMx= .37 | Arm.Lat.=[2 X 2 B 4.2mm] - LN= 1.4 |
x/dMx= .37 |
    
```

[tf,cm]		M[-]Min =	65.1			M[+]Min =	65.1			M[-]Min =	65.1
[cm2 ]		Asapo[+]=	.98			Asapo[+]=	.93			Asapo[+]=	.93

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.-	186.	2.51	26.48	1	45.	.0	2.3	2.3	5.0	15.0	2	.0	.0	
	186.-	228.	6.46	26.48	1	45.	1.9	2.3	3.3	5.0	10.0	2	.0	1.6	

T O R C A O-	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
E M															
[tf,cm]	0.-	186.	.00	1.33	5	6.0	11.1	21.1	.0	1.4	.1	.1	.09	S	
	186.-	228.	.00	1.33	5	6.0	11.1	21.1	.0	1.4	.1	.1	.24	S	

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

Vao= 2 /L= 3.28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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= 1.5 tf\* m - Abcis.= 167 | M.[-] = 2.0 tf\*

m

[tf,cm]| As = 3.00 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 2.71 -SRAS- [ 4 B 10.0mm]

| AsL= .00 ----- | x/d = .18 | As = 1.95 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----

x/d = .16 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.9 |

x/dMx= .37

[tf,cm]		M[-]Min =	65.1			M[+]Min =	65.1			M[-]Min =	65.1
[cm2 ]		Asapo[+]=	.85			Asapo[+]=	.49			Asapo[+]=	.49

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.	4.74	26.48	1	45.	.2	2.3	2.3	5.0	15.0	2	.0	1.6	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	1	.989	.989	.20	.01	2	V213	.00	.00	0 0 0
0	0									
0	0	2	7.879	7.879	.30	.06	T9	.00	.00	8009 0 0 0
0	0	3	3.289	3.289	.30	.06	T10	.00	.00	8010 0 0 0

## V210

Viga= 210 V210 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 4.26 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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= 1.1 tf\* m - Abcis.= 213 | M.[-] = 2.0 tf\*

m

[tf,cm]| As = 2.67 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 2.67 -SRAS- [ 4 B 10.0mm]

| AsL= .00 ----- | x/d = .16 | As = 1.39 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .16 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.1 |

x/dMx= .37

[tf,cm]		M[-]Min =	65.1			M[+]Min =	65.1			M[-]Min =	65.1
[cm2 ]		Asapo[+]=	.35			Asapo[+]=	.35			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.-	409.	3.99	26.48	1	45.	.0	2.3	2.3	5.0	15.0	2	.0	.0	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	1	2.845	2.845	.30	.06	1	T11	.00	.00	8011 0 0 0
0	0									
0	0	2	2.844	2.844	.30	.06	T12	.00	.00	8012 0 0 0

## V211

Viga= 211 V211 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 2.07 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
      | M.[-] = .0 tf* m | M.[+] Max= .7 tf* m - Abcis.= 103 | M.[-] = .0 tf*
m
[tf,cm]| As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .00 -SRAS- [
0 B 6.3mm] | AsL= .00 ----- x/d = .05 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .00 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1
[cm2 ] | Asapo[+]= .90 | | Asapo[+]= .90

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.- 189. 1.98 26.48 1 45. .0 2.3 2.3 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 1.410 1.410 .20 .01 2 V218 .00 .00 0 0 0 0
0 0 2 1.378 1.378 .20 .01 2 V219 .00 .00 0 0 0 0
    
```

## V212

Viga= 212 V212 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 5.54 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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.[-] = 5.4 tf* m | M.[+] Max= 2.6 tf* m - Abcis.= 230 | M.[-] = 4.2 tf*
m
[tf,cm]| As = 5.44 -SRAS- [ 3 B 16.0mm] | AsL= .00 ----- | As = 4.07 -SRAS- [
2 B 16.0mm] | AsL= .00 ----- x/d = .23 | As = 2.44 -SRAS- [ 2 B 12.5mm ] | AsL= .00 -----
x/d = .17 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.6 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ] | Asapo[+]= .61 | | Asapo[+]= 1.14

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.- 533. 7.77 36.66 1 45. 1.1 2.3 2.3 6.3 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 2 /L= 3.80 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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.[-] = 3.3 tf* m | M.[+] Max= 1.8 tf* m - Abcis.= 191 | M.[-] = 2.8 tf*
m
[tf,cm]| As = 3.14 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 2.67 -SRAS- [
4 B 10.0mm] | AsL= .00 ----- x/d = .13 | As = 1.70 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .11 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.5 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= 1.14

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.- 358. 5.68 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 1.6

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 3 /L= 4.35 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
      | M.[-] = 1.9 tf* m | M.[+] Max= .9 tf* m - Abcis.= 219 | M.[-] = 2.9 tf*
m
[tf,cm]| As = 1.82 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.75 -SRAS- [
3 B 12.5mm] | AsL= .00 -----
    
```

```

| AsL= .00 ----- x/d = .08 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .12
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |
| [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8

[cm2 ] | Asapo[+]= 1.14 | Asapo[+]= 1.14

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.- 414. 4.53 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0
----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 5.54 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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.[-] = 4.9 tf* m | M.[+] Max= 2.7 tf* m - Abcis.= 230 | M.[-] = 4.6 tf*
m
[tf,cm] | As = 4.84 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 4.57 -SRAS- [
4 B 12.5mm]
| AsL= .00 ----- x/d = .20 | As = 2.54 -SRAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/d = .19
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.8 |
| [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ] | Asapo[+]= 1.14 | Asapo[+]= 1.14 | Asapo[+]= .64

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.- 533. 7.68 36.66 1 45. 1.0 2.3 2.3 6.3 20.0 2 .0 1.3

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 5.539 5.539 .60 .18 4 P17 .00 .00 17 0 0 0
0 0 2 8.317 8.317 .19 .00 4 P18 .00 .00 18 0 0 0
0 0 3 6.790 6.790 .30 .03 1 T13 .00 .00 8013 0 0 0
0 0 4 8.720 8.719 .19 .00 4 P19 .00 .00 19 0 0 0
0 0 5 4.492 4.492 .60 .18 4 P20 .00 .00 20 0 0 0

```

## V213

Viga= 213 V213 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= 1.11 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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[-]= 1.28 tf* m | As = 1.20 -SRAS- [ 2 B 12.5mm] | D I R E I T A
BAL.ESQ | x/d = .05 | AsL= .00 - | M.[+] Max= 2.1 tf* m - Abcis.= 269 | M.[-] = 4.1 tf*
[tf,cm] | M[-]Min= 115.8 - 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.- 93. 2.02 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 5.26 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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.[-] = 3.5 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 269 | M.[-] = 4.1 tf*
m
[tf,cm] | As = 3.37 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 3.95 -SRAS- [
2 B 16.0mm]
| AsL= .00 ----- x/d = .14 | As = 1.94 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .17
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.9 |
| [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ] | Asapo[+]= .48 | Asapo[+]= 1.14 | Asapo[+]= 1.14

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.- 503. 6.18 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

```

----- G E O M E T R I A E C A R G A S -----  
 -----  
 Vao= 3 /L= 2.86 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= .7 tf\* m - Abcis.= 129 | M.[-] = 1.4 tf\* m  
 [tf,cm] | As = 1.39 -SRAS- [ 2 B 16.0mm ] | AsL= .00 ----- | As = 1.30 -SRAS- [ 2 B 12.5mm ]  
 | AsL= .00 ----- | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |  
 x/dMx= .37 |  
 [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
 [cm2 ] | Asapo[+] = 1.14 | | Asapo[+] = 1.14

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.- 262. 3.88 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .7

----- G E O M E T R I A E C A R G A S -----  
 -----  
 Vao= 4 /L= 5.26 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 5.0 tf\* m | M.[+] Max= 2.1 tf\* m - Abcis.= 269 | M.[-] = 3.6 tf\* m  
 [tf,cm] | As = 4.99 -SRAS- [ 4 B 12.5mm ] | AsL= .00 ----- | As = 3.44 -SRAS- [ 3 B 12.5mm ]  
 | AsL= .00 ----- | As = 1.97 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.9 |  
 x/dMx= .37 |  
 [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
 [cm2 ] | Asapo[+] = 1.14 | | Asapo[+] = .49

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.- 503. 7.95 36.66 1 45. 1.2 2.3 2.3 6.3 20.0 2 .0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1 5.375	5.375	.30	.03	4	P17	.00	.00	17 0 0 0
0	0	2 7.080	7.080	.50	.13	4	P13	.00	.00	13 0 0 0
0	0	3 7.992	7.992	.50	.13	4	P7	.00	.00	7 0 0 0
0	0	4 3.969	3.969	.30	.03	4	P1	.00	.00	1 0 0 0

## V214

Viga= 214 V214 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 -----  
 Vao= 1 /L= 3.31 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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.= 165 | M.[-] = .1 tf\* m  
 [tf,cm] | As = .90 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- | As = .90 -SRAS- [ 2 B 8.0mm ]  
 | AsL= .00 ----- | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.6 |  
 x/dMx= .37 |  
 [tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1  
 [cm2 ] | Asapo[+] = .90 | | Asapo[+] = .90

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.- 313. 3.15 26.48 1 45. .0 2.3 2.3 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 2.195	2.195	.20	.01	2	V212	.00	.00	0 0 0 0
0	0	2 2.247	2.247	.20	.01	2	V209	.00	.00	0 0 0 0

## V215

Viga= 215 V215 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 3.25 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=  
.10 [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-| 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.= 165 | M.[-] = 1.3 tf\*  
m  
[tf,cm] | As = 1.40 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.73 -SRAS- [  
2 B 12.5mm] | AsL= .00 ----- x/d = .08 | As = .93 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----  
x/d = .10 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1  
[cm2 ] | Asapo[+]= .23 | | Asapo[+]= .85  
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. 3.18 26.48 1 45. .0 2.3 2.3 5.0 15.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 2 /L= 3.31 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=  
.10 [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-| 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= .8 tf\* m - Abcis.= 224 | M.[-] = .0 tf\*  
m  
[tf,cm] | As = 3.38 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = .00 -SRAS- [  
0 B 6.3mm] | AsL= .00 ----- x/d = .20 | As = 1.07 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
x/d = .00 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.6 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1  
[cm2 ] | Asapo[+]= .85 | | Asapo[+]= .90  
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.- 313. 4.18 26.48 1 45. .0 2.3 2.3 5.0 15.0 2 .0 .0

REAC.	POIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	2.102	2.102	.30	.06	1	T9	.00	.00	8009	0	0	0
0	0	2	5.181	5.181	.30	.06	1	T3	.00	.00	8003	0	0	0
0	0	3	1.488	1.488	.20	.01	2	V203	.00	.00	0	0	0	0

## V216

Viga= 216 V216 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 3.36 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=  
.10 [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-| 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= 1.9 tf\* m - Abcis.= 167 | M.[-] = .0 tf\*  
m  
[tf,cm] | As = .90 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .90 -SRAS- [  
2 B 8.0mm] | AsL= .00 ----- x/d = .05 | As = 2.51 -SRAS- [ 2 B 12.5mm ] | AsL= .00 -----  
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.7 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1  
[cm2 ] | Asapo[+]= .90 | | Asapo[+]= .90  
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. 3.16 26.48 1 45. .0 2.3 2.3 5.0 15.0 2 .0 .0

REAC.	POIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	2.246	2.246	.20	.01	2	V209	.00	.00	0	0	0	0

## V217

Viga= 217 V217 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 3.92 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.[-] = 2.8 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 261 | M.[-] = .0 tf*
m
[tf,cm] | As = 3.93 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = .00 -SRAS- [
0 B 6.3mm] | AsL= .00 ----- x/d = .23 | As = 1.79 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .00 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.7 |
x/dMx= .37 |
| M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min = 65.1
[cm2 ] | Asapo[+]= .45 | | Asapo[+]= .90

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.- 375. 4.67 26.48 1 45. .2 2.3 2.3 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 3.334 3.334 .30 .06 1 T2 .00 .00 8002 0 0 0
0 0 2 1.915 1.915 .20 .01 2 V201 .00 .00 0 0 0 0
    
```

## V218

Viga= 218 V218 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.92 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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= 1.0 tf* m - Abcis.= 147 | M.[-] = 1.4 tf*
m
[tf,cm] | As = 1.39 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.33 -SRAS- [
2 B 10.0mm] | AsL= .00 ----- x/d = .06 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .06 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |
x/dMx= .37 |
| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ] | Asapo[+]= .30 | | Asapo[+]= 1.14

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.- 268. 3.87 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.89 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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= .3 tf* m - Abcis.= 105 | M.[-] = .7 tf*
m
[tf,cm] | As = 1.20 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.20 -SRAS- [
2 B 12.5mm] | AsL= .00 ----- x/d = .05 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |
x/dMx= .37 |
| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8
[cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= 1.14

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. 2.61 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0
    
```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.86 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [M]
    
```

ENGENHARIA E COMÉRCIO LTDA.

--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-| 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.[-] = 3.4 tf\* m | M.[+] Max= 2.1 tf\* m - Abcis.= 132 | M.[-] = 2.6 tf\* m  
[tf,cm]| As = 3.30 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 2.49 -SRAS- [ 2 B 12.5mm]  
| AsL= .00 ----- | As = 1.99 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .10 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.0 |  
x/dMx= .37 |  
[tf,cm]| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
[cm2 ]| Asapo[+]= 1.14 | | Asapo[+]= 1.14

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	69.	8.57	36.66	1	45.	1.6	2.3	2.3	6.3	20.0	2	.0	.0	
	69.-	125.	6.87	36.66	1	45.	.4	2.3	3.5	6.3	17.5	2	.0	3.5	
	125.-	262.	5.72	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.0	

----- G E O M E T R I A E C A R G A S -----  
Vao= 4 /L= 4.96 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 2.9 tf\* m | M.[+] Max= 1.4 tf\* m - Abcis.= 254 | M.[-] = 2.8 tf\* m  
[tf,cm]| As = 2.77 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 2.67 -SRAS- [ 4 B 10.0mm]  
| AsL= .00 ----- | As = 1.32 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
x/d = .11 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.0 |  
x/dMx= .37 |  
[tf,cm]| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
[cm2 ]| Asapo[+]= 1.14 | | Asapo[+]= .33

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	473.	4.90	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.0	

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0	1 2.719	2.719	.60	.18	4	P18	.00	.00	18 0 0 0
0 0	2 4.565	4.565	.30	.03	1	T10	.00	.00	8010 0 0 0
0 0	3 7.847	7.846	.60	.18	4	P14	.00	.00	14 0 0 0
0 0	4 7.477	7.477	.50	.13	4	P8	.00	.00	8 0 0 0
0 0	5 3.424	3.424	.60	.18	4	P2	.00	.00	2 0 0 0

## V219

Viga= 219 V219 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 4.28 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = .0 tf\* m | M.[+] Max= 2.6 tf\* m - Abcis.= 179 | M.[-] = 4.3 tf\* m  
[tf,cm]| As = 1.20 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 4.23 -SRAS- [ 4 B 12.5mm]  
| AsL= .00 ----- | As = 2.51 -SRAS- [ 2 B 12.5mm ] | AsL= .00 -----  
x/d = .18 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 3.8 |  
x/dMx= .37 |  
[tf,cm]| M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
[cm2 ]| Asapo[+]= 1.20 | | Asapo[+]= 1.14

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	406.	6.47	36.66	1	45.	.2	2.3	2.3	6.3	20.0	2	.0	.0	

----- G E O M E T R I A E C A R G A S -----  
Vao= 2 /L= 2.37 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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.[-] = 2.1 tf* m	M.[+] Max= .2 tf* m	- Abcis.= 180	M.[-] = .0 tf*
m			
[tf,cm]  As = 1.96 -SRAS- [ 2 B 12.5mm]	AsL= .00 -----		As = .00 -SRAS- [
0 B 6.3mm]			
AsL= .00 -----	x/d = .08	As = 1.20 -SRAS- [ 2 B 10.0mm ]	AsL= .00 -----
x/d = .00			
	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.8	
x/dMx= .37			
[tf,cm]  M[-]Min = 115.8	M[+]Min = 115.8		M[-]Min = 115.8
[cm2 ]  Asapo[+]= 1.14			Asapo[+]= 1.20

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	215.	3.56	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.0	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:	
0	0	1	2.737	2.737	.20	.00	2 V212	.00	.00	0	0
0	0	2	7.066	7.066	.30	.03	1 T8	.00	.00	8008	0
0	0	3	.772	.772	.20	.00	2 V205	.00	.00	0	0

## V220

Viga= 220 V220 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 1.96 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-  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= .3 tf* m	- Abcis.= 114	M.[-] = .7 tf*
m			
[tf,cm]  As = .94 -SRAS- [ 2 B 8.0mm]	AsL= .00 -----		As = .88 -SRAS- [
2 B 8.0mm]			
AsL= .00 -----	x/d = .06	As = .89 -SRAS- [ 2 B 8.0mm ]	AsL= .00 -----
x/d = .05			
	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.4	
x/dMx= .37			
[tf,cm]  M[-]Min = 61.9	M[+]Min = 61.9		M[-]Min = 61.9
[cm2 ]  Asapo[+]= .22			Asapo[+]= .22

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	2.27	25.15	1	45.	.0	2.2	2.2	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	1.618	1.028	.40	.11	0 P9	.00	.00	9	0
0	0	2	1.573	.983	.40	.11	0 P5	.00	.00	5	0

## V221

Viga= 221 V221 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 3.27 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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= .6 tf* m	- Abcis.= 165	M.[-] = 1.4 tf*
m			
[tf,cm]  As = 1.20 -SRAS- [ 2 B 10.0mm]	AsL= .00 -----		As = 1.29 -SRAS- [
2 B 10.0mm]			
AsL= .00 -----	x/d = .05	As = 1.20 -SRAS- [ 2 B 10.0mm ]	AsL= .00 -----
x/d = .05			
	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.8	
x/dMx= .37			
[tf,cm]  M[-]Min = 115.8	M[+]Min = 115.8		M[-]Min = 115.8
[cm2 ]  Asapo[+]= .30			Asapo[+]= 1.14

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	303.	3.35	36.66	1	45.	.0	2.3	2.3	6.3	20.0	2	.0	.0	

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

-----

Vao= 2 /L= 3.31 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=.10 [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-  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= 1.0 tf* m - Abcis.= 195		M.[-] = 2.2 tf*	
m					
[tf,cm]	As = 1.62 -SRAS- [ 2 B 10.0mm]	AsL= .00 -----		As = 2.11 -SRAS- [	
	AsL= .00 -----	x/d = .07	As = 1.20 -SRAS- [ 2 B 10.0mm ]	AsL= .00 -----	
x/d = .09		x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.8		
x/dMx= .37					
[tf,cm]	M[-]Min = 115.8		M[+]Min = 115.8		M[-]Min = 115.8
[cm2 ]	Asapo[+] = 1.14				Asapo[+] = .30

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	308.	6.80	36.66	1	45.	.4	2.3	2.3	6.3	20.0	2	.0	1.7	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	8013	Pilares:			
0	0	1	2.163	2.163	.30	.03	1 T13	.00	.00	8013	0	0	0	
0	0	2	5.104	5.104	.30	.03	1 T11	.00	.00	8011	0	0	0	
0	0	3	4.855	4.855	.30	.03	1 T5	.00	.00	8005	0	0	0	

## V222

Viga= 222 V222 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

Vao= 1 /L= 1.96 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=.10 [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-  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.= 69		M.[-] = .9 tf*	
m					
[tf,cm]	As = .85 -SRAS- [ 2 B 8.0mm]	AsL= .00 -----		As = 1.20 -SRAS- [	
	AsL= .00 -----	x/d = .05	As = .89 -SRAS- [ 2 B 8.0mm ]	AsL= .00 -----	
x/d = .07		x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.4		
x/dMx= .37					
[tf,cm]	M[-]Min = 61.9		M[+]Min = 61.9		M[-]Min = 61.9
[cm2 ]	Asapo[+] = .22				Asapo[+] = .81

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	2.53	25.15	1	45.	.0	2.2	2.2	5.0	15.0	2	.0	.0	

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

Vao= 2 /L= 3.18 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=.10 [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-  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.= 164		M.[-] = 1.2 tf*	
m					
[tf,cm]	As = 1.50 -SRAS- [ 2 B 10.0mm]	AsL= .00 -----		As = 1.53 -SRAS- [	
	AsL= .00 -----	x/d = .09	As = .89 -SRAS- [ 2 B 8.0mm ]	AsL= .00 -----	
x/d = .09		x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.4		
x/dMx= .37					
[tf,cm]	M[-]Min = 61.9		M[+]Min = 61.9		M[-]Min = 61.9
[cm2 ]	Asapo[+] = .81				Asapo[+] = .22

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	300.	3.05	25.15	1	45.	.0	2.2	2.2	5.0	15.0	2	.0	.0	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	10	Pilares:			
0	0	1	1.292	.818	.40	.11	0 P10	.00	.00	10	0	0	0	
0	0	2	3.830	3.434	.40	.11	0 P6	.00	.00	6	0	0	0	
0	0	3	2.177	2.090	.30	.06	1 T1	.00	.00	8001	0	0	0	

## V223

Viga= 223 V223  
/Cob/S=3.0 .0 CM

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00

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

Vao= 1 /L= 2.91 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.= 147 | M.[-] = .9 tf\* m

[tf,cm] | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 1.20 -SRAS- [ 2 B 10.0mm ]

| AsL= .00 ----- | x/d = .05 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8

[cm2 ] | Asapo[+] = .30 | | Asapo[+] = 1.14

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.- 267. 2.86 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

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

Vao= 2 /L= 1.90 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.= 105 | M.[-] = .9 tf\* m

[tf,cm] | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 1.20 -SRAS- [ 2 B 16.0mm ]

| AsL= .00 ----- | x/d = .05 | As = 1.20 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8

[cm2 ] | Asapo[+] = 1.14 | | Asapo[+] = 1.14

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.- 166. 2.94 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

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

Vao= 3 /L= 2.86 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 5.3 tf\* m | M.[+] Max= 3.0 tf\* m - Abcis.= 132 | M.[-] = 3.5 tf\* m

[tf,cm] | As = 5.37 -SRAS- [ 3 B 16.0mm ] | AsL= .00 ----- | As = 3.43 -SRAS- [ 3 B 12.5mm ]

| AsL= .00 ----- | x/d = .22 | As = 2.91 -SRAS- [ 4 B 10.0mm ] | AsL= .00 -----

x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X 2 B 4.2mm] - LN= 4.2 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8

[cm2 ] | Asapo[+] = 1.23 | | Asapo[+] = 1.23

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

E M [tf,cm] 0.- 55. 14.96 36.66 1 45. 6.2 2.3 7.7 8.0 12.5 2 .0 1.8

55.- 125. 9.16 36.66 1 45. 2.1 2.3 6.5 8.0 15.0 2 .0 4.9

125.- 262. 7.17 36.66 1 45. .6 2.3 2.3 8.0 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-lR AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G

E M [tf,cm] 0.- 55. .00 2.18 5 6.7 11.1 31.1 .0 1.5 .1 .2 .41 S

55.- 125. .00 2.18 5 6.7 11.1 31.1 .0 1.5 .1 .2 .25 S

125.- 262. .00 2.18 5 6.7 11.1 31.1 .0 1.5 .1 .2 .20 S

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

Vao= 4 /L= 4.96 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 3.8 tf\* m | M.[+] Max= 2.0 tf\* m - Abcis.= 254 | M.[-] = 3.5 tf\* m  
 [tf,cm] | As = 3.71 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 3.33 -SRAS- [ 3 B 12.5mm]  
 | AsL= .00 ----- | x/d = .16 | As = 1.90 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.8 |  
 x/dMx= .37 |  
 [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
 [cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= .47

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. 6.03 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

REAC.	POPIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	2.041	2.041	.60	.18	4	P19	.00	.00	19 0 0 0
0	0	2	3.383	3.383	.30	.03	1	T12	.00	.00	8012 0 0 0
0	0	3	12.597	12.596	.60	.18	4	P15	.00	.00	15 0 0 0
0	0	4	9.291	9.255	.50	.13	4	P11	.00	.00	11 0 0 0
0	0	5	3.921	3.898	.60	.18	4	P3	.00	.00	3 0 0 0

## V224

Viga= 224 V224 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 Vao= 1 /L= 4.58 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= 1.9 tf\* m - Abcis.= 152 | M.[-] = 3.9 tf\* m  
 [tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = 3.81 -SRAS- [ 2 B 16.0mm]  
 | AsL= .00 ----- | x/d = .00 | As = 1.79 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .16 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.7 |  
 x/dMx= .37 |  
 [tf,cm] | M[-]Min = 115.8 | M[+]Min = 115.8 | M[-]Min = 115.8  
 [cm2 ] | Asapo[+]= 1.20 | | Asapo[+]= .45

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G  
 E M  
 [tf,cm] 0.- 436. 5.63 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

REAC.	POPIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	2.312	2.312	.20	.00	2	V212	.00	.00	0 0 0 0
0	0	2	4.020	4.020	.30	.03	1	T7	.00	.00	8007 0 0 0

## V225

Viga= 225 V225 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 Vao= 1B /L= 1.11 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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[-] = 1.28 tf\* m | As = 1.20 -SRAS- [ 2 B 10.0mm]  
 BAL.ESQ | x/d = .05 | AsL= .00 -  
 [tf,cm] | M[-]Min = 115.8 - 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.- 93. 2.02 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 2 /L= 5.26 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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.[-] = 3.0 tf* m	M.[+] Max= 1.6 tf* m - Abcis.= 269	M.[-] = 3.3 tf* m
[tf,cm]   As = 2.89 -SRAS- [ 4 B 10.0mm]	AsL= .00 -----	As = 3.19 -SRAS- [
4 B 10.0mm]		
AsL= .00 -----	x/d = .12	As = 1.52 -SRAS- [ 2 B 10.0mm ]
x/d = .13		AsL= .00 -----
	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 2.3
x/dMx= .37		
[tf,cm]   M[-]Min = 115.8	M[+]Min = 115.8	M[-]Min = 115.8
[cm2 ]   Asapo[+]= .38		Asapo[+]= 1.14

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.- 503. 5.24 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

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

Vao= 3 /L= 2.86 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  E S Q U E R D A	M E I O D O V A O	D I R E I T A
M.[-] = 2.4 tf* m	M.[+] Max= 1.3 tf* m - Abcis.= 129	M.[-] = 1.9 tf*
m		
[tf,cm]   As = 2.25 -SRAS- [ 3 B 10.0mm]	AsL= .00 -----	As = 1.78 -SRAS- [
3 B 10.0mm]		
AsL= .00 -----	x/d = .09	As = 1.25 -SRAS- [ 2 B 10.0mm ]
x/d = .07		AsL= .00 -----
	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 1.9
x/dMx= .37		
[tf,cm]   M[-]Min = 115.8	M[+]Min = 115.8	M[-]Min = 115.8
[cm2 ]   Asapo[+]= 1.14		Asapo[+]= 1.14

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.- 262. 5.99 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 1.9

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

Vao= 4 /L= 5.26 /B= .20 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-  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.[-] = 3.3 tf* m	M.[+] Max= 1.6 tf* m - Abcis.= 269	M.[-] = 3.0 tf*
m		
[tf,cm]   As = 3.19 -SRAS- [ 4 B 10.0mm]	AsL= .00 -----	As = 2.85 -SRAS- [
4 B 10.0mm]		
AsL= .00 -----	x/d = .13	As = 1.54 -SRAS- [ 2 B 10.0mm ]
x/d = .12		AsL= .00 -----
	x/dMx= .37	Arm.Lat.=[2 X -- B --- mm] - LN= 2.3
x/dMx= .37		
[tf,cm]   M[-]Min = 115.8	M[+]Min = 115.8	M[-]Min = 115.8
[cm2 ]   Asapo[+]= 1.14		Asapo[+]= .38

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.- 503. 5.26 36.66 1 45. .0 2.3 2.3 6.3 20.0 2 .0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1 5.043	5.043	.30	.03	4	P20	.00	.00	20 0 0 0
0	0	2 7.906	7.906	.50	.13	4	P16	.00	.00	16 0 0 0
0	0	3 6.795	6.795	.50	.13	4	P12	.00	.00	12 0 0 0
0	0	4 3.588	3.588	.30	.03	4	P4	.00	.00	4 0 0 0

## pav1 V301

Viga= 301 V301 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 5.59 /B= .30 /H= .75 /BCs= 1.14 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 14.2 tf\* m | M.[+] Max= 11.7 tf\* m - Abcis.= 232 | M.[-] = 19.8 tf\* m  
[tf,cm] | As = 6.98 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 9.81 -SRAS- [ 4 B 20.0mm]  
| AsL= .00 ----- x/d = .10 | As = 5.63 -STAS- [ 3 B 16.0mm ] | AsL= .00 -----  
x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.4 |  
x/dMx= .37 | | |  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+]= 1.41 | | | Asapo[+]= 3.45

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	174.	20.07	108.45	1	45.	.6	3.5	3.5	6.3	17.5	2	.0	.0	
	174.-	348.	11.70	108.45	1	45.	.0	3.5	3.5	6.3	17.5	2	.0	.0	
	348.-	522.	26.06	108.45	1	45.	2.7	3.5	3.9	6.3	15.0	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	174.	.14	12.52	5	10.7	19.3	64.3	.1	.0	.0	.0	.20	N	
	174.-	348.	.40	12.52	5	10.7	19.3	64.3	.4	.0	.0	.0	.14	N	
	348.-	522.	.63	12.52	5	10.7	19.3	64.3	.6	2.5	.2	.8	.29	N	

----- G E O M E T R I A E C A R G A S -----  
Vao= 2 /L= 8.32 /B= .30 /H= .75 /BCs= .80 /BCi= .00 /TpS= 8 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = 17.0 tf\* m | M.[+] Max= 8.9 tf\* m - Abcis.= 416 | M.[-] = 15.9 tf\* m  
[tf,cm] | As = 8.61 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 8.05 -SRAS- [ 3 B 20.0mm]  
| AsL= .00 ----- x/d = .12 | As = 4.56 -STAS- [ 4 B 12.5mm ] | AsL= .00 -----  
x/d = .11 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.5 |  
x/dMx= .37 | | |  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+]= 3.67 | | | Asapo[+]= 3.67

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	160.	17.83	108.45	1	45.	.0	3.5	4.8	6.3	12.5	2	.0	.0	
	160.-	642.	9.58	108.45	1	45.	.0	3.5	3.5	6.3	17.5	2	.0	.0	
	642.-	802.	17.46	108.45	1	45.	.0	3.5	4.0	6.3	15.0	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	160.	2.57	12.52	5	10.7	19.3	64.3	2.4	2.5	.5	1.5	.37	N	
	160.-	642.	1.05	12.52	5	10.7	19.3	64.3	1.0	2.5	.2	.8	.17	N	
	642.-	802.	2.16	12.52	5	10.7	19.3	64.3	2.0	2.5	.4	1.3	.33	N	

----- G E O M E T R I A E C A R G A S -----  
Vao= 3 /L= 5.59 /B= .30 /H= .75 /BCs= 1.14 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 18.5 tf\* m | M.[+] Max= 10.6 tf\* m - Abcis.= 326 | M.[-] = 13.7 tf\* m  
[tf,cm] | As = 8.89 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 6.50 -SRAS- [ 4 B 16.0mm]  
| AsL= .00 ----- x/d = .13 | As = 4.87 -STAS- [ 4 B 12.5mm ] | AsL= .00 -----  
x/d = .09 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.3 |  
x/dMx= .37 | | |  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+]= 3.21 | | | Asapo[+]= 1.22

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	522.	21.27	108.45	1	45.	1.0	3.5	3.5	6.3	17.5	2	.0	.0	

ENGENHARIA E COMÉRCIO LTDA.

T O R C A O - E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	522.	.52	12.52	5	10.7	19.3	64.3	.5	.0	.0	.24	N	

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 1	14.319	10.949	.60	.07	0	P1	.00	.00	1 0 0 0
0 0 2	31.340	27.182	.30	.00	0	P2	.00	.00	2 0 0 0
0 0 3	27.666	23.654	.30	.00	0	P3	.00	.00	3 0 0 0
0 0 4	13.699	10.341	.60	.07	0	P4	.00	.00	4 0 0 0

## V302

Viga= 302 V302 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 2.30 /B= .19 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= .6 tf\* m - Abcis.= 76 | M.[-] = .8 tf\* m  
[tf,cm] | As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .05 | As = 1.14 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
x/d = .05 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |  
x/dMx= .37 | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0  
[cm2 ] | Asapo[+] = 1.14 | Asapo[+] = 1.08

CISALHAMENTO- E M	Xi	Xf	Vsd	Vrd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	211.	2.54	34.83	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

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

Vao= 2 /L= 2.72 /B= .19 /H= .40 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS --- DeltaE=1.00  
DeltaD=1.00 ---

\* \* \* \* \*  
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.[-] = .6 tf\* m | M.[+] Max= .0 tf\* m - Abcis.= 272 | M.[-] = 1.0 tf\* m  
[tf,cm] | As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [ 2 B 10.0mm]  
| AsL= .00 ----- x/d = .05 | As = 1.14 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----  
x/d = .05 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |  
x/dMx= .37 | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0  
[cm2 ] | Asapo[+] = 1.08 | Asapo[+] = .29

CISALHAMENTO- E M	Xi	Xf	Vsd	Vrd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	253.	1.65	34.83	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 1	1.482	.915	.19	.00	0	P5	.00	.00	5 0 0 0
0 0 2	1.738	1.272	.19	.00	0	P6	.00	.00	6 0 0 0
0 0 3	-.950	-1.138	.19	.00	2	V311	.00	.00	0 0 0 0

## V303

Viga= 303 V303 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 3.19 /B= .19 /H= .40 /BCs= .43 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [M]  
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS --- DeltaE=1.00  
DeltaD=1.00 ---

\* \* \* \* \*  
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 | M.[-] = 1.7 tf* m | M.[+] Max= .5 tf* m - Abcis.= 319 | M.[-] = .0 tf*
m
[tf,cm]| As = 1.60 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .07 | As = 1.14 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .05
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |
x/dMx= .37
[tf,cm]| M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0
[cm2 ]| Asapo[+]= 1.14 | | Asapo[+]= 1.11

```

```

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. 3.61 34.83 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

```

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

```

Vao= 2 /L= 2.30 /B= .19 /H= .40 /BCs= .36 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-| 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 | M.[-] = .2 tf* m | M.[+] Max= .7 tf* m - Abcis.= 134 | M.[-] = .5 tf*
m
[tf,cm]| As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .05 | As = 1.14 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .05
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |
x/dMx= .37
[tf,cm]| M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0
[cm2 ]| Asapo[+]= 1.11 | | Asapo[+]= 1.14

```

```

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. 2.33 34.83 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

```

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	-2.034	-2.528	.19	.00	0	P8	.00	.00	8 0 0 0
0	0	2	1.027	.752	.19	.00	0	P9	.00	.00	9 0 0 0
0	0	3	1.661	1.102	.19	.00	0	P10	.00	.00	10 0 0 0

## V304

Viga= 304 V304 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

```

Vao= 1 /L= 8.21 /B= .19 /H= .70 /BCs= 1.83 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex=
.10 [M]
--Solicitações provenientes de modelo de grelha e/ou pórtico espacial--- Estrut. Nós FIXOS --- DeltaE=1.00
DeltaD=1.00 ---

```

\* \* \* \* \*  
 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 | M.[-] = 3.1 tf* m | M.[+] Max= 18.7 tf* m - Abcis.= 410 | M.[-] = 3.1 tf*
m
[tf,cm]| As = 2.00 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.00 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .04 | As = 9.32 -STAS- [ 3 B 20.0mm ] | AsL= .00 -----
x/d = .04
| Grampos Esq.= 3B 8.0mm x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.5 | Grampos Dir.= 3B
8.0mm x/dMx= .37
[tf,cm]| M[-]Min = 336.9 | M[+]Min = 336.9 | M[-]Min = 336.9
[cm2 ]| Asapo[+]= 3.11 | | Asapo[+]= 3.11

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 160. 24.58 63.85 1 45. 5.3 2.2 5.3 8.0 17.5 2 .0 .0
160.- 642. 12.52 63.85 1 45. .6 2.2 2.2 8.0 30.0 2 .0 .0
642.- 802. 28.10 63.85 1 45. 6.7 2.2 6.7 8.0 15.0 2 .0 .0

```

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	-16.648	-17.533	.19	.00	2	V307	.00	.00	0 0 0 0
0	0	2	-19.129	-20.069	.19	.00	2	V311	.00	.00	0 0 0 0



## V305

Viga= 305 V305  
/Cob/S=3.0 .0 CM

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00

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

Vao= 1 /L= 5.64 /B= .30 /H= .75 /BCs= 1.15 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 7.9 tf\* m | M.[+] Max= 7.4 tf\* m - Abcis.= 141 | M.[-] = 22.3 tf\* m  
[tf,cm] | As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 10.84 -SRAS- [ 6 B 16.0mm]  
| AsL= .00 ----- x/d = .05 | As = 3.42 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
x/d = .15 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= .9 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+]= 3.38 | | Asapo[+]= 3.21

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M  
[tf,cm] 0.- 533. 16.35 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

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

Vao= 2 /L= 8.21 /B= .30 /H= .75 /BCs= 1.29 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = 22.1 tf\* m | M.[+] Max= 19.3 tf\* m - Abcis.= 410 | M.[-] = 21.7 tf\* m  
[tf,cm] | As = 10.79 -SRAS- [ 6 B 16.0mm] | AsL= .00 ----- | As = 10.54 -SRAS- [ 6 B 16.0mm]  
| AsL= .00 ----- x/d = .15 | As = 8.93 -STAS- [ 3 B 20.0mm ] | AsL= .00 -----  
x/d = .15 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 2.1 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+]= 3.21 | | Asapo[+]= 3.21

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M  
[tf,cm] 0.- 802. 22.57 108.45 1 45. 1.5 3.5 3.5 6.3 17.5 2 .0 .0

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

Vao= 3 /L= 5.64 /B= .30 /H= .75 /BCs= 1.15 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = 21.8 tf\* m | M.[+] Max= 7.3 tf\* m - Abcis.= 423 | M.[-] = 8.2 tf\* m  
[tf,cm] | As = 10.61 -SRAS- [ 6 B 16.0mm] | AsL= .00 ----- | As = 3.85 -SRAS- [ 2 B 16.0mm]  
| AsL= .00 ----- x/d = .15 | As = 3.38 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= .9 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+]= 3.21 | | Asapo[+]= 3.38

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.- 533. 16.28 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

REAC.	POI	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	6.641	3.620	.60	.07	0	P17	.00	.00	17	0	0	0
0	0	2	25.075	21.448	.19	.00	0	P18	.00	.00	18	0	0	0
0	0	3	24.063	20.456	.19	.00	0	P19	.00	.00	19	0	0	0
0	0	4	6.884	3.873	.60	.07	0	P20	.00	.00	20	0	0	0

## V306

Viga= 306 V306  
/Cob/S=3.0 .0 CM

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00

----- G E O M E T R I A E C A R G A S -----  
Vao= 1B /L= 1.08 /B= .19 /H= .75 /BCs= .41 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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[-]= 4.28 tf\* m | As = 2.14 -SRAS- [ 3 B 10.0mm]  
BAL.ESQ | x/d = .04 | AsL= .00 -Arm.Lat.= [ 2 X 5 B 6.3mm]  
[tf,cm] | M[-]Min= 386.8 - 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.- 93. 2.18 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
Vao= 2 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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- | 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.[-] = 4.3 tf\* m | M.[+] Max= 5.7 tf\* m - Abcis.= 226 | M.[-] = 8.6 tf\*  
m  
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 4.08 -SRAS- [ 2 B 16.0mm]  
| AsL= .00 ----- x/d = .04 | As = 2.61 -STAS- [ 4 B 10.0mm ] | AsL= .00 -----  
x/d = .09 | | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.5 |  
x/dMx= .37 | |  
[tf,cm] | M[-]Min = 386.8 | | M[+]Min = 386.8 | | M[-]Min = 386.8  
[cm2 ] | Asapo[+] = .65 | | | Asapo[+] = 2.03

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.- 503. 13.14 68.68 1 45. .5 2.2 2.2 5.0 17.5 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= .19 /H= .75 /BCs= .37 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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- | 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.[-] = 6.1 tf\* m | M.[+] Max= .0 tf\* m - Abcis.= 311 | M.[-] = 6.1 tf\*  
m  
[tf,cm] | As = 2.85 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 2.85 -SRAS- [ 4 B 10.0mm]  
| AsL= .00 ----- x/d = .06 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .06 | | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.6 |  
x/dMx= .37 | |  
[tf,cm] | M[-]Min = 386.8 | | M[+]Min = 386.8 | | M[-]Min = 386.8  
[cm2 ] | Asapo[+] = 2.03 | | | Asapo[+] = 2.03

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.- 262. 8.88 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
Vao= 4 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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- | 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.[-] = 5.9 tf\* m | M.[+] Max= 4.4 tf\* m - Abcis.= 226 | M.[-] = 7.7 tf\*  
m  
[tf,cm] | As = 2.76 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.65 -SRAS- [ 3 B 12.5mm]  
| AsL= .00 ----- x/d = .06 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .08 | | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.2 |  
x/dMx= .37 | |  
[tf,cm] | M[-]Min = 386.8 | | M[+]Min = 386.8 | | M[-]Min = 386.8  
[cm2 ] | Asapo[+] = 2.03 | | | Asapo[+] = .53

ENGENHARIA E COMÉRCIO LTDA.

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.- 503. 10.40 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

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

Vao= 5B /L= 2.67 /B= .19 /H= .75 /BCs= .73 /BCi= .00 /TpS= 5 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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[-] = 6.03 tf\* m | As = 2.83 -SRAS- [ 3 B 12.5mm]  
BAL.DIR | x/d = .06 | AsL = .00 -Arm.Lat.= [ 2 X 5 B 6.3mm]  
[tf,cm] | M[-]Min = 386.8 - 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.- 253. 5.56 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	6.569	5.725	.30	.00	0	P17	.00	.00	17	0	0	0
0	0	2	14.198	12.844	.50	.03	0	P13	.00	.00	13	0	0	0
0	0	3	12.886	11.615	.50	.03	0	P7	.00	.00	7	0	0	0
0	0	4	9.267	8.321	.30	.00	0	P1	.00	.00	1	0	0	0

## V307

Viga= 307 V307 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 5.04 /B= .19 /H= .70 /BCs= .95 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [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 | 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.[-] = 10.9 tf\* m | M.[+] Max= 11.2 tf\* m - Abcis.= 213 | M.[-] = 19.3 tf\* m  
[tf,cm] | As = 5.67 -SRAS- [ 3 B 16.0mm] | AsL = .00 ----- | As = 11.02 -SRAS- [ 4 B 20.0mm]  
| AsL = .00 ----- | x/d = .14 | As = 5.59 -STAS- [ 3 B 16.0mm ] | AsL = .00 -----  
x/d = .27 | x/dMx = .37 | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.8 |  
x/dMx = .37 | |  
[tf,cm] | M[-]Min = 336.9 | | M[+]Min = 336.9 | | M[-]Min = 336.9  
[cm2 ] | Asapo[+] = 1.40 | | | | Asapo[+] = 1.90

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.- 154. 23.55 63.85 1 45. 4.9 2.2 4.9 8.0 20.0 2 .0 .0  
154.- 308. 10.59 63.85 1 45. .0 2.2 2.2 8.0 30.0 2 .0 .0  
308.- 463. 27.74 63.85 1 45. 6.5 2.2 6.5 8.0 15.0 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= .19 /H= .70 /BCs= .55 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [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 | 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.[-] = 14.6 tf\* m | M.[+] Max= 4.1 tf\* m - Abcis.= 184 | M.[-] = 7.0 tf\* m  
[tf,cm] | As = 8.01 -SRAS- [ 3 B 20.0mm] | AsL = .00 ----- | As = 3.67 -SRAS- [ 3 B 12.5mm]  
| AsL = .00 ----- | x/d = .19 | As = 2.12 -STAS- [ 3 B 10.0mm ] | AsL = .00 -----  
x/d = .09 | x/dMx = .37 | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.1 |  
x/dMx = .37 | |  
[tf,cm] | M[-]Min = 336.9 | | M[+]Min = 336.9 | | M[-]Min = 336.9  
[cm2 ] | Asapo[+] = 1.98 | | | | Asapo[+] = 1.98

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.- 140. 26.72 63.85 1 45. 6.1 2.2 8.0 8.0 12.5 2 .0 6.3  
140.- 262. 23.51 63.85 1 45. 4.9 2.2 6.6 8.0 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnR Asl-b Asl-h ComDia AdPla M E N S A G  
E M  
[tf,cm] 0.- 140. .00 4.37 5 7.5 10.1 61.1 .0 1.7 .1 .5 .42 S  
140.- 262. .00 4.37 5 7.5 10.1 61.1 .0 1.7 .1 .5 .37 S

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

Vao= 3 /L= 5.14 /B= .19 /H= .70 /BCs= .50 /BCi= .00 /TpS= 8 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [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| 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.[-] = 5.0 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 172 | M.[-] = 15.4 tf*
m
[tf,cm]| As = 2.51 -SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 12.74 -SRAS- [
4 B 20.0mm]
      | AsL= .00 ----- | x/d = .06 | As = 2.00 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .32
      | | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.1 |
x/dMx= .37
      | | |
[tf,cm]| M[-]Min = 336.9 | | |
[cm2 ]| Asapo[+]= 1.90 | | M[+]Min = 336.9 | | M[-]Min = 336.9
      | | | | Asapo[+]= .50

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 473. 11.53 63.85 1 45. .2 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 4B /L= 2.92 /B= .19 /H= .70 /BCs= 1.36 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex=
.10 [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[-]= 21.92 tf* m | As = 12.74 -SRAS- [ 4 B 20.0mm]
BAL.DIR | x/d = .32 | AsL= .00 -Arm.Lat.=[ 2 X 5 B 6.3mm]
[tf,cm] | M[-]Min= 336.9 - 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.- 126. 19.66 63.85 1 45. 3.4 2.2 3.4 6.3 17.5 2 .0 .0
126.- 253. 10.55 63.85 1 45. .0 2.2 2.2 6.3 25.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 16.799 14.555 .60 .09 0 P18 .00 .00 18 0 0 0
0 0 2 37.143 35.140 .60 .09 0 P14 .00 .00 14 0 0 0
0 0 3 20.748 18.729 .50 .04 0 P8 .00 .00 8 0 0 0
0 0 4 18.827 16.748 .60 .09 0 P2 .00 .00 2 0 0 0
```

## V309

Viga= 309 V309 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.02 /B= .19 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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| 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= .8 tf* m - Abcis.= 16 | M.[-] = 1.4 tf*
m
[tf,cm]| As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.31 -SRAS- [
2 B 10.0mm]
      | AsL= .00 ----- | x/d = .05 | As = 1.14 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .06
      | | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |
x/dMx= .37
      | | |
[tf,cm]| M[-]Min = 110.0 | | |
[cm2 ]| Asapo[+]= 1.14 | | M[+]Min = 110.0 | | M[-]Min = 110.0
      | | | | Asapo[+]= 1.14

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.- 178. 3.12 34.83 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 1.643 .089 .40 .08 0 P9 .00 .00 9 0 0 0
0 0 2 2.231 .677 .40 .08 0 P5 .00 .00 5 0 0 0
```

## V310

Viga= 310 V310 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.02 /B= .19 /H= .40 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex=
.10 [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-  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.= 0				M.[-] = 1.4 tf*			
m									
[tf,cm]   As = 1.14 -SRAS- [ 2 B 10.0mm]		AsL= .00 -----				As = 1.30 -SRAS- [			
2 B 10.0mm]									
AsL= .00 -----		x/d = .05				As = 1.14 -STAS- [ 2 B 10.0mm ]			
x/d = .06						AsL= .00 -----			
		x/dMx= .37				Arm.Lat.=[2 X -- B --- mm] - LN= .9			
x/dMx= .37									
[tf,cm]   M[-]Min = 110.0		M[+]Min = 110.0				M[-]Min = 110.0			
[cm2 ]   Asapo[+]= 1.14						Asapo[+]= 1.14			

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	2.98	34.83	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:	
0	0	1	1.659	-.130	.40	.08	0 P10	.00	.00	10	0 0 0
0	0	2	2.127	.337	.40	.08	0 P6	.00	.00	6	0 0 0

## V311

Viga= 311 V311 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 5.04 /B= .19 /H= .70 /BCs= .95 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [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-  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.[-] = 10.4 tf* m		M.[+] Max= 10.7 tf* m - Abcis.= 213				M.[-] = 17.6 tf*			
m									
[tf,cm]   As = 5.38 -SRAS- [ 3 B 16.0mm]		AsL= .00 -----				As = 9.71 -SRAS- [			
3 B 20.0mm]									
AsL= .00 -----		x/d = .13				As = 5.34 -STAS- [ 3 B 16.0mm ]			
x/d = .24						AsL= .00 -----			
		x/dMx= .37				Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.7			
x/dMx= .37									
[tf,cm]   M[-]Min = 336.9		M[+]Min = 336.9				M[-]Min = 336.9			
[cm2 ]   Asapo[+]= 1.33						Asapo[+]= 1.90			

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	154.	24.07	63.85	1	45.	5.1	2.2	5.1	8.0	17.5	2	.0	.0	
	154.-	308.	9.90	63.85	1	45.	.0	2.2	2.2	8.0	30.0	2	.0	.0	
	308.-	463.	25.48	63.85	1	45.	5.6	2.2	5.6	8.0	17.5	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= .19 /H= .70 /BCs= .55 /BCi= .00 /TpS= 2 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [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-  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.[-] = 12.5 tf* m		M.[+] Max= 2.1 tf* m - Abcis.= 158				M.[-] = 10.0 tf*			
m									
[tf,cm]   As = 6.75 -SRAS- [ 3 B 20.0mm]		AsL= .00 -----				As = 5.30 -SRAS- [			
3 B 16.0mm]									
AsL= .00 -----		x/d = .16				As = 2.08 -STAS- [ 3 B 10.0mm ]			
x/d = .13						AsL= .00 -----			
		x/dMx= .37				Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.0			
x/dMx= .37									
[tf,cm]   M[-]Min = 336.9		M[+]Min = 336.9				M[-]Min = 336.9			
[cm2 ]   Asapo[+]= 1.98						Asapo[+]= 1.98			

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	55.	24.36	63.85	1	45.	5.2	2.2	6.9	8.0	12.5	2	.0	.0	
	55.-	140.	15.48	63.85	1	45.	1.8	2.2	9.0	8.0	10.0	2	.0	7.2	
	140.-	262.	18.40	63.85	1	45.	2.9	2.2	4.6	8.0	20.0	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	55.	.00	4.37	5	7.5	10.1	61.1	.0	1.7	.1	.5	.38	S	
	55.-	140.	.00	4.37	5	7.5	10.1	61.1	.0	1.7	.1	.5	.24	S	
	140.-	262.	.00	4.37	5	7.5	10.1	61.1	.0	1.7	.1	.5	.29	S	

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

Vao= 3 /L= 5.14 /B= .19 /H= .70 /BCs= .50 /BCi= .00 /TpS= 5 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [M]

ENGENHARIA E COMÉRCIO LTDA.

--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 | 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.[-] = 11.0 tf\* m | M.[+] Max= 7.0 tf\* m - Abcis.= 259 | M.[-] = 23.0 tf\* m  
[tf,cm] | As = 5.74 -SRAS- [ 3 B 16.0mm] | AsL= .00 ----- | As = 14.41 -SRAS- [ 3 B 25.0mm]  
| AsL= .00 ----- | As = 3.48 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
x/d = .35 | x/dMx = .37 | Arm.Lat.=[ 2 X 5 B 6.3mm] - LN= 2.1 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 336.9 | M[+]Min = 336.9 | M[-]Min = 336.9  
[cm2 ] | Asapo[+]= 1.90 | | Asapo[+]= .87

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	158.-	19.21	63.85	1	45.	3.2	2.2	3.2	6.3	17.5	2	.0	.0	
	158.-	315.-	10.69	63.85	1	45.	.0	2.2	2.2	6.3	25.0	2	.0	.0	
	315.-	473.-	24.64	63.85	1	45.	5.3	2.2	5.3	6.3	10.0	2	.0	.0	

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

Vao= 4B /L= 2.92 /B= .19 /H= .70 /BCs= 1.36 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [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[-]= 24.54 tf\* m | As = 14.41 -SRAS- [ 3 B 25.0mm]  
BAL.DIR | x/d = .35 | AsL= .00 -Arm.Lat.=[ 2 X 5 B 6.3mm]  
[tf,cm] | M[-]Min= 336.9 | x/dMx = .50 | | % Baric.Armad. = 3

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	126.-	27.18	63.85	1	45.	6.3	2.2	6.3	8.0	15.0	2	.0	.0	
	126.-	253.-	11.39	63.85	1	45.	.2	2.2	2.2	8.0	30.0	2	.0	.0	

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	17.172	14.844	.60	.09	0	P19	.00	.00	19 0 0 0
2	33.876	32.197	.60	.09	0	P15	.00	.00	15 0 0 0
3	25.672	24.198	.50	.04	0	P11	.00	.00	11 0 0 0
4	26.556	24.405	.60	.09	0	P3	.00	.00	3 0 0 0

## V312

Viga= 312 V312 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1B /L= 1.08 /B= .19 /H= .75 /BCs= .41 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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[-]= 4.28 tf\* m | As = 2.14 -SRAS- [ 3 B 10.0mm]  
BAL.ESQ | x/d = .04 | AsL= .00 -Arm.Lat.=[ 2 X 5 B 6.3mm]  
[tf,cm] | M[-]Min= 386.8 | x/dMx = .50 | | % Baric.Armad. = 1

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	93.-	2.18	68.68	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

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

Vao= 2 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 8 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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 | 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.[-] = 4.3 tf\* m | M.[+] Max= 5.6 tf\* m - Abcis.= 226 | M.[-] = 8.6 tf\* m  
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 4.10 -SRAS- [ 2 B 16.0mm]  
| AsL= .00 ----- | As = 2.60 -STAS- [ 4 B 10.0mm ] | AsL= .00 -----  
x/d = .09 | x/dMx = .37 | Arm.Lat.=[ 2 X 5 B 6.3mm] - LN= 1.5 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8  
[cm2 ] | Asapo[+]= .65 | | Asapo[+]= 2.03

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	503.-	13.00	68.68	1	45.	.5	2.2	2.2	5.0	17.5	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= .19 /H= .75 /BCs= .37 /BCi= .00 /TpS= 8 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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-| 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.[-] = 6.2 tf\* m | M.[+] Max= .0 tf\* m - Abcis.= 311 | M.[-] = 6.0 tf\* m  
 [tf,cm] | As = 2.91 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 2.84 -SRAS- [ 4 B 10.0mm]  
 | AsL= .00 ----- x/d = .07 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .06 | x/dMx= .37 | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.6 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8  
 [cm2 ] | Asapo[+] = 2.03 | | Asapo[+] = 2.03

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.- 262. 8.66 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 4 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 8 /Esp.LS= .16 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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-| 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.[-] = 5.9 tf\* m | M.[+] Max= 4.2 tf\* m - Abcis.= 226 | M.[-] = 7.8 tf\* m  
 [tf,cm] | As = 2.75 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.69 -SRAS- [ 3 B 12.5mm]  
 | AsL= .00 ----- x/d = .06 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .08 | x/dMx= .37 | Arm.Lat.= [ 2 X 5 B 6.3mm ] - LN= 1.1 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8  
 [cm2 ] | Asapo[+] = 2.03 | | Asapo[+] = .53

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.- 503. 10.33 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 5B /L= 2.67 /B= .19 /H= .75 /BCs= .73 /BCi= .00 /TpS= 8 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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[-] = 6.09 tf\* m | As = 2.86 -SRAS- [ 3 B 12.5mm]  
 BAL.DIR | x/d = .06 | AsL= .00 -Arm.Lat.= [ 2 X 5 B 6.3mm]  
 [tf,cm] | M[-]Min= 386.8 - 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.- 253. 5.73 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1 6.527	5.609	.30	.00	0	P20	.00	.00	20 0 0 0
0	0	2 14.176	12.753	.50	.03	0	P16	.00	.00	16 0 0 0
0	0	3 12.595	11.284	.50	.03	0	P12	.00	.00	12 0 0 0
0	0	4 9.241	8.226	.30	.00	0	P4	.00	.00	4 0 0 0

## VE1

Viga= 308 VE1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 Vao= 1 /L= 5.09 /B= .19 /H= .60 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .30 /FLt.Ex= .10 [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-| 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.[-] = 5.6 tf\* m | M.[+] Max= 5.1 tf\* m - Abcis.= 296 | M.[-] = 10.1 tf\* m

ENGENHARIA E COMÉRCIO LTDA.

```
[tf,cm] | As = 3.37 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 6.34 -SRAS- [
2 B 20.0mm]
| AsL= .00 ----- x/d = .10 | As = 3.06 -SRAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/d = .18
| x/dMx= .37 | Arm.Lat.=[2 X 4 B 6.3mm] - LN= 4.8 |
x/dMx= .37
|
[tf,cm] | M[-]Min = 247.5 | M[+]Min = 247.5 | M[-]Min = 247.5
[cm2 ] | Asapo[+]= .76 | | Asapo[+]= .76
```

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	315.	7.33	54.17	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	
	315.-	473.	15.75	54.17	1	45.	3.0	2.2	3.0	5.0	12.5	2	.0	.0	

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	5.227	3.836	.50	.07	0	P8	.00	.00	8 0 0 0
2	11.248	9.857	.60	.12	0	P2	.00	.00	2 0 0 0

## pav2 V401

Viga= 401 V401 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 5.92 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex=
.10 [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-| 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= 1.3 tf* m - Abcis.= 246 | M.[-] = 1.7 tf*
m
[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = 1.65 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .00 | As = 1.65 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .04
| x/dMx= .37 | Arm.Lat.=[2 X 3 B 4.2mm] - LN= 2.4 |
x/dMx= .37
|
[tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0
[cm2 ] | Asapo[+]= 1.65 | | Asapo[+]= 1.57
```

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	574.	2.30	49.34	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	574.	.00	3.11	5	7.1	10.1	46.1	.0	1.6	.1	.4	.05	S	

```
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 8.21 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex=
.10 [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-| 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= 2.2 tf* m - Abcis.= 410 | M.[-] = 2.0 tf*
m
[tf,cm] | As = 1.65 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 1.65 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .04 | As = 1.65 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .04
| x/dMx= .37 | Arm.Lat.=[2 X 3 B 4.2mm] - LN= 2.4 |
x/dMx= .37
|
[tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0
[cm2 ] | Asapo[+]= 1.57 | | Asapo[+]= 1.57
```

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	802.	2.72	49.34	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	802.	.00	3.11	5	7.1	10.1	46.1	.0	1.6	.1	.4	.06	S	

```
----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.92 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex=
.10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
```



ENGENHARIA E COMÉRCIO LTDA.

M.[-] = 2.0 tf\* m | M.[+] Max= 1.2 tf\* m - Abcis.= 345 | M.[-] = .0 tf\*

[tf,cm] | As = 1.65 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = .00 -SRAS- [ 0 B 6.3mm]

| AsL= .00 ----- | x/d = .04 | As = 1.65 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----

x/d = .00 | x/dMx= .37 | Arm.Lat.=[2 X 3 B 4.2mm] - LN= 2.4 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0

[cm2 ] | Asapo[+]= 1.57 | | Asapo[+]= 1.65

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.- 574. 2.38 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G

E M [tf,cm] 0.- 574. .00 3.11 5 7.1 10.1 46.1 .0 1.6 .1 .4 .05 S

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

0 0 1 1.106 1.036 .19 .00 2 V408 .00 .00 0 0 0 0

0 0 2 3.498 3.311 .19 .00 2 V411 .00 .00 0 0 0 0

0 0 3 3.640 3.465 .19 .00 2 V415 .00 .00 0 0 0 0

0 0 4 1.047 .983 .19 .00 2 V416 .00 .00 0 0 0 0

## V402

Viga= 402 V402 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00

/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 5.92 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .10 [M]

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

DeltaD=1.00 ---

\* \* \* \* \*

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.[-] = .0 tf\* m | M.[+] Max= .0 tf\* m - Abcis.= 592 | M.[-] = 1.3 tf\*

[tf,cm] | As = .00 -SRAS- [ 0 B 6.3mm] | AsL= .00 ----- | As = 1.65 -SRAS- [ 3 B 10.0mm]

| AsL= .00 ----- | x/d = .00 | As = 1.65 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----

x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 3 B 4.2mm] - LN= 2.4 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0

[cm2 ] | Asapo[+]= .55 | | Asapo[+]= 1.57

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.- 574. .74 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G

E M [tf,cm] 0.- 574. .00 3.11 5 7.1 10.1 46.1 .0 1.6 .1 .4 .01 S

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

Vao= 2 /L= 8.21 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .10 [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- 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= 2.3 tf\* m - Abcis.= 410 | M.[-] = 1.6 tf\*

[tf,cm] | As = 1.65 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 1.65 -SRAS- [ 3 B 10.0mm]

| AsL= .00 ----- | x/d = .04 | As = 1.65 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----

x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 3 B 4.2mm] - LN= 2.4 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0

[cm2 ] | Asapo[+]= 1.57 | | Asapo[+]= 1.57

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.- 802. 2.21 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G

E M [tf,cm] 0.- 802. .00 3.11 5 7.1 10.1 46.1 .0 1.6 .1 .4 .04 S

ENGENHARIA E COMÉRCIO LTDA.

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

Vao= 3 /L= 5.92 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .10 [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-| 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= .0 tf\* m - Abcis.= 592 | M.[-] = .0 tf\* m  
 [tf,cm] | As = 1.65 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = .00 -SRAS- [ 0 B 6.3mm]  
 | AsL= .00 ----- | x/d = .04 | As = 1.65 -SRAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .00 | x/dMx= .37 | Arm.Lat.=[2 X 3 B 4.2mm] - LN= 2.4 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0  
 [cm2 ] | Asapo[+] = 1.57 | | | Asapo[+] = .55

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M  
 [tf,cm] 0.- 574. .57 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M  
 [tf,cm] 0.- 574. .00 3.11 5 7.1 10.1 46.1 .0 1.6 .1 .4 .01 S

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	-0.174	-0.224	.19	.00	2 V408	.00	.00	0	0	0	0
0	0	2	1.115	1.087	.19	.00	2 V411	.00	.00	0	0	0	0
0	0	3	1.527	1.496	.19	.00	2 V415	.00	.00	0	0	0	0
0	0	4	-0.018	-0.061	.19	.00	2 V416	.00	.00	0	0	0	0

## V403

Viga= 403 V403  
 /Cob/S=3.0 .0 CM

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00

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

Vao= 1 /L= 5.59 /B= .30 /H= .75 /BCs= 1.14 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 10.9 tf\* m | M.[+] Max= 8.6 tf\* m - Abcis.= 232 | M.[-] = 14.4 tf\* m  
 [tf,cm] | As = 5.40 -SRAS- [ 3 B 16.0mm] | AsL= .00 ----- | As = 7.08 -SRAS- [ 4 B 16.0mm]  
 | AsL= .00 ----- | x/d = .07 | As = 4.19 -STAS- [ 4 B 12.5mm ] | AsL= .00 -----  
 x/d = .10 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.0 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
 [cm2 ] | Asapo[+] = 1.05 | | | Asapo[+] = 3.45

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M  
 [tf,cm] 0.- 522. 17.84 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M  
 [tf,cm] 0.- 522. 1.16 12.52 5 10.7 19.3 64.3 1.1 2.5 .2 .8 .26 S

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

Vao= 2 /L= 8.32 /B= .30 /H= .75 /BCs= .80 /BCi= .00 /TpS= 8 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 12.8 tf\* m | M.[+] Max= 6.3 tf\* m - Abcis.= 416 | M.[-] = 12.1 tf\* m  
 [tf,cm] | As = 6.31 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 5.98 -SRAS- [ 2 B 20.0mm]  
 | AsL= .00 ----- | x/d = .09 | As = 3.64 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
 x/d = .08 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.2 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
 [cm2 ] | Asapo[+] = 3.47 | | | Asapo[+] = 3.47

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.- 802. 12.85 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G  
E M  
[tf,cm] 0.- 802. 1.47 12.52 5 10.7 19.3 64.3 1.4 2.5 .3 .9 .24 S

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

Vao= 3 /L= 5.59 /B= .30 /H= .75 /BCs= 1.14 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 13.6 tf\* m | M.[+] Max= 7.9 tf\* m - Abcis.= 326 | M.[-] = 10.7 tf\* m

[tf,cm] | As = 6.70 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 5.29 -SRAS- [ 5 B 12.5mm]

| AsL= .00 ----- x/d = .09 | As = 3.87 -STAS- [ 2 B 16.0mm ] | AsL= .00 -----

x/d = .07 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.0 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7

[cm2 ] | Asapo[+]= 3.45 | | Asapo[+]= .97

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.- 522. 15.77 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G  
E M

[tf,cm] 0.- 522. 1.16 12.52 5 10.7 19.3 64.3 1.1 2.5 .2 .8 .24 S

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:  
0 0 1 10.805 8.603 .60 .07 0 P1 .00 .00 1 0 0 0

0 0 2 21.861 19.618 .30 .00 0 P2 .00 .00 2 0 0 0

0 0 3 19.131 16.965 .30 .00 0 P3 .00 .00 3 0 0 0

0 0 4 10.394 8.206 .60 .07 0 P4 .00 .00 4 0 0 0

0 0

## V404

Viga= 404 V404 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 2.30 /B= .19 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= .5 tf\* m - Abcis.= 76 | M.[-] = 1.2 tf\* m

[tf,cm] | As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [ 2 B 10.0mm]

| AsL= .00 ----- x/d = .05 | As = 1.14 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0

[cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= 1.08

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. 2.75 34.83 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

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

Vao= 2 /L= 2.72 /B= .19 /H= .40 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= .0 tf\* m - Abcis.= 272 | M.[-] = .3 tf\* m

[tf,cm] | As = 1.21 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [ 2 B 10.0mm]

| AsL= .00 ----- x/d = .05 | As = 1.14 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0

[cm2 ] | Asapo[+]= 1.08 | | Asapo[+]= .38

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	253.	1.27	34.83	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	1.170	.769	.19	.00	0 P5	.00	.00	5 0 0 0
0	0	2	2.745	2.411	.19	.00	0 P6	.00	.00	6 0 0 0
0	0	3	-.062	-.221	.19	.00	2 V415	.00	.00	0 0 0 0

## V405

Viga= 405 V405 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 5.92 /B= .19 /H= .80 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex= .10 [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-| 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= 14.2 tf\* m - Abcis.= 296 | M.[-] = 11.2 tf\* m  
m  
[tf,cm] | As = 2.28 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- | As = 5.00 -SRAS- [ 4 B 12.5mm ]  
| AsL= .00 ----- | As = 6.13 -STAS- [ 3 B 16.0mm ] | AsL= .00 -----  
x/d = .10 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.7 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 440.1 | M[+]Min = 440.1 | M[-]Min = 440.1  
[cm2 ] | Asapo[+] = 2.28 | | Asapo[+] = 2.17

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	574.	19.27	73.52	1	45.	2.3	2.2	2.3	6.3	25.0	2	.0	.0	

----- G E O M E T R I A E C A R G A S -----  
Vao= 2 /L= 3.19 /B= .19 /H= .80 /BCs= .38 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex= .10 [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-| 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.[-] = 10.7 tf\* m | M.[+] Max= 1.5 tf\* m - Abcis.= 319 | M.[-] = .6 tf\* m  
m  
[tf,cm] | As = 4.77 -SRAS- [ 4 B 12.5mm ] | AsL= .00 ----- | As = 2.28 -SRAS- [ 3 B 10.0mm ]  
| AsL= .00 ----- | As = 2.28 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.6 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 440.1 | M[+]Min = 440.1 | M[-]Min = 440.1  
[cm2 ] | Asapo[+] = 2.17 | | Asapo[+] = 2.21

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	300.	7.14	73.52	1	45.	.0	2.2	2.2	6.3	25.0	2	.0	.0	

----- G E O M E T R I A E C A R G A S -----  
Vao= 3 /L= 2.30 /B= .19 /H= .80 /BCs= .33 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex= .10 [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-| 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= 2.3 tf\* m - Abcis.= 95 | M.[-] = 1.9 tf\* m  
m  
[tf,cm] | As = 2.28 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- | As = 2.28 -SRAS- [ 3 B 10.0mm ]  
| AsL= .00 ----- | As = 2.28 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.9 |  
x/dMx= .37 |  
[tf,cm] | M[-]Min = 440.1 | M[+]Min = 440.1 | M[-]Min = 440.1  
[cm2 ] | Asapo[+] = 2.21 | | Asapo[+] = 2.21

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	211.	3.55	73.52	1	45.	.0	2.2	2.2	6.3	25.0	2	.0	.0	

----- G E O M E T R I A E C A R G A S -----  
Vao= 4 /L= 2.72 /B= .19 /H= .80 /BCs= .52 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex= .10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 1.9 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 0 | M.[-] = 11.9 tf*
m
[tf,cm]| As = 2.28 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 5.33 -SRAS- [
3 B 16.0mm]
| AsL= .00 ----- x/d = .04 | As = 2.28 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .11 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.2 |
x/dMx= .37 |
|
[tf,cm]| M[-]Min = 440.1 | | |
[cm2 ]| Asapo[+]= 2.21 | | M[+]Min = 440.1 | | M[-]Min = 440.1
| | | Asapo[+]= 2.17

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.- 253. 10.32 73.52 1 45. .0 2.2 2.2 6.3 25.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 5.92 /B= .19 /H= .80 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex=
.10 [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-| 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.[-] = 12.4 tf* m | M.[+] Max= 13.6 tf* m - Abcis.= 296 | M.[-] = 1.3 tf*
m
[tf,cm]| As = 5.54 -SRAS- [ 3 B 16.0mm] | AsL= .00 ----- | As = 2.28 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .12 | As = 5.88 -STAS- [ 3 B 16.0mm ] | AsL= .00 -----
x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.6 |
x/dMx= .37 |
|
[tf,cm]| M[-]Min = 440.1 | | |
[cm2 ]| Asapo[+]= 2.17 | | M[+]Min = 440.1 | | M[-]Min = 440.1
| | | Asapo[+]= 2.28

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.- 574. 17.61 73.52 1 45. 1.7 2.2 2.2 6.3 25.0 2 .0 .0

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 8.569 7.730 .19 .00 0 P7 .00 .00 7 0 0 0
0 0 2 17.058 15.261 .19 .00 0 P8 .00 .00 8 0 0 0
0 0 3 .719 -.341 .19 .00 0 P9 .00 .00 9 0 0 0
0 0 4 2.861 .223 .19 .00 0 P10 .00 .00 10 0 0 0
0 0 5 18.784 15.976 .19 .00 0 P11 .00 .00 11 0 0 0
0 0 6 8.250 7.304 .19 .00 0 P12 .00 .00 12 0 0 0
0 0
```

## V406

Viga= 406 V406 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 5.92 /B= .19 /H= .80 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex=
.10 [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-| 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= 7.0 tf* m - Abcis.= 197 | M.[-] = 23.8 tf*
m
[tf,cm]| As = 2.28 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 11.58 -SRAS- [
4 B 20.0mm]
| AsL= .00 ----- x/d = .04 | As = 3.00 -STAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/d = .25 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= .8 |
x/dMx= .37 |
|
[tf,cm]| M[-]Min = 440.1 | | |
[cm2 ]| Asapo[+]= 2.28 | | M[+]Min = 440.1 | | M[-]Min = 440.1
| | | Asapo[+]= 2.17

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.- 574. 19.75 73.52 1 45. 2.4 2.2 2.4 6.3 25.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 8.21 /B= .19 /H= .80 /BCs= 1.18 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex=
.10 [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-| 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.[-] = 24.2 tf* m | M.[+] Max= 19.1 tf* m - Abcis.= 410 | M.[-] = 23.8 tf*
m
[tf,cm]| As = 11.83 -SRAS- [ 4 B 20.0mm] | AsL= .00 ----- | As = 11.59 -SRAS- [
4 B 20.0mm]
| AsL= .00 ----- | As = 8.27 -STAS- [ 4 B 16.0mm ] | AsL= .00 -----
x/d = .25 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 2.1 |
x/dMx= .37 |
|
[tf,cm]| M[-]Min = 440.1 | M[+]Min = 440.1 | M[-]Min = 440.1
[cm2 ]| Asapo[+]= 2.17 | | Asapo[+]= 2.17

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 160. 24.52 73.52 1 45. 4.0 2.2 4.0 6.3 15.0 2 .0 .0
160.- 642. 16.91 73.52 1 45. 1.5 2.2 2.2 6.3 25.0 2 .0 .0
642.- 802. 22.45 73.52 1 45. 3.3 2.2 3.3 6.3 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 3 /L= 5.92 /B= .19 /H= .80 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .40 /FLt.Ex=
.10 [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-| 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.[-] = 23.4 tf* m | M.[+] Max= 7.3 tf* m - Abcis.= 395 | M.[-] = .8 tf*
m
[tf,cm]| As = 11.36 -SRAS- [ 4 B 20.0mm] | AsL= .00 ----- | As = 2.28 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- | As = 3.14 -STAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= .9 |
x/dMx= .37 |
|
[tf,cm]| M[-]Min = 440.1 | M[+]Min = 440.1 | M[-]Min = 440.1
[cm2 ]| Asapo[+]= 2.17 | | Asapo[+]= 2.28

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.- 574. 19.19 73.52 1 45. 2.2 2.2 2.2 6.3 25.0 2 .0 .0

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 6.152 5.617 .19 .00 0 P13 .00 .00 13 0 0 0
0 0 2 27.970 26.657 .19 .00 0 P14 .00 .00 14 0 0 0
0 0 3 27.768 26.448 .19 .00 0 P15 .00 .00 15 0 0 0
0 0 4 6.285 5.794 .19 .00 0 P16 .00 .00 16 0 0 0
0 0
```

## V407

Viga= 407 V407 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 5.64 /B= .30 /H= .75 /BCs= 1.15 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.15 [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-| 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.[-] = 6.8 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 141 | M.[-] = 21.1 tf*
m
[tf,cm]| As = 3.61 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 10.48 -SRAS- [
6 B 16.0mm]
| AsL= .00 ----- | As = 3.61 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----
x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= .8 |
x/dMx= .37 |
|
[tf,cm]| M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7
[cm2 ]| Asapo[+]= 3.61 | | Asapo[+]= 3.45

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 533. 16.12 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G
E M
[tf,cm] 0.- 533. .96 12.52 5 10.7 19.3 64.3 .9 2.5 .2 .8 .19 N

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

Vao= 2 /L= 8.21 /B= .30 /H= .75 /BCs= 1.29 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
 | M.[-] = 21.5 tf\* m | M.[+] Max= 18.9 tf\* m - Abcis.= 410 | M.[-] = 20.9 tf\* m  
 [tf,cm] | As = 10.72 -SRAS- [ 6 B 16.0mm] | AsL= .00 ----- | As = 10.41 -SRAS- [ 6 B 16.0mm]  
 | AsL= .00 ----- | x/d = .15 | As = 9.00 -STAS- [ 3 B 20.0mm ] | AsL= .00 -----  
 x/d = .14 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 2.0 |  
 [tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
 [cm2 ] | Asapo[+] = 3.47 | | Asapo[+] = 3.47

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	160.	22.34	108.45	1	45.	1.4	3.5	4.1	6.3	15.0	2	.0	.0	
	160.-	802.	20.64	108.45	1	45.	.8	3.5	3.5	6.3	17.5	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	160.	1.49	12.52	5	10.7	19.3	64.3	1.4	2.5	.3	.9	.33	N	
	160.-	802.	1.14	12.52	5	10.7	19.3	64.3	1.1	2.5	.2	.8	.28	N	

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

Vao= 3 /L= 5.64 /B= .30 /H= .75 /BCs= 1.15 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
 | M.[-] = 20.6 tf\* m | M.[+] Max= 6.1 tf\* m - Abcis.= 376 | M.[-] = 7.0 tf\* m  
 [tf,cm] | As = 10.20 -SRAS- [ 5 B 16.0mm] | AsL= .00 ----- | As = 3.61 -SRAS- [ 3 B 12.5mm]  
 | AsL= .00 ----- | x/d = .14 | As = 3.61 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= .8 |  
 [tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
 [cm2 ] | Asapo[+] = 3.45 | | Asapo[+] = 3.61

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	533.	16.16	108.45	1	45.	.0	3.5	3.5	6.3	17.5	2	.0	.0	

T O R C A O- E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M E N S A G
[tf,cm]	0.-	533.	.99	12.52	5	10.7	19.3	64.3	.9	2.5	.2	.8	.20	N	

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0	1 7.060	5.047	.60	.07	0	P17	.00	.00	17 0 0 0
0 0	2 24.183	21.721	.19	.00	0	P18	.00	.00	18 0 0 0
0 0	3 22.749	20.334	.19	.00	0	P19	.00	.00	19 0 0 0
0 0	4 7.358	5.357	.60	.07	0	P20	.00	.00	20 0 0 0

## V408

Viga= 408 V408 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

Vao= 1B /L= 1.08 /B= .19 /H= .75 /BCs= .41 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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[-]= 4.28 tf\* m | As = 2.14 -SRAS- [ 3 B 10.0mm]  
 BAL.ESQ | x/d = .04 | AsL= .00 -Arm.Lat.=[ 2 X 5 B 6.3mm]  
 [tf,cm] | M[-]Min= 386.8 | x/dMx = .50 | | % Baric.Armad. = 1

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	93.	1.94	68.68	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

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

Vao= 2 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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-	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	M.[-] = 4.3 tf* m			M.[+] Max= 4.9 tf* m - Abcis.= 226				M.[-] = 6.8 tf*							
[tf,cm]	As = 2.14 -SRAS- [ 3 B 10.0mm]			AsL= .00 -----				As = 3.18 -SRAS- [							
4 B 10.0mm]	AsL= .00 -----			x/d = .04				As = 2.25 -STAS- [ 3 B 10.0mm ]							
x/d = .07				x/dMx= .37				Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.3							
x/dMx= .37															
[tf,cm]	M[-]Min = 386.8			M[+]Min = 386.8				M[-]Min = 386.8							
[cm2 ]	Asapo[+] = .56							Asapo[+] = 2.03							
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.-	503.	9.10	68.68	1	45.	.0	2.2	2.2	5.0	17.5	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= .19 /H= .75 /BCs= .37 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=															
.10 [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-	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	M.[-] = 3.7 tf* m			M.[+] Max= .0 tf* m - Abcis.= 311				M.[-] = 4.4 tf*							
[tf,cm]	As = 2.14 -SRAS- [ 3 B 10.0mm]			AsL= .00 -----				As = 2.14 -SRAS- [							
2 B 12.5mm]	AsL= .00 -----			x/d = .04				As = 2.14 -STAS- [ 3 B 10.0mm ]							
x/d = .05				x/dMx= .37				Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.6							
x/dMx= .37															
[tf,cm]	M[-]Min = 386.8			M[+]Min = 386.8				M[-]Min = 386.8							
[cm2 ]	Asapo[+] = 2.03							Asapo[+] = 2.03							
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.-	262.	5.02	68.68	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0
----- G E O M E T R I A E C A R G A S -----															
-----															
Vao= 4 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=															
.10 [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-	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	M.[-] = 5.3 tf* m			M.[+] Max= 4.4 tf* m - Abcis.= 271				M.[-] = 5.7 tf*							
[tf,cm]	As = 2.46 -SRAS- [ 2 B 12.5mm]			AsL= .00 -----				As = 2.69 -SRAS- [							
4 B 10.0mm]	AsL= .00 -----			x/d = .05				As = 2.14 -STAS- [ 3 B 10.0mm ]							
x/d = .06				x/dMx= .37				Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.2							
x/dMx= .37															
[tf,cm]	M[-]Min = 386.8			M[+]Min = 386.8				M[-]Min = 386.8							
[cm2 ]	Asapo[+] = 2.03							Asapo[+] = .53							
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.-	503.	8.22	68.68	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0
----- G E O M E T R I A E C A R G A S -----															
-----															
Vao= 5B /L= 2.68 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex=															
.10 [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[-] = 4.05 tf* m			As = 2.68 -SRAS- [ 4 B 10.0mm]											
BAL.DIR				x/d = .08				AsL= .00 -							
[tf,cm]	M[-]Min = 208.0			x/dMx = .50				% Baric.Armad. = 2							
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.-	253.	3.37	49.34	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.8
REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:					
0	0	1	5.838	5.194	.30	.00	0 P17	.00	.00	17	0	0	0	0	
0	0	2	8.408	7.582	.50	.03	0 P13	.00	.00	13	0	0	0	0	
0	0	3	8.740	7.854	.50	.03	0 P7	.00	.00	7	0	0	0	0	
0	0	4	7.978	7.255	.30	.00	0 P1	.00	.00	1	0	0	0	0	



## V409

Viga= 409 V409 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 4.99 /B= .19 /H= .60 /BCs= 1.19 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .30 /FLt.Ex= .10 [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-| 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.[-] = 9.5 tf\* m | M.[+] Max= 8.1 tf\* m - Abcis.= 207 | M.[-] = 11.5 tf\*

m [tf,cm] | As = 5.92 -SRAS- [ 3 B 16.0mm] | AsL= .00 ----- | As = 7.36 -SRAS- [ 4 B 16.0mm]

| AsL= .00 ----- x/d = .17 | As = 4.74 -STAS- [ 4 B 12.5mm ] | AsL= .00 -----

x/d = .21 | x/dMx= .37 | Arm.Lat.=[2 X 4 B 6.3mm] - LN= 1.2 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 247.5 | M[+]Min = 247.5 | M[-]Min = 247.5

[cm2 ] | Asapo[+]= 1.19 | | Asapo[+]= 1.19

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.- 154. 20.88 54.17 1 45. 5.3 2.2 5.3 6.3 10.0 2 .0 .0

154.- 308. 7.81 54.17 1 45. .0 2.2 2.2 6.3 25.0 2 .0 .0

308.- 463. 17.20 54.17 1 45. 3.6 2.2 3.6 6.3 15.0 2 .0 .0

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

1 14.892 13.047 .60 .12 0 P18 .00 .00 18 0 0 0

0 0 2 12.288 10.540 .60 .12 0 P14 .00 .00 14 0 0 0

0 0

## V411

Viga= 411 V411 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 5.05 /B= .19 /H= .55 /BCs= .57 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .33 /FLt.Ex= .10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = 2.4 tf\* m | M.[+] Max= 1.3 tf\* m - Abcis.= 168 | M.[-] = 6.9 tf\*

m [tf,cm] | As = 1.57 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 4.67 -SRAS- [ 4 B 12.5mm]

| AsL= .00 ----- x/d = .05 | As = 1.57 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .15 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 208.0 | M[+]Min = 208.0 | M[-]Min = 208.0

[cm2 ] | Asapo[+]= .39 | | 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. 5.86 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

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

Vao= 2B /L= 2.96 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .23 /FLt.Ex= .10 [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[-]= 10.99 tf\* m | As = 7.86 -SRAS- [ 4 B 16.0mm]

BAL.DIR | x/d = .25 | AsL= .00 -

[tf,cm] | M[-]Min= 208.0 - x/dMx = .50 | | % Baric.Armad.= 2

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.- 209. 7.41 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .5

209.- 253. 5.08 49.34 1 45. .0 2.2 2.5 5.0 15.0 2 .0 2.5

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

1 2.206 1.078 .50 .09 0 P8 .00 .00 8 0 0 0

0 0 2 9.105 7.935 .60 .14 0 P2 .00 .00 2 0 0 0

0 0

## V412

Viga= 412 V412 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

ENGENHARIA E COMÉRCIO LTDA.

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

Vao= 1 /L= 2.02 /B= .19 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= .7 tf\* m - Abcis.= 33 | M.[-] = 1.2 tf\* m  
 [tf,cm] | As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.14 -SRAS- [ 2 B 10.0mm]  
 | AsL= .00 ----- | x/d = .05 | As = 1.14 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.8 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0  
 [cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= .29

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.- 178. 2.83 34.83 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	1.401	.299	.40	.08	0 P9	.00	.00	9	0	0	0
0	0	2	2.022	.919	.40	.08	0 P5	.00	.00	5	0	0	0

## V413

Viga= 413 V413 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

Vao= 1 /L= 2.02 /B= .19 /H= .40 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .10 [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-| 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= .8 tf\* m - Abcis.= 16 | M.[-] = 1.3 tf\* m  
 [tf,cm] | As = 1.14 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.22 -SRAS- [ 2 B 10.0mm]  
 | AsL= .00 ----- | x/d = .05 | As = 1.14 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 110.0 | M[+]Min = 110.0 | M[-]Min = 110.0  
 [cm2 ] | Asapo[+]= 1.14 | | Asapo[+]= .29

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.- 178. 3.31 34.83 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	1.483	.191	.40	.08	0 P10	.00	.00	10	0	0	0
0	0	2	2.366	1.074	.40	.08	0 P6	.00	.00	6	0	0	0

## V414

Viga= 414 V414 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

Vao= 1 /L= 4.99 /B= .19 /H= .60 /BCs= 1.19 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .30 /FLt.Ex= .10 [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-| 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.[-] = 8.1 tf\* m | M.[+] Max= 6.3 tf\* m - Abcis.= 207 | M.[-] = 9.9 tf\* m  
 [tf,cm] | As = 4.98 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 6.16 -SRAS- [ 3 B 16.0mm]  
 | AsL= .00 ----- | x/d = .14 | As = 3.71 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
 x/d = .17 | x/dMx= .37 | Arm.Lat.=[2 X 4 B 6.3mm] - LN= .9 |  
 x/dMx= .37 | |  
 [tf,cm] | M[-]Min = 247.5 | M[+]Min = 247.5 | M[-]Min = 247.5  
 [cm2 ] | Asapo[+]= .93 | | Asapo[+]= .93

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	154.	19.78	54.17	1	45.	4.8	2.2	4.8	6.3	12.5	2	.0	.0	
	154.-	463.	14.62	54.17	1	45.	2.5	2.2	2.5	6.3	25.0	2	.0	.0	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	14.110	12.216	.60	.12	0 P19	.00	.00	19
0	0	2	10.446	8.672	.60	.12	0 P15	.00	.00	15

## V415

Viga= 415 V415 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 5.14 /B= .19 /H= .70 /BCs= .58 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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	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.[-]=	6.6 tf* m	M.[+]	Max= 8.6 tf* m -	Abcis.= 257   M.[-]= 17.7 tf* m
[tf,cm]	As = 3.36 -SRAS-	[ 3 B 12.5mm]	AsL= .00	-----   As = 9.80 -SRAS-
	[ 5 B 16.0mm]	AsL= .00	-----	x/d = .08   As = 4.28 -STAS-
	AsL= .00	-----	x/dMx= .37	Arm.Lat.=[2 X 5 B 6.3mm] - LN= 2.2
	x/d = .24			
	M[-]Min = 336.9			M[-]Min = 336.9
	[cm2 ]   Asapo[+]= 1.07			Asapo[+]= 1.07

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	315.	12.35	63.85	1	45.	.6	2.2	2.2	6.3	25.0	2	.0	.0	
	315.-	473.	22.48	63.85	1	45.	4.5	2.2	4.5	6.3	12.5	2	.0	.0	

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

Vao= 2B /L= 2.92 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .10 [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[-]=	As =	-SRAS-	[ 3 B 20.0mm]
BAL.DIR   <td>12.87 tf* m</td> <td>9.55</td> <td></td> <td></td>	12.87 tf* m	9.55		
[tf,cm]	M[-]Min= 208.0	x/d = .30	AsL= .00	-
		x/dMx = .50		% Baric.Armad.= 3

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	208.	9.87	49.34	1	45.	.7	2.2	2.2	5.0	17.5	2	.0	.7	
	208.-	253.	5.27	49.34	1	45.	.0	2.2	2.6	5.0	15.0	2	.0	2.6	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	8.812	7.215	.50	.04	0 P11	.00	.00	11
0	0	2	22.460	20.774	.60	.09	0 P3	.00	.00	3

## V416

Viga= 416 V416 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1B /L= 1.08 /B= .19 /H= .75 /BCs= .41 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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[-]=	As =	-SRAS-	[ 3 B 10.0mm]
BAL.ESQ   <td>4.28 tf* m</td> <td>2.14</td> <td></td> <td></td>	4.28 tf* m	2.14		
[tf,cm]	M[-]Min= 386.8	x/d = .04	AsL= .00	-Arm.Lat.=[ 2 X 5 B 6.3mm]
		x/dMx = .50		% Baric.Armad.= 1

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	93.	1.94	68.68	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	

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

Vao= 2 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .10 [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-| 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.[-] = 4.3 tf* m | M.[+] Max= 4.9 tf* m - Abcis.= 226 | M.[-] = 6.7 tf*
m
[tf,cm]| As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 3.15 -SRAS- [
4 B 10.0mm]
| AsL= .00 ----- | x/d = .04 | As = 2.25 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .07 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.3 |
|
x/dMx= .37 | |
|
[tf,cm]| M[-]Min = 386.8 | | | M[-]Min = 386.8
[cm2 ]| Asapo[+] = .56 | | | Asapo[+] = 2.03

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.- 503. 8.97 68.68 1 45. .0 2.2 2.2 5.0 17.5 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= .19 /H= .75 /BCs= .37 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.10 [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-| 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.[-] = 3.8 tf* m | M.[+] Max= .0 tf* m - Abcis.= 311 | M.[-] = 4.3 tf*
m
[tf,cm]| As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [
2 B 12.5mm]
| AsL= .00 ----- | x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .04 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.6 |
|
x/dMx= .37 | |
|
[tf,cm]| M[-]Min = 386.8 | | | M[-]Min = 386.8
[cm2 ]| Asapo[+] = 2.03 | | | Asapo[+] = 2.03

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.- 262. 5.03 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 4 /L= 5.40 /B= .19 /H= .75 /BCs= .51 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.10 [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-| 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.[-] = 5.3 tf* m | M.[+] Max= 4.3 tf* m - Abcis.= 271 | M.[-] = 5.6 tf*
m
[tf,cm]| As = 2.49 -SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 2.63 -SRAS- [
4 B 10.0mm]
| AsL= .00 ----- | x/d = .06 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .06 | x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.1 |
|
x/dMx= .37 | |
|
[tf,cm]| M[-]Min = 386.8 | | | M[-]Min = 386.8
[cm2 ]| Asapo[+] = 2.03 | | | Asapo[+] = .53

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.- 503. 8.10 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 5B /L= 2.68 /B= .19 /H= .55 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex=
.10 [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[-]= 4.06 tf* m | As = 2.68 -SRAS- [ 4 B 10.0mm]
BAL.DIR | x/d = .08 | AsL= .00 -
[tf,cm] | M[-]Min= 208.0 - x/dMx = .50 | | | % Baric.Armad= 2

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.- 253. 3.52 49.34 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .8

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 5.804 5.139 .30 .00 0 P20 .00 .00 20 0 0 0
0 0
2 8.432 7.557 .50 .03 0 P16 .00 .00 16 0 0 0
0 0
3 8.636 7.737 .50 .03 0 P12 .00 .00 12 0 0 0
0 0
4 7.967 7.242 .30 .00 0 P4 .00 .00 4 0 0 0
0 0

```

## VE2

Viga= 410 VE2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 5.09 /B= .19 /H= .60 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .30 /FLt.Ex=
.10 [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-| 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.[-] = 5.3 tf* m | M.[+] Max= 5.1 tf* m - Abcis.= 296 | M.[-] = 10.3 tf*
m
[tf,cm] | As = 3.19 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 6.46 -SRAS- [
2 B 20.0mm]
| AsL= .00 ----- x/d = .09 | As = 3.09 -SRAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/d = .18
| x/dMx= .37 | Arm.Lat.=[2 X 4 B 6.3mm] - LN= 4.9 |
|
[tf,cm] | M[-]Min = 247.5 | M[+]Min = 247.5 | M[-]Min = 247.5
[cm2 ] | Asapo[+] = .77 | | Asapo[+] = .77

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 315. 7.37 54.17 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0
315.- 473. 15.93 54.17 1 45. 3.1 2.2 3.1 5.0 12.5 2 .0 .0

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 5.255 4.041 .50 .07 0 P8 .00 .00 8 0 0 0
0 0 2 11.382 10.168 .60 .12 0 P2 .00 .00 2 0 0 0
    
```

## cobertura

### V501

Viga= 501 V501 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 5.59 /B= .30 /H= .75 /BCs= .72 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.15 [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-| 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.[-] = 3.0 tf* m | M.[+] Max= 3.4 tf* m - Abcis.= 139 | M.[-] = 15.5 tf*
m
[tf,cm] | As = 3.38 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 7.39 -SRAS- [
4 B 16.0mm]
| AsL= .00 ----- x/d = .04 | As = 3.38 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----
x/d = .10
| x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.3 |
|
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7
[cm2 ] | Asapo[+] = 3.38 | | Asapo[+] = 3.21

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 522. 11.91 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 8.32 /B= .30 /H= .75 /BCs= 1.30 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 16.0 tf* m | M.[+] Max= 14.1 tf* m - Abcis.= 416 | M.[-] = 16.0 tf*
m
[tf,cm] | As = 7.66 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.62 -SRAS- [
4 B 16.0mm]
| AsL= .00 ----- x/d = .11 | As = 6.52 -STAS- [ 4 B 16.0mm ] | AsL= .00 -----
x/d = .11
| x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.5 |
|
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7
[cm2 ] | Asapo[+] = 3.21 | | Asapo[+] = 3.21
    
```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G  
E M  
[tf,cm] 0.- 802. 17.76 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

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

Vao= 3 /L= 5.59 /B= .30 /H= .75 /BCs= .72 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex= .15 [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-| 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.[-] = 15.3 tf\* m | M.[+] Max= 3.3 tf\* m - Abcis.= 419 | M.[-] = 3.1 tf\* m  
m  
[tf,cm] | As = 7.30 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 3.38 -SRAS- [ 3 B 12.5mm]  
| AsL= .00 ----- x/d = .10 | As = 3.38 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
x/d = .04  
| x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.3 |  
x/dMx= .37  
|  
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
[cm2 ] | Asapo[+] = 3.21 | | Asapo[+] = 3.38

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.- 522. 11.88 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	4.811	3.983	.60	.07	1	P1	.00	.00	1	0	0	0
0	0	2	21.010	20.214	.30	.00	1	P2	.00	.00	2	0	0	0
0	0	3	21.082	20.242	.30	.00	1	P3	.00	.00	3	0	0	0
0	0	4	5.174	4.328	.60	.07	1	P4	.00	.00	4	0	0	0

## V502

Viga= 502 V502 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 2.29 /B= .19 /H= .30 /BCs= .42 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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.= 95 | M.[-] = .6 tf\* m  
m  
[tf,cm] | As = .89 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .85 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- x/d = .06 | As = .88 -STAS- [ 2 B 8.0mm ] | AsL= .00 -----  
x/d = .05  
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |  
x/dMx= .37  
|  
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
[cm2 ] | Asapo[+] = .22 | | 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.- 211. 3.17 25.15 1 45. .0 2.2 2.2 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	2.264	1.997	.19	.01	0	P5	.00	.00	5	0	0	0
0	0	2	1.621	1.354	.19	.01	0	P6	.00	.00	6	0	0	0

## V503

Viga= 503 V503 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 5.92 /B= .19 /H= .50 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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= 4.3 tf\* m - Abcis.= 246 | M.[-] = 4.9 tf\* m  
m  
[tf,cm] | As = 1.43 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 3.70 -SRAS- [ 3 B 12.5mm]

```

x/d = .13 | AsL= .00 ----- x/d = .04 | As = 3.10 -STAS- [ 4 B 10.0mm ] | AsL= .00 -----
x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9
[cm2 ] | Asapo[+]= 1.43 | | Asapo[+]= 1.35

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.- 574. 6.26 44.50 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0
-----
G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.19 /B= .19 /H= .50 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.5 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 212 | M.[-] = 1.8 tf*
m
[tf,cm] | As = 3.31 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 1.43 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .11 | As = 1.43 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .04 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9
[cm2 ] | Asapo[+]= 1.35 | | Asapo[+]= 1.35

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.- 300. 9.01 44.50 1 45. .8 2.2 2.2 5.0 17.5 2 .0 .0
-----
G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.30 /B= .19 /H= .50 /BCs= .33 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| 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= .1 tf* m - Abcis.= 134 | M.[-] = 1.3 tf*
m
[tf,cm] | As = 1.43 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.43 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .04 | As = 1.43 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .04 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.2 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9
[cm2 ] | Asapo[+]= 1.35 | | Asapo[+]= 1.35

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.- 211. 2.05 44.50 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0
-----
G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 2.72 /B= .19 /H= .50 /BCs= .52 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| 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= .7 tf* m - Abcis.= 68 | M.[-] = 4.1 tf*
m
[tf,cm] | As = 1.43 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 3.06 -SRAS- [
3 B 12.5mm]
| AsL= .00 ----- x/d = .04 | As = 1.43 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .11 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9
[cm2 ] | Asapo[+]= 1.35 | | Asapo[+]= 1.35

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.- 253. 5.90 44.50 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0
-----
G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 5.92 /B= .19 /H= .50 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| 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.[-] =      4.7 tf* m      | M.[+] Max=      4.3 tf* m - Abcis.= 345 | M.[-] =      .6 tf*
m
[tf,cm] | As =      3.47 -SRAS- [ 3 B 12.5mm] | AsL=      .00 ----- | As =      1.43 -SRAS- [
2 B 10.0mm]
      | AsL=      .00 ----- | x/d = .12 | As =      3.10 -STAS- [ 4 B 10.0mm ] | AsL=      .00 -----
x/d = .04
      | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |
x/dMx= .37
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9
[cm2 ] | Asapo[+]= 1.35 | | Asapo[+]= 1.43
  
```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 574. 5.58 44.50 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0
  
```

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	2.907	2.681	.19	.00	1	P7	.00	.00	7	0	0	0
0	0	2	7.486	6.826	.19	.00	0	P8	.00	.00	8	0	0	0
0	0	3	7.611	7.135	.19	.00	0	P9	.00	.00	9	0	0	0
0	0	4	4.818	3.922	.19	.00	0	P10	.00	.00	10	0	0	0
0	0	5	6.513	5.550	.19	.00	0	P11	.00	.00	11	0	0	0
0	0	6	2.829	2.575	.19	.00	1	P12	.00	.00	12	0	0	0

## V504

Viga= 504 V504 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

```

Vao= 1 /L= 5.92 /B= .19 /H= .50 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| 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=      2.9 tf* m - Abcis.= 197 | M.[-] =     13.4 tf*
m
[tf,cm] | As =      1.43 -SRAS- [ 2 B 10.0mm] | AsL=      .00 ----- | As =     11.55 -SRAD- [
4 B 20.0mm]
      | AsL=      .00 ----- | x/d = .04 | As =      2.06 -STAS- [ 3 B 10.0mm ] | AsL=      1.33 -----
x/d = .37
      | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .6 |
x/dMx= .37
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | ***AsL Compr.***
[cm2 ] | Asapo[+]= 1.43 | | Asapo[+]= 1.35
  
```

```

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.- 574. 9.57 44.50 1 45. 1.1 2.2 2.2 5.0 17.5 2 .0 .0
  
```

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

```

Vao= 2 /L= 8.21 /B= .19 /H= .50 /BCs= 1.18 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| 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.[-] =     13.3 tf* m      | M.[+] Max=     14.1 tf* m - Abcis.= 410 | M.[-] =     13.5 tf*
m
[tf,cm] | As =     11.53 -SRAD- [ 4 B 20.0mm] | AsL=      .00 ----- | As =     11.68 -SRAD- [
4 B 20.0mm]
      | AsL=      1.30 ----- | x/d = .37 | As =     10.44 -STAS- [ 4 B 20.0mm ] | AsL=      1.46 -----
x/d = .37
      | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.7 |
x/dMx= .37
[tf,cm] | ***AsL Compr.*** | | ***AsL Compr.***
[cm2 ] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9
      | Asapo[+]= 2.61 | | Asapo[+]= 2.61
  
```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 160. 14.20 44.50 1 45. 3.7 2.2 3.7 6.3 15.0 2 .0 .0
      160.- 642. 11.02 44.50 1 45. 1.9 2.2 2.2 6.3 25.0 2 .0 .0
      642.- 802. 14.59 44.50 1 45. 3.9 2.2 3.9 6.3 15.0 2 .0 .0
  
```

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

```

Vao= 3 /L= 5.92 /B= .19 /H= .50 /BCs= 1.08 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex=
.10 [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-| 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.[-] = 13.6 tf\* m | M.[+] Max= 2.7 tf\* m - Abcis.= 395 | M.[-] = .3 tf\*  
 m  
 [tf,cm] | As = 11.76 -SRAS- [ 4 B 20.0mm] | AsL= .00 ----- | As = 1.43 -SRAS- [  
 2 B 10.0mm]  
 | AsL= 1.53 ----- x/d = .37 | As = 1.92 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
 x/d = .04  
 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .5 |  
 | \*\*\*AsL Compr.\*\*\* | |  
 [tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9  
 [cm2 ] | Asapo[+] = 1.53 | | | Asapo[+] = 1.43

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G  
 E M  
 [tf,cm] 0.- 574. 8.61 44.50 1 45. .6 2.2 2.2 5.0 17.5 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:  
 0 0 1 2.487 1.996 .19 .00 1 P13 .00 .00 13 0 0 0  
 0 0 2 13.628 12.340 .19 .00 0 P14 .00 .00 14 0 0 0  
 0 0 3 11.393 10.114 .19 .00 0 P15 .00 .00 15 0 0 0  
 0 0 4 2.408 1.917 .19 .00 1 P16 .00 .00 16 0 0 0

## V505

Viga= 505 V505 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
 Vao= 1 /L= 5.64 /B= .30 /H= .75 /BCs= .72 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=  
 .15 [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-| 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.[-] = 3.4 tf\* m | M.[+] Max= 3.4 tf\* m - Abcis.= 188 | M.[-] = 8.8 tf\*  
 m  
 [tf,cm] | As = 3.38 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 4.12 -SRAS- [  
 2 B 16.0mm]  
 | AsL= .00 ----- x/d = .04 | As = 3.38 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
 x/d = .06  
 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 1.3 |  
 | | |  
 [tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
 [cm2 ] | Asapo[+] = .84 | | | Asapo[+] = 3.21

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G  
 E M  
 [tf,cm] 0.- 533. 7.80 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 2 /L= 8.21 /B= .30 /H= .75 /BCs= 1.29 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=  
 .15 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
 | M.[-] = 8.8 tf\* m | M.[+] Max= 8.0 tf\* m - Abcis.= 410 | M.[-] = 8.9 tf\*  
 m  
 [tf,cm] | As = 4.13 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 4.16 -SRAS- [  
 4 B 12.5mm]  
 | AsL= .00 ----- x/d = .06 | As = 3.68 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----  
 x/d = .06  
 | x/dMx= .37 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= .9 |  
 | | |  
 [tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7  
 [cm2 ] | Asapo[+] = 3.21 | | | Asapo[+] = 3.21

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G  
 E M  
 [tf,cm] 0.- 802. 8.66 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
 Vao= 3 /L= 5.64 /B= .30 /H= .75 /BCs= .72 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=  
 .15 [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-| 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.[-] = 8.9 tf\* m | M.[+] Max= 3.4 tf\* m - Abcis.= 376 | M.[-] = 3.3 tf\*  
 m  
 [tf,cm] | As = 4.17 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 3.38 -SRAS- [  
 3 B 12.5mm]

```

x/d = .04 | AsL= .00 ----- x/d = .06 | As = 3.38 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----
| | | | | | | | | | | | | | | | | | | | | |
x/dMx= .37 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
[tf,cm] | M[-]Min = 610.7 | M[+]Min = 610.7 | M[-]Min = 610.7
[cm2 ] | Asapo[+]= 3.21 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 533. 7.51 108.45 1 45. .0 3.5 3.5 6.3 17.5 2 .0 .0

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 3.959 3.094 .60 .07 1 P17 .00 .00 17 0 0 0
0 0 2 11.219 10.297 .19 .00 1 P18 .00 .00 18 0 0 0
0 0 3 10.619 9.717 .19 .00 1 P19 .00 .00 19 0 0 0
0 0 4 3.910 3.091 .60 .07 1 P20 .00 .00 20 0 0 0
    
```

## V506

Viga= 506 V506 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 5.40 /B= .19 /H= .75 /BCs= .60 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = .7 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 226 | M.[-] = 2.7 tf*
m
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .04 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
x/dMx= .37 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
[tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8
[cm2 ] | Asapo[+]= 2.14 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
    
```

```

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.- 503. 3.79 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.07 /B= .19 /H= .75 /BCs= .37 /BCi= .00 /TpS= 5 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.10 [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-| 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= .0 tf* m - Abcis.= 311 | M.[-] = 1.9 tf*
m
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .04 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
x/dMx= .37 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
[tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8
[cm2 ] | Asapo[+]= 2.03 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
    
```

```

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.- 262. 1.79 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.40 /B= .19 /H= .75 /BCs= .60 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=
.10 [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-| 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= 2.3 tf* m - Abcis.= 271 | M.[-] = 1.0 tf*
m
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----
x/d = .04 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
x/dMx= .37 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
    
```

[tf,cm]	M[-]Min = 386.8	M[+]Min = 386.8	M[-]Min = 386.8												
[cm2]	Asapo[+] = 2.03		Asapo[+] = 2.14												
CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	503.	3.66	68.68	1	45.	.0	2.2	2.2	5.0	17.5	2	.0	.0	
REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn						Pilares:	
0 0	1 1.746	1.458	.30	.00	1	P17	.00	.00						0 0	0
0 0	2 3.227	3.011	.50	.03	1	P13	.00	.00						0 0	0
0 0	3 3.561	3.314	.50	.03	1	P7	.00	.00						0 0	0
0 0	4 1.830	1.521	.30	.00	1	P1	.00	.00						0 0	0

**V507**Viga= 507 V507 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM----- G E O M E T R I A E C A R G A S -----  
Vao= 1 /L= 4.92 /B= .19 /H= .50 /BCs= .93 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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.[-] = 3.8 tf\* m | M.[+] Max= 5.7 tf\* m - Abcis.= 253 | M.[-] = 5.7 tf\* m  
[tf,cm] | As = 2.82 -SRAS- [ 4 B 10.0mm ] | AsL= .00 ----- | As = 4.32 -SRAS- [ 4 B 12.5mm ]  
| AsL= .00 ----- | As = 4.12 -STAS- [ 2 B 16.0mm ] | AsL= .00 -----  
x/d = .15 | x/dMx = .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= 1.3 |  
x/dMx = .37  
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9  
[cm2 ] | Asapo[+] = 1.03 | | Asapo[+] = 1.35----- G E O M E T R I A E C A R G A S -----  
Vao= 2 /L= 2.92 /B= .19 /H= .50 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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= 3.1 tf\* m - Abcis.= 0 | M.[-] = 8.6 tf\* m  
[tf,cm] | As = 1.43 -SRAS- [ 2 B 12.5mm ] | AsL= .00 ----- | As = 6.94 -SRAS- [ 3 B 20.0mm ]  
| AsL= .00 ----- | As = 2.20 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .25 | x/dMx = .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= 1.2 |  
x/dMx = .37  
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9  
[cm2 ] | Asapo[+] = 2.15 | | Asapo[+] = 1.35----- G E O M E T R I A E C A R G A S -----  
Vao= 3 /L= 5.03 /B= .19 /H= .50 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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.[-] = 8.2 tf\* m | M.[+] Max= 6.2 tf\* m - Abcis.= 256 | M.[-] = 5.7 tf\* m  
[tf,cm] | As = 6.34 -SRAS- [ 2 B 20.0mm ] | AsL= .00 ----- | As = 4.29 -SRAS- [ 4 B 12.5mm ]  
| AsL= .00 ----- | As = 4.47 -STAS- [ 4 B 12.5mm ] | AsL= .00 -----  
x/d = .15 | x/dMx = .37 | Arm.Lat.= [ 2 X -- B --- mm ] - LN= 1.4 |  
x/dMx = .37  
[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9  
[cm2 ] | Asapo[+] = 1.35 | | Asapo[+] = 1.12

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	158.	12.25	44.50	1	45.	2.6	2.2	2.6	5.0	15.0	2	.0	.0	
	158.-	473.	9.86	44.50	1	45.	1.3	2.2	2.2	5.0	17.5	2	.0	.0	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	5.908	4.735	.60	.15	1 P18	.00	.00	18
0	0	2	9.078	5.714	.60	.15	0 P14	.00	.00	14
0	0	3	15.820	11.655	.50	.10	0 P8	.00	.00	8
0	0	4	7.044	5.947	.60	.15	1 P2	.00	.00	2

## V508

Viga= 508 V508 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 1.96 /B= .19 /H= .30 /BCs= .39 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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.= 0 | M.[-] = .7 tf\* m  
[tf,cm] | As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .89 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- | As = .88 -STAS- [ 2 B 8.0mm ] | AsL= .00 -----  
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  
x/dMx= .37  
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
[cm2 ] | Asapo[+] = .85 | | Asapo[+] = .22

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	2.75	25.15	1	45.	.0	2.2	2.2	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	.217	-.289	.40	.11	0 P9	.00	.00	9
0	0	2	1.966	1.460	.40	.11	0 P5	.00	.00	5

## V509

Viga= 509 V509 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 1.96 /B= .19 /H= .30 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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 tf\* m - Abcis.= 114 | M.[-] = .7 tf\* m  
[tf,cm] | As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .91 -SRAS- [ 2 B 8.0mm]  
| AsL= .00 ----- | As = .88 -STAS- [ 2 B 8.0mm ] | AsL= .00 -----  
x/d = .06 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .7 |  
x/dMx= .37  
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
[cm2 ] | Asapo[+] = .22 | | Asapo[+] = .22

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	1.92	25.15	1	45.	.0	2.2	2.2	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	.742	.243	.40	.11	0 P10	.00	.00	10
0	0	2	1.372	.873	.40	.11	0 P6	.00	.00	6

## V510

Viga= 510 V510 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

Vao= 1 /L= 4.92 /B= .19 /H= .50 /BCs= .93 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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.[-] = 3.6 tf\* m | M.[+] Max= 5.2 tf\* m - Abcis.= 253 | M.[-] = 5.6 tf\*

m [tf,cm] | As = 2.67 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 4.23 -SRAS- [ 4 B 12.5mm]

| AsL= .00 ----- | x/d = .09 | As = 3.74 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----

x/d = .15 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.2 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9

[cm2 ] | Asapo[+]= .94 | | Asapo[+]= 1.35

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.- 463. 8.01 44.50 1 45. .2 2.2 2.2 5.0 17.5 2 .0 .0

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

Vao= 2 /L= 2.92 /B= .19 /H= .50 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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= 2.0 tf\* m - Abcis.= 52 | M.[-] = 6.0 tf\*

m [tf,cm] | As = 1.79 -SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 4.52 -SRAS- [ 4 B 12.5mm]

| AsL= .00 ----- | x/d = .06 | As = 1.43 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----

x/d = .16 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .8 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9

[cm2 ] | Asapo[+]= 1.38 | | Asapo[+]= 1.35

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.- 262. 8.54 44.50 1 45. .5 2.2 2.2 5.0 17.5 2 .0 .0

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

Vao= 3 /L= 5.03 /B= .19 /H= .50 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .10 [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-| 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.[-] = 6.3 tf\* m | M.[+] Max= 5.1 tf\* m - Abcis.= 256 | M.[-] = 5.7 tf\*

m [tf,cm] | As = 4.83 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 4.29 -SRAS- [ 4 B 12.5mm]

| AsL= .00 ----- | x/d = .17 | As = 3.63 -STAS- [ 3 B 12.5mm ] | AsL= .00 -----

x/d = .15 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.1 |

x/dMx= .37 |

[tf,cm] | M[-]Min = 171.9 | M[+]Min = 171.9 | M[-]Min = 171.9

[cm2 ] | Asapo[+]= 1.35 | | Asapo[+]= .91

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. 9.75 44.50 1 45. 1.2 2.2 2.2 5.0 17.5 2 .0 .0

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

0 0 1 5.711 4.704 .60 .15 1 P19 .00 .00 19 0 0 0

0 0 2 10.307 8.172 .60 .15 0 P15 .00 .00 15 0 0 0

0 0 3 12.730 10.090 .50 .10 0 P11 .00 .00 11 0 0 0

0 0 4 6.007 5.155 .60 .15 1 P3 .00 .00 3 0 0 0

0 0

## V511

Viga= 511 V511 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 1 /L= 5.40 /B= .19 /H= .75 /BCs= .60 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=  
.10 [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-| E S Q U E R D A | M E I O D O V A O | D I R E I T A  
| M.[-] = .7 tf\* m | M.[+] Max= 2.3 tf\* m - Abcis.= 226 | M.[-] = 2.6 tf\*  
m  
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [  
3 B 10.0mm]  
| AsL= .00 ----- x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .04  
| x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.0 |  
x/dMx= .37  
|  
[tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8  
[cm2 ] | Asapo[+]= 2.14 | | Asapo[+]= 2.03

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.- 503. 3.70 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 2 /L= 3.07 /B= .19 /H= .75 /BCs= .37 /BCi= .00 /TpS= 8 /Esp.LS= .10 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=  
.10 [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-| 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= .0 tf\* m - Abcis.= 311 | M.[-] = 1.8 tf\*  
m  
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [  
3 B 10.0mm]  
| AsL= .00 ----- x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .04  
| x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.6 |  
x/dMx= .37  
|  
[tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8  
[cm2 ] | Asapo[+]= 2.03 | | Asapo[+]= 2.03

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.- 262. 1.77 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

----- G E O M E T R I A E C A R G A S -----  
-----  
Vao= 3 /L= 5.40 /B= .19 /H= .75 /BCs= .60 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .38 /FLt.Ex=  
.10 [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-| 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= 2.2 tf\* m - Abcis.= 271 | M.[-] = 1.0 tf\*  
m  
[tf,cm] | As = 2.14 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.14 -SRAS- [  
3 B 10.0mm]  
| AsL= .00 ----- x/d = .04 | As = 2.14 -STAS- [ 3 B 10.0mm ] | AsL= .00 -----  
x/d = .04  
| x/dMx= .37 | Arm.Lat.=[2 X 5 B 6.3mm] - LN= 1.0 |  
x/dMx= .37  
|  
[tf,cm] | M[-]Min = 386.8 | M[+]Min = 386.8 | M[-]Min = 386.8  
[cm2 ] | Asapo[+]= 2.03 | | Asapo[+]= 2.14

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.- 503. 3.58 68.68 1 45. .0 2.2 2.2 5.0 17.5 2 .0 .0

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	1	1.743	1.463	.30	.00	1	P20	.00	.00	20	0	0	0
0	0	2	3.214	2.996	.50	.03	1	P16	.00	.00	16	0	0	0
0	0	3	3.471	3.259	.50	.03	1	P12	.00	.00	12	0	0	0
0	0	4	1.683	1.373	.30	.00	1	P4	.00	.00	4	0	0	0

## Laje Elevador

### V601

Viga= 601 V601 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.29 /B= .19 /H= .30 /BCs= .42 /BCi= .00 /TpS= 5 /Esp.LS= .20 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 114 | M.[-] = .9 tf*
m
[tf,cm]| As = 1.21 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 1.21 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .08 | As = 1.33 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .07 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |
x/dMx= .37 | |
[tf,cm]| M[-]Min = 61.9 | | | M[-]Min = 61.9
[cm2 ]| Asapo[+]= .33 | | | Asapo[+]= .33

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G
E M
[tf,cm] 0.- 211. 3.62 25.15 1 45. .0 2.2 2.2 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 2.570 2.290 .19 .01 0 P5 .00 .00 5 0 0 0
0 0 2 2.583 2.301 .19 .01 0 P6 .00 .00 6 0 0 0
0 0
    
```

### V602

Viga= 602 V602 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.29 /B= .19 /H= .30 /BCs= .42 /BCi= .00 /TpS= 8 /Esp.LS= .20 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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= 1.1 tf* m - Abcis.= 114 | M.[-] = .5 tf*
m
[tf,cm]| As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .85 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- x/d = .05 | As = 1.47 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.0 |
x/dMx= .37 | |
[tf,cm]| M[-]Min = 61.9 | | | M[-]Min = 61.9
[cm2 ]| Asapo[+]= .37 | | | Asapo[+]= .37

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. 2.86 25.15 1 45. .0 2.2 2.2 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 2.041 1.854 .19 .01 1 P9 .00 .00 9 0 0 0
0 0 2 2.009 1.824 .19 .01 1 P10 .00 .00 10 0 0 0
0 0
    
```

### V603

Viga= 603 V603 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.96 /B= .19 /H= .30 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .20 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 98 | M.[-] = 1.3 tf*
m
    
```

```
[tf,cm] | As = 1.16 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 1.77 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .07 | As = 1.12 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .11
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |
x/dMx= .37
|
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[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.- 178. 6.25 25.15 1 45. 1.9 2.2 2.2 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	3.202	2.760	.40	.11	1	P9	.00	.00	9 0 0 0
0	0	2	4.466	3.946	.40	.11	0	P5	.00	.00	5 0 0 0

## V604

Viga= 604 V604 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.96 /B= .19 /H= .30 /BCs= .39 /BCi= .00 /TpS= 8 /Esp.LS= .20 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 98 | M.[-] = 1.3 tf*
m
```

```
[tf,cm] | As = 1.19 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 1.73 -SRAS- [
3 B 10.0mm]
| AsL= .00 ----- x/d = .07 | As = 1.14 -STAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .11
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= .9 |
x/dMx= .37
|
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ] | Asapo[+]= .29 | | Asapo[+]= .29
```

```
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.- 178. 6.01 25.15 1 45. 1.7 2.2 2.2 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	3.186	2.755	.40	.11	1	P10	.00	.00	10 0 0 0
0	0	2	4.295	3.790	.40	.11	0	P6	.00	.00	6 0 0 0

## torre

### V701

Viga= 701 V701 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 3.18 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 106 | M.[-] = .8 tf*
m
```

```
[tf,cm] | As = .85 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- | As = .99 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- x/d = .05 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .06
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37
|
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ] | Asapo[+]= .85 | | 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.- 300. 1.36 25.15 1 45. .0 2.2 2.2 5.0 15.0 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= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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.= 229 | M.[-] = .4 tf\* m  
 [tf,cm]| As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .85 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |  
 x/dMx= .37 |  
 [tf,cm]| M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
 [cm2 ]| Asapo[+]= .81 | | 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.- 211. .77 25.15 1 45. .0 2.2 2.2 5.0 15.0 2 .0 .0

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

Vao= 3 /L= 2.71 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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= .3 tf\* m - Abcis.= 203 | M.[-] = .1 tf\* m  
 [tf,cm]| As = .91 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .85 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |  
 x/dMx= .37 |  
 [tf,cm]| M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
 [cm2 ]| Asapo[+]= .81 | | Asapo[+]= .85

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.- 253. 1.30 25.15 1 45. .0 2.2 2.2 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	.641	.435	.19	.01	1	PT1	.00	.00	21 0 0 0
0	0	2	1.495	1.314	.19	.01	1	P5	.00	.00	5 0 0 0
0	0	3	1.413	1.153	.19	.01	1	P6	.00	.00	6 0 0 0
0	0	4	.541	.281	.19	.01	1	PT2	.00	.00	22 0 0 0

## V702

Viga= 702 V702 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
 /Cob/S=3.0 .0 CM

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

Vao= 1 /L= 3.18 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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= 1.2 tf\* m - Abcis.= 318 | M.[-] = .2 tf\* m  
 [tf,cm]| As = 1.76 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = .85 -SRAS- [ 2 B 8.0mm]  
 | AsL= .00 ----- | As = 1.58 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----  
 x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.5 |  
 x/dMx= .37 |  
 [tf,cm]| M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9  
 [cm2 ]| Asapo[+]= .40 | | Asapo[+]= 1.50

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M  
 [tf,cm] 0.- 300. 2.10 25.15 1 45. .0 2.2 2.2 5.0 15.0 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= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [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-| 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 | M.[-] = .3 tf* m | M.[+] Max= .7 tf* m - Abcis.= 95 | M.[-] = .2 tf*
m
[tf,cm]| As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .85 -SRAS- [
2 B 8.0mm]
| AsL= .00 ----- x/d = .05 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37
[tf,cm]| M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ]| Asapo[+]= .83 | | Asapo[+]= .83

```

```

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. .90 25.15 1 45. .0 2.2 2.2 5.0 15.0 2 .0 .0

```

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

```

Vao= 3 /L= 2.71 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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 | M.[-] = .1 tf* m | M.[+] Max= 1.2 tf* m - Abcis.= 0 | M.[-] = 1.2 tf*
m
[tf,cm]| As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 1.57 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .05 | As = 1.54 -SRAS- [ 2 B 10.0mm ] | AsL= .00 -----
x/d = .10
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 2.4 |
x/dMx= .37
[tf,cm]| M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ]| Asapo[+]= 1.45 | | Asapo[+]= .38

```

```

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.- 253. 2.05 25.15 1 45. .0 2.2 2.2 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	1.499	.722	.19	.01	1	P14	.00	.00	14 0 0 0
0	0	2	1.204	.320	.19	.01	1	PT3	.00	.00	23 0 0 0
0	0	3	1.034	.349	.19	.01	1	PT4	.00	.00	24 0 0 0
0	0	4	1.463	.638	.19	.01	1	P15	.00	.00	15 0 0 0

## V703

Viga= 703 V703 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

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

```

Vao= 1 /L= 2.80 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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 | M.[-] = .1 tf* m | M.[+] Max= .2 tf* m - Abcis.= 49 | M.[-] = .8 tf*
m
[tf,cm]| As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 1.11 -SRAS- [
2 B 10.0mm]
| AsL= .00 ----- x/d = .05 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .07
| x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37
[tf,cm]| M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ]| Asapo[+]= .85 | | 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.- 262. 1.39 25.15 1 45. .0 2.2 2.2 5.0 15.0 2 .0 .0

```

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

```

Vao= 2 /L= 1.96 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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 | M.[-] = .9 tf* m | M.[+] Max= .4 tf* m - Abcis.= 212 | M.[-] = .1 tf*
m

```

```
[tf,cm] | As = 1.12 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = .85 -SRAS- [
2 B 8.0mm] | AsL= .00 ----- x/d = .07 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ] | Asapo[+]= .81 | | Asapo[+]= .85
```

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	1.54	25.15	1	45.	.0	2.2	2.2	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	.526	.264	.19	.01	1 P14	.00	.00	14	0	0	0	0	0	0
0 0	2	1.988	1.249	.50	.16	1 P8	.00	.00	8	0	0	0	0	0	0
0 0	3	.404	-.213	.30	.06	1 PT1	.00	.00	21	0	0	0	0	0	0

## V704

Viga= 704 V704 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00  
/Cob/S=3.0 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.80 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 123 | M.[-] = .7 tf*
m
[tf,cm] | As = .85 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .95 -SRAS- [
2 B 10.0mm] | AsL= .00 ----- x/d = .05 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .06 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ] | Asapo[+]= .85 | | Asapo[+]= .81
```

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	262.	1.29	25.15	1	45.	.0	2.2	2.2	5.0	15.0	2	.0	.0	

```
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.96 /B= .19 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex=
.10 [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-| 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.= 212 | M.[-] = .1 tf*
m
[tf,cm] | As = 1.04 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = .85 -SRAS- [
2 B 8.0mm] | AsL= .00 ----- x/d = .06 | As = .89 -SRAS- [ 2 B 8.0mm ] | AsL= .00 -----
x/d = .05 | x/dMx= .37 | Arm.Lat.=[2 X -- B --- mm] - LN= 1.4 |
x/dMx= .37 |
[tf,cm] | M[-]Min = 61.9 | M[+]Min = 61.9 | M[-]Min = 61.9
[cm2 ] | Asapo[+]= .81 | | Asapo[+]= .85
```

CISALHAMENTO- E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M E N S A G
[tf,cm]	0.-	178.	1.47	25.15	1	45.	.0	2.2	2.2	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	.544	.329	.19	.01	1 P15	.00	.00	15	0	0	0	0	0	0
0 0	2	1.874	1.229	.50	.16	1 P11	.00	.00	11	0	0	0	0	0	0
0 0	3	.405	-.164	.30	.06	1 PT2	.00	.00	22	0	0	0	0	0	0

## MEMORIAL DE CÁLCULO DOS PILARES

A seguir são apresentados os dados e resultados do cálculo/dimensionamento dos pilares:

### Montagem de carregamentos de pilares

#### Legenda

\*\*Nota A\*\*

Os valores apresentados equivalem a carregamentos de esforços finais de cálculo para o dimensionamento após a envoltória.

\*\*Legenda\*\*

FdzT = FORÇA NORMAL DE CÁLCULO PARA DIMENSIONAMENTO DE ARMADURAS NA SEÇÃO

MdxT = MOMENTO DE CÁLCULO P/DIMENSIONAMENTO DE ARMADURAS NA SEÇÃO, MOMENTO x

MdyT = MOMENTO DE CÁLCULO P/DIMENSIONAMENTO DE ARMADURAS NA SEÇÃO, MOMENTO y

CARR = NÚMERO DO CARREGAMENTO NA ENVOLTÓRIA

COMB = NÚMERO DA COMBINAÇÃO DE ORIGEM DO CARREGAMENTO

#### P1

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	80.7	80.7	80.7	80.7	79.2	79.3	79.9	79.0	79.0
78.5									
MdxT	278.9	-278.9	.0	.0	26.7	-190.3	-191.7	83.6	-240.7
-163.8									
MdyT	.0	.0	266.3	-266.3	500.4	307.5	-538.8	479.6	296.6
-232.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 10 )	( 18 )	( 11 )	( 11 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	76.8	77.3	77.3	75.6	75.1	75.1	79.9	80.7	80.7
77.1									
MdxT	-39.3	185.5	56.1	21.7	-180.3	-48.9	22.8	-193.7	-58.9
124.2									
MdyT	453.0	294.5	-213.9	113.4	376.6	462.4	1038.8	-363.4	-908.6
456.7									
COMB	( 3 )	( 12 )	( 12 )	( 13 )	( 4 )	( 4 )	( 18 )	( 14 )	( 14 )
( 15 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	77.1	76.6	73.8	74.2	74.2	71.0	71.4	71.0	79.9
77.3									
MdxT	-240.4	-233.2	-80.2	199.3	133.0	21.1	-171.4	-41.7	-58.5
-39.2									
MdyT	282.7	-226.7	419.6	279.1	-191.7	-162.5	587.2	929.3	-1347.1
463.4									
COMB	( 15 )	( 6 )	( 7 )	( 16 )	( 16 )	( 8 )	( 17 )	( 8 )	( 18 )
( 12 )									
CARR	31	32	33	34	35	36	37	38	
FdzT	75.6	80.7	77.1	74.2	80.7	80.7	80.7	80.7	
MdxT	-181.4	22.7	-233.1	-80.1	197.2	-197.2	-197.2	197.2	
MdyT	373.5	829.6	-232.7	429.7	188.3	188.3	-188.3	-188.3	
COMB	( 13 )	( 14 )	( 15 )	( 16 )	( 0 )	( 0 )	( 0 )	( 0 )	

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	41.8	41.8	41.8	41.8	41.5	41.4	41.5	41.1	41.1
41.1									
MdxT	135.6	-135.6	.0	.0	179.9	95.0	-132.9	220.9	109.0
-157.5									
MdyT	.0	.0	137.9	-137.9	623.3	-280.8	-702.9	581.8	-263.6
-659.1									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 10 )	( 1 )	( 10 )	( 11 )	( 11 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	40.2	40.2	40.2	39.4	39.4	39.4	41.8	41.8	40.4
40.4									
MdxT	120.0	74.3	-90.7	168.3	89.5	-123.3	172.6	-124.9	243.7
115.3									
MdyT	565.5	-260.1	-650.3	269.8	-232.5	-480.6	877.5	-828.9	553.4
-249.1									
COMB	( 12 )	( 12 )	( 12 )	( 13 )	( 13 )	( 13 )	( 14 )	( 14 )	( 15 )
( 15 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	40.4	38.9	38.9	38.9	37.6	37.6	37.6	41.6	41.6
41.5									
MdxT	-174.3	75.7	104.8	-63.3	156.1	82.8	-117.5	163.4	-120.1
94.6									
MdyT	-622.7	526.3	-243.2	-608.0	34.3	-231.3	-325.5	1045.2	-905.2
-281.2									
COMB	( 15 )	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 17 )	( 18 )	( 18 )
( 10 )									
CARR	31	32							
FdzT	41.8	41.8							
MdxT	-95.9	95.9							
MdyT	97.5	-97.5							
COMB	( 0 )	( 0 )							

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	11.6	11.6	11.6	11.6	11.6	11.6	11.3	11.3	11.0
11.0									
MdxT	37.8	-37.8	.0	.0	104.0	-126.7	139.7	-140.8	58.4
-93.1									
MdyT	.0	.0	38.4	-38.4	289.9	-437.4	200.8	-351.4	175.7
-345.5									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 10 )	( 15 )	( 15 )	( 3 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	10.8	10.8	11.4	11.4	11.2	11.2	10.8	10.8	10.4
10.4									
MdxT	87.4	-112.0	88.2	-110.6	133.7	-135.9	35.6	-75.3	84.0
-106.7									
MdyT	46.1	-314.2	308.0	-374.1	173.0	-324.1	168.6	-328.7	-47.2
-276.2									
COMB	( 4 )	( 4 )	( 5 )	( 5 )	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	11.6	11.6	11.6	11.4	11.4	11.1	11.1	10.9	10.9
11.5									
MdxT	91.4	-43.7	106.5	123.5	-134.5	64.5	-98.1	93.7	-117.0
94.5									
MdyT	416.5	166.6	289.5	206.5	-370.6	203.8	-373.2	74.2	-341.9
336.1									
COMB	( 18 )	( 18 )	( 10 )	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )
( 14 )									
CARR	31	32	33	34	35				
20									
FdzT	10.9	10.9	10.6	10.6	11.6				
10.4									
MdxT	41.6	-80.2	90.0	-111.6	26.7				
196.3									
MdyT	196.3	-356.0	-19.5	-303.5	-27.2				
COMB	( 16 )	( 16 )	( 17 )	( 17 )	( 0 )				

## P2

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	189.3	189.3	189.3	189.3	186.1	186.1	184.1	189.3	188.9
184.5									
MdxT	654.3	-654.3	.0	.0	56.6	446.7	-441.8	454.3	-94.8
50.7									
MdyT	.0	.0	624.6	-624.6	1033.1	966.6	959.3	971.1	1041.2
1219.5									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 10 )	( 10 )	( 5 )	( 13 )	( 4 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	184.1	188.9	185.9	186.0	178.3	178.3	178.0	185.9	178.4
178.0									
MdxT	441.8	453.3	447.6	-42.1	49.4	428.0	-27.6	-180.6	261.2
-530.8									
MdyT	1025.6	971.5	926.9	1080.0	1275.0	736.7	-663.3	979.2	936.9
906.7									
COMB	( 3 )	( 4 )	( 8 )	( 6 )	( 16 )	( 16 )	( 7 )	( 8 )	( 18 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	189.3	184.5	189.3	184.5	186.3	186.3	178.4	189.3	189.3
189.3									
MdxT	454.3	442.7	-91.0	-442.8	-44.2	-177.0	-533.6	462.7	-462.7
-462.7									
MdyT	937.5	1025.2	1042.6	958.9	1076.9	980.4	906.2	441.7	441.7
-441.7									
COMB	( 11 )	( 12 )	( 13 )	( 14 )	( 15 )	( 17 )	( 18 )	( 0 )	( 0 )
( 0 )									
CARR	31								
20									
FdzT	189.3								
189.3									
MdxT	462.7								
-441.7									
COMB	( 0 )								

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	102.4	102.4	102.4	102.4	99.6	100.8	100.8	101.8	102.4
102.4									
MdxT	332.2	-332.2	.0	.0	118.6	-241.8	-57.8	95.5	-245.7
-59.1									
MdyT	.0	.0	337.8	-337.8	-872.1	-1067.8	-1204.8	-1212.0	-1072.0
1155.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 5 )	( 10 )	( 10 )	( 4 )	( 11 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	99.5	100.0	102.3	100.2	97.2	97.7	97.7	100.9	100.9
97.9									
MdxT	25.3	-55.4	-245.4	-130.2	25.2	-234.6	-53.6	-300.1	163.8
294.5									
MdyT	873.5	-1245.7	-1076.8	-1184.3	955.8	-480.8	-1201.9	-1029.4	-1149.0
1003.0									
COMB	( 3 )	( 12 )	( 13 )	( 14 )	( 7 )	( 16 )	( 16 )	( 8 )	( 8 )
( 18 )									
CARR	21	22	23	24	25	26	27	28	29

## ENGENHARIA E COMÉRCIO LTDA.

FdzT	97.9	100.0	102.3	97.7	101.4	101.4	102.4	102.4	102.4
MdxT	-207.2	25.1	88.9	24.9	-293.4	157.2	234.9	-234.9	234.9
MdyT	-1099.6	980.8	-1216.9	1062.2	-1032.1	-1153.7	238.9	238.9	-238.9
COMB	( 18 )	( 12 )	( 13 )	( 16 )	( 17 )	( 17 )	( 0 )	( 0 )	( 0 )

### LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	41.8	41.8	41.8	41.8	40.3	40.3	40.7	41.3	41.7
41.2									
MdxT	135.8	-135.8	.0	.0	212.1	128.2	-102.8	260.5	206.2
-62.6									
MdyT	.0	.0	138.1	-138.1	-2.0	-401.5	-594.6	-382.1	-473.5
-615.9									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 5 )	( 14 )	( 15 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	40.7	40.7	41.1	41.3	41.3	40.7	40.7	40.2	40.2
41.1									
MdxT	178.4	298.6	-67.2	122.9	141.4	237.2	158.5	177.5	-134.1
85.3									
MdyT	104.7	-381.1	-615.7	49.3	-397.2	28.8	-418.9	151.6	-580.4
59.1									
COMB	( 3 )	( 18 )	( 6 )	( 4 )	( 4 )	( 5 )	( 18 )	( 7 )	( 9 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	41.1	40.2	40.2	41.3	41.8	41.8	41.7	41.7	40.8
40.7									
MdxT	3.5	275.5	150.2	-118.4	205.1	131.8	-82.7	130.6	200.6
-149.5									
MdyT	-596.4	25.1	-391.3	-456.5	-437.5	-461.7	-479.5	-477.1	-254.7
-444.1									
COMB	( 8 )	( 9 )	( 9 )	( 14 )	( 11 )	( 11 )	( 15 )	( 15 )	( 16 )
( 18 )									
CARR	31	32	33						
FdzT	41.8	41.8	41.8						
MdxT	96.0	-96.0	-96.0						
MdyT	97.6	97.6	-97.6						
COMB	( 0 )	( 0 )	( 0 )						

### P3

#### LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	193.7	193.7	193.7	193.7	189.8	189.8	189.8	193.7	193.7
189.6									
MdxT	669.6	-669.6	.0	.0	-53.1	-455.4	30.5	-464.9	94.6
-41.4									
MdyT	.0	.0	639.3	-639.3	754.9	626.2	-192.9	634.0	771.4
953.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 5 )	( 5 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	189.6	188.9	188.9	188.9	193.7	183.8	183.8	183.8	182.6
182.6									
MdxT	26.3	-177.0	453.4	215.0	-473.5	-43.3	-441.2	28.6	-268.7
510.7									
MdyT	-632.2	743.1	624.1	-177.9	-452.0	1013.3	489.0	-904.1	663.9
580.3									
COMB	( 3 )	( 4 )	( 4 )	( 4 )	( 0 )	( 7 )	( 7 )	( 7 )	( 8 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	182.6	190.6	190.6	190.6	190.1	190.1	190.1	189.5	189.5
188.8									
MdxT	342.9	183.1	-457.5	-293.2	-53.3	-456.1	30.7	-44.9	27.9
-180.3									
MdyT	-147.7	711.1	597.0	-203.1	751.4	625.8	-189.8	946.7	-628.5
736.7									
COMB	( 8 )	( 9 )	( 9 )	( 9 )	( 10 )	( 10 )	( 10 )	( 12 )	( 12 )
( 13 )									
CARR	31	32	33	34	35	36	37	38	39
FdzT	188.8	183.7	183.7	182.5	182.5	182.5	193.7	193.7	193.7
MdxT	216.6	-46.6	30.1	-272.0	512.6	344.4	473.5	-473.5	473.5
MdyT	-174.2	1007.0	-900.3	657.6	577.8	-143.9	452.0	452.0	-452.0
COMB	( 13 )	( 16 )	( 16 )	( 17 )	( 17 )	( 17 )	( 0 )	( 0 )	( 0 )

#### LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	106.4	106.4	106.4	106.4	104.3	104.6	104.3	106.4	106.4
106.3									
MdxT	345.5	-345.5	.0	.0	-45.9	251.1	160.7	-60.9	255.5
55.4									
MdyT	.0	.0	351.3	-351.3	-36.1	-502.0	-610.1	-642.7	-522.1
-576.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 10 )	( 13 )	( 5 )	( 5 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	104.4	104.5	104.4	104.3	104.3	104.3	106.4	105.5	105.5
102.2									
MdxT	-22.3	250.7	50.5	-145.6	250.4	154.7	244.3	-128.1	266.4
-27.4									

ENGENHARIA E COMÉRCIO LTDA.									
MdyT	197.0	-483.0	-681.1	-23.5	-501.1	-605.6	248.4	-584.8	-489.1
283.8									
COMB	( 12 )	( 3 )	( 12 )	( 4 )	( 4 )	( 4 )	( 0 )	( 9 )	( 9 )
( 16 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	102.2	102.2	102.0	102.0	105.5	104.3	104.6	106.4	106.4
105.5									
MdxT	245.4	53.2	-329.9	236.6	191.1	-152.3	71.5	105.3	-54.9
-122.1									
MdyT	-424.2	-646.0	-451.3	-527.8	2.7	21.7	-615.6	55.3	-647.4
-589.5									
COMB	( 7 )	( 16 )	( 17 )	( 17 )	( 9 )	( 13 )	( 10 )	( 14 )	( 14 )
( 18 )									
CARR	31	32							
FdzT	106.4	106.4							
MdxT	-244.3	-244.3							
MdyT	248.4	-248.4							
COMB	( 0 )	( 0 )							

LANCE: 4

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	41.2	41.2	41.2	41.2	40.5	40.2	40.5	41.0	41.1
41.0									
MdxT	133.6	-133.6	.0	.0	-232.0	-124.1	121.2	-212.7	-137.1
106.5									
MdyT	.0	.0	135.9	-135.9	-385.4	127.3	318.8	-479.5	126.0
335.9									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 10 )	( 1 )	( 10 )	( 15 )	( 5 )
( 15 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	40.5	40.6	40.5	40.6	40.0	40.1	40.0	40.1	41.0
41.2									
MdxT	-118.6	-265.6	-136.6	138.5	-116.5	-303.5	-146.3	170.0	-129.9
94.5									
MdyT	137.5	-379.0	124.5	301.6	146.2	-377.6	124.6	302.0	127.0
-96.1									
COMB	( 3 )	( 13 )	( 4 )	( 13 )	( 7 )	( 17 )	( 8 )	( 17 )	( 9 )
( 0 )									

## P4

LANCE: 2

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	78.5	78.5	78.5	78.5	77.3	77.3	78.5	76.7	76.7
76.7									
MdxT	271.2	-271.2	.0	.0	32.6	-185.5	-188.3	95.5	-262.6
-182.0									
MdyT	.0	.0	258.9	-258.9	-435.5	-270.2	359.6	-395.9	-257.5
203.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 13 )	( 11 )	( 11 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	74.6	75.1	74.6	77.8	77.8	73.4	72.8	72.8	74.9
74.9									
MdxT	-40.7	180.2	59.9	29.4	-66.9	26.7	-174.8	-55.2	141.0
-258.6									
MdyT	-398.0	-253.0	223.9	-974.3	1339.2	-43.8	-379.2	-471.8	-366.9
-246.1									
COMB	( 3 )	( 12 )	( 3 )	( 17 )	( 17 )	( 14 )	( 5 )	( 5 )	( 15 )
( 15 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	74.9	71.7	71.7	71.7	77.8	68.8	69.3	68.8	77.3
75.1									
MdxT	-258.6	-85.4	212.8	144.2	-186.7	26.2	-166.3	-47.5	-185.5
-40.3									
MdyT	182.3	-378.0	-233.5	219.8	535.7	229.2	-563.7	-937.6	-269.8
-408.9									
COMB	( 15 )	( 7 )	( 7 )	( 7 )	( 17 )	( 9 )	( 18 )	( 9 )	( 10 )
( 12 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	75.1	78.5	78.5	73.4	73.4	72.2	72.2	72.2	69.3
69.3									
MdxT	59.5	28.4	-67.1	-176.0	-55.6	-85.0	212.3	143.6	26.6
-48.0									
MdyT	228.8	-761.0	898.9	-377.0	-466.9	-388.6	-238.6	224.6	218.5
-932.8									
COMB	( 12 )	( 13 )	( 13 )	( 14 )	( 14 )	( 16 )	( 16 )	( 16 )	( 18 )
( 18 )									
CARR	41	42	43	44					
FdzT	78.5	78.5	78.5	78.5					
191.8									
MdxT	191.8	-191.8	-191.8	191.8					
MdyT	183.1	183.1	-183.1	-183.1					
COMB	( 0 )	( 0 )	( 0 )	( 0 )					

LANCE: 3

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	41.0	41.0	41.0	41.0	40.8	40.8	40.9	40.2	39.9
40.2									
MdxT	133.0	-133.0	.0	.0	172.6	97.3	-115.8	218.7	113.1
-141.8									

ENGENHARIA E COMÉRCIO LTDA.									
MdyT	.0	.0	135.3	-135.3	-608.3	270.6	678.0	-549.1	240.9
623.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 10 )	( 11 )	( 2 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	39.4	39.4	39.4	41.0	41.0	38.6	38.6	38.6	39.6
39.2									
MdxT	105.6	105.6	-70.6	164.8	-107.2	159.5	90.8	-105.0	246.1
121.2									
MdyT	-558.0	248.4	620.9	-857.5	796.2	-249.6	219.8	447.7	-514.8
226.8									
COMB	( 12 )	( 12 )	( 12 )	( 13 )	( 13 )	( 14 )	( 14 )	( 14 )	( 15 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	39.6	38.1	38.1	38.1	40.8	40.8	36.5	36.5	36.5
40.9									
MdxT	-161.3	57.8	91.5	-42.7	156.5	-103.7	145.2	83.9	-95.6
172.2									
MdyT	587.4	-529.6	233.5	583.8	-1027.7	875.6	7.8	213.3	275.2
-612.6									
COMB	( 15 )	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 9 )	( 9 )	( 9 )
( 10 )									
CARR	31	32	33	34	35	36	37		
30									
FdzT	40.9	40.2	39.6	36.9	36.9	36.9	41.0		
40.9									
MdxT	96.2	113.1	121.1	147.6	83.9	-100.1	-94.1		
172.2									
MdyT	271.2	249.2	235.0	-16.5	219.5	295.7	-95.6		
-612.6									
COMB	( 10 )	( 11 )	( 15 )	( 18 )	( 18 )	( 18 )	( 0 )		

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	11.6	11.6	11.6	11.6	11.6	11.6	11.1	11.1	10.9
10.9									
MdxT	37.7	-37.7	.0	.0	97.4	-117.2	109.1	-119.0	51.4
-87.4									
MdyT	.0	.0	38.4	-38.4	-341.0	432.7	-208.7	330.8	-202.6
321.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 2 )	( 2 )	( 3 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	11.3	11.3	10.7	10.7	11.1	11.1	11.1	10.7	10.7
11.4									
MdxT	80.5	-102.1	79.9	-104.2	125.6	50.2	-124.5	29.4	-71.8
78.0									
MdyT	-336.4	355.7	-74.9	296.2	-204.3	126.8	317.1	-193.9	300.9
-416.9									
COMB	( 4 )	( 4 )	( 5 )	( 5 )	( 6 )	( 6 )	( 6 )	( 7 )	( 7 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	11.4	11.5	10.4	10.4	11.6	11.6	11.3	11.3	11.0
11.0									
MdxT	-38.6	-111.0	77.0	-99.8	102.2	-123.1	117.7	-128.0	60.1
-96.3									
MdyT	-166.8	378.4	18.8	259.3	-334.9	427.4	-238.0	353.5	-231.8
343.8									
COMB	( 8 )	( 13 )	( 9 )	( 9 )	( 10 )	( 10 )	( 11 )	( 11 )	( 12 )
( 12 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	11.5	10.8	10.8	11.3	11.3	11.3	10.8	10.8	11.6
11.6									
MdxT	89.2	88.6	-113.1	134.1	53.6	-133.3	37.9	-80.6	86.5
-42.1									
MdyT	-365.7	-104.2	318.9	-233.0	135.8	339.5	-222.6	323.1	-445.6
-178.2									
COMB	( 13 )	( 14 )	( 14 )	( 15 )	( 15 )	( 15 )	( 16 )	( 16 )	( 17 )
( 17 )									
CARR	41	42	43						
40									
FdzT	10.5	10.5	11.6						
10.5									
MdxT	85.5	-108.6	26.7						
11.6									
MdyT	-9.9	281.7	27.1						
-178.2									
COMB	( 18 )	( 18 )	( 0 )						

## P5

LANCE: 1

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	45.6	45.6	45.6	45.6	43.7	43.3	45.4	45.6	41.6
42.0									
MdxT	94.5	-94.5	.0	.0	12.7	-8.5	13.4	-66.8	38.1
-7.1									
MdyT	.0	.0	123.2	-123.2	61.2	20.0	120.7	87.1	53.9
-7.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 10 )	( 13 )	( 6 )	( 0 )	( 8 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	43.1	44.3	39.8	39.8	41.8	43.7	41.8	43.3	44.5
45.6									
MdxT	26.7	-5.6	14.1	-7.8	-10.4	-10.5	38.2	26.9	-5.7
13.6									
MdyT	60.3	62.7	-23.9	-23.9	20.9	58.0	53.6	60.1	62.4
120.3									
COMB	( 4 )	( 5 )	( 7 )	( 7 )	( 17 )	( 9 )	( 17 )	( 13 )	( 14 )
( 15 )									



ENGENHARIA E COMÉRCIO LTDA.

CARR	21	22	23	24	25
FdzT	40.0	40.0	45.6	45.6	45.6
MdxT	14.3	-8.0	66.8	-66.8	66.8
MdyT	-23.8	-23.8	87.1	-87.1	-87.1
COMB	( 16 )	( 16 )	( 0 )	( 0 )	( 0 )

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	34.3	34.3	34.3	34.3	31.8	32.0	32.0	34.2	33.8
34.2									
MdxT	161.2	-161.2	.0	.0	80.6	66.3	-5.7	10.4	70.0
-6.6									
MdyT	.0	.0	92.7	-92.7	-15.1	15.0	15.0	-79.7	76.9
116.8									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 4 )	( 1 )	( 1 )	( 6 )	( 2 )
( 6 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	31.0	31.0	31.0	31.8	32.9	32.9	34.3	29.2	29.4
29.4									
MdxT	9.1	64.3	-5.3	-7.7	27.0	-101.5	71.1	8.8	60.8
-5.5									
MdyT	26.6	-47.6	-47.6	-15.1	-13.3	14.7	75.5	52.4	-64.4
-90.2									
COMB	( 12 )	( 12 )	( 12 )	( 4 )	( 5 )	( 5 )	( 15 )	( 7 )	( 16 )
( 16 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	30.8	30.8	30.8	32.6	32.6	32.3	32.3	34.0	32.0
32.0									
MdxT	-19.3	107.0	37.1	38.5	-127.5	9.2	66.9	70.4	-7.8
80.9									
MdyT	-15.1	-15.1	13.9	-12.0	13.3	-12.3	14.8	76.4	-14.0
14.6									
COMB	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )	( 10 )	( 10 )	( 11 )	( 13 )
( 13 )									
CARR	31	32	33	34	35	36	37	38	39
FdzT	33.1	29.4	31.0	31.0	32.7	34.3	34.3	34.3	34.3
MdxT	-101.8	8.7	-19.5	107.3	-127.8	114.0	-114.0	-114.0	114.0
MdyT	14.3	53.5	-14.0	-14.0	12.9	65.6	65.6	-65.6	-65.6
COMB	( 14 )	( 16 )	( 17 )	( 17 )	( 18 )	( 0 )	( 0 )	( 0 )	( 0 )

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	28.6	28.6	28.6	28.6	27.3	27.3	27.3	28.3	28.5
28.3									
MdxT	115.0	-115.0	.0	.0	9.5	-56.5	-11.5	11.3	-59.0
-13.0									
MdyT	.0	.0	77.1	-77.1	-83.4	-49.4	75.3	-147.3	-68.5
123.9									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 6 )	( 15 )
( 6 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	26.7	26.7	27.3	27.3	27.3	27.8	27.8	27.8	28.3
25.6									
MdxT	10.4	-55.3	-6.4	-56.4	.8	27.9	70.0	-25.8	-58.5
9.9									
MdyT	-44.9	45.6	-86.4	-50.2	77.7	-83.4	-50.2	74.8	-69.3
-14.4									
COMB	( 3 )	( 3 )	( 4 )	( 4 )	( 4 )	( 5 )	( 5 )	( 5 )	( 6 )
( 7 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	25.6	26.4	26.4	26.4	27.4	27.4	27.4	27.6	27.6
28.6									
MdxT	-52.9	-17.9	-54.7	9.9	39.2	86.5	-34.4	-57.1	-11.6
10.9									
MdyT	22.1	-83.3	-48.4	75.5	-78.4	-48.4	70.6	-48.8	75.6
-122.4									
COMB	( 7 )	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )	( 9 )	( 10 )	( 10 )
( 11 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	28.6	28.6	27.0	27.5	27.5	27.5	25.8	26.7	26.7
26.7									
MdxT	-59.1	-12.7	-55.8	-6.7	-56.9	1.1	-53.4	-18.2	-55.2
10.2									
MdyT	-61.8	106.3	45.1	-84.0	-49.2	77.1	21.6	-81.1	-47.5
74.9									
COMB	( 11 )	( 11 )	( 12 )	( 13 )	( 13 )	( 13 )	( 16 )	( 17 )	( 17 )
( 17 )									
CARR	41	42	43	44					
FdzT	28.6	28.6	28.6	28.6					
MdxT	81.3	-81.3	-81.3	81.3					
MdyT	54.6	54.6	-54.6	-54.6					
COMB	( 0 )	( 0 )	( 0 )	( 0 )					

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	23.8	23.8	23.8	23.8	23.1	23.1	23.3	23.4	22.9
22.9									
MdxT	97.5	-97.5	.0	.0	-47.9	-6.7	-48.8	-48.4	-47.3
-1.4									
MdyT	.0	.0	64.2	-64.2	31.4	-11.1	26.5	30.1	46.2
-6.0									

ENGENHARIA E COMÉRCIO LTDA.									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 6 )	( 13 )	( 10 )	( 3 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	23.1	23.1	23.3	22.0	22.0	22.4	22.4	22.8	23.4
23.8									
MdxT	-48.6	8.3	1.8	-45.6	-1.7	-57.0	5.9	8.3	-6.9
-69.0									
MdyT	25.8	23.7	24.6	58.9	-11.8	24.9	5.9	23.0	30.1
45.4									
COMB	( 4 )	( 18 )	( 5 )	( 7 )	( 7 )	( 8 )	( 8 )	( 9 )	( 10 )
( 0 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	23.6	23.1	23.3	23.8	23.4	22.3	22.3	22.6	23.8
23.8									
MdxT	-48.8	-47.8	3.1	69.0	-6.7	-46.1	-1.7	-57.2	-69.0
69.0									
MdyT	25.3	46.9	5.9	45.4	-10.5	59.5	-10.4	25.5	-45.4
-45.4									
COMB	( 14 )	( 12 )	( 13 )	( 0 )	( 15 )	( 16 )	( 16 )	( 17 )	( 0 )
( 0 )									

LANCE: 5

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	12.4	12.4	12.4	12.4	12.1	12.1	12.2	12.0	11.8
12.0									
MdxT	25.8	-25.8	.0	.0	58.5	-11.8	49.8	49.7	-14.0
49.1									
MdyT	.0	.0	33.6	-33.6	-176.7	-28.0	-191.5	-165.9	-29.7
-186.8									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 5 )	( 5 )	( 2 )	( 3 )	( 18 )
( 15 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	11.8	11.8	11.3	11.3	11.5	11.6	11.6	11.6	12.3
12.3									
MdxT	46.9	-7.1	46.5	-7.4	32.2	-8.0	61.2	-13.4	53.6
-12.3									
MdyT	-188.4	-23.9	-145.9	-28.8	-170.7	-26.3	-163.7	-32.2	-174.9
-25.6									
COMB	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )	( 16 )	( 9 )	( 9 )	( 10 )
( 14 )									
CARR	21	22	23	24	25	26			
27									
FdzT	12.4	12.4	12.3	11.8	12.4	12.4			
12.4									
MdxT	52.1	-18.2	60.8	63.6	18.2	-18.2			
18.2									
MdyT	-189.7	-23.8	-174.7	-162.0	23.8	23.8			
23.8									
COMB	( 11 )	( 0 )	( 14 )	( 18 )	( 0 )	( 0 )			

LANCE: 6

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	2.3	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.1
2.1									
MdxT	4.8	-4.8	.0	.0	-54.5	-72.7	-76.6	-77.3	-71.3
-72.5									
MdyT	.0	.0	6.2	-6.2	20.2	19.9	24.4	23.5	25.9
24.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 2 )	( 4 )	( 6 )
( 8 )									
CARR	11	12	13	14	15	16	17		
18									
FdzT	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
2.3									
MdxT	-71.0	-73.4	-74.1	-68.2	3.4	-3.4	3.4		
3.4									
MdyT	25.8	30.0	29.0	31.4	4.4	-4.4	-4.4		
-4.4									
COMB	( 10 )	( 11 )	( 13 )	( 15 )	( 0 )	( 0 )	( 0 )		

## P6

LANCE: 1

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	51.5	51.5	51.5	51.5	49.5	49.9	50.2	51.0	51.0
51.5									
MdxT	106.7	-106.7	.0	.0	34.2	49.4	-19.6	34.3	34.3
-75.4									
MdyT	.0	.0	139.1	-139.1	218.7	217.7	-49.0	257.0	200.2
-98.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 4 )	( 13 )	( 2 )	( 2 )
( 0 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	47.6	47.6	47.9	49.5	48.8	49.2	49.5	51.2	45.7
45.7									
MdxT	34.0	34.0	-17.8	58.1	18.9	58.1	-20.2	33.0	32.5
32.5									
MdyT	175.3	127.9	-71.8	210.6	214.5	210.1	-48.9	275.4	139.7
98.4									
COMB	( 3 )	( 3 )	( 12 )	( 17 )	( 5 )	( 8 )	( 17 )	( 6 )	( 16 )
( 16 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	45.7	49.5	47.4	47.7	51.4	47.9	50.2	51.5	47.7
51.5									
MdxT	-17.1	58.1	7.4	-14.1	34.2	33.9	49.3	32.9	7.3
75.4									
MdyT	-87.1	160.3	204.5	157.1	257.5	175.7	218.1	275.8	205.0
98.4									

ENGENHARIA E COMÉRCIO LTDA.		( 16 )	( 17 )	( 9 )	( 18 )	( 11 )	( 12 )	( 13 )	( 15 )	( 18 )
COMB	( 0 )									
CARR	31	32								
FdzT	51.5	51.5								
MdxT	-75.4	75.4								
MdyT	98.4	-98.4								
COMB	( 0 )	( 0 )								

LANCE: 2

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA										
CARR	1	2	3	4	5	6	7	8	9	
10										
FdzT	35.5	35.5	35.5	35.5	33.8	33.9	34.9	34.9	34.9	
31.8										
MdxT	166.9	-166.9	.0	.0	-35.4	-70.1	-5.3	-72.1	-2.0	
-4.1										
MdyT	.0	.0	96.0	-96.0	8.5	-23.1	-38.5	41.7	41.7	
50.1										
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 17 )	( 10 )	( 2 )	( 2 )	( 2 )	
( 3 )										
CARR	11	12	13	14	15	16	17	18	19	
20										
FdzT	31.8	31.8	33.8	33.8	32.9	32.9	35.5	35.2	35.2	
30.1										
MdxT	-65.8	-2.2	-23.8	119.0	14.4	-96.9	-118.0	-72.9	-1.8	
-3.2										
MdyT	-66.6	-87.2	6.0	-23.4	5.5	-23.2	-67.9	83.7	83.7	
80.4										
COMB	( 3 )	( 3 )	( 4 )	( 17 )	( 5 )	( 5 )	( 0 )	( 6 )	( 6 )	
( 7 )										
CARR	21	22	23	24	25	26	27	28	29	
30										
FdzT	30.1	30.1	33.4	33.4	31.9	31.9	32.1	32.1	32.1	
34.1										
MdxT	-62.4	-2.4	-36.0	118.9	27.4	-122.6	-3.4	-66.5	-2.5	
-23.1										
MdyT	-79.0	-130.9	7.1	-22.7	6.2	-24.5	51.5	-66.9	-87.9	
7.6										
COMB	( 7 )	( 7 )	( 8 )	( 8 )	( 9 )	( 9 )	( 12 )	( 12 )	( 12 )	
( 13 )										
CARR	31	32	33	34	35	36	37	38	39	
40										
FdzT	34.1	33.2	33.2	35.5	30.5	30.5	30.5	32.3	32.3	
35.5										
MdxT	91.1	15.0	-97.9	-73.6	-2.5	-63.1	-2.7	28.0	-123.5	
118.0										
MdyT	-23.0	7.0	-23.9	82.9	81.9	-79.2	-131.7	7.7	-25.2	
67.9										
COMB	( 13 )	( 14 )	( 14 )	( 15 )	( 16 )	( 16 )	( 16 )	( 18 )	( 18 )	
( 0 )										
CARR	41	42								
FdzT	35.5	35.5								
MdxT	-118.0	118.0								
MdyT	67.9	-67.9								
COMB	( 0 )	( 0 )								

LANCE: 3

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA										
CARR	1	2	3	4	5	6	7	8	9	
10										
FdzT	26.4	29.7	29.7	29.5	29.7	28.6	28.8	29.2	29.1	
29.2										
MdxT	1.3	119.4	-119.4	.0	.0	59.3	23.2	-1.1	61.5	
8.4										
MdyT	.0	.0	.0	-149.8	80.1	-77.1	71.8	-153.0	-77.8	
130.6										
COMB	( 7 )	( 0 )	( 0 )	( 15 )	( 0 )	( 1 )	( 4 )	( 6 )	( 13 )	
( 6 )										
CARR	11	12	13	14	15	16	17	18	19	
20										
FdzT	27.4	27.7	28.8	28.6	28.2	28.3	28.2	29.2	26.4	
28.3										
MdxT	77.3	6.0	-19.7	77.4	19.6	79.0	-9.1	60.5	54.7	
-32.6										
MdyT	-48.4	34.9	-81.1	-72.7	-82.0	-75.9	73.1	-71.1	5.6	
-75.9										
COMB	( 9 )	( 3 )	( 4 )	( 17 )	( 5 )	( 8 )	( 5 )	( 6 )	( 7 )	
( 8 )										
CARR	21	22	23	24	25	26	27	28	29	
30										
FdzT	28.3	27.4	27.4	28.9	29.7	29.7	29.5	28.0	29.1	
29.1										
MdxT	33.5	32.9	-20.3	59.9	.6	61.4	7.1	57.9	-18.5	
22.0										
MdyT	67.1	-77.4	69.2	-76.3	-124.2	-63.0	129.5	33.9	-77.8	
70.7										
COMB	( 8 )	( 9 )	( 9 )	( 10 )	( 11 )	( 11 )	( 15 )	( 12 )	( 13 )	
( 13 )										
CARR	31	32	33	34	35	36	37	38	39	
40										
FdzT	28.6	28.6	29.5	26.8	28.6	28.6	27.7	27.7	29.7	
29.7										
MdxT	20.9	-10.2	61.1	55.4	-31.4	32.2	79.3	-21.4	84.4	
-84.4										
MdyT	-78.8	72.0	-70.0	4.6	-72.7	65.9	-74.2	68.2	56.6	
56.6										
COMB	( 14 )	( 14 )	( 15 )	( 16 )	( 17 )	( 17 )	( 18 )	( 18 )	( 0 )	
( 0 )										
CARR	41	42								
FdzT	29.7	29.7								
MdxT	-84.4	84.4								
MdyT	-56.6	-56.6								

ENGENHARIA E COMÉRCIO LTDA.

COMB

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	22.1	22.1	21.4	22.1	22.1	21.5	21.5	21.5	21.7
21.8									
MdxT	90.9	-90.9	.0	.0	.0	44.5	-44.6	-14.8	56.1
-45.2									
MdyT	.0	.0	-1.1	59.8	-59.8	55.6	39.1	-9.9	34.4
37.7									
COMB	( 0 )	( 0 )	( 17 )	( 0 )	( 0 )	( 12 )	( 1 )	( 1 )	( 14 )
( 10 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	21.2	21.2	21.4	21.4	21.5	20.4	20.4	20.4	21.1
21.1									
MdxT	43.9	-9.9	54.5	-15.7	10.5	10.8	42.2	-9.8	-43.8
.7									
MdyT	54.0	-14.3	32.9	-1.5	-6.3	67.6	53.8	-22.0	29.1
-1.3									
COMB	( 3 )	( 3 )	( 5 )	( 5 )	( 6 )	( 7 )	( 7 )	( 7 )	( 8 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	20.7	20.7	21.8	21.8	22.1	22.1	21.5	21.5	21.7
21.8									
MdxT	62.9	-19.3	14.4	-14.7	64.2	-64.2	12.2	-11.2	-16.9
11.5									
MdyT	32.2	-.6	37.7	-6.6	42.3	42.3	55.6	-14.3	-1.4
-4.8									
COMB	( 9 )	( 9 )	( 10 )	( 10 )	( 0 )	( 0 )	( 12 )	( 12 )	( 14 )
( 15 )									
CARR	31	32	33	34	35	36	37		
FdzT	20.7	20.7	20.7	21.0	21.0	22.1	22.1		
MdxT	11.6	42.8	-11.1	64.5	-20.6	-64.2	64.2		
MdyT	69.2	55.1	-21.8	33.7	-.6	-42.3	-42.3		
COMB	( 16 )	( 16 )	( 16 )	( 18 )	( 18 )	( 0 )	( 0 )		

LANCE: 5

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	12.1	12.1	12.1	12.1	11.7	11.7	11.8	11.5	11.5
11.6									
MdxT	25.0	-25.0	.0	.0	-57.7	11.5	-49.4	-48.9	13.4
-48.3									
MdyT	.0	.0	32.6	-32.6	-173.7	-36.0	-188.4	-162.8	-37.4
-182.6									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 4 )	( 4 )	( 2 )	( 3 )	( 17 )
( 15 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	11.3	11.3	10.9	10.9	11.2	11.2	11.1	12.0	12.0
12.1									
MdxT	-46.6	7.7	-45.5	7.4	-60.3	12.9	-31.9	-59.4	12.0
-51.1									
MdyT	-185.2	-33.6	-142.7	-34.4	-160.7	-40.2	-167.2	-171.1	-33.2
-185.8									
COMB	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )	( 8 )	( 9 )	( 13 )	( 13 )
( 11 )									
CARR	21	22	23	24	25	26	27	28	
FdzT	12.1	11.8	11.8	11.9	11.5	12.1	12.1	12.1	
MdxT	9.0	-50.4	8.8	-42.3	-61.9	17.7	-17.7	17.7	
MdyT	-29.3	-160.2	-29.8	-174.9	-158.1	23.0	23.0	-23.0	
COMB	( 11 )	( 12 )	( 12 )	( 14 )	( 17 )	( 0 )	( 0 )	( 0 )	

LANCE: 6

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	2.2	2.2	2.2	2.2	2.0	2.0	1.8	1.9	1.8
1.9									
MdxT	4.5	-4.5	.0	.0	53.1	74.1	76.6	77.3	76.7
77.1									
MdyT	.0	.0	5.9	-5.9	18.5	17.1	20.4	17.4	17.2
20.6									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 2 )	( 3 )	( 4 )
( 5 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	1.8	1.9	2.2	2.1	2.1	2.1	2.1	2.1	2.1
2.2									
MdxT	71.3	72.2	72.4	73.9	74.8	74.1	74.6	68.7	69.7
-3.2									
MdyT	21.3	21.6	23.9	26.9	23.8	23.7	27.0	27.7	28.0
4.2									
COMB	( 6 )	( 9 )	( 10 )	( 11 )	( 12 )	( 13 )	( 14 )	( 15 )	( 18 )
( 0 )									
CARR	21	22							
FdzT	2.2	2.2							
MdxT	-3.2	3.2							
MdyT	-4.2	-4.2							
COMB	( 0 )	( 0 )							

## P7

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	63.3	63.3	63.3	63.3	62.6	62.6	63.3	63.2	63.2
61.5									
MdxT	324.1	-324.1	.0	.0	308.4	-84.7	229.2	304.3	-57.5
300.2									
MdyT	.0	.0	189.8	-189.8	49.3	49.3	-134.2	176.4	217.7
168.1									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 5 )	( 5 )	( 0 )	( 2 )	( 2 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	61.5	61.9	61.9	61.9	59.1	59.1	59.1	60.1	60.1
60.9									
MdxT	-57.4	110.6	293.3	-54.6	110.2	286.3	-54.3	279.3	-9.0
-100.0									
MdyT	-137.5	-154.3	210.3	329.4	250.9	-127.8	-261.9	54.9	18.5
49.1									
COMB	( 3 )	( 6 )	( 6 )	( 6 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )
( 9 )									
CARR	21	22	23	24	25	26			
20									
FdzT	61.6	62.2	62.0	59.2	63.3	63.3			
60.9									
MdxT	-57.1	295.4	292.6	285.8	-229.2	-229.2			
-100.0									
MdyT	-137.6	50.5	210.3	-127.8	134.2	-134.2			
49.1									
COMB	( 12 )	( 13 )	( 15 )	( 16 )	( 0 )	( 0 )			

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	38.5	38.5	38.5	38.5	38.2	38.2	38.2	38.5	38.5
38.5									
MdxT	138.1	-138.1	.0	.0	119.3	-156.8	-156.8	112.3	-153.9
-153.9									
MdyT	.0	.0	115.6	-115.6	-34.2	-34.2	5.7	-137.8	-90.4
96.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 11 )	( 11 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	37.6	37.6	38.0	38.3	37.7	37.7	37.7	36.3	36.4
36.3									
MdxT	110.9	-153.6	-158.2	127.5	106.3	-145.9	-145.9	105.3	-146.2
-145.7									
MdyT	87.8	-98.1	-18.6	-33.7	-206.9	-107.1	155.8	167.2	77.9
-165.3									
COMB	( 3 )	( 3 )	( 13 )	( 14 )	( 15 )	( 15 )	( 15 )	( 7 )	( 16 )
( 7 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	36.8	36.7	37.3	38.2	38.2	38.2	37.7	37.7	36.4
36.4									
MdxT	81.8	-152.3	131.6	118.7	-156.7	-156.7	112.8	-154.1	107.1
-146.2									
MdyT	-8.5	-16.9	-33.5	-35.6	-35.6	9.1	85.4	-94.5	164.8
-161.7									
COMB	( 17 )	( 8 )	( 18 )	( 10 )	( 10 )	( 10 )	( 12 )	( 12 )	( 16 )
( 16 )									
CARR	31	32							
30									
FdzT	36.8	38.5							
36.4									
MdxT	-152.9	97.7							
-146.2									
MdyT	-13.4	81.7							
-161.7									
COMB	( 17 )	( 0 )							

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	10.7	10.8	10.8	10.8	10.8	10.7	10.7	10.7	10.8
10.8									
MdxT	109.9	46.2	-46.2	.0	.0	113.1	96.2	-95.5	98.6
-85.8									
MdyT	.0	.0	.0	32.5	-32.5	-8.5	-113.0	-28.4	-69.9
26.6									
COMB	( 9 )	( 0 )	( 0 )	( 0 )	( 0 )	( 18 )	( 15 )	( 1 )	( 11 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	10.6	10.6	10.6	10.8	10.8	10.7	10.4	10.4	10.4
10.7									
MdxT	95.5	38.2	-83.0	105.6	-91.8	-82.5	93.1	37.2	-80.1
-94.8									
MdyT	72.4	-37.2	-89.0	2.0	-34.0	63.3	117.6	-48.9	-122.4
-30.7									
COMB	( 3 )	( 3 )	( 3 )	( 5 )	( 5 )	( 15 )	( 7 )	( 7 )	( 7 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	10.7	10.7	10.7	10.8	10.8	10.4	10.4	10.4	10.7
10.8									
MdxT	107.2	98.7	-86.5	108.8	-95.2	96.3	38.5	-83.4	-98.1
32.7									

	ENGENHARIA E COMÉRCIO LTDA.								
MdyT	-10.9	63.1	-78.8	-7.3	-23.8	108.6	-44.9	-112.3	-20.6
23.0									
COMB	( 10 )	( 12 )	( 12 )	( 14 )	( 14 )	( 16 )	( 16 )	( 16 )	( 18 )
( 0 )									

## P8

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	109.4	109.4	109.4	109.4	108.0	108.4	108.0	107.3	107.0
107.3									
MdxT	534.1	-534.1	.0	.0	-99.7	-318.6	80.6	-81.1	-311.4
43.8									
MdyT	.0	.0	328.1	-328.1	503.7	335.6	-247.4	535.2	391.3
-439.7									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 4 )	( 1 )	( 4 )	( 12 )	( 2 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	109.4	109.4	108.0	107.3	103.0	103.4	103.4	107.3	107.3
105.1									
MdxT	-79.4	42.8	-347.5	-305.6	-111.2	-299.0	41.6	-75.6	40.6
-109.5									
MdyT	535.1	-441.1	332.9	-252.7	495.6	382.6	96.0	547.8	-571.8
495.5									
COMB	( 3 )	( 3 )	( 4 )	( 7 )	( 17 )	( 6 )	( 6 )	( 7 )	( 7 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	105.1	105.1	105.1	105.3	105.9	104.9	105.9	106.2	101.3
101.3									
MdxT	-358.1	103.5	-313.3	-305.2	-101.5	-311.1	-346.8	-31.6	-77.3
-298.8									
MdyT	323.7	-249.2	332.7	-249.5	503.7	389.4	330.9	-232.4	431.1
380.2									
COMB	( 8 )	( 8 )	( 10 )	( 16 )	( 13 )	( 11 )	( 13 )	( 14 )	( 15 )
( 15 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	101.3	105.3	105.3	103.0	103.0	103.5	109.4	109.4	109.4
109.4									
MdxT	42.4	-77.3	41.4	-357.1	104.4	-33.7	377.7	-377.7	-377.7
377.7									
MdyT	97.3	547.8	-570.5	321.8	-247.9	-225.3	232.0	232.0	-232.0
-232.0									
COMB	( 15 )	( 16 )	( 16 )	( 17 )	( 17 )	( 18 )	( 0 )	( 0 )	( 0 )
( 0 )									

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	74.5	74.5	74.5	74.5	73.7	73.0	73.7	72.9	72.9
74.5									
MdxT	278.9	-278.9	.0	.0	-111.7	235.8	128.1	-90.2	223.2
-90.0									
MdyT	.0	.0	223.6	-223.6	223.3	-216.2	-357.8	-175.1	-270.6
299.2									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 4 )	( 1 )	( 4 )	( 2 )	( 2 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	74.5	74.5	73.7	70.5	70.5	70.5	73.3	73.3	71.8
71.8									
MdxT	224.8	113.7	243.6	-90.2	213.5	108.2	-85.7	108.4	-121.7
247.5									
MdyT	-209.8	-400.0	-213.8	-242.9	179.1	310.7	366.0	-425.3	239.5
-203.4									
COMB	( 3 )	( 3 )	( 4 )	( 11 )	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	71.8	69.5	69.4	69.5	70.5	70.5	72.1	72.1	68.1
68.1									
MdxT	132.4	-121.7	231.0	134.3	223.5	115.5	-90.0	115.5	-85.8
213.9									
MdyT	-355.0	253.3	-192.4	-332.2	-266.4	-282.1	312.9	-376.9	-296.7
155.0									
COMB	( 8 )	( 17 )	( 10 )	( 17 )	( 11 )	( 11 )	( 12 )	( 12 )	( 15 )
( 15 )									
CARR	31	32	33	34	35	36	37		
FdzT	68.1	70.9	70.9	69.5	74.5	74.5	74.5		
MdxT	110.0	-85.7	110.0	247.5	197.2	-197.2	-197.2		
MdyT	319.9	379.7	-402.5	-181.4	158.1	158.1	-158.1		
COMB	( 15 )	( 16 )	( 16 )	( 17 )	( 0 )	( 0 )	( 0 )		

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	37.6	37.6	37.6	37.6	37.6	37.6	37.6	35.6	35.5
35.6									
MdxT	160.2	-160.2	.0	.0	-49.0	134.5	58.9	-44.2	134.9
53.6									
MdyT	.0	.0	112.8	-112.8	-168.6	86.3	181.0	-167.0	100.0
185.8									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 2 )	( 4 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									

ENGENHARIA E COMÉRCIO LTDA.									
FdzT	35.4	35.5	35.5	35.3	35.3	35.3	34.9	34.9	35.1
35.1									
MdxT	121.2	-55.6	61.3	-44.1	121.7	52.1	-36.4	116.4	64.7
-63.1									
MdyT	111.9	-93.5	158.1	-209.0	-88.1	199.4	23.5	109.6	153.2
-86.7									
COMB	( 3 )	( 4 )	( 4 )	( 6 )	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	35.1	33.8	33.8	34.0	33.7	33.7	33.8	33.7	33.3
33.3									
MdxT	138.9	-70.3	136.3	131.3	128.3	-54.2	-106.5	128.4	-50.8
123.5									
MdyT	99.3	133.6	94.6	105.0	160.3	199.8	120.7	113.1	248.4
189.0									
COMB	( 8 )	( 13 )	( 10 )	( 11 )	( 12 )	( 12 )	( 13 )	( 15 )	( 16 )
( 16 )									
CARR	31	32	33	34	35				
FdzT	33.4	33.4	37.6	37.6	37.6				
MdxT	-77.6	-110.0	-113.3	-113.3	113.3				
MdyT	138.2	123.0	79.8	-79.8	-79.8				
COMB	( 17 )	( 17 )	( 0 )	( 0 )	( 0 )				

LANCE: 5

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	3.5	3.5	2.7	2.6	2.7	2.5	2.8	2.6	3.5
3.4									
MdxT	27.8	-27.8	.0	.0	.0	.0	.0	.0	.0
.0									
MdyT	.0	.0	-26.0	-39.3	-3.2	-51.4	8.8	-22.1	24.6
-4.5									
COMB	( 0 )	( 0 )	( 1 )	( 2 )	( 3 )	( 6 )	( 7 )	( 9 )	( 16 )
( 17 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	3.5	2.7	2.6	2.6	2.7	2.7	2.6	2.5	2.5
2.8									
MdxT	.0	35.3	22.4	7.3	34.8	18.2	37.0	17.2	3.4
38.4									
MdyT	-10.6	-18.8	-24.8	4.8	-19.0	-26.2	-16.6	-27.6	15.5
-21.5									
COMB	( 0 )	( 1 )	( 2 )	( 2 )	( 3 )	( 3 )	( 4 )	( 6 )	( 6 )
( 7 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	2.8	2.6	2.6	3.5	3.5	3.4	3.4	3.4	3.5
3.5									
MdxT	21.4	42.0	-13.9	39.1	39.7	.7	26.4	7.0	.6
17.8									
MdyT	-36.1	-16.2	-17.6	-13.1	-11.2	-23.4	-15.0	7.6	12.6
-23.2									
COMB	( 7 )	( 8 )	( 9 )	( 12 )	( 10 )	( 11 )	( 11 )	( 11 )	( 12 )
( 12 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	3.4	3.4	3.3	3.3	3.3	3.5	3.5	3.4	3.4
3.5									
MdxT	41.5	23.3	.7	20.4	2.9	42.7	21.0	46.3	-1.4
19.6									
MdyT	-7.6	-8.1	-35.4	-17.9	18.3	-14.1	-32.9	-6.7	-7.8
7.5									
COMB	( 13 )	( 14 )	( 15 )	( 15 )	( 15 )	( 16 )	( 16 )	( 17 )	( 18 )
( 0 )									
CARR	41	42							
FdzT	3.5	3.5							
MdxT	-19.6	-19.6							
MdyT	7.5	-7.5							
COMB	( 0 )	( 0 )							

## P9

LANCE: 1

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	44.4	44.4	43.7	44.4	43.9	40.6	44.4	44.4	44.4
40.3									
MdxT	92.0	-92.0	.0	.0	.0	.0	.0	65.0	-65.0
-.8									
MdyT	.0	.0	-80.5	-120.0	32.5	5.0	120.0	-84.8	84.8
4.9									
COMB	( 0 )	( 0 )	( 3 )	( 0 )	( 10 )	( 11 )	( 0 )	( 0 )	( 0 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	40.3	43.9	43.7	42.0	41.8	42.0	42.5	38.6	38.6
44.2									
MdxT	1.8	1.3	1.3	7.7	3.5	-11.6	-1.1	-2.1	2.4
1.5									
MdyT	46.3	-80.5	18.1	-37.8	33.0	-37.8	31.5	33.3	54.7
-108.9									
COMB	( 2 )	( 12 )	( 3 )	( 13 )	( 4 )	( 18 )	( 14 )	( 6 )	( 6 )
( 7 )									
CARR	21	22	23	24	25	26	27	28	29
FdzT	44.4	41.3	41.0	41.8	42.0	40.6	44.4	41.3	44.4
MdxT	65.0	11.2	5.5	-12.6	-2.0	1.3	1.0	5.0	-65.0
MdyT	84.8	-37.9	32.3	-37.8	30.0	46.5	-108.9	32.5	-84.8
COMB	( 0 )	( 17 )	( 8 )	( 9 )	( 18 )	( 11 )	( 16 )	( 17 )	( 0 )

**ENGENHARIA E COMÉRCIO LTDA.**

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	28.3	28.3	28.3	28.3	28.2	28.3	28.3	24.4	24.4
24.4									
MdxT	138.5	-138.5	.0	.0	61.3	97.9	-97.9	10.5	56.9
-4.9									
MdyT	.0	.0	76.5	-76.5	-73.2	54.1	54.1	-49.3	69.5
104.7									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 16 )	( 0 )	( 0 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	27.3	27.3	25.7	25.7	26.0	26.0	23.0	23.0	23.0
27.9									
MdxT	61.2	-5.0	-10.5	83.5	31.5	-99.4	10.1	54.0	-4.5
10.2									
MdyT	32.8	-25.9	-8.0	38.9	-8.5	39.9	-74.8	81.8	144.8
61.9									
COMB	( 3 )	( 3 )	( 4 )	( 4 )	( 5 )	( 5 )	( 6 )	( 6 )	( 6 )
( 7 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	27.9	28.2	25.2	25.2	25.7	25.7	27.9	27.9	24.7
24.7									
MdxT	61.5	-4.8	-24.8	112.0	44.9	-100.3	59.6	-5.2	10.2
56.8									
MdyT	-72.7	-73.2	-6.0	35.1	-6.9	36.8	38.9	38.9	-48.2
69.9									
COMB	( 7 )	( 16 )	( 8 )	( 8 )	( 9 )	( 9 )	( 10 )	( 10 )	( 11 )
( 11 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	24.7	27.6	27.6	26.0	26.0	26.0	26.3	26.3	23.3
23.3									
MdxT	-4.9	61.1	-5.0	-10.8	84.1	24.2	31.2	-100.0	9.8
53.9									
MdyT	104.2	33.9	-26.5	-6.9	38.4	38.4	-7.3	39.3	-73.5
82.2									
COMB	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )	( 13 )	( 14 )	( 14 )	( 15 )
( 15 )									
CARR	41	42	43	44	45	46	47	48	
FdzT	23.3	28.2	25.5	25.5	25.9	25.9	28.3	28.3	
MdxT	-4.5	9.9	-25.1	112.5	44.8	-126.0	-97.9	97.9	
MdyT	144.2	63.0	-4.9	34.6	-5.7	36.3	-54.1	-54.1	
COMB	( 15 )	( 16 )	( 17 )	( 17 )	( 18 )	( 18 )	( 0 )	( 0 )	

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	22.4	24.7	24.7	24.7	24.7	24.7	24.7	21.7	21.9
21.7									
MdxT	45.8	92.4	-92.4	.0	.0	65.3	-65.3	13.4	-45.3
-15.4									
MdyT	.0	.0	.0	66.7	-66.7	-47.1	47.1	-45.5	45.5
45.5									
COMB	( 18 )	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 2 )	( 11 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	23.3	23.7	23.3	22.4	22.6	22.6	22.6	22.6	20.7
20.7									
MdxT	13.4	-49.0	-15.4	-7.6	-46.9	3.6	34.6	68.3	12.9
-42.8									
MdyT	33.9	49.6	-14.3	-6.3	15.7	15.7	-5.3	15.5	-68.3
-38.5									
COMB	( 3 )	( 16 )	( 3 )	( 4 )	( 13 )	( 13 )	( 5 )	( 5 )	( 6 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	20.7	23.5	23.5	22.0	22.2	22.2	22.2	22.4	24.3
24.3									
MdxT	-15.0	13.0	-15.0	-22.0	-53.1	15.8	48.0	83.0	6.4
-50.2									
MdyT	62.0	64.0	-37.4	-2.9	12.5	12.5	-1.4	12.3	-8.3
17.2									
COMB	( 6 )	( 7 )	( 7 )	( 8 )	( 17 )	( 17 )	( 9 )	( 18 )	( 10 )
( 10 )									
CARR	31	32	33	34	35	36	37	38	39
FdzT	23.5	22.6	20.9	20.9	23.7	22.2	22.4	24.7	24.7
MdxT	-48.7	-9.8	-43.2	-13.4	10.8	-24.2	-42.8	65.3	-65.3
MdyT	34.9	-5.3	-38.1	62.2	65.0	-2.0	12.3	47.1	-47.1
COMB	( 12 )	( 13 )	( 15 )	( 15 )	( 16 )	( 17 )	( 18 )	( 0 )	( 0 )

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	21.5	21.5	20.5	21.2	21.0	19.8	21.5	21.5	21.5
21.5									
MdxT	91.8	-91.8	.0	.0	.0	.0	.0	.0	-23.9
-62.7									
MdyT	.0	.0	16.5	-3.5	-81.3	22.8	58.2	-58.2	-78.0
-67.0									
COMB	( 0 )	( 0 )	( 2 )	( 3 )	( 5 )	( 6 )	( 0 )	( 0 )	( 1 )
( 1 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	21.5	20.5	20.5	21.3	21.3	20.8	20.8	20.7	21.0
21.0									



ENGENHARIA E COMÉRCIO LTDA.									
MdxT	64.9	-12.6	-42.7	-22.0	-59.3	-25.2	-63.7	10.4	-43.4
-8.4									
MdyT	41.1	-100.8	-76.0	-77.7	-65.7	-79.4	-67.5	8.7	-68.8
6.6									
COMB	( 0 )	( 2 )	( 2 )	( 10 )	( 10 )	( 4 )	( 4 )	( 13 )	( 5 )
( 5 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	19.8	19.8	20.2	20.2	20.2	20.5	20.5	20.5	21.3
20.5									
MdxT	-12.5	-41.8	-33.5	-74.9	15.7	9.2	-46.7	-13.7	9.4
-14.8									
MdyT	-111.9	-79.4	-76.0	-65.1	8.1	-79.4	-74.5	6.3	9.8
-99.8									
COMB	( 6 )	( 6 )	( 8 )	( 8 )	( 17 )	( 9 )	( 11 )	( 9 )	( 10 )
( 11 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	20.5	21.2	20.7	20.7	20.9	20.9	19.7	19.7	19.7
20.9									
MdxT	2.4	2.1	-27.4	-66.9	-1.8	-5.9	-14.6	-45.4	2.5
2.1									
MdyT	18.8	-1.3	-78.3	-65.9	-80.4	8.8	-110.9	-77.8	25.1
-8.5									
COMB	( 11 )	( 12 )	( 13 )	( 13 )	( 14 )	( 14 )	( 15 )	( 15 )	( 15 )
( 16 )									
CARR	41	42	43	44	45	46			
FdzT	20.2	20.2	20.4	21.5	21.5	21.5			
MdxT	-35.6	-77.6	-11.2	-64.9	-64.9	64.9			
MdyT	-75.0	-63.6	8.4	41.1	-41.1	-41.1			
COMB	( 17 )	( 17 )	( 18 )	( 0 )	( 0 )	( 0 )			

LANCE: 5

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	10.2	10.2	10.2	10.2	10.2	10.0	9.9	9.9	10.1
10.0									
MdxT	21.0	-21.0	.0	.0	94.4	-5.0	94.2	-19.3	-21.6
92.0									
MdyT	.0	.0	27.4	-27.4	194.7	46.2	166.0	44.5	42.1
180.9									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 3 )	( 10 )	( 2 )	( 2 )	( 14 )
( 10 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	9.9	10.1	10.1	9.3	9.3	9.8	9.8	9.4	9.4
9.7									
MdxT	-16.2	100.8	-24.6	89.3	-17.5	89.3	-18.3	78.4	-9.5
100.2									
MdyT	47.3	182.4	39.3	145.2	47.5	192.9	40.6	165.6	49.1
172.3									
COMB	( 11 )	( 5 )	( 5 )	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )	( 8 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	9.7	10.1	9.9	9.9	9.3	9.7	9.4	9.7	10.2
10.2									
MdxT	-26.3	-16.8	87.1	-11.5	-14.4	-15.4	-6.6	-23.2	-14.9
14.9									
MdyT	38.9	43.3	175.6	48.3	50.4	43.4	52.1	41.9	-19.4
-19.4									
COMB	( 9 )	( 12 )	( 13 )	( 13 )	( 15 )	( 16 )	( 17 )	( 18 )	( 0 )
( 0 )									

P10

LANCE: 1

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	35.3	36.7	38.3	38.3	38.3	38.3	38.3	38.3	31.8
31.8									
MdxT	18.6	19.3	79.3	-79.3	.0	.0	-56.1	56.1	-33.2
18.1									
MdyT	.0	.0	.0	.0	103.5	-103.5	73.2	73.2	66.8
26.5									
COMB	( 3 )	( 12 )	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	35.3	33.9	33.9	33.2	33.2	30.0	30.0	35.7	35.7
33.2									
MdxT	-34.3	-27.4	20.7	-40.0	18.8	-31.4	17.2	-33.2	18.1
-34.6									
MdyT	-22.5	22.8	12.2	21.3	26.5	96.2	34.3	-52.6	-10.5
67.1									
COMB	( 3 )	( 4 )	( 4 )	( 5 )	( 11 )	( 6 )	( 6 )	( 7 )	( 7 )
( 11 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	33.4	32.3	32.3	36.7	35.3	35.3	34.6	34.6	31.3
31.3									
MdxT	21.6	-42.7	13.6	-35.7	-28.8	21.4	-41.3	16.7	-32.6
17.8									
MdyT	10.2	20.4	13.4	-22.4	23.1	12.0	21.6	14.0	96.3
34.2									
COMB	( 8 )	( 9 )	( 9 )	( 12 )	( 13 )	( 13 )	( 14 )	( 14 )	( 15 )
( 15 )									
CARR	31	32	33	34	35	36	37	38	
FdzT	37.1	37.1	34.7	34.7	33.7	33.7	38.3	38.3	
MdxT	-34.6	18.8	-23.2	22.3	-44.0	14.3	-56.1	56.1	

ENGENHARIA E COMÉRCIO LTDA.									
MdyT	-52.4	-10.5	23.2	10.2	20.7	13.4	-73.2	-73.2	
COMB	( 16 )	( 16 )	( 17 )	( 17 )	( 18 )	( 18 )	( 0 )	( 0 )	
LANÇE: 2									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	25.4	25.4
25.4									
MdxT	155.4	-155.4	.0	.0	-109.9	-109.9	109.9	-13.4	-64.2
12.2									
MdyT	.0	.0	85.9	-85.9	-60.7	60.7	60.7	-88.6	59.4
112.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	28.5	28.5	28.5	27.2	27.2	26.7	26.7	26.8	23.7
23.7									
MdxT	-13.6	-69.1	12.5	-31.9	110.7	4.9	-70.4	-66.6	-13.0
-60.9									
MdyT	2.5	-23.5	-23.5	-44.4	45.8	-41.7	42.8	61.1	-115.8
71.4									
COMB	( 3 )	( 3 )	( 3 )	( 4 )	( 4 )	( 5 )	( 5 )	( 11 )	( 6 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	23.7	28.9	28.9	28.9	26.7	26.7	26.7	25.9	25.9
25.9									
MdxT	11.6	-13.3	-69.1	12.0	-43.7	108.8	58.4	17.4	-100.0
-34.7									
MdyT	153.4	35.8	-72.5	-72.5	-42.3	42.8	42.8	-37.7	37.9
37.9									
COMB	( 6 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )
( 9 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	31.5	26.8	26.8	29.9	29.9	29.9	28.6	28.1	28.1
25.1									
MdxT	-13.7	-13.6	12.5	-13.7	-71.5	12.7	113.6	4.8	-72.1
-13.2									
MdyT	-37.8	-86.2	111.0	4.9	-24.6	-24.6	44.7	-39.3	41.7
-113.4									
COMB	( 10 )	( 11 )	( 11 )	( 12 )	( 12 )	( 12 )	( 13 )	( 14 )	( 14 )
( 15 )									
CARR	41	42	43	44	45	46	47	48	49
50									
FdzT	25.1	25.1	30.2	30.2	30.2	28.1	28.1	28.1	27.3
27.3									
MdxT	-63.2	11.9	-13.4	-71.4	12.3	-44.0	113.2	58.7	17.2
-102.2									
MdyT	73.2	152.3	38.1	-73.6	-73.6	-39.9	41.7	41.7	-35.3
36.8									
COMB	( 15 )	( 15 )	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 17 )	( 18 )
( 18 )									
CARR	51								
50									
FdzT	31.8								
31.8									
MdxT	109.9								
109.9									
MdyT	-60.7								
-60.7									
COMB	( 0 )								

LANÇE: 3									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	25.9	25.9	22.4	25.9	25.9	25.9	25.9	20.2	20.2
20.2									
MdxT	97.0	-97.0	.0	.0	.0	-68.6	53.7	-14.7	41.8
16.0									
MdyT	.0	.0	63.3	70.0	-70.0	-49.5	66.2	-78.0	50.7
100.2									
COMB	( 0 )	( 0 )	( 14 )	( 0 )	( 0 )	( 0 )	( 1 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	21.9	21.8	21.0	21.0	21.0	20.9	20.9	19.1	19.1
19.1									
MdxT	-81.2	48.5	-34.7	-67.0	30.8	5.2	43.3	-14.1	39.6
15.5									
MdyT	48.6	57.5	-32.9	48.7	65.2	-31.9	47.6	-103.7	50.9
119.6									
COMB	( 17 )	( 18 )	( 4 )	( 4 )	( 4 )	( 5 )	( 5 )	( 6 )	( 6 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	21.8	21.8	20.5	20.5	20.5	20.4	20.4	20.4	25.6
25.6									
MdxT	-14.4	21.4	-47.5	-59.2	40.2	18.9	43.6	-9.0	-5.9
53.0									
MdyT	48.2	-28.3	-28.4	47.5	61.2	-27.0	45.6	57.3	-41.7
66.8									
COMB	( 7 )	( 18 )	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )	( 9 )	( 10 )
( 10 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	21.6	21.6	21.6	23.2	23.2	22.4	22.4	22.4	22.4
22.4									
MdxT	-12.0	44.7	14.7	-12.2	48.0	-32.1	-64.6	29.4	7.8
46.3									
MdyT	-79.5	51.9	100.7	11.8	28.3	-34.3	49.8	65.5	-33.5
48.7									

ENGENHARIA E COMÉRCIO LTDA.									
COMB	( 11 )	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )	( 13 )	( 14 )
( 14 )									
CARR	41	42	43	44	45	46	47	48	49
50									
FdzT	20.5	20.5	20.5	23.1	23.1	23.1	21.9	21.9	21.8
25.9									
MdxT	-11.6	42.5	14.3	-11.9	47.9	14.4	-44.8	38.9	-10.2
68.6									
MdyT	-105.0	52.1	119.8	46.9	46.9	- .8	-29.8	61.5	57.5
49.5									
COMB	( 15 )	( 15 )	( 15 )	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 18 )
( 0 )									
CARR	51	52							
FdzT	25.9	25.9							
MdxT	-68.6	68.6							
MdyT	49.5	-49.5							
COMB	( 0 )	( 0 )							

LANCE: 4

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	19.4	19.4	18.7	18.4	19.4	19.4	19.4	19.4	19.4
17.8									
MdxT	82.8	-82.8	.0	.0	.0	.0	21.0	55.6	-58.5
5.7									
MdyT	.0	.0	-2.4	-11.8	52.5	-52.5	-75.2	-60.4	37.1
-94.8									
COMB	( 0 )	( 0 )	( 12 )	( 16 )	( 0 )	( 0 )	( 1 )	( 1 )	( 0 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	17.8	17.8	18.4	18.3	18.2	18.2	18.2	18.1	18.1
18.1									
MdxT	36.9	3.2	38.1	56.0	-7.6	39.2	11.9	18.6	50.3
-5.2									
MdyT	-69.0	17.8	-60.6	-58.9	-74.2	-62.2	4.9	-71.7	-60.6
4.9									
COMB	( 2 )	( 2 )	( 13 )	( 14 )	( 4 )	( 4 )	( 4 )	( 5 )	( 5 )
( 5 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	17.1	17.1	17.1	17.8	17.8	17.8	17.6	17.6	17.6
19.2									
MdxT	5.7	35.5	2.8	-16.4	47.9	17.4	27.0	62.1	-11.1
19.6									
MdyT	-106.8	-72.3	25.8	-72.4	-60.9	4.2	-68.2	-58.1	4.3
-75.3									
COMB	( 6 )	( 6 )	( 6 )	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )	( 9 )
( 10 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	19.2	19.2	18.0	18.0	18.0	18.7	18.7	18.4	18.4
18.3									
MdxT	53.1	-10.6	9.4	37.4	- .7	8.8	38.7	-3.9	8.0
22.1									
MdyT	-59.1	16.9	-95.5	-67.4	23.4	-51.7	-51.2	-74.8	10.4
-72.2									
COMB	( 10 )	( 10 )	( 11 )	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )
( 14 )									
CARR	41	42	43	44	45	46	47	48	49
50									
FdzT	18.3	17.4	17.4	17.4	18.0	18.0	17.8	17.8	19.4
19.4									
MdxT	-9.0	9.1	35.9	- .8	-13.0	13.6	67.3	-14.7	58.5
-58.5									
MdyT	10.5	-107.2	-70.7	31.1	-72.8	9.7	-56.6	9.7	37.1
-37.1									
COMB	( 14 )	( 15 )	( 15 )	( 15 )	( 17 )	( 17 )	( 18 )	( 18 )	( 0 )
( 0 )									
CARR	51								
FdzT	19.4								
MdxT	58.5								
MdyT	-37.1								
COMB	( 0 )								

LANCE: 5

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	10.0	10.0	10.0	10.0	10.0	9.9	9.8	9.8	9.9
10.0									
MdxT	20.7	-20.7	.0	.0	-96.0	14.7	-95.9	29.7	31.8
-102.5									
MdyT	.0	.0	27.1	-27.1	194.5	34.2	167.0	29.7	29.1
182.8									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 3 )	( 10 )	( 2 )	( 2 )	( 13 )
( 4 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	10.0	9.8	9.7	9.2	9.2	9.6	9.6	9.6	9.6
9.3									
MdxT	35.1	-89.5	26.3	-90.9	27.7	-91.1	29.1	-101.9	36.8
-80.1									
MdyT	25.6	178.6	33.3	146.6	31.9	192.1	29.3	172.8	25.1
165.9									
COMB	( 4 )	( 5 )	( 11 )	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )	( 8 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
FdzT	9.3	10.0	9.8	9.2	9.6	9.5	9.2	10.0	10.0
MdxT	20.0	27.2	21.7	24.5	25.9	33.6	16.8	-14.7	14.7
MdyT	36.1	31.6	35.8	35.4	32.8	28.6	39.6	-19.1	-19.1

ENGENHARIA E COMÉRCIO LTDA.

COMB ( 9 ) ( 12 ) ( 14 ) ( 15 ) ( 16 ) ( 17 ) ( 18 ) ( 0 ) ( 0 )

## P11

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	120.1	120.1	120.1	120.1	117.0	116.4	120.1	120.1	120.1
120.1									
MdxT	615.0	-615.0	.0	.0	283.8	-20.9	434.9	434.9	-434.9
289.2									
MdyT	.0	.0	360.2	-360.2	247.0	63.8	-254.7	254.7	254.7
177.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 11 )	( 1 )	( 0 )	( 0 )	( 0 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	120.1	119.5	119.5	114.8	115.2	115.2	116.8	116.8	116.8
115.8									
MdxT	-434.9	298.9	-45.8	275.9	277.2	-19.0	39.6	279.6	-18.9
-322.8									
MdyT	-254.7	45.1	45.1	-283.8	278.1	368.3	278.2	-284.3	-284.3
43.5									
COMB	( 0 )	( 5 )	( 5 )	( 16 )	( 6 )	( 6 )	( 7 )	( 7 )	( 7 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	114.6	117.0	118.0	117.4	117.4	113.2	113.2	113.2	114.8
113.8									
MdxT	-21.1	-19.9	-19.7	295.1	-45.8	39.6	273.5	-19.0	-18.8
-319.4									
MdyT	62.9	247.0	-144.9	45.8	45.8	-203.3	275.8	368.9	-283.8
43.0									
COMB	( 10 )	( 11 )	( 12 )	( 14 )	( 14 )	( 15 )	( 15 )	( 15 )	( 16 )
( 18 )									

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	77.2	77.2	77.2	77.2	72.9	73.3	72.5	77.2	77.2
77.2									
MdxT	276.7	-276.7	.0	.0	58.0	-151.8	-64.7	195.6	-195.6
50.3									
MdyT	.0	.0	231.5	-231.5	151.3	171.2	-76.4	163.7	163.7
268.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 16 )	( 17 )	( 0 )	( 0 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	77.2	77.2	77.2	73.5	73.5	75.5	75.5	75.5	74.3
74.6									
MdxT	-159.8	-60.6	-195.6	47.6	-152.1	48.0	-156.2	-58.0	153.8
-154.5									
MdyT	170.5	-207.3	-163.7	-27.4	77.1	348.0	184.9	-286.2	170.2
150.4									
COMB	( 3 )	( 3 )	( 0 )	( 6 )	( 6 )	( 7 )	( 7 )	( 7 )	( 9 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	74.6	75.0	71.0	71.0	71.0	73.8	75.0	74.5	71.3
71.3									
MdxT	-64.5	-60.9	55.9	-146.9	-63.1	-152.7	50.8	-64.8	48.2
-147.6									
MdyT	-95.6	-187.6	119.1	119.1	-58.0	30.5	236.0	-73.2	-58.8
96.3									
COMB	( 8 )	( 12 )	( 10 )	( 10 )	( 10 )	( 11 )	( 12 )	( 13 )	( 15 )
( 15 )									
CARR	31	32	33	34	35	36			
FdzT	73.3	73.3	72.5	72.1	72.1	77.2			
MdxT	48.6	-58.2	-150.0	152.6	-51.4	195.6			
MdyT	316.7	-267.0	119.0	138.9	-94.2	-163.7			
COMB	( 16 )	( 16 )	( 17 )	( 18 )	( 18 )	( 0 )			

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.0	32.2
32.0									
MdxT	139.2	-139.2	.0	.0	98.4	-117.5	-51.7	118.4	-101.1
-51.4									
MdyT	.0	.0	98.0	-98.0	69.3	-147.2	-181.7	-134.6	-130.3
-200.9									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 5 )	( 2 )
( 5 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	32.0	32.0	32.0	32.2	32.0	31.6	31.6	31.6	31.6
31.6									
MdxT	35.4	-97.6	-38.5	-81.0	52.9	32.5	-93.5	-36.1	61.7
129.8									
MdyT	134.4	-130.6	-243.2	-134.2	61.0	187.2	-125.1	-270.1	65.0
-131.8									
COMB	( 3 )	( 3 )	( 3 )	( 4 )	( 5 )	( 7 )	( 7 )	( 7 )	( 9 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	31.6	30.7	30.6	30.7	31.1	31.2	31.1	31.0	31.0
31.0									

ENGENHARIA E COMÉRCIO LTDA.									
MdxT	-57.5	76.4	129.4	-65.4	68.0	120.7	-59.4	50.4	113.5
-46.5									
MdyT	-199.6	218.1	-108.0	-246.1	215.3	-103.3	-247.5	288.8	-115.9
-289.8									
COMB	( 9 )	( 18 )	( 10 )	( 18 )	( 14 )	( 11 )	( 14 )	( 12 )	( 12 )
( 12 )									
CARR	31	32	33	34	35	36	37		
FdzT	30.9	30.7	30.7	30.7	30.9	32.7	32.7		
MdxT	120.5	47.2	108.5	-44.0	-77.3	-98.4	98.4		
MdyT	-103.3	340.5	136.2	-316.5	-96.6	69.3	-69.3		
COMB	( 15 )	( 16 )	( 16 )	( 16 )	( 17 )	( 0 )	( 0 )		

LANCE: 5

CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

	1	2	3	4	5	6	7	8	9
CARR	10								
FdzT	3.2	3.4	3.4	2.6	2.5	2.7	2.5	2.7	3.3
3.3									
MdxT	-0.6	26.5	-26.5	.0	.0	.0	.0	.0	.0
.0									
MdyT	.0	.0	.0	-20.9	-35.0	1.4	-47.2	13.4	-3.8
19.6									
COMB	( 17 )	( 0 )	( 0 )	( 1 )	( 2 )	( 3 )	( 6 )	( 7 )	( 10 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	3.3	3.4	3.4	2.6	2.6	2.5	2.5	2.7	2.7
2.6									
MdxT	.0	.0	.0	-41.9	-25.9	-28.2	-12.7	-40.3	-23.8
-42.0									
MdyT	2.2	31.5	-10.2	-13.2	6.2	-18.2	14.6	-8.6	-9.9
-11.9									
COMB	( 18 )	( 16 )	( 0 )	( 1 )	( 1 )	( 2 )	( 2 )	( 3 )	( 3 )
( 5 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	2.5	2.5	2.7	2.7	2.6	2.6	3.3	3.2	3.2
3.2									
MdxT	-23.5	-8.7	-43.8	-27.0	-46.5	-30.5	-62.6	-0.6	-45.0
-25.3									
MdyT	-22.1	23.0	-8.7	-17.9	-11.5	2.8	10.1	-16.8	10.2
21.8									
COMB	( 6 )	( 6 )	( 7 )	( 7 )	( 9 )	( 9 )	( 18 )	( 11 )	( 11 )
( 11 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	3.3	3.3	3.3	3.1	3.1	3.1	3.4	3.4	3.3
3.4									
MdxT	-56.7	-36.3	-43.3	-0.6	-40.2	-21.0	-60.0	-39.3	-42.8
18.8									
MdyT	14.8	-2.5	9.5	-29.0	12.1	30.2	18.8	-10.4	10.2
7.2									
COMB	( 12 )	( 12 )	( 13 )	( 15 )	( 15 )	( 15 )	( 16 )	( 16 )	( 18 )
( 0 )									
CARR	41								
FdzT	3.4								
MdxT	18.8								
MdyT	-7.2								
COMB	( 0 )								

## P12

LANCE: 2

CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

	1	2	3	4	5	6	7	8	9
CARR	10								
FdzT	61.7	61.7	61.7	61.7	61.5	60.8	61.7	61.5	59.7
59.7									
MdxT	316.1	-316.1	.0	.0	-284.2	80.8	-223.5	53.3	-280.2
53.5									
MdyT	.0	.0	185.1	-185.1	181.0	63.1	-130.9	247.8	164.8
-142.1									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 2 )	( 4 )	( 0 )	( 2 )	( 3 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	60.8	60.4	60.4	60.4	57.4	57.4	57.4	59.3	59.3
58.5									
MdxT	-288.6	-99.7	-274.5	50.8	-99.7	-267.8	50.8	-281.8	96.5
-260.4									
MdyT	63.1	-190.3	218.6	370.4	256.5	-133.6	-278.9	62.9	62.9
40.9									
COMB	( 4 )	( 6 )	( 6 )	( 6 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	58.5	61.7	61.7	61.7	61.0	61.0	60.6	60.6	60.6
59.5									
MdxT	5.2	-104.0	-283.6	53.1	-288.0	80.4	-99.0	-274.0	50.4
-281.1									
MdyT	28.8	-104.2	181.6	248.6	63.8	63.8	-190.7	219.1	371.1
63.6									
COMB	( 9 )	( 11 )	( 11 )	( 11 )	( 13 )	( 13 )	( 15 )	( 15 )	( 15 )
( 17 )									
CARR	31	32	33						
FdzT	59.5	61.7	61.7						
MdxT	96.0	223.5	223.5						
MdyT	63.6	130.9	-130.9						
COMB	( 17 )	( 0 )	( 0 )						

LANCE: 3  
 CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

ENGENHARIA E COMÉRCIO LTDA.									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	37.7	37.7	37.7	37.7	37.6	37.6	37.6	37.7	37.5
37.7									
MdxT	135.2	-135.2	.0	.0	-113.1	143.2	143.2	-105.0	139.4
140.1									
MdyT	.0	.0	113.1	-113.1	-25.8	-25.8	-25.5	-134.3	-91.9
85.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 10 )	( 11 )	( 2 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	36.6	36.6	37.5	36.9	37.0	37.0	35.3	35.6	35.3
36.6									
MdxT	-102.3	139.4	-120.0	143.5	-99.5	133.1	-97.3	133.3	132.4
-124.6									
MdyT	112.4	-124.0	-20.7	-29.0	-209.9	148.8	198.9	84.1	-196.1
-20.7									
COMB	( 3 )	( 3 )	( 13 )	( 5 )	( 15 )	( 15 )	( 7 )	( 16 )	( 7 )
( 17 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	35.6	35.7	37.6	37.7	36.9	36.9	37.1	35.6	36.0
37.7									
MdxT	-100.1	141.1	143.2	140.1	-105.3	140.1	144.3	133.3	-75.0
-95.6									
MdyT	196.4	-37.7	-5.2	-91.7	109.8	-119.0	-23.8	-191.1	7.3
80.0									
COMB	( 16 )	( 9 )	( 10 )	( 11 )	( 12 )	( 12 )	( 14 )	( 16 )	( 18 )
( 0 )									

LANCE: 4

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	10.6	10.6	10.6	10.6	10.5	10.6	10.5	10.4	10.6
10.4									
MdxT	45.3	-45.3	.0	.0	-110.0	-98.6	95.3	-94.1	-96.3
79.1									
MdyT	.0	.0	31.9	-31.9	9.9	-56.3	-42.7	89.3	-98.6
-105.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 11 )	( 1 )	( 3 )	( 15 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	10.6	10.6	10.6	10.2	10.2	10.2	10.4	10.4	10.6
10.6									
MdxT	-104.3	88.1	80.4	-91.8	-36.7	76.3	-108.8	91.1	-109.2
83.4									
MdyT	20.7	-54.9	44.0	133.4	-54.2	-135.5	19.0	-51.2	-2.8
9.5									
COMB	( 4 )	( 4 )	( 15 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )	( 10 )
( 11 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	10.5	10.5	10.3	10.3	10.3	10.5	10.5	10.6	10.6
10.5									
MdxT	-98.4	83.6	-96.0	-38.4	80.6	-113.0	95.6	-32.1	-32.1
10.5									
MdyT	73.8	-87.8	118.0	-47.3	-118.2	3.8	-33.9	22.6	22.6
10.5									
COMB	( 12 )	( 12 )	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 0 )	( 0 )

## P13

LANCE: 2

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	59.6	59.6	59.6	59.6	58.4	58.4	57.4	58.0	57.4
59.6									
MdxT	305.5	-305.5	.0	.0	284.2	-79.8	105.7	278.0	-51.8
282.1									
MdyT	.0	.0	178.9	-178.9	-154.1	147.1	-267.7	151.0	313.7
-43.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 5 )	( 5 )	( 2 )	( 11 )	( 2 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	59.6	58.1	58.0	58.5	55.1	55.7	55.1	58.5	56.7
56.7									
MdxT	-216.0	272.2	-51.9	271.5	99.8	264.7	-48.7	-49.8	276.2
-95.3									
MdyT	-126.5	-137.2	312.5	-171.2	-340.6	184.4	422.7	-171.2	-151.5
145.2									
COMB	( 0 )	( 4 )	( 11 )	( 16 )	( 6 )	( 15 )	( 6 )	( 16 )	( 9 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	56.7	58.9	58.9	58.0	55.7	55.7	57.3	57.3	59.6
59.6									
MdxT	106.8	286.0	-79.9	106.1	100.2	-49.0	278.0	-95.6	216.0
-216.0									
MdyT	-151.5	-151.6	145.9	-265.2	-338.1	421.4	-149.1	143.9	126.5
126.5									
COMB	( 9 )	( 14 )	( 14 )	( 11 )	( 15 )	( 15 )	( 18 )	( 18 )	( 0 )
( 0 )									
CARR	31								
30									
FdzT	59.6								
59.6									
MdxT	216.0								
216.0									
MdyT	-126.5								
-126.5									
COMB	( 0 )								

LANCE: 3  
 CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

ENGENHARIA E COMÉRCIO LTDA.									
	1	2	3	4	5	6	7	8	9
CARR 10									
FdzT 32.5	33.0	33.0	33.0	33.0	32.7	32.8	31.6	31.6	32.1
MdxT -128.5	118.3	-118.3	.0	.0	84.0	-128.2	70.3	-125.0	85.5
MdyT 260.3	.0	.0	99.0	-99.0	-262.8	261.9	-367.5	371.3	-268.8
COMB ( 13 )	( 0 )	( 0 )	( 0 )	( 0 )	( 14 )	( 1 )	( 2 )	( 2 )	( 5 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 31.4	31.9	31.9	32.2	30.5	30.5	30.5	31.1	31.0	31.0
MdxT 91.8	-134.1	-128.9	-124.6	66.5	-118.3	-118.3	65.1	-136.2	-124.9
MdyT -263.3	105.4	263.6	368.1	-427.6	-171.0	420.8	-421.7	96.6	241.5
COMB ( 9 )	( 4 )	( 4 )	( 11 )	( 6 )	( 6 )	( 6 )	( 15 )	( 8 )	( 8 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 33.0	32.9	32.9	32.2	32.5	32.7	31.1	31.1	31.6	32.0
MdxT 83.6	76.4	-127.3	68.9	-135.8	-120.4	-119.2	-117.9	-137.8	90.4
MdyT 70.0	-239.1	264.6	-361.3	104.1	285.9	-168.7	417.6	95.3	-257.5
COMB ( 0 )	( 10 )	( 10 )	( 11 )	( 13 )	( 14 )	( 15 )	( 15 )	( 17 )	( 18 )
CARR 31									
FdzT 33.0									
MdxT -83.6									
MdyT -70.0									
COMB ( 0 )									

LANCE: 4

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

	1	2	3	4	5	6	7	8	9
CARR 10									
FdzT 8.8	9.5	9.5	9.5	9.5	9.4	9.5	9.4	8.8	8.8
MdxT -14.8	40.5	-40.5	.0	.0	57.5	-38.5	-42.8	11.2	-33.0
MdyT 173.5	.0	.0	28.5	-28.5	-125.0	103.2	128.5	-185.6	-74.3
COMB ( 2 )	( 0 )	( 0 )	( 0 )	( 0 )	( 18 )	( 10 )	( 18 )	( 2 )	( 2 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 8.7	8.9	9.0	8.9	9.0	8.7	8.7	8.7	8.7	8.7
MdxT 1.7	27.7	-32.3	-29.1	-30.8	10.8	-32.0	-14.3	-6.7	-20.6
MdyT 107.5	-128.0	30.7	127.5	50.7	-226.7	-90.7	205.2	-103.9	43.0
COMB ( 8 )	( 9 )	( 3 )	( 9 )	( 5 )	( 6 )	( 6 )	( 6 )	( 8 )	( 8 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 9.4	9.4	9.3	9.3	9.3	9.4	9.2	9.2	9.2	9.2
MdxT 25.1	52.1	42.0	42.4	-29.0	39.3	40.7	41.5	-28.0	36.1
MdyT 51.4	51.1	-182.6	-73.0	174.3	46.3	-223.7	-89.5	206.1	43.3
COMB ( 18 )	( 14 )	( 11 )	( 11 )	( 11 )	( 13 )	( 15 )	( 15 )	( 15 )	( 17 )
CARR 31		32							
FdzT 9.5		9.5							
MdxT -28.6		28.6							
MdyT -20.1		-20.1							
COMB ( 0 )		( 0 )							

## P14

LANCE: 2

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

	1	2	3	4	5	6	7	8	9
CARR 10									
FdzT 182.1	182.1	182.1	182.1	182.1	175.7	175.6	181.5	182.1	181.5
MdxT 659.5	932.7	-932.7	.0	.0	363.7	-11.1	24.5	377.0	-10.9
MdyT -424.9	.0	.0	601.0	-601.0	-346.8	780.6	-541.9	582.8	589.5
COMB ( 0 )	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 15 )	( 11 )	( 2 )	( 11 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 178.9	182.1	181.1	182.1	175.6	176.2	176.2	175.0	175.7	175.0
MdxT 370.3	-659.5	374.9	-659.5	24.9	364.8	-9.0	-425.4	380.4	-62.4
MdyT -355.6	-424.9	-322.1	424.9	-668.4	435.0	774.2	-312.6	-289.5	266.6
COMB ( 10 )	( 0 )	( 13 )	( 0 )	( 15 )	( 6 )	( 6 )	( 18 )	( 8 )	( 18 )
CARR 30	21	22	23	24	25	26			
FdzT 178.9	178.9	181.5	181.1	174.5	175.0	182.1			
MdxT 178.9	-12.3	375.6	31.4	25.3	374.9	659.5			
MdyT 178.9	293.4	589.5	-328.3	53.5	-302.4	424.9			

ENGENHARIA E COMÉRCIO LTDA.

COMB	( 10 )	( 11 )	( 14 )	( 16 )	( 17 )	( 0 )			
LANCE: 3									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	110.2	110.2	110.2	110.2	104.9	104.9	104.9	110.2	110.2
110.2									
MdxT	395.1	-395.1	.0	.0	60.9	217.2	-48.7	57.1	228.1
-46.6									
MdyT	.0	.0	363.7	-363.7	-579.6	274.5	613.1	-733.5	-295.3
725.8									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	109.8	109.8	109.7	107.3	107.3	107.3	105.8	106.6	106.6
106.5									
MdxT	-227.2	-52.1	72.4	55.4	222.2	-46.3	219.0	-220.6	-55.4
80.9									
MdyT	-267.8	586.2	-601.9	-793.8	-317.5	787.8	-345.1	-257.1	555.4
-574.4									
COMB	( 4 )	( 4 )	( 5 )	( 6 )	( 6 )	( 6 )	( 7 )	( 8 )	( 8 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	108.3	109.9	109.9	109.5	109.5	107.0	107.0	105.5	106.3
106.2									
MdxT	224.3	-227.6	-42.6	-48.0	226.6	-221.6	-42.1	-218.4	-51.2
219.9									
MdyT	288.0	298.8	728.3	588.7	271.7	316.1	790.2	338.0	557.8
262.5									
COMB	( 10 )	( 11 )	( 11 )	( 13 )	( 14 )	( 15 )	( 15 )	( 16 )	( 17 )
( 18 )									
CARR	31	32	33	34					
FdzT	110.2	110.2	110.2	110.2					
MdxT	279.4	-279.4	-279.4	279.4					
MdyT	257.2	257.2	-257.2	-257.2					
COMB	( 0 )	( 0 )	( 0 )	( 0 )					

LANCE: 4									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	37.9	37.9	37.9	37.9	33.3	33.3	33.3	37.4	37.5
37.4									
MdxT	161.5	-161.5	.0	.0	75.0	-106.6	-76.6	171.6	-146.8
-107.9									
MdyT	.0	.0	125.0	-125.0	-268.4	122.3	305.8	-393.3	142.0
375.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 11 )	( 2 )
( 11 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	37.9	37.6	37.8	37.6	36.9	37.0	36.9	37.6	37.3
37.5									
MdxT	-146.6	189.4	177.8	-120.3	170.4	-143.8	-106.0	-143.3	199.9
177.1									
MdyT	170.4	-286.9	156.6	335.4	-454.2	-156.1	390.7	180.4	-277.1
166.8									
COMB	( 3 )	( 14 )	( 12 )	( 14 )	( 15 )	( 6 )	( 15 )	( 7 )	( 18 )
( 16 )									
CARR	21	22	23	24	25	26	27	28	29
FdzT	37.3	36.8	36.8	36.8	37.4	37.6	37.3	37.9	37.9
MdxT	-126.4	177.5	177.5	-114.8	176.8	189.4	199.9	-114.2	199.9
MdyT	324.4	-321.6	130.4	326.1	-157.3	136.2	133.0	-88.4	133.0
COMB	( 18 )	( 10 )	( 10 )	( 10 )	( 11 )	( 14 )	( 18 )	( 0 )	( 0 )

LANCE: 5									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	2.8	2.8	2.8	2.8	2.1	2.0	2.0	2.0	2.0
2.1									
MdxT	8.1	-8.1	.0	.0	-9.8	6.2	-7.1	-9.4	1.4
-11.9									
MdyT	.0	.0	8.1	-8.1	50.1	-43.4	44.7	41.2	-37.9
44.5									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 9 )	( 1 )	( 2 )	( 4 )	( 2 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.8	2.8
2.8									
MdxT	7.6	4.2	-9.7	-.7	-13.6	9.7	4.9	21.7	-11.0
-27.6									
MdyT	-37.7	-34.0	48.0	-37.9	44.2	-37.5	-44.1	184.9	74.0
-159.7									
COMB	( 3 )	( 4 )	( 5 )	( 6 )	( 7 )	( 7 )	( 9 )	( 10 )	( 10 )
( 10 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	2.7	2.7	2.8	2.8	2.8	2.7	2.7	2.7	2.8
2.8									
MdxT	-12.4	-30.8	18.5	-11.4	-27.4	22.1	-13.0	-32.5	17.9
-11.3									
MdyT	72.8	-155.5	185.4	74.1	-159.2	180.9	72.4	-154.7	186.3
74.5									
COMB	( 11 )	( 11 )	( 14 )	( 14 )	( 14 )	( 15 )	( 15 )	( 15 )	( 18 )
( 18 )									
CARR	31	32							
FdzT	2.8	2.8							



ENGENHARIA E COMÉRCIO LTDA.

MdxT -26.9 5.8  
 MdyT -160.9 -5.8  
 COMB ( 18 ) ( 0 )

## P15

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	171.9	171.9	171.9	171.9	167.2	165.2	170.9	171.9	170.9
171.9									
MdxT	880.4	-880.4	.0	.0	-346.1	13.2	-22.8	-622.6	12.9
-622.6									
MdyT	.0	.0	567.3	-567.3	-385.1	825.7	-597.7	401.1	628.9
-401.1									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 15 )	( 11 )	( 0 )	( 11 )
( 0 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	171.9	170.4	171.9	165.2	166.2	165.4	164.3	164.3	164.3
169.0									
MdxT	622.6	-29.5	622.6	-23.2	-344.0	-362.8	411.0	-34.2	64.3
-349.8									
MdyT	-401.1	-380.1	401.1	-725.8	425.0	-340.8	-363.7	-363.7	297.4
-392.3									
COMB	( 0 )	( 13 )	( 0 )	( 15 )	( 6 )	( 9 )	( 17 )	( 17 )	( 17 )
( 10 )									
CARR	21	22	23	24	25				
20									
FdzT	169.0	170.4	164.4	164.4	163.5				
169.0									
MdxT	13.3	-352.7	-38.8	-356.0	12.3				
-349.8									
MdyT	317.0	-371.3	270.6	-348.9	-257.7				
-392.3									
COMB	( 10 )	( 14 )	( 18 )	( 18 )	( 16 )				

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	106.1	106.1	106.1	106.1	102.2	103.2	102.2	106.1	106.1
106.1									
MdxT	380.5	-380.5	.0	.0	-54.6	-213.6	41.9	-50.8	-219.7
39.8									
MdyT	.0	.0	350.3	-350.3	-478.0	316.4	577.4	-635.2	308.8
704.6									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 6 )	( 1 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	105.7	105.7	105.7	103.2	103.2	101.7	102.4	102.5	102.5
104.1									
MdxT	-65.9	218.8	45.4	-49.3	39.2	-210.4	-74.5	212.1	48.3
-215.4									
MdyT	-499.8	281.0	563.2	-696.6	764.7	310.2	-471.2	270.2	529.3
301.2									
COMB	( 4 )	( 5 )	( 5 )	( 6 )	( 6 )	( 7 )	( 8 )	( 9 )	( 9 )
( 10 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	105.3	104.4	104.4	104.8	104.8	102.4	100.8	100.8	106.1
106.1									
MdxT	218.0	-33.2	35.1	-217.0	29.5	211.9	-31.2	208.8	269.1
-269.1									
MdyT	317.3	-328.2	429.4	292.0	570.8	324.7	-204.1	307.9	247.7
247.7									
COMB	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )	( 15 )	( 16 )	( 16 )	( 0 )
( 0 )									
CARR	31	32							
30									
FdzT	106.1	106.1							
106.1									
MdxT	-269.1	269.1							
-269.1									
MdyT	-247.7	-247.7							
247.7									
COMB	( 0 )	( 0 )							

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	39.9	39.9	39.9	39.9	36.5	36.5	36.5	39.5	39.5
39.5									
MdxT	170.1	-170.1	.0	.0	-76.4	-116.3	72.1	-66.2	-147.4
62.7									
MdyT	.0	.0	131.7	-131.7	-182.4	-88.2	173.6	-266.4	-122.2
224.6									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	39.9	39.8	39.8	39.7	38.9	39.1	38.9	39.2	39.1
39.3									
MdxT	-147.3	-83.7	75.0	124.3	-185.4	-202.9	107.4	-192.2	119.7
108.2									
MdyT	122.3	-160.6	186.8	102.4	-333.1	-227.2	249.1	109.4	211.3
99.6									
COMB	( 3 )	( 4 )	( 4 )	( 5 )	( 11 )	( 13 )	( 11 )	( 12 )	( 13 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	38.5	38.7	38.5	38.9	39.1	38.3	38.3	38.9	38.7
38.7									
MdxT	-191.8	-212.9	115.2	-191.4	-202.9	-183.8	105.3	-191.3	-212.9
125.7									
MdyT	-246.1	-217.7	201.3	-151.5	-103.4	-393.8	261.9	120.1	-102.1
198.9									

ENGENHARIA E COMÉRCIO LTDA.									
COMB	( 10 )	( 17 )	( 10 )	( 11 )	( 13 )	( 15 )	( 15 )	( 16 )	( 17 )
( 17 )									
CARR	31								
FdzT	39.9								
MdxT	120.3								
MdyT	-93.1								
COMB	( 0 )								

LANCE: 5

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	2.9	2.9	2.9	2.9	2.0	2.0	1.9	1.9	2.0
2.0									
MdxT	8.3	-8.3	.0	.0	-12.5	9.2	-9.8	4.1	-14.8
9.8									
MdyT	.0	.0	8.3	-8.3	-42.4	38.6	-37.0	33.9	-37.1
34.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 8 )	( 1 )	( 2 )	( 2 )	( 3 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.8
2.8									
MdxT	-12.3	-12.2	6.7	-8.1	2.0	-16.5	11.6	7.1	10.2
-9.3									
MdyT	-40.3	-33.7	30.2	-36.8	33.9	-37.0	33.9	40.0	-164.9
-66.2									
COMB	( 4 )	( 5 )	( 5 )	( 6 )	( 6 )	( 7 )	( 7 )	( 8 )	( 10 )
( 13 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
2.8									
MdxT	-17.2	11.1	-10.1	-20.3	8.5	-9.2	-16.9	12.6	-10.5
-22.1									
MdyT	136.1	-162.1	-64.8	132.3	-165.5	-66.6	137.8	-161.0	-64.4
131.6									
COMB	( 13 )	( 11 )	( 11 )	( 11 )	( 13 )	( 17 )	( 17 )	( 15 )	( 15 )
( 15 )									
CARR	31	32	33						
FdzT	2.9	2.8	2.9						
MdxT	-12.6	8.3	5.8						
MdyT	-64.5	-166.6	5.8						
COMB	( 16 )	( 17 )	( 0 )						

## P16

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	59.6	59.6	59.6	59.6	58.4	58.4	57.4	57.8	57.4
59.6									
MdxT	305.4	-305.4	.0	.0	-278.8	79.8	-101.9	-272.4	52.2
-276.6									
MdyT	.0	.0	178.9	-178.9	-168.6	159.9	-293.9	158.0	342.7
-48.0									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 4 )	( 4 )	( 2 )	( 11 )	( 2 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	59.6	58.4	55.1	55.6	55.1	58.5	58.5	56.8	56.8
57.8									
MdxT	215.9	-106.0	-96.5	-259.8	49.7	-96.9	49.3	-271.6	95.6
-102.2									
MdyT	-126.5	-168.6	-374.5	194.8	462.4	74.9	-188.0	-165.9	157.9
-292.0									
COMB	( 0 )	( 4 )	( 6 )	( 15 )	( 6 )	( 16 )	( 16 )	( 8 )	( 8 )
( 11 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	57.8	58.8	58.8	55.6	55.6	57.2	57.2	59.6	59.6
59.6									
MdxT	52.5	-280.4	79.9	-96.9	49.8	-273.1	95.8	215.9	-215.9
-215.9									
MdyT	342.3	-166.7	159.5	-372.7	462.0	-164.1	157.5	126.5	126.5
-126.5									
COMB	( 11 )	( 13 )	( 13 )	( 15 )	( 15 )	( 17 )	( 17 )	( 0 )	( 0 )
( 0 )									

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	33.3	33.3	33.3	33.3	33.0	32.9	32.0	32.0	32.0
32.5									
MdxT	119.3	-119.3	.0	.0	-87.1	124.9	-73.6	121.9	121.9
-88.5									
MdyT	.0	.0	99.9	-99.9	-248.6	245.7	-362.6	-145.0	356.4
-254.5									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 13 )	( 1 )	( 2 )	( 2 )	( 2 )
( 4 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	32.5	32.3	32.3	30.9	30.9	30.9	31.7	31.4	31.4
31.4									
MdxT	121.5	131.2	126.0	-70.0	115.5	115.5	-94.9	-68.6	133.5
122.2									
MdyT	354.6	96.6	241.5	-429.2	-171.7	410.5	-249.3	-423.5	87.6
219.0									

ENGENHARIA E COMÉRCIO LTDA.									
COMB ( 9 )	( 11 )	( 5 )	( 5 )	( 6 )	( 6 )	( 6 )	( 8 )	( 15 )	( 9 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 32.2	33.0	32.5	32.5	33.3	33.0	32.8	32.8	31.4	31.4
MdxT -93.5	124.0	-72.1	121.5	-71.4	117.5	132.7	125.6	115.8	115.1
MdyT -243.6	247.8	-356.7	-142.7	-113.8	266.4	95.9	239.7	-169.4	408.7
COMB ( 17 )	( 10 )	( 11 )	( 11 )	( 12 )	( 13 )	( 14 )	( 14 )	( 15 )	( 15 )
CARR	31	32	33						
FdzT	31.9	33.3	33.3						
MdxT	134.9	-84.4	84.4						
MdyT	88.9	70.6	-70.6						
COMB ( 18 )	( 0 )	( 0 )	( 0 )						

LANCE: 4

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT 8.8	9.4	9.4	8.8	8.7	9.4	9.4	9.2	9.3	9.2
MdxT -10.9	40.0	-40.0	.0	.0	.0	.0	-39.2	43.7	29.8
MdyT -164.4	.0	.0	-92.1	88.1	28.2	-28.2	-167.4	114.7	157.1
COMB ( 2 )	( 0 )	( 0 )	( 5 )	( 9 )	( 0 )	( 0 )	( 11 )	( 17 )	( 11 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 8.9	8.8	8.8	8.8	8.9	8.8	8.9	8.6	8.6	8.6
MdxT -9.8	35.9	17.1	-27.4	35.2	31.2	32.6	-10.5	34.7	16.4
MdyT 12.3	-65.7	149.1	-107.9	27.9	106.7	-42.4	-204.8	-81.9	178.8
COMB ( 7 )	( 2 )	( 2 )	( 8 )	( 3 )	( 8 )	( 4 )	( 6 )	( 6 )	( 6 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 9.3	8.7	8.7	9.3	9.4	9.4	9.2	9.1	9.1	9.1
MdxT -23.0	7.1	21.2	-54.7	-49.3	38.8	-39.5	-37.8	-38.5	28.8
MdyT 45.9	-84.6	35.2	-111.2	45.5	113.8	-67.0	-207.9	-83.2	186.8
COMB ( 17 )	( 9 )	( 9 )	( 17 )	( 13 )	( 13 )	( 11 )	( 15 )	( 15 )	( 15 )
CARR	31	32	33						
FdzT	9.1	9.4	9.4						
MdxT	-32.9	-28.3	28.3						
MdyT	38.4	-19.9	-19.9						
COMB ( 18 )	( 0 )	( 0 )	( 0 )						

## P17

LANCE: 2

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT 48.8	54.1	54.1	54.1	54.1	53.3	53.3	50.1	51.8	51.8
MdxT -105.4	187.0	-187.0	.0	.0	-157.9	11.8	-151.6	-201.9	194.9
MdyT -332.6	.0	.0	178.5	-178.5	87.2	-21.8	25.6	49.8	-25.1
COMB ( 4 )	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 2 )	( 16 )	( 16 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 46.3	48.8	48.8	53.2	53.2	53.2	48.5	51.3	51.3	46.3
MdxT -153.3	-154.1	14.7	-95.5	-143.1	.6	-207.7	-200.2	194.2	-105.7
MdyT 546.6	362.5	718.6	376.2	-339.8	-700.1	37.7	33.6	-16.9	-571.9
COMB ( 8 )	( 4 )	( 4 )	( 5 )	( 5 )	( 5 )	( 6 )	( 7 )	( 7 )	( 8 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 49.4	46.3	53.5	53.5	53.5	50.7	52.4	52.4	49.4	49.4
MdxT 15.5	21.6	-89.2	-135.0	-2.0	-151.0	-163.9	119.1	-107.1	-156.4
MdyT 710.2	1190.4	606.9	-529.5	-1169.3	28.8	48.0	-15.7	-316.0	364.9
COMB ( 13 )	( 8 )	( 9 )	( 9 )	( 9 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )
CARR 40	31	32	33	34	35	36	37	38	39
FdzT 54.1	53.7	53.7	53.7	49.1	46.8	46.8	46.8	54.1	54.1
MdxT -1.1	-97.2	-145.5	1.4	-208.8	-107.2	-155.5	22.3	-90.9	-137.4
MdyT 1177.4	392.8	-338.9	-708.5	29.5	-555.7	549.0	1182.3	623.1	-528.6
COMB ( 18 )	( 14 )	( 14 )	( 14 )	( 15 )	( 17 )	( 17 )	( 17 )	( 18 )	( 18 )
CARR	41	42	43						
FdzT	54.1	54.1	54.1						

ENGENHARIA E COMÉRCIO LTDA.

MdxT	132.2	-132.2	132.2
MdyT	126.2	126.2	-126.2
COMB	( 0 )	( 0 )	( 0 )

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	32.2	32.2	32.2	32.2	32.2	32.2	32.2	30.1	30.1
31.0									
MdxT	104.6	-104.6	.0	.0	-138.0	60.5	140.3	-72.8	94.5
-209.2									
MdyT	.0	.0	106.4	-106.4	210.0	88.8	-195.4	71.5	-75.5
126.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 10 )	( 1 )	( 1 )	( 2 )	( 2 )
( 16 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	31.0	29.5	29.5	29.5	31.5	31.5	31.5	29.2	29.2
30.6									
MdxT	182.3	-131.7	57.3	136.1	-116.2	55.9	120.3	-33.2	90.6
-203.6									
MdyT	-112.3	-233.5	-141.4	94.1	396.6	177.7	-254.7	57.1	-65.4
90.4									
COMB	( 16 )	( 4 )	( 4 )	( 4 )	( 5 )	( 5 )	( 5 )	( 6 )	( 6 )
( 7 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	30.6	28.2	28.2	28.2	31.6	31.6	31.6	32.2	32.2
30.5									
MdxT	178.8	-131.2	56.1	135.8	-105.4	53.9	109.6	59.5	139.7
-78.7									
MdyT	-81.2	-450.2	-220.6	217.0	597.7	254.9	-363.4	90.0	-196.3
108.5									
COMB	( 7 )	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )	( 9 )	( 10 )	( 10 )
( 11 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	30.5	30.5	31.4	31.4	29.9	29.9	29.9	31.9	31.9
31.9									
MdxT	56.8	98.3	-181.0	165.5	-137.6	57.6	139.9	-122.1	56.2
124.0									
MdyT	62.4	-107.4	128.4	-117.0	-196.6	-132.5	62.3	433.4	187.6
-286.6									
COMB	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )	( 13 )	( 14 )	( 14 )
( 14 )									
CARR	41	42	43	44	45	46	47	48	49
50									
FdzT	29.6	29.6	28.6	28.6	28.6	32.0	32.0	32.0	32.2
32.2									
MdxT	-38.9	95.2	-136.9	56.4	139.4	-111.2	54.2	113.3	74.0
-74.0									
MdyT	93.1	-96.3	-414.3	-212.0	185.9	633.6	264.6	-394.5	75.2
-75.2									
COMB	( 15 )	( 15 )	( 17 )	( 17 )	( 17 )	( 18 )	( 18 )	( 18 )	( 0 )
( 0 )									

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	10.8	10.8	10.8	10.8	10.8	10.8	10.8	9.9	9.9
9.9									
MdxT	34.9	-34.9	.0	.0	-93.9	65.4	154.4	-46.9	62.5
140.0									
MdyT	.0	.0	35.5	-35.5	421.8	168.7	-341.6	219.2	87.7
-190.3									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 2 )	( 2 )
( 13 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	10.1	10.1	10.1	9.7	9.7	10.3	10.3	10.3	9.7
9.7									
MdxT	-105.8	62.8	157.1	-80.8	142.0	-72.0	62.0	155.1	-25.8
58.9									
MdyT	223.3	89.3	-175.0	86.4	-151.3	356.2	145.9	-213.9	213.6
85.5									
COMB	( 3 )	( 3 )	( 3 )	( 4 )	( 4 )	( 5 )	( 5 )	( 12 )	( 6 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	9.7	10.1	10.1	10.1	9.5	9.5	10.4	10.4	10.4
10.0									
MdxT	99.8	-124.0	64.8	162.1	-82.3	136.9	-67.5	58.0	132.9
-47.7									
MdyT	-173.2	220.4	88.1	-165.6	-7.7	-125.9	441.6	193.4	-242.3
266.7									
COMB	( 6 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )	( 9 )	( 9 )	( 14 )
( 11 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	10.0	10.0	10.3	10.3	9.9	10.4	10.4	9.9	9.9
9.9									
MdxT	61.2	117.7	-106.7	62.0	-81.6	-72.8	60.6	-26.6	57.5
97.9									
MdyT	106.7	-218.5	270.8	108.3	133.8	403.6	161.4	259.7	103.9
-211.1									
COMB	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 14 )	( 14 )	( 15 )	( 15 )
( 15 )									
CARR	41	42	43	44	45	46	47	48	49
FdzT	10.3	10.3	10.3	9.6	9.6	10.5	10.5	10.5	10.8
MdxT	-124.9	64.1	160.3	-83.2	135.0	-68.3	56.7	123.2	-24.7

**ENGENHARIA E COMÉRCIO LTDA.**

MdyT	266.4	106.6	-203.6	38.5	-163.8	487.8	206.2	-250.9	-25.1
COMB	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 18 )	( 18 )	( 18 )	( 0 )

## P18

**LANCE: 2**
**CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA**

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	153.2	153.2	153.2	153.2	150.0	149.4	148.9	152.0	152.1
152.0									
MdxT	698.7	-698.7	.0	.0	310.5	-27.3	-21.1	50.4	314.7
-24.5									
MdyT	.0	.0	505.7	-505.7	381.2	-86.7	220.4	532.6	368.2
-362.7									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 10 )	( 2 )	( 12 )	( 3 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	153.2	153.2	147.6	147.6	144.0	144.0	149.2	149.2	151.2
151.2									
MdxT	494.1	494.1	343.1	-73.2	298.1	-19.9	50.3	-24.9	-16.8
61.0									
MdyT	357.6	-357.6	377.7	-73.8	409.5	409.5	624.4	-555.8	330.0
-71.7									
COMB	( 0 )	( 0 )	( 14 )	( 14 )	( 6 )	( 6 )	( 16 )	( 16 )	( 8 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	141.9	141.9	149.4	148.8	152.0	153.2	153.2	147.6	143.9
151.2									
MdxT	379.4	-106.3	309.3	-21.8	314.6	317.0	26.7	87.4	-20.6
-15.4									
MdyT	366.7	-74.6	392.1	212.2	375.0	365.5	-76.7	377.7	401.7
346.4									
COMB	( 18 )	( 18 )	( 10 )	( 11 )	( 12 )	( 13 )	( 13 )	( 14 )	( 15 )
( 17 )									
CARR	31	32	33	34					
FdzT	151.2	141.9	153.2	153.2					
MdxT	60.3	111.9	-494.1	-494.1					
MdyT	-79.5	366.7	357.6	-357.6					
COMB	( 17 )	( 18 )	( 0 )	( 0 )					

**LANCE: 3**
**CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA**

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	87.6	87.6	87.6	87.6	86.1	86.1	86.1	87.2	87.2
87.2									
MdxT	352.9	-352.9	.0	.0	89.7	-226.1	-92.3	77.7	-210.2
-81.5									
MdyT	.0	.0	289.2	-289.2	564.8	-230.9	-571.8	682.1	273.6
-626.8									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 3 )	( 3 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	85.1	85.1	85.1	82.2	82.9	82.2	85.6	85.6	85.6
82.2									
MdxT	114.5	258.2	-113.7	138.3	-204.4	-134.3	77.1	-207.6	-80.8
288.3									
MdyT	556.6	226.6	-549.2	535.6	-220.8	-529.5	744.4	297.8	-658.7
218.1									
COMB	( 5 )	( 5 )	( 5 )	( 9 )	( 15 )	( 9 )	( 7 )	( 7 )	( 7 )
( 9 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	85.5	85.5	87.2	87.2	87.2	87.6	85.1	85.1	85.1
85.6									
MdxT	-225.7	-92.4	81.9	-215.5	-84.8	-181.4	118.7	264.2	-117.0
81.2									
MdyT	-237.1	-563.2	648.1	259.2	-622.7	-228.2	522.8	-230.3	-545.2
710.4									
COMB	( 10 )	( 10 )	( 12 )	( 12 )	( 12 )	( 13 )	( 14 )	( 14 )	( 14 )
( 16 )									
CARR	31	32	33	34	35	36	37	38	39
FdzT	85.6	85.6	82.2	82.2	82.2	87.6	87.6	87.6	87.6
MdxT	-212.9	-84.1	142.4	293.9	-137.6	249.5	-249.5	-249.5	249.5
MdyT	284.1	-654.1	501.6	-222.7	-524.9	204.5	204.5	-204.5	-204.5
COMB	( 16 )	( 16 )	( 18 )	( 18 )	( 18 )	( 0 )	( 0 )	( 0 )	( 0 )

**LANCE: 4**
**CARREGAMENTOS DE ESFORÇOS FINAIS DE CALCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA**

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	25.8	25.8	25.8	25.8	25.8	25.7	25.8	25.1	25.1
25.1									
MdxT	103.9	-103.9	.0	.0	52.6	-90.3	-71.5	55.3	-84.5
-72.8									
MdyT	.0	.0	85.2	-85.2	203.1	-253.1	-486.4	353.9	-256.1
-514.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 4 )	( 1 )	( 14 )	( 2 )
( 14 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	25.7	25.5	25.3	25.0	24.4	24.6	24.5	25.1	24.4
25.1									
MdxT	38.6	-85.5	-59.1	-86.1	66.2	-82.9	-80.6	49.0	-85.3
-89.3									
MdyT	406.8	-252.3	-473.3	-255.3	109.1	-244.4	-493.2	391.9	-243.1
-214.6									

ENGENHARIA E COMÉRCIO LTDA.									
COMB	( 12 )	( 3 )	( 11 )	( 5 )	( 9 )	( 6 )	( 18 )	( 10 )	( 9 )
( 10 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	25.1	25.7	25.8	24.5	24.8	25.4	24.5	25.8	25.8
25.8									
MdxT	-69.9	-59.5	-93.5	66.1	-57.7	38.2	-87.4	73.5	-73.5
73.5									
MdyT	-536.5	-543.6	-201.0	349.3	-424.8	437.5	-197.3	60.2	60.2
-60.2									
COMB	( 10 )	( 12 )	( 13 )	( 18 )	( 15 )	( 16 )	( 18 )	( 0 )	( 0 )
( 0 )									

## P19

LANCE: 2

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	147.1	147.1	147.1	147.1	143.8	143.4	142.5	146.0	146.0
146.0									
MdxT	670.5	-670.5	.0	.0	-297.6	31.8	27.7	-51.4	-302.2
26.5									
MdyT	.0	.0	485.3	-485.3	375.3	-77.8	234.2	539.6	368.4
-370.2									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 10 )	( 2 )	( 12 )	( 12 )
( 12 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	141.5	141.5	147.1	147.1	137.5	137.5	143.2	143.2	135.8
135.8									
MdxT	-340.7	77.7	-304.4	-474.1	-284.6	27.7	-49.8	25.2	-375.6
110.6									
MdyT	376.9	-68.3	366.4	-343.2	430.8	430.8	635.9	-570.9	365.1
-68.3									
COMB	( 13 )	( 13 )	( 14 )	( 0 )	( 6 )	( 6 )	( 16 )	( 16 )	( 17 )
( 17 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	144.9	144.9	143.4	142.6	141.5	147.1	137.6	137.6	135.8
145.0									
MdxT	14.3	-57.3	-296.9	28.4	-90.2	-22.5	-284.8	28.6	-114.5
12.7									
MdyT	333.2	-72.0	385.3	227.5	376.9	-74.3	424.3	424.3	365.1
347.5									
COMB	( 9 )	( 9 )	( 10 )	( 11 )	( 13 )	( 14 )	( 15 )	( 15 )	( 17 )
( 18 )									
CARR	31	32	33	34					
FdzT	145.0	147.1	147.1	147.1					
MdxT	-56.4	474.1	-474.1	474.1					
MdyT	-78.4	343.2	343.2	-343.2					
COMB	( 18 )	( 0 )	( 0 )	( 0 )					

LANCE: 3

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	83.5	83.5	83.5	83.5	81.9	81.9	81.9	82.9	83.1
82.9									
MdxT	336.2	-336.2	.0	.0	-86.5	217.6	89.5	-72.1	204.6
76.9									
MdyT	.0	.0	275.6	-275.6	436.8	-245.6	-520.4	561.5	-247.1
-586.5									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 3 )	( 12 )
( 3 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	80.8	81.0	80.8	77.9	78.8	77.9	81.3	81.3	81.3
78.0									
MdxT	-110.5	-254.1	110.2	-134.1	197.9	130.6	-70.3	194.7	75.2
-283.3									
MdyT	429.7	-248.8	-506.0	407.0	-239.9	-484.8	626.6	250.7	-618.8
-241.0									
COMB	( 4 )	( 13 )	( 4 )	( 8 )	( 15 )	( 8 )	( 7 )	( 7 )	( 7 )
( 17 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	81.6	81.6	83.1	83.1	81.0	81.0	78.0	78.0	81.5
81.5									
MdxT	217.5	89.6	-76.4	80.4	-114.8	113.7	-138.3	134.0	-74.5
78.5									
MdyT	-252.1	-508.5	523.7	-578.2	391.9	-497.7	369.3	-476.1	588.8
-610.1									
COMB	( 10 )	( 10 )	( 12 )	( 12 )	( 13 )	( 13 )	( 17 )	( 17 )	( 16 )
( 16 )									
CARR	31	32	33	34					
FdzT	83.5	83.5	83.5	83.5					
MdxT	237.7	-237.7	-237.7	237.7					
MdyT	194.9	194.9	-194.9	-194.9					
COMB	( 0 )	( 0 )	( 0 )	( 0 )					

LANCE: 4

CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	26.0	26.0	26.0	26.0	25.8	25.5	25.8	25.0	25.2
25.0									
MdxT	104.6	-104.6	.0	.0	-51.8	100.9	66.2	-53.6	98.7
64.4									
MdyT	.0	.0	85.8	-85.8	173.2	-192.4	-373.1	92.3	-199.6
-335.4									

ENGENHARIA E COMÉRCIO LTDA.									
COMB ( 4 )	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 3 )	( 1 )	( 4 )	( 2 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 25.8	25.7	24.7	24.7	24.7	25.4	25.4	24.5	24.5	24.5
MdxT -37.7	81.8	-35.3	96.3	75.2	-48.6	65.0	-64.4	81.2	72.2
MdyT 399.7	-194.6	-14.0	-183.1	-385.3	378.7	-425.2	90.4	-185.1	-315.0
COMB ( 12 )	( 5 )	( 6 )	( 6 )	( 17 )	( 10 )	( 10 )	( 8 )	( 8 )	( 8 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 24.7	25.8	25.8	25.3	25.3	26.0	25.0	25.0	25.6	25.6
MdxT -65.0	84.3	54.3	-54.3	67.3	86.3	-35.8	100.4	-37.2	83.4
MdyT 342.9	-172.8	-432.0	347.6	-406.8	-157.4	238.4	-130.2	429.5	171.8
COMB ( 17 )	( 12 )	( 12 )	( 13 )	( 13 )	( 14 )	( 15 )	( 15 )	( 16 )	( 16 )
CARR 31	31	32	33						
FdzT 26.0	26.0	26.0	26.0						
MdxT 74.0	74.0	-74.0	-74.0						
MdyT 60.6	60.6	60.6	-60.6						
COMB ( 0 )	( 0 )	( 0 )	( 0 )						

## P20

LANÇE: 2									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	54.4	54.4	53.4	54.4	54.4	53.4	53.4	50.5	50.5
52.1									
MdxT	187.9	-187.9	.0	.0	.0	-142.4	.7	-175.5	-122.5
-201.5									
MdyT	.0	.0	95.8	179.4	-179.4	-133.8	96.5	-79.5	77.3
-67.1									
COMB ( 16 )	( 0 )	( 0 )	( 10 )	( 0 )	( 0 )	( 1 )	( 1 )	( 2 )	( 2 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 51.6	52.1	54.0	53.8	53.8	49.1	49.1	49.1	48.9	48.9
MdxT -200.1	120.0	-85.4	-129.2	-11.3	-94.5	-140.3	6.4	26.6	-216.6
MdyT	43.5	-440.9	550.9	1236.8	283.5	-340.9	-649.0	-80.2	85.0
-52.1									
COMB ( 7 )	( 3 )	( 13 )	( 8 )	( 8 )	( 5 )	( 5 )	( 5 )	( 6 )	( 6 )
CARR 30	21	22	23	24	25	26	27	28	29
FdzT 52.6	52.1	52.1	54.4	46.6	46.6	46.6	51.0	51.0	52.6
MdxT 120.3	91.5	203.4	-79.4	-95.5	-140.5	14.1	-175.9	-122.1	-158.9
MdyT 51.8	-67.1	36.8	-670.6	523.3	-526.1	-1123.2	-94.9	85.7	-78.0
COMB ( 12 )	( 16 )	( 16 )	( 17 )	( 9 )	( 9 )	( 9 )	( 11 )	( 11 )	( 12 )
CARR 40	31	32	33	34	35	36	37	38	39
FdzT 47.1	54.4	49.7	49.7	49.7	49.4	49.4	49.4	54.4	47.1
MdxT -142.5	-130.5	-96.0	-142.5	6.7	25.2	-218.0	-200.2	-11.1	-96.9
MdyT -528.0	550.4	268.0	-342.7	-640.6	-95.3	-95.3	93.0	1244.7	508.2
COMB ( 18 )	( 17 )	( 14 )	( 14 )	( 14 )	( 15 )	( 15 )	( 15 )	( 17 )	( 18 )
CARR 41	41	42	43	44	45				
FdzT 47.1	47.1	54.4	54.4	54.4	54.4				
MdxT 14.4	14.4	132.9	-132.9	-132.9	132.9				
MdyT -1115.1	-1115.1	126.8	126.8	-126.8	-126.8				
COMB ( 18 )	( 18 )	( 0 )	( 0 )	( 0 )	( 0 )				

LANÇE: 3									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT 30.4	32.4	32.4	32.4	32.4	32.3	32.4	32.4	30.4	30.4
MdxT 103.2	105.0	-105.0	.0	.0	-143.9	64.2	149.4	-73.5	61.7
MdyT 84.0	.0	.0	106.8	-106.8	-245.8	-112.3	194.7	-133.3	-86.4
COMB ( 2 )	( 0 )	( 0 )	( 0 )	( 0 )	( 10 )	( 1 )	( 1 )	( 2 )	( 2 )
CARR 20	11	12	13	14	15	16	17	18	19
FdzT 29.5	31.3	31.3	31.8	31.8	31.8	29.8	29.8	29.8	29.5
MdxT 83.4	-225.5	196.7	-121.8	60.3	130.9	-138.3	61.6	147.1	-30.7
MdyT -85.4	-137.8	105.0	-442.0	-203.8	258.4	188.3	116.1	-90.6	-128.1
COMB ( 6 )	( 16 )	( 16 )	( 4 )	( 4 )	( 4 )	( 5 )	( 5 )	( 5 )	( 6 )
CARR 30	21	22	23	24	25	26	27	28	29

ENGENHARIA E COMÉRCIO LTDA.									
FdzT	29.5	30.9	30.9	31.9	31.9	31.9	28.5	28.5	28.5
32.3									
MdxT	74.3	-219.0	193.3	-111.2	58.4	120.4	-138.5	60.4	147.4
149.2									
MdyT	76.0	-106.8	76.0	-641.6	-280.5	366.2	406.7	195.9	-214.3
194.9									
COMB	( 6 )	( 7 )	( 7 )	( 8 )	( 8 )	( 8 )	( 9 )	( 9 )	( 9 )
( 10 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	30.7	30.7	30.7	31.6	31.6	32.2	32.2	32.2	30.2
30.2									
MdxT	-80.1	61.5	106.7	-193.2	178.2	-128.5	60.0	134.3	-144.9
61.3									
MdyT	-165.1	-94.0	114.0	-152.3	113.8	-473.9	-211.5	288.3	156.5
109.5									
COMB	( 11 )	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )	( 13 )	( 14 )
( 14 )									
CARR	41	42	43	44	45	46	47	48	49
50									
FdzT	30.2	29.8	29.8	29.8	32.2	32.2	32.2	28.9	28.9
28.9									
MdxT	150.5	-37.2	83.2	77.7	-117.7	58.1	123.8	-145.0	60.3
150.8									
MdyT	-60.6	-159.0	-92.8	105.1	-672.6	-287.9	395.4	375.8	189.5
-185.2									
COMB	( 14 )	( 15 )	( 15 )	( 15 )	( 17 )	( 17 )	( 17 )	( 18 )	( 18 )
( 18 )									
CARR	51	52							
FdzT	32.4	32.4							
MdxT	-74.3	74.3							
MdyT	75.5	-75.5							
COMB	( 0 )	( 0 )							

LANÇE: 4									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	10.6	10.6	10.6	10.6	10.6	10.6	10.6	9.8	9.8
9.8									
MdxT	34.4	-34.4	.0	.0	-99.1	67.2	161.1	-54.0	66.0
144.6									
MdyT	.0	.0	35.0	-35.0	-387.0	-154.8	314.2	-193.2	-77.3
175.4									
COMB	( 0 )	( 0 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 2 )	( 2 )
( 14 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	10.1	10.1	10.1	10.2	10.2	10.2	9.7	9.7	9.6
9.6									
MdxT	-112.0	65.1	162.7	-78.7	64.3	157.5	-87.4	149.8	-33.2
63.2									
MdyT	-200.8	-80.3	165.9	-331.9	-138.6	208.0	-62.2	133.3	-186.2
-74.5									
COMB	( 3 )	( 3 )	( 3 )	( 4 )	( 4 )	( 12 )	( 5 )	( 5 )	( 6 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	9.5	10.1	10.1	10.1	10.3	10.3	10.4	9.4	9.4
10.6									
MdxT	139.3	-129.8	66.4	166.0	-74.2	60.3	138.0	-88.8	144.5
152.0									
MdyT	149.7	-198.8	-79.5	163.2	-417.1	-185.6	227.2	32.1	108.6
315.0									
COMB	( 18 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )	( 13 )	( 9 )	( 9 )
( 10 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	10.0	10.0	10.0	10.2	10.4	10.4	9.8	9.8	9.8
9.8									
MdxT	-52.6	63.6	125.2	-110.5	-77.1	61.9	-86.0	-31.8	60.8
107.0									
MdyT	-241.2	-96.5	194.6	-248.8	-379.8	-151.9	-110.2	-232.8	-93.1
182.0									
COMB	( 11 )	( 11 )	( 11 )	( 12 )	( 13 )	( 13 )	( 14 )	( 15 )	( 15 )
( 15 )									
CARR	41	42	43	44	45	46	47	48	
FdzT	10.2	10.2	10.2	10.4	10.4	10.4	9.5	10.6	
MdxT	-128.2	64.3	160.7	-72.7	58.0	128.4	-87.2	-24.4	
MdyT	-245.4	-98.2	204.3	-463.7	-197.4	236.5	-14.6	24.8	
COMB	( 16 )	( 16 )	( 16 )	( 17 )	( 17 )	( 17 )	( 18 )	( 0 )	

## PT1

LANÇE: 5									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	1.7	1.9	1.9	.9	1.1	.9	1.0	1.0	1.2
.8									
MdxT	-9.7	5.2	-5.2	.0	.0	.0	.0	.0	.0
.0									
MdyT	.0	.0	.0	-15.3	10.9	-32.6	-12.2	-9.5	25.5
-46.9									
COMB	( 5 )	( 0 )	( 0 )	( 10 )	( 11 )	( 12 )	( 13 )	( 14 )	( 15 )
( 16 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	.9	1.0	1.9	1.9	1.6	1.6	1.6	1.8	1.8
1.8									
MdxT	.0	.0	.0	.0	11.5	6.1	-5.5	22.1	10.9
-9.7									



ENGENHARIA E COMÉRCIO LTDA.									
MdyT	-13.0	-8.4	4.6	-4.6	1.5	-3.9	-4.9	-8.5	10.3
20.0									
COMB	( 17 )	( 18 )	( 0 )	( 0 )	( 1 )	( 1 )	( 1 )	( 2 )	( 2 )
( 2 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.9	1.9
1.9									
MdxT	20.7	9.9	-9.7	17.9	8.3	-9.7	24.9	22.7	11.3
-9.7									
MdyT	12.5	-10.7	-23.5	2.5	-3.1	-4.1	1.4	-15.5	16.4
34.6									
COMB	( 3 )	( 3 )	( 3 )	( 4 )	( 4 )	( 8 )	( 5 )	( 6 )	( 6 )
( 6 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	1.5	1.5	1.5	1.7	1.8	1.8	.9	1.1	.9
1.0									
MdxT	20.2	9.5	-9.7	15.7	27.2	-9.7	-12.7	-6.3	-7.7
-10.5									
MdyT	19.5	-16.5	-37.9	2.8	1.0	.6	47.3	36.1	57.1
47.2									
COMB	( 7 )	( 7 )	( 7 )	( 8 )	( 9 )	( 9 )	( 10 )	( 11 )	( 12 )
( 13 )									
CARR	41	42	43	44	45	46	47	48	
FdzT	1.0	1.0	1.2	.8	.9	1.0	1.0	1.9	
MdxT	-3.5	-3.7	-5.5	-7.8	-12.5	-1.0	-2.1	-3.7	
MdyT	46.1	24.8	28.7	63.6	47.0	45.2	24.8	-3.2	
COMB	( 14 )	( 14 )	( 15 )	( 16 )	( 17 )	( 18 )	( 18 )	( 0 )	

## PT2

LANCE: 5

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

	1	2	3	4	5	6	7	8	9
CARR									
10									
FdzT	1.5	1.8	1.8	1.5	1.8	1.8	1.5	1.7	1.7
1.7									
MdxT	.0	4.8	-4.8	.0	.0	.0	3.1	-13.0	-7.4
4.5									
MdyT	.0	.0	.0	-3.6	4.2	-4.2	-3.6	-8.7	8.8
17.8									
COMB	( 1 )	( 0 )	( 0 )	( 1 )	( 0 )	( 0 )	( 1 )	( 2 )	( 2 )
( 2 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	1.4	1.4	1.4	1.6	1.6	1.6	1.5	1.5	1.5
1.8									
MdxT	-10.9	-6.0	4.5	-15.7	-8.9	4.5	-8.3	-4.4	4.5
-13.6									
MdyT	13.2	-12.4	-27.2	1.7	-3.2	-3.2	2.8	-4.1	-6.3
-16.1									
COMB	( 3 )	( 3 )	( 3 )	( 4 )	( 4 )	( 4 )	( 5 )	( 5 )	( 5 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	1.8	1.8	1.4	1.4	1.4	1.6	1.6	1.6	1.5
1.5									
MdxT	-7.8	4.5	-10.4	-5.6	4.5	-18.1	-10.4	4.5	-5.9
-3.0									
MdyT	14.9	32.8	20.4	-18.4	-42.1	1.3	-2.2	-2.2	3.1
-4.5									
COMB	( 6 )	( 6 )	( 7 )	( 7 )	( 7 )	( 8 )	( 8 )	( 8 )	( 9 )
( 9 )									
CARR	31	32	33	34	35	36	37	38	39
40									
FdzT	1.5	.8	.8	1.0	1.0	.7	.7	.9	.9
.8									
MdxT	4.5	23.5	-.8	15.5	-.8	17.5	-.8	12.9	-.8
20.2									
MdyT	-7.1	38.9	-13.3	29.3	8.8	51.1	-36.1	39.6	-12.2
40.9									
COMB	( 9 )	( 10 )	( 10 )	( 11 )	( 11 )	( 12 )	( 12 )	( 13 )	( 13 )
( 14 )									
CARR	41	42	43	44	45	46	47	48	49
50									
FdzT	.8	1.1	1.1	1.1	.7	.7	.9	.9	.8
.8									
MdxT	-.8	14.6	9.3	-.8	17.8	-.8	10.1	-.8	22.3
-.8									
MdyT	-15.1	21.6	23.0	23.9	58.0	-51.0	38.9	-11.1	40.7
-16.1									
COMB	( 14 )	( 15 )	( 15 )	( 15 )	( 16 )	( 16 )	( 17 )	( 17 )	( 18 )
( 18 )									
CARR	51								
FdzT	1.8								
MdxT	3.4								
MdyT	-3.0								
COMB	( 0 )								

## PT3

LANCE: 5

CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA

	1	2	3	4	5	6	7	8	9
CARR									
10									
FdzT	2.0	2.0	1.9	2.0	1.9	.7	.8	.8	.8
.8									
MdxT	13.4	-13.4	.0	.0	.0	.0	.0	.0	.0
.0									
MdyT	.0	.0	6.6	14.7	-6.9	102.3	100.9	107.2	-142.8
110.6									

ENGENHARIA E COMÉRCIO LTDA.									
COMB	( 0 )	( 0 )	( 1 )	( 9 )	( 8 )	( 10 )	( 11 )	( 14 )	( 16 )
( 18 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
1.9									
MdxT	.0	-8.1	-.7	-10.1	-1.8	-9.7	-1.5	-10.3	-2.0
-1.4									
MdyT	-5.7	-8.9	-16.5	-8.3	-14.0	-11.6	-23.7	-8.3	-13.9
2.8									
COMB	( 0 )	( 1 )	( 1 )	( 2 )	( 2 )	( 5 )	( 5 )	( 6 )	( 6 )
( 8 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	2.0	2.0	.7	.7	.8	.8	.8	.8	.8
.8									
MdxT	-9.5	-1.4	-4.3	-1.0	-4.7	-1.3	-4.3	-4.4	-1.0
-5.1									
MdyT	-13.8	-30.1	-58.3	-145.7	-57.7	-144.3	-53.8	-61.7	-154.1
-57.3									
COMB	( 9 )	( 9 )	( 10 )	( 10 )	( 11 )	( 11 )	( 13 )	( 14 )	( 14 )
( 15 )									
CARR	31	32	33	34	35	36	37	38	
FdzT	.8	.8	.8	.8	.8	2.0	2.0	2.0	
MdxT	-1.5	1.6	-4.3	-4.4	-1.0	9.4	-9.4	9.4	
MdyT	-143.2	-57.1	-50.6	-63.8	-159.5	4.0	4.0	-4.0	
COMB	( 15 )	( 16 )	( 17 )	( 18 )	( 18 )	( 0 )	( 0 )	( 0 )	

## PT4

LANCE: 5									
CARREGAMENTOS DE ESFORÇOS FINAIS DE CÁLCULO PARA DIMENSIONAMENTO APOS A ENVOLTORIA									
CARR	1	2	3	4	5	6	7	8	9
10									
FdzT	1.7	1.7	1.7	1.7	1.7	1.7	.8	.8	.8
.8									
MdxT	.0	11.7	-11.7	.0	.0	.0	.0	.0	.0
.0									
MdyT	.0	.0	.0	-14.6	-21.4	-4.8	-127.5	-125.6	173.9
-131.9									
COMB	( 9 )	( 0 )	( 0 )	( 1 )	( 8 )	( 5 )	( 10 )	( 12 )	( 12 )
( 13 )									
CARR	11	12	13	14	15	16	17	18	19
20									
FdzT	.8	.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7
1.7									
MdxT	.0	.0	.0	-7.0	-.6	-8.8	-1.5	-8.4	-1.3
-9.0									
MdyT	172.3	-135.0	5.0	10.1	24.2	9.1	20.2	14.6	36.3
9.1									
COMB	( 16 )	( 17 )	( 0 )	( 1 )	( 1 )	( 2 )	( 2 )	( 8 )	( 8 )
( 6 )									
CARR	21	22	23	24	25	26	27	28	29
30									
FdzT	1.7	.8	.8	.8	.8	.8	.8	.8	.8
.8									
MdxT	-1.7	-4.0	-.7	-4.5	-1.0	1.6	-4.3	-.8	-4.0
-4.9									
MdyT	20.0	70.4	176.1	69.5	173.7	69.6	73.4	183.4	65.6
68.8									
COMB	( 6 )	( 10 )	( 10 )	( 11 )	( 11 )	( 12 )	( 13 )	( 13 )	( 14 )
( 15 )									
CARR	31	32	33	34	35	36	37		
FdzT	.8	.8	.8	.8	1.7	1.7	1.7		
MdxT	-1.3	1.7	-4.3	-.8	8.3	-8.3	8.3		
MdyT	172.1	68.9	75.3	188.3	3.5	-3.5	-3.5		
COMB	( 15 )	( 16 )	( 17 )	( 17 )	( 0 )	( 0 )	( 0 )		

## Seleção de bitolas de pilares

### 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
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 2ºOrdem
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)

## P1

PILAR:P1 num: 1  
Lances: 2 à 4

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)			
4	110,15m	30.x 60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	6.5	39.	.0301
3	106,75m	30.x 60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	23.0	39.	.1074
2	103,35m	30.x 60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	44.0	43.	.2054

## P2

PILAR:P2 num: 2  
Lances: 2 à 4

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)			
4	110,15m	30.x 60.	1800.0	12	12.5	N N	15	.83	6.3	15.0	N	30.0	3.0	22.4	39.	.1046
3	106,75m	30.x 60.	1800.0	12	12.5	N N	15	.83	6.3	15.0	N	30.0	3.0	55.5	39.	.2590
2	103,35m	30.x 60.	1800.0	12	12.5	N N	15	.83	6.3	15.0	N	30.0	3.0	103.0	43.	.4804

## P3

PILAR:P3 num: 3  
Lances: 2 à 4

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)			
4	110,15m	30.x 60.	1800.0	12	12.5	N N	15	.83	6.3	15.0	N	30.0	3.0	22.3	39.	.1042
3	106,75m	30.x 60.	1800.0	12	12.5	N N	15	.83	6.3	15.0	N	30.0	3.0	57.9	39.	.2704
2	103,35m	30.x 60.	1800.0	12	12.5	N N	15	.83	6.3	15.0	N	30.0	3.0	105.4	43.	.4920

## P4

PILAR:P4 num: 4  
Lances: 2 à 4

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)			
4	110,15m	30.x 60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	6.5	39.	.0301
3	106,75m	30.x 60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	22.7	39.	.1059
2	103,35m	30.x 60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	42.9	43.	.2004

## P5

PILAR:P5 num: 5  
Lances: 1 à 6

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)			
6	112,45m	19.x 40.	760.0	6	10.0	S N	4.7	.62	5.0	12.0	N	30.0	3.0	2.8	16.	.0131
5	111,65m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	15.9	27.	.0743
4	110,15m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	30.5	63.	.1421
3	106,75m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	35.9	62.	.1677
2	103,35m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	42.1	69.	.1966
1	99,50m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	57.1	15.	.2664

## P6

PILAR:P6 num: 6  
Lances: 1 à 6

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
6	112,45m	19.x 40.	760.0	6	10.0	S N	4.7	.62	5.0	12.0	N	30.0	3.0	2.6	16.	.0121
5	111,65m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	15.4	27.	.0721
4	110,15m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	28.3	63.	.1322
ELOL KAPA																
3	106,75m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	37.7	62.	.1758
ELOL KAPA																
2	103,35m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	44.2	69.	.2062
ELOL KAPA																
1	99,50m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	65.2	15.	.3042

## P7

PILAR:P7 num: 7  
Lances: 2 à 4

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
4	110,15m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	11.2	65.	.0524
3	106,75m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	40.2	56.	.1878
ELOL KAPA																
2	103,35m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	65.7	73.	.3068
ELOL KAPA																

## P8

PILAR:P8 num: 8  
Lances: 2 à 6

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
6	112,45m	19.x 50.	950.0	8	10.0	N S	6.4	.67	5.0			30.0	3.0			
5	111,65m	19.x 50.	950.0	8	10.0	S S	6.4	.67	5.0	12.0	N	30.0	3.0	2.8	93.	.0130
ELOL N,M,1/																
4	110,15m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	39.6	65.	.1847
ELOL KAPA																
3	106,75m	19.x 50.	950.0	8	12.5	N N	10.0	1.05	5.0	12.0	N	30.0	3.0	76.9	58.	
.3588 ELOL KAPA																
2	103,35m	19.x 50.	950.0	8	16.0	N N	16.0	1.68	5.0	12.0	N	30.0	3.0	114.1	71.	
.5326 ELOL KAPA																

## P9

PILAR:P9 num: 9  
Lances: 1 à 5

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
5	111,65m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	13.2	29.	.0618
4	110,15m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	28.3	65.	.1323
ELOL KAPA																
3	106,75m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	32.5	58.	.1516
ELOL KAPA																
2	103,35m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	37.3	71.	.1741
ELOL KAPA																
1	99,50m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	58.3	13.	.2721

## P10

PILAR:P10 num: 10  
Lances: 1 à 5

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

ENGENHARIA E COMÉRCIO LTDA.

5	111,65m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	13.1	29.	.0610
4	110,15m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	25.6	65.	.1193
ELOL KAPA																
3	106,75m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	34.1	58.	.1592
ELOL KAPA																
2	103,35m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	41.9	71.	.1953
ELOL KAPA																
1	99,50m	19.x 40.	760.0	6	10.0	N N	4.7	.62	5.0	12.0	N	30.0	3.0	50.4	13.	.2353

## P11

PILAR:P11 num: 11  
Lances: 2 à 6

Lance	Titulo	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)			
6	112,45m	19.x 50.	950.0	8	10.0	N S	6.4	.67	5.0			30.0	3.0			
5	111,65m	19.x 50.	950.0	8	10.0	S S	6.4	.67	5.0	12.0	N	30.0	3.0	2.7	93.	.0128
ELOL N,M,1/																
4	110,15m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	34.4	65.	.1605
ELOL KAPA																
3	106,75m	19.x 50.	950.0	8	12.5	N N	10	1.05	5.0	12.0	N	30.0	3.0	76.8	56.	.3583
ELOL KAPA																
2	103,35m	19.x 50.	950.0	8	16.0	N N	16	1.68	6.3	19.0	N	30.0	3.0	122.5	73.	.5718
ELOL KAPA																

## P12

PILAR:P12 num: 12  
Lances: 2 à 4

Lance	Titulo	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)			
4	110,15m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	11.1	65.	.0517
ELOL KAPA																
3	106,75m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	39.6	56.	.1847
ELOL KAPA																
2	103,35m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	64.3	73.	.2999
ELOL KAPA																

## P13

PILAR:P13 num: 13  
Lances: 2 à 4

Lance	Titulo	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)			
4	110,15m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	9.9	65.	.0464
ELOL KAPA																
3	106,75m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	34.5	56.	.1610
ELOL KAPA																
2	103,35m	19.x 50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	62.0	73.	.2895
ELOL KAPA																

## P14

PILAR:P14 num: 14  
Lances: 2 à 6

Lance	Titulo	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)			
6	112,45m	19.x 19.	361.0	4	16.0	N N	8.0	2.23	6.3			30.0	3.0			
5	111,65m	19.x 19.	361.0	4	16.0	S S	8.0	2.23	6.3	19.0	N	30.0	3.0	5.7	44.	.0263
ELOL KAPA																
4	110,15m	19.x 60.	1140.0	8	16.0	N N	16	1.40	5.0	12.0	N	30.0	3.0	29.2	65.	.1363
ELOL KAPA																
3	106,75m	19.x 60.	1140.0	8	16.0	N N	16	1.40	5.0	12.0	N	30.0	3.0	92.0	56.	.4295
ELOL KAPA																
2	103,35m	19.x 60.	1140.0	14	20.0	N N	44.0	3.86	6.3	19.0	N	30.0	3.0	154.1	73.	.7192
ELOL KAPA																

## P15

PILAR:P15 num: 15  
Lances: 2 à 6

Lance	Titulo	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)			
6	112,45m	19.x 19.	361.0	4	16.0	N N	8.0	2.23	6.3			30.0	3.0			

ENGENHARIA E COMÉRCIO LTDA.

5	111,65m	19.x	19.	361.0	4	16.0	S S	8.0	2.23	6.3	19.0	N	30.0	3.0	5.4	44.	.0254	
ELOL KAPA																		
4	110,15m	19.x	60.	1140.0	8	16.0	N N	16	1.40	5.0	12.0	N	30.0	3.0	32.1	65.	.1496	
ELOL KAPA																		
3	106,75m	19.x	60.	1140.0	8	16.0	N N	16	1.40	5.0	12.0	N	30.0	3.0	89.6	56.	.4183	
ELOL KAPA																		
2	103,35m	19.x	60.	1140.0	14	20.0	N N	44.7	3.86	6.3	19.0	N	30.0	3.0	146.7	73.	.6845	
ELOL KAPA																		

## P16

PILAR:P16 num: 16  
Lances: 2 à 4

Lance	Titulo	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)					
4	110,15m	19.x	50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	9.7	65.	.0454	
ELOL KAPA																		
3	106,75m	19.x	50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	34.7	56.	.1617	
ELOL KAPA																		
2	103,35m	19.x	50.	950.0	8	10.0	N N	6.4	.67	5.0	12.0	N	30.0	3.0	61.8	73.	.2883	
ELOL KAPA																		

## P17

PILAR:P17 num: 17  
Lances: 2 à 4

Lance	Titulo	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)					
4	110,15m	30.x	60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	6.0	39.	.0279	
ELOL KAPA																		
3	106,75m	30.x	60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	17.9	39.	.0836	
ELOL KAPA																		
2	103,35m	30.x	60.	1800.0	8	12.5	N N	10	.56	6.3	15.0	N	30.0	3.0	29.6	43.	.1383	
ELOL KAPA																		

## P18

PILAR:P18 num: 18  
Lances: 2 à 4

Lance	Titulo	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)					
4	110,15m	19.x	60.	1140.0	10	10.0	N N	8	0.70	5.0	12.0	N	30.0	3.0	22.6	62.	.1057	
ELOL KAPA																		
3	106,75m	19.x	60.	1140.0	10	12.5	N N	15	1.32	5.0	12.0	N	30.0	3.0	75.6	62.	.3526	
ELOL KAPA																		
2	103,35m	19.x	60.	1140.0	10	16.0	N N	20.0	1.76	6.3	19.0	N	30.0	3.0	131.6	68.	.6140	
ELOL KAPA																		

## P19

PILAR:P19 num: 19  
Lances: 2 à 4

Lance	Titulo	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)					
4	110,15m	19.x	60.	1140.0	10	10.0	N N	8.0	.70	5.0	12.0	N	30.0	3.0	22.6	62.		
.1055 ELOL KAPA																		
3	106,75m	19.x	60.	1140.0	10	12.5	N N	12.5	1.09	5.0	12.0	N	30.0	3.0	71.9	62.		
.3353 ELOL KAPA																		
2	103,35m	19.x	60.	1140.0	10	16.0	N N	20.0	1.65	6.3	19.0	N	30.0	3.0	126.1	68.		
.5886 ELOL KAPA																		

## P20

PILAR:P20 num: 20  
Lances: 2 à 4

Lance	Titulo	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)					
4	110,15m	30.x	60.	1800.0	8	12.5	N N	10.	.56	6.3	15.0	N	30.0	3.0	5.9	39.	.0275	
ELOL KAPA																		
3	106,75m	30.x	60.	1800.0	8	12.5	N N	10.	.56	6.3	15.0	N	30.0	3.0	18.0	39.	.0839	
ELOL KAPA																		
2	103,35m	30.x	60.	1800.0	8	12.5	N N	10.	.56	6.3	15.0	N	30.0	3.0	29.7	43.	.1386	
ELOL KAPA																		

**PT1**

PILAR:PT1 num: 21  
Lances: 5 à 6

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
6	112,45m	19.x 30.	570.0	4	12.5	N N	5.0	.88	5.0			30.0	3.0			
5	111,65m	19.x 30.	570.0	4	12.5	S S	5.0	.88	5.0	12.0	N	30.0	3.0	2.9	40.	.0135

ELOL KAPA

**PT2**

PILAR:PT2 num: 22  
Lances: 5 à 6

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
6	112,45m	19.x 30.	570.0	4	12.5	N N	5.0	.88	5.0			30.0	3.0			
5	111,65m	19.x 30.	570.0	4	12.5	S S	5.0	.88	5.0	12.0	N	30.0	3.0	2.6	40.	.0121

ELOL KAPA

**PT3**

PILAR:PT3 num: 23  
Lances: 5 à 6

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
6	112,45m	19.x 19.	361.0	4	16.0	N S	8.0	2.23	6.3			30.0	3.0			
5	111,65m	19.x 19.	361.0	4	16.0	S S	8.0	2.23	6.3	19.0	N	30.0	3.0	5.3	86.	.0248

ELOL KAPA

**PT4**

PILAR:PT4 num: 24  
Lances: 5 à 6

Lance	Título	Seção	Área	NFer	Bitola	PDD	As	Taxa	Estr	C/	PP	fck	Cobr	T	Lbd	Ni
		[cm]	[cm2]		[mm]	x y	[cm2]	[%]	[mm]	[cm]		(MPa)	(cm)			
6	112,45m	19.x 19.	361.0	4	16.0	N S	8.0	2.23	6.3			30.0	3.0			
5	111,65m	19.x 19.	361.0	4	16.0	S S	8.0	2.23	6.3	19.0	N	30.0	3.0	4.7	86.	.0218

ELOL KAPA

Projeto - TP17					
Área construída	892,10	m <sup>2</sup>			
Volume de Concreto Superestrutura	241,70	m <sup>3</sup>			
Consumo de aço Superestrutura	25578,00	kgf			
Volume de Concreto Baldrame e Blocos	43,00	m <sup>3</sup>			
Consumo de aço Baldrame e Blocos	3300,00	kgf			
Espessura média superestrutura	0,27	m			
Espessura média fundações	0,05	m			
Relação Aço / Concreto (exceto estaqueamento)	101,46	kgf/m <sup>3</sup>			
Tipo de Peça	Área de Forma	Volume de Concreto	Peso Aço	Aço / Concreto	Forma / Concreto
	(m <sup>2</sup> )	(m <sup>3</sup> )	(kgf)	(kgf / m <sup>3</sup> )	(m <sup>2</sup> / m <sup>3</sup> )
Estacas	xxxx	68,00	1248,00	18,35	xxxx
Blocos	85,00	28,60	1846,00	64,55	2,97
Vigamentos	790,00	85,70	8129,00	94,85	9,22
Pilares	351,00	27,00	3741,00	138,56	13,00
Lajes	845,00	129,00	13708,00	106,26	6,55
<b>Total</b>	<b>2071,00</b>	<b>338,30</b>	<b>28672,00</b>		

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