

Contrato Administrativo Nº 301/2014

**PROJETO EXECUTIVO DA ETE NOVO MUNDO -
Atualização Gráfica e Orçamentária da ETE**



PROJETO ESTRUTURAL - TOMO III



Contrato nº 301 / 2014

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Atualização Gráfica e Orçamentária da ETE**

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Fevereiro / 2015

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ATUALIZAÇÃO GRÁFICA E ORÇAMENTÁRIA DA ETE
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1 APRESENTAÇÃO

1 APRESENTAÇÃO

O presente trabalho se refere ao “Projeto Executivo da ETE Novo Mundo – Atualização Gráfica e Orçamentária da ETE”, contratado pela Prefeitura de Pelotas.

Os principais dados e informações que caracterizam o Contrato são os seguintes:

Contrato Administrativo nº: Nº 301/2014;

Data da Assinatura do Contrato: 15/12/2014;

Prazo de Execução do Contrato: 25 dias;

Valor do Contrato: R\$ 7.993,42.

Esse trabalho teve por objetivo a atualização gráfica e orçamentária do Projeto Executivo do Coletor Geral CG-3 e da Estação de Tratamento de Esgotos – ETE Novo Mundo desenvolvido pelo Consórcio STE-ECSAM-ENGEPLUS, em Junho / 2011 e as obras parcialmente executadas até Dezembro / 2014.

A atualização gráfica e orçamentária do Projeto compreendeu as seguintes atividades:

- Levantamento de Quantitativos das obras já realizadas, a partir do cadastro fornecido pela UGP (serviços de Terraplenagem de implantação do CG-3);
- Verificação completa dos Quantitativos de Projeto, considerando as obras previstas para serem implantadas;
- Atualização dos Preços Unitários do Orçamento, segundo valores da tabela SINAPI;
- Atualização de Preços de Materiais e Equipamentos, através de Consulta aos fornecedores; e
- Edição atualizada e completa do Projeto.

Tendo por base, portanto, as atividades realizadas, o presente relatório contempla o **Projeto Estrutural – TOMO III**, sendo o Memorial do Projeto Estrutural da Elevatória de Lodo Adensado, Decantador Final, Tanque de Lodo, Adensador de Lodo, Elevatória de Lodo Adensado, Tratamento Químico e Casa dos Sopradores.

Como o próprio título diz, este documento que não se apresenta como uma memória de cálculo clássica onde, de forma manual, toda a sequência de cálculo da obra é apresentada. Isso decorre da introdução, cada vez mais intensa, da utilização de diferentes ferramentas de apoio ao projeto estrutural, tais como aplicativos CAD munidos de calculadoras especializadas, planilhas eletrônicas, dentre outros, além do próprio cálculo manual.

Dessa forma, ao invés de uma simples memória de cálculo, temos um Memorial de Projeto Estrutural, o qual vem a ser um documento onde o projeto como um todo é apresentado e não apenas os cálculos. Desde a descrição das principais características da obra e condicionantes de projeto, passando pela tipologia estrutural, modelos adotados, carregamentos, análise de esforços, dimensionamento e detalhamento.

Na medida em que grande parte dos cálculos são feitos através do uso de aplicativos computacionais e os relatórios, mesmo quando já resumidos, podem ser bastante extensos, é dada especial ênfase à descrição da modelagem estrutural e do entendimento do comportamento da estrutural o que, associado ao detalhamento final, permite o seu pleno entendimento. Isso permite, a reprodução do projeto, com bastante aproximação, mesmo com a utilização de outros aplicativos que não o utilizado no seu desenvolvimento. Em alguns casos, quando a modelagem é complexa, são utilizados de forma amostral cálculos

manuais servindo como testemunhos comparativos do que os aplicativos computacionais apresentam como resultados. Isso dá uma maior segurança na análise, dimensionamento e detalhamento, tanto na fase de desenvolvimento quanto posteriormente durante qualquer revisão.

A seguir são apresentados em um primeiro item a caracterização da obra. Na sequência são apresentados os condicionantes que afetam o projeto estrutural de modo mais significativo, principalmente aqueles que, pelas suas especificidades e importância, inclusive normativas, necessitam ser explicitados em plantas. Quando necessário neste item constam os carregamentos especiais e/ou específicos da obra. A concepção geral do modelo ou modelos estruturais que foram utilizados são descritos, seguidos da descrição da metodologia de projeto adotada. Segue-se o memorial de desenvolvimento do projeto e seus resultados que podem, quando necessário, serem comentados. Quando os resultados são constituídos por relatórios muito extensos estes são mencionados de forma resumida neste item e incluídos na sua íntegra na forma de anexos.

2 ELEVATÓRIA DE ESGOTO BRUTO

2 ELEVATÓRIA DE ESGOTO BRUTO

2.1 Caracterização da obra

A Elevatória de Esgoto Bruto constitui-se na entrada do esgoto na ETE Novo Mundo, estando constituída por quatro estruturas hidráulicas em sequência: a Câmara de Chegada, a Câmara de Gradeamento (manual e automático), o Poço de Bombas e a Câmara de Manobras. A cota superior de todas as câmaras corresponde a +3,74 m. A Câmara de Chegada apresenta-se em planta com uma configuração trapezoidal medindo aproximadamente 2,58m/3,95m x 2,75 m, com o fundo na cota -1,35 m e com uma profundidade de 5,29 m; o Gradeamento mede em planta 4,89 m x 2,75 m, com uma altura de 7,46 m e fundo na cota -3,72 m; o Poço de Bombas mede 5,85 m x 9,00 m, com profundidade de 7,46 m e fundo na cota -3,72 m; e, a Câmara de Manobra mede 6,65 m x 9,00 m, com uma profundidade de 1,66 m e fundo na cota +2,08 m. O projeto estrutural foi elaborado a partir do projeto hidráulico constante das plantas integrantes do arquivo EG0112-D-EEB-HID-01a02-00.

As estruturas de todos os elementos acima são em concreto armado, conforme já mencionado, e as fundações em estacas pré-moldadas também em concreto.

2.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônico e hidráulico de reforma da elevatória, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR 6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, foi observado o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN.

A Classe de Agressividade Ambiental adotada, conforme as especificações da CORSAN, foi a III indicada na Tabela 6.1 da NBR 6118/2003, correspondendo a agressividade *forte*.

Para esta classe a NBR 6118 estabelece o seguinte:

- a) Especificações para o concreto:
 - Classe de concreto: $\geq C30$ – $f_{ck} \geq 30\text{Mpa}$ (300 kgf/cm^2);
 - $E_{cs} = 0,85 E_{ci} = 26072\text{ Mpa}$ (260720 kgf/cm^2);
 - Fator água cimento máximo = 0,55.
- b) Especificações para cobrimentos de armaduras (CORSAN):
 - Vigas e pilares: 45 mm
 - Lajes : 45 mm

Como carregamentos específicos deste projeto têm-se:

- i) Peso específico aparente do lodo: 1,2 tf/m³.
- ii) Nas passarelas e escadas foi considerada uma sobrecarga acidental de 300 kfg/m².
- iii) Nas lajes de apoio das canalizações adotou-se uma sobrecarga permanente de 1 t/m² complementadas por 0,3 tf/m² acidental.

- iv) As vigas dos pórticos das talhas foram carregadas na sua extremidade com uma carga accidental de 3,0 tf

Para efeito do cálculo das pressões nas paredes e lajes de fundo o nível de lodo foi considerado como com a altura máxima das próprias paredes admitindo-se, à favor da segurança, a possibilidade deste enchimento máximo.

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, emitidos pela empresa FS Sondagens de Cachoeirinha-RS.

2.3 Concepção geral do(s) modelo(s) estrutural(is)

A estrutura da elevatória foi modelada no TQS com lajes, vigas e pilares. As paredes foram calculadas como vigas paredes para as cargas verticais e como lajes para as cargas horizontais.

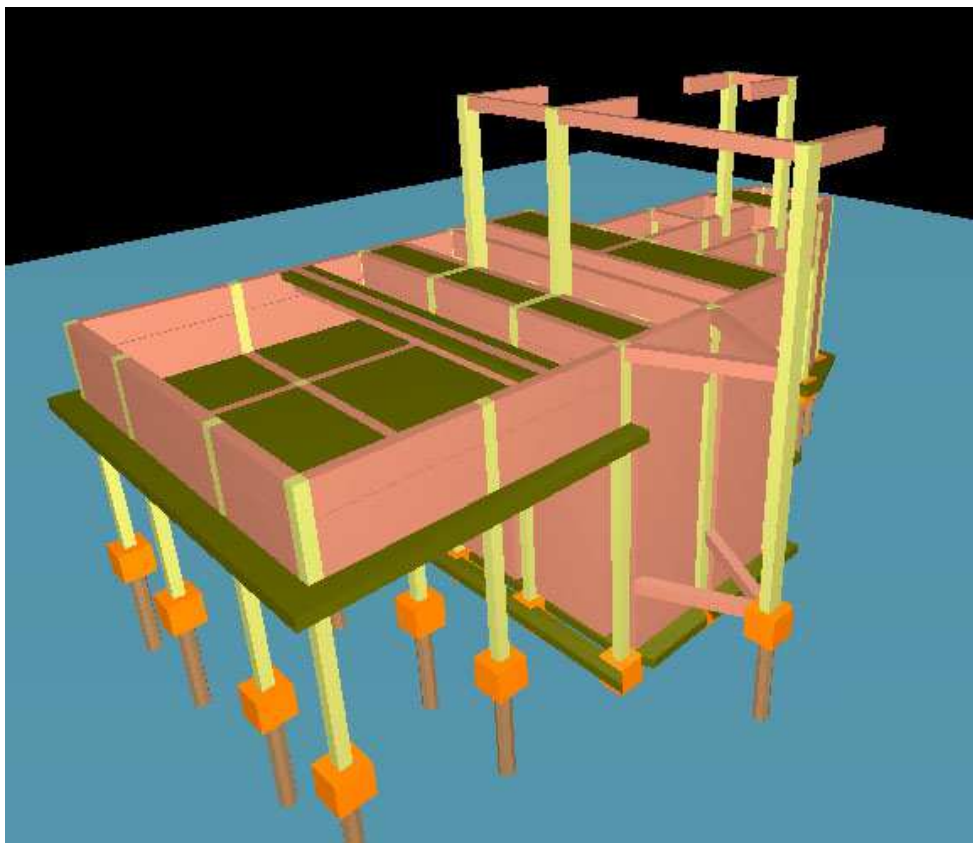


Figura 1 – Vista geral do modelo da reforma da Elevatória de Esgoto Bruto..

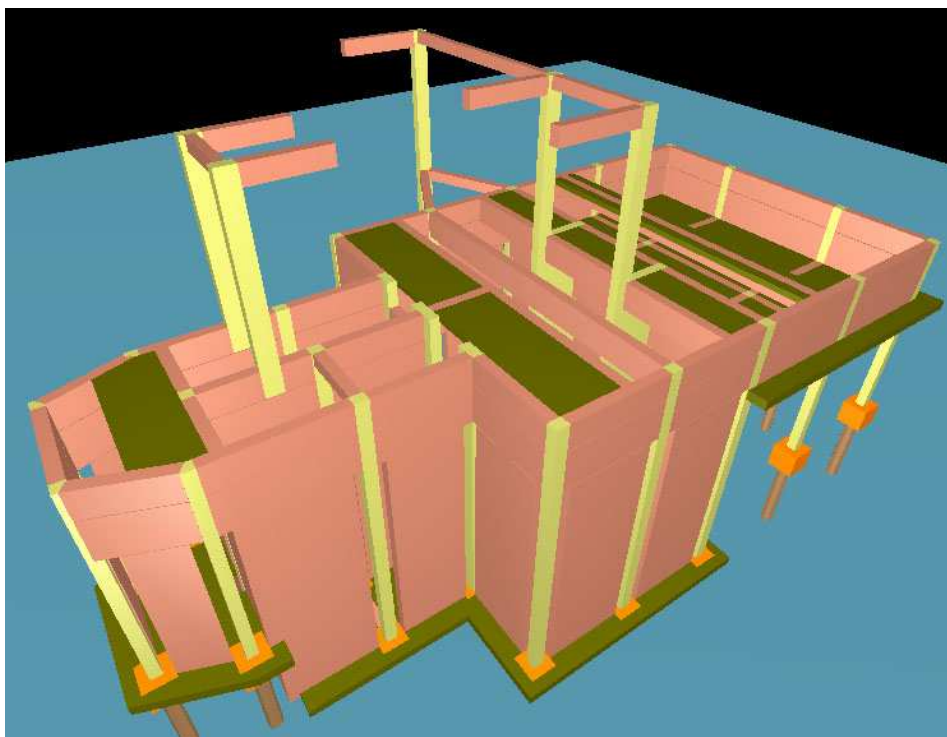


Figura 2 – Outra vista do mesmo modelo.

2.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento (laje de fundo do decantador e vigas paredes), discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito, os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais. Neste modelo de pórtico, as lajes horizontais são tratadas como diafragmas rígidos e os esforços são distribuídos entre os pilares de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária, parcial ou total, e, posteriormente, final de detalhamento e desenho. O

dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. De uma forma geral os procedimentos são os seguintes:

- 1º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.
- 2º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 3º. Detalhamento final e desenho.
- 4º. Emissão de plantas.

2.5 Memorial de Desenvolvimento e resultados do projeto

As Figuras 3 e 4 apresentam os momentos fletores utilizados no dimensionamento das vigas e lajes conforme se segue:

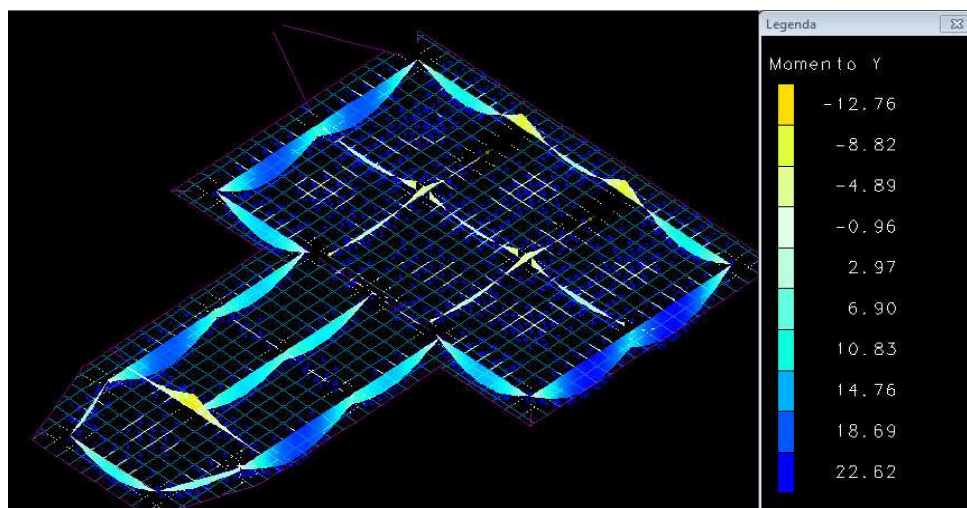


Figura 3 – Momentos fletores no pavimento de fundação.

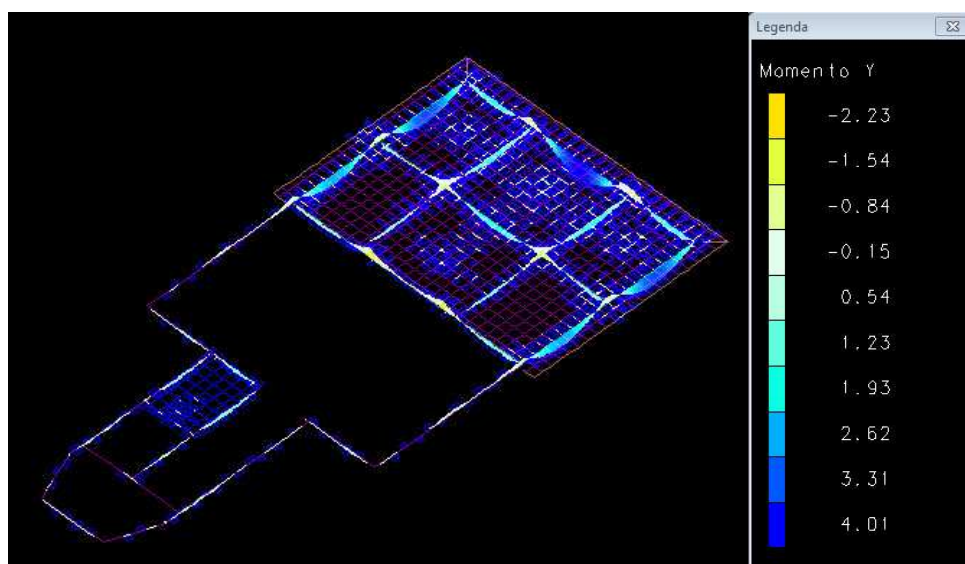


Figura 4 – Momentos fletores no nível N268.

2.5.1 Memórias de Cálculo de Vigas no nível da fundação

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.7.1)
 Pg 1
 AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
 32283060

T Q S Projeto: 0002 - Fundação
 17/08/12
 CAD/Vigas
 09:55:30

fck=300.kgf/cm2 - Aco: 50A - Esforços Caracteristicos

L E G E N D A
 G E O M E T R I A
 Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
 Repeticoes
 NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator
 de Alternancia de Cargas
 Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa
 Colaborante Superior
 BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
 Espessura Laje 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.trans.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
 Espacamento selecionado
 NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura
 transversal-Suspensao
 A R M A D U R A S - T O R C A O
 %dT : % limite de TRD2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de
 torcao
 b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
 Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao
 p/NR estribos selecionado
 Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de
 torcao no lado h
 ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica
 no vao - S[sim] N[nao]
 R E A C O E S D E A P O I O
 DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre / segue
 / vigas
 M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
 =====
 =====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.48 /B= .25 /H= .55 /BCs= .47 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .28 /FLT.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 55 | M.[-] =
 2.6 tf* m | [tf,cm]| As = .45 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 2.95
 -SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .00 | As = 2.90 -STAS- [4 B 10.0mm] | AsL= .00
 ----- x/d = .07 x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm]| M[-]Min = 273.7 | M[+]Min = 317.0 | M[-]Min =
 435.0

[cm2] | Asapo[+]= 2.90
1.96

1

```
| Asapo[+]=
```

CISALHAMENTO - E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tfr,cm]	0.-	115.	10.88	63.01	2	45.	.1	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O -	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
E N S A G E M															
[tf,cm]	0.-	115.	.01	4.59	5	8.6	13.1	43.1	.0	.0	.0	.0	.18	N	

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

Vao= 2 /L= 1.48 /B= .25 /H= .55 /BCs= .47 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXA0- | E S Q U E R D A | M E I O D O V A O | D I R E I T

| M.[-] = 3.0 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 124 | M.[-] =

[tf,cm] | As = 2.95 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = .45

-SRAS- [2 B 8.0mm]

| ASL= .00 ----- x/d = .07 | As = 2.90 -STAS- [4 B 10.0mm] | ASL= .00
x/d = .00

----- x/u = .00

| x/dMx= .50 |

$$x/dMx = .50$$

[tf,cm] | M[-]Min = 435.0 | M[+]Min = 317.0 | M[-]Min = 372.7

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[cm2 ]| Asapo[+]= 1.96 | Asapo[+]=
```

2.90

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf, cm]	0.-	115.	9.84	63.01	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	115.	.01	4.59	5	8.6	13.1	43.1	.0	.0	.0	.0	.16	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:	
0	0	1	2.456	2.361	.70	.19	0	B8	.00	.00	8008	0
0	0	2	14.585	14.406	.70	.19	0	B7	.00	.00	8007	0
0	0	3	2.593	2.509	.70	.19	0	B6	.00	.00	8006	0

Viga= 2 V2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXA0- | E S Q U E R D A | M E I O D O V A O | D I R E I T

| M.[-] = .0 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 38 | M.[-] =

```
2.0 tf* m
```

[tf, cm]	As = 2.16	-SRAS-	[3 B 10.0mm]	AsL= .00	-----	As = 2.40
SRAS [3 B 10.0mm]						

-SRAS- [3 B 10.0mm]
| AsL= .00 ----- x/d = .05 | As = 2.40 -STAS- [3 B 10.0mm] | AsL= .00

----- x/d = .06

6. $x/dMx = .50$

$x/dMx = .50$

[tf,cm]	M[-]Min = 294.4	M[+]Min = 294.8	M[-]Min =

343.9

[cm2]| Asapo[+]= 2.40 | Asapo[+]=

CISALHAMENTO- EN S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[+tf, cm]	0	88	7.44	63.01	3.45		0	3.0	3.0	6.3	30.0	3	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.- 88. .11 4.59 5 8.6 13.1 43.1 .2 .0 .0 .0 .14 N

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

Vao= 2 /L= 1.21 /B= .25 /H= .55 /BCs= .34 /BCi= .00 /TpS= 8 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 2.3 tf* m | M.[+] Max= .8 tf* m - Abcis.= 102 | M.[-] =

.0 tf* m | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = .34

-SRAS- [2 B 8.0mm] | AsL= .00 ----- x/d = .06 | As = 2.40 -STAS- [3 B 10.0mm] | AsL= .00

----- x/d = .00 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 343.9 | M[+]Min = 294.8 | M[-]Min =

273.7 | Asapo[+]= 1.96 | Asapo[+]=

2.40 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 88. 8.02 63.01 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 88. .16 4.59 5 8.6 13.1 43.1 .3 .0 .0 .0 .16 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 2.867 2.420 .70 .19 0 B12 .00 .00 8012 0

0 0 2 10.877 9.970 1.00 .34 0 B11 .00 .00 8011 0

0 0 3 1.615 1.155 .70 .19 0 B10 .00 .00 8010 0

0 0 0 0

=====

Viga= 3 V3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.62 /B= .25 /H= .55 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 3.7 tf* m | M.[+] Max= 4.2 tf* m - Abcis.= 108 | M.[-] =

8.1 tf* m | As = 2.73 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.63

-SRAS- [3 B 16.0mm] | AsL= .00 ----- x/d = .07 | As = 3.53 -STAS- [3 B 12.5mm] | AsL= .00

----- x/d = .14 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 403.4 | M[+]Min = 338.8 | M[-]Min =

537.8 | Asapo[+]= .88 | Asapo[+]=

1.96 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 105. 14.60 63.01 2 45. 2.4 2.9 2.9 6.3 20.0 2 .0 .0
105.- 210. 18.05 63.01 2 45. 4.5 2.9 4.5 6.3 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 105. .09 4.59 5 8.6 13.1 43.1 .2 .0 .0 .0 .25 N
105.- 210. .07 4.59 5 8.6 13.1 43.1 .1 .0 .0 .0 .30 N

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

Vao= 2 /L= 1.98 /B= .25 /H= 2.77 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.50 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 9.1 tf* m | M.[+] Max= .4 tf* m - Abcis.= 132 | M.[-] =
.0 tf* m | [tf,cm] As = 10.39 -SRAS- [6 B 16.0mm] | AsL= .00 ----- | As = 1.72
-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 10.39 -SRAS- [6 B 16.0mm] | AsL= .00
----- x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 23 B 6.3mm] - LN= 11.1 |
x/dMx= .50 | [tf,cm] M[-]Min = 6942.1 | M[+]Min = 6942.1 | M[-]Min =
6942.1 | [cm2] Asapo[+]= 9.87 | Asapo[+]=
10.39

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	80.	17.19	345.58	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	80.	.61	37.66	5	11.5	13.1	265.1	.2	.0	.0	.0	.07	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:		
0	0	0	10.415	10.059	.70	.19	0	B10	.00	.00	8010	0
0	0	0	25.172	24.552	.70	.00	1	B15	.00	.00	8015	0
0	0	0	1.120	.856	1.95	.14	0	B18	.00	.00	8018	0

Viga= 4 V4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.62 /B= .25 /H= .55 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.7 tf* m | M.[+] Max= 4.3 tf* m - Abcis.= 108 | M.[-] =
8.5 tf* m | [tf,cm] As = 2.73 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.91
-SRAS- [3 B 16.0mm] | AsL= .00 ----- x/d = .07 | As = 3.53 -STAS- [3 B 12.5mm] | AsL= .00
----- x/d = .14 | x/dMx= .50 |
x/dMx= .50 | [tf,cm] M[-]Min = 403.4 | M[+]Min = 338.8 | M[-]Min =
537.8 | [cm2] Asapo[+]= .88 | Asapo[+]=
1.96

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	105.	15.15	63.01	2	45.	2.7	2.9	2.9	6.3	20.0	2	.0	.0	
	105.-	210.	19.07	63.01	2	45.	5.2	2.9	5.2	6.3	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	105.	.10	4.59	5	8.6	13.1	43.1	.2	.0	.0	.0	.26	N	
	105.-	210.	.09	4.59	5	8.6	13.1	43.1	.2	.0	.0	.0	.32	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.98 /B= .25 /H= 2.77 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.50 /Flt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 9.5 tf* m | M.[+] Max= .2 tf* m - Abcis.= 148 | M.[-] =
.0 tf* m | As = 10.39 -SRAS- [ 6 B 16.0mm] | AsL= .00 ----- | As = 1.72
[tf,cm] | AsL= .00 ----- | As = 10.39 -SRAS- [ 6 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 23 B 6.3mm] - LN= 11.1 |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 6942.1 | M[+]Min = 6942.1 | M[-]Min =
6942.1 | | |
[cm2 ] | Asapo[+]= 9.87 | | Asapo[+]=
10.39 | | |

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.- 80. 17.64 345.58 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 80. .71 37.66 5 11.5 13.1 265.1 .2 .0 .0 .0 .07 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 10.808 10.451 .70 .19 0 B12 .00 .00 8012 0
0 0 0 0 0 0 0 0 0 0 0 0
2 26.220 25.603 .70 .00 1 B16 .00 .00 8016 0
0 0 0 0 0 0 0 0 0 0 0 0
3 .916 .654 1.95 .14 0 B19 .00 .00 8019 0
0 0 0 0 0 0 0 0 0 0 0 0
=====
=====

```

Viga= 5 V5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 2.58 /B= .25 /H= .55 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.28 /FLt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.0 tf* m | M.[+] Max= 6.9 tf* m - Abcis.= 115 | M.[-] =
9.4 tf* m | As = 2.41 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 6.63
[tf,cm] | AsL= .00 ----- | As = 4.62 -STAS- [ 4 B 12.5mm ] | AsL= .00
----- | x/d = .06 | x/dMx= .50 | |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 345.3 | M[+]Min = 338.2 | M[-]Min =
534.9 | | |
[cm2 ] | Asapo[+]= 3.51 | | Asapo[+]=
1.96 | | |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 113. 18.28 63.01 2 45. 4.7 2.9 4.7 6.3 12.0 2 .0 .0
113.- 225. 27.73 63.01 2 45. 10.6 2.9 10.6 10.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 113. .02 4.59 5 8.6 13.1 43.1 .0 .0 .0 .0 .29 N
113.- 225. .04 4.59 5 8.6 13.1 43.1 .1 .0 .0 .0 .45 N

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 2 /L= 2.48 /B= .25 /H= .55 /BCs= .55 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.28 /FLt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 9.9 tf* m | M.[+] Max= 2.4 tf* m - Abcis.= 142 | M.[-] =
9.4 tf* m | | |

```

[tf,cm] | As = 6.97 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 6.64
 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 3.18 -STAS- [4 B 10.0mm] | AsL= .00
 ----- | x/d = .16 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 482.5 | M[+]Min = 327.4 | M[-]Min =
 482.5 |
 [cm2] | Asapo[+]= 1.96 | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 215. 24.17 63.01 2 45. 8.3 2.9 8.3 8.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 215. .03 4.59 5 8.6 13.1 43.1 .1 .0 .0 .0 .39 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 3 /L= 2.58 /B= .25 /H= .55 /BCs= .64 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 8.2 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 161 | M.[-] =
 2.3 tf* m |
 [tf,cm] | As = 5.70 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 2.41
 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 4.06 -STAS- [2 B 16.0mm] | AsL= .00
 ----- | x/d = .06 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 534.9 | M[+]Min = 338.2 | M[-]Min =
 345.3 |
 [cm2] | Asapo[+]= 1.96 | Asapo[+]=
 1.02

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 113. 24.05 63.01 2 45. 8.3 2.9 8.3 8.0 12.0 2 .0 .0
 113.- 225. 15.28 63.01 2 45. 2.8 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 113. .03 4.59 5 8.6 13.1 43.1 .1 .0 .0 .0 .39 N
 113.- 225. .02 4.59 5 8.6 13.1 43.1 .0 .0 .0 .0 .25 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	13.036	12.938	.70	.19	0	B17	.00	.00	8017
0	0	2	35.669	35.572	.70	.19	1	B16	.00	.00	8016
0	0	3	33.934	33.825	.70	.19	1	B15	.00	.00	8015
0	0	4	10.917	10.809	.70	.19	0	B14	.00	.00	8014
0	0	0	0	0							0

Viga= 6 V6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 2.65 /B= .25 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
 .15 /Flt.Ex= .13 [M]

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

* * * * *
 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.[-] = .4 tf* m | M.[+] Max= .0 tf* m - Abcis.= 264 | M.[-] =
 .6 tf* m

```
[tf,cm] | As = 1.13 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 1.13
-SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 1.24 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .06 | x/dMx= .50 |
| x/dMx= .50 |
| [tf,cm] | M[-]Min = 81.4 | M[+]Min = 81.4 | M[-]Min =
81.4 |
[cm2 ] | Asapo[+]= .41 | Asapo[+]=
.31 |
```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	247.	4.00	31.19	2	45.	.0	2.9	2.9	6.3	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	247.	.07	1.53	5	6.8	13.1	18.1	.4	.0	.0	.0	.18	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	.31	0	B14	.00	.00	8014
0	0	0	0	0	.31	0	B30	.00	.00	8030

Viga= 7 V7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.56 /B= .25 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /Flt.Ex= .13 [M]

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= .5 tf* m - Abcis.= 256 | M.[-] =
.0 tf* m | [tf,cm] | As = 1.23 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = .22
-SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- | As = 1.35 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .06 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 |
| x/dMx= .50 |
| [tf,cm] | M[-]Min = 81.4 | M[+]Min = 81.4 | M[-]Min =
81.4 |
[cm2 ] | Asapo[+]= .34 | Asapo[+]=
1.23 |
```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	238.	1.82	31.19	2	45.	.0	2.9	2.9	6.3	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	238.	.11	1.53	5	6.8	13.1	18.1	.5	1.6	.1	.1	.13	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	.29	0	B20	.00	.00	8020
0	0	0	0	0	.29	0	B30	.00	.00	8030

Viga= 51 PA1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.82 /B= .25 /H= 3.88 /BCs= .00 /BCi= .34 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 1.94 /Flt.Ex= .01 [M]

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= .5 tf* m - Abcis.= 256 | M.[-] =
.0 tf* m | [tf,cm] | As = 1.23 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = .22
-SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- | As = 1.35 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .06 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 |
| x/dMx= .50 |
| [tf,cm] | M[-]Min = 81.4 | M[+]Min = 81.4 | M[-]Min =
81.4 |
[cm2 ] | Asapo[+]= .34 | Asapo[+]=
1.23 |
```

```

      | M.[-] =      .0 tf* m      | M.[+] Max=      6.5 tf* m - Abcis.= 91 | M.[-] =
.0 tf* m
[tf,cm]| As = 2.24 -STAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 14.89
-STAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 14.89 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- | x/d = .03 | Arm.Lat.=[2 X 32 B 6.3mm] - LN= 15.4 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 14139.0 | M[+]Min = 14759.2 | M[-]Min =
14139.0 |
[cm2 ]| Asapo[+]= 14.89 | Asapo[+]=
14.44 |

```

```

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.- 109. 14.03 486.87 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 109. .58 54.72 5 11.7 13.1 376.1 .1 .0 .0 .0 .04 N

```

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

```

Vao= 2 /L= 3.02 /B= .25 /H= 3.88 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
1.94 /FLt.Ex= .01 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

```

      | M.[-] =      .0 tf* m      | M.[+] Max=      39.4 tf* m - Abcis.= 176 | M.[-] =
.0 tf* m
[tf,cm]| As = 14.55 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 14.55
-STAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 14.55 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- | x/d = .04 | Arm.Lat.=[2 X 32 B 6.3mm] - LN= 15.4 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 13620.6 | M[+]Min = 13620.6 | M[-]Min =
13620.6 |
[cm2 ]| Asapo[+]= 14.11 | Asapo[+]=
14.11 |

```

```

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.- 232. 69.53 486.87 2 45. .0 2.9 2.9 6.3 20.0 2 20.3 2.3

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 232. .86 54.72 5 11.7 13.1 376.1 .2 .0 .0 .0 .16 N

```

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

```

Vao= 3 /L= 2.50 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
1.94 /FLt.Ex= .01 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

```

      | M.[-] =      .0 tf* m      | M.[+] Max=      28.0 tf* m - Abcis.= 20 | M.[-] =
4.6 tf* m
[tf,cm]| As = 22.20 -SRAS- [ 7 B 20.0mm] | AsL= .00 ----- | As = 22.20
-STAS- [ 7 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
----- | x/d = .04 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 | Grampos
Dir.= 7B 10.0mm x/dMx= .50 |
[tf,cm]| M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6 |
[cm2 ]| Asapo[+]= 22.20 | Asapo[+]=
22.20 |

```

```

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.- 180. 36.80 746.54 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 180. .57 85.31 5 12.0 13.0 580.0 .1 .0 .0 .0 .06 N

```


REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	10.007	9.238	.75	.00	0	B1	.00	.00	8001
0	0	2	56.208	46.008	.71	.00	0	B3	.00	.00	8003
0	0	3	21.316	14.320	.70	.00	0	B6	.00	.00	8006
0	0	4	26.287	22.144	.70	.00	0	B10	.00	.00	8010

Viga= 52 PA2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.82 /B= .25 /H= 3.88 /BCs= .00 /BCi= .34 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 1.94 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 8.2 tf* m - Abcis.= 91 | M.[-] =
.0 tf* m | As = 2.24 -STAS- [3 B 10.0mm] | AsL= .00 ----- | As = 14.89
-STAS- [5 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 14.89 -SRAS- [5 B 20.0mm] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 32 B 6.3mm] - LN= 15.4 |
x/dMx= .50 | M[-]Min = 14139.0 | M[+]Min = 14759.2 | M[-]Min =
[tf,cm] | 14139.0 | | 14.44
[cm2] | Asapo[+]= 14.89 | | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	109.	16.55	486.87	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	109.	.47	54.72	5	11.7	13.1	376.1	.1	.0	.0	.0	.04	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.02 /B= .25 /H= 3.88 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 1.94 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 37.8 tf* m - Abcis.= 151 | M.[-] =
.0 tf* m | As = 14.55 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 14.55
-SRAS- [5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 14.55 -SRAS- [5 B 20.0mm] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 32 B 6.3mm] - LN= 15.4 |
x/dMx= .50 | M[-]Min = 13620.6 | M[+]Min = 13620.6 | M[-]Min =
[tf,cm] | 13620.6 | | 14.11
[cm2] | Asapo[+]= 14.11 | | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	232.	67.12	486.87	2	45.	.0	2.9	2.9	6.3	20.0	2	21.5	2.4	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	232.	.95	54.72	5	11.7	13.1	376.1	.2	.0	.0	.0	.16	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.50 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 1.94 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 23.1 tf* m - Abcis.= 62 | M.[-] =
5.2 tf* m | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00 ----- | As = 22.20
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00
----- x/d = .04 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 | Grampos
Dir.= 7B 10.0mm x/dMx= .50 | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6 | Asapo[+]= 22.20 | Asapo[+]=
22.20

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	180.	34.24	746.54	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	180.	.55	85.31	5	12.0	13.0	580.0	.1	.0	.0	.0	.05	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:		
0	0	1	11.802	11.074	.75	.00	0	B2	.00	.00	8002	0
0	0	2	52.097	42.533	.71	.00	0	B4	.00	.00	8004	0
0	0	3	26.334	20.608	.70	.00	0	B8	.00	.00	8008	0
0	0	4	24.457	20.991	.70	.00	0	B12	.00	.00	8012	0

Viga= 53 PA3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.39 /B= .25 /H= 3.88 /BCs= .00 /BCi= .25 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 1.94 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .7 tf* m | M.[+] Max= 10.8 tf* m - Abcis.= 119 | M.[-] =
.0 tf* m | As = 14.55 -STAS- [5 B 20.0mm] | AsL= .00 ----- | As = 2.24
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 14.55 -SRAS- [5 B 20.0mm] | AsL= .00
----- x/d = .04 | Arm.Lat.=[2 X 32 B 6.3mm] - LN= 15.4 |
x/dMx= .50 | M[-]Min = 13620.6 | M[+]Min = 13620.6 | M[-]Min =
13620.6 | Asapo[+]= 14.55 | Asapo[+]=
14.55

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	169.	21.17	486.87	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	169.	.61	54.72	5	11.7	13.1	376.1	.1	.0	.0	.0	.05	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:		
0	0	1	15.102	15.098	.70	.00	0	B2	.00	.00	8002	0
0	0	2	13.248	13.245	.70	.00	0	B1	.00	.00	8001	0

Viga= 54 PA4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.85 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.96 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 42.5 tf* m - Abcis.= 185 | M.[-] =
.0 tf* m | As = .00 -SRAS- [0 B 8.0mm] | AsL= .00 ----- | As = 22.20
[tf,cm] | AsL= .00 ----- x/d = .00 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00
-SRAS- [7 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00
----- x/d = .04 | Grampos Esq.=10B 10.0mm x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6 | | |
[cm2] | Asapo[+]= 22.20 | | Asapo[+]=
21.53 | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	138.	43.09	746.54	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	138.	.45	85.31	5	12.0	13.0	580.0	.1	.0	.0	.0	.06	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.85 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.96 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 42.0 tf* m - Abcis.= 0 | M.[-] =
.0 tf* m | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00 ----- | As = .00
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00
-SRAS- [7 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00
----- x/d = .00 | Grampos
Dir.=10B 10.0mm x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 |
[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6 | | |
[cm2] | Asapo[+]= 21.53 | | Asapo[+]=
22.20 | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	138.	42.63	746.54	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	138.	.44	85.31	5	12.0	13.0	580.0	.1	.0	.0	.0	.06	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	1	30.735	24.159	.25	.00	2	PA2	.00	.00	0
0	2	-13.238	-26.391	.70	.00	0	B5	.00	.00	8005
0	3	29.026	22.449	.25	.00	2	PA1	.00	.00	0

Viga= 55 PA5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.50 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.96 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= 38.4 tf* m - Abcis.= 249 | M.[-] =

.0 tf* m | [tf,cm] As = 3.14 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 22.20

-SRAS- [7 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00

----- | x/d = .04 | | |

| Grampos Esq.= 7B 10.0mm x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 |

x/dMx= .50 | | |

[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =

31708.6 | | |

[cm2] | Asapo[+]= 22.20 | | Asapo[+]=

21.53 | | |

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.- 180. 41.34 746.54 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 180. .10 85.31 5 12.0 13.0 580.0 .0 .0 .0 .0 .06 N

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

Vao= 2 /L= 2.50 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

2.96 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= 38.3 tf* m - Abcis.= 0 | M.[-] =

.0 tf* m | [tf,cm] As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00 ----- | As = 3.14

-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00

----- | x/d = .00 | | |

| x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 | Grampos

Dir.= 7B 10.0mm x/dMx= .50 | | |

[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =

31708.6 | | |

[cm2] | Asapo[+]= 21.53 | | Asapo[+]=

22.20 | | |

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.- 180. 40.80 746.54 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 180. .13 85.31 5 12.0 13.0 580.0 .0 .0 .0 .0 .06 N

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

1 29.491 23.164 .70 .00 0 B5 .00 .00 8005 0

0 0 0 0 0 0 0 B7 .00 .00 8007 0

0 0 0 0 0 0 0 B11 .00 .00 8011 0

0 0 0 0 0 0 0

Viga= 56 PA6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.65 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

2.96 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= 17.2 tf* m - Abcis.= 132 | M.[-] =

1.1 tf* m | [tf,cm] As = 3.14 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 22.20

-SRAS- [7 B 20.0mm] | | |

```

----- | AsL= .00 ----- x/d = .00 | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
----- | x/d = .04
----- | Grampos Esq.= 7B 10.0mm x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 | Grampos
Dir.= 7B 10.0mm x/dMx= .50
|
| [tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6
|
| [cm2 ] | Asapo[+]= 22.20 | | Asapo[+]=
22.20

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	195.	29.21	746.54	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	195.	1.11	85.31	5	12.0	13.0	580.0	.2	.0	.0	.0	.05	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	17.900	17.745	.70	.00	0	B13	.00	.00	8013
0 0 0	2	20.867	20.712	.70	.00	0	B12	.00	.00	8012
0 0 0	0	0	0	0	0	0	0	0	0	0

Viga= 57 PA7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 2.65 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.96 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .9 tf* m | M.[+] Max= 16.3 tf* m - Abcis.= 132 | M.[-] =
.0 tf* m
| [tf,cm] | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00 ----- | As = 3.14
-SRAS- [ 4 B 10.0mm ]
| AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
----- | x/d = .00
| Grampos Esq.= 7B 10.0mm x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 | Grampos
Dir.= 7B 10.0mm x/dMx= .50
|
| [tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6
|
| [cm2 ] | Asapo[+]= 22.20 | | Asapo[+]=
22.20

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	195.	26.11	746.54	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	195.	.93	85.31	5	12.0	13.0	580.0	.1	.0	.0	.0	.04	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	18.622	18.446	.70	.00	0	B10	.00	.00	8010
0 0 0	2	16.816	16.640	.70	.00	0	B9	.00	.00	8009
0 0 0	0	0	0	0	0	0	0	0	0	0

Viga= 58 PA8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 2.80 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.96 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .0 tf* m | M.[+] Max= 23.2 tf* m - Abcis.= 163 | M.[-] =
.0 tf* m

```

```
[tf,cm] | As = 3.14 -SRAS- [ 4 B 10.0mm ] | AsL= .00 ----- | As = 22.20
-SRAS- [ 7 B 20.0mm ] | AsL= .00 ----- | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
----- | x/d = .04 | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
| Grampos Esq.= 7B 10.0mm x/dMx= .50 | Arm.Lat.= [2 X 48 B 6.3mm] - LN= 23.4 |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6 | | |
[cm2 ] | Asapo[+]= 22.20 | | Asapo[+]=
21.53 | | |
```

```
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.- 210. 31.31 746.54 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 210. 2.10 85.31 5 12.0 13.0 580.0 .3 .0 .0 .0 .07 N
```

```
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.80 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.96 /FLt.Ex= .13 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 23.4 tf* m - Abcis.= 116 | M.[-] =
.0 tf* m | | |
[tf,cm] | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00 ----- | As = 3.14
-SRAS- [ 4 B 10.0mm ] | AsL= .00 ----- | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
----- | x/d = .04 | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
| x/dMx= .50 | Arm.Lat.= [2 X 48 B 6.3mm] - LN= 23.4 | Grampos
Dir.= 7B 10.0mm x/dMx= .50 | | |
[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min =
31708.6 | | |
[cm2 ] | Asapo[+]= 21.53 | | Asapo[+]=
22.20 | | |
```

```
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.- 210. 31.54 746.54 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 210. 2.26 85.31 5 12.0 13.0 580.0 .3 .0 .0 .0 .07 N
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 22.335 19.130 .70 .00 0 B9 .00 .00 8009 0
0 0 0 0
2 35.470 28.981 .70 .00 0 B14 .00 .00 8014 0
0 0 0 0
3 22.532 19.248 .70 .00 0 B20 .00 .00 8020 0
0 0 0 0
```

Viga= 59 PA9 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.80 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.96 /FLt.Ex= .13 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 24.6 tf* m - Abcis.= 163 | M.[-] =
.0 tf* m | | |
[tf,cm] | As = 3.14 -SRAS- [ 4 B 10.0mm ] | AsL= .00 ----- | As = 22.20
-SRAS- [ 7 B 20.0mm ] | AsL= .00 ----- | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
----- | x/d = .04 | As = 22.20 -SRAS- [ 7 B 20.0mm ] | AsL= .00
| Grampos Esq.= 7B 10.0mm x/dMx= .50 | Arm.Lat.= [2 X 48 B 6.3mm] - LN= 23.4 |
x/dMx= .50 | | |
| | |
```

[tf,cm] | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min = 31708.6
[cm2] | Asapo[+]= 22.20 | Asapo[+]= 21.53

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.- 210. 32.47 746.54 2 45. .0 2.9 2.9 5.0 12.0 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.- 210. 2.75 85.31 5 12.0 13.0 580.0 .4 .0 .0 .0 .08 N

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

Vao= 2 /L= 2.80 /B= .25 /H= 5.92 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.96 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .0 tf* m | M.[+] Max= 25.0 tf* m - Abcis.= 116 | M.[-] = .0 tf* m

[tf,cm] | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00 ----- | As = 3.14

-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 22.20 -SRAS- [7 B 20.0mm] | AsL= .00

----- x/d = .00 x/dMx= .50 | Arm.Lat.=[2 X 48 B 6.3mm] - LN= 23.4 | Grampos

Dir.= 7B 10.0mm x/dMx= .50 | M[-]Min = 31708.6 | M[+]Min = 31708.6 | M[-]Min = 31708.6

[cm2] | Asapo[+]= 21.53 | Asapo[+]= 22.20

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.- 210. 34.14 746.54 2 45. .0 2.9 2.9 5.0 12.0 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.- 210. 2.65 85.31 5 12.0 13.0 580.0 .4 .0 .0 .0 .08 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	23.162	19.700	.70	.00	0	B13	.00	.00	8013
0	0	2	40.202	33.170	.70	.00	0	B17	.00	.00	8017
0	0	3	24.384	20.814	.70	.00	0	B21	.00	.00	8021

Viga= 60 PA10 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.95 /B= .25 /H= 5.42 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.71 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .0 tf* m | M.[+] Max= 26.5 tf* m - Abcis.= 172 | M.[-] = 13.5 tf* m

[tf,cm] | As = 3.14 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 20.32

-SRAS- [7 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 20.32 -SRAS- [7 B 20.0mm] | AsL= .00

----- x/d = .04 x/dMx= .50 | Arm.Lat.=[2 X 44 B 6.3mm] - LN= 21.5 |

x/dMx= .50 | M[-]Min = 26578.6 | M[+]Min = 26578.6 | M[-]Min = 26578.6

[cm2] | Asapo[+]= 20.32 | Asapo[+]= 19.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 225. 38.43 682.89 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 225. 1.64 77.94 5 11.9 13.1 530.1 .3 .0 .0 .0 .08 N

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

Vao= 2 /L= 2.85 /B= .25 /H= 5.42 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.71 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 13.7 tf* m | M.[+] Max= 25.6 tf* m - Abcis.= 142 | M.[-] =
19.3 tf* m | As = 20.32 -SRAS- [7 B 20.0mm] | AsL= .00 ----- | As = 20.32
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 20.32 -SRAS- [7 B 20.0mm] | AsL= .00
-SRAS- [7 B 20.0mm] | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 44 B 6.3mm] - LN= 21.5 |
----- x/dMx= .50 | M[-]Min = 26578.6 | M[+]Min = 26578.6 | M[-]Min =
[tf,cm] | Asapo[+]= 19.72 | Asapo[+]=
26578.6
[cm2] | 19.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 215. 31.97 682.89 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 215. 1.01 77.94 5 11.9 13.1 530.1 .2 .0 .0 .0 .06 N

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

Vao= 3 /L= 2.95 /B= .25 /H= 5.42 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.71 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 18.8 tf* m | M.[+] Max= 21.0 tf* m - Abcis.= 147 | M.[-] =
.0 tf* m | As = 20.32 -SRAS- [7 B 20.0mm] | AsL= .00 ----- | As = 3.14
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 20.32 -SRAS- [7 B 20.0mm] | AsL= .00
-SRAS- [4 B 10.0mm] | x/d = .00 | x/dMx= .50 | Arm.Lat.= [2 X 44 B 6.3mm] - LN= 21.5 |
----- x/dMx= .50 | M[-]Min = 26578.6 | M[+]Min = 26578.6 | M[-]Min =
[tf,cm] | Asapo[+]= 19.72 | Asapo[+]=
26578.6
[cm2] | 20.32

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 225. 37.05 682.89 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 225. 1.59 77.94 5 11.9 13.1 530.1 .3 .0 .0 .0 .07 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	23.916	15.299	.70	.00	0	B21	.00	.00	8021
0	0	2	44.678	35.446	.70	.00	0	B19	.00	.00	8019
0	0	3	48.684	41.289	.70	.00	0	B18	.00	.00	8018
0	0	4	20.873	12.863	.70	.00	0	B20	.00	.00	8020

=====

[cm2] | Asapo[+]= 11.25
11.25

|

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	110.	3.30	374.86	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	110.	.15	41.19	5	11.5	13.1	288.1	.0	.0	.0	.0	.01	N	

REAC. APOIO	-	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn		Pilares:
0	0	1	2.355	1.961	.75	.00	0	P4	.00	.00	4	0
0	0	2	1.529	1.136	.50	.00	0	P3	.00	.00	3	0

Viga= 51 PA1

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

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.84 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A														
A															
	M.[-] =	.0 tf* m													
	.7 tf* m														
	[tf,cm] As =	.53 -SRAS-	[2 B 8.0mm]												
	-SRAS-	[3 B 12.5mm]													
	AsL=	.00													
	x/d =	.04													
	Grampos Esq.=	1B 6.3mm													
	x/dMx=	.50													
	[tf,cm] M[-]Min =	868.9													
	868.9														
	[cm2] Asapo[+]=	3.68													
	3.49														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	158.	1.33	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	158.	.02	10.63	5	10.0	13.1	86.1	.0	.0	.0	.0	.01	N	

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

Vao= 2 /L= 3.02 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A														
A															
	M.[-] =	.7 tf* m													
	.5 tf* m														
	[tf,cm] As =	3.68 -SRAS-	[3 B 12.5mm]												
	-SRAS-	[3 B 12.5mm]													
	AsL=	.00													
	x/d =	.04													
	Grampos Esq.=	1B 6.3mm													
	x/dMx=	.50													
	[tf,cm] M[-]Min =	868.9													
	868.9														
	[cm2] Asapo[+]=	3.49													
	3.49														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	274.	2.02	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.1	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	274.	.12	10.63	5	10.0	13.1	86.1	.1	.0	.0	.0	.03	N	

```

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.50 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.49 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .6 tf* m | M.[+] Max= .8 tf* m - Abcis.= 124 | M.[-] =
.0 tf* m | [tf,cm] As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 3.68
-SRAS- [ 3 B 12.5mm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 | | |
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | | |
[cm2 ] | Asapo[+]= 3.49 | | | Asapo[+]=
3.68 | | |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 222. 2.33 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 222. .08 10.63 5 10.0 13.1 86.1 .1 .0 .0 .0 .02 N

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 .368 .176 .27 .00 0 APG1 .00 .00 100 0
0 0 0 2.396 2.015 .25 .00 0 APG3 .00 .00 103 0
0 0 0 2.798 2.418 .30 .00 0 APG6 .00 .00 106 0
0 0 0 1.264 1.073 .25 .00 0 P3 .00 .00 3 0
=====
=====

Viga= 52 PA2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.84 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.49 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .1 tf* m - Abcis.= 15 | M.[-] =
.8 tf* m | [tf,cm] As = .53 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 3.68
-SRAS- [ 3 B 12.5mm] | AsL= .00 ----- x/d = .00 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | | |
[cm2 ] | Asapo[+]= 3.68 | | | Asapo[+]=
3.49 | | |

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.- 158. 1.49 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 158. .01 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .01 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.02 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.49 /Flt.Ex= .01 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .7 tf* m | M.[+] Max= .3 tf* m - Abcis.= 151 | M.[-] =
.5 tf* m | [tf,cm] As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 3.68
- SRAS- [ 3 B 12.5mm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- | x/d = .04 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
x/dMx= .50 | |
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | |
[cm2 ] | Asapo[+]= 3.49 | | Asapo[+]=
3.49 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	274.	2.03	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.2	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	274.	.03	10.63	5	10.0	13.1	86.1	.0	.0	.0	.0	.02	N	

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

Vao= 3 /L= 2.50 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .01 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .3 tf* m | M.[+] Max= .3 tf* m - Abcis.= 145 | M.[-] =
.1 tf* m | [tf,cm] As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 3.68
- SRAS- [ 3 B 12.5mm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- | x/d = .04 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 | |
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | |
[cm2 ] | Asapo[+]= 3.49 | | Asapo[+]=
3.68 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	222.	1.25	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	222.	.02	10.63	5	10.0	13.1	86.1	.0	.0	.0	.0	.01	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	.152	.060	.27	.00	0	APG2	.00	.00	102
0	0	2	2.519	2.382	.25	.00	0	APG4	.00	.00	104
0	0	3	1.876	1.791	.30	.00	0	APG8	.00	.00	108
0	0	4	.695	.638	.25	.00	0	P5	.00	.00	5

Viga= 53 PA3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.39 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

```

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

```

```

      | M.[-] =      .1 tf* m      | M.[+] Max=      .4 tf* m - Abcis.= 139 | M.[-] =
.0 tf* m
[tf,cm] | As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = .53
-SRAS- [ 2 B 8.0mm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- | x/d = .00 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | Asapo[+]= 1.23 | Asapo[+]=
[cm2 ] | Asapo[+]= 1.23 | Asapo[+]=
3.68

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 214. 1.16 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 214. .00 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .01 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 0 .826 .821 .25 .00 0 APG2 .00 .00 102 0
0 0 2 .645 .641 .25 .00 0 APG1 .00 .00 100 0
0 0 0 0
=====
=====

```

Viga= 54 PA4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.85 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.49 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] =      .0 tf* m      | M.[+] Max=      .2 tf* m - Abcis.= 92 | M.[-] =
.1 tf* m
[tf,cm] | As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = 3.68
-SRAS- [ 3 B 12.5mm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- | x/d = .04 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
x/dMx= .50 | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | Asapo[+]= 1.23 | Asapo[+]=
[cm2 ] | Asapo[+]= 1.23 | Asapo[+]=
3.49

```

```

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.- 160. .83 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 160. .02 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .01 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.85 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.49 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] =      .1 tf* m      | M.[+] Max=      .3 tf* m - Abcis.= 107 | M.[-] =
.0 tf* m
[tf,cm] | As = 3.68 -SRAS- [ 3 B 12.5mm] | AsL= .00 ----- | As = .00
-SRAS- [ 0 B 8.0mm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [ 3 B 12.5mm ] | AsL= .00
----- | x/d = .00 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | Asapo[+]= 1.23 | Asapo[+]=
[cm2 ] | Asapo[+]= 1.23 | Asapo[+]=
3.49

```

[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min = 868.9
[cm2] | Asapo[+]= 3.49 | Asapo[+]= 3.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. .96 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M [tf,cm] 0.- 160. .00 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .01 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 .558 .542 .25 .00 2 PA2 .00 .00 0 0
0 0 2 1.280 1.264 .25 .00 0 APG5 .00 .00 105 0
0 0 3 .447 .446 .25 .00 2 PA1 .00 .00 0 0
0 0 0 0

Viga= 55 PA5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.50 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 83 | M.[-] =
.6 tf* m [tf,cm] | As = .53 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 3.68
-SRAS- [3 B 12.5mm] | AsL= .00 ----- | AsL= .00
----- x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
----- x/d = .04 | Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
x/dMx= .50 | M.[+]Min = 868.9 | M.[+]Min = 868.9 | M.[+]Min =
[tf,cm] | M.[-]Min = 868.9 | M.[+]Min = 868.9 | M.[+]Min =
868.9 | Asapo[+]= 3.68 | Asapo[+]= 3.68
[cm2] | Asapo[+]= 3.68 | Asapo[+]= 3.68
3.49

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.- 222. 1.63 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M [tf,cm] 0.- 222. .03 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .02 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.50 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= .8 tf* m - Abcis.= 124 | M.[-] =
.1 tf* m [tf,cm] | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68
-SRAS- [3 B 12.5mm] | AsL= .00 ----- | AsL= .00
----- x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
----- x/d = .04 | Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
Dir.= 2B 6.3mm x/dMx= .50 | M.[+]Min = 868.9 | M.[+]Min = 868.9 | M.[+]Min =
[tf,cm] | M.[-]Min = 868.9 | M.[+]Min = 868.9 | M.[+]Min =
868.9 | Asapo[+]= 3.49 | Asapo[+]= 3.49
[cm2] | Asapo[+]= 3.49 | Asapo[+]= 3.49
3.68

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M [tf,cm] 0.- 222. 2.23 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 222. .09 10.63 5 10.0 13.1 86.1 .1 .0 .0 .0 .03 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 .545 .530 .25 .00 0 APG5 .00 .00 105 0
0 0 2 2.753 2.653 .30 .00 0 APG7 .00 .00 107 0
0 0 3 1.206 1.120 .25 .00 0 P4 .00 .00 4 0
0 0 0 0

Viga= 56 PA6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.65 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .1 tf* m | M.[+] Max= .5 tf* m - Abcis.= 154 | M.[-] =
.1 tf* m | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
-SRAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .04 |
----- x/d = .04 | Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.= [2 X 8 B 6.3mm] - LN= 4.1 |
x/dMx= .50 | |
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | |
[cm2] | Asapo[+]= 3.68 | | Asapo[+]=
3.68

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 228. 1.24 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 228. .01 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .01 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 .884 .820 .25 .00 0 APG13 .00 .00 110 0
0 0 2 .805 .741 .50 .00 0 P5 .00 .00 5 0
0 0 0 0

Viga= 57 PA7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.65 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .2 tf* m | M.[+] Max= .4 tf* m - Abcis.= 132 | M.[-] =
.1 tf* m | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
-SRAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .04 |
----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 8 B 6.3mm] - LN= 4.1 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 | |
[tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
868.9 | |
[cm2] | Asapo[+]= 3.68 | | Asapo[+]=
3.68

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	228.	1.20	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	228.	.00	10.63	5	10.0	13.1	86.1	.0	.0	.0	.0	.01	N	
REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn					Pilares:	
0	0	1	.855	.827	.50	.00	0	P3	.00	.00	3	0			
0	0	2	.798	.769	.25	.00	0	APG9	.00	.00	109	0			

Viga= 58 PA8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.80 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .3 tf* m | M.[+] Max= .3 tf* m - Abcis.= 140 | M.[-] =
.4 tf* m | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
-SRAS- [3 B 12.5mm] | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 8 B 6.3mm] - LN= 4.1 |
----- x/dMx= .50 | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
[tf,cm] | 868.9 | Asapo[+]= 1.23 | Asapo[+]=
[cm2] | 3.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	250.	1.28	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	250.	.04	10.63	5	10.0	13.1	86.1	.0	.0	.0	.0	.01	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.80 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .6 tf* m | M.[+] Max= .4 tf* m - Abcis.= 163 | M.[-] =
.0 tf* m | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = .53
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
-SRAS- [2 B 8.0mm] | x/d = .00 | x/dMx= .50 | Arm.Lat.= [2 X 8 B 6.3mm] - LN= 4.1 | Grampos
----- x/dMx= .50 | Dir.= 1B 6.3mm | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
[tf,cm] | 868.9 | Asapo[+]= 3.49 | Asapo[+]=
[cm2] | 3.68

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	250.	1.48	117.74	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	250.	.01	10.63	5	10.0	13.1	86.1	.0	.0	.0	.0	.01	N	

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

0	0	0	1	.828	.800	.30	.00	0	APG9	.00	.00	109	0
0	0	0	2	1.948	1.943	.30	.00	0	APG17	.00	.00	112	0
0	0	0	3	.690	.656	.30	.00	0	APG18	.00	.00	114	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

Viga= 59 PA9 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 2.80 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= .4 tf* m - Abcis.= 93 | M.[-] =
 .6 tf* m | [tf,cm] | As = .53 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 3.68
 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
 ----- | x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
 ----- | Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
 x/dMx= .50 | | |
 [tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
 868.9 | | |
 [cm2] | Asapo[+]= 3.68 | | Asapo[+]=
 3.49 | | |

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.- 250. 1.56 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0
 T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 250. .04 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .02 N

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

 Vao= 2 /L= 2.80 /B= .25 /H= .98 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .49 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .4 tf* m | M.[+] Max= .3 tf* m - Abcis.= 140 | M.[-] =
 .2 tf* m | [tf,cm] | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68
 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
 ----- | x/d = .04 | As = 3.68 -SRAS- [3 B 12.5mm] | AsL= .00
 ----- | x/dMx= .50 | Arm.Lat.=[2 X 8 B 6.3mm] - LN= 4.1 |
 x/dMx= .50 | | |
 [tf,cm] | M[-]Min = 868.9 | M[+]Min = 868.9 | M[-]Min =
 868.9 | | |
 [cm2] | Asapo[+]= 3.49 | | 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.- 250. 1.32 117.74 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0
 T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 250. .05 10.63 5 10.0 13.1 86.1 .0 .0 .0 .0 .02 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 0 0 0 1 .644 .602 .30 .00 0 APG13 .00 .00 110 0
 0 0 0 2 2.030 2.013 .30 .00 0 APG14 .00 .00 113 0
 0 0 0 3 .801 .776 .30 .00 0 APG15 .00 .00 115 0
 0 0 0 0 0 0 0 0 0 0 0 0 0

Viga= 60 PA10
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

Vao= 1 /L= 2.95 /B= .25 /H= 1.48 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .74 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 122 | M.[-] =
 2.6 tf* m | [tf,cm] As = 5.55 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.55
 -SRAS- [3 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 5.55 -SRAS- [3 B 16.0mm] | AsL= .00
 ----- x/d = .04 | Grampos Esq.= 2B 8.0mm x/dMx= .50 | Arm.Lat.=[2 X 12 B 6.3mm] - LN= 6.0 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 1981.8 | M[+]Min = 1981.8 | M[-]Min =
 1981.8 | [cm2] | Asapo[+]= 5.55 | Asapo[+]=
 5.27

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	270.	5.05	181.38	2	45.	.0	2.9	2.9	6.3	20.0	2	.7	.2	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	270.	.25	18.04	5	10.7	13.1	136.1	.2	.0	.0	.0	.04	N	

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

Vao= 2 /L= 2.85 /B= .25 /H= 1.48 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .74 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.2 tf* m | M.[+] Max= .0 tf* m - Abcis.= 285 | M.[-] =
 3.3 tf* m | [tf,cm] As = 5.55 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.55
 -SRAS- [3 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 5.55 -SRAS- [3 B 16.0mm] | AsL= .00
 ----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 12 B 6.3mm] - LN= 6.0 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 1981.8 | M[+]Min = 1981.8 | M[-]Min =
 1981.8 | [cm2] | Asapo[+]= 5.27 | Asapo[+]=
 5.27

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	260.	3.72	181.38	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	260.	.40	18.04	5	10.7	13.1	136.1	.3	.0	.0	.0	.04	N	

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

Vao= 3 /L= 2.95 /B= .25 /H= 1.48 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .74 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.2 tf* m | M.[+] Max= .5 tf* m - Abcis.= 196 | M.[-] =
 .3 tf* m | [tf,cm] As = 5.55 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.55
 -SRAS- [3 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 5.55 -SRAS- [3 B 16.0mm] | AsL= .00
 ----- x/d = .04

Dir.= 2B 8.0mm x/dMx= .50 | Arm.Lat.=[2 X 12 B 6.3mm] - LN= 6.0 | Grampos
[tf,cm] | M[-]Min = 1981.8 | M[+]Min = 1981.8 | M[-]Min =
1981.8
[cm2] | Asapo[+]= 5.27 | Asapo[+]=
5.55

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	270.	5.73	181.38	2	45.	.0	2.9	2.9	6.3	20.0	2	.3	.1	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	270.	.34	18.04	5	10.7	13.1	136.1	.2	.0	.0	.0	.05	N	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0 1	2.374	1.989	.25	.00	0	APG15	.00	.00	115	0
0 0 0 2	5.687	5.240	.25	.00	0	P8	.00	.00	8	0
0 0 0 3	6.654	6.515	.25	.00	0	P7	.00	.00	7	0
0 0 0 4	2.582	2.311	.25	.00	0	APG18	.00	.00	114	0

Viga= 61 PA11 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 3.33 /B= .25 /H= 1.25 /BCs= .00 /BCi= .42 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
.63 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .2 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 110 | M.[-] =
4.0 tf* m | [tf,cm] | As = 5.31 -STAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.31
-STAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.31 -SRAS- [3 B 16.0mm] | AsL= .00
----- | x/d = .03 |
| Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 10 B 6.3mm] - LN= 6.3 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 1590.5 | M[+]Min = 1920.2 | M[-]Min =
1590.5 |
[cm2] | Asapo[+]= 5.32 | Asapo[+]=
4.45

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	305.	7.18	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	305.	.11	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.05	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.33 /B= .25 /H= 1.25 /BCs= .00 /BCi= .42 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
.63 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.9 tf* m | M.[+] Max= 2.4 tf* m - Abcis.= 193 | M.[-] =
.0 tf* m | [tf,cm] | As = 5.31 -STAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.31
-STAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.31 -SRAS- [3 B 16.0mm] | AsL= .00
----- | x/d = .03 |
| Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 10 B 6.3mm] - LN= 6.3 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 1590.5 | M[+]Min = 1920.2 | M[-]Min =
1590.5 |

[cm2] | Asapo[+]= 4.45
5.32

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	308.	7.43	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	308.	.14	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.06	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	.30	.00	0	AP618	.00	.00	0
0	0	2	7.962	7.877	.25	0	P9	.00	.00	9
0	0	3	3.279	3.273	.25	0	P13	.00	.00	13

Viga= 62 PA12
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 3.33 /B= .25 /H= 1.25 /BCs= .00 /BCi= .42 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .63 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 110 | M.[-] =
 4.2 tf* m | As = .86 -STAS- [2 B 8.0mm] | AsL= .00 ----- | As = 5.31
 [tf,cm] | AsL= .00 ----- x/d = .00 | As = 5.31 -SRAS- [3 B 16.0mm] | AsL= .00
 -STAS- [3 B 16.0mm] | x/d = .03 | Arm.Lat.= [2 X 10 B 6.3mm] - LN= 6.3 |
 ----- | Grampos Esq.= 2B 6.3mm x/dMx= .50 | M.[+]Min = 1920.2 | M[-]Min =
 x/dMx= .50 | M[-]Min = 1590.5 |
 [tf,cm] | M[-]Min = 1590.5 |
 [cm2] | Asapo[+]= 5.32 |
 4.45 | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	305.	7.09	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	305.	.11	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.05	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 3.33 /B= .25 /H= 1.25 /BCs= .00 /BCi= .42 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .63 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 4.0 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 193 | M.[-] =
 .2 tf* m | As = 5.31 -STAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.31
 [tf,cm] | AsL= .00 ----- x/d = .03 | As = 5.31 -SRAS- [3 B 16.0mm] | AsL= .00
 -STAS- [3 B 16.0mm] | x/d = .03 | Arm.Lat.= [2 X 10 B 6.3mm] - LN= 6.3 | Grampos
 ----- | Dir.= 2B 6.3mm x/dMx= .50 | M.[+]Min = 1920.2 | M[-]Min =
 x/dMx= .50 | M[-]Min = 1590.5 |
 [tf,cm] | M[-]Min = 1590.5 |
 [cm2] | Asapo[+]= 4.45 |
 5.32 | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	308.	7.11	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	308.	.13	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.06	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	2.741	2.635	.30	.00	0	AP615	.00	.00	115
0	0	2	8.314	8.185	.25	.00	0	P12	.00	.00	12
0	0	3	3.457	3.435	.25	.00	0	P16	.00	.00	16

Viga= 63 PA13 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.52 /B= .25 /H= 1.25 /BCs= .00 /BCi= .38 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .63 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 84 | M.[-] =
3.2 tf* m | As = .86 -STAS- [2 B 8.0mm] | AsL= .00 ----- | As = 5.16
[tf,cm] | AsL= .00 ----- x/d = .00 | As = 5.16 -SRAS- [3 B 16.0mm] | AsL= .00
-STAS- [3 B 16.0mm] | x/d = .03 | Arm.Lat.=[2 X 10 B 6.3mm] - LN= 5.9 |
----- x/dMx= .50 | M[-]Min = 1554.3 | M[+]Min = 1800.5 | M[-]Min =
[tf,cm] | 1554.3 | Asapo[+]= 5.16 | Asapo[+]=
[cm2] | 4.45 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	228.	7.37	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	228.	.11	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.05	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.70 /B= .25 /H= 1.25 /BCs= .00 /BCi= .40 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .63 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.1 tf* m | M.[+] Max= 3.1 tf* m - Abcis.= 185 | M.[-] =
3.4 tf* m | As = 5.24 -STAS- [3 B 16.0mm] | AsL= .00 ----- | As = 5.24
[tf,cm] | AsL= .00 ----- x/d = .03 | As = 5.24 -SRAS- [3 B 16.0mm] | AsL= .00
-STAS- [3 B 16.0mm] | x/d = .03 | Arm.Lat.=[2 X 10 B 6.3mm] - LN= 6.2 |
----- x/dMx= .50 | M[-]Min = 1574.4 | M[+]Min = 1865.7 | M[-]Min =
[tf,cm] | 1574.4 | Asapo[+]= 4.45 | Asapo[+]=
[cm2] | 4.45 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	345.	7.99	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	345.	.11	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.06	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.52 /B= .25 /H= 1.25 /BCs= .00 /BCi= .38 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .63 /FLt.Ex= .13 [M]

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

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 3.2 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 147 | M.[-] =
.3 tf* m | As = 5.16 -STAS- [ 3 B 16.0mm] | AsL= .00 ----- | As = 5.16
[tf,cm] | AsL= .00 ----- x/d = .03 | As = 5.16 -SRAS- [ 3 B 16.0mm ] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 10 B 6.3mm] - LN= 5.9 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 | | |
[tf,cm] | M[-]Min = 1554.3 | M[+]Min = 1800.5 | M[-]Min =
1554.3 | | |
[cm2 ] | Asapo[+]= 4.45 | | Asapo[+]=
5.16 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	228.	6.91	152.11	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	228.	.11	14.60	5	10.4	13.1	113.1	.1	.0	.0	.0	.05	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	2.976	2.856	.25	.00	0	P16	.00	.00	16
0	0	6.669	6.538	.25	.00	0	P15	.00	.00	15
0	0	7.480	7.379	.25	.00	0	P14	.00	.00	14
0	0	3.295	3.183	.25	.00	0	P13	.00	.00	13

Viga= 101 VF101 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 3.33 /B= .25 /H= .55 /BCs= .75 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .2 tf* m | M.[+] Max= .7 tf* m - Abcis.= 138 | M.[-] =
2.1 tf* m | As = 2.48 -SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 4.09
[tf,cm] | AsL= .00 ----- x/d = .06 | As = 3.93 -STAS- [ 2 B 16.0mm ] | AsL= .00
----- x/d = .10 | Grampos Esq.= 2B 6.3mm x/dMx= .50 | |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 358.9 | M[+]Min = 350.3 | M[-]Min =
595.7 | | |
[cm2 ] | Asapo[+]= 3.93 | | Asapo[+]=
1.96 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	308.	3.89	63.01	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	308.	.02	4.59	5	8.6	13.1	43.1	.0	.0	.0	.0	.06	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.33 /B= .25 /H= .55 /BCs= .75 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -

```

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 2.1 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 193 | M.[-] =
.2 tf* m
[tf,cm]| As = 4.09 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 2.48
-SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 3.93 -STAS- [ 2 B 16.0mm ] | AsL= .00
----- | x/d = .06 | x/dMx= .50 | Grampos
Dir.= 2B 6.3mm x/dMx= .50 |
[tf,cm]| M[-]Min = 595.7 | M[+]Min = 350.3 | M[-]Min =
358.9
[cm2 ]| Asapo[+]= 1.96 | Asapo[+]=
3.93

```

```

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.- 308. 8.67 63.01 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 308. .01 4.59 5 8.6 13.1 43.1 .0 .0 .0 .0 .14 N

```

```

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 0 .452 .416 .25 .00 2 PA10 .00 .00 0 0
0 0 0 0 6.158 6.118 .25 .00 1 P10 .00 .00 10 0
0 0 0 0 6.190 6.186 .25 .00 0 P14 .00 .00 14 0

```

Viga= 102 VF102 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 3.33 /B= .25 /H= .55 /BCs= .75 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.28 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .2 tf* m | M.[+] Max= .8 tf* m - Abcis.= 138 | M.[-] =
2.1 tf* m
[tf,cm]| As = 2.48 -SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 4.09
-SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 3.93 -STAS- [ 2 B 16.0mm ] | AsL= .00
----- | x/d = .10 | Grampos Esq.= 2B 6.3mm x/dMx= .50 |
x/dMx= .50
[tf,cm]| M[-]Min = 358.9 | M[+]Min = 350.3 | M[-]Min =
595.7
[cm2 ]| Asapo[+]= 3.93 | Asapo[+]=
1.96

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 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. 3.93 63.01 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 308. .03 4.59 5 8.6 13.1 43.1 .1 .0 .0 .0 .07 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.33 /B= .25 /H= .55 /BCs= .75 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.28 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 2.1 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 193 | M.[-] =
.3 tf* m
[tf,cm]| As = 4.09 -SRAS- [ 2 B 16.0mm] | AsL= .00 ----- | As = 2.48
-SRAS- [ 2 B 12.5mm] | AsL= .00 ----- | As = 3.93 -STAS- [ 2 B 16.0mm ] | AsL= .00
----- | x/d = .06

```

Dir.= 2B 6.3mm x/dMx= .50 | Grampos
[tf,cm] | M[-]Min = 595.7 | M[+]Min = 350.3 | M[-]Min =
358.9
[cm2] | Asapo[+]= 1.96 | Asapo[+]=
3.93

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	308.	7.34	63.01	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	308.	.02	4.59	5	8.6	13.1	43.1	.0	.0	.0	.0	.12	N	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	1.040	1.006	.25	.00	2	PA10	.00	.00	0
0 0 0	2	6.125	6.087	.25	.00	1	P11	.00	.00	11
0 0 0	3	5.246	5.242	.25	.00	0	P15	.00	.00	15
0 0 0	0	0	0	0	0	0	0	0	0	0

Viga= 103 VF103 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.52 /B= .25 /H= .55 /BCs= .63 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .3 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 42 | M.[-] =
2.0 tf* m | As = 2.38 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 3.62
[tf,cm] | AsL= .00 ----- | As = 3.48 -STAS- [3 B 12.5mm] | AsL= .00
-SRAS- [2 B 16.0mm] | x/d = .06 | x/d = .09
----- | Grampos Esq.= 1B 6.3mm x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 339.3 | M[+]Min = 337.2 | M[-]Min =
530.2 |
[cm2] | Asapo[+]= 3.48 | Asapo[+]=
1.96

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	228.	4.47	63.01	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	228.	.02	4.59	5	8.6	13.1	43.1	.0	.0	.0	.0	.07	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.70 /B= .25 /H= .55 /BCs= .69 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.0 tf* m | M.[+] Max= 1.5 tf* m - Abcis.= 185 | M.[-] =
1.9 tf* m | As = 3.88 -SRAS- [2 B 16.0mm] | AsL= .00 ----- | As = 3.88
[tf,cm] | AsL= .00 ----- | As = 3.73 -STAS- [3 B 12.5mm] | AsL= .00
-SRAS- [2 B 16.0mm] | x/d = .09 | x/d = .09
----- | Grampos Esq.= 1B 6.3mm x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 566.5 | M[+]Min = 344.5 | M[-]Min =
566.5 |
[cm2] | Asapo[+]= 1.96 | Asapo[+]=
1.96

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 345. 4.61 63.01 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 345. .01 4.59 5 8.6 13.1 43.1 .0 .0 .0 .0 .07 N

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

Vao= 3 /L= 2.52 /B= .25 /H= .55 /BCs= .63 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .28 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 1.8 tf* m | M.[+] Max= .5 tf* m - Abcis.= 210 | M.[-] =
.5 tf* m
[tf,cm] | As = 3.62 -SRAS- [2 B 16.0mm] | AsL= .00 ----- | As = 2.38
-SRAS- [3 B 10.0mm]
| AsL= .00 ----- x/d = .09 | As = 3.48 -STAS- [3 B 12.5mm] | AsL= .00
----- x/d = .06
| x/dMx= .50 | | Grampos
Dir.= 1B 6.3mm x/dMx= .50
[tf,cm] | M[-]Min = 530.2 | M[+]Min = 337.2 | M[-]Min =
339.3
[cm2] | Asapo[+]= 1.96 | | Asapo[+]=
3.48

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 228. 5.80 63.01 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 228. .02 4.59 5 8.6 13.1 43.1 .1 .0 .0 .0 .10 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	3.188	3.170	.25	.00	0	P12	.00	.00	12
0	0	2	5.990	5.972	.25	.00	1	P11	.00	.00	11
0	0	3	5.921	5.907	.25	.00	1	P10	.00	.00	10
0	0	4	4.140	4.126	.25	.00	0	P9	.00	.00	9

JOAO SOARES VIEGAS FILHO R E L G E R - Relatorio geral de vigas (V15.7.1)
Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
32283060
T Q S Projeto: 0006 - N374
17/08/12
CAD/Vigas
09:54:56

----- fck=300.kgf/cm2 - Aco: 50A ----- Esforços Caracteristicos

L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator
de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa
Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
Espessura Laje Inferior
FSp.Ex : Distancia Face Superior Eixo / Flt.Ex : Distancia Face Lateral ao Eixo / Cob/S :
Cobrim/Cobr.superior adicional
C A R G A S
MESq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q : Cortante
Adicional (valor unico)
A R M A D U R A S - F L E X A O
SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS : Secao Te
Armadura Simples
STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx : Profund.
relativa da LN Maxima
AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo : Armadura
e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O
 MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :
 Armad.transv.minima-cisalhamento
 Asw[C+T]: Arm.trans.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
 Espacamento selecionado
 NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura transversal-Suspensao
 A R M A D U R A S - T O R C A O
 %dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de torcao
 b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
 Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao
 p/NR estribos selecionado
 Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
 ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacidade adaptacao plastica no vao - S[sim] N[nao]
 R E A C O E S D E A P O I O
 DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre / segue / vigas
 M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
 =====
 =====

Viga= 6 V6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 3.15 /B= .25 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .6 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 314 | M.[-] =
 .0 tf* m | As = 1.24 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = .22
 [tf,cm]| 2 B 8.0mm | AsL= .00 ----- x/d = .06 | As = 1.46 -SRAS- [2 B 10.0mm] | AsL= .00
 -SRAS- | AsL= .00 ----- x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.6 |
 ----- x/d = .00 |
 x/dMx= .50 |
 [tf,cm]| M[-]Min = 81.4 | M[+]Min = 81.4 | M[-]Min =
 81.4 |
 [cm2]| Asapo[+]= .36 | Asapo[+]=
 1.45 |

CISALHAMENTO-ENSA G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	297.	1.11	31.19	2	45.	.0	2.9	2.9	6.3	12.0	2	.0	.0	

T O R C A O-ENSA G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	297.	.17	1.53	5	6.8	13.1	18.1	.8	1.6	.1	.2	.15	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.792	.779	.28	.05	1 APG17	.00	.00	112 0
0	2	0	-.188	-.200	.28	.05	0 P6	.00	.00	6 0
0	0	0	0	0						

=====

Viga= 7 V7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 3.07 /B= .25 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 0 | M.[-] =
 1.1 tf* m | As = .22 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 1.71
 [tf,cm]| 3 B 10.0mm |

```

----- | AsL= .00 ----- x/d = .00 | As = 1.36 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .08 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 |
| | | |
[tf,cm] | M[-]Min = 81.4 | M[+]Min = 81.4 | M[-]Min =
81.4 | | | |
[cm2 ] | Asapo[+]= 1.24 | | | Asapo[+]=
.34 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	289.	1.04	31.19	2	45.	.0	2.9	2.9	6.3	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	289.	.19	1.53	5	6.8	13.1	18.1	.9	1.6	.1	.2	.16	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0

Viga= 30 VFIC2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 1.78 /B= .25 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.15 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | | |
.0 tf* m | M.[-] = .0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 178 | M.[-] =
[tf,cm] | As = 1.13 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = .22
-SRAS- [ 2 B 8.0mm ] | | | |
----- | AsL= .00 ----- x/d = .06 | As = 1.24 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .00 | x/dMx= .50 | |
x/dMx= .50 | | |
| | |
[tf,cm] | M[-]Min = 81.4 | M[+]Min = 81.4 | M[-]Min =
81.4 | | | |
[cm2 ] | Asapo[+]= .41 | | | Asapo[+]=
.41 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	160.	.07	31.19	2	45.	.0	2.9	2.9	6.3	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	160.	.02	1.53	5	6.8	13.1	18.1	.1	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0

Viga= 31 VFIC1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 8.75 /B= .25 /H= .70 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.35 /Flt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | | |
.2 tf* m | M.[-] = .0 tf* m | M.[+] Max= .1 tf* m - Abcis.= 0 | M.[-] =

```

```
[tf,cm] | As = .45 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- | As = 2.63
-SRAS- [ 4 B 10.0mm ] | AsL= .00 ----- | As = 2.63 -SRAS- [ 4 B 10.0mm ] | AsL= .00
----- | x/d = .04 | x/d = .00 | As = 2.63 -SRAS- [ 4 B 10.0mm ] | AsL= .00
----- | x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 3.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 443.3 | M[+]Min = 443.3 | M[-]Min =
443.3 |
[cm2 ] | Asapo[+]= 2.63 | Asapo[+]=
.88 |
```

```
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 850. .06 82.10 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 850. .00 6.63 5 9.2 13.1 58.1 .0 .0 .0 .0 .00 N
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 -.041 -.041 .25 .00 1 APG14 .00 .00 113 0
0 0 2 .024 .023 .25 .00 1 APG17 .00 .00 112 0
0 0 0 .00 .00 .25 .00 1 APG17 .00 .00 112 0
```

Viga= 51 PA1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.84 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /Flt.Ex= .01 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 91 | M.[-] =
.2 tf* m |
[tf,cm] | As = .34 -SRAS- [ 2 B 8.0mm ] | AsL= .00 ----- | As = 2.40
-SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | x/d = .04 | x/d = .00 | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6 |
[cm2 ] | Asapo[+]= 2.40 | Asapo[+]=
2.33 |
```

```
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.- 158. 1.14 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 158. .13 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .04 N
```

```
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 3.02 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /Flt.Ex= .01 [M]
```

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

* * * * *
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.[-] = .1 tf* m | M.[+] Max= 3.8 tf* m - Abcis.= 226 | M.[-] =
1.3 tf* m |
[tf,cm] | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- | As = 2.40
-SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | x/d = .04 | x/d = .00 | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
x/dMx= .50 |
```

```

|
[tf,cm]| M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6
[cm2 ]| Asapo[+]= 2.33 | | 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.- 274. 8.41 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .1

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 274. .09 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .11 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.50 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /Flt.Ex= .01 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .8 tf* m | M.[+] Max= .0 tf* m - Abcis.= 249 | M.[-] =
.3 tf* m | As = 2.40 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.40
[tf,cm]| As = 2.40 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.40
- SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | x/d = .04 | x/d = .04 | x/d = .04 | x/d = .04
x/dMx= .50 | x/dMx= .50 | x/dMx= .50 | x/dMx= .50
| Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
[tf,cm]| M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6
[cm2 ]| Asapo[+]= 2.28 | | Asapo[+]=
.80

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 222. .98 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 222. .01 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .02 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .727 .586 .27 .00 1 APG1 .00 .00 100 0
0 0 0 0 .607 .576 .25 .00 1 APG3 .00 .00 103 0
0 0 0 0 6.708 6.465 .30 .00 1 APG6 .00 .00 106 0
0 0 0 0 .426 .295 .25 .00 1 P3 .00 .00 3 0
0 0 0 0

=====
=====

Viga= 52 PA2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.84 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /Flt.Ex= .01 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 91 | M.[-] =
.4 tf* m | As = .34 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 2.40
[tf,cm]| As = .34 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 2.40
- SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | x/d = .04 | x/d = .04 | x/d = .04 | x/d = .04
x/dMx= .50 | Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
[tf,cm]| M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6
[cm2 ]| Asapo[+]= 2.40 | | 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.- 158. 1.32 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 158. .15 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .04 N

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

Vao= 2 /L= 3.02 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .3 tf* m | M.[+] Max= .2 tf* m - Abcis.= 151 | M.[-] =
.3 tf* m
[tf,cm] | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40
-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00
----- | x/d = .04 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6
[cm2] | Asapo[+]= 2.28 | 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.- 274. 1.36 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .2

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.- 274. .09 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .03 N

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

Vao= 3 /L= 2.50 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .2 tf* m | M.[+] Max= .0 tf* m - Abcis.= 249 | M.[-] =
.4 tf* m
[tf,cm] | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40
-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00
----- | x/d = .04 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6
[cm2] | Asapo[+]= 2.28 | Asapo[+]=
.80

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 222. .85 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 222. .01 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .01 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.495	.453	.27	.00	1	APG2	.00	.00	102
0	0	2	1.915	1.853	.25	.00	1	APG4	.00	.00	104
0	0	3	1.062	1.044	.30	.00	1	APG8	.00	.00	108
0	0	4	.608	.587	.25	.00	1	P5	.00	.00	5
0	0	0	0	0	0	0	0	0	0	0	0

=====

Viga= 53 PA3
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.39 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 119 | M.[-] =
.0 tf* m | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = .34
[tf,cm] | 2 B 8.0mm | AsL= .00 ----- | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00
-SRAS- | x/d = .04 | x/d = .00
----- | Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 2.8 | Grampos
Dir.= 1B 6.3mm x/dMx= .50 | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
[tf,cm] | Asapo[+]= 2.40 | Asapo[+]=
[cm2] | 2.40
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 214. .72 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 214. .01 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .01 N
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 .511 .507 .25 .00 1 APG2 .00 .00 102 0
0 0 2 .450 .446 .25 .00 1 APG1 .00 .00 100 0
0 0 0 0
=====

Viga= 54 PA4
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.85 /B= .25 /H= .64 /BCs= .39 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 77 | M.[-] =
.3 tf* m | As = .00 -SRAS- [0 B 8.0mm] | AsL= .00 ----- | As = 2.80
[tf,cm] | 4 B 10.0mm | AsL= .00 ----- | As = 2.71 -STAS- [4 B 10.0mm] | AsL= .00
-SRAS- | x/d = .06 | x/d = .00
----- | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.8 |
x/dMx= .50 | M[-]Min = 370.6 | M[+]Min = 411.9 | M[-]Min =
[tf,cm] | 491.6
[cm2] | Asapo[+]= 2.71 | 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.- 160. 1.22 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 160. .10 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .03 N
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.85 /B= .25 /H= .64 /BCs= .39 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .4 tf* m | M.[+] Max= .2 tf* m - Abcis.= 123 | M.[-] =
.0 tf* m | [tf,cm] As = 2.80 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = .00
-SRAS- [ 0 B 8.0mm] | AsL= .00 ----- x/d = .06 | As = 2.71 -STAS- [ 4 B 10.0mm ] | AsL= .00
----- | x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.8 |
x/dMx= .50 | | |
[tf,cm] M[-]Min = 491.6 | M[+]Min = 411.9 | M[-]Min =
370.6 | | |
[cm2 ] Asapo[+]= 2.28 | | Asapo[+]=
2.71 | | |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 1.40 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 160. .17 5.81 5 9.0 13.1 52.1 .3 .0 .0 .0 .05 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .416 .393 .25 .00 2 PA2 .00 .00 0 0
0 0 0 0 1.871 1.849 .25 .00 1 APG5 .00 .00 105 0
0 0 0 0 .267 .266 .25 .00 2 PA1 .00 .00 0 0
0 0 0 0
=====
=====

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Viga= 55 PA5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 2.50 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /FLt.Ex= .13 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
* * * * *
Diagrama M[-] nao usual. Verificar apoios com M[-] Max.
* * * * *

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO-| E 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= 5.2 tf* m - Abcis.= 166 | M.[-] =
.7 tf* m | [tf,cm] As = 2.40 -SRAS- [ 3 B 10.0mm] | AsL= .00 ----- | As = 2.40
-SRAS- [ 3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.97 -SRAS- [ 4 B 10.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 3.5 |
x/dMx= .50 | | |
[tf,cm] M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6 | | |
[cm2 ] Asapo[+]= .99 | | Asapo[+]=
2.33 | | |

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.- 222. 7.82 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 222. .00 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .11 N

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 2 /L= 2.50 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /FLt.Ex= .13 [M]

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

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

```


| M.[-] = .0 tf* m | M.[+] Max= 1.2 tf* m - Abcis.= 0 | M.[-] =
 7.7 tf* m | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 5.52
 [tf,cm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00
 ----- x/d = .11 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
 x/dMx= .50 | M[+]Min = 370.6 | M[-]Min =
 [tf,cm] | M[-]Min = 370.6 | Asapo[+]= 2.33 | Asapo[+]=
 370.6 |
 [cm2] |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	222.	5.69	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	222.	.01	5.81	5	9.0	13.1	52.1	.0	.0	.0	.0	.08	N	

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

Vao= 3B /L= 1.84 /B= .25 /H= .64 /BCs= .99 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex=
 .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO | M[-]= 7.69 tf* m | As = 5.52 -SRAS- [3 B 16.0mm]
 BAL.DIR | x/d = .11 | AsL= .00 -Arm.Lat.= [2 X 6 B 6.3mm]
 1.2 | M[-]Min= 946.6 - x/dMx= 1.00 | %
 [tf,cm] | Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	172.	7.53	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	172.	.07	5.81	5	9.0	13.1	52.1	.1	.0	.0	.0	.11	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	1	APG5	.00	.00	105
0	0	0	0	0	0	1	APG7	.00	.00	107
0	0	0	0	0	0	1	P4	.00	.00	4

Viga= 56 PA6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.59 /B= .25 /H= .64 /BCs= .51 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex=
 .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .1 tf* m | M.[+] Max= .7 tf* m - Abcis.= 129 | M.[-] =
 .2 tf* m | As = 2.50 -SRAS- [2 B 12.5mm] | AsL= .00 ----- | As = 2.50
 [tf,cm] | AsL= .00 ----- x/d = .05 | As = 2.98 -STAS- [4 B 10.0mm] | AsL= .00
 ----- x/d = .05 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 1.4 |
 | Grampos Esq.= 1B 6.3mm x/dMx= .50 | M[+]Min = 437.5 | M[-]Min =
 x/dMx= .50 | M[-]Min = 409.0 | Asapo[+]= 2.98 | Asapo[+]=
 [tf,cm] | 409.0 |
 [cm2] | 2.98 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	228.	1.84	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 228. .26 5.81 5 9.0 13.1 52.1 .4 .0 .0 .0 .07 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 1.106 1.044 .25 .00 1 APG13 .00 .00 110 0
0 0 2 1.314 1.252 .50 .06 1 P5 .00 .00 5 0
0 0 0 0

Viga= 57 PA7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.59 /B= .25 /H= .64 /BCs= .51 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .32 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .3 tf* m | M.[+] Max= .7 tf* m - Abcis.= 129 | M.[-] =
.1 tf* m | As = 2.50 -SRAS- [2 B 12.5mm] | AsL= .00 ----- | As = 2.50
[tf,cm] | AsL= .00 ----- x/d = .05 | As = 2.98 -STAS- [4 B 10.0mm] | AsL= .00
-SRAS- [2 B 12.5mm] | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.4 | Grampos
----- x/d = .05 | M[-]Min = 409.0 | M[+]Min = 437.5 | M[-]Min =
Dir.= 1B 6.3mm x/dMx= .50 | [cm2] | Asapo[+]= 2.98 | Asapo[+]=
[tf,cm] | 2.98

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.- 228. 2.31 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 228. .14 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .05 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 1.645 1.616 .50 .06 1 P3 .00 .00 3 0
0 0 2 1.047 1.018 .25 .00 1 APG9 .00 .00 109 0
0 0 0 0

Viga= 58 PA8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.80 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .3 tf* m | M.[+] Max= .9 tf* m - Abcis.= 163 | M.[-] =
.9 tf* m | As = 2.54 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.54
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 2.54 -SRAS- [4 B 10.0mm] | AsL= .00
-SRAS- [4 B 10.0mm] | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 2.8 |
----- x/d = .04 | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
x/dMx= .50 | [cm2] | Asapo[+]= .85 | Asapo[+]=
[tf,cm] | 2.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 250. 2.76 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 250. .45 5.81 5 9.0 13.1 52.1 .7 2.1 .1 .5 .11 N

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

Vao= 2 /L= 2.80 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .9 tf* m | M.[+] Max= .5 tf* m - Abcis.= 163 | M.[-] =

.2 tf* m | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40

[tf,cm]| As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |

[tf,cm]| M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =

370.6 | Asapo[+]= 2.28 | Asapo[+]=

.80

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 250. 1.65 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .6 .3

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 250. .12 5.81 5 9.0 13.1 52.1 .2 .0 .0 .0 .04 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 1.151 1.093 .30 .00 1 APG9 .00 .00 109 0
0 0 0 0 0 0 0 0 0 0 0 0
2 3.121 2.913 .30 .00 1 APG17 .00 .00 112 0
0 0 0 0 0 0 0 0 0 0 0 0
3 .369 .331 .30 .00 1 APG18 .00 .00 114 0
0 0 0 0 0 0 0 0 0 0 0 0

Viga= 59 PA9 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.80 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .1 tf* m | M.[+] Max= .9 tf* m - Abcis.= 163 | M.[-] =

1.0 tf* m | As = 2.54 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.54

[tf,cm]| As = 2.54 -SRAS- [4 B 10.0mm] | AsL= .00

----- x/d = .04 | As = 2.54 -SRAS- [4 B 10.0mm] | AsL= .00

x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |

[tf,cm]| M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =

370.6 | Asapo[+]= 2.54 | Asapo[+]=

2.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 250. 2.85 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 250. .37 5.81 5 9.0 13.1 52.1 .6 2.1 .1 .5 .10 N

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

Vao= 2 /L= 2.80 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .9 tf* m | M.[+] Max= .4 tf* m - Abcis.= 163 | M.[-] =
.3 tf* m | [tf,cm] As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40
-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 2.8 |
x/dMx= .50 | [tf,cm] M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6 | [cm2] Asapo[+]= 2.28 | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	250.	1.51	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.6	.3	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	250.	.12	5.81	5	9.0	13.1	52.1	.2	.0	.0	.0	.04	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:		
0	0	1	1.057	1.003	.30	.00	1	APG13	.00	.00	110	0
0	0	2	3.088	2.873	.30	.00	1	APG14	.00	.00	113	0
0	0	3	.611	.556	.30	.00	1	APG15	.00	.00	115	0

Viga= 60 PA10 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.95 /B= .25 /H= .64 /BCs= .47 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .7 tf* m - Abcis.= 98 | M.[-] =
1.0 tf* m | [tf,cm] As = .45 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 3.20
-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .00 | As = 2.90 -STAS- [4 B 10.0mm] | AsL= .00
----- x/d = .07 | Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.5 |
x/dMx= .50 | [tf,cm] M[-]Min = 370.6 | M[+]Min = 430.2 | M[-]Min =
560.5 | [cm2] Asapo[+]= 2.90 | Asapo[+]=
2.28

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	270.	2.09	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	270.	.07	5.81	5	9.0	13.1	52.1	.1	.0	.0	.0	.03	N	

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

Vao= 2 /L= 2.85 /B= .25 /H= .64 /BCs= .42 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .8 tf* m | M.[+] Max= .0 tf* m - Abcis.= 285 | M.[-] =
1.0 tf* m
[tf,cm] | As = 2.96 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.96
-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .06 | As = 2.78 -STAS- [4 B 10.0mm] | AsL= .00
----- x/d = .06 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.7 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 518.8 | M[+]Min = 419.5 | M[-]Min =
518.8
[cm2] | Asapo[+]= 2.28 | Asapo[+]=
2.28

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	260.	1.53	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	260.	.04	5.81	5	9.0	13.1	52.1	.1	.0	.0	.0	.03	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.95 /B= .25 /H= .64 /BCs= .47 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex=
.32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 1.1 tf* m | M.[+] Max= .7 tf* m - Abcis.= 221 | M.[-] =
.0 tf* m
[tf,cm] | As = 3.20 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = .45
-SRAS- [2 B 8.0mm] | AsL= .00 ----- x/d = .07 | As = 2.90 -STAS- [4 B 10.0mm] | AsL= .00
----- x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.5 | Grampos
Dir.= 1B 6.3mm x/dMx= .50 |
[tf,cm] | M[-]Min = 560.5 | M[+]Min = 430.2 | M[-]Min =
370.6
[cm2] | Asapo[+]= 2.28 | Asapo[+]=
2.90

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	270.	2.10	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	270.	.07	5.81	5	9.0	13.1	52.1	.1	.0	.0	.0	.03	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.994	.931	.25	.00	1	APG15	.00	.00	115
0	0	2	2.463	2.390	.25	.00	0	P8	.00	.00	8
0	0	3	2.577	2.536	.25	.00	0	P7	.00	.00	7
0	0	4	1.152	1.100	.25	.00	1	APG18	.00	.00	114
0	0	0									0

Viga= 61 PA11 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 3.33 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .7 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 166 | M.[-] =
1.6 tf* m
[tf,cm] | As = 2.61 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.61
-SRAS- [4 B 10.0mm]

```

----- | AsL= .00 ----- x/d = .04 | As = 2.61 -SRAS- [ 4 B 10.0mm ] | AsL= .00
----- | x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
| | | |
[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6 | | |
[cm2 ] | Asapo[+]= .87 | | | Asapo[+]=
2.49 | | |

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CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	203.	2.76	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	
	203.-	305.	3.99	74.46	2	45.	.0	2.9	3.2	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	203.	.81	5.81	5	9.0	13.1	52.1	1.4	2.1	.2	.7	.18	N	
	203.-	305.	.94	5.81	5	9.0	13.1	52.1	1.6	2.1	.2	.8	.22	N	

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 2 /L= 3.33 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /FLt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.5 tf* m | M.[+] Max= .2 tf* m - Abcis.= 277 | M.[-] =
.0 tf* m | | |
[tf,cm] | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- | As = .34
-SRAS- [ 2 B 8.0mm ] | | |
| AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [ 3 B 10.0mm ] | AsL= .00
----- | x/d = .00 | | |
| x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 | Grampos
Dir.= 1B 6.3mm x/dMx= .50 | | |
[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =
370.6 | | |
[cm2 ] | Asapo[+]= 2.28 | | | Asapo[+]=
2.40 | | |

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CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	308.	1.60	74.46	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	308.	.05	5.81	5	9.0	13.1	52.1	.1	.0	.0	.0	.03	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	1.949	1.917	.30	.00	1 APG18	.00	.00	114 0
0	0	2	3.981	3.966	.25	.00	1 P9	.00	.00	9 0
0	0	3	.201	.184	.25	.00	1 P13	.00	.00	13 0

Viga= 62 PA12 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 3.33 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.32 /FLt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 166 | M.[-] =
1.6 tf* m | | |
[tf,cm] | As = 2.59 -SRAS- [ 4 B 10.0mm ] | AsL= .00 ----- | As = 2.59
-SRAS- [ 4 B 10.0mm ] | | |
| AsL= .00 ----- x/d = .04 | As = 2.59 -SRAS- [ 4 B 10.0mm ] | AsL= .00
----- | x/d = .04 | | |
| x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |
x/dMx= .50 | | |
| | |

```

[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min = 370.6
[cm2] | Asapo[+]= .86 | Asapo[+]= 2.47

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.- 305. 4.04 74.46 2 45. .0 2.9 3.0 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 305. .88 5.81 5 9.0 13.1 52.1 1.5 2.1 .2 .8 .21 N

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

Vao= 2 /L= 3.33 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 1.4 tf* m | M.[+] Max= .1 tf* m - Abcis.= 277 | M.[-] = .0 tf* m

[tf,cm] | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40

-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

----- x/d = .04 x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 2.8 | Grampos

Dir.= 1B 6.3mm x/dMx= .50 |

[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min = 370.6

[cm2] | Asapo[+]= 2.28 | Asapo[+]= 2.40

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

[tf,cm] 0.- 308. 1.53 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 308. .07 5.81 5 9.0 13.1 52.1 .1 .0 .0 .0 .03 N

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

0 0 0 1 1.860 1.824 .30 .00 1 AP615 .00 .00 115 0

0 0 0 2 3.960 3.939 .25 .00 1 P12 .00 .00 12 0

0 0 0 3 .254 .238 .25 .00 1 P16 .00 .00 16 0

0 0 0 0

=====

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Viga= 63 PA13 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.52 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .0 tf* m | M.[+] Max= .2 tf* m - Abcis.= 84 | M.[-] = .4 tf* m

[tf,cm] | As = .34 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 2.40

-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .00 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

----- x/d = .04 x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 2.8 |

Grampos Esq.= 1B 6.3mm x/dMx= .50 |

[tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min = 370.6

[cm2] | Asapo[+]= 2.40 | 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.- 228. .96 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 228. .01 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .01 N

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

Vao= 2 /L= 3.70 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = .4 tf* m | M.[+] Max= .3 tf* m - Abcis.= 185 | M.[-] =

.4 tf* m | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40

[tf,cm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

| x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |

| [tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =

370.6 | M[+]Min = 370.6 | M[-]Min =

[cm2] | Asapo[+]= 2.28 | Asapo[+]=

2.28 | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 345. 1.05 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 345. .01 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .02 N

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

Vao= 3 /L= 2.52 /B= .25 /H= .64 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .32 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = .4 tf* m | M.[+] Max= .1 tf* m - Abcis.= 147 | M.[-] =

.0 tf* m | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.40

[tf,cm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

-SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

----- x/d = .04 | As = 2.40 -SRAS- [3 B 10.0mm] | AsL= .00

| x/dMx= .50 | Arm.Lat.= [2 X 6 B 6.3mm] - LN= 2.8 |

| [tf,cm] | M[-]Min = 370.6 | M[+]Min = 370.6 | M[-]Min =

370.6 | M[+]Min = 370.6 | M[-]Min =

[cm2] | Asapo[+]= 2.28 | Asapo[+]=

.80 | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 228. .89 74.46 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 228. .01 5.81 5 9.0 13.1 52.1 .0 .0 .0 .0 .01 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.350	.327	.25	.00	1	P16	.00	.00	16
0	0	0	1.416	1.392	.25	.00	1	P15	.00	.00	15
0	0	0	1.384	1.363	.25	.00	1	P14	.00	.00	14
0	0	0	.396	.374	.25	.00	1	P13	.00	.00	13

Viga= 301 V301
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

 Vao= 1 /L= 4.38 /B= .25 /H= .50 /BCs= .58 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .25 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .4 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 218 | M.[-] =
 1.5 tf* m | [tf,cm] | As = 2.04 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 3.11
 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.61 -STAS- [4 B 10.0mm] | AsL= .00
 ----- | x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 269.9 | M[+]Min = 274.0 | M[-]Min =
 409.0 | [cm2] | Asapo[+]= 2.61 | Asapo[+]=
 1.78

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	413.	2.28	56.64	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	413.	.13	3.94	5	8.3	13.1	38.1	.3	.0	.0	.0	.07	N	

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

 Vao= 2 /L= 4.38 /B= .25 /H= .50 /BCs= .58 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .25 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 1.5 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 218 | M.[-] =
 .5 tf* m | [tf,cm] | As = 3.11 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.04
 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.61 -STAS- [4 B 10.0mm] | AsL= .00
 ----- | x/d = .06 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 409.0 | M[+]Min = 274.0 | M[-]Min =
 269.9 | [cm2] | Asapo[+]= 1.78 | Asapo[+]=
 2.61

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	413.	2.22	56.64	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	413.	.13	3.94	5	8.3	13.1	38.1	.3	.0	.0	.0	.07	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	1.539	1.244	.25	.00	2	PA9	.00	.00	0
0	0	2	3.217	2.626	.25	.00	2	PA5	.00	.00	0
0	0	3	1.574	1.278	.25	.00	2	PA8	.00	.00	0
0	0	0	0								0

Viga= 302 V302 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 2.95 /B= .25 /H= .70 /BCs= .47 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .35 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 122 | M.[-] =

1.0 tf* m | [tf,cm] As = .00 -SRAS- [0 B 8.0mm] | AsL= .00 ----- | As = 3.42

-SRAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .00 | As = 3.12 -STAS- [4 B 10.0mm] | AsL= .00

----- | x/d = .06 | | |

| Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.7 |

x/dMx= .50 | | |

[tf,cm] | M[-]Min = 443.3 | M[+]Min = 513.7 | M[-]Min =

660.9 | | |

[cm2] | Asapo[+]= 3.12 | | Asapo[+]=

2.49 | | |

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.- 270. 1.99 82.10 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 270. .04 6.63 5 9.2 13.1 58.1 .1 .0 .0 .0 .03 N

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

Vao= 2 /L= 2.85 /B= .25 /H= .70 /BCs= .42 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex=

.35 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .9 tf* m | M.[+] Max= .1 tf* m - Abcis.= 142 | M.[-] =

.8 tf* m | [tf,cm] As = 3.16 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 3.16

-SRAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .06 | As = 3.01 -STAS- [4 B 10.0mm] | AsL= .00

----- | x/d = .06 | | |

| x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.8 |

x/dMx= .50 | | |

[tf,cm] | M[-]Min = 612.8 | M[+]Min = 501.0 | M[-]Min =

612.8 | | |

[cm2] | Asapo[+]= 2.49 | | Asapo[+]=

2.49 | | |

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.- 260. 1.54 82.10 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 260. .04 6.63 5 9.2 13.1 58.1 .1 .0 .0 .0 .02 N

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

Vao= 3 /L= 2.95 /B= .25 /H= .70 /BCs= .47 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex=

.35 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .8 tf* m | M.[+] Max= .6 tf* m - Abcis.= 172 | M.[-] =

.0 tf* m | [tf,cm] As = 3.42 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = .00

-SRAS- [0 B 8.0mm] | AsL= .00 ----- x/d = .06 | As = 3.12 -STAS- [4 B 10.0mm] | AsL= .00

----- | x/d = .00 | | |

| Dir.= 1B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 6 B 6.3mm] - LN= 1.7 | Grampos

| | |

[tf,cm] | M[-]Min = 660.9 | M[+]Min = 513.7 | M[-]Min =

493.1 | | |

[cm2] | Asapo[+]= 2.49 | | Asapo[+]=

3.12 | | |

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

E N S A G E M

[tf,cm] 0.- 270. 1.85 82.10 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 270. .05 6.63 5 9.2 13.1 58.1 .1 .0 .0 .0 .03 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 .822 .741 .25 .00 2 PA9 .00 .00 0 0
0 0 0 2 2.526 2.434 .25 .00 0 P8 .00 .00 8 0
0 0 0 3 2.320 2.264 .25 .00 0 P7 .00 .00 7 0
0 0 0 4 .878 .811 .25 .00 2 PA8 .00 .00 0 0

Viga= 303 V303 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 8.75 /B= .25 /H= .50 /BCs= 2.00 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .25 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 437 | M.[-] =
.9 tf* m | As = 2.96 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.96
[tf,cm] | AsL= .00 ----- x/d = .08 | As = 5.81 -STAS- [3 B 16.0mm] | AsL= .00
----- x/d = .08 | Grampos Esq.= 2B 8.0mm x/dMx= .50 | | Grampos
Dir.= 2B 8.0mm x/dMx= .50 | |
[tf,cm] | M[-]Min = 390.4 | M[+]Min = 335.2 | M[-]Min =
390.4 | |
[cm2] | Asapo[+]= 5.81 | | Asapo[+]=
5.81 | |

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.- 850. 3.82 56.64 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 850. .01 3.94 5 8.3 13.1 38.1 .0 .0 .0 .0 .07 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 2.569 2.569 .25 .00 2 PA12 .00 .00 0 0
0 0 0 2 2.418 2.418 .25 .00 2 PA11 .00 .00 0 0

JOAO SOARES VIEGAS FILHO R E L G E R - Relatorio geral de vigas (V15.7.1)
Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
32283060
T Q S Projeto: 0004 - N764
17/08/12
CAD/Vigas
09:54:43

----- fck=300.kgf/cm2 - Aco: 50A ----- Esforços Caracteristicos
L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator
de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa
Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
Espessura Laje Inferior
FSp.Ex : Distancia Face Superior Eixo / Flt.Ex : Distancia Face Lateral ao Eixo / Cob/S :
Cobrim/Cobr.superior adicional
C A R G A S

```

MEsq : Momento Adicional a Esquerda      / MDir : Momento Adicional a Direita      / Q      : Cortante
Adicional (valor unico)
A R M A D U R A S - F L E X A O
SRAS : Secao Retangular Armad.Simples      / SRAD : Secao Retangular Armad.Dupla      / STAS : Secao Te
Armadura Simples
STAD : Secao Te Armadura Dupla      / x/d : Profund. relativa da Linha Neutra      / x/dMx : Profund.
relativa da LN Maxima
AsL : Armadura de Compressao      / Bit.de Fiss.: Bitola de fissuracao      / Asapo : Armadura
e/d que chega no extremo
A R M A D U R A S - C I S A L H A M E N T O
MdC : Modelo de Calculo (I ou II)      / Ang. : Angulo da biela de compressao      / Aswmin :
Armad.transv.minima-cisalhamento
Asw[C+T]: Arm.trans.calculada cisalh+torcao / Bit : Bitola selecionada      / Esp :
Espacamento selecionado
NR : Numero de ramos do estribo      / AsTrt : Armadura transversal de Tirante      / AsSus : Armadura
transversal-Suspensao
A R M A D U R A S - T O R C A O
%dT : % limite de TRd2 para desprezar o M de torcao (Tsd)      / he : Espessura do nucleo de
torcao
b-nuc : Largura do nucleo      / h-nuc : Altura do nucleo
Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo      / AswmnNR : Armad.transv.minima-torcao
p/NR estribos selecionado
Asl-b : Armadura longitudinal de torcao no lado b      / Asl-h : Armadura longitudinal de
torcao no lado h
ComDia : Valor da compressao diagonal (cisalhamento+torcao)      / AdPla : Capacida/ adaptacao plastica
no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre / segue
/ vigas
M.I.Mx : Momento Imposto Maximo      / M.I.Mn : Momento Imposto Minimo
=====
=====

```

```

Viga= 401 V401      Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1B /L= 1.74 /B= .25 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.20 /FLt.Ex= .13 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO | M[-]= 5.70 tf* m | As = 5.91 -SRAS- [ 3 B 16.0mm]
BAL.Esq | x/d = .21 | AsL= .00 -
1.2
[tf,cm] | M[-]Min= 144.8 - 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.- 165. 4.82 43.91 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 3.443 3.442 .17 .00 1 P1 .00 .00 1 0
0 0 0 0
=====
=====

```

```

Viga= 402 V402      Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1B /L= 1.74 /B= .25 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.20 /FLt.Ex= .13 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO | M[-]= 5.70 tf* m | As = 5.91 -SRAS- [ 3 B 16.0mm]
BAL.Esq | x/d = .21 | AsL= .00 -
1.2
[tf,cm] | M[-]Min= 144.8 - 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.- 165. 4.82 43.91 2 45. .0 2.9 2.9 6.3 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 3.443 3.442 .17 .00 1 P2 .00 .00 2 0
0 0 0 0

```

Viga= 403 V403
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.78 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 178 | M.[-] =
.0 tf* m | As = .14 -SRAS- [2 B 6.3mm] | AsL= .00 ----- | As = .14
[tf,cm] | AsL= .00 ----- x/d = .00 | As = .99 -SRAS- [2 B 8.0mm] | AsL= .00
-SRAS- [2 B 6.3mm] | AsL= .00 ----- x/dMx= .50 |
----- x/d = .00 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
65.1 |
[cm2] | Asapo[+]= .33 | Asapo[+]=
.33

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	160.	.19	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	160.	.00	.84	5	6.0	8.1	18.1	.0	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.135	.133	.25	.04	1 P2	.00	.00	2 0
0	0	0	.134	.132	.25	.04	1 P1	.00	.00	1 0

Viga= 404 V404
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= 2.18 /B= .25 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO | M[-]= 7.28 tf* m | As = 7.76 -SRAS- [4 B 16.0mm]
BAL.ESQ | x/d = .27 | AsL= .00 -
1.5 | M[-]Min= 144.8 - x/dMx = .50 | %
[tf,cm] | Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	210.	4.98	43.91	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	3.555	3.555	.17	.00	1 P6	.00	.00	6 0

Viga= 405 V405
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= 2.18 /B= .25 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 7.28 tf* m | As = 7.76 -SRAS- [4 B 16.0mm]
 BAL.ESQ | x/d = .27 | ASL= .00 -
 1.5
 [tf,cm] | M[-]Min= 144.8 - x/dMx = .50 | %
 Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	210.	4.98	43.91	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	1	P7	.00	.00	7

Viga= 406 V406 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1B /L= 2.18 /B= .25 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 7.28 tf* m | As = 7.76 -SRAS- [4 B 16.0mm]
 BAL.ESQ | x/d = .27 | ASL= .00 -
 1.5
 [tf,cm] | M[-]Min= 144.8 - x/dMx = .50 | %
 Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	210.	4.98	43.91	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	1	P8	.00	.00	8

Viga= 407 V407 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 2.78 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 281 | M.[-] =
 .3 tf* m | As = .90 -SRAS- [2 B 8.0mm] | ASL= .00 ----- | As = .90
 [tf,cm] | AsL= .00 ----- x/d = .06 | As = .99 -SRAS- [2 B 8.0mm] | ASL= .00
 -SRAS- | x/d = .06 x/dMx= .50 |
 ----- x/dMx= .50 |
 [tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
 65.1 | Asapo[+]= .33 | Asapo[+]=
 [cm2] | .85

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	260.	.41	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	260.	.03	.84	5	6.0	8.1	18.1	.2	.0	.0	.0	.05	N	

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

Vao= 2 /L= 5.76 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .4 tf* m | M.[+] Max= .3 tf* m - Abcis.= 289 | M.[-] =
.3 tf* m | As = .96 -SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = .96
[tf,cm] | AsL= .00 ----- x/d = .06 | As = 1.05 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .06 | x/dMx= .50 | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.5 |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
65.1 | | |
[cm2 ] | Asapo[+]= .91 | | 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.- 558. .65 24.95 2 45. .0 2.3 2.3 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 558. .05 .84 5 6.0 8.1 18.1 .4 1.4 .1 .1 .09 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .128 .127 .25 .04 1 P8 .00 .00 8 0
0 0 0 0 .748 .746 .25 .04 1 P7 .00 .00 7 0
0 0 0 0 .407 .406 .25 .04 1 P6 .00 .00 6 0
0 0 0 0 0
=====
=====
  
```

2.5.3 Memória de Cálculo dos Pilares

A memória a seguir contém os pilares reais e os pilares fictícios que serviram para promover a transferência de carga para as fundações.

```

JOAO SOARES VIEGAS FILHO LISPIIL - Listagem dos resultados -P-A-S- por pil (V15.7.1 )
Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
32283060
T Q S Projeto: 0001 - ELEVATÓRIA DE ESGOTO BRUTO (EEB)
17/08/12
CAD/Pilar SANEP
09:57:12
-----
-----
  
```

AS RESULTANTE POR BITOLAS fck = .300 [tf,cm] fck(opc.) = .300

SEL = Quantidade Efetiva de Barras na Secao
 Nb = Quantidades de Barras Dimensionadas na Secao
 NbH = Numero de Barras lado H
 NbB = Numero de Barras lado B

```

PILAR:P1
num. 1 Esforco de Calculo do
Dimensionamento
+-----+
LANCE B(cm) H(cm) ROS SEL BITL BITE Nb NbH NbB AS(cm) RO ASnec | LBDALM LAMDBA | FNd (tf) Mxd
(tf,cm) Myd (tf,cm) |
|-----|
| N764
|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|
|.....|
| 12.5 6.3 10 4 1 12.27 1.2 12.01| 35.0 52.0 | 6.4 23.9
897.6 |
| 16.0 6.3 6 3 0 12.06 1.2 12.06| | CASO PÓRTICO = 9
(COMBINAÇÃO= 1) |
| L. 3 25.0 40.01.3 4 20.0 6.3 4 2 0 12.57 1.3 12.13| | **VER NOTA (A)**
| 25.0 8.0 4 2 0 19.63 2.0 12.42| |
|
  
```

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:P2

num. 2

Esforço de Calculo do

Dimensionamento

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf,cm)														

N764

897.7					12.5	6.3	10	4	1	12.27	1.2	12.01	35.0	52.0	6.4	-24.0

					16.0	6.3	6	3	0	12.06	1.2	12.06				

(COMBINAÇÃO= 1)																CASO PÓRTICO = 9

L. 3 25.0 40.01.3					4	20.0	6.3	4	2	0	12.57	1.3	12.13			**VER NOTA (A)**

					25.0	8.0	4	2	0	19.63	2.0	12.42				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:P3

num. 3

Esforço de Calculo do

Dimensionamento

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf,cm)														

N374

52.4					10.0	5.0	8	4	0	6.28	.5	5.00	35.2	11.5	4.4	28.6

(L. 2 25.0 50.0 .6					6	12.5	6.3	6	3	0	7.36	.6	5.00			CASO PÓRTICO = 9

(COMBINAÇÃO= 1)																**VER NOTA (A)**

					16.0	6.3	6	3	0	12.06	1.0	5.00				

					20.0	6.3	6	3	0	18.85	1.5	5.00				

					25.0	8.0	6	3	0	29.45	2.4	5.00				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208

-361.7					10.0	5.0	12	5	1	9.42	.8	7.97	40.5	89.2	89.0	-789.6

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS											
Cobrimento[cm]		fck[MPa]	GamaAço	GamaConcreto		AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5		30.0	1.15	1.40		8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37						
50	A	2.0	15.0	1	1						
Fundacao											

[illegible]

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS										
Cobrimento[cm]		fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm
4.5		30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37					
50	A	2.0	15.0	1	1					

1	25.0	75.0	.4	10	10.0	5.0	10	5	0	7.85	.4	7.50	53.0	89.2	68.0	320.9
254.9																
(COMBINAÇÃO=	1)				12.5	6.3	8	4	0	9.82	.5	7.69			CASO PÓRTICO =	9
					16.0	6.3	8	4	0	16.08	.9	7.81			**VER NOTA (A)**	
					20.0	6.3	8	4	0	25.13	1.3	7.96				
					25.0	8.0	8	4	0	39.27	2.1	8.41				

PILAR:P5	
num. 5	Esforço de Cálculo do
Dimensionamento	

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
			Myd (tf, cm)													
N374																

PILAR:P6																
num. 6																
Dimensionamento																
Esforço de Calculo do																
+-----+																

69

70

PILAR:P10

num. 10

Esforço de Cálculo do

Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf, cm)														
N208																
L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	35.0	46.5	17.6	59.7
59.7																
(COMBINAÇÃO= 1)																

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37				
50	A	2.0	15.0	1	1				

Fundacao

PILAR:P11

num. 11

Esforço de Cálculo do

Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf, cm)														
N208																
L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	35.0	46.5	17.8	60.1
-60.1																
(COMBINAÇÃO= 3)																

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37				
50	A	2.0	15.0	1	1				

Fundacao

PILAR:P12

num. 12

Esforço de Cálculo do

Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf, cm)														

72

L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	35.0	55.5	12.7	51.5
-51.5																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:P14

num. 14

Dimensionamento

Esforço de Calculo do

LANCE	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	R0	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
(tf,cm)		Myd	(tf,cm)													

N374

L. 2	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	58.8	13.4	2.3	8.4
5.2																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208

L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	35.0	55.5	22.2	89.9
-75.3																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:P15

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37											
50	A	2.0	15.0	1	1											
N208																
.....																

Fundacao

PILAR:APG2

num. 18

Esforço de Calculo do

Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf, cm)														
N374																
L. 2	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	67.5	11.5	1.8	-17.4
-4.0																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208

L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	54.4	59.1	3.9	-13.3
-8.8																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:APG3

num. 19

Esforço de Calculo do

Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf, cm)														
N374																
L. 2	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	67.3	22.0	2.0	12.0
6.2																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto			AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm										
4.5	30.0	1.15	1.40			8.00	.40	1.40	1.40	1.40	1.40										
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37																
50	A	2.0	15.0	1	1																
N208																					
.....																					
L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	35.0	52.0		5.6	-12.7				
12.7																					
(COMBINAÇÃO= 1)												12.5	6.3	4	2	0	4.91	.8	2.50	CASO PÓRTICO =	9
												16.0	6.3	4	2	0	8.04	1.3	2.50	**VER NOTA (A)**	
												20.0	6.3	4	2	0	12.57	2.0	2.50		
												25.0	8.0	4	2	0	19.63	3.1	2.50		

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]		fck[MPa]	GamaAço	GamaConcreto		AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5		30.0	1.15	1.40		8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37						
50	A	2.0	15.0	1	1						
Fundacao											
.....											

 PILAR:APG4
 num. 20

Esforço de Calculo do

Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	R0	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
Myd (tf, cm)																
N374																
L. 2	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	62.2	22.0	3.3	-31.2
7.4																
(COMBINAÇÃO= 1)					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]		fck[MPa]	GamaAço	GamaConcreto			AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm												
4.5		30.0	1.15	1.40			8.00	.40	1.40	1.40	1.40	1.40												
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37																			
50	A	2.0	15.0	1	1																			
N208																								
.....																								
L. 1	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	44.2	52.0		7.4	-16.7							
-16.7																								
(COMBINAÇÃO= 1)															12.5	6.3	4	2	0	4.91	.8	2.50	CASO PÓRTICO =	9
															16.0	6.3	4	2	0	8.04	1.3	2.50	**VER NOTA (A)**	
															20.0	6.3	4	2	0	12.57	2.0	2.50		
															25.0	8.0	4	2	0	19.63	3.1	2.50		

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

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

4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37				
50	A	2.0	15.0	1	1				
Fundacao									

PILAR:APG5

num. 21

Esforço de Calculo do

Dimensionamento

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf,cm)														

N374																
L. 2	25.0	25.0	.5	4	10.0	5.0	4	2	0	3.14	.5	2.50	35.0	11.5	4.1	-9.2
-22.0																
(COMBINAÇÃO= 1)																
					12.5	6.3	4	2	0	4.91	.8	2.50			CASO PÓRTICO =	9
					16.0	6.3	4	2	0	8.04	1.3	2.50			**VER NOTA (A)**	
					20.0	6.3	4	2	0	12.57	2.0	2.50				
					25.0	8.0	4	2	0	19.63	3.1	2.50				

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto		AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40		8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37					
50	A	2.0	15.0	1	1					
N208										
.....										

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37				
50	A	2.0	15.0	1	1				
Fundacao									

PILAR:APG6

num. 22

Esforço de Calculo do

Dimensionamento

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
		Myd (tf,cm)														

N374																
L. 2	25.0	30.0	.4	4	10.0	5.0	4	2	0	3.14	.4		35.0	98.7	EFEITOS LOCAIS:	
ESFORÇOS PÓRTICO ESPACIAL																
					12.5	6.3	4	2	0	4.91	.7					
					16.0	6.3	4	2	0	8.04	1.1					

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VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmapv
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:APG8

num. 24

Esforço de Calculo do

Dimensionamento

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd

N374

ESFORÇOS PÓRTICO ESPACIAL																
L.	2	25.0	30.0	1.7	4	20.0	6.3	4	2	0	12.57	1.7				
25.0 8.0 4 2 0 19.63 2.6																

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmapv
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208

ESFORÇOS PÓRTICO ESPACIAL																
L.	1	25.0	30.0	1.7	4	20.0	6.3	4	2	0	12.57	1.7				
25.0 8.0 4 2 0 19.63 2.6																

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmapv
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:APG9

num. 25

Esforço de Calculo do

Dimensionamento

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd

N374

ESFORÇOS PÓRTICO																		
49.7							10.0	5.0	4	2	0	3.14	.4	3.00	51.5	11.5	3.4	16.0
(COMBINAÇÃO= 1)																		
L.	2	25.0	30.0	1.1	4	16.0	6.3	4	2	0	8.04	1.1	3.00					9
20.0 6.3 4 2 0 12.57 1.7 3.00																		

CASO PÓRTICO =

VER NOTA (A)

25.0 8.0 4 2 0 19.63 2.6 3.00										
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS										
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM	
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37					
50	A	2.0	15.0	1	1					
N208										
.....										
.....										
20.0 6.3 6 3 0 18.85 2.5 18.06 35.0 89.2 61.5 545.3										
434.4										
L. 1 25.0 30.02.6 4 25.0 8.0 4 2 0 19.63 2.6 17.28 CASO PÓRTICO = 13										
(COMBINAÇÃO= 3)										
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS										
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM	
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37					
50	A	2.0	15.0	1	1					
Fundacao										
.....										
.....										
PILAR:APG13										
num. 26										
Dimensionamento										
Esforço de Calculo do										
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----										
LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO ASnec
(tf,cm)	Myd (tf,cm)									
.....										
.....										
N374										
.....										
.....										
25.5 10.0 5.0 4 2 0 3.14 .4 3.00 56.6 11.5 3.4 -23.4										
12.5 6.3 4 2 0 4.91 .7 3.00 CASO PÓRTICO = 9										
(COMBINAÇÃO= 1)										
L. 2 25.0 30.01.1 4 16.0 6.3 4 2 0 8.04 1.1 3.00 **VER NOTA (A)**										
20.0 6.3 4 2 0 12.57 1.7 3.00										
25.0 8.0 4 2 0 19.63 2.6 3.00										
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS										
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM	
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37					
50	A	2.0	15.0	1	1					
N208										
.....										
.....										
L. 1 25.0 30.02.6 4 25.0 8.0 4 2 0 19.63 2.6 18.88 35.0 89.2 58.9 132.5										
-141.4										
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS										
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM	
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37					
50	A	2.0	15.0	1	1					
Fundacao										
.....										
.....										
PILAR:APG17										

num. 27
Dimensionamento

Esforço de Cálculo do

-----+-----
LANCE B(cm) H(cm) ROS SEL BITL BITE Nb NbH NbB AS(cm) RO ASnec | LBDALM LAMDBA | FNd (tf) Mxd
(tf,cm) Myd (tf,cm)

N374

| L. 2 **AVISO**..LANCE NAO DIMENSIONADO..*

|-----|

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208

|-----|

| L. 1 **AVISO**..LANCE NAO DIMENSIONADO..*

|-----|

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

|-----|

|-----|

PILAR:APG14

num. 28
Dimensionamento

Esforço de Cálculo do

-----+-----
LANCE B(cm) H(cm) ROS SEL BITL BITE Nb NbH NbB AS(cm) RO ASnec | LBDALM LAMDBA | FNd (tf) Mxd
(tf,cm) Myd (tf,cm)

N374

| L. 2 **AVISO**..LANCE NAO DIMENSIONADO..*

|-----|

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208

|-----|

| L. 1 **AVISO**..LANCE NAO DIMENSIONADO..*

|-----|

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1
Fundacao					

PILAR:APG18
 num. 29
 Dimensionamento

Esforço de Calculo do

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
N374																
62.0					10.0	5.0	4	2	0	3.14	.4	3.00	47.8	15.0	5.1	53.6
(COMBINAÇÃO= 1)					12.5	6.3	4	2	0	4.91	.7	3.00			CASO PÓRTICO =	9
L. 2 25.0	30.0	1.1	4	16.0	6.3	4	2	0	8.04	1.1	3.00				**VER NOTA (A)**	
				20.0	6.3	4	2	0	12.57	1.7	3.00					
				25.0	8.0	4	2	0	19.63	2.6	3.00					

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

N208																
L. 1 25.0	30.0	3.9	6	25.0	8.0	6	3	0	29.45	3.9	25.31	35.0	85.7	72.0	-589.4	

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao																

PILAR:APG15
 num. 30
 Dimensionamento

Esforço de Calculo do

LANCE (tf,cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
N374																
25.2					10.0	5.0	4	2	0	3.14	.4	3.00	35.0	15.0	5.3	-22.3
(COMBINAÇÃO= 1)					12.5	6.3	4	2	0	4.91	.7	3.00			CASO PÓRTICO =	9
L. 2 25.0	30.0	1.1	4	16.0	6.3	4	2	0	8.04	1.1	3.00				**VER NOTA (A)**	
				20.0	6.3	4	2	0	12.57	1.7	3.00					
				25.0	8.0	4	2	0	19.63	2.6	3.00					

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

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

4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37				
50	A	2.0	15.0	1	1				
N208									
.....									
L. 1	25.0	30.03.9	6 25.0	8.0	6 3 0	29.45	3.9	29.30	35.0
-523.6									85.7
									77.1
									-631.4
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS									
Cobramento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37				
50	A	2.0	15.0	1	1				
Fundacao									
.....									
=====									

Nota A:
 Este carregamento listado é, dentre os inúmeros carregamentos analisados, o que provocou a seleção desta armadura em primeiro lugar. Não necessariamente, este carregamento é o que necessita a maior quantidade de armadura na seção, pois o dimensionamento é feito de forma indireta, por verificação. Exemplificando, temos duas configurações de armaduras válidas para o lance, uma correspondendo a 17 cm2 e outra a 20 cm2.
 Um carregamento inicial necessitou de 18 cm2 e, por esta razão foi selecionada a configuração de 20 cm2 como definitiva. Outros carregamentos posteriores necessitaram, por exemplo, de 19 cm2, 19.5 cm2 (sempre inferiores aos 20 cm2), mas a listagem com o carregamento mais desfavorável foi feita com aquele que necessitou os 18 cm2, pois foi o primeiro a requisitar os 20 cm2. A pesquisa do carregamento exato que provoca maior armadura na seção não é realizada automaticamente para não aumentar de forma significativa o tempo de processamento.
 Se o usuário quiser calcular a real necessidade de armadura para um carregamento específico, ele poderá fazê-lo facilmente no Editor de Esforços e Armaduras, comando do próprio Cad/Pilar.

=====

3 DECANTADOR FINAL

3 DECANTADOR FINAL

3.1 Caracterização da obra

O Decantador constitui-se por uma estrutura em concreto armado na forma de tanque, medindo internamente 26,70 m x 19,80 m. A estrutura está dividida em três partes de desenvolvimento longitudinal: duas células de decantação e um canal central denominado canal do lodo. Numa das extremidades encontra-se o canal afluente e na outra o canal efluente. A planta EG0112-D-DCF-HID-01-02 traz seu detalhe.

As estruturas de todos os elementos acima são em concreto armado, conforme já mencionado, e as fundações em estacas pré-moldadas.

3.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônicos e hidráulico, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, foi observado o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN.

A Classe de Agressividade Ambiental adotada, conforme as especificações da CORSAN (adotadas como referência), foi a III indicada na Tabela 6.1 da NBR 6118/2003, correspondendo a agressividade *forte*.

Para esta classe a NBR 6118 estabelece o seguinte:

- c) Especificações para o concreto:
 - Classe de concreto: $\geq C30$ – $f_{ck} \geq 30\text{Mpa}$ (300 kgf/cm^2);
 - $E_{cs} = 0,85 E_{ci} = 26072\text{ Mpa}$ (260720 kgf/cm^2);
 - Fator água cimento máximo = 0,55.
- d) Especificações para cobrimentos de armaduras (CORSAN):
 - Vigas e pilares: 45 mm
 - Lajes : 45 mm

Como carregamentos específicos deste projeto têm-se:

- v) Peso específico aparente do lodo: 1,2 tf/m³.
- vi) Nas passarelas e escadas foi considerada uma sobrecarga acidental de 300 kfg/m².

Para efeito do cálculo das pressões nas paredes e lajes de fundo o nível de lodo foi considerado como com a altura máxima das próprias paredes admitindo-se, à favor da segurança, a possibilidade deste enchimento máximo.

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, pela empresa FS Sondagens de Cachoeirinha-RS.

3.3 Concepção geral do(s) modelo(S) estrutural(is)

A estrutura do decantador basicamente está constituída por uma laje de fundo e paredes em concreto armado. O mesmo acontece com os canais afluente e efluente. Essas

estruturas foram modeladas no cad/estrutural TQS. As Figuras 1 e 2 ilustram de forma geral o modelo.

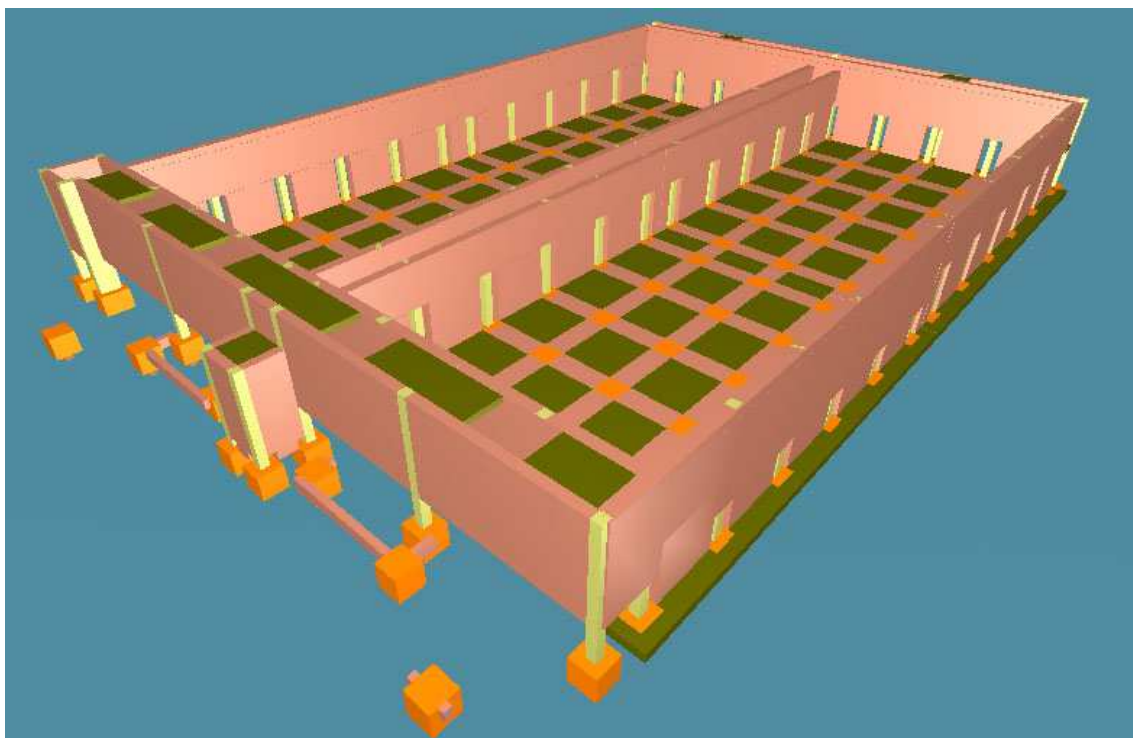


Figura 1 – Vista geral do modelo do decantador construído no TQS. Em primeiro plano o canal afluente.

Em virtude do seu comprimento a estrutura foi segmentada em duas partes: Toda a estrutura – laje de fundo, paredes, canais e poços – estão apoiados em estacas pré-moldadas de concreto armado.

A laje de fundo está apoiada em blocos sobre estacas e a modelagem foi feita com a utilização de vigas faixas de mesma altura da mesma formando uma malha em cujos nós encontram-se os apoios. A vantagem da modelagem com o que se denomina vigas faixas é que os resultados da determinação de esforços e do dimensionamento da mesma é passado para o subsistema de dimensionamento das lajes podendo-se tratar o conjunto como um todo. Foram utilizados blocos, ao invés de apoio direto da laje de fundo sobre as estacas, para reduzir as tensões de punção a valores que dispensassem a correspondente armadura.

As paredes foram tratadas como vigas paredes no sentido vertical, apoiadas sobre blocos de estacas; e, horizontalmente, como lajes submetidas à pressão do lodo, de um lado, e, quando o decantador vazio à pressão do solo.

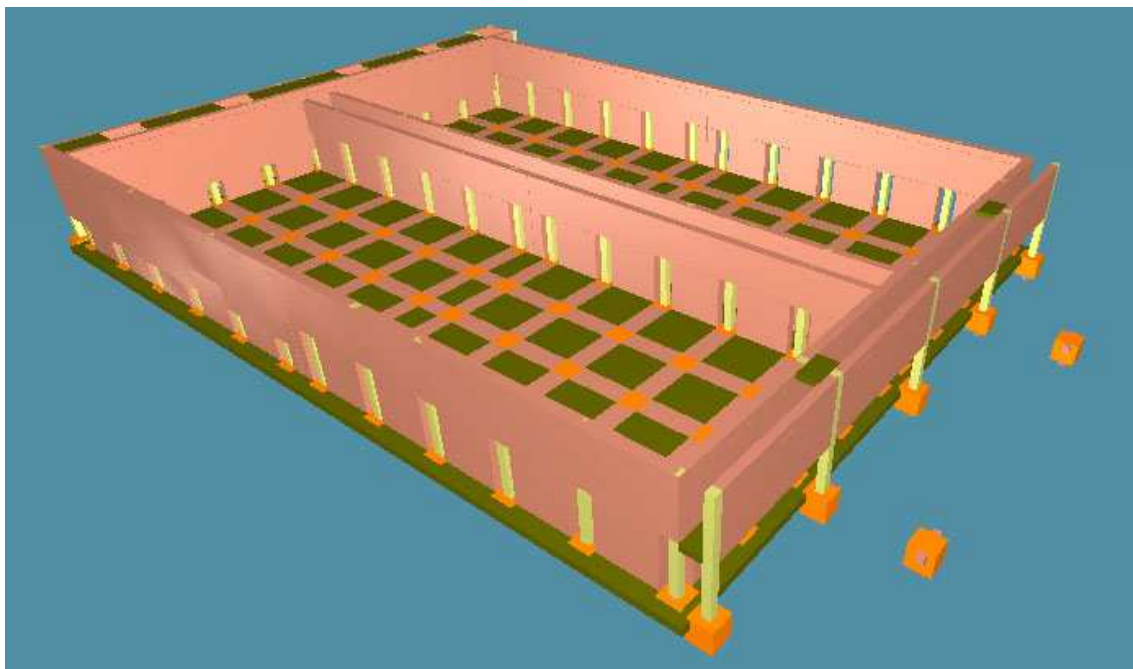


Figura 2 – Outra vista do mesmo modelo – em primeiro plano o canal efluente.

3.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento (laje de fundo do decantador e vigas paredes), discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito, os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais. Neste modelo de pórtico, as lajes horizontais são tratadas como diafragmas rígidos e os esforços são distribuídos entre os pilares de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária, parcial ou total, e, posteriormente, final de detalhamento e desenho. O dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. De uma forma geral os procedimentos são os seguintes:

- 5º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.

- 6º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 7º. Detalhamento final e desenho.
- 8º. Emissão de plantas.

3.5 Memorial de Desenvolvimento e resultados do projeto

A Figura 3, por sua vez, ilustra os diagramas de momentos fletores na laje de fundo resultantes de um grande conjunto de combinações e que foram utilizados no dimensionamento dos elementos estruturais: lajes, vigas faixas, vigas paredes, dentre outros.

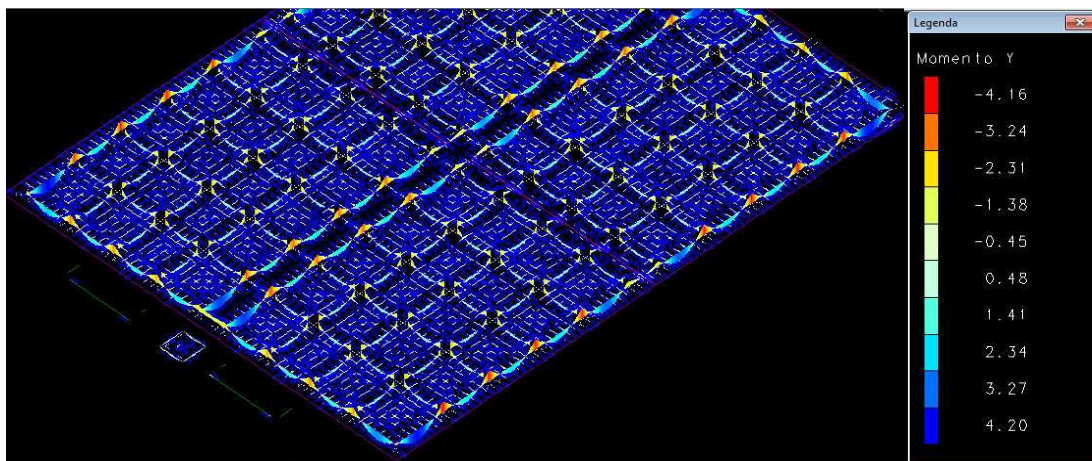


Figura 3 – Momentos fletores resultantes do modelo de grelha.

As figuras 4 e 5 apresentam extratos das planilhas utilizadas para a determinação de esforços devidos ao empuxo lateral do lodo e o correspondente dimensionamento das paredes.

Na continuidade, abaixo, estão transcritos os resultados do dimensionamento das vigas faixas – lajes -, vigas paredes e vigas.

DECANTADOR FINAL ETE PELotas			
PAREDES PAA1 PAA4 PAB1 E PAB4			
Momentos $PL = gl \cdot h$ $h = 3,625 \text{ m}$ $gl = 12,00 \text{ KN/m}^3$ $PL = 43,50 \text{ KN/m}^2$			
	$lx = 27,25$ $ly = 3,625$ $ly/lx = 0,1330275$		
MODELO A			
	$lx = 3,625$ $Me = -95,26953$		
Flecha na extremidade livre $D = \frac{Eh^3}{12(1-\nu^2)}$ $D = 61.105,30 \text{ KNm}$ $W = \frac{(k/384) \cdot (p \cdot lx^4)}{D}$ $W = 0,0102438 \text{ m}$			
$Me = (P \cdot lx^2)/6$ $Me = -95,26953125 \text{ KNm/m}$	$W = 1,02438 \text{ cm}$		
$H = e = 0,30 \text{ m}$ $Pt = 43,50 \text{ KN/m}^2$ $fck = 30,00 \text{ Mpa}$ $Ec = 5600(fck^{1/2}) = 30.672,46 \text{ Mpa}$ $E = 0,85 Ec = 26.071,59 \text{ Mpa}$ $\nu = 0,20$ $D = (E \cdot h^3) / (12 \cdot (1 - \nu^2)) = 61.105,30 \text{ KNm}$	$W = 1,02438 \text{ cm}$		
DECANTADOR FINAL NOVO MUNDO			
MOMENTO DE ENGASTE (PAREDE-FUNDO)			
$Me P = 96,00 \text{ KNm/m}$ $Me F = \text{KNm/m}$	$Me = (Me P + Me F) / 2 = \text{KNm/m}$		
$Me = -96,00 \text{ KNm/m} = -960 \text{ tfcm}$			
$\Phi = 1,60 \text{ cm}$ $c = 4,50 \text{ cm}$ $h = 35,00 \text{ cm}$ $d = 29,70 \text{ cm}$ $bw = 100,00 \text{ cm}$ $fck = 40,00 \text{ Mpa}$ $fyd = 434,80 \text{ Mpa}$	$Kc = (bw \cdot d^2) / Me = 91,88$ $Ks = 0,334$		
$As = Ks \cdot Me / d = 10,79596 \text{ cm}^2$	$Asmin = 0,2108951 \% bw \cdot h = 7,38 \text{ cm}^2$		
$Asmin = 0,210895 \% bw \cdot h = 7,38 \text{ cm}^2$	$As = 15,34 \text{ cm}^2$		
OBS: Area alterada devido a Fissuração			

Figura 4 – Planilha de cálculo com a determinação dos esforços e o dimensionamento das paredes devido ao empuxo horizontal devido ao lodo.

FISSURAS NO ENGASTE (PAREDE-FUNDO)									
Φ=	1,25	cm							
Φ=	12,50	mm							
d'=		4,5	cm			0,045	m		
d=		30,50	cm			0,305	m		
b=		100	cm			1	m		
δ=d'/d		0,147540984							
fck=			30,00	Mpa					
Ec=	5600(fck ^{1/2})		30.672,46	Mpa					
Ecs=	0,85 Ec		26.071,59	Mpa					
M=	96,00	KNm							
Es=		200.000.000,00	KN/m2						
Ecs=		26.071.593,74	KN/m2						
As=		15,34	cm2	Tr					
A's=		15,34	cm2	Co					
p=As/(b*d)		0,005029508							
p'=A's/(b*d)		0,005029508							
n=E/Ecs		7,67							
ξ=	-n*(p+p')+((n^2)*(p+p')+2*n*(p+δ*p'))^(1/2)			=		0,2302503			
K2=	1/6*ξ^2(3-ξ)+n*p'*(ξ-δ)*(1-δ)			=		0,0271934			
Ts=	(n*(1-ξ)*M)/(K2*b*d^2)			=		224088,53	KN/m2		
fct=	1,4*((fck/10)^(2/3))			=		2912,1174	KN/m2		
Ace=	b*(d'+7,5*Φ)			=		1387,5	cm2		
pse=As/Ace				=		0,0110559		1,105585586	%
η1=	2,25								
w1=	(Φ/12,5*η1)*(Ts/Es)*(3*Ts/fct)			=		0,11496	mm		
w2=	(Φ/12,5*η1)*(Ts/Es)*((4/pse)+45)			=		0,20258	mm		

Figura 5 – Planilha com a verificação da fissuração no engaste da parede com a laje de fundo.

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.7.1)

Pg 1

AV. REPUBLICA, 440 AREAL

PELOTAS 96077-230 RS

32283060

T Q S Projeto: 0002 - Fundação

11/08/12

CAD/Vigas

10:54:47

fck=300.kgf/cm2 - Aco: 50A

- Esforços Característicos

L E G E N D A

G E O M E T R I A

Eng.E : Engastamento a Esquerda

/ Eng.D : Engastamento a Direita

/ Repet :

Repeticoes

NAnd : N.de Andares

/ Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator

de Alternancia de Cargas

Cob : Cobrimento

/ TpS : Tipo da Secao

/ BCs : Mesa

Colaborante Superior

BCi : Mesa Colaborante Inferior

/ Esp.LS : Espessura Laje Superior

/ Esp.LI :

Espessura Laje Inferior

FSp.Ex : Distancia Face Superior

Eixo / FLT.Ex : Distancia Face Lateral ao Eixo / Cob/S :

Cobrim/Cobr.superior adicional

C A R G A S

MEsq : Momento Adicional a Esquerda

/ MDir : Momento Adicional a Direita

/ Q : Cortante

Adicional (valor unico)

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

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS : Secao Te Armadura Simples
 STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx : Profund. relativa da LN Maxima
 AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo : Armadura e/d que chega no extremo
 A R M A D U R A S - C I S A L H A M E N T O
 MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :
 Armad.transv.minima-cisalhamento
 Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
 Espacamento selecionado
 NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura transversal-Suspensao
 A R M A D U R A S - T O R C A O
 %dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de torcao
 b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
 Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao
 p/NR estribos selecionado
 Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
 ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica no vao - S[sim] N[nao]
 R E A C O E S D E A P O I O
 DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre / segue / vigas
 M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
 =====
 =====

Viga= 1 PAA1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 4.6 tf* m - Abcis.= 106 | M.[-] =
 5.3 tf* m | [tf,cm] As = 1.35 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 9.13
 -SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00
 ----- | x/d = .04 | Arm.Lat.= [2 X 20 B 6.3mm] - LN= 7.0 |
 x/dMx= .50 | x/dMx= .50 |
 [tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
 3835.0 |
 [cm2] | Asapo[+]= 9.13 | Asapo[+]=
 8.68 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	185.	14.59	300.27	2	45.	.0	4.1	4.1	6.3	15.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	185.	.99	44.74	5	14.6	20.4	159.4	.4	.0	.0	.0	.07	N	

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

 Vao= 2 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 5.0 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 126 | M.[-] =
 3.5 tf* m | [tf,cm] As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13
 -SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00
 ----- | x/d = .04 | Arm.Lat.= [2 X 20 B 6.3mm] - LN= 7.0 |
 x/dMx= .50 | x/dMx= .50 |
 | |

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[tf,cm]| M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0
[cm2 ]| Asapo[+]= 8.68 | | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.31 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. 1.05 44.74 5 14.6 20.4 159.4 .4 .0 .0 .0 .06 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 3.4 tf* m | M.[+] Max= 2.6 tf* m - Abcis.= 126 | M.[-] =
3.9 tf* m
[tf,cm]| As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
-SRAS- [ 3 B 20.0mm]
| AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04
| x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
x/dMx= .50
| M.[-]Min = 3835.0 | M.[+]Min = 3835.0 | M.[-]Min =
3835.0
[cm2 ]| Asapo[+]= 8.68 | | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.52 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .56 44.74 5 14.6 20.4 159.4 .2 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 3.7 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 126 | M.[-] =
4.6 tf* m
[tf,cm]| As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
-SRAS- [ 3 B 20.0mm]
| AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04
| x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
x/dMx= .50
| M.[-]Min = 3835.0 | M.[+]Min = 3835.0 | M.[-]Min =
3835.0
[cm2 ]| Asapo[+]= 8.68 | | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.52 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .31 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

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

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- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 4.1 tf* m | M.[+] Max= 3.2 tf* m - Abcis.= 147 | M.[-] =

42.4 tf* m | [tf,cm] | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13

-SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00

----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 20 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =

3835.0 |

[cm2] | Asapo[+]= 8.68 | Asapo[+]=

9.13 |

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

E N S A G E M

[tf,cm] 0.- 184. 11.30 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 184. .31 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

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

Vao= 6B /L= .80 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

.87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 42.39 tf* m | As = 9.13 -SRAS- [3 B 20.0mm]

BAL.DIR | x/d = .04 | AsL= .00 -Arm.Lat.= [2 X 20 B 6.3mm]

.5

[tf,cm] | M[-]Min= 3835.0 - x/dMx= 1.00 | %

Baric.Armad.= 1

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

E N S A G E M

[tf,cm] 0.- 45. 4.34 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 45. .07 44.74 5 14.6 20.4 159.4 .0 .0 .0 .0 .02 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	4.403	4.399	.70	.00	0	BA4	.00	.00	8001
0	0	2	17.782	17.779	.70	.00	0	BA5	.00	.00	8002
0	0	3	13.583	13.582	.70	.00	0	BA6	.00	.00	8003
0	0	4	14.463	14.462	.70	.00	0	BA7	.00	.00	8004
0	0	5	15.586	15.584	.70	.00	0	BA8	.00	.00	8005
0	0	6	10.227	10.223	.70	.00	0	BA9	.00	.00	8006
0	0	0	0	0	0	0	0	0	0	0	0

Viga= 2 PAA4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

.87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= 4.6 tf* m - Abcis.= 106 | M.[-] =

5.4 tf* m | [tf,cm] | As = 1.35 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 9.13

-SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .00 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00

----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 20 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 3.8 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 126 | M.[-] =

4.6 tf* m | [tf,cm] | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13

-SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00

----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =

3835.0 |

[cm2] | Asapo[+]= 8.68 | Asapo[+]=

8.68 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.66 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 184. .28 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

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

Vao= 5 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

.87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 4.2 tf* m | M.[+] Max= 3.2 tf* m - Abcis.= 147 | M.[-] =

42.4 tf* m | [tf,cm] | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13

-SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00

----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =

3835.0 |

[cm2] | Asapo[+]= 8.68 | Asapo[+]=

9.13 |

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

E N S A G E M

[tf,cm] 0.- 184. 11.67 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 184. .31 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

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

Vao= 6B /L= .80 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

.87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 42.39 tf* m | As = 9.13 -SRAS- [3 B 20.0mm]

BAL.DIR | x/d = .04 | AsL= .00 -Arm.Lat.=[2 X 20 B 6.3mm]

.5 |

[tf,cm] | M[-]Min= 3835.0 - x/dMx =1.00 | | %

Baric.Armad.= 1

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

E N S A G E M

[tf,cm] 0.- 45. 4.42 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 45. .06 44.74 5 14.6 20.4 159.4 .0 .0 .0 .0 .02 N

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

1 5.276 5.275 .70 .00 0 BA71 .00 .00 8061 0

0 0 0 0

2 18.474 18.474 .70 .00 0 BA72 .00 .00 8062 0

0 0 0 0

0	0	3	14.101	14.101	.70	.00	0	BA73	.00	.00	8063	0
0	0	4	14.826	14.826	.70	.00	0	BA74	.00	.00	8064	0
0	0	5	15.948	15.947	.70	.00	0	BA75	.00	.00	8065	0
0	0	6	10.413	10.412	.70	.00	0	BA76	.00	.00	8066	0

Viga= 3 PAB1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .80 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO | M[-]= 42.39 tf* m | As = 9.13 -SRAS- [3 B 20.0mm]
BAL.Esq | x/d = .04 | AsL= .00 -Arm.Lat.= [2 X 20 B 6.3mm]
.5
[tf,cm] | M[-]Min= 3835.0 - x/dMx = 1.00 | | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	4.02	300.27	2	45.	.0	4.1	4.1	6.3	15.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.06	44.74	5	14.6	20.4	159.4	.0	.0	.0	.0	.01	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 42.4 tf* m | M.[+] Max= 3.4 tf* m - Abcis.= 105 | M.[-] =
4.3 tf* m | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00
-SRAS- [3 B 20.0mm] | x/d = .04 | Arm.Lat.= [2 X 20 B 6.3mm] - LN= 7.0 |
----- x/dMx= .50 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 9.13 | Asapo[+]=
[cm2] | 8.68

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.54	300.27	2	45.	.0	4.1	4.1	6.3	15.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.36	44.74	5	14.6	20.4	159.4	.1	.0	.0	.0	.04	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 4.8 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 126 | M.[-] =
3.5 tf* m | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00
-SRAS- [3 B 20.0mm] | x/d = .04

```

x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 8.68 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.34 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .29 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.9 tf* m | M.[+] Max= 2.5 tf* m - Abcis.= 126 | M.[-] =
3.3 tf* m | As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04
x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 8.68 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.41 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .40 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.7 tf* m | M.[+] Max= 1.7 tf* m - Abcis.= 126 | M.[-] =
5.3 tf* m | As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04
x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 8.68 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.99 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .65 44.74 5 14.6 20.4 159.4 .2 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 5.4 tf* m | M.[+] Max= 4.8 tf* m - Abcis.= 148 | M.[-] =
.0 tf* m | [tf,cm] | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 1.35
-SRAS- [2 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00
----- x/d = .00 | Arm.Lat.= [2 X 20 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | [cm2] | Asapo[+]= 8.68 | Asapo[+]=
9.13

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	185.	14.44	300.27	2	45.	.0	4.1	4.1	6.3	15.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	185.	1.62	44.74	5	14.6	20.4	159.4	.6	.0	.0	.0	.08	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	BB1	.00	.00	8007
0	0	0	0	0	0	0	BB2	.00	.00	8008
0	0	0	0	0	0	0	BB3	.00	.00	8009
0	0	0	0	0	0	0	BB4	.00	.00	8010
0	0	0	0	0	0	0	BB5	.00	.00	8011
0	0	0	0	0	0	0	BB6	.00	.00	8012

Viga= 4 PAB4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .80 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | M[-]= 42.39 tf* m | As = 9.13 -SRAS- [3 B 20.0mm]
BAL.ESQ | x/d = .04 | AsL= .00 -Arm.Lat.= [2 X 20 B 6.3mm]
.5 | [tf,cm] | M[-]Min= 3835.0 - x/dMx =1.00 | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	4.13	300.27	2	45.	.0	4.1	4.1	6.3	15.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.05	44.74	5	14.6	20.4	159.4	.0	.0	.0	.0	.01	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 42.4 tf* m | M.[+] Max= 3.3 tf* m - Abcis.= 105 | M.[-] =
4.3 tf* m | [tf,cm] | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.13
-SRAS- [3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [3 B 20.0mm] | AsL= .00
----- x/d = .04

```

x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 9.13 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.65 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .35 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 4.8 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 126 | M.[-] =
3.6 tf* m | As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
-SRAS- [ 3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 8.68 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.58 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .28 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.9 tf* m | M.[+] Max= 2.5 tf* m - Abcis.= 126 | M.[-] =
3.4 tf* m | As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
-SRAS- [ 3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
[tf,cm] | M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | Asapo[+]= 8.68 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.56 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .41 44.74 5 14.6 20.4 159.4 .1 .0 .0 .0 .04 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .17 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 3.7 tf* m | M.[+] Max= 1.7 tf* m - Abcis.= 126 | M.[-] =
5.3 tf* m | [tf,cm]| As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 9.13
-SRAS- [ 3 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | [tf,cm]| M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | [cm2 ]| Asapo[+]= 8.68 | Asapo[+]=
8.68

CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.19 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .68 44.74 5 14.6 20.4 159.4 .2 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 2.54 /B= .35 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /Flt.Ex= .17 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 5.5 tf* m | M.[+] Max= 4.8 tf* m - Abcis.= 148 | M.[-] =
.0 tf* m | [tf,cm]| As = 9.13 -SRAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 1.35
-SRAS- [ 2 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 9.13 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 20 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | [tf,cm]| M[-]Min = 3835.0 | M[+]Min = 3835.0 | M[-]Min =
3835.0 | [cm2 ]| Asapo[+]= 8.68 | Asapo[+]=
9.13

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 185. 14.71 300.27 2 45. .0 4.1 4.1 6.3 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. 1.73 44.74 5 14.6 20.4 159.4 .6 .0 .0 .0 .09 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 10.005 10.005 .70 .00 0 BB61 .00 .00 8067 0
0 0 2 16.597 16.597 .70 .00 0 BB62 .00 .00 8068 0
0 0 3 14.275 14.275 .70 .00 0 BB63 .00 .00 8069 0
0 0 4 14.194 14.194 .70 .00 0 BB64 .00 .00 8070 0
0 0 5 18.499 18.499 .70 .00 0 BB65 .00 .00 8071 0
0 0 6 3.699 3.699 .70 .00 0 BB66 .00 .00 8072 0
0 0 0 0
=====
=====

```

Viga= 5 PAA2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /Flt.Ex= .15 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 106 | M.[-] =

4.5 tf* m | [tf,cm] | As = 1.15 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 7.83

-SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .00 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00

----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =

3287.1 |

[cm2] | Asapo[+]= 7.83 | Asapo[+]=

7.44 |

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.- 185. 12.20 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 185. .85 33.46 5 12.8 17.2 161.2 .4 .0 .0 .0 .07 N

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

Vao= 2 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

.87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 4.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =

3.0 tf* m | [tf,cm] | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83

-SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00

----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =

3287.1 |

[cm2] | Asapo[+]= 7.44 | Asapo[+]=

7.44 |

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.- 184. 9.16 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

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

E N S A G E M

[tf,cm] 0.- 184. .34 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .05 N

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

Vao= 3 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=

.87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.8 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 126 | M.[-] =

3.3 tf* m | [tf,cm] | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83

-SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00

----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =

3287.1 |

[cm2] | Asapo[+]= 7.44 | Asapo[+]=

7.44 |

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.- 184. 8.91 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.28	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.04	N

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

Vao= 4 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 3.2 tf* m	M.[+] Max= 1.7 tf* m - Abcis.= 126	M.[-] =
3.9 tf* m		
[tf,cm] As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00 -----	As = 7.83
-SRAS- [4 B 16.0mm]		
AsL= .00 -----	As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00
----- x/d = .04		
x/dMx= .50	Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0	
[tf,cm] M[-]Min = 3287.1	M[+]Min = 3287.1	M[-]Min =
3287.1		
[cm2] Asapo[+]= 7.44		Asapo[+]=
7.44		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	8.87	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.26	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.04	N

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

Vao= 5 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 3.5 tf* m	M.[+] Max= 2.7 tf* m - Abcis.= 147	M.[-] =
36.3 tf* m		
[tf,cm] As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00 -----	As = 7.83
-SRAS- [4 B 16.0mm]		
AsL= .00 -----	As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00
----- x/d = .04		
x/dMx= .50	Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0	
[tf,cm] M[-]Min = 3287.1	M[+]Min = 3287.1	M[-]Min =
3287.1		
[cm2] Asapo[+]= 7.44		Asapo[+]=
7.83		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	9.55	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.31	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.04	N

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

Vao= 6B /L= .80 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO M[-]= 36.33 tf* m	As = 7.83 -SRAS- [4 B 16.0mm]
BAL.DIR	AsL= .00 -Arm.Lat.= [2 X 17 B 6.3mm]
.5	
[tf,cm] M[-]Min= 3287.1	- x/dMx =1.00
Baric.Armad.= 1	%

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 3.91 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 45. .19 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .02 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	8049	Pilares:
0	0	1	4.474	4.470	.70	.00	0	BA32	.00	.00	8049	0
0	0	2	15.256	15.253	.70	.00	0	BA33	.00	.00	8050	0
0	0	3	11.550	11.549	.70	.00	0	BA34	.00	.00	8051	0
0	0	4	12.285	12.284	.70	.00	0	BA35	.00	.00	8052	0
0	0	5	13.153	13.152	.70	.00	0	BA36	.00	.00	8053	0
0	0	6	8.187	8.184	.70	.00	0	BA37	.00	.00	8054	0

Viga= 6 PAA3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 106 | M.[-] =
4.6 tf* m | As = 1.15 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- x/d = .00 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
----- x/d = .04 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
[tf,cm] | Asapo[+]= 7.83 | Asapo[+]=
3287.1
[cm2] | 7.44

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.- 185. 12.27 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. .85 33.46 5 12.8 17.2 161.2 .4 .0 .0 .0 .07 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 4.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =
3.1 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
----- x/d = .04 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
[tf,cm] | Asapo[+]= 7.44 | Asapo[+]=
3287.1
[cm2] | 7.44

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.- 184. 9.21 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .34 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .05 N

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

Vao= 3 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.9 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 126 | M.[-] =
3.4 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
-SRAS- [4 B 16.0mm] | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
----- | x/d = .04 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2] | Asapo[+]= 7.44 | Asapo[+]=
7.44

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.- 184. 8.96 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .29 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .04 N

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

Vao= 4 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.2 tf* m | M.[+] Max= 1.7 tf* m - Abcis.= 126 | M.[-] =
3.9 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
-SRAS- [4 B 16.0mm] | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
----- | x/d = .04 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2] | Asapo[+]= 7.44 | Asapo[+]=
7.44

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.- 184. 8.92 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .26 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .04 N

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

Vao= 5 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.6 tf* m | M.[+] Max= 2.7 tf* m - Abcis.= 147 | M.[-] =
36.3 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
-SRAS- [4 B 16.0mm]

```

----- | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [ 2 X 17 B 6.3mm ] - LN= 7.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2 ] | Asapo[+]= 7.44 | | Asapo[+]=
7.83 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	9.62	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.31	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.04	N	

```

----- G E O M E T R I A E C A R G A S -----
Vao= 6B /L= .80 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .15 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO | M[-]= 36.33 tf* m | As = 7.83 -SRAS- [ 4 B 16.0mm]
BAL.DIR | x/d = .04 | AsL= .00 -Arm.Lat.= [ 2 X 17 B 6.3mm]
.5 |
[tf,cm] | M[-]Min= 3287.1 - x/dMx =1.00 | | %
Baric.Armad.= 1

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	3.91	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.18	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.02	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	1	4.475	4.471	.70	.00	0	BA40	.00	.00	8109
0	2	15.339	15.336	.70	.00	0	BA41	.00	.00	8110
0	3	11.632	11.632	.70	.00	0	BA42	.00	.00	8111
0	4	12.363	12.362	.70	.00	0	BA43	.00	.00	8112
0	5	13.239	13.238	.70	.00	0	BA44	.00	.00	8113
0	6	8.237	8.235	.70	.00	0	BA45	.00	.00	8114

```

Viga= 7 PAB2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .80 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .15 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO | M[-]= 36.33 tf* m | As = 7.83 -SRAS- [ 4 B 16.0mm]
BAL.ESQ | x/d = .04 | AsL= .00 -Arm.Lat.= [ 2 X 17 B 6.3mm]
.5 |
[tf,cm] | M[-]Min= 3287.1 - x/dMx =1.00 | | %
Baric.Armad.= 1

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	3.81	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.17	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.02	N	

```

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /FLt.Ex= .15 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 36.3 tf* m | M.[+] Max= 3.0 tf* m - Abcis.= 105 | M.[-] =
3.6 tf* m | [tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | |
[cm2 ]| Asapo[+]= 7.83 | | Asapo[+]=
7.44 | | |

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CISALHAMENTO- Xi Xf Vsd VRd2 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. 9.76 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .37 33.46 5 12.8 17.2 161.2 .2 .0 .0 .0 .04 N

```

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

Vao= 3 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 3.9 tf* m | M.[+] Max= 1.5 tf* m - Abcis.= 126 | M.[-] =
3.0 tf* m | [tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | |
[cm2 ]| Asapo[+]= 7.44 | | Asapo[+]=
7.44 | | |

```

```

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.- 184. 8.82 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .21 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .04 N

```

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

Vao= 4 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 3.2 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 126 | M.[-] =
2.8 tf* m | [tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | |
[cm2 ]| Asapo[+]= 7.44 | | Asapo[+]=
7.44 | | |

```

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.- 184. 8.73 257.37 2 45. .0 3.5 3.5 6.3 17.0 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.- 184. .29 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .04 N

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

Vao= 5 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.1 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =
 4.6 tf* m | [tf,cm] As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
 -SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
 ----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
 x/dMx= .50 | |
 [tf,cm] M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
 3287.1 | |
 [cm2] Asapo[+]= 7.44 | | Asapo[+]=
 7.44

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.- 184. 9.31 257.37 2 45. .0 3.5 3.5 6.3 17.0 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.- 184. .36 33.46 5 12.8 17.2 161.2 .1 .0 .0 .0 .05 N

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

Vao= 6 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 4.7 tf* m | M.[+] Max= 4.3 tf* m - Abcis.= 148 | M.[-] =
 .0 tf* m | [tf,cm] As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 1.15
 -SRAS- [2 B 10.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
 ----- x/d = .00 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
 x/dMx= .50 | |
 [tf,cm] M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
 3287.1 | |
 [cm2] Asapo[+]= 7.44 | | Asapo[+]=
 7.83

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.- 185. 12.47 257.37 2 45. .0 3.5 3.5 6.3 17.0 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.- 185. .80 33.46 5 12.8 17.2 161.2 .3 .0 .0 .0 .07 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	8.220	8.220	.70	.00	0	BB28	.00	.00	8055
0	0	2	13.270	13.270	.70	.00	0	BB29	.00	.00	8056
0	0	3	11.802	11.802	.70	.00	0	BB30	.00	.00	8057
0	0	4	11.618	11.618	.70	.00	0	BB31	.00	.00	8058
0	0	5	15.559	15.559	.70	.00	0	BB32	.00	.00	8059
0	0	6	3.630	3.630	.70	.00	0	BB33	.00	.00	8060

Viga= 8 PAB3
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

Vao= 1B /L= .80 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 36.33 tf* m | As = 7.83 -SRAS- [4 B 16.0mm]
BAL.ESQ | x/d = .04 | AsL= .00 -Arm.Lat.= [2 X 17 B 6.3mm]
.5
[tf,cm] | M[-]Min= 3287.1 - x/dMx =1.00 | | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	3.81	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.17	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.02	N	

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

Vao= 2 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A
A | M.[-] = 36.3 tf* m | M.[+] Max= 3.0 tf* m - Abcis.= 105 | M.[-] =
3.7 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1
[cm2] | Asapo[+]= 7.83 | | Asapo[+]=
7.44

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	9.83	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.38	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.04	N	

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

Vao= 3 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A
A | M.[-] = 4.0 tf* m | M.[+] Max= 1.5 tf* m - Abcis.= 126 | M.[-] =
3.1 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1
[cm2] | Asapo[+]= 7.44 | | Asapo[+]=
7.44

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	8.86	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.22	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.04	N	

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

Vao= 4 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 3.3 tf* m	M.[+] Max= 2.3 tf* m - Abcis.= 126	M.[-] =
2.8 tf* m		
[tf,cm] As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00 -----	As = 7.83
-SRAS- [4 B 16.0mm]		
AsL= .00 -----	As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00
----- x/d = .04		
x/dMx= .50	Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0	
[tf,cm] M[-]Min = 3287.1	M[+]Min = 3287.1	M[-]Min =
3287.1		
[cm2] Asapo[+]= 7.44		Asapo[+]=
7.44		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	8.79	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.30	33.46	5	12.8	17.2	161.2	.1	.0	.0	.0	.04	N	

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

Vao= 5 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 3.1 tf* m	M.[+] Max= 1.4 tf* m - Abcis.= 126	M.[-] =
4.6 tf* m		
[tf,cm] As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00 -----	As = 7.83
-SRAS- [4 B 16.0mm]		
AsL= .00 -----	As = 7.83 -SRAS- [4 B 16.0mm]	AsL= .00
----- x/d = .04		
x/dMx= .50	Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0	
[tf,cm] M[-]Min = 3287.1	M[+]Min = 3287.1	M[-]Min =
3287.1		
[cm2] Asapo[+]= 7.44		Asapo[+]=
7.44		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	9.36	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.36	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 6 /L= 2.54 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /FLt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 4.7 tf* m	M.[+] Max= 4.3 tf* m - Abcis.= 148	M.[-] =
.0 tf* m		

```
[tf,cm] | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00 ----- | As = 1.15
-SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2 ] | Asapo[+]= 7.44 | Asapo[+]=
7.83 |
```

```
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.- 185. 12.51 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. .80 33.46 5 12.8 17.2 161.2 .3 .0 .0 .0 .07 N
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 8.281 8.281 .70 .00 0 BB35 .00 .00 8115 0
0 0 2 13.350 13.350 .70 .00 0 BB36 .00 .00 8116 0
0 0 3 11.880 11.879 .70 .00 0 BB37 .00 .00 8117 0
0 0 4 11.711 11.711 .70 .00 0 BB38 .00 .00 8118 0
0 0 5 15.619 15.618 .70 .00 0 BB39 .00 .00 8119 0
0 0 6 3.666 3.666 .70 .00 0 BB40 .00 .00 8120 0
0 0 0 0
```

Viga= 9 PAA6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /Flt.Ex= .15 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 2.9 tf* m - Abcis.= 98 | M.[-] =
3.9 tf* m |
[tf,cm] | As = 1.15 -SRAS- [ 2 B 10.0mm ] | AsL= .00 ----- | As = 8.08
-SRAS- [ 4 B 16.0mm ] | AsL= .00 ----- | As = 8.08 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2 ] | Asapo[+]= 8.08 | Asapo[+]=
7.69 |
```

```
CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.26 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. 1.83 33.46 5 12.8 17.2 161.2 .8 3.0 .3 2.4 .09 N
```

```
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.87 /Flt.Ex= .15 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.8 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 117 | M.[-] =
2.6 tf* m |
[tf,cm] | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm ] | AsL= .00 ----- | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
```

```

----- | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2 ] | Asapo[+]= 7.44 | | Asapo[+]=
7.44 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.15	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.50	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 3 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A |
| M.[-] = 2.6 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 117 | M.[-] =
3.4 tf* m |
[tf,cm] | As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] |
| AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2 ] | Asapo[+]= 7.44 | | Asapo[+]=
7.44 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	8.81	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.47	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 4 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A |
| M.[-] = 3.3 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 117 | M.[-] =
1.5 tf* m |
[tf,cm] | As = 8.08 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 8.08
-SRAS- [ 4 B 16.0mm] |
| AsL= .00 ----- x/d = .04 | As = 8.08 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 |
[cm2 ] | Asapo[+]= 7.69 | | Asapo[+]=
7.69 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.61	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	1.86	33.46	5	12.8	17.2	161.2	.8	3.0	.3	2.4	.09	N	

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

Vao= 5 /L= 1.30 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.8 tf* m | M.[+] Max= .0 tf* m - Abcis.= 130 | M.[-] =
1.9 tf* m | | | |
[tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
| | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | | |
[cm2 ]| Asapo[+]= 7.44 | | | Asapo[+]=
7.44 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	60.	2.00	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	60.	.02	33.46	5	12.8	17.2	161.2	.0	.0	.0	.0	.01	N	

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

Vao= 6 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.4 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 98 | M.[-] =
3.3 tf* m | | | |
[tf,cm]| As = 8.08 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 8.08
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 8.08 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
| | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | | |
[cm2 ]| Asapo[+]= 7.69 | | | Asapo[+]=
7.69 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.73	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	1.85	33.46	5	12.8	17.2	161.2	.8	3.0	.3	2.4	.09	N	

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

Vao= 7 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.4 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 117 | M.[-] =
2.7 tf* m | | | |
[tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
| | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | | |

```

[cm2]| Asapo[+]= 7.44

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	8.46	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.48	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 8 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T				
A														
M.[-] = 2.8 tf* m					M.[+] Max= 1.6 tf* m - Abcis.= 117					M.[-] =				
3.7 tf* m														
[tf,cm] As = 7.83 -SRAS- [4 B 16.0mm]					AsL= .00 -----					As = 7.83				
-SRAS- [4 B 16.0mm]														
AsL= .00 -----					x/d = .04					As = 7.83 -SRAS- [4 B 16.0mm]				
-----					x/d = .04					AsL= .00				
					x/dMx= .50					Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0				
x/dMx= .50														
[tf,cm] M[-]Min = 3287.1					M[+]Min = 3287.1					M[-]Min =				
3287.1														
[cm2] Asapo[+]= 7.44										Asapo[+]=				
7.44														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.36	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.52	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 9 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T				
A														
M.[-] = 3.6 tf* m					M.[+] Max= 2.6 tf* m - Abcis.= 137					M.[-] =				
.8 tf* m														
[tf,cm] As = 8.08 -SRAS- [4 B 16.0mm]					AsL= .00 -----					As = 8.08				
-SRAS- [4 B 16.0mm]														
AsL= .00 -----					x/d = .04					As = 8.08 -SRAS- [4 B 16.0mm]				
-----					x/d = .04					AsL= .00				
					x/dMx= .50					Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0				
x/dMx= .50														
[tf,cm] M[-]Min = 3287.1					M[+]Min = 3287.1					M[-]Min =				
3287.1														
[cm2] Asapo[+]= 7.69										Asapo[+]=				
8.08														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.42	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	1.79	33.46	5	12.8	17.2	161.2	.7	3.0	.3	2.4	.09	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	BA71	.00	.00	8061
0	0	0	0	0	0	0	BA63	.00	.00	8073
0	0	0	0	0	0	0	BA56	.00	.00	8085
0	0	0	0	0	0	0	BA49	.00	.00	8097

0	0	5	6.596	6.595	.70	.00	0	BA40	.00	.00	8109	0
0	0	6	6.468	6.468	.70	.00	0	BA32	.00	.00	8049	0
0	0	7	12.991	12.991	.70	.00	0	BA25	.00	.00	8037	0
0	0	8	11.856	11.856	.70	.00	0	BA19	.00	.00	8025	0
0	0	9	14.134	14.132	.70	.00	0	BA11	.00	.00	8013	0
0	0	10	5.284	5.283	.70	.00	0	BA4	.00	.00	8001	0
0	0	0	0	0								

Viga= 10 PAB5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 3.1 tf* m - Abcis.= 98 | M.[-] =
3.9 tf* m | As = 1.15 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 8.08
[tf,cm] | AsL= .00 ----- x/d = .00 | As = 8.08 -SRAS- [4 B 16.0mm] | AsL= .00
-SRAS- [4 B 16.0mm] | x/d = .04 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
----- x/dMx= .50 | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
x/dMx= .50 | [cm2] | Asapo[+]= 8.08 | Asapo[+]=
[tf,cm] | 7.69

CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.03 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M [tf,cm] 0.- 166. 1.95 33.46 5 12.8 17.2 161.2 .8 3.0 .3 2.4 .09 N

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

Vao= 2 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 4.0 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 117 | M.[-] =
2.5 tf* m | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00
-SRAS- [4 B 16.0mm] | x/d = .04 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
----- x/dMx= .50 | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
x/dMx= .50 | [cm2] | Asapo[+]= 7.44 | Asapo[+]=
[tf,cm] | 7.44

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.- 166. 9.09 257.37 2 45. .0 3.5 3.5 6.3 17.0 2 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M [tf,cm] 0.- 166. .54 33.46 5 12.8 17.2 161.2 .2 .0 .0 .0 .05 N

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

Vao= 3 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.5 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 117 | M.[-] =
3.5 tf* m | | | |
[tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
| | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | | |
[cm2 ]| Asapo[+]= 7.44 | | | Asapo[+]=
7.44 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	8.68	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.53	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 4 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.4 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 117 | M.[-] =
1.3 tf* m | | | |
[tf,cm]| As = 8.08 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 8.08
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 8.08 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
| | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | | |
[cm2 ]| Asapo[+]= 7.69 | | | Asapo[+]=
7.69 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.09	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	1.84	33.46	5	12.8	17.2	161.2	.8	3.0	.3	2.4	.09	N	

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

Vao= 5 /L= 1.30 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.2 tf* m | M.[+] Max= .0 tf* m - Abcis.= 130 | M.[-] =
2.2 tf* m | | | |
[tf,cm]| As = 7.83 -SRAS- [ 4 B 16.0mm] | AsL= .00 ----- | As = 7.83
-SRAS- [ 4 B 16.0mm] | AsL= .00 ----- x/d = .04 | As = 7.83 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 7.0 |
| | | |
[tf,cm]| M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =
3287.1 | | | |

```

[cm²] | Asapo[+]= 7.44

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	60.	2.83	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	60.	.02	33.46	5	12.8	17.2	161.2	.0	.0	.0	.0	.01	N	

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

Vao= 6 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T A				
M.[-] = 1.2 tf* m					M.[+] Max= 2.3 tf* m - Abcis.= 98					M.[-] =				
3.5 tf* m														
[tf,cm] As = 8.08 -SRAS- [4 B 16.0mm]					AsL= .00 -----					As = 8.08				
-SRAS- [4 B 16.0mm]														
AsL= .00 -----					x/d = .04					As = 8.08 -SRAS- [4 B 16.0mm]				
-----					x/d = .04					AsL= .00				
					x/dMx= .50					Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0				
x/dMx= .50														
[tf,cm] M[-]Min = 3287.1					M[+]Min = 3287.1					M[-]Min =				
3287.1														
[cm ²] Asapo[+]= 7.69										Asapo[+]=				
7.69														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.39	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	1.83	33.46	5	12.8	17.2	161.2	.8	3.0	.3	2.4	.09	N	

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

Vao= 7 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T A				
M.[-] = 3.5 tf* m					M.[+] Max= 1.6 tf* m - Abcis.= 117					M.[-] =				
2.6 tf* m														
[tf,cm] As = 7.83 -SRAS- [4 B 16.0mm]					AsL= .00 -----					As = 7.83				
-SRAS- [4 B 16.0mm]														
AsL= .00 -----					x/d = .04					As = 7.83 -SRAS- [4 B 16.0mm]				
-----					x/d = .04					AsL= .00				
					x/dMx= .50					Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0				
x/dMx= .50														
[tf,cm] M[-]Min = 3287.1					M[+]Min = 3287.1					M[-]Min =				
3287.1														
[cm ²] Asapo[+]= 7.44										Asapo[+]=				
7.44														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	8.50	257.37	2	45.	.0	3.5	3.5	6.3	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.51	33.46	5	12.8	17.2	161.2	.2	.0	.0	.0	.05	N	

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

Vao= 8 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

3.9 tf* m | M.[-] = 2.5 tf* m | M.[+] Max= 1.5 tf* m - Abcis.= 117 | M.[-] =

[tf,cm] | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.83

-SRAS- [4 B 16.0mm] | AsL= .00 ----- | AsL= .00

----- x/d = .04 | x/d = .04 | As = 7.83 -SRAS- [4 B 16.0mm] | AsL= .00

x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |

[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =

[cm2] | Asapo[+]= 7.44 | | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 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. 9.18 257.37 2 45. .0 3.5 3.5 6.3 17.0 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.- 166. .55 33.46 5 12.8 17.2 161.2 .2 .0 .0 .0 .05 N

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

Vao= 9 /L= 2.36 /B= .30 /H= 1.74 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .87 /Flt.Ex= .15 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

.0 tf* m | M.[-] = 3.8 tf* m | M.[+] Max= 3.0 tf* m - Abcis.= 137 | M.[-] =

[tf,cm] | As = 8.08 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 8.08

-SRAS- [4 B 16.0mm] | AsL= .00 ----- | AsL= .00

----- x/d = .04 | x/d = .04 | As = 8.08 -SRAS- [4 B 16.0mm] | AsL= .00

x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 7.0 |

[tf,cm] | M[-]Min = 3287.1 | M[+]Min = 3287.1 | M[-]Min =

[cm2] | Asapo[+]= 7.69 | | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.69 257.37 2 45. .0 3.5 3.5 6.3 17.0 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.- 166. 1.92 33.46 5 12.8 17.2 161.2 .8 3.0 .3 2.4 .09 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	5.570	5.569	.70	.00	0	BB66	.00	.00	8072
0	0	2	14.369	14.369	.70	.00	0	BB60	.00	.00	8084
0	0	3	10.870	10.870	.70	.00	0	BB52	.00	.00	8096
0	0	4	13.404	13.404	.70	.00	0	BB46	.00	.00	8108
0	0	5	6.947	6.947	.70	.00	0	BB40	.00	.00	8120
0	0	6	6.908	6.908	.70	.00	0	BB33	.00	.00	8060
0	0	7	13.493	13.493	.70	.00	0	BB27	.00	.00	8048
0	0	8	10.914	10.914	.70	.00	0	BB19	.00	.00	8036
0	0	9	14.194	14.194	.70	.00	0	BB13	.00	.00	8024
0	0	10	5.826	5.825	.70	.00	0	BB6	.00	.00	8012

Viga= 11 PAA11 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.25 /B= .25 /H= 1.74 /BCs= .00 /BCi= .25 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .87 /FLt.Ex= .13 [M]

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

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E 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.= 52 | M.[-] =
.1 tf* m | | | |
[tf,cm]| As = 1.15 -STAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 6.53
-STAS- [ 4 B 16.0mm] | | | |
| AsL= .00 ----- x/d = .00 | As = 6.53 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
| x/dMx= .50 | Arm.Lat.=[2 X 14 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | | | |
[tf,cm]| M[-]Min = 2739.3 | M[+]Min = 2739.3 | M[-]Min =
2739.3 | | | |
[cm2 ]| Asapo[+]= 6.53 | | | | Asapo[+]=
6.53 | | | |

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CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	55.	2.41	214.48	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	55.	.08	21.96	5	10.9	13.1	162.1	.0	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.933	.908	.70	.00	BA38	.00	.00	8124
0	0	0	1.720	1.695	.70	.00	BA39	.00	.00	8125

Viga= 12 PAA12 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.25 /B= .25 /H= 1.74 /BCs= .00 /BCi= .25 /TpS= 9 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .87 /FLt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .6 tf* m - Abcis.= 52 | M.[-] =
.1 tf* m | | | |
[tf,cm]| As = 1.15 -STAS- [ 2 B 10.0mm] | AsL= .00 ----- | As = 6.53
-STAS- [ 4 B 16.0mm] | | | |
| AsL= .00 ----- x/d = .00 | As = 6.53 -SRAS- [ 4 B 16.0mm ] | AsL= .00
----- x/d = .04 | | | |
| x/dMx= .50 | Arm.Lat.=[2 X 14 B 6.3mm] - LN= 7.0 |
x/dMx= .50 | | | |
[tf,cm]| M[-]Min = 2739.3 | M[+]Min = 2739.3 | M[-]Min =
2739.3 | | | |
[cm2 ]| Asapo[+]= 6.53 | | | | Asapo[+]=
6.53 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	55.	2.29	214.48	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	55.	.09	21.96	5	10.9	13.1	162.1	.0	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.867	.842	.70	.00	BA46	.00	.00	8127
0	0	0	1.633	1.609	.70	.00	BA47	.00	.00	8126

Viga= 13 PAA13 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.25 /B= .25 /H= 1.74 /BCs= .00 /BCi= .25 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .87 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .6 tf* m - Abcis.= 62 | M.[-] =
.0 tf* m | As = 1.15 -STAS- [2 B 10.0mm] | AsL= .00 ----- | As = 1.15
[tf,cm] | AsL= .00 ----- | As = 6.53 -SRAS- [4 B 16.0mm] | AsL= .00
-STAS- [2 B 10.0mm] | x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 14 B 6.3mm] - LN= 7.0 |
----- | x/d = .00 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 2739.3 | M[+]Min = 2739.3 | M[-]Min =
2739.3 |
[cm2] | Asapo[+]= 6.53 | Asapo[+]=
6.53

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	55.	1.82	214.48	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	55.	.09	21.96	5	10.9	13.1	162.1	.0	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	BA46	.00	.00	8127
0	0	0	0	0	0	0	BA38	.00	.00	8124

Viga= 14 PAA5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.25 /B= .25 /H= 1.74 /BCs= .00 /BCi= .25 /TpS= 9 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= .87 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 62 | M.[-] =
.0 tf* m | As = 1.15 -STAS- [2 B 10.0mm] | AsL= .00 ----- | As = 1.15
[tf,cm] | AsL= .00 ----- | As = 6.53 -SRAS- [4 B 16.0mm] | AsL= .00
-STAS- [2 B 10.0mm] | x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 14 B 6.3mm] - LN= 7.0 |
----- | x/d = .00 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 2739.3 | M[+]Min = 2739.3 | M[-]Min =
2739.3 |
[cm2] | Asapo[+]= 6.53 | Asapo[+]=
6.53

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	55.	1.77	214.48	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	55.	.10	21.96	5	10.9	13.1	162.1	.1	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	BA47	.00	.00	8126
0	0	0	0	0	0	0	BA39	.00	.00	8125

Viga= 15 V15 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -

FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [2 B 8.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 -
.2
[tf,cm] | M[-]Min= 65.1 - x/dMx = .50 | | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	15.	.05	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.036	.036	.25	.00	1	BA69	.00	.00	8139
0	0	0	0	0							0

Viga= 16 VAE2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= .64 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .1 tf* m | M.[+] Max= .0 tf* m - Abcis.= 64 | M.[-] =
.1 tf* m | As = .98 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = .98
[tf,cm] | AsL= .00 ----- x/d = .06 | As = 1.07 -SRAS- [2 B 10.0mm] | AsL= .00
-SRAS- [2 B 8.0mm] | AsL= .00 ----- x/dMx = .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 | Grampos
----- x/d = .06 |
Dir.= 1B 6.3mm x/dMx = .50 |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
65.1 |
[cm2] | Asapo[+]= .36 | Asapo[+]=
.36

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	50.	.10	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	50.	.12	.84	5	6.0	8.1	18.1	1.0	1.4	.1	.2	.15	N	

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.071	.070	.70	.26	1	BA17	.00	.00	8137
0	0	0	0	0							0
0	0	0	.026	.025	.10	.00	0	BA18	.00	.00	8130
0	0	0	0	0							0

Viga= 17 VAE3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 3.34 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .2 tf* m - Abcis.= 167 | M.[-] =
.0 tf* m

```
[tf,cm] | As = .22 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- | As = .98
-SRAS- [ 2 B 8.0mm] | AsL= .00 ----- | As = 1.07 -SRAS- [ 2 B 10.0mm ] | AsL= .00
----- | x/d = .06 |
| Grampos Esq.= 1B 6.3mm x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
65.1 |
[cm2 ] | Asapo[+]= .36 | Asapo[+]=
```

```
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 320. .35 24.95 2 45. .0 2.3 2.3 5.0 12.0 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.- 320. .12 .84 5 6.0 8.1 18.1 .9 1.4 .1 .2 .16 N
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .248 .248 .10 .00 1 BA31 .00 .00 8142 0
0 0 0 0 .253 .253 .70 .26 1 BA17 .00 .00 8137 0
0 0 0 0
```

Viga= 18 VAE4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.15 /Flt.Ex= .10 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [ 2 B 8.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 -
.2
[tf,cm] | M[-]Min= 65.1 - 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.- 15. .05 24.95 2 45. .0 2.3 2.3 5.0 12.0 2 .0 .0
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .036 .036 .25 .00 1 BA31 .00 .00 8142 0
0 0 0 0
```

Viga= 19 VAE5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.15 /Flt.Ex= .10 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [ 2 B 8.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 -
.2
[tf,cm] | M[-]Min= 65.1 - 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.- 15. .05 24.95 2 45. .0 2.3 2.3 5.0 12.0 2 .0 .0
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .036 .036 .25 .00 1 BA48 .00 .00 8143 0
0 0 0 0
```

Viga= 20 VAE6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 3.34 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= .2 tf* m - Abcis.= 167 | M.[-] =
.0 tf* m | As = .98 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = .22
[tf,cm] | AsL= .00 ----- | As = 1.07 -SRAS- [2 B 10.0mm] | AsL= .00
-SRAS- [2 B 6.3mm] | x/d = .06 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 | Grampos
----- | x/d = .00 | | |
Dir.= 1B 6.3mm x/dMx= .50 | | |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
65.1 | | |
[cm2] | Asapo[+]= .36 | | Asapo[+]=
.36

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	320.	.35	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	320.	.12	.84	5	6.0	8.1	18.1	.9	1.4	.1	.2	.16	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.253	.253	.70	.26	1 BA62	.00	.00	8138
0	0	0	.248	.248	.10	.00	1 BA48	.00	.00	8143
0	0	0	0							0

Viga= 21 VAE7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= .64 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .1 tf* m | M.[+] Max= .0 tf* m - Abcis.= 64 | M.[-] =
.1 tf* m | As = .98 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = .98
[tf,cm] | AsL= .00 ----- | As = 1.07 -SRAS- [2 B 10.0mm] | AsL= .00
-SRAS- [2 B 8.0mm] | x/d = .06 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.5 | Grampos
----- | x/d = .06 | | |
Dir.= 1B 6.3mm x/dMx= .50 | | |
[tf,cm] | M[-]Min = 65.1 | M[+]Min = 65.1 | M[-]Min =
65.1 | | |
[cm2] | Asapo[+]= .36 | | Asapo[+]=
.36

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	50.	.08	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	50.	.12	.84	5	6.0	8.1	18.1	.9	1.4	.1	.2	.15	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.054	.054	.70	.26	1 BA62	.00	.00	8138
0	0	0	.042	.042	.10	.00	0 BA55	.00	.00	8131
0	0	0	0							0

Viga= 22 VAE8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.15 /Flt.Ex= .10 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [ 2 B 8.0mm]
BAL.ESQ | x/d = .06 | ASL= .00 -
.2
[tf,cm] | M[-]Min= 65.1 - 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.- 15. .05 24.95 2 45. .0 2.3 2.3 5.0 12.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .036 .036 .25 .00 1 BA69 .00 .00 8139 0
0 0 0 0

=====
Viga= 23 VBE1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.15 /Flt.Ex= .10 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [ 2 B 8.0mm]
BAL.ESQ | x/d = .06 | ASL= .00 -
.2
[tf,cm] | M[-]Min= 65.1 - 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.- 15. .05 24.95 2 45. .0 2.3 2.3 5.0 12.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .036 .036 .25 .00 1 BB21 .00 .00 8140 0
0 0 0 0

=====
Viga= 24 VBE2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.15 /Flt.Ex= .10 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [ 2 B 8.0mm]
BAL.ESQ | x/d = .06 | ASL= .00 -
.2
[tf,cm] | M[-]Min= 65.1 - 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.- 15. .05 24.95 2 45. .0 2.3 2.3 5.0 12.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .036 .036 .25 .00 1 BB54 .00 .00 8141 0
0 0 0 0

=====
Viga= 25 V25 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

```

Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [2 B 8.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 -

[tf,cm] | M[-]Min= 65.1 - x/dMx = .50 | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	15.	.05	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.036	.036	.25	.00	1	BB21	.00	.00	8140

Viga= 26 V26 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1B /L= .28 /B= .20 /H= .30 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .15 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= .72 tf* m | As = .99 -SRAS- [2 B 8.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 -

[tf,cm] | M[-]Min= 65.1 - x/dMx = .50 | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	15.	.05	24.95	2	45.	.0	2.3	2.3	5.0	12.0	2	.0	.0	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	.036	.036	.25	.00	1	BB54	.00	.00	8141

Viga= 101 VF1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .3 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 75 | M.[-] =

2.9 tf* m | As = 2.99 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.12

-SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00

| AsL= .00 ----- | x/d = .07 | x/dMx= .50 |

----- | x/dMx= .50 |

| M.[-]Min = 175.4 | M.[+]Min = 226.0 | M.[-]Min =

226.0 |

[cm2] | Asapo[+] = 3.82 | Asapo[+] =

2.49 |

|

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

 Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.5 tf* m | M.[+] Max= .7 tf* m - Abcis.= 147 | M.[-] =
 2.3 tf* m | [tf,cm] As = 6.15 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 4.01
 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .09 | x/d = .14 | x/d = .09
 ----- | x/dMx= .50 | x/dMx= .50 |
 [tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
 212.2 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	10.82	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.12	6.63	5	9.2	58.1	13.1	.2	.0	.0	.0	.17	N	

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

 Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.4 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 126 | M.[-] =
 2.4 tf* m | [tf,cm] As = 4.11 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.16
 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .09 | x/d = .09 | x/d = .09
 ----- | x/dMx= .50 | x/dMx= .50 |
 [tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
 212.2 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.10	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.03	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

 Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.4 tf* m | M.[+] Max= .8 tf* m - Abcis.= 126 | M.[-] =
 3.4 tf* m | [tf,cm] As = 4.20 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 6.06
 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .13 | x/d = .09 | x/d = .09
 ----- | x/dMx= .50 | x/dMx= .50 |
 [tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
 212.2 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min = 212.2
[cm2] | Asapo[+]= 2.49 | Asapo[+]= 2.49

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.- 184. 11.03 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 3.0 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 150 | M.[-] =

1.8 tf* m | As = 5.29 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 4.41

-SRAS- [6 B 10.0mm] | AsL= .00 ----- | AsL= .00

----- x/d = .12 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .10 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

3.59 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 13.64 69.50 2 45. 2.8 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 184. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .20 N

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

Vao= 6B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]

BAL.DIR | x/d = .10 | AsL= .00 -

.7 |

[tf,cm] | M[-]Min= 255.6 - x/dMx= 1.00 | %

Baric.Armad.= 1

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

E N S A G E M

[tf,cm] 0.- 45. 4.59 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 45. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

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

0 0 0 7.192 7.190 .70 .28 0 BA11 .00 .00 8013 0

0 0 0 17.209 17.207 .70 .28 1 BA12 .00 .00 8014 0

0 0 0 15.174 15.173 .70 .28 1 BA13 .00 .00 8015 0

0 0 0 15.386 15.386 .70 .28 1 BA14 .00 .00 8016 0

0 0 0 17.363 17.363 .70 .28 1 BA15 .00 .00 8017 0

0 0 0 10.256 10.256 .70 .28 1 BA16 .00 .00 8018 0

0 0 0 0

=====

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Viga= 102 VF2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]														
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----														
----- A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -----														
FLEXAO M[-]= 1.75 tf* m As = 4.41 -SRAS- [6 B 10.0mm]														
BAL.ESQ x/d = .10 AsL= .00 -														
.7														
[tf,cm] M[-]Min= 255.6 - x/dMx =1.00 %														
Baric.Armad.= 1														
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M														
E N S A G E M [tf,cm] 0.- 45. 4.54 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 45. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N														
----- G E O M E T R I A E C A R G A S -----														

Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]														
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----														
----- A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -----														
FLEXAO- E S Q U E R D A M E I O D O V A O D I R E I T														
A M.[-] = 1.8 tf* m M.[+] Max= 2.2 tf* m - Abcis.= 75 M.[-] =														
3.3 tf* m As = 4.41 -SRAS- [6 B 10.0mm] AsL= .00 ----- As = 5.80														
[tf,cm] AsL= .00 ----- x/d = .10 As = 3.80 -STAS- [5 B 10.0mm] AsL= .00														
-SRAS- [5 B 12.5mm] AsL= .00 ----- x/dMx= .50														
----- x/d = .13														
x/dMx= .50														
[tf,cm] M[-]Min = 212.2 M[+]Min = 212.2 M[-]Min =														
212.2														
[cm2] Asapo[+]= 3.59 Asapo[+]=														
2.49														
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.- 184. 12.39 69.50 2 45. .8 8.1 8.1 6.3 10.0 4 .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.- 184. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N														
----- G E O M E T R I A E C A R G A S -----														

Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]														
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----														
----- A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -----														
FLEXAO- E S Q U E R D A M E I O D O V A O D I R E I T														
A M.[-] = 3.3 tf* m M.[+] Max= .6 tf* m - Abcis.= 126 M.[-] =														
2.3 tf* m As = 5.73 -SRAS- [5 B 12.5mm] AsL= .00 ----- As = 3.95														
[tf,cm] AsL= .00 ----- x/d = .13 As = 3.61 -STAS- [5 B 10.0mm] AsL= .00														
-SRAS- [5 B 10.0mm] AsL= .00 ----- x/dMx= .50														
----- x/d = .09														
x/dMx= .50														
[tf,cm] M[-]Min = 212.2 M[+]Min = 212.2 M[-]Min =														
212.2														
[cm2] Asapo[+]= 2.49 Asapo[+]=														
2.49														
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.- 184. 12.25 69.50 2 45. .6 8.1 8.1 6.3 10.0 4 .0 .0														

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 184. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 2.4 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =

2.3 tf* m | As = 4.07 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.01

-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .09 | x/dMx= .50 |

x/dMx= .50 |

|

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 184. 11.46 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 2.5 tf* m | M.[+] Max= .7 tf* m - Abcis.= 126 | M.[-] =

3.5 tf* m | As = 4.31 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 6.17

-SRAS- [5 B 12.5mm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .14 | x/dMx= .50 |

x/dMx= .50 |

|

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 184. 11.41 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 184. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N

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

Vao= 6 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 3.1 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 151 | M.[-] =

.1 tf* m | As = 5.42 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 2.99

-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .12 | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .07 |

$x/dMx = .50$ | $x/dMx = .50$ |
 $[tf, cm]$ | $M[-]Min = 226.0$ | $M[+]Min = 226.0$ | $M[-]Min =$
 175.4 | $[cm^2]$ | $Asapo[+] = 2.49$ | $Asapo[+] =$
 3.82 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf, cm]	0.-	185.	13.89	69.50	2	45.	3.2	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf, cm]	0.-	185.	.09	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.21	N	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0	1	10.166	10.166	.70	.28	1	BB8	.00	.00	8019
0 0	2	17.339	17.339	.70	.28	1	BB9	.00	.00	8020
0 0	3	14.792	14.792	.70	.28	1	BB10	.00	.00	8021
0 0	4	15.370	15.370	.70	.28	1	BB11	.00	.00	8022
0 0	5	17.808	17.808	.70	.28	1	BB12	.00	.00	8023
0 0	6	4.862	4.862	.70	.28	0	BB13	.00	.00	8024
0 0	0	0	0							0

Viga= 103 VF3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A
 | M.[-] = .0 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 75 | M.[-] =
 3.0 tf* m | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 5.30
 [tf, cm] | AsL= .00 ----- | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [5 B 12.5mm]
 ----- x/d = .12 | x/d = .00 |
 ----- x/dMx = .50 |
 x/dMx= .50 |
 [tf, cm] | M[-]Min = 158.3 | M[+]Min = 226.0 | M[-]Min =
 226.0 |
 [cm2] | Asapo[+] = 3.82 | Asapo[+] =
 2.49 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf, cm]	0.-	185.	14.55	69.50	2	45.	4.2	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf, cm]	0.-	185.	.04	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.22	N	

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

 Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A
 | M.[-] = 3.7 tf* m | M.[+] Max= .7 tf* m - Abcis.= 147 | M.[-] =
 2.3 tf* m | As = 6.58 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 3.94
 [tf, cm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [5 B 10.0mm]
 ----- x/d = .09 | x/d = .15 |
 ----- x/dMx = .50 |
 x/dMx= .50 |

[tf,cm]	M[-]Min = 212.2	M[+]Min = 212.2	M[-]Min =
212.2			
[cm2]	Asapo[+]= 2.49		Asapo[+]=
2.49			
CISALHAMENTO- E N S A G E M	Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus		M
[tf,cm]	0.- 184. 10.94 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0		
T O R C A O- E N S A G E M	Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla		M
[tf,cm]	0.- 184. .05 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N		
----- G E O M E T R I A E C A R G A S -----			
Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]			
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----			
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -			
FLEXAO- E S Q U E R D A		M E I O D O V A O	D I R E I T
A			
M.[-] = 2.3 tf* m		M.[+] Max= 1.4 tf* m - Abcis.= 126	M.[-] =
2.3 tf* m			
[tf,cm] As = 3.99 -SRAS- [5 B 10.0mm]		AsL= .00 -----	As = 4.04
-SRAS- [5 B 10.0mm]			
AsL= .00 -----		As = 3.61 -STAS- [5 B 10.0mm]	AsL= .00
----- x/d = .09			
	x/dMx= .50		
x/dMx= .50			
[tf,cm] M[-]Min = 212.2		M[+]Min = 212.2	M[-]Min =
212.2			
[cm2] Asapo[+]= 2.49			Asapo[+]=
2.49			
CISALHAMENTO- E N S A G E M	Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus		M
[tf,cm]	0.- 184. 11.04 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0		
T O R C A O- E N S A G E M	Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla		M
[tf,cm]	0.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N		
----- G E O M E T R I A E C A R G A S -----			
Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]			
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----			
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -			
FLEXAO- E S Q U E R D A		M E I O D O V A O	D I R E I T
A			
M.[-] = 2.4 tf* m		M.[+] Max= .7 tf* m - Abcis.= 126	M.[-] =
3.5 tf* m			
[tf,cm] As = 4.15 -SRAS- [6 B 10.0mm]		AsL= .00 -----	As = 6.24
-SRAS- [5 B 12.5mm]			
AsL= .00 -----		As = 3.61 -STAS- [5 B 10.0mm]	AsL= .00
----- x/d = .14			
	x/dMx= .50		
x/dMx= .50			
[tf,cm] M[-]Min = 212.2		M[+]Min = 212.2	M[-]Min =
212.2			
[cm2] Asapo[+]= 2.49			Asapo[+]=
2.49			
CISALHAMENTO- E N S A G E M	Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus		M
[tf,cm]	0.- 184. 11.05 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0		
T O R C A O- E N S A G E M	Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla		M
[tf,cm]	0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N		
----- G E O M E T R I A E C A R G A S -----			
Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]			
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----			

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 3.0 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 150 | M.[-] =
1.8 tf* m
[tf,cm]| As = 5.28 -SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = 4.41
-SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 3.63 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .10 | x/dMx= .50 |
x/dMx= .50
|
[tf,cm]| M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2
[cm2 ]| Asapo[+]= 2.49 | Asapo[+]=
3.59

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 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. 13.81 69.50 2 45. 3.1 8.1 8.1 6.3 10.0 4 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .20 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 6B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [ 6 B 10.0mm]
BAL.DIR | x/d = .10 | AsL= .00 -
.7
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | %
Baric.Armad.= 1

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 4.52 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 45. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

```

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	7.027	7.026	.70	.28	0	BA19	.00	.00	8025
0	0	2	17.941	17.939	.70	.28	1	BA20	.00	.00	8026
0	0	3	15.053	15.052	.70	.28	1	BA21	.00	.00	8027
0	0	4	15.250	15.250	.70	.28	1	BA22	.00	.00	8028
0	0	5	17.496	17.496	.70	.28	1	BA23	.00	.00	8029
0	0	6	10.078	10.078	.70	.28	1	BA24	.00	.00	8030
0	0	0	0	0							0

Viga= 104 VF4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [ 6 B 10.0mm]
BAL.ESQ | x/d = .10 | AsL= .00 -
.7
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | %
Baric.Armad.= 1

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 4.45 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 45. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

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

Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 1.8 tf* m | M.[+] Max= 2.4 tf* m - Abcis.= 75 | M.[-] =

3.3 tf* m | As = 4.41 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 5.81

[tf,cm] | AsL= .00 ----- x/d = .10 | As = 4.06 -STAS- [6 B 10.0mm] | AsL= .00

----- x/d = .13

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 3.59 | Asapo[+]=

2.49

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.- 184. 12.58 69.50 2 45. 1.1 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N

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

Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 3.4 tf* m | M.[+] Max= .6 tf* m - Abcis.= 147 | M.[-] =

2.3 tf* m | As = 5.93 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.91

[tf,cm] | AsL= .00 ----- x/d = .13 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .09

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49

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.- 184. 12.27 69.50 2 45. .7 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 184. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 2.3 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =

2.2 tf* m | As = 3.95 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.85

[tf,cm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .08

x/dMx= .50															
[tf,cm] M[-]Min = 212.2															
212.2															
[cm2] Asapo[+]= 2.49															
2.49															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.41	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.17	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
	M.[-] = 2.5 tf* m					M.[+] Max= .6 tf* m - Abcis.= 126					M.[-] =				
3.7 tf* m															
[tf,cm]	As = 4.24 -SRAS- [6 B 10.0mm]					AsL= .00 -----					As = 6.48				
-SRAS- [6 B 12.5mm]															
	AsL= .00 -----					As = 3.61 -STAS- [5 B 10.0mm]					AsL= .00				
-----	x/d = .14														
	x/dMx= .50														
x/dMx= .50															
[tf,cm]	M[-]Min = 212.2					M[+]Min = 212.2					M[-]Min =				
212.2															
[cm2] Asapo[+]= 2.49											Asapo[+]=				
2.49															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.50	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.17	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 6 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
	M.[-] = 3.1 tf* m					M.[+] Max= 2.3 tf* m - Abcis.= 151					M.[-] =				
.0 tf* m															
[tf,cm]	As = 5.53 -SRAS- [5 B 12.5mm]					AsL= .00 -----					As = .56				
-SRAS- [4 B 8.0mm]															
	AsL= .00 -----					As = 3.86 -STAS- [5 B 10.0mm]					AsL= .00				
-----	x/d = .00														
	x/dMx= .50														
x/dMx= .50															
[tf,cm]	M[-]Min = 226.0					M[+]Min = 226.0					M[-]Min =				
158.3															
[cm2] Asapo[+]= 2.49											Asapo[+]=				
3.82															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	185.	14.26	69.50	2	45.	3.8	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	185.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.21	N	
REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:					
0	1	9.983	9.983	.70	.28	1	BB14	.00	.00	8031	0				
0	2	17.488	17.488	.70	.28	1	BB15	.00	.00	8032	0				
0	0	0	0	0	0	0	0	0	0	0	0				

0	0	3	14.651	14.651	.70	.28	1	BB16	.00	.00	8033	0
0	0	4	15.190	15.190	.70	.28	1	BB17	.00	.00	8034	0
0	0	5	18.125	18.125	.70	.28	1	BB18	.00	.00	8035	0
0	0	6	4.592	4.592	.70	.28	0	BB19	.00	.00	8036	0

Viga= 105 VF5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .3 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 75 | M.[-] =
3.0 tf* m | [tf,cm] As = 2.99 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.34
-SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00
----- | x/d = .12 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 175.4 | M[+]Min = 226.0 | M[-]Min =
226.0 | [cm2] | Asapo[+]= 3.82 | Asapo[+]=
2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	185.	14.84	69.50	2	45.	4.7	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	185.	.10	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.23	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.7 tf* m | M.[+] Max= .7 tf* m - Abcis.= 147 | M.[-] =
2.4 tf* m | [tf,cm] As = 6.48 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 4.11
-SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
----- | x/d = .09 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.35	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.03	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.17	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 2.5 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 126 | M.[-] =
2.5 tf* m | As = 4.24 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 4.27
[tf,cm] | AsL= .00 ----- | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
- - - - - | x/d = .09 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49

```

```

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.- 184. 11.54 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 2.5 tf* m | M.[+] Max= .8 tf* m - Abcis.= 126 | M.[-] =
3.5 tf* m | As = 4.30 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 6.22
[tf,cm] | AsL= .00 ----- | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
- - - - - | x/d = .14 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49

```

```

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.- 184. 11.42 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 3.1 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 150 | M.[-] =
1.8 tf* m | As = 5.42 -SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = 4.41
[tf,cm] | AsL= .00 ----- | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
- - - - - | x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
3.59

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 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. 14.21 69.50 2 45. 3.7 8.1 8.1 6.3 10.0 4 .0 .0

```


T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .21 N

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

Vao= 6B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]
BAL.DIR | x/d = .10 | ASL= .00 -
.7
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | %
Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 4.82 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 45. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	7.609	7.607	.70	.28	0	BA25	.00	.00	8037
0	0	2	18.354	18.352	.70	.28	1	BA26	.00	.00	8038
0	0	3	15.847	15.846	.70	.28	1	BA27	.00	.00	8039
0	0	4	16.026	16.026	.70	.28	1	BA28	.00	.00	8040
0	0	5	18.037	18.037	.70	.28	1	BA29	.00	.00	8041
0	0	6	10.661	10.661	.70	.28	1	BA30	.00	.00	8042

Viga= 106 VF6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]
BAL.ESQ | x/d = .10 | ASL= .00 -
.7
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | %
Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 4.81 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 45. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

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

Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.8 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 75 | M.[-] =
3.4 tf* m | As = 4.41 -SRAS- [6 B 10.0mm] | ASL= .00 ----- | As = 5.96
[tf,cm] | ASL= .00 ----- x/d = .10 | As = 3.87 -STAS- [5 B 10.0mm] | ASL= .00
-SRAS- [5 B 12.5mm]
----- x/d = .13

```

x/dMx= .50
[tf,cm] M[-]Min = 212.2
212.2
[cm2 ] Asapo[+]= 3.59
2.49

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.- 184. 12.79 69.50 2 45. 1.5 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.3 tf* m | M.[+] Max= .6 tf* m - Abcis.= 126 | M.[-] =
2.3 tf* m | As = 5.86 -SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = 4.04
-SRAS- [ 5 B 10.0mm] | AsL= .00 ----- x/d = .13 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .09 x/dMx= .50 |
x/dMx= .50
[tf,cm] M[-]Min = 212.2 | M.[+]Min = 212.2 | M[-]Min =
212.2
[cm2 ] Asapo[+]= 2.49 | Asapo[+]=
2.49

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.- 184. 12.82 69.50 2 45. 1.5 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .19 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.4 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =
2.4 tf* m | As = 4.18 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 4.12
-SRAS- [ 6 B 10.0mm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .09 x/dMx= .50 |
x/dMx= .50
[tf,cm] M[-]Min = 212.2 | M.[+]Min = 212.2 | M[-]Min =
212.2
[cm2 ] Asapo[+]= 2.49 | Asapo[+]=
2.49

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.- 184. 11.95 69.50 2 45. .1 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.6 tf* m | M.[+] Max= .7 tf* m - Abcis.= 126 | M.[-] =
3.6 tf* m | [tf,cm] As = 4.43 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 6.35
-SRAS- [6 B 12.5mm] | AsL= .00 ----- x/d = .10 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .14 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | [cm2] Asapo[+]= 2.49 | Asapo[+]=
2.49 |
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.- 184. 11.85 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N
----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.2 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 151 | M.[-] =
.0 tf* m | [tf,cm] As = 5.57 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = .56
-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .12 | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .00 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] M[-]Min = 226.0 | M[+]Min = 226.0 | M[-]Min =
158.3 | [cm2] Asapo[+]= 2.49 | Asapo[+]=
3.82 |
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 185. 14.46 69.50 2 45. 4.1 8.1 8.1 6.3 10.0 4 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. .09 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .22 N
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 10.594 10.594 .70 .28 1 BB22 .00 .00 8043 0
0 0 2 18.026 18.026 .70 .28 1 BB23 .00 .00 8044 0
0 0 3 15.399 15.399 .70 .28 1 BB24 .00 .00 8045 0
0 0 4 16.021 16.021 .70 .28 1 BB25 .00 .00 8046 0
0 0 5 18.515 18.515 .70 .28 1 BB26 .00 .00 8047 0
0 0 6 4.781 4.781 .70 .28 0 BB27 .00 .00 8048 0
=====

Viga= 107 VF7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .3 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 75 | M.[-] =

3.0 tf* m | [tf,cm] | As = 2.99 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.35

-SRAS- [5 B 12.5mm] | AsL= .00 ----- x/d = .07 | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .12 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 175.4 | M[+]Min = 226.0 | M[-]Min =

226.0 |

[cm2] | Asapo[+]= 3.82 | Asapo[+]=

2.49 |

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.- 185. 14.69 69.50 2 45. 4.5 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 185. .07 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .22 N

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

Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 3.6 tf* m | M.[+] Max= .8 tf* m - Abcis.= 126 | M.[-] =

2.4 tf* m | [tf,cm] | As = 6.46 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 4.11

-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .14 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .09 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 184. 11.23 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N

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

Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.5 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =

2.5 tf* m | [tf,cm] | As = 4.24 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.26

-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .09 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 184. 11.43 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.17	N

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 2.5 tf* m	M.[+] Max= .8 tf* m - Abcis.= 126	M.[-] =
3.5 tf* m		
[tf,cm] As = 4.30 -SRAS- [6 B 10.0mm]	AsL= .00 -----	As = 6.21
-SRAS- [5 B 12.5mm]		
AsL= .00 -----	x/d = .09	As = 3.61 -STAS- [5 B 10.0mm]
-----	x/d = .14	AsL= .00
x/dMx= .50		
[tf,cm] M[-]Min = 212.2	M[+]Min = 212.2	M[-]Min =
212.2		
[cm2] Asapo[+]= 2.49		Asapo[+]=
2.49		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2 MdC Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.34	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.17	

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 3.1 tf* m	M.[+] Max= 2.1 tf* m - Abcis.= 150	M.[-] =
1.8 tf* m		
[tf,cm] As = 5.42 -SRAS- [5 B 12.5mm]	AsL= .00 -----	As = 4.41
-SRAS- [6 B 10.0mm]		
AsL= .00 -----	x/d = .12	As = 3.61 -STAS- [5 B 10.0mm]
-----	x/d = .10	AsL= .00
x/dMx= .50		
[tf,cm] M[-]Min = 212.2	M[+]Min = 212.2	M[-]Min =
212.2		
[cm2] Asapo[+]= 2.49		Asapo[+]=
3.59		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2 MdC Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	14.06	69.50	2	45.	3.5	8.1	8.1	6.3	10.0	4	.0

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.21	

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

Vao= 6B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO M[-]= 1.75 tf* m	As = 4.41 -SRAS- [6 B 10.0mm]
BAL.DIR	x/d = .10 AsL= .00 -
.7	
[tf,cm] M[-]Min= 255.6	- x/dMx =1.00
Baric.Armad.= 1	%

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 4.75 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 45. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	8097	Pilares:
0	0	1	7.497	7.497	.70	.28	0	BA49	.00	.00	8097	0
0	0	2	18.193	18.192	.70	.28	1	BA50	.00	.00	8098	0
0	0	3	15.691	15.690	.70	.28	1	BA51	.00	.00	8099	0
0	0	4	15.865	15.865	.70	.28	1	BA52	.00	.00	8100	0
0	0	5	17.878	17.878	.70	.28	1	BA53	.00	.00	8101	0
0	0	6	10.573	10.573	.70	.28	1	BA54	.00	.00	8102	0

Viga= 108 VF8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]
BAL.ESQ | x/d = .10 | ASL= .00 -
.7
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | | %
Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 45. 4.71 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 45. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .07 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.8 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 75 | M.[-] =
3.4 tf* m | As = 4.41 -SRAS- [6 B 10.0mm] | ASL= .00 ----- | As = 5.95
[tf,cm] | AsL= .00 | ASL= .00
-SRAS- [5 B 12.5mm] | As = 3.88 -STAS- [5 B 10.0mm] | ASL= .00
| ASL= .00
----- x/d = .13 | x/dMx = .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | Asapo[+]= 3.59 | Asapo[+]=
[cm2] | 2.49

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.- 184. 12.72 69.50 2 45. 1.4 8.1 8.1 6.3 10.0 4 .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.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .19 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO-| E 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= .7 tf* m - Abcis.= 126 | M.[-] =
2.3 tf* m | | | |
[tf,cm]| As = 5.87 -SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = 4.04
-SRAS- [ 5 B 10.0mm] | | | |
| AsL= .00 ----- x/d = .13 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .09 | | | |
x/dMx= .50 | | | |
| | | |
[tf,cm]| M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | | |
[cm2 ]| Asapo[+]= 2.49 | | | |
2.49 | | | |

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CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.65 69.50 2 45. 1.2 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.4 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =
2.4 tf* m | | | |
[tf,cm]| As = 4.18 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 4.12
-SRAS- [ 6 B 10.0mm] | | | |
| AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .09 | | | |
x/dMx= .50 | | | |
| | | |
[tf,cm]| M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | | |
[cm2 ]| Asapo[+]= 2.49 | | | |
2.49 | | | |

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CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.83 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

```

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.6 tf* m | M.[+] Max= .7 tf* m - Abcis.= 126 | M.[-] =
3.6 tf* m | | | |
[tf,cm]| As = 4.43 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 6.33
-SRAS- [ 5 B 12.5mm] | | | |
| AsL= .00 ----- x/d = .10 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .14 | | | |
x/dMx= .50 | | | |
| | | |
[tf,cm]| M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | | |
[cm2 ]| Asapo[+]= 2.49 | | | |
2.49 | | | |

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CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.75 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

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

Vao= 6 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 3.2 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 151 | M.[-] =
.0 tf* m
[tf,cm]| As = 5.56 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = .56
-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .12 | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .00
x/dMx= .50 |
[tf,cm]| M[-]Min = 226.0 | M[+]Min = 226.0 | M[-]Min =
175.4
[cm2]| Asapo[+]= 2.49 | Asapo[+]=
3.82

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 185. 14.32 69.50 2 45. 3.9 8.1 8.1 6.3 10.0 4 .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.- 185. .07 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .22 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	10.492	10.492	.70	.28	1	BB41	.00	.00	8103
0	0	2	17.858	17.858	.70	.28	1	BB42	.00	.00	8104
0	0	3	15.246	15.246	.70	.28	1	BB43	.00	.00	8105
0	0	4	15.861	15.861	.70	.28	1	BB44	.00	.00	8106
0	0	5	18.345	18.345	.70	.28	1	BB45	.00	.00	8107
0	0	6	4.888	4.888	.70	.28	0	BB46	.00	.00	8108

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Viga= 109 VF9 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .0 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 75 | M.[-] =
3.0 tf* m
[tf,cm]| As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 5.26
-SRAS- [5 B 12.5mm] | AsL= .00 ----- x/d = .00 | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .12
x/dMx= .50 |
[tf,cm]| M[-]Min = 158.3 | M[+]Min = 226.0 | M[-]Min =
226.0
[cm2]| Asapo[+]= 3.82 | Asapo[+]=
2.49

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.-	185.	14.61	69.50	2	45.	4.4	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla		M
[tf,cm]	0.-	185.	.03	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.21	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A							M E I O D O V A O				D I R E I T			
A	M.[-] = 3.7 tf* m							M.[+] Max= .7 tf* m - Abcis.= 147				M.[-] =			
2.3 tf* m	As = 6.56 -SRAS- [6 B 12.5mm]							AsL= .00 -----				As = 3.94			
[tf,cm]	AsL= .00							As = 3.61 -STAS- [5 B 10.0mm]				AsL= .00			
-SRAS-	x/d = .09							x/dMx= .50							

x/dMx=															
.50															
[tf,cm]	M[-]Min = 212.2							M[+]Min = 212.2				M[-]Min =			
212.2															
[cm2]	Asapo[+]= 2.49											Asapo[+]=			
2.49															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2 MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus		M
[tf,cm]	0.-	184.	10.97	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla		M
[tf,cm]	0.-	184.	.03	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A							M E I O D O V A O				D I R E I T			
A	M.[-] = 2.3 tf* m							M.[+] Max= 1.3 tf* m - Abcis.= 126				M.[-] =			
2.4 tf* m	As = 3.99 -SRAS- [5 B 10.0mm]							AsL= .00 -----				As = 4.05			
[tf,cm]	AsL= .00							As = 3.61 -STAS- [5 B 10.0mm]				AsL= .00			
-SRAS-	x/d = .09							x/dMx= .50							

x/dMx=															
.50															
[tf,cm]	M[-]Min = 212.2							M[+]Min = 212.2				M[-]Min =			
212.2															
[cm2]	Asapo[+]= 2.49											Asapo[+]=			
2.49															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2 MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus		M
[tf,cm]	0.-	184.	11.12	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla		M
[tf,cm]	0.-	184.	.03	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A							M E I O D O V A O				D I R E I T			
A	M.[-] = 2.4 tf* m							M.[+] Max= .7 tf* m - Abcis.= 126				M.[-] =			
3.5 tf* m	As = 4.15 -SRAS- [6 B 10.0mm]							AsL= .00 -----				As = 6.25			
[tf,cm]															
-SRAS-															

```

----- | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .14 | | | |
x/dMx= .50 | x/dMx= .50 | | |
| | | |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | |
[cm2 ] | Asapo[+]= 2.49 | | | Asapo[+]=
2.49 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.10	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | | | |
1.8 tf* m | M.[-] = 3.0 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 150 | M.[-] =
[tf,cm] | As = 5.28 -SRAS- [ 5 B 12.5mm ] | AsL= .00 ----- | As = 4.41
-SRAS- [ 6 B 10.0mm ] | AsL= .00 ----- x/d = .12 | As = 3.62 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .10 | | |
x/dMx= .50 | x/dMx= .50 | | |
| | | |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | |
[cm2 ] | Asapo[+]= 2.49 | | | Asapo[+]=
3.59 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	13.92	69.50	2	45.	3.2	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.20	N	

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

Vao= 6B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [ 6 B 10.0mm ]
BAL.DIR | x/d = .10 | AsL= .00 -
.7 | | |
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | | %
Baric.Armad.= 1 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	4.56	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.07	N	

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	7.168	7.167	.70	.28	0	BA56	.00	.00	8085
0	0	2	18.003	18.003	.70	.28	1	BA57	.00	.00	8086
0	0	3	15.157	15.157	.70	.28	1	BA58	.00	.00	8087
0	0	4	15.367	15.367	.70	.28	1	BA59	.00	.00	8088
0	0	5	17.609	17.609	.70	.28	1	BA60	.00	.00	8089
0	0	6	10.141	10.141	.70	.28	1	BA61	.00	.00	8090

Viga= 110 VF10
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

Vao= 1B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]
BAL.ESQ | x/d = .10 | ASL= .00 -
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	4.52	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.07	N	

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

Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.8 tf* m | M.[+] Max= 2.4 tf* m - Abcis.= 75 | M.[-] =
3.3 tf* m | As = 4.41 -SRAS- [6 B 10.0mm] | ASL= .00 ----- | As = 5.81
[tf,cm] | As = 4.41 -SRAS- [5 B 12.5mm] | ASL= .00 ----- | As = 5.81
-SRAS- [5 B 12.5mm] | ASL= .00 ----- | ASL= .00
----- x/d = .13 | As = 4.06 -STAS- [6 B 10.0mm] | ASL= .00
----- x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 |
[cm2] | Asapo[+]= 3.59 | Asapo[+]=
2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	12.63	69.50	2	45.	1.2	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.03	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.19	N	

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

Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.4 tf* m | M.[+] Max= .6 tf* m - Abcis.= 147 | M.[-] =
2.3 tf* m | As = 5.93 -SRAS- [5 B 12.5mm] | ASL= .00 ----- | As = 3.90
[tf,cm] | As = 5.93 -SRAS- [5 B 10.0mm] | ASL= .00 ----- | As = 3.90
-SRAS- [5 B 10.0mm] | ASL= .00 ----- | ASL= .00
----- x/d = .13 | As = 3.61 -STAS- [5 B 10.0mm] | ASL= .00
----- x/d = .09 |
x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 |
[cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

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.- 184. 12.39 69.50 2 45. .8 8.1 8.1 6.3 10.0 4 .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.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .18 N

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 2.3 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =
2.2 tf* m
[tf,cm] | As = 3.95 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.85
-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .08 x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2
[cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

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.- 184. 11.49 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 2.5 tf* m | M.[+] Max= .6 tf* m - Abcis.= 126 | M.[-] =
3.7 tf* m
[tf,cm] | As = 4.25 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 6.48
-SRAS- [6 B 12.5mm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .14 x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2
[cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

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.- 184. 11.56 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 184. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

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

Vao= 6 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 3.1 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 151 | M.[-] =
.0 tf* m

```
[tf,cm] | As = 5.52 -SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = .56
-SRAS- [ 4 B 8.0mm] | AsL= .00 ----- | As = 3.85 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .00 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 226.0 | M[+]Min = 226.0 | M[-]Min =
158.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
3.82 |
```

```
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 185. 14.34 69.50 2 45. 3.9 8.1 8.1 6.3 10.0 4 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. .03 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .21 N
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 10.056 10.056 .70 .28 1 BB47 .00 .00 8091 0
0 0 2 17.607 17.607 .70 .28 1 BB48 .00 .00 8092 0
0 0 3 14.757 14.757 .70 .28 1 BB49 .00 .00 8093 0
0 0 4 15.306 15.306 .70 .28 1 BB50 .00 .00 8094 0
0 0 5 18.230 18.230 .70 .28 1 BB51 .00 .00 8095 0
0 0 6 4.553 4.553 .70 .28 0 BB52 .00 .00 8096 0
0 0 0 0
```

Viga= 111 VF11 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```
----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .35 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .3 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 75 | M.[-] =
3.0 tf* m |
[tf,cm] | As = 2.99 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 5.22
-SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = 3.84 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .12 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 175.4 | M[+]Min = 226.0 | M[-]Min =
226.0 |
[cm2 ] | Asapo[+]= 3.82 | Asapo[+]=
2.49 |
```

```
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.- 185. 14.26 69.50 2 45. 3.8 8.1 8.1 6.3 10.0 4 .0 .0
```

```
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. .11 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .22 N
```

```
----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .35 [M]
```

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

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.6 tf* m | M.[+] Max= .7 tf* m - Abcis.= 126 | M.[-] =
2.3 tf* m |
[tf,cm] | As = 6.29 -SRAS- [ 5 B 12.5mm] | AsL= .00 ----- | As = 4.02
-SRAS- [ 5 B 10.0mm] |
```

```

----- | AsL= .00 ----- x/d = .14 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .09 | | |
x/dMx= .50 | x/dMx= .50 | |
| | |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | |
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	10.89	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.04	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	

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

Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.4 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 126 | M.[-] =
2.4 tf* m | As = 4.13 -SRAS- [ 6 B 10.0mm ] | AsL= .00 ----- | As = 4.16
[tf,cm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .09 | |
x/dMx= .50 | x/dMx= .50 | |
| | |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | |
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.10	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.4 tf* m | M.[+] Max= .8 tf* m - Abcis.= 126 | M.[-] =
3.4 tf* m | As = 4.20 -SRAS- [ 6 B 10.0mm ] | AsL= .00 ----- | As = 6.07
[tf,cm] | AsL= .00 ----- x/d = .09 | As = 3.61 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .13 | |
x/dMx= .50 | x/dMx= .50 | |
| | |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | | |
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	11.05	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 3.0 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 150 | M.[-] =
1.8 tf* m | [tf,cm] | As = 5.30 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 4.41
-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .12 | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =
212.2 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
3.59

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	13.66	69.50	2	45.	2.8	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.20	N	

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

Vao= 6B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]
BAL.DIR | x/d = .10 | AsL= .00 -
.7
[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 | | %
Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	4.60	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.07	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:		
0	0	1	7.277	7.277	.70	.28	0	BA63	.00	.00	8073	0
0	0	2	17.685	17.685	.70	.28	1	BA64	.00	.00	8074	0
0	0	3	15.240	15.240	.70	.28	1	BA65	.00	.00	8075	0
0	0	4	15.397	15.397	.70	.28	1	BA66	.00	.00	8076	0
0	0	5	17.391	17.391	.70	.28	1	BA67	.00	.00	8077	0
0	0	6	10.267	10.267	.70	.28	1	BA68	.00	.00	8078	0

Viga= 112 VF12 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1B /L= 1.08 /B= .70 /H= .25 /BCs= 1.13 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO | M[-]= 1.75 tf* m | As = 4.41 -SRAS- [6 B 10.0mm]
BAL.ESQ | x/d = .10 | AsL= .00 -
.7

[tf,cm] | M[-]Min= 255.6 - x/dMx =1.00 |
 Baric.Armad.= 1

| %

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	45.	4.55	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	45.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.07	N	

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

Vao= 2 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.8 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 75 | M.[-] =

3.3 tf* m | [tf,cm] | As = 4.41 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 5.80

-SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.80 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .13 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 | [cm2] | Asapo[+]= 3.59 | Asapo[+]=

2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	12.41	69.50	2	45.	.9	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.18	N	

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

Vao= 3 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 3.3 tf* m | M.[+] Max= .6 tf* m - Abcis.= 126 | M.[-] =

2.3 tf* m | [tf,cm] | As = 5.74 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.95

-SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .09 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

212.2 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	184.	12.27	69.50	2	45.	.7	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	184.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.18	N	

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

Vao= 4 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 2.4 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 126 | M.[-] =

2.3 tf* m | As = 4.07 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.02

[tf,cm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

-SRAS- [5 B 10.0mm] | x/d = .09 | x/dMx= .50 |

----- | x/dMx= .50 |

| M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

[tf,cm] | Asapo[+]= 2.49 | Asapo[+]=

212.2

[cm2] |

2.49

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.- 184. 11.48 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 184. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

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

Vao= 5 /L= 1.99 /B= .70 /H= .25 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 2.5 tf* m | M.[+] Max= .7 tf* m - Abcis.= 126 | M.[-] =

3.5 tf* m | As = 4.32 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 6.17

[tf,cm] | AsL= .00 ----- | As = 3.61 -STAS- [5 B 10.0mm] | AsL= .00

-SRAS- [5 B 12.5mm] | x/d = .09 | x/dMx= .50 |

----- | x/dMx= .50 |

| M[-]Min = 212.2 | M[+]Min = 212.2 | M[-]Min =

[tf,cm] | Asapo[+]= 2.49 | Asapo[+]=

212.2

[cm2] |

2.49

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.- 184. 11.42 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 184. .03 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N

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

Vao= 6 /L= 2.00 /B= .70 /H= .25 /BCs= 1.00 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 3.1 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 151 | M.[-] =

.1 tf* m | As = 5.42 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 2.99

[tf,cm] | AsL= .00 ----- | As = 3.84 -STAS- [5 B 10.0mm] | AsL= .00

-SRAS- [4 B 10.0mm] | x/d = .12 | x/dMx= .50 |

----- | x/dMx= .50 |

| M[-]Min = 226.0 | M[+]Min = 226.0 | M[-]Min =

[tf,cm] | Asapo[+]= 2.49 | Asapo[+]=

175.4

[cm2] |

3.82

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

E N S A G E M

[tf,cm] 0.- 185. 13.90 69.50 2 45. 3.2 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 185. .10 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .21 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 1 10.179 10.179 .70 .28 1 BB55 .00 .00 8079 0
0 0 2 17.370 17.370 .70 .28 1 BB56 .00 .00 8080 0
0 0 3 14.814 14.814 .70 .28 1 BB57 .00 .00 8081 0
0 0 4 15.400 15.400 .70 .28 1 BB58 .00 .00 8082 0
0 0 5 17.823 17.823 .70 .28 1 BB59 .00 .00 8083 0
0 0 6 4.857 4.857 .70 .28 0 BB60 .00 .00 8084 0
0 0 0 0

Viga= 113 VF13 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 69 | M.[-] =
2.7 tf* m | As = 2.97 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 4.79
[tf,cm] | AsL= .00 ----- x/d = .07 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
-SRAS- [4 B 12.5mm] | x/d = .11 | x/dMx= .50 |
----- x/dMx= .50 |
[tf,cm] | M[-]Min = 174.1 | M[+]Min = 219.7 | M[-]Min =
219.7 | Asapo[+]= 3.72 | Asapo[+]=
[cm2] | 2.49

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.- 166. 12.70 69.50 2 45. 1.3 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .23 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.0 tf* m | M.[+] Max= .8 tf* m - Abcis.= 117 | M.[-] =
1.8 tf* m | As = 5.34 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.55
[tf,cm] | AsL= .00 ----- x/d = .12 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
-SRAS- [5 B 10.0mm] | x/d = .08 | x/dMx= .50 |
----- x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 | Asapo[+]= 2.49 | Asapo[+]=
[cm2] | 2.49

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.- 166. 11.10 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

```

[tf,cm]      0.- 166.    .04  6.63  5  9.2 58.1 13.1    .1    .0    .0    .0    .16  N
-----
G E O M E T R I A      E      C A R G A S  -----
-----
Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A      | M E I O D O V A O      | D I R E I T
A      | M.[-] =      2.0 tf* m      | M.[+] Max=      1.0 tf* m - Abcis.= 117 | M.[-] =
2.9 tf* m      | As = 3.55 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 5.02
[tf,cm]| As = 3.55 -SRAS- [ 7 B 10.0mm] | AsL= .00 ----- | As = 5.02
- - - - - | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
- - - - - | x/d = .11          | x/dMx= .50      |
x/dMx= .50      |
[tf,cm]| M[-]Min = 207.3      | M[+]Min = 207.3      | M[-]Min =
207.3           |
[cm2 ]| Asapo[+]= 2.49      | Asapo[+]=
2.49           |

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.- 166. 10.73 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm]      0.- 166. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .16 N
-----
G E O M E T R I A      E      C A R G A S  -----
-----
Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A      | M E I O D O V A O      | D I R E I T
A      | M.[-] =      2.6 tf* m      | M.[+] Max=      1.3 tf* m - Abcis.= 137 | M.[-] =
.8 tf* m      | As = 4.43 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 3.55
[tf,cm]| As = 4.43 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 3.55
- - - - - | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
- - - - - | x/d = .08          | x/dMx= .50      |
x/dMx= .50      |
[tf,cm]| M[-]Min = 207.3      | M[+]Min = 207.3      | M[-]Min =
207.3           |
[cm2 ]| Asapo[+]= 2.49      | Asapo[+]=
2.49           |

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.- 166. 12.60 69.50 2 45. 1.2 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm]      0.- 166. .20 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N
-----
G E O M E T R I A      E      C A R G A S  -----
-----
Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A      | M E I O D O V A O      | D I R E I T
A      | M.[-] =      1.8 tf* m      | M.[+] Max=      .0 tf* m - Abcis.= 129 | M.[-] =
1.8 tf* m      | As = 3.05 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.09
[tf,cm]| As = 3.05 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.09
- - - - - | AsL= .00 ----- | As = 3.04 -STAS- [ 4 B 10.0mm ] | AsL= .00
- - - - - | x/d = .07          | x/dMx= .50      |
x/dMx= .50      |

```

EG0186-R-ETE-EST-01-00-Tomo III

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E 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= 1.1 tf* m - Abcis.= 117 | M.[-] =

2.3 tf* m | [tf,cm] | As = 3.61 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.93

-SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .09 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 166. 11.08 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 166. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.5 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 139 | M.[-] =

.2 tf* m | [tf,cm] | As = 4.33 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 2.97

-SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .07 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =

174.1 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

3.72 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 9.32 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 166. .21 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .16 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	6.379	6.379	.70	.28	0	BA72	.00	.00	8062
0	0	2	16.752	16.751	.70	.28	1	BA64	.00	.00	8074
0	0	3	13.956	13.956	.70	.28	1	BA57	.00	.00	8086
0	0	4	16.420	16.420	.70	.28	1	BA50	.00	.00	8098
0	0	5	7.626	7.626	.70	.28	0	BA41	.00	.00	8110
0	0	6	7.719	7.719	.70	.28	0	BA33	.00	.00	8050
0	0	7	15.984	15.984	.70	.28	1	BA26	.00	.00	8038
0	0	8	14.786	14.786	.70	.28	1	BA20	.00	.00	8026
0	0	9	14.035	14.035	.70	.28	1	BA12	.00	.00	8014
0	0	10	4.381	4.381	.70	.28	0	BA5	.00	.00	8002

Viga= 114 VF14
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

 Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 69 | M.[-] =
 2.8 tf* m | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 4.97
 [tf,cm] | AsL= .00 ----- | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [4 B 12.5mm] | x/d = .11 | x/dMx= .50 |
 ----- | x/dMx= .50 |
 [tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =
 219.7 | Asapo[+]= 3.72 | Asapo[+]=
 [cm2] | 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	12.92	69.50	2	45.	1.7	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.08	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.20	N	

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

 Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.2 tf* m | M.[+] Max= .8 tf* m - Abcis.= 137 | M.[-] =
 1.7 tf* m | As = 5.67 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.55
 [tf,cm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [5 B 10.0mm] | x/d = .08 | x/dMx= .50 |
 ----- | x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 | Asapo[+]= 2.49 | Asapo[+]=
 [cm2] | 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.05	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

 Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 1.9 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] =
 3.0 tf* m | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.13
 [tf,cm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [7 B 10.0mm] | x/d = .11 | x/dMx= .50 |
 ----- | x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 | Asapo[+]= 2.49 | Asapo[+]=
 [cm2] | 2.49

```

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49

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.- 166. 10.67 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 137 | M.[-] =
.6 tf* m
[tf,cm] | As = 4.50 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 3.55
-SRAS- [ 5 B 10.0mm] | AsL= .00 ----- x/d = .10 | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .08
x/dMx= .50 | x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49

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.- 166. 12.46 69.50 2 45. 1.0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .08 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
2.0 tf* m
[tf,cm] | As = 3.38 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 3.43
-SRAS- [ 5 B 10.0mm] | AsL= .00 ----- x/d = .07 | As = 3.04 -STAS- [ 4 B 10.0mm ] | AsL= .00
----- x/d = .08
x/dMx= .50 | x/dMx= .50 |
[tf,cm] | M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min =
178.7
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49

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.- 60. 3.49 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 60. .00 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

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

```

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 98 | M.[-] =
2.5 tf* m | [tf,cm] As = 3.55 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 4.30
-SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .09 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49

```

```

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.- 166. 12.57 69.50 2 45. 1.1 8.1 8.1 6.3 10.0 4 .0 .0

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```

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.- 166. .08 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 3.0 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] =
1.9 tf* m | [tf,cm] As = 5.15 -SRAS- [ 7 B 10.0mm] | AsL= .00 ----- | As = 3.55
-SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49

```

```

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.- 166. 10.24 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .15 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 1.8 tf* m | M.[+] Max= .8 tf* m - Abcis.= 117 | M.[-] =
3.0 tf* m | [tf,cm] As = 3.55 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 5.28
-SRAS- [ 7 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .12 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49

```

```

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.- 166. 11.25 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

```


T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 2.9 tf* m | M.[+] Max= 1.7 tf* m - Abcis.= 139 | M.[-] =

.1 tf* m | As = 4.97 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 2.97

[tf,cm] | AsL= .00 ----- x/d = .11 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .07

----- x/d = .07 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =

174.1 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

3.72 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.36 69.50 2 45. .8 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M
 [tf,cm] 0.- 166. .08 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

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

1 5.788 5.788 .70 .28 0 BA73 .00 .00 8063 0

0 0 0 0 0 0 0 0 0 0 0 0 0

2 16.874 16.873 .70 .28 1 BA65 .00 .00 8075 0

0 0 0 0 0 0 0 0 0 0 0 0 0

3 13.249 13.249 .70 .28 1 BA58 .00 .00 8087 0

0 0 0 0 0 0 0 0 0 0 0 0 0

4 16.279 16.279 .70 .28 1 BA51 .00 .00 8099 0

0 0 0 0 0 0 0 0 0 0 0 0 0

5 7.283 7.283 .70 .28 0 BA42 .00 .00 8111 0

0 0 0 0 0 0 0 0 0 0 0 0 0

6 7.238 7.238 .70 .28 0 BA34 .00 .00 8051 0

0 0 0 0 0 0 0 0 0 0 0 0 0

7 16.050 16.050 .70 .28 1 BA27 .00 .00 8039 0

0 0 0 0 0 0 0 0 0 0 0 0 0

8 13.514 13.514 .70 .28 1 BA21 .00 .00 8027 0

0 0 0 0 0 0 0 0 0 0 0 0 0

9 16.611 16.611 .70 .28 1 BA13 .00 .00 8015 0

0 0 0 0 0 0 0 0 0 0 0 0 0

10 6.211 6.211 .70 .28 0 BA6 .00 .00 8003 0

0 0 0 0 0 0 0 0 0 0 0 0 0

=====

Viga= 115 VF15 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = .0 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 69 | M.[-] =

2.9 tf* m | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 5.10

[tf,cm] | AsL= .00 ----- x/d = .00 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

-SRAS- [5 B 12.5mm] | AsL= .00 ----- x/d = .11

----- x/d = .11 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =

219.7 |

[cm2]| Asapo[+]= 3.72
2.49

|

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	13.15	69.50	2	45.	2.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.07	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.20	N	

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

Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 3.3 tf* m | M.[+] Max= .8 tf* m - Abcis.= 137 | M.[-] =

1.7 tf* m | [tf,cm]| As = 5.86 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.55

-SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.15	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.8 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] =

3.0 tf* m | [tf,cm]| As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.20

-SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .11 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.72	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

- - - - -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 2.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 137 | M.[-] =
.5 tf* m
[tf,cm]| As = 4.56 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 3.55
-SRAS- [ 5 B 10.0mm] | AsL= .00 ----- x/d = .10 | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .08 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3
[cm2 ]| Asapo[+]= 2.49 | | Asapo[+]=
2.49

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CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.53 69.50 2 45. 1.1 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .07 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 2.1 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
2.1 tf* m
[tf,cm]| As = 3.53 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 3.55
-SRAS- [ 5 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.04 -STAS- [ 4 B 10.0mm ] | AsL= .00
----- x/d = .08 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min =
178.7
[cm2 ]| Asapo[+]= 2.49 | | Asapo[+]=
2.49

```

```

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.- 60. 3.46 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 60. .00 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .5 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 98 | M.[-] =
2.5 tf* m
[tf,cm]| As = 3.55 -SRAS- [ 5 B 10.0mm] | AsL= .00 ----- | As = 4.39
-SRAS- [ 6 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- x/d = .10 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3
[cm2 ]| Asapo[+]= 2.49 | | Asapo[+]=
2.49

```

```

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.- 166. 12.64 69.50 2 45. 1.2 8.1 8.1 6.3 10.0 4 .0 .0

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .07 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

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

Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 3.0 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] =

1.8 tf* m | As = 5.23 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.55

[tf,cm] | AsL= .00 ----- x/d = .11 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .08

| x/dMx= .50 |

x/dMx= .50

|

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49

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.- 166. 10.33 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .15 N

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 1.8 tf* m | M.[+] Max= .8 tf* m - Abcis.= 117 | M.[-] =

3.2 tf* m | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.61

[tf,cm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .12

| x/dMx= .50 |

x/dMx= .50

|

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49

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.- 166. 11.39 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .17 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A

| M.[-] = 2.9 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 139 | M.[-] =

.0 tf* m | As = 5.15 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = .56

[tf,cm] | AsL= .00 ----- x/d = .11 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .00

x/dMx= .50 |
 |
 [tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =
 158.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 3.72 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.66 69.50 2 45. 1.3 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .07 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	5.599	5.598	.70	.28	0	BA74	.00	.00	8064
0	0	2	17.101	17.101	.70	.28	1	BA66	.00	.00	8076
0	0	3	13.115	13.114	.70	.28	1	BA59	.00	.00	8088
0	0	4	16.362	16.362	.70	.28	1	BA52	.00	.00	8100
0	0	5	7.241	7.241	.70	.28	0	BA43	.00	.00	8112
0	0	6	7.153	7.153	.70	.28	0	BA35	.00	.00	8052
0	0	7	16.170	16.170	.70	.28	1	BA28	.00	.00	8040
0	0	8	13.314	13.314	.70	.28	1	BA22	.00	.00	8028
0	0	9	16.924	16.924	.70	.28	1	BA14	.00	.00	8016
0	0	10	5.956	5.956	.70	.28	0	BA7	.00	.00	8004

Viga= 116 VF16 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 69 | M.[-] =
 2.9 tf* m | [tf,cm] | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 5.07
 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .11 | x/d = .00 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =
 219.7 |
 [cm2] | Asapo[+]= 3.72 | Asapo[+]=
 2.49 |

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.- 166. 13.06 69.50 2 45. 1.9 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .19 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .22 N

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

 Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /FLt.Ex= .35 [M]

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

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

M.[-] =	3.3 tf* m	M.[+] Max=	.7 tf* m - Abcis.= 137	M.[-] =
1.6 tf* m				
[tf,cm] As =	5.82 -SRAS- [5 B 12.5mm]	AsL=	.00 -----	As =
-SRAS- [5 B 10.0mm]		As =	3.52 -STAS- [5 B 10.0mm]	AsL=
AsL=	.00 -----	x/d =	.13	AsL=
-----	x/d = .08			
		x/dMx=	.50	
x/dMx=	.50			
[tf,cm] M[-]Min =	207.3	M[+]Min =	207.3	M[-]Min =
207.3				
[cm2] Asapo[+]=	2.49			Asapo[+]=
2.49				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.09	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.04	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	

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

Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

M.[-] =	1.8 tf* m	M.[+] Max=	1.0 tf* m - Abcis.= 117	M.[-] =
2.9 tf* m				
[tf,cm] As =	3.55 -SRAS- [5 B 10.0mm]	AsL=	.00 -----	As =
-SRAS- [7 B 10.0mm]		As =	3.52 -STAS- [5 B 10.0mm]	AsL=
AsL=	.00 -----	x/d =	.08	AsL=
-----	x/d = .11			
		x/dMx=	.50	
x/dMx=	.50			
[tf,cm] M[-]Min =	207.3	M[+]Min =	207.3	M[-]Min =
207.3				
[cm2] Asapo[+]=	2.49			Asapo[+]=
2.49				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.59	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.04	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	

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

Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

M.[-] =	2.6 tf* m	M.[+] Max=	1.4 tf* m - Abcis.= 137	M.[-] =
.5 tf* m				
[tf,cm] As =	4.49 -SRAS- [6 B 10.0mm]	AsL=	.00 -----	As =
-SRAS- [5 B 10.0mm]		As =	3.52 -STAS- [5 B 10.0mm]	AsL=
AsL=	.00 -----	x/d =	.10	AsL=
-----	x/d = .08			
		x/dMx=	.50	
x/dMx=	.50			
[tf,cm] M[-]Min =	207.3	M[+]Min =	207.3	M[-]Min =
207.3				
[cm2] Asapo[+]=	2.49			Asapo[+]=
2.49				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	12.40	69.50	2	45.	.8	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.18	6.63	5	9.2	58.1	13.1	.3	.0	.0	.0	.21	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.1 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
2.1 tf* m | [tf,cm] As = 3.52 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.54
-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.04 -STAS- [4 B 10.0mm] | AsL= .00
----- x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min =
178.7 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	60.	3.47	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	60.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.05	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 98 | M.[-] =
2.5 tf* m | [tf,cm] As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.33
-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	12.51	69.50	2	45.	1.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.18	6.63	5	9.2	58.1	13.1	.3	.0	.0	.0	.21	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.0 tf* m | M.[+] Max= .9 tf* m - Abcis.= 117 | M.[-] =
1.8 tf* m | [tf,cm] As = 5.15 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.55
-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .11 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
----- x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=
2.49

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min = 207.3
[cm2] | Asapo[+]= 2.49 | | Asapo[+]= 2.49

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.- 166. 10.21 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .15 N

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.7 tf* m | M.[+] Max= .7 tf* m - Abcis.= 98 | M.[-] =

3.2 tf* m | [tf,cm] | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.60

-SRAS- [5 B 12.5mm] | AsL= .00 ----- | AsL= .00

----- x/d = .12 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M.[+]Min = 207.3 | M[-]Min =

207.3 | [cm2] | Asapo[+]= 2.49 | | Asapo[+]=

2.49

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.- 166. 11.34 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .03 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.9 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 139 | M.[-] =

.0 tf* m | [tf,cm] | As = 5.13 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = .56

-SRAS- [4 B 8.0mm] | AsL= .00 ----- | AsL= .00

----- x/d = .00 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

----- x/dMx= .50 |

[tf,cm] | M[-]Min = 219.7 | M.[+]Min = 219.7 | M[-]Min =

158.3 | [cm2] | Asapo[+]= 2.49 | | Asapo[+]=

3.72

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.59 69.50 2 45. 1.2 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .18 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N

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

0 0 0 0 5.486 5.486 .70 .28 0 BA75 .00 .00 8065 0

0 0 0 0 16.993 16.993 .70 .28 1 BA67 .00 .00 8077 0

0 0 0 0 12.969 12.969 .70 .28 1 BA60 .00 .00 8089 0

0	0	4	16.177	16.177	.70	.28	1	BA53	.00	.00	8101	0
0	0	5	7.154	7.154	.70	.28	0	BA44	.00	.00	8113	0
0	0	6	7.054	7.054	.70	.28	0	BA36	.00	.00	8053	0
0	0	7	15.985	15.985	.70	.28	1	BA29	.00	.00	8041	0
0	0	8	13.157	13.157	.70	.28	1	BA23	.00	.00	8029	0
0	0	9	16.840	16.840	.70	.28	1	BA15	.00	.00	8017	0
0	0	10	5.835	5.834	.70	.28	0	BA8	.00	.00	8005	0
0	0	0	0	0								

=====

Viga= 117 VF17 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.8 tf* m - Abcis.= 52 | M.[-] =
 2.5 tf* m | | | |
 [tf,cm] | As = .67 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 4.92
 -SRAS- [7 B 10.0mm] | | | |
 | AsL= .00 ----- x/d = .00 | As = 4.36 -STAS- [6 B 10.0mm] | AsL= .00
 ----- x/d = .09 | | | |
 | x/dMx= .50 | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.1 | |
 x/dMx= .50 | | | |
 [tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =
 219.7 | | | |
 [cm2] | Asapo[+]= 4.34 | | | Asapo[+]=
 3.11 | | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.28	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.51	6.63	5	9.2	58.1	13.1	.8	4.3	.6	.1	.23	N	

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

 Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.9 tf* m | M.[+] Max= .6 tf* m - Abcis.= 137 | M.[-] =
 1.3 tf* m | | | |
 [tf,cm] | As = 5.01 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.55
 -SRAS- [5 B 10.0mm] | | | |
 | AsL= .00 ----- x/d = .11 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .08 | | | |
 | x/dMx= .50 | | | |
 x/dMx= .50 | | | |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 | | | |
 [cm2] | Asapo[+]= 2.49 | | | Asapo[+]=
 2.49 | | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.42	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.08	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.15	N	

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

 Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 1.4 tf* m | M.[+] Max= .8 tf* m - Abcis.= 98 | M.[-] =
 2.5 tf* m | [tf,cm] As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.36
 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .10 | x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.05	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.15	6.63	5	9.2	58.1	13.1	.2	.0	.0	.0	.15	N	

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

 Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.2 tf* m | M.[+] Max= 1.2 tf* m - Abcis.= 137 | M.[-] =
 .4 tf* m | [tf,cm] As = 4.44 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.17
 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.14 -STAS- [6 B 10.0mm] | AsL= .00
 ----- | x/d = .08 | x/dMx= .50 | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.1 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 3.11 | Asapo[+]=
 3.11

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.55	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.46	6.63	5	9.2	58.1	13.1	.7	4.3	.6	.1	.22	N	

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

 Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 1.9 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
 1.9 tf* m | [tf,cm] As = 3.17 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 3.19
 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 3.04 -STAS- [4 B 10.0mm] | AsL= .00
 ----- | x/d = .07 | x/dMx= .50 |
 x/dMx= .50 |

[tf,cm] | M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min = 178.7
 [cm2] | Asapo[+]= 2.49 | | Asapo[+]= 2.49

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.- 60. 3.20 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 60. .00 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .05 N

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

Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .4 tf* m | M.[+] Max= 1.2 tf* m - Abcis.= 98 | M.[-] =

2.2 tf* m | [tf,cm] | As = 4.17 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.31

-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 4.14 -STAS- [6 B 10.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |

x/dMx= .50 | |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 | [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.- 166. 10.67 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .48 6.63 5 9.2 58.1 13.1 .7 4.3 .6 .1 .22 N

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

Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.5 tf* m | M.[+] Max= .8 tf* m - Abcis.= 137 | M.[-] =

1.4 tf* m | [tf,cm] | As = 4.39 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.55

-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .10 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 | |

x/dMx= .50 | |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 | [cm2] | Asapo[+]= 2.49 | | Asapo[+]=

2.49 |

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.- 166. 8.77 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .14 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .15 N

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.4 tf* m | M.[+] Max= .6 tf* m - Abcis.= 98 | M.[-] =

2.8 tf* m | [tf,cm] | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.87

-SRAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .11 x/dMx= .50 | |

x/dMx= .50 | |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 | |

[cm2] | Asapo[+]= 2.49 | | Asapo[+]=

2.49 | |

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.- 166. 9.60 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 166. .09 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .15 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.5 tf* m | M.[+] Max= 1.8 tf* m - Abcis.= 156 | M.[-] =

.0 tf* m | [tf,cm] | As = 4.99 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = .67

-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .10 | As = 4.36 -STAS- [6 B 10.0mm] | AsL= .00

----- x/d = .00 x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |

x/dMx= .50 | |

[tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =

158.3 | |

[cm2] | Asapo[+]= 3.11 | | Asapo[+]=

4.34 | |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 10.90 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 166. .49 6.63 5 9.2 58.1 13.1 .7 4.3 .6 .1 .22 N

REAC.	APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	4.543	4.543	.70	.28	0	BA76	.00	.00	8066
0	0	2	14.568	14.568	.70	.28	1	BA68	.00	.00	8078
0	0	3	10.678	10.678	.70	.28	1	BA61	.00	.00	8090
0	0	4	13.795	13.795	.70	.28	1	BA54	.00	.00	8102
0	0	5	6.305	6.305	.70	.28	0	BA45	.00	.00	8114
0	0	6	6.215	6.215	.70	.28	0	BA37	.00	.00	8054
0	0	7	13.679	13.679	.70	.28	1	BA30	.00	.00	8042
0	0	8	10.809	10.809	.70	.28	1	BA24	.00	.00	8030
0	0	9	14.432	14.431	.70	.28	1	BA16	.00	.00	8018
0	0	10	4.821	4.821	.70	.28	0	BA9	.00	.00	8006

Viga= 118 VF18
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

 Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 52 | M.[-] =
 2.6 tf* m | As = .67 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 5.08
 [tf,cm] | AsL= .00 ----- | As = 4.36 -STAS- [6 B 10.0mm] | AsL= .00
 -SRAS- [7 B 10.0mm] | x/d = .10 | x/dMx= .50 | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.1 |
 ----- | x/dMx= .50 | |
 [tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =
 219.7 | | |
 [cm2] | Asapo[+]= 4.34 | | Asapo[+]=
 3.11 | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.63	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.57	6.63	5	9.2	58.1	13.1	.9	4.3	.6	.1	.24	N	

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

 Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.0 tf* m | M.[+] Max= .6 tf* m - Abcis.= 137 | M.[-] =
 1.3 tf* m | As = 5.19 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.55
 [tf,cm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [5 B 10.0mm] | x/d = .08 | x/dMx= .50 | |
 ----- | x/dMx= .50 | |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 | | |
 [cm2] | Asapo[+]= 2.49 | | Asapo[+]=
 2.49 | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	9.67	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.11	6.63	5	9.2	58.1	13.1	.2	.0	.0	.0	.16	N	

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

 Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 1.5 tf* m | M.[+] Max= .8 tf* m - Abcis.= 98 | M.[-] =
 2.6 tf* m | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.50
 [tf,cm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [6 B 10.0mm] | x/d = .10 | x/dMx= .50 | |
 ----- | x/dMx= .50 | |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 | | |
 [cm2] | Asapo[+]= 2.49 | | Asapo[+]=
 2.49 | | |

```

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49

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.- 166. 9.32 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .18 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .16 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 2.3 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 137 | M.[-] =
.4 tf* m
[tf,cm] | As = 4.58 -SRAS- [ 6 B 10.0mm] | AsL= .00 ----- | As = 4.17
-SRAS- [ 6 B 10.0mm] | AsL= .00 ----- x/d = .09 | As = 4.14 -STAS- [ 6 B 10.0mm ] | AsL= .00
----- x/d = .08
x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3
[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.- 166. 10.82 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .52 6.63 5 9.2 58.1 13.1 .8 4.3 .6 .1 .23 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 1.9 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
1.9 tf* m
[tf,cm] | As = 3.20 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 3.22
-SRAS- [ 4 B 10.0mm] | AsL= .00 ----- x/d = .07 | As = 3.04 -STAS- [ 4 B 10.0mm ] | AsL= .00
----- x/d = .07
x/dMx= .50 |
[tf,cm] | M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min =
178.7
[cm2 ] | Asapo[+]= 2.49 | | Asapo[+]=
2.49

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.- 60. 3.17 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 60. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

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

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- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E 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= 1.3 tf* m - Abcis.= 98 | M.[-] =

2.2 tf* m | [tf,cm] | As = 4.17 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.45

-SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 4.14 -STAS- [6 B 10.0mm] | AsL= .00

----- | x/d = .08 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[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.- 166. 10.93 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 166. .55 6.63 5 9.2 58.1 13.1 .8 4.3 .6 .1 .23 N

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

Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.6 tf* m | M.[+] Max= .8 tf* m - Abcis.= 137 | M.[-] =

1.5 tf* m | [tf,cm] | As = 4.53 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.55

-SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .10 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 166. 9.02 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 166. .16 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .15 N

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.4 tf* m | M.[+] Max= .6 tf* m - Abcis.= 98 | M.[-] =

2.9 tf* m | [tf,cm] | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.00

-SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 166. 9.85 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .12 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .16 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 2.6 tf* m | M.[+] Max= 1.8 tf* m - Abcis.= 156 | M.[-] =

.0 tf* m | As = 5.10 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = .67

-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .10 | As = 4.36 -STAS- [6 B 10.0mm] | AsL= .00

----- x/d = .00 x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =

158.3 |

[cm2] | Asapo[+]= 3.11 | Asapo[+]=

4.34 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 11.22 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .55 6.63 5 9.2 58.1 13.1 .8 4.3 .6 .1 .24 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	4.655	4.655	.70	.28	0	BB61	.00	.00	8067
0	0	2	14.993	14.993	.70	.28	1	BB55	.00	.00	8079
0	0	3	10.962	10.962	.70	.28	1	BB47	.00	.00	8091
0	0	4	14.173	14.173	.70	.28	1	BB41	.00	.00	8103
0	0	5	6.454	6.454	.70	.28	0	BB35	.00	.00	8115
0	0	6	6.367	6.367	.70	.28	0	BB28	.00	.00	8055
0	0	7	14.042	14.042	.70	.28	1	BB22	.00	.00	8043
0	0	8	11.114	11.114	.70	.28	1	BB14	.00	.00	8031
0	0	9	14.825	14.825	.70	.28	1	BB8	.00	.00	8019
0	0	10	4.970	4.970	.70	.28	0	BB1	.00	.00	8007

Viga= 119 VF19 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .0 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 69 | M.[-] =

2.9 tf* m | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 5.12

-SRAS- [5 B 12.5mm] | AsL= .00 ----- x/d = .00 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .11 x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =

219.7 |

[cm2]| Asapo[+]= 3.72
2.49

|

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	13.28	69.50	2	45.	2.2	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.21	6.63	5	9.2	58.1	13.1	.3	.0	.0	.0	.22	N	

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

Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 3.3 tf* m | M.[+] Max= .7 tf* m - Abcis.= 137 | M.[-] =

1.6 tf* m | [tf,cm]| As = 5.89 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.55

-SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.27	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.06	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.17	N	

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

Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.8 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 98 | M.[-] =

3.0 tf* m | [tf,cm]| As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.17

-SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- | x/d = .11 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3 |

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.73	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.05	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	

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

Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

- - - - -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 2.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 137 | M.[-] =

.5 tf* m

[tf,cm]| As = 4.50 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.55

-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .10 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

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.- 166. 12.61 69.50 2 45. 1.2 8.1 8.1 6.3 10.0 4 .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.- 166. .20 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N

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

Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 2.1 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =

2.1 tf* m

[tf,cm]| As = 3.54 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.56

-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.04 -STAS- [4 B 10.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min =

178.7

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

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.- 60. 3.55 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 60. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .05 N

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

Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .5 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 98 | M.[-] =

2.5 tf* m

[tf,cm]| As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.34

-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .10 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =

207.3

[cm2]| Asapo[+]= 2.49 | Asapo[+]=

2.49

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.- 166. 12.73 69.50 2 45. 1.4 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.20	6.63	5	9.2	58.1	13.1	.3	.0	.0	.0	.21	N

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

Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-	E S Q U E R D A			M E I O D O V A O			D I R E I T
A							
	M.[-] =	3.0 tf* m		M.[+] Max=	.9 tf* m - Abcis.= 137		M.[-] =
1.8 tf* m	As =	5.19 -SRAS- [7 B 10.0mm]		AsL=	.00 -----		As =
[tf,cm]	As =	5 B 10.0mm		As =	3.52 -STAS- [5 B 10.0mm]		AsL=
-SRAS-	AsL=	.00 -----		As =	3.52 -STAS- [5 B 10.0mm]		AsL=
	x/d =	.08		x/dMx=	.50		
	x/dMx=	.50					
[tf,cm]	M[-]Min =	207.3		M[+]Min =	207.3		M[-]Min =
207.3							
[cm2]	Asapo[+]=	2.49					Asapo[+]=
2.49							

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2 MdC Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.33	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.05	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-	E S Q U E R D A			M E I O D O V A O			D I R E I T
A							
	M.[-] =	1.7 tf* m		M.[+] Max=	.7 tf* m - Abcis.= 98		M.[-] =
3.2 tf* m	As =	3.55 -SRAS- [5 B 10.0mm]		AsL=	.00 -----		As =
[tf,cm]	As =	5 B 12.5mm		As =	3.52 -STAS- [5 B 10.0mm]		AsL=
-SRAS-	AsL=	.00 -----		As =	3.52 -STAS- [5 B 10.0mm]		AsL=
	x/d =	.12		x/dMx=	.50		
	x/dMx=	.50					
[tf,cm]	M[-]Min =	207.3		M[+]Min =	207.3		M[-]Min =
207.3							
[cm2]	Asapo[+]=	2.49					Asapo[+]=
2.49							

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2 MdC Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.52	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.06	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.17	

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-	E S Q U E R D A			M E I O D O V A O			D I R E I T
A							
	M.[-] =	3.0 tf* m		M.[+] Max=	1.9 tf* m - Abcis.= 139		M.[-] =
.0 tf* m	As =	5.16 -SRAS- [5 B 12.5mm]		AsL=	.00 -----		As =
[tf,cm]	As =	4 B 8.0mm		As =	3.74 -STAS- [5 B 10.0mm]		AsL=
-SRAS-	AsL=	.00 -----		As =	3.74 -STAS- [5 B 10.0mm]		AsL=
	x/d =	.00		x/d =	.11		
	x/d =	.00					

x/dMx= .50 |
 [tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =
 158.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 3.72 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.78 69.50 2 45. 1.4 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .21 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	5.478	5.478	.70	.28	0	BB62	.00	.00	8068
0	0	2	17.275	17.275	.70	.28	1	BB56	.00	.00	8080
0	0	3	13.195	13.195	.70	.28	1	BB48	.00	.00	8092
0	0	4	16.429	16.429	.70	.28	1	BB42	.00	.00	8104
0	0	5	7.176	7.176	.70	.28	0	BB36	.00	.00	8116
0	0	6	7.073	7.073	.70	.28	0	BB29	.00	.00	8056
0	0	7	16.228	16.228	.70	.28	1	BB23	.00	.00	8044
0	0	8	13.400	13.400	.70	.28	1	BB15	.00	.00	8032
0	0	9	17.102	17.102	.70	.28	1	BB9	.00	.00	8020
0	0	10	5.838	5.838	.70	.28	0	BB2	.00	.00	8008

Viga= 120 VF20 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 69 | M.[-] =
 2.8 tf* m | [tf,cm] | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 4.98
 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .11 | x/d = .00 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =
 219.7 |
 [cm2] | Asapo[+]= 3.72 | Asapo[+]=
 2.49 |

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.- 166. 12.90 69.50 2 45. 1.6 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .11 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .20 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /FLt.Ex= .35 [M]

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

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

M.[-] =	3.2 tf* m	M.[+] Max=	.7 tf* m - Abcis.= 137	M.[-] =
1.6 tf* m				
[tf,cm] As =	5.72 -SRAS- [5 B 12.5mm]	AsL=	.00 -----	As =
-SRAS- [5 B 10.0mm]		As =	3.52 -STAS- [5 B 10.0mm]	AsL=
AsL=	.00 -----	x/d =	.13	AsL=
-----	x/d = .08			
		x/dMx=	.50	
x/dMx=	.50			
[tf,cm] M[-]Min =	207.3	M[+]Min =	207.3	M[-]Min =
207.3				
[cm2] Asapo[+]=	2.49			Asapo[+]=
2.49				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.95	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.04	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	

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

Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

M.[-] =	1.8 tf* m	M.[+] Max=	.9 tf* m - Abcis.= 117	M.[-] =
2.9 tf* m				
[tf,cm] As =	3.55 -SRAS- [5 B 10.0mm]	AsL=	.00 -----	As =
-SRAS- [7 B 10.0mm]		As =	3.52 -STAS- [5 B 10.0mm]	AsL=
AsL=	.00 -----	x/d =	.08	AsL=
-----	x/d = .11			
		x/dMx=	.50	
x/dMx=	.50			
[tf,cm] M[-]Min =	207.3	M[+]Min =	207.3	M[-]Min =
207.3				
[cm2] Asapo[+]=	2.49			Asapo[+]=
2.49				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.48	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.03	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	

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

Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

M.[-] =	2.6 tf* m	M.[+] Max=	1.4 tf* m - Abcis.= 137	M.[-] =
.5 tf* m				
[tf,cm] As =	4.42 -SRAS- [6 B 10.0mm]	AsL=	.00 -----	As =
-SRAS- [5 B 10.0mm]		As =	3.52 -STAS- [5 B 10.0mm]	AsL=
AsL=	.00 -----	x/d =	.10	AsL=
-----	x/d = .08			
		x/dMx=	.50	
x/dMx=	.50			
[tf,cm] M[-]Min =	207.3	M[+]Min =	207.3	M[-]Min =
207.3				
[cm2] Asapo[+]=	2.49			Asapo[+]=
2.49				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	12.31	69.50	2	45.	.7	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.10	6.63	5	9.2	58.1	13.1	.2	.0	.0	.0	.19	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
 2.0 tf* m | [tf,cm] As = 3.47 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.50
 -SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.04 -STAS- [4 B 10.0mm] | AsL= .00
 ----- x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min =
 178.7 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M [tf,cm] 0.- 60. 3.43 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0
 T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M [tf,cm] 0.- 60. .01 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .5 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 98 | M.[-] =
 2.5 tf* m | [tf,cm] As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.26
 -SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .09 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.42 69.50 2 45. .9 8.1 8.1 6.3 10.0 4 .0 .0
 T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M [tf,cm] 0.- 166. .10 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .19 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.9 tf* m | M.[+] Max= .9 tf* m - Abcis.= 117 | M.[-] =
 1.8 tf* m | [tf,cm] As = 5.10 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.55
 -SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .11 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min = 207.3
[cm2] | Asapo[+]= 2.49 | Asapo[+]= 2.49

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.- 166. 10.10 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .03 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .15 N

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 1.7 tf* m | M.[+] Max= .7 tf* m - Abcis.= 98 | M.[-] =

3.1 tf* m | [tf,cm] | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.44

-SRAS- [7 B 10.0mm] | AsL= .00 ----- | AsL= .00

----- x/d = .12 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

x/dMx= .50 | x/dMx= .50 |

[tf,cm] | M[-]Min = 207.3 | M.[+]Min = 207.3 | M[-]Min =

207.3 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=

2.49 |

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.- 166. 11.19 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.9 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 139 | M.[-] =

.0 tf* m | [tf,cm] | As = 4.98 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = .56

-SRAS- [4 B 8.0mm] | AsL= .00 ----- | AsL= .00

----- x/d = .11 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00

x/dMx= .50 | x/dMx= .50 |

[tf,cm] | M[-]Min = 219.7 | M.[+]Min = 219.7 | M[-]Min =

158.3 | [cm2] | Asapo[+]= 2.49 | Asapo[+]=

3.72 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.41 69.50 2 45. .9 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 166. .11 6.63 5 9.2 58.1 13.1 .2 .0 .0 .0 .19 N

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

0 0 0 0 0 0 0 BB63 .00 .00 8069 0

0 0 0 0 0 0 1 BB57 .00 .00 8081 0

0 0 0 0 0 0 1 BB49 .00 .00 8093 0

0	0	4	16.037	16.037	.70	.28	1	BB43	.00	.00	8105	0
0	0	5	7.097	7.097	.70	.28	0	BB37	.00	.00	8117	0
0	0	6	7.001	7.001	.70	.28	0	BB30	.00	.00	8057	0
0	0	7	15.851	15.851	.70	.28	1	BB24	.00	.00	8045	0
0	0	8	13.033	13.033	.70	.28	1	BB16	.00	.00	8033	0
0	0	9	16.609	16.609	.70	.28	1	BB10	.00	.00	8021	0
0	0	10	5.816	5.816	.70	.28	0	BB3	.00	.00	8009	0
0	0	0	0	0								

Viga= 121 VF21 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 69 | M.[-] =
 2.9 tf* m | | | |
 [tf,cm] | As = .56 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 4.99
 -SRAS- [4 B 12.5mm] | | | |
 | AsL= .00 ----- x/d = .00 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .11 | | | |
 | x/dMx= .50 | | | |
 x/dMx= .50 | | | |
 [tf,cm] | M[-]Min = 158.3 | M[+]Min = 219.7 | M[-]Min =
 219.7 | | | |
 [cm2] | Asapo[+]= 3.72 | | | |
 2.49 | | | |

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.- 166. 12.93 69.50 2 45. 1.7 8.1 8.1 6.3 10.0 4 .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.- 166. .10 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .20 N

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

 Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.2 tf* m | M.[+] Max= .8 tf* m - Abcis.= 137 | M.[-] =
 1.7 tf* m | | | |
 [tf,cm] | As = 5.69 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 3.55
 -SRAS- [5 B 10.0mm] | | | |
 | AsL= .00 ----- x/d = .13 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .08 | | | |
 | x/dMx= .50 | | | |
 x/dMx= .50 | | | |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 | | | |
 [cm2] | Asapo[+]= 2.49 | | | |
 2.49 | | | |

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.- 166. 11.05 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .16 N

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

 Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 1.9 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] =
 3.0 tf* m | [tf,cm] As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.13
 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .11 | x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	10.66	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.16	N	

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

 Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 137 | M.[-] =
 .6 tf* m | [tf,cm] As = 4.50 -SRAS- [6 B 10.0mm] | AsL= .00 ----- | As = 3.55
 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	12.44	69.50	2	45.	.9	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.10	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.19	N	

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

 Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 129 | M.[-] =
 2.0 tf* m | [tf,cm] As = 3.37 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.40
 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 3.04 -STAS- [4 B 10.0mm] | AsL= .00
 ----- | x/d = .07 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49

[tf,cm] | M[-]Min = 178.7 | M[+]Min = 178.7 | M[-]Min = 178.7
 [cm2] | Asapo[+]= 2.49 | Asapo[+]= 2.49

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.- 60. 3.46 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

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

Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 98 | M.[-] = 2.5 tf* m

[tf,cm] | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 4.34

-SRAS- [6 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .10 x/dMx= .50 |

|

x/dMx= .50 |

|

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min = 207.3

[cm2] | Asapo[+]= 2.49 | Asapo[+]= 2.49

2.49

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.- 166. 12.56 69.50 2 45. 1.1 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .10 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .20 N

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

Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 3.0 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] = 1.9 tf* m

[tf,cm] | As = 5.17 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.55

-SRAS- [5 B 10.0mm] | AsL= .00 ----- x/d = .11 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00

----- x/d = .08 x/dMx= .50 |

|

x/dMx= .50 |

|

[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min = 207.3

[cm2] | Asapo[+]= 2.49 | Asapo[+]= 2.49

2.49

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.- 166. 10.28 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 166. .02 6.63 5 9.2 58.1 13.1 .0 .0 .0 .0 .15 N

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

Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

A

| M.[-] = 1.8 tf* m | M.[+] Max= .8 tf* m - Abcis.= 117 | M.[-] =
 3.1 tf* m | As = 3.55 -SRAS- [5 B 10.0mm] | AsL= .00 ----- | As = 5.42
 [tf,cm] | AsL= .00 ----- x/d = .08 | As = 3.52 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .12 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
 207.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 2.49 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	11.30	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.02	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.17	N	

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

Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 2.9 tf* m | M.[+] Max= 1.8 tf* m - Abcis.= 139 | M.[-] =
 .0 tf* m | As = 5.00 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = .56
 [tf,cm] | AsL= .00 ----- x/d = .11 | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .00 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =
 158.3 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 3.72 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	166.	12.45	69.50	2	45.	.9	8.1	8.1	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	166.	.10	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.19	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	5.749	5.749	.70	.28	0	BB64	.00	.00	8070
0	0	2	16.878	16.878	.70	.28	1	BB58	.00	.00	8082
0	0	3	13.233	13.233	.70	.28	1	BB50	.00	.00	8094
0	0	4	16.257	16.257	.70	.28	1	BB44	.00	.00	8106
0	0	5	7.300	7.300	.70	.28	0	BB38	.00	.00	8118
0	0	6	7.213	7.213	.70	.28	0	BB31	.00	.00	8058
0	0	7	16.074	16.074	.70	.28	1	BB25	.00	.00	8046
0	0	8	13.425	13.425	.70	.28	1	BB17	.00	.00	8034
0	0	9	16.713	16.713	.70	.28	1	BB11	.00	.00	8022
0	0	10	6.098	6.098	.70	.28	0	BB4	.00	.00	8010

Viga= 122 VF22 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T				
A														
M.[-] = .5 tf* m					M.[+] Max= 1.6 tf* m - Abcis.= 69					M.[-] =				
2.8 tf* m														
[tf,cm] As = 2.97 -SRAS- [4 B 10.0mm]					AsL= .00 -----					As = 4.83				
-SRAS- [4 B 12.5mm]														
AsL= .00 ----- x/d = .07					As = 3.74 -STAS- [5 B 10.0mm]					AsL= .00				
----- x/d = .11														
x/dMx= .50														
[tf,cm] M[-]Min = 174.1					M[+]Min = 219.7					M[-]Min =				
219.7														
[cm2] Asapo[+]= 3.72										Asapo[+]=				
2.49														
CISALHAMENTO- X i X f V s d V R d 2 M d C A n g . A s w [C] A s w m i n A s w [C + T] B i t E s p N R A s T r t A s S u s M														
E N S A G E M														
[tf,cm] 0.- 166. 12.69 69.50 2 45. 1.3 8.1 8.1 6.3 10.0 4 .0 .0														
T O R C A O- X i X f T s d T R d 2 % d T h e b - n u c h - n u c A s w - 1 R A s w m n N R A s l - b A s l - h C o m D i a A d P l a M														
E N S A G E M														
[tf,cm] 0.- 166. .21 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N														
----- G E O M E T R I A E C A R G A S -----														
Vao= 2 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=														
.13 /FLt.Ex= .35 [M]														

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -																			
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T									
A																			
1.8 tf* m					M.[-] = 3.1 tf* m					M.[+] Max= .8 tf* m - Abcis.= 117					M.[-] =				
[tf,cm]					As = 5.38 -SRAS- [5 B 12.5mm]					AsL= .00 -----					As = 3.55				
-SRAS- [5 B 10.0mm]																			
AsL= .00 -----					x/d = .12					As = 3.52 -STAS- [5 B 10.0mm]					AsL= .00				
----- x/d = .08																			
x/dMx= .50					x/dMx= .50														
[tf,cm]					M[-]Min = 207.3					M[+]Min = 207.3					M[-]Min =				
207.3																			
[cm2] Asapo[+]= 2.49															Asapo[+]=				
2.49																			
CISALHAMENTO- X i X f V s d V R d 2 M d C A n g . A s w [C] A s w m i n A s w [C + T] B i t E s p N R A s T r t A s S u s M																			
E N S A G E M																			
[tf,cm] 0.- 166. 11.06 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .0 .0																			
T O R C A O- X i X f T s d T R d 2 % d T h e b - n u c h - n u c A s w - 1 R A s w m n N R A s l - b A s l - h C o m D i a A d P l a M																			
E N S A G E M																			
[tf,cm] 0.- 166. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N																			
----- G E O M E T R I A E C A R G A S -----																			
Vao= 3 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=																			
.13 /Flt.Ex= .35 [M]																			

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T				
A														
M.[-] = 2.1 tf* m					M.[+] Max= 1.0 tf* m - Abcis.= 117					M.[-] =				
2.9 tf* m														
[tf,cm] As = 3.55 -SRAS- [5 B 10.0mm]					AsL= .00 -----					As = 5.03				
-SRAS- [7 B 10.0mm]														
AsL= .00 ----- x/d = .08					As = 3.52 -STAS- [5 B 10.0mm]					AsL= .00				
----- x/d = .11														
x/dMx= .50														
[tf,cm] M[-]Min = 207.3					M[+]Min = 207.3					M[-]Min =				
207.3														
[cm2] Asapo[+]= 2.49										Asapo[+]=				
2.49														

CISALHAMENTO- E N S A G E M [tf,cm]	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
	0.-	166.	10.72	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M [tf,cm]	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
	0.-	166.	.05	6.63	5	9.2	58.1	13.1	.1	.0	.0	.0	.16	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 4 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
	M.[-] = 2.6 tf* m					M.[+] Max= 1.3 tf* m - Abcis.= 117					M.[-] =				
.9 tf* m															
[tf,cm] As = 4.46 -SRAS- [6 B 10.0mm]						AsL= .00 -----					As = 3.55				
-SRAS- [5 B 10.0mm]															
	AsL= .00 -----					x/d = .10 As = 3.52 -STAS- [5 B 10.0mm]					AsL= .00				
-----	x/d = .08														
						x/dMx= .50									
x/dMx= .50															
[tf,cm] M[-]Min = 207.3						M[+]Min = 207.3					M[-]Min =				
207.3															
[cm2] Asapo[+]= 2.49											Asapo[+]=				
2.49															
CISALHAMENTO- E N S A G E M [tf,cm]	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
	0.-	166.	12.49	69.50	2	45.	1.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M [tf,cm]	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
	0.-	166.	.19	6.63	5	9.2	58.1	13.1	.3	.0	.0	.0	.21	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 5 /L= .75 /B= .70 /H= .25 /BCs= .79 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
	M.[-] = 1.7 tf* m					M.[+] Max= .0 tf* m - Abcis.= 129					M.[-] =				
1.8 tf* m															
[tf,cm] As = 3.05 -SRAS- [4 B 10.0mm]						AsL= .00 -----					As = 3.05				
-SRAS- [4 B 10.0mm]															
	AsL= .00 -----					x/d = .07 As = 3.04 -STAS- [4 B 10.0mm]					AsL= .00				
-----	x/d = .07														
						x/dMx= .50									
x/dMx= .50															
[tf,cm] M[-]Min = 178.7						M[+]Min = 178.7					M[-]Min =				
178.7															
[cm2] Asapo[+]= 2.49											Asapo[+]=				
2.49															
CISALHAMENTO- E N S A G E M [tf,cm]	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
	0.-	60.	3.61	69.50	2	45.	.0	8.1	8.1	6.3	10.0	4	.0	.0	
T O R C A O- E N S A G E M [tf,cm]	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
	0.-	60.	.01	6.63	5	9.2	58.1	13.1	.0	.0	.0	.0	.05	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 6 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .35 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
	M.[-] = .8 tf* m					M.[+] Max= 1.3 tf* m - Abcis.= 117					M.[-] =				
2.5 tf* m															

```

[tf,cm] | As = 3.55 -SRAS- [ 5 B 10.0mm ] | AsL= .00 ----- | As = 4.30
-SRAS- [ 6 B 10.0mm ] | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .09 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49 |

```

```

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.- 166. 12.62 69.50 2 45. 1.2 8.1 8.1 6.3 10.0 4 .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.- 166. .19 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .21 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 7 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.9 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 117 | M.[-] =
2.0 tf* m |
[tf,cm] | As = 5.06 -SRAS- [ 7 B 10.0mm ] | AsL= .00 ----- | As = 3.55
-SRAS- [ 5 B 10.0mm ] | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49 |

```

```

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.- 166. 10.33 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 166. .05 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .16 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 8 /L= 1.80 /B= .70 /H= .25 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .35 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.9 tf* m | M.[+] Max= .9 tf* m - Abcis.= 117 | M.[-] =
3.0 tf* m |
[tf,cm] | As = 3.55 -SRAS- [ 5 B 10.0mm ] | AsL= .00 ----- | As = 5.18
-SRAS- [ 5 B 12.5mm ] | AsL= .00 ----- | As = 3.52 -STAS- [ 5 B 10.0mm ] | AsL= .00
----- | x/d = .11 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 207.3 | M[+]Min = 207.3 | M[-]Min =
207.3 |
[cm2 ] | Asapo[+]= 2.49 | Asapo[+]=
2.49 |

```

```

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.- 166. 11.33 69.50 2 45. .0 8.1 8.1 6.3 10.0 4 .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.- 166. .04 6.63 5 9.2 58.1 13.1 .1 .0 .0 .0 .17 N

```

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

 Vao= 9 /L= 1.81 /B= .70 /H= .25 /BCs= .97 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .35 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.8 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 139 | M.[-] =
 .5 tf* m | As = 4.90 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 2.97
 [tf,cm] | AsL= .00 ----- | As = 3.74 -STAS- [5 B 10.0mm] | AsL= .00
 -SRAS- [4 B 10.0mm] | x/d = .11 | x/dMx= .50 |
 ----- | x/d = .07 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 219.7 | M[+]Min = 219.7 | M[-]Min =
 174.1 |
 [cm2] | Asapo[+]= 2.49 | Asapo[+]=
 3.72 |

CISALHAMENTO- Xi Xf Vsd VRd2 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. 12.23 69.50 2 45. .6 8.1 8.1 6.3 10.0 4 .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.- 166. .20 6.63 5 9.2 58.1 13.1 .3 .0 .0 .0 .20 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	6.352	6.352	.70	.28	0	BB65	.00	.00	8071 0
0	0	2	16.709	16.709	.70	.28	1	BB59	.00	.00	8083 0
0	0	3	13.876	13.876	.70	.28	1	BB51	.00	.00	8095 0
0	0	4	16.335	16.335	.70	.28	1	BB45	.00	.00	8107 0
0	0	5	7.713	7.713	.70	.28	0	BB39	.00	.00	8119 0
0	0	6	7.604	7.604	.70	.28	0	BB32	.00	.00	8059 0
0	0	7	16.147	16.147	.70	.28	1	BB26	.00	.00	8047 0
0	0	8	14.061	14.061	.70	.28	1	BB18	.00	.00	8035 0
0	0	9	16.578	16.578	.70	.28	1	BB12	.00	.00	8023 0
0	0	10	6.692	6.692	.70	.28	0	BB5	.00	.00	8011 0

=====

4 TANQUE DE LODO

4 TANQUE DE LODO

4.1 Caracterização da obra

O Tanque de Lodo constitui-se de um tanque em concreto armado destinado ao armazenamento de lodo e anexo à Unidade de Desidratação do Lodo. O tanque está dividido em duas células medindo internamente em planta 8,5 m x 8,5 m e com uma profundidade de 4,00 m. O arquivo EG0112-D-DL-HID-01a03-00 contém as plantas do projeto hidráulico que serviram de referencial para o projeto estrutural.

As estruturas de todos os elementos acima são em concreto armado, conforme já mencionado, e as fundações em estacas pré-moldadas também em concreto.

4.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônico e hidráulico de reforma da elevatória, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, foi observado o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN tendo em vista a experiência deste órgão na gestão de ETES.

A Classe de Agressividade Ambiental adotada, conforme as especificações da CORSAN, foi a III indicada na Tabela 6.1 da NBR 6118/2003, correspondendo a agressividade *forte*.

Para esta classe a NBR 6118 estabelece o seguinte:

- e) Especificações para o concreto:
 - Classe de concreto: $\geq C30$ – $f_{ck} \geq 30\text{Mpa}$ (300 kgf/cm^2);
 - $E_{cs} = 0,85 E_{ci} = 26072\text{ Mpa}$ (260720 kgf/cm^2);
 - Fator água cimento máximo = 0,55.
- f) Especificações para cobrimentos de armaduras (CORSAN):
 - Vigas e pilares: 45 mm
 - Lajes : 45 mm

Como carregamentos específicos deste projeto têm-se:

- vii) Peso específico aparente do lodo: 1,2 tf/m³.
- viii) Nas passarelas e escadas foi considerada uma sobrecarga acidental de 300 kfg/m².

Para efeito do cálculo das pressões nas paredes e lajes de fundo o nível de lodo foi considerado como com a altura máxima das próprias paredes admitindo-se, à favor da segurança, a possibilidade deste enchimento máximo.

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, emitidos pela empresa FS Sondagens de Cachoeirinha-RS.

4.3 Concepção geral do(s) modelo(S) estrutural(is)

A estrutura do tanque foi modelada no TQS. Na Figura 1 pode-se ver o modelo em vista 3D. A laje de fundo está em verde e os quadrados em laranja são os blocos de fundação. As paredes foram calculadas como vigas paredes para as cargas verticais e como lajes para as cargas horizontais. A cor rosada mostra essas vigas onde as falhas de continuidade devem-se a um problema de representação do aplicativo. Na verdade a continuidade está presente numericamente no modelo.

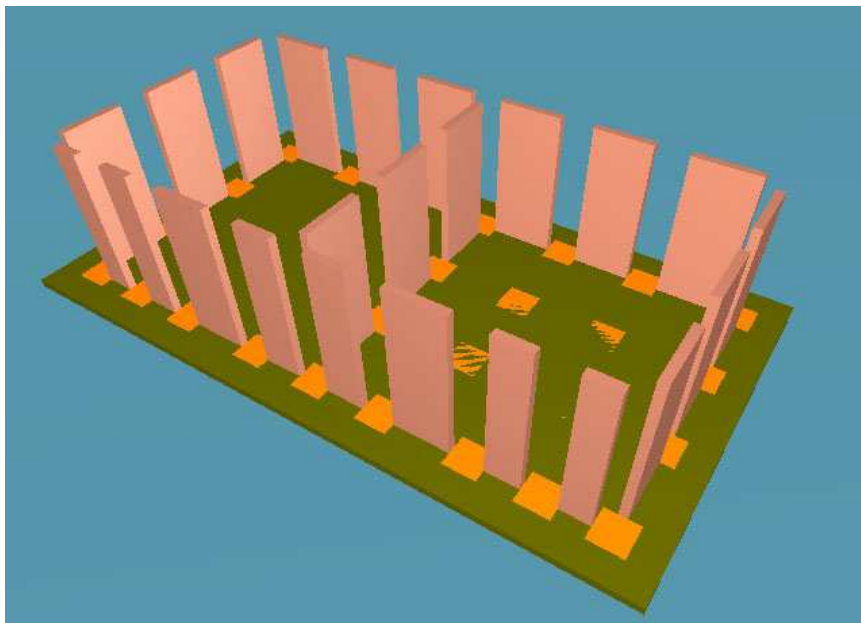


Figura 1 – Vista geral do modelo do Tanque de Lodo..

4.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento (laje de fundo do decantador e vigas paredes), discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito, os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais. Neste modelo de pórtico, as lajes horizontais são tratadas como diafragmas rígidos e os esforços são distribuídos entre os pilares de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária,

parcial ou total, e, posteriormente, final de detalhamento e desenho. O dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. De uma forma geral os procedimentos são os seguintes:

- 9º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.
- 10º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 11º. Detalhamento final e desenho.
- 12º. Emissão de plantas.

4.5 Memorial de Desenvolvimento e resultados do projeto

A Figura 2 apresenta os momentos fletores utilizados no dimensionamento da laje de fundo tratada como laje plana diretamente apoiada sobre os blocos.

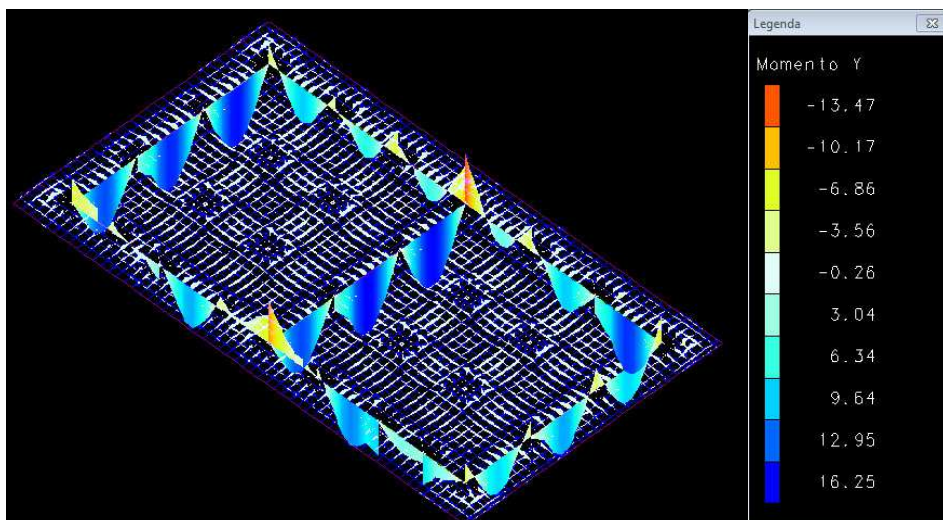


Figura 2 – Momentos fletores na laje de fundo.

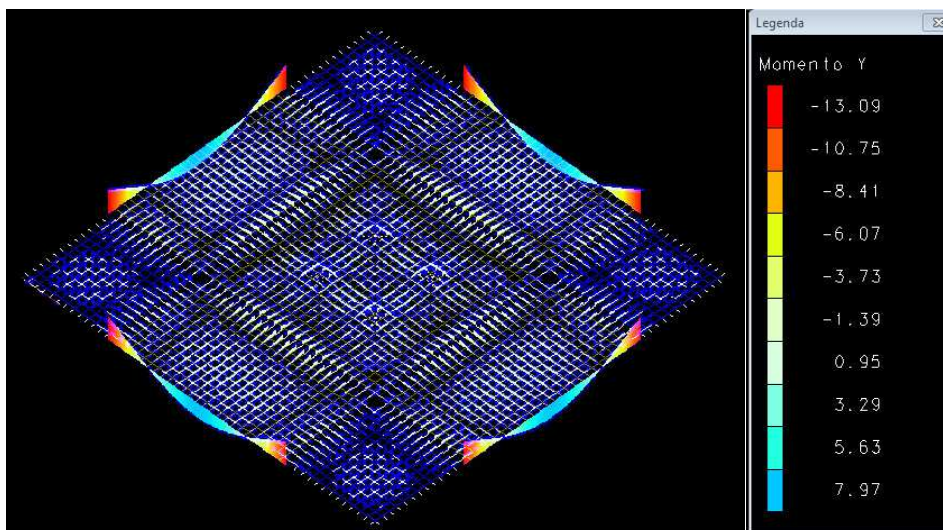


Figura 3 – Momentos fletores no nível N268

A Figura 3 ilustra o modelo construído para determinar os esforços e o dimensionamento das paredes. O modelo foi concebido planejando as paredes relativamente ao fundo. Ou seja, a região central está o fundo apoiado sobre os blocos vistos na Figura 1 e na Figura 2. Na parte externa estão as paredes diretamente ligadas ao fundo com a continuidade assegurada. Nos cantos foram colocadas lajes com grande espessura para simular uma ligação compatível com a rigidez da ligação entre paredes. A laje central – de fundo – recebeu o mesmo carregamento do modelo

anterior e as paredes foram carregadas em faixas de 1 m com cargas escalonadas representando a variação das pressões desde a periferia (borda). Na periferia foram colocadas as vigas passarelas.

A seguir são apresentadas as memórias de cálculo das vigas paredes e vigas passarelas.

.

4.5.1 Memórias de Cálculo de Vigas

JOAO SOARES VIEGAS FILHO R E L G E R - Relatorio geral de vigas (V15.8.56)
Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
32283060

T Q S Projeto: 0002 - Fundação
27/10/11
CAD/Vigas
13:34:36

fck=300.kgf/cm2 - Aco: 50A - Esforços Caracteristicos

L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator
de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa
Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
Espessura Laje 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.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
Espacamento selecionado
NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura
transversal-Suspensao
A R M A D U R A S - T O R C A O
%dT : % limite de TRD2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de
torcao
b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao
p/NR estribos selecionado
Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de
torcao no lado h
ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica
no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre / segue
/ vigas
M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
=====

Viga= 101 V101 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.92 /B= .25 /H= 4.75 /BCs= .00 /BCi= .32 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLT.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 10.4 tf* m | M.[+] Max= 4.9 tf* m - Abcis.= 146 | M.[-] =
8.9 tf* m | As = 18.09 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.09
[tf,cm]| As = 18.09 -STAS- [6 B 20.0mm] | AsL= .00
----- | AsL= .00 ----- x/d = .03 | As = 18.09 -SRAS- [6 B 20.0mm] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50 | |
[tf,cm]| M[-]Min = 20947.0 | M[+]Min = 21557.5 | M[-]Min =
20947.0

[cm2]| Asapo[+]= 6.03
16.92

|

| Asapo[+]=

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 193. 21.38 597.61 2 45. .0 2.9 2.9 5.0 12.0 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.- 193. .62 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .04 N

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

Vao= 2 /L= 2.90 /B= .25 /H= 4.75 /BCs= .00 /BCi= .37 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 5.3 tf* m | M.[+] Max= 6.2 tf* m - Abcis.= 145 | M.[-] =

9.5 tf* m | [tf,cm]| As = 18.25 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.25

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.25 -SRAS- [6 B 20.0mm] | AsL= .00

----- | x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 21245.5 | M[+]Min = 22227.3 | M[-]Min =

21245.5 |

[cm2]| Asapo[+]= 16.92 | Asapo[+]=

16.92 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 190. 23.71 597.61 2 45. .0 2.9 2.9 5.0 12.0 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.- 190. .49 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .04 N

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

Vao= 3 /L= 2.92 /B= .25 /H= 4.75 /BCs= .00 /BCi= .40 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 9.4 tf* m | M.[+] Max= 5.1 tf* m - Abcis.= 146 | M.[-] =

13.2 tf* m | [tf,cm]| As = 18.36 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.36

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .02 | As = 18.36 -SRAS- [6 B 20.0mm] | AsL= .00

----- | x/d = .02 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 19.0 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 21450.2 | M[+]Min = 22699.5 | M[-]Min =

21450.2 |

[cm2]| Asapo[+]= 16.92 | Asapo[+]=

16.12 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 193. 25.02 597.61 2 45. .0 2.9 2.9 5.0 12.0 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.- 193. .51 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .05 N

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	15.249	15.249	1.00	.00	1	B1	.00	.00	8001
0	0	0	20.273	20.273	1.00	.00	1	B2	.00	.00	8002
0	0	0	33.016	33.016	1.00	.00	1	B3	.00	.00	8003
0	0	0	17.872	17.872	1.00	.00	1	B4	.00	.00	8004

Viga= 102 V102
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

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

Vao= 1 /L= 2.92 /B= .25 /H= 4.75 /BCs= .00 /BCi= .40 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 12.1 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 146 | M.[-] =
9.2 tf* m | As = 18.36 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.36
[tf,cm] | AsL= .00 ----- | As = 18.36 -SRAS- [6 B 20.0mm] | AsL= .00
-STAS- [6 B 20.0mm] | x/d = .02 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 19.0 |
----- | x/d = .02 | | |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 21450.2 | M[+]Min = 22699.5 | M[-]Min =
21450.2 | | |
[cm2] | Asapo[+]= 6.12 | | Asapo[+]=
16.92

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	193.	22.22	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	193.	1.59	68.06	5	11.9	13.1	463.1	.3	.0	.0	.0	.06	N	

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

Vao= 2 /L= 2.90 /B= .25 /H= 4.75 /BCs= .00 /BCi= .37 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 5.7 tf* m | M.[+] Max= 7.2 tf* m - Abcis.= 145 | M.[-] =
9.7 tf* m | As = 18.25 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.25
[tf,cm] | AsL= .00 ----- | As = 18.25 -SRAS- [6 B 20.0mm] | AsL= .00
-STAS- [6 B 20.0mm] | x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
----- | x/d = .03 | | |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 21245.5 | M[+]Min = 22227.3 | M[-]Min =
21245.5 | | |
[cm2] | Asapo[+]= 16.92 | | Asapo[+]=
16.92

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	190.	25.86	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	190.	.37	68.06	5	11.9	13.1	463.1	.1	.0	.0	.0	.05	N	

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

Vao= 3 /L= 2.92 /B= .25 /H= 4.75 /BCs= .00 /BCi= .40 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 9.6 tf* m | M.[+] Max= 4.4 tf* m - Abcis.= 121 | M.[-] =
15.3 tf* m | As = 18.36 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.36
[tf,cm] | AsL= .00 ----- | As = 18.36 -SRAS- [6 B 20.0mm] | AsL= .00
-STAS- [6 B 20.0mm] | x/d = .02 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 19.0 |
----- | x/d = .02 | | |
x/dMx= .50 | | |
[tf,cm] | M[-]Min = 21450.2 | M[+]Min = 22699.5 | M[-]Min =
21450.2 | | |
[cm2] | Asapo[+]= 6.12 | | Asapo[+]=
16.92


```

----- | AsL= .00 ----- x/d = .02 | As = 18.36 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- | x/d = .02 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 19.0 |
| | | |
[tf,cm] | M[-]Min = 21450.2 | M[+]Min = 22699.5 | M[-]Min =
21450.2 | | | |
[cm2 ] | Asapo[+]= 16.92 | | | Asapo[+]=
6.12 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	193.	26.10	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	193.	1.53	68.06	5	11.9	13.1	463.1	.3	.0	.0	.0	.06	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	15.850	15.850	1.00	.00	1	B14	.00	.00	8014 0
0 0 0	2	21.799	21.799	1.00	.00	1	B15	.00	.00	8015 0
0 0 0	3	34.712	34.712	1.00	.00	1	B16	.00	.00	8016 0
0 0 0	4	18.644	18.644	1.00	.00	1	B17	.00	.00	8017 0

Viga= 103 V103 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 1 /L= 2.92 /B= .25 /H= 4.75 /BCs= .00 /BCi= .40 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 9.9 tf* m | M.[+] Max= 4.9 tf* m - Abcis.= 146 | M.[-] =
9.1 tf* m | | | |
[tf,cm] | As = 18.54 -STAS- [ 6 B 20.0mm ] | AsL= .00 ----- | As = 18.54
-STAS- [ 6 B 20.0mm ] | | | |
| AsL= .00 ----- x/d = .02 | As = 18.54 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- | x/d = .02 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 19.0 |
| | | |
[tf,cm] | M[-]Min = 21450.2 | M[+]Min = 22699.5 | M[-]Min =
21450.2 | | | |
[cm2 ] | Asapo[+]= 6.18 | | | Asapo[+]=
17.10 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	193.	20.52	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	193.	5.19	68.06	5	11.9	13.1	463.1	1.0	2.8	.2	6.4	.11	N	

```

----- G E O M E T R I A E C A R G A S -----
-----
Vao= 2 /L= 2.90 /B= .25 /H= 4.75 /BCs= .00 /BCi= .37 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 5.0 tf* m | M.[+] Max= 6.3 tf* m - Abcis.= 145 | M.[-] =
9.5 tf* m | | | |
[tf,cm] | As = 18.25 -STAS- [ 6 B 20.0mm ] | AsL= .00 ----- | As = 18.25
-STAS- [ 6 B 20.0mm ] | | | |
| AsL= .00 ----- x/d = .03 | As = 18.25 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- | x/d = .03 | | | |
x/dMx= .50 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |
| | | |
| | | |

```

[tf,cm] | M[-]Min = 21245.5 | M[+]Min = 22227.3 | M[-]Min = 21245.5
[cm2] | Asapo[+]= 16.92 | | Asapo[+]= 16.92

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 190. 23.75 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 190. .46 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .04 N

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

Vao= 3 /L= 2.92 /B= .25 /H= 4.75 /BCs= .00 /BCi= .32 /TpS= 9 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 9.4 tf* m | M.[+] Max= 5.2 tf* m - Abcis.= 146 | M.[-] = 13.0 tf* m

[tf,cm] | As = 18.27 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.27

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.27 -SRAS- [6 B 20.0mm] | AsL= .00

----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 20947.0 | M[+]Min = 21557.5 | M[-]Min = 20947.0

[cm2] | Asapo[+]= 17.10 | | Asapo[+]= 6.09

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

E N S A G E M
[tf,cm] 0.- 193. 24.25 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 193. 4.94 68.06 5 11.9 13.1 463.1 .9 2.8 .2 6.4 .11 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 14.636 14.636 1.00 .00 1 B27 .00 .00 8027 0

0 0 0 2 19.679 19.679 1.00 .00 1 B28 .00 .00 8028 0

0 0 0 3 33.013 33.013 1.00 .00 1 B29 .00 .00 8029 0

0 0 0 4 17.321 17.321 1.00 .00 1 B30 .00 .00 8030 0

0 0 0 0

=====

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Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 11.9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 186 | M.[-] = .0 tf* m

[tf,cm] | As = 17.99 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.99

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 17.99 -SRAS- [6 B 20.0mm] | AsL= .00

----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 20757.4 | M[+]Min = 21143.2 | M[-]Min = 20757.4

[cm2] | Asapo[+]= 6.00 | | Asapo[+]= 17.45

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.- 193. 24.25 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 193. 4.94 68.06 5 11.9 13.1 463.1 .9 2.8 .2 6.4 .11 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 14.636 14.636 1.00 .00 1 B27 .00 .00 8027 0

0 0 0 2 19.679 19.679 1.00 .00 1 B28 .00 .00 8028 0

0 0 0 3 33.013 33.013 1.00 .00 1 B29 .00 .00 8029 0

0 0 0 4 17.321 17.321 1.00 .00 1 B30 .00 .00 8030 0

0 0 0 0

=====

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Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 11.9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 186 | M.[-] = .0 tf* m

[tf,cm] | As = 17.99 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.99

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 17.99 -SRAS- [6 B 20.0mm] | AsL= .00

----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 20757.4 | M[+]Min = 21143.2 | M[-]Min = 20757.4

[cm2] | Asapo[+]= 6.00 | | Asapo[+]= 17.45

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.- 193. 24.25 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 193. 4.94 68.06 5 11.9 13.1 463.1 .9 2.8 .2 6.4 .11 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 14.636 14.636 1.00 .00 1 B27 .00 .00 8027 0

0 0 0 2 19.679 19.679 1.00 .00 1 B28 .00 .00 8028 0

0 0 0 3 33.013 33.013 1.00 .00 1 B29 .00 .00 8029 0

0 0 0 4 17.321 17.321 1.00 .00 1 B30 .00 .00 8030 0

0 0 0 0

=====

=====

Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 11.9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 186 | M.[-] = .0 tf* m

[tf,cm] | As = 17.99 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.99

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 17.99 -SRAS- [6 B 20.0mm] | AsL= .00

----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 20757.4 | M[+]Min = 21143.2 | M[-]Min = 20757.4

[cm2] | Asapo[+]= 6.00 | | Asapo[+]= 17.45

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.- 193. 24.25 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 193. 4.94 68.06 5 11.9 13.1 463.1 .9 2.8 .2 6.4 .11 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 14.636 14.636 1.00 .00 1 B27 .00 .00 8027 0

0 0 0 2 19.679 19.679 1.00 .00 1 B28 .00 .00 8028 0

0 0 0 3 33.013 33.013 1.00 .00 1 B29 .00 .00 8029 0

0 0 0 4 17.321 17.321 1.00 .00 1 B30 .00 .00 8030 0

0 0 0 0

=====

=====

Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 11.9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 186 | M.[-] = .0 tf* m

[tf,cm] | As = 17.99 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.99

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 17.99 -SRAS- [6 B 20.0mm] | AsL= .00

----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 20757.4 | M[+]Min = 21143.2 | M[-]Min = 20757.4

[cm2] | Asapo[+]= 6.00 | | Asapo[+]= 17.45

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.- 193. 24.25 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 193. 4.94 68.06 5 11.9 13.1 463.1 .9 2.8 .2 6.4 .11 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 14.636 14.636 1.00 .00 1 B27 .00 .00 8027 0

0 0 0 2 19.679 19.679 1.00 .00 1 B28 .00 .00 8028 0

0 0 0 3 33.013 33.013 1.00 .00 1 B29 .00 .00 8029 0

0 0 0 4 17.321 17.321 1.00 .00 1 B30 .00 .00 8030 0

0 0 0 0

=====

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Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 11.9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 186 | M.[-] = .0 tf* m

[tf,cm] | As = 17.99 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.99

-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 17.99 -SRAS- [6 B 20.0mm] | AsL= .00

----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 20757.4 | M[+]Min = 21143.2 | M[-]Min = 20757.4

[cm2] | Asapo[+]= 6.00 | | Asapo[+]= 17.45

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.- 193. 24.25 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 193. 4.94 68.06 5 11.9 13.1 463.1 .9 2.8 .2 6.4 .11 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 14.636 14.636 1.00 .00 1 B27 .00 .00 8027 0

0 0 0 2 19.679 19.679 1.00 .00 1 B28 .00 .00 8028 0

0 0 0 3 33.013 33.013 1.00 .00 1 B29 .00 .00 8029 0

0 0 0 4 17.321 17.321 1.00 .00 1 B30 .00 .00 8030 0

0 0 0 0

=====

=====

Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 11.9 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 186 | M.[-] = .0 tf* m

[tf,cm] | As = 17.99 -STAS- [6 B

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 87. 17.23 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 87. 1.60 68.06 5 11.9 13.1 463.1 .3 .0 .0 .0 .05 N

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

Vao= 2 /L= 2.01 /B= .25 /H= 4.75 /BCs= .00 /BCi= .33 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .0 tf* m | M.[+] Max= 2.5 tf* m - Abcis.= 0 | M.[-] =
7.2 tf* m
[tf,cm] | As = 18.11 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.11
-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.11 -SRAS- [6 B 20.0mm] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50
[tf,cm] | M[-]Min = 20998.4 | M[+]Min = 21671.2 | M[-]Min =
20998.4
[cm2] | Asapo[+]= 17.57 | Asapo[+]=
16.92

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 101. 12.39 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 101. 1.17 68.06 5 11.9 13.1 463.1 .2 .0 .0 .0 .04 N

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

Vao= 3 /L= 2.71 /B= .25 /H= 4.75 /BCs= .00 /BCi= .36 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = .5 tf* m | M.[+] Max= 5.4 tf* m - Abcis.= 135 | M.[-] =
5.0 tf* m
[tf,cm] | As = 18.22 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.22
-STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.22 -SRAS- [6 B 20.0mm] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50
[tf,cm] | M[-]Min = 21193.4 | M[+]Min = 22108.7 | M[-]Min =
21193.4
[cm2] | Asapo[+]= 16.92 | Asapo[+]=
16.92

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 171. 14.15 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 171. .41 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .03 N

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

Vao= 4 /L= 2.17 /B= .25 /H= 4.75 /BCs= .00 /BCi= .34 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 3.5 tf* m | M.[+] Max= .8 tf* m - Abcis.= 126 | M.[-] =
1.3 tf* m

```

[tf,cm] | As = 18.14 -STAS- [ 6 B 20.0mm ] | AsL= .00 ----- | As = 18.14
-STAS- [ 6 B 20.0mm ] | AsL= .00 ----- x/d = .03 | As = 18.14 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 21041.9 | M[+]Min = 21768.1 | M[-]Min =
21041.9 |
[cm2 ] | Asapo[+]= 16.92 | Asapo[+]=
16.92 |

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 117. 9.56 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 117. 1.98 68.06 5 11.9 13.1 463.1 .4 .0 .0 .0 .05 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 2.17 /B= .25 /H= 4.75 /BCs= .00 /BCi= .34 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 1.3 tf* m - Abcis.= 90 | M.[-] =
6.9 tf* m |
[tf,cm] | As = 18.14 -STAS- [ 6 B 20.0mm ] | AsL= .00 ----- | As = 18.14
-STAS- [ 6 B 20.0mm ] | AsL= .00 ----- x/d = .03 | As = 18.14 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 21041.9 | M[+]Min = 21768.1 | M[-]Min =
21041.9 |
[cm2 ] | Asapo[+]= 17.59 | Asapo[+]=
16.92 |

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 117. 15.13 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 117. 2.93 68.06 5 11.9 13.1 463.1 .6 .0 .0 .0 .07 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 2.71 /B= .25 /H= 4.75 /BCs= .00 /BCi= .36 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 6.4 tf* m | M.[+] Max= 6.1 tf* m - Abcis.= 135 | M.[-] =
6.6 tf* m |
[tf,cm] | As = 18.22 -STAS- [ 6 B 20.0mm ] | AsL= .00 ----- | As = 18.22
-STAS- [ 6 B 20.0mm ] | AsL= .00 ----- x/d = .03 | As = 18.22 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 21193.4 | M[+]Min = 22108.7 | M[-]Min =
21193.4 |
[cm2 ] | Asapo[+]= 16.92 | Asapo[+]=
16.92 |

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 171. 20.69 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 171. .77 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .05 N

```

----- G E O M E T R I A E C A R G A S -----
 Vao= 7 /L= 2.01 /B= .25 /H= 4.75 /BCs= .00 /BCi= .33 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.8 tf* m | M.[+] Max= 2.8 tf* m - Abcis.= 200 | M.[-] =
 .0 tf* m | As = 18.11 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.11
 [tf,cm] | AsL= .00 ----- | As = 18.11 -SRAS- [6 B 20.0mm] | AsL= .00
 -STAS- | x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
 ----- |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 20998.4 | M[+]Min = 21671.2 | M[-]Min =
 20998.4 |
 [cm2] | Asapo[+]= 16.92 | Asapo[+]=
 17.57

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	101.	10.16	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	101.	1.33	68.06	5	11.9	13.1	463.1	.3	.0	.0	.0	.04	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 8 /L= 1.87 /B= .25 /H= 4.75 /BCs= .00 /BCi= .30 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /Flt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 1.7 tf* m - Abcis.= 0 | M.[-] =
 7.8 tf* m | As = 17.99 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.99
 [tf,cm] | AsL= .00 ----- | As = 17.99 -SRAS- [6 B 20.0mm] | AsL= .00
 -STAS- | x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
 ----- |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 20757.4 | M[+]Min = 21143.2 | M[-]Min =
 20757.4 |
 [cm2] | Asapo[+]= 17.45 | Asapo[+]=
 6.00

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	87.	11.02	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	87.	2.37	68.06	5	11.9	13.1	463.1	.4	.0	.0	.0	.05	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	9.211	9.211	1.00	.00	1	B27	.00	.00	8027
0	0	2	-13.131	-13.131	1.00	.00	1	B26	.00	.00	8026
0	0	3	10.269	10.269	1.00	.00	1	B22	.00	.00	8022
0	0	4	13.416	13.416	1.00	.00	1	B18	.00	.00	8018
0	0	5	4.994	4.994	1.00	.00	1	B14	.00	.00	8014
0	0	6	25.589	25.589	1.00	.00	1	B13	.00	.00	8013
0	0	7	13.868	13.868	1.00	.00	1	B9	.00	.00	8009
0	0	8	-5.395	-5.395	1.00	.00	1	B5	.00	.00	8005
0	0	9	7.868	7.868	1.00	.00	1	B1	.00	.00	8001
0	0	0	0	0							

Viga= 105 V105
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 2.98 /B= .25 /H= 4.75 /BCs= .00 /BCi= .32 /TpS= 9 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 10.2 tf* m | M.[+] Max= 5.0 tf* m - Abcis.= 148 | M.[-] =
 4.2 tf* m | [tf,cm] As = 18.09 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.09
 -STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.09 -SRAS- [6 B 20.0mm] | AsL= .00
 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 20955.9 | M[+]Min = 21577.1 | M[-]Min =
 20955.9 | [cm2] Asapo[+]= 6.03 | Asapo[+]=
 16.92

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	198.	18.24	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	198.	3.22	68.06	5	11.9	13.1	463.1	.6	.0	.0	.0	.08	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 2.80 /B= .25 /H= 4.75 /BCs= .00 /BCi= .36 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 7.4 tf* m | M.[+] Max= 4.4 tf* m - Abcis.= 140 | M.[-] =
 5.1 tf* m | [tf,cm] As = 18.23 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.23
 -STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.23 -SRAS- [6 B 20.0mm] | AsL= .00
 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 21218.1 | M[+]Min = 22164.9 | M[-]Min =
 21218.1 | [cm2] Asapo[+]= 16.92 | Asapo[+]=
 16.92

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	180.	16.38	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	180.	.31	68.06	5	11.9	13.1	463.1	.1	.0	.0	.0	.03	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 3 /L= 2.98 /B= .25 /H= 4.75 /BCs= .00 /BCi= .37 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 2.38 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 7.9 tf* m | M.[+] Max= 6.0 tf* m - Abcis.= 148 | M.[-] =
 9.4 tf* m | [tf,cm] As = 18.26 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.26
 -STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.26 -SRAS- [6 B 20.0mm] | AsL= .00
 ----- x/d = .03

```

x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
[tf,cm] | M[-]Min = 21266.1 | M[+]Min = 22274.2 | M[-]Min =
21266.1 | Asapo[+]= 16.92 | Asapo[+]=
16.92

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 198. 19.90 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 198. 3.32 68.06 5 11.9 13.1 463.1 .6 .0 .0 .0 .08 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 2.98 /B= .25 /H= 4.75 /BCs= .00 /BCi= .37 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 8.2 tf* m | M.[+] Max= 6.0 tf* m - Abcis.= 148 | M.[-] =
4.6 tf* m | As = 18.26 -STAS- [ 6 B 20.0mm] | AsL= .00 ----- | As = 18.26
-STAS- [ 6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.26 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50 | M[-]Min = 21266.1 | M[+]Min = 22274.2 | M[-]Min =
21266.1 | Asapo[+]= 16.92 | Asapo[+]=
16.92

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 198. 17.62 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 198. 3.29 68.06 5 11.9 13.1 463.1 .6 .0 .0 .0 .08 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 2.80 /B= .25 /H= 4.75 /BCs= .00 /BCi= .36 /TpS= 3 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 7.9 tf* m | M.[+] Max= 3.9 tf* m - Abcis.= 140 | M.[-] =
5.6 tf* m | As = 18.23 -STAS- [ 6 B 20.0mm] | AsL= .00 ----- | As = 18.23
-STAS- [ 6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.23 -SRAS- [ 6 B 20.0mm ] | AsL= .00
----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
x/dMx= .50 | M[-]Min = 21218.1 | M[+]Min = 22164.9 | M[-]Min =
21218.1 | Asapo[+]= 16.92 | Asapo[+]=
16.92

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 180. 16.38 597.61 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 180. .30 68.06 5 11.9 13.1 463.1 .1 .0 .0 .0 .03 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 2.98 /B= .25 /H= 4.75 /BCs= .00 /BCi= .32 /TpS= 9 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex=
2.38 /FLt.Ex= .13 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 8.4 tf* m | M.[+] Max= 7.0 tf* m - Abcis.= 148 | M.[-] =
 6.8 tf* m | [tf,cm] As = 18.27 -STAS- [6 B 20.0mm] | AsL= .00 ----- | As = 18.27
 -STAS- [6 B 20.0mm] | AsL= .00 ----- x/d = .03 | As = 18.27 -SRAS- [6 B 20.0mm] | AsL= .00
 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 24 B 8.0mm] - LN= 18.8 |
 x/dMx= .50 | M[-]Min = 20955.9 | M[+]Min = 21577.1 | M[-]Min =
 [tf,cm] | 20955.9 | |
 [cm2] | Asapo[+]= 17.10 | | Asapo[+]=
 18.27

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	198.	18.63	597.61	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	198.	3.41	68.06	5	11.9	13.1	463.1	.6	2.8	.2	6.4	.08	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	12.532	12.532	1.00	.00	1	B30	.00	.00	8030
0	0	2	17.442	17.442	1.00	.00	1	B25	.00	.00	8025
0	0	3	18.949	18.949	1.00	.00	1	B21	.00	.00	8021
0	0	4	25.989	25.989	1.00	.00	1	B17	.00	.00	8017
0	0	5	18.278	18.278	1.00	.00	1	B12	.00	.00	8012
0	0	6	19.909	19.909	1.00	.00	1	B8	.00	.00	8008
0	0	7	13.189	13.189	1.00	.00	1	B4	.00	.00	8004

JOAO SOARES VIEGAS FILHO R E L G E R - Relatorio geral de vigas (V15.8.56)
 Pg 1
 AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
 32283060
 T Q S Projeto: 0002 - Fundacao
 22/10/11
 CAD/Vigas
 22:09:28

fck=300.kgf/cm2 - Aco: 50A - Esforços Caracteristicos

L E G E N D A
 G E O M E T R I A
 Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
 Repeticoes
 NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator
 de Alternancia de Cargas
 Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa
 Colaborante Superior
 BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
 Espessura Laje 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.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.trans.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
 Espacamento selecionado
 NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura
 transversal-Suspensao

A R M A D U R A S - T O R C A O
 %dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de torcao
 b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
 Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao
 p/NR estribos selecionado
 Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
 ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica no vao - S[sim] N[nao]
 R E A C O E S D E A P O I O
 DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre / segue / vigas
 M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
 =====
 =====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 8.92 /B= .20 /H= .70 /BCs= 1.09 /BCi= .00 /TpS= 5 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 13.1 tf* m | M.[+] Max= 7.9 tf* m - Abcis.= 446 | M.[-] =
 13.1 tf* m | [tf,cm] | As = 7.29 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.27
 -SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .17 | As = 5.45 -STAS- [3 B 16.0mm] | AsL= .00
 ----- x/d = .17 | x/dMx= .50 | Arm.Lat.= [2 X 3 B 8.0mm] - LN= 1.1 |
 x/dMx= .50 | | |
 [tf,cm] | M[-]Min = 819.1 | M[+]Min = 499.6 | M[-]Min =
 819.1 | | |
 [cm2] | Asapo[+]= 1.36 | | | Asapo[+]=
 1.36 | | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	850.	9.38	65.68	2	45.	.0	2.3	2.3	5.0	17.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	850.	.14	3.47	5	7.8	8.1	58.1	.3	.0	.0	.0	.18	N	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	6.694	6.694	4.75	2.17	1	P6	.00	.00	6 0
0 0 0	2	6.534	6.534	4.75	2.17	1	P5	.00	.00	5 0

Viga= 2 V2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 8.92 /B= .20 /H= .70 /BCs= 1.09 /BCi= .00 /TpS= 5 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .35 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 13.0 tf* m | M.[+] Max= 7.9 tf* m - Abcis.= 446 | M.[-] =
 12.9 tf* m | [tf,cm] | As = 7.22 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.19
 -SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .17 | As = 5.45 -STAS- [3 B 16.0mm] | AsL= .00
 ----- x/d = .17 | x/dMx= .50 | Arm.Lat.= [2 X 3 B 8.0mm] - LN= 1.1 |
 x/dMx= .50 | | |
 [tf,cm] | M[-]Min = 819.1 | M[+]Min = 499.6 | M[-]Min =
 819.1 | | |

[cm2] | Asapo[+]= 1.36

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	850.	9.27	65.68	2	45.	.0	2.3	2.3	5.0	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	850.	.14	3.47	5	7.8	8.1	58.1	.3	.0	.0	.0	.18	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	6.614	6.614	4.49	2.04	1	P8	.00	.00	8
0	0	2	6.384	6.384	4.00	1.79	1	P7	.00	.00	7
0	0	0	0								0

Viga= 3 V3

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

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 8.92 /B= .20 /H= .70 /BCs= 1.09 /BCi= .00 /TpS= 8 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .35 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T A				
M.[-] = 13.0 tf* m					M.[+] Max= 7.9 tf* m - Abcis.= 446					M.[-] =				
13.0 tf* m														
[tf,cm] As = 7.24 -SRAS- [4 B 16.0mm]					AsL= .00 -----					As = 7.21				
-SRAS- [4 B 16.0mm]														
AsL= .00 -----					x/d = .17					As = 5.45 -STAS- [3 B 16.0mm]				
-----					x/d = .17									
x/dMx= .50					x/dMx= .50					Arm.Lat.= [2 X 3 B 8.0mm] - LN= 1.1				
[tf,cm] M[-]Min = 819.1					M[+]Min = 499.6					M[-]Min =				
819.1														
[cm2] Asapo[+]= 1.36										Asapo[+]=				
1.36														

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	850.	9.23	65.68	2	45.	.0	2.3	2.3	5.0	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	850.	.14	3.47	5	7.8	8.1	58.1	.3	.0	.0	.0	.18	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	6.587	6.587	4.49	2.04	1	P11	.00	.00	11
0	0	2	6.441	6.441	4.49	2.04	1	P12	.00	.00	12
0	0	0	0								0

Viga= 103 V103

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

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 8.92 /B= .20 /H= .70 /BCs= 1.09 /BCi= .00 /TpS= 8 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .35 /Flt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T A				
M.[-] = 12.9 tf* m					M.[+] Max= 7.8 tf* m - Abcis.= 446					M.[-] =				
12.8 tf* m														
[tf,cm] As = 7.14 -SRAS- [4 B 16.0mm]					AsL= .00 -----					As = 7.12				
-SRAS- [4 B 16.0mm]														
AsL= .00 -----					x/d = .17					As = 5.45 -STAS- [3 B 16.0mm]				
-----					x/d = .17									
x/dMx= .50					x/dMx= .50					Arm.Lat.= [2 X 3 B 8.0mm] - LN= 1.1				
[tf,cm] M[-]Min = 819.1					M[+]Min = 499.6					M[-]Min =				
819.1														
[cm2] Asapo[+]= 1.36										Asapo[+]=				
1.36														

[tf,cm] | M[-]Min = 819.1 | M[+]Min = 499.6 | M[-]Min = 819.1
 [cm2] | Asapo[+]= 1.36 | Asapo[+]= 1.36

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	850.	9.18	65.68	2	45.	.0	2.3	2.3	5.0	17.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	850.	.14	3.47	5	7.8	8.1	58.1	.3	.0	.0	.0	.18	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	P9	.00	.00	9
0	0	0	0	0	0	0	P10	.00	.00	10

Viga= 901 V901 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 1.98 /B= .25 /H= 4.50 /BCs= .45 /BCi= .00 /TpS= 5 /Esp.LS= .35 /Esp.LI= .00 FSp.Ex= 2.25 /FLt.Ex= .13 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .1 tf* m | M.[+] Max= .1 tf* m - Abcis.= 148 | M.[-] =
 .3 tf* m | As = 17.57 -SRAS- [6 B 20.0mm] | AsL= .00 ----- | As = 17.22
 [tf,cm] | AsL= .00 ----- | As = 17.91 -STAS- [6 B 20.0mm] | AsL= .00
 ----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 23 B 8.0mm] - LN= 9.9 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 20925.1 | M[+]Min = 19968.3 | M[-]Min =
 19625.3 |
 [cm2] | Asapo[+]= 17.91 | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	50.	1.65	565.79	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	50.	.44	64.28	5	11.8	13.1	438.1	.1	.0	.0	.0	.01	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	0	0	0	0	P7	.00	.00	7
0	0	0	0	0	0	0	P6	.00	.00	6

5 ADENSADOR DE LODO

5 ADENSADOR DE LODO

5.1 Caracterização da obra

O Adensador de Lodo constitui-se por uma estrutura em concreto armado na forma de um tanque cilíndrico com um diâmetro interno de 12 m e uma altura na borda de 3,60 m. O fundo inclina-se para o centro com uma declividade aproximada de 15,3%. No centro existe um poço tronco cônico invertido por cujo centro, de baixo para cima, é bombeada a afluência vinda do Tanque de Aeração. Na parede cilíndrica existe um canal externo alimentado por uma ranhura na forma de ladrão.

As estruturas de todos os elementos acima são em concreto armado, conforme já mencionado, e as fundações em estacas escavadas do tipo hélice contínua.

5.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônicos e hidráulico, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR 6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, foi observado o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN.

A Classe de Agressividade Ambiental adotada, conforme as especificações da CORSAN, foi a III indicada na Tabela 6.1 da NBR 6118/2003, correspondendo a agressividade *forte*.

Para esta classe a NBR 6118 estabelece o seguinte:

- g) Especificações para o concreto:
 - Classe de concreto: $\geq C30$ – $f_{ck} \geq 30\text{Mpa}$ (300 kgf/cm²);
 - $E_{cs} = 0,85 E_{ci} = 26072 \text{ Mpa}$ (260720 kgf/cm²);
 - Fator água cimento máximo = 0,55.
- h) Especificações para cobrimentos de armaduras (CORSAN):
 - Vigas e pilares: 45 mm
 - Lajes : 45 mm

Como carregamentos específicos deste projeto têm-se:

- ix) Peso específico aparente do lodo: 1,2 tf/m³.
- x) Nas passarelas e escadas foi considerada uma sobrecarga acidental de 300 kfg/m².

Para efeito do cálculo das pressões nas paredes e lajes de fundo o nível de lodo foi considerado como com a altura máxima das próprias paredes admitindo-se, à favor da segurança, a possibilidade deste enchimento máximo.

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, elaborados, respectivamente, pelas empresas Fundasolos Engenharia de Solos e Fundações Ltda, datado de 1982, e RW – Geologia e Geotecnia Ltda, de setembro de 2010.

5.3 Concepção geral do(s) modelo(S) estrutural(is)

A estrutura do adensador está basicamente constituída por uma laje de fundo, apoiada em blocos sobre estacas modelada como uma grelha plana no cad TQS. As paredes, por sua

vez, foram modeladas com cascas cilíndricas submetidas a esforços radiais oriundos da pressão do lodo. Complementarmente foi dimensionada, à título de verificação geral e de determinação das armaduras inferior e superior, como viga parede. Além disso, foi verificada a fissuração limitada a 0,1 mm e a armadura mínima de absorção dos esforços horizontais de retração. A Figura 1 ilustra de forma geral o modelo.

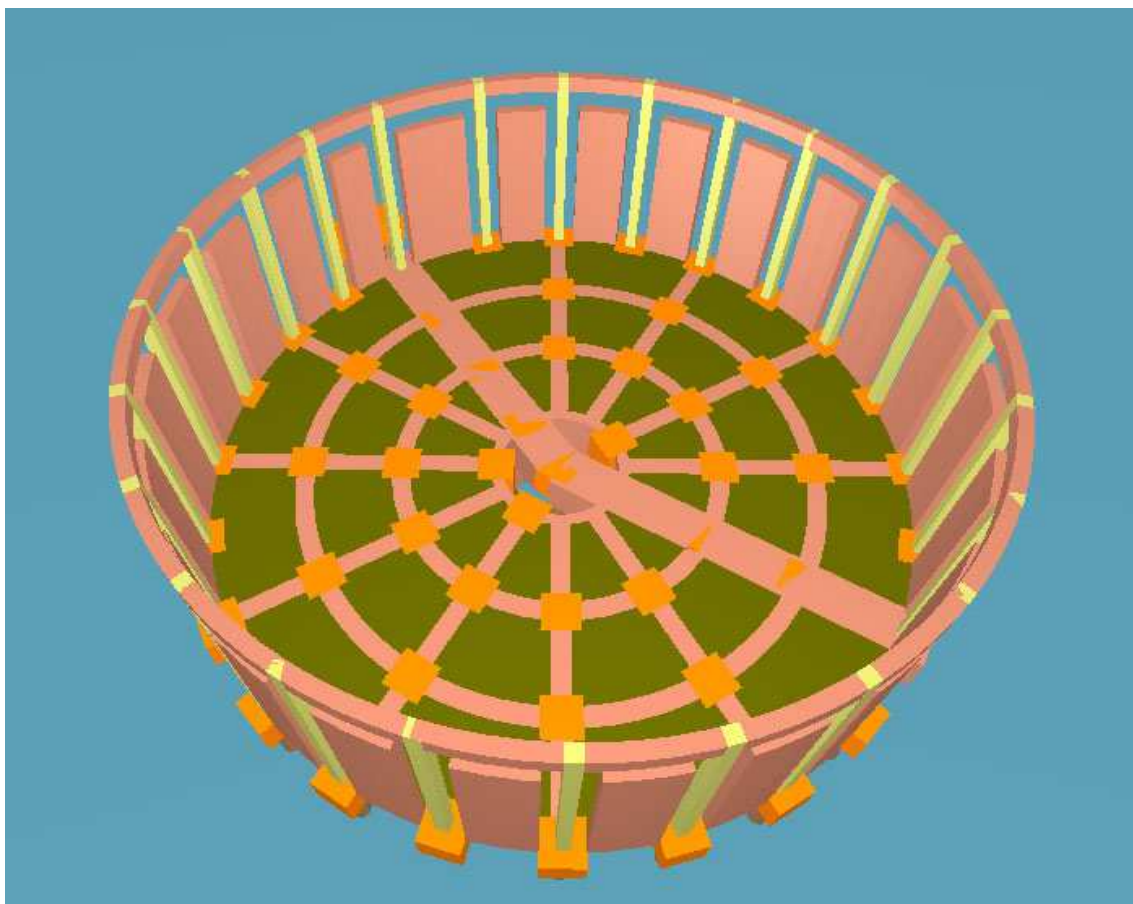


Figura 1 – Vista geral do modelo do adensador construído no TQS.

5.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento (grelha de fundo), discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito, os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais. Neste modelo de pórtico, as lajes horizontais são tratadas como diafragmas rígidos e os

esforços são distribuídos entre os pilares de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária, parcial ou total, e, posteriormente, final de detalhamento e desenho. O dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. De uma forma geral os procedimentos são os seguintes:

- 13º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.
- 14º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 15º. Detalhamento final e desenho.
- 16º. Emissão de plantas.

5.5 Memorial de Desenvolvimento e resultados do projeto

5.5.1 Esforços nas paredes:

A Tabela 1 e as Figuras 2 e 3 mostram os esforços nas paredes do adensador.

Tabela 1 – Esforços nas paredes (Montoya, 7ª Ed., 1973, p.620)

Z	x	N(kgf)	M(kgfm)	Q
0,10	3,50	191,73	1338,97	-1876,66
0,20	3,40	709,04	1012,14	-1505,69
0,30	3,30	1472,63	725,14	-1174,19
0,40	3,20	2412,85	475,79	-880,75
0,50	3,10	3469,17	261,65	-623,59
0,60	3,00	4589,60	80,14	-400,63
0,70	2,90	5730,08	-71,41	-209,60
0,80	2,80	6853,78	-195,71	-48,10
0,90	2,70	7930,52	-295,41	86,34
1,00	2,60	8936,06	-373,14	196,20
1,10	2,50	9851,50	-431,42	283,92
1,20	2,40	10662,65	-472,65	351,91
1,30	2,30	11359,47	-499,09	402,46
1,40	2,20	11935,50	-512,88	437,77
1,50	2,10	12387,36	-515,95	459,88
1,60	2,00	12714,28	-510,10	470,72
1,70	1,90	12917,62	-496,98	472,06
1,80	1,80	13000,55	-478,03	465,53
1,90	1,70	12967,64	-454,58	452,57
2,00	1,60	12824,55	-427,78	434,53
2,10	1,50	12577,76	-398,64	412,58
2,20	1,40	12234,31	-368,05	387,74
2,30	1,30	11801,62	-336,74	360,92
2,40	1,20	11287,26	-305,35	332,91
2,50	1,10	10698,84	-274,40	304,37
2,60	1,00	10043,85	-244,32	275,86
2,70	0,90	9329,58	-215,46	247,84
2,80	0,80	8563,03	-188,06	220,67
2,90	0,70	7750,83	-162,32	194,66
3,00	0,60	6899,23	-138,38	170,04
3,10	0,50	6014,03	-116,31	146,95
3,20	0,40	5100,59	-96,16	125,52
3,30	0,30	4163,78	-77,91	105,81
3,40	0,20	3208,04	-61,54	87,83
3,50	0,10	2237,34	-46,99	71,58
3,60	0,00	1255,21	-34,18	57,02

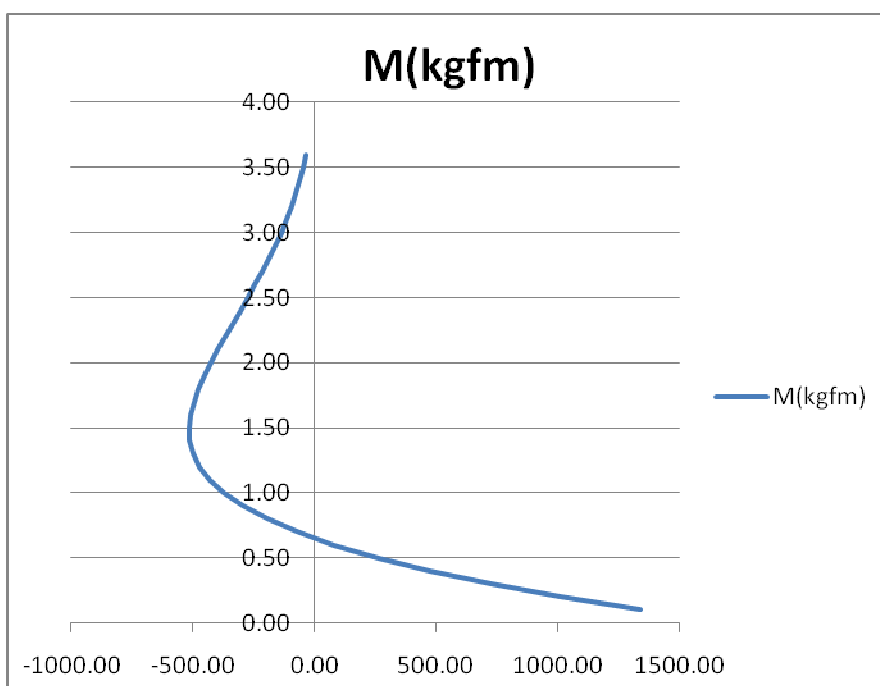


Figura 2 – Momentos fletores nas paredes.

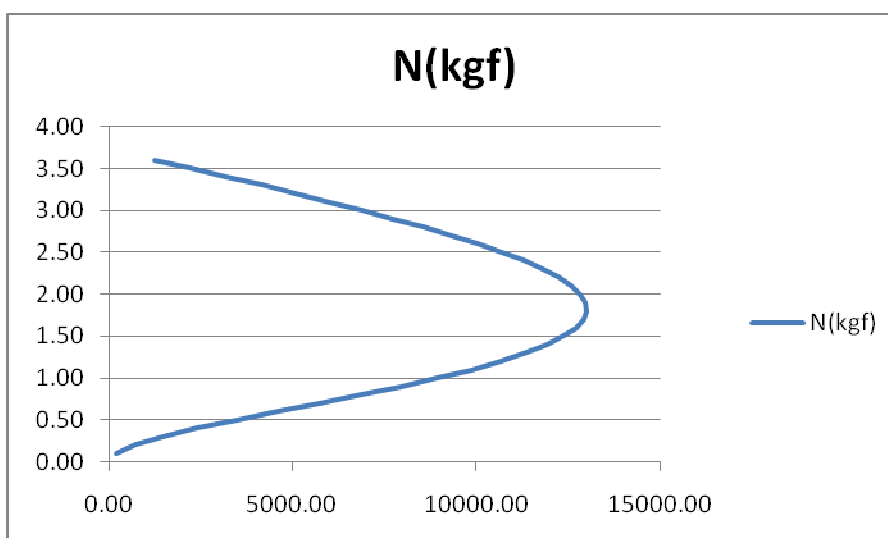


Figura 3 – Esforços de tração nas paredes.

5.5.2 Esforços na laje de fundo:

A laje de fundo foi discretizada como grelha na forma de vigas faixas de mesma espessura da laje. A Figura 4 ilustra os momentos fletores utilizados para o dimensionamento das vigas.

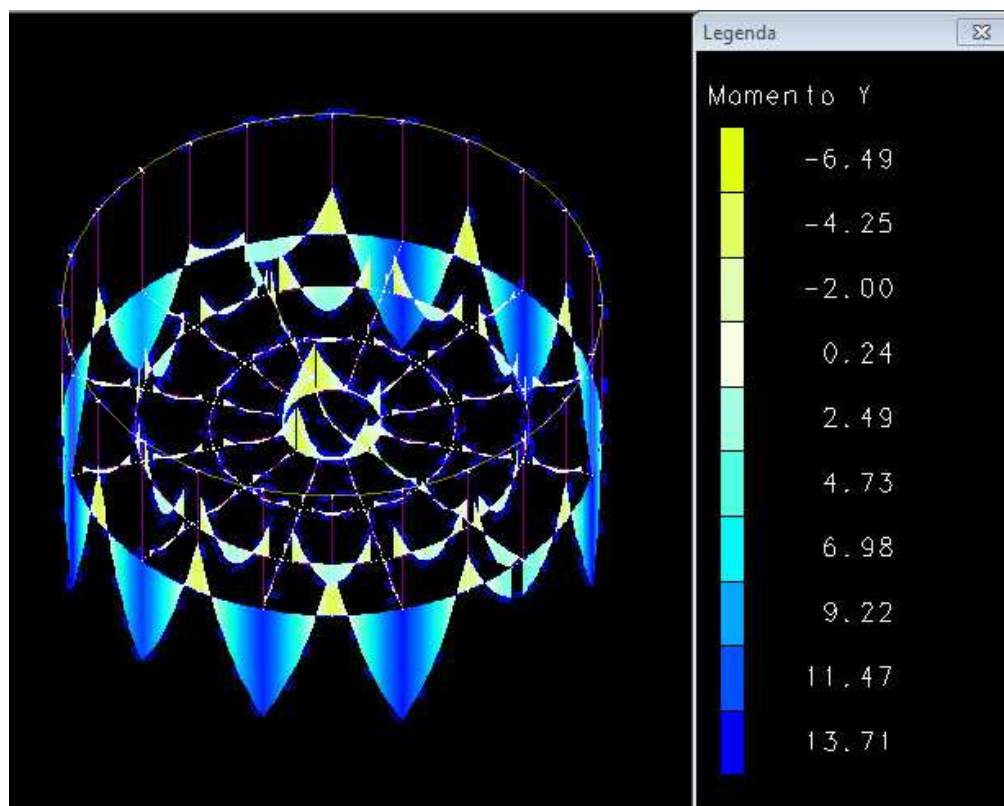


Figura 4 – Momentos fletores nas estruturas do modelo da laje de fundo.

A seguir são apresentados os relatórios das vigas desse modelo.

JOAO SOARES VIEGAS FILHO
Pg 1
AV. REPUBLICA, 440 AREAL
32283060
T Q S Projeto: 0002 - Fundação
19/11/11
CAD/Vigas
04:47:13

R E L G E R - Relatório geral de vigas (V15.7.1)
PELOTAS 96077-230 RS

fck=300.kgf/cm2 - Aco: 50A - Esforços Característicos

L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator
de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa
Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
Espessura Laje 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.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
Espacamento selecionado
NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura transversal-Suspensao
A R M A D U R A S - T O R C A O
%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de torcao
b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao
p/NR estribos selecionado
Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre / segue / vigas
M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
=====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.70 /B= .40 /H= .25 /BCs= .66 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.0 tf* m | M.[+] Max= .4 tf* m - Abcis.= 84 | M.[-] =
.5 tf* m | [tf,cm] | As = 2.33 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.56
-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .09 | As = 2.51 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 136.3 | M[+]Min = 148.2 | M[-]Min =
148.2 | [cm2] | Asapo[+]= .63 | Asapo[+]=
1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	155.	3.94	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	155.	.02	2.68	5	7.7	28.1	13.1	.1	.0	.0	.0	.11	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.41 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .7 tf* m | M.[+] Max= .2 tf* m - Abcis.= 103 | M.[-] =
.9 tf* m | [tf,cm] | As = 2.21 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.20
-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .09 | As = 2.18 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 128.7 | M[+]Min = 128.7 | M[-]Min =
128.7 | [cm2] | Asapo[+]= 1.42 | Asapo[+]=
1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	4.19	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 126. .04 2.68 5 7.7 28.1 13.1 .1 .0 .0 .0 .12 N

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

Vao= 3 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A

| M.[-] = 1.0 tf* m | M.[+] Max= .6 tf* m - Abcis.= 101 | M.[-] =

.9 tf* m | As = 2.37 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 1.99

-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .09 | As = 2.34 -STAS- [5 B 8.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 138.2 | M[+]Min = 138.2 | M[-]Min =

116.6 |

[cm2] | Asapo[+]= 1.42 | Asapo[+]=

.58 |

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

E N S A G E M

[tf,cm] 0.- 126. 6.52 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 126. .07 2.68 5 7.7 28.1 13.1 .2 .0 .0 .0 .19 N

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

0 0 0 1 2.808 2.808 .25 .05 2 V14 .00 .00 0 0

0 0 0 2 5.005 5.005 .80 .33 1 B20 .00 .00 8020 0

0 0 0 3 7.543 7.543 .80 .33 1 B16 .00 .00 8016 0

0 0 0 4 4.517 4.517 .80 .33 0 B11 .00 .00 8011 0

0 0 0 0 0 0 0 0 0 0 0 0 0

=====

=====

Viga= 2 V2 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.17 /B= 1.00 /H= .95 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A

| M.[-] = .3 tf* m | M.[+] Max= .6 tf* m - Abcis.= 53 | M.[-] =

.5 tf* m | As = 14.25 -SRAS- [7 B 16.0mm] | AsL= .00 ----- | As = 14.25

-SRAS- [5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 14.25 -SRAS- [7 B 16.0mm] | AsL= .00

----- x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 8 B 12.5mm] - LN= 4.0 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 3266.2 | M[+]Min = 3266.2 | M[-]Min =

3266.2 |

[cm2] | Asapo[+]= 14.25 | Asapo[+]=

13.54 |

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

E N S A G E M

[tf,cm] 0.- 60. 4.82 455.69 2 45. .0 11.6 11.6 6.3 10.0 4 .0 .0

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

E N S A G E M

[tf,cm] 0.- 60. 1.37 122.72 5 24.4 75.6 70.6 .3 .0 .0 .0 .02 N

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

Vao= 2 /L= 1.85 /B= 1.00 /H= .95 /BCs= 1.22 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

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- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E 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= .6 tf* m - Abcis.= 121 | M.[-] =
.9 tf* m | | | |
[tf,cm]| As = 15.08 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.08
-SRAS- [ 5 B 20.0mm] | | | |
| AsL= .00 ----- x/d = .05 | As = 15.08 -STAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .05 | | | |
| x/dMx= .50 | Arm.Lat.=[2 X 8 B 12.5mm] - LN= 3.2 |
x/dMx= .50 | | | |
[tf,cm]| M[-]Min = 3723.8 | M[+]Min = 3433.2 | M[-]Min =
3723.8 | | | |
[cm2 ]| Asapo[+]= 13.54 | | | |
13.54 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	128.	6.36	455.69	2	45.	.0	11.6	11.6	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	128.	.51	122.72	5	24.4	75.6	70.6	.1	.0	.0	.0	.02	N	

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

Vao= 3 /L= 1.83 /B= 1.00 /H= .95 /BCs= 1.22 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.1 tf* m | M.[+] Max= .5 tf* m - Abcis.= 85 | M.[-] =
2.8 tf* m | | | |
[tf,cm]| As = 15.07 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.07
-SRAS- [ 5 B 20.0mm] | | | |
| AsL= .00 ----- x/d = .05 | As = 15.07 -STAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .05 | | | |
| x/dMx= .50 | Arm.Lat.=[2 X 8 B 12.5mm] - LN= 3.2 |
x/dMx= .50 | | | |
[tf,cm]| M[-]Min = 3718.4 | M[+]Min = 3431.3 | M[-]Min =
3718.4 | | | |
[cm2 ]| Asapo[+]= 13.54 | | | |
13.54 | | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	8.73	455.69	2	45.	.0	11.6	11.6	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.22	122.72	5	24.4	75.6	70.6	.0	.0	.0	.0	.02	N	

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

Vao= 4 /L= 1.83 /B= 1.00 /H= .95 /BCs= 1.22 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.9 tf* m | M.[+] Max= 2.4 tf* m - Abcis.= 113 | M.[-] =
36.1 tf* m | | | |
[tf,cm]| As = 15.07 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.07
-SRAS- [ 5 B 20.0mm] | | | |
| AsL= .00 ----- x/d = .05 | As = 15.07 -STAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .05 | | | |
| x/dMx= .50 | Arm.Lat.=[2 X 8 B 12.5mm] - LN= 3.2 |
x/dMx= .50 | | | |
[tf,cm]| M[-]Min = 3719.6 | M[+]Min = 3431.8 | M[-]Min =
3719.6 | | | |

```

[cm²] | Asapo[+]= 13.54
15.07

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	13.90	455.69	2	45.	.0	11.6	11.6	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.01	122.72	5	24.4	75.6	70.6	.0	.0	.0	.0	.03	N	

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

Vao= 5B /L= .61 /B= 1.00 /H= .95 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO M[-]=	36.10 tf* m	As =	14.25	-SRAS-	[7 B 16.0mm]
BAL.DIR		x/d =	.04	AsL=	.00 -Arm.Lat.= [2 X 8 B 12.5mm]
.4					
[tf,cm] M[-]Min=	3266.2	- x/dMx =	1.00		%
Baric.Armad.=	1				

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	10.	1.28	455.69	2	45.	.0	11.6	11.6	6.3	10.0	4	.0	.0	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	3.062	3.062	.80	.12	1	B28	.00	.00	8028 0
0 0 0	2	7.865	7.865	.80	.12	1	B29	.00	.00	8029 0
0 0 0	3	7.822	7.822	.80	.12	1	B30	.00	.00	8030 0
0 0 0	4	15.927	15.927	.80	.12	1	B31	.00	.00	8031 0
0 0 0	5	7.710	7.710	.80	.12	0	B32	.00	.00	8032 0
0 0 0	0	0	0	0	0	0	0	0	0	0

Viga= 3 V3 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] =	.8 tf* m	M.[+] Max=
1.1 tf* m		.5 tf* m - Abcis.=
[tf,cm] As =	2.24 -SRAS- [5 B 8.0mm]	AsL=
-SRAS- [6 B 8.0mm]	.00	-----
AsL=	.00	As =
----- x/d =	.09	2.59 -STAS- [5 B 8.0mm]
		AsL=
x/dMx=	.50	Arm.Lat.= [2 X 1 B 5.0mm] - LN=
		1.1
[tf,cm] M[-]Min =	116.6	M[+]Min =
138.3		138.3
[cm ²] Asapo[+]=	.65	
1.68		Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	6.32	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.19	2.68	5	7.7	28.1	13.1	.6	3.6	.3	.1	.23	N	

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

Vao= 2 /L= 1.41 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .9 tf* m | M.[+] Max= .4 tf* m - Abcis.= 103 | M.[-] =
.7 tf* m | [tf,cm] As = 2.45 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.46
-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 2.43 -STAS- [5 B 8.0mm] | AsL= .00
----- | x/d = .09 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |
x/dMx= .50 | |
[tf,cm] | M[-]Min = 128.7 | M[+]Min = 128.7 | M[-]Min =
128.7 | |
[cm2] | Asapo[+]= 1.68 | | Asapo[+]=
1.68 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	4.98	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.15	2.68	5	7.7	28.1	13.1	.5	3.6	.3	.1	.18	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.70 /B= .40 /H= .25 /BCs= .65 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .8 tf* m | M.[+] Max= .3 tf* m - Abcis.= 117 | M.[-] =
.8 tf* m | [tf,cm] As = 2.56 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.33
-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .10 | As = 2.50 -STAS- [5 B 8.0mm] | AsL= .00
----- | x/d = .09 | x/dMx= .50 | |
x/dMx= .50 | |
[tf,cm] | M[-]Min = 148.0 | M[+]Min = 148.0 | M[-]Min =
136.2 | |
[cm2] | Asapo[+]= 1.42 | | Asapo[+]=
.63 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	155.	3.53	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	155.	.03	2.68	5	7.7	28.1	13.1	.1	.0	.0	.0	.10	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	3.919	3.919	.80	.33	0	B24	.00	.00	8024
0	0	0	7.954	7.954	.80	.33	1	B25	.00	.00	8025
0	0	0	5.746	5.746	.80	.33	1	B26	.00	.00	8026
0	0	0	2.521	2.521	.25	.05	2	V15	.00	.00	0

Viga= 4 V4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.14 /B= 1.00 /H= .95 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
.47 /FLt.Ex= .50 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .4 tf* m | M.[+] Max= .7 tf* m - Abcis.= 62 | M.[-] =
.0 tf* m |

```

[tf,cm] | As = 14.25 -SRAS- [ 7 B 16.0mm ] | AsL= .00 ----- | As = 14.25
-SRAS- [ 5 B 20.0mm ] | AsL= .00 ----- | As = 14.25 -SRAS- [ 7 B 16.0mm ] | AsL= .00
----- | x/d = .04 | x/d = .04 | As = 14.25 -SRAS- [ 7 B 16.0mm ] | AsL= .00
| x/dMx= .50 | x/dMx= .50 | Arm.Lat.=[2 X 8 B 12.5mm] - LN= 4.0 |
| [tf,cm] | M[-]Min = 3266.2 | M[+]Min = 3266.2 | M[-]Min =
3266.2
[cm2 ] | Asapo[+]= 14.25 | Asapo[+]=
13.82

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 57. 5.04 455.69 2 45. .0 11.6 11.6 6.3 10.0 4 .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.- 57. .84 122.72 5 24.4 75.6 70.6 .2 .0 .0 .0 .02 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.85 /B= 1.00 /H= .95 /BCs= 1.22 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.47 /FLt.Ex= .50 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.0 tf* m | M.[+] Max= .4 tf* m - Abcis.= 121 | M.[-] =
1.2 tf* m | As = 15.08 -SRAS- [ 5 B 20.0mm ] | AsL= .00 ----- | As = 15.08
[tf,cm] | AsL= .00 ----- | As = 15.08 -STAS- [ 5 B 20.0mm ] | AsL= .00
----- | x/d = .05 | x/d = .05 | Arm.Lat.=[2 X 8 B 12.5mm] - LN= 3.2 |
| x/dMx= .50 | x/dMx= .50 |
| [tf,cm] | M[-]Min = 3724.3 | M[+]Min = 3433.3 | M[-]Min =
3724.3
[cm2 ] | Asapo[+]= 13.54 | Asapo[+]=
13.54

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 128. 6.73 455.69 2 45. .0 11.6 11.6 6.3 10.0 4 .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.- 128. 2.40 122.72 5 24.4 75.6 70.6 .5 .0 .0 .0 .03 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.81 /B= 1.00 /H= .95 /BCs= 1.22 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.47 /FLt.Ex= .50 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.2 tf* m | M.[+] Max= .8 tf* m - Abcis.= 85 | M.[-] =
3.0 tf* m | As = 15.07 -SRAS- [ 5 B 20.0mm ] | AsL= .00 ----- | As = 15.07
[tf,cm] | AsL= .00 ----- | As = 15.07 -STAS- [ 5 B 20.0mm ] | AsL= .00
----- | x/d = .05 | x/d = .05 | Arm.Lat.=[2 X 8 B 12.5mm] - LN= 3.3 |
| x/dMx= .50 | x/dMx= .50 |
| [tf,cm] | M[-]Min = 3715.5 | M[+]Min = 3430.4 | M[-]Min =
3715.5
[cm2 ] | Asapo[+]= 13.54 | Asapo[+]=
13.54

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 124. 10.36 455.69 2 45. .0 11.6 11.6 6.3 10.0 4 .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.- 124. 1.87 122.72 5 24.4 75.6 70.6 .4 .0 .0 .0 .04 N

```


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

 Vao= 4 /L= 1.83 /B= 1.00 /H= .95 /BCs= 1.22 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.1 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 129 | M.[-] =
 36.1 tf* m | [tf,cm] As = 15.07 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.07
 -SRAS- [5 B 20.0mm] | AsL= .00 ----- x/d = .05 | As = 15.07 -STAS- [5 B 20.0mm] | AsL= .00
 ----- x/d = .05 | x/dMx= .50 | Arm.Lat.= [2 X 8 B 12.5mm] - LN= 3.2 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 3719.4 | M[+]Min = 3431.7 | M[-]Min =
 3719.4 | |
 [cm2] | Asapo[+]= 13.54 | | Asapo[+]=
 15.07

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	13.60	455.69	2	45.	.0	11.6	11.6	6.3	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	4.93	122.72	5	24.4	75.6	70.6	1.1	.0	.0	.0	.07	N	

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

 Vao= 5B /L= .61 /B= 1.00 /H= .95 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .47 /Flt.Ex= .50 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO | M[-]= 36.10 tf* m | As = 14.25 -SRAS- [7 B 16.0mm]
 BAL.DIR | x/d = .04 | AsL= .00 -Arm.Lat.= [2 X 8 B 12.5mm]
 .4 |
 [tf,cm] | M[-]Min= 3266.2 - x/dMx = 1.00 | | %
 Baric.Armad.= 1

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	10.	1.27	455.69	2	45.	.0	11.6	11.6	6.3	10.0	4	.0	.0	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	8028	Pilares:
0	0	0	3.593	3.593	.89	.16	1	B28	.00	.00	8028	0
0	0	2	7.477	7.477	.80	.12	1	B22	.00	.00	8022	0
0	0	3	9.136	9.136	.80	.12	1	B21	.00	.00	8021	0
0	0	4	16.867	16.867	.80	.12	1	B17	.00	.00	8017	0
0	0	5	6.898	6.898	.80	.12	0	B12	.00	.00	8012	0

Viga= 5 V5 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.70 /B= .40 /H= .25 /BCs= .66 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .8 tf* m | M.[+] Max= .5 tf* m - Abcis.= 84 | M.[-] =
 .7 tf* m | [tf,cm] As = 2.06 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 2.56
 -SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 2.51 -STAS- [5 B 8.0mm] | AsL= .00
 ----- x/d = .10

x/dMx= .50															
[tf,cm] M[-]Min = 121.0					M[+]Min = 148.2					M[-]Min =					
148.2															
[cm2] Asapo[+]= .63										Asapo[+]=					
1.42															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	155.	4.26	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	155.	.01	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.11	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 2 /L= 1.41 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
M.[-] = .9 tf* m						M.[+] Max= .2 tf* m - Abcis.= 103					M.[-] =				
.8 tf* m															
[tf,cm] As = 2.21 -SRAS- [4 B 10.0mm]						AsL= .00 -----					As = 2.20				
-SRAS- [5 B 8.0mm]															
AsL= .00 -----						x/d = .09					As = 2.18 -STAS- [5 B 8.0mm]				
-----						x/d = .08					AsL= .00				
						x/dMx= .50									
x/dMx= .50															
[tf,cm] M[-]Min = 128.7						M[+]Min = 128.7					M[-]Min =				
128.7															
[cm2] Asapo[+]= 1.42											Asapo[+]=				
1.42															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	4.18	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.06	2.68	5	7.7	28.1	13.1	.2	.0	.0	.0	.13	N	
----- G E O M E T R I A E C A R G A S -----															
Vao= 3 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO- E S Q U E R D A						M E I O D O V A O					D I R E I T				
A															
M.[-] = .9 tf* m						M.[+] Max= .6 tf* m - Abcis.= 100					M.[-] =				
.9 tf* m															
[tf,cm] As = 2.37 -SRAS- [5 B 8.0mm]						AsL= .00 -----					As = 1.99				
-SRAS- [4 B 8.0mm]															
AsL= .00 -----						x/d = .09					As = 2.34 -STAS- [5 B 8.0mm]				
-----						x/d = .08					AsL= .00				
						x/dMx= .50									
x/dMx= .50															
[tf,cm] M[-]Min = 138.2						M[+]Min = 138.2					M[-]Min =				
116.6															
[cm2] Asapo[+]= 1.42											Asapo[+]=				
.58															
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	6.31	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.08	2.68	5	7.7	28.1	13.1	.2	.0	.0	.0	.19	N	
REAC. APOIO - No.	1	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:					
0	0	0	0	0	0	0	0	0	0	0					
0	0	2	5.779	5.779	.80	.33	1	B35	.00	.00	8035	0			
0	0	0	0	0											

0	0	3	7.226	7.226	.80	.33	1	B39	.00	.00	8039	0
0	0	4	4.489	4.489	.80	.33	0	B44	.00	.00	8044	0

Viga= 6 V6 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .7 tf* m | M.[+] Max= .6 tf* m - Abcis.= 57 | M.[-] =
1.3 tf* m | [tf,cm] As = 1.99 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 2.37
-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .08 | As = 2.34 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .09 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 116.6 | M[+]Min = 138.3 | M[-]Min =
138.3 | [cm2] | Asapo[+]= .58 | Asapo[+]=
1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	7.01	39.71	2	45.	.4	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.05	2.68	5	7.7	28.1	13.1	.1	.0	.0	.0	.19	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.42 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .9 tf* m | M.[+] Max= .5 tf* m - Abcis.= 103 | M.[-] =
.9 tf* m | [tf,cm] As = 2.20 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.20
-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .08 | As = 2.18 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 129.0 | M[+]Min = 129.0 | M[-]Min =
129.0 | [cm2] | Asapo[+]= 1.42 | Asapo[+]=
1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	127.	5.52	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	127.	.05	2.68	5	7.7	28.1	13.1	.1	.0	.0	.0	.16	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.42 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

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

| M.[-] = .8 tf* m | M.[+] Max= .3 tf* m - Abcis.= 116 | M.[-] =
 .4 tf* m | As = 2.37 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 1.99
 [tf,cm] | AsL= .00 ----- x/d = .09 | As = 2.34 -STAS- [5 B 8.0mm] | AsL= .00
 ----- x/d = .08 | x/dMx= .50 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 138.5 | M[+]Min = 138.5 | M[-]Min =
 116.7 | Asapo[+]= 1.42 | Asapo[+]=
 .78

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	127.	4.25	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	127.	.00	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.11	N	

REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0 1	4.132	4.132	.80	.33	0	B42	.00	.00	8042	0
0 0 0 2	8.822	8.822	.80	.33	1	B38	.00	.00	8038	0
0 0 0 3	6.825	6.825	.80	.33	1	B33	.00	.00	8033	0
0 0 0 4	2.417	2.417	.80	.33	1	B27	.00	.00	8027	0

Viga= 7 V7 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.74 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 9.3 tf* m - Abcis.= 0 | M.[-] =
 2.4 tf* m | As = 2.24 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 15.60
 [tf,cm] | AsL= .00 ----- x/d = .00 | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 -SRAS- [5 B 20.0mm] | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5 |
 ----- x/dMx= .50 |
 [tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
 15657.4 | Asapo[+]= 15.60 | Asapo[+]=
 [cm2] | 14.82

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	93.	15.74	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	93.	1.02	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.05	N	

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

 Vao= 2 /L= 1.75 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 2.4 tf* m | M.[+] Max= .0 tf* m - Abcis.= 175 | M.[-] =
 1.5 tf* m | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60
 [tf,cm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 -SRAS- [5 B 20.0mm] | x/d = .04

```

x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
[tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
15657.4
[cm2 ] | Asapo[+]= 14.82 | Asapo[+]=
14.82

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 95. 5.97 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 95. .07 59.04 5 11.8 13.1 404.1 .0 .0 .0 .0 .01 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 2.48 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .0 tf* m | M.[+] Max= 2.5 tf* m - Abcis.= 62 | M.[-] =
5.6 tf* m
[tf,cm] | As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04
x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
[tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
15657.4
[cm2 ] | Asapo[+]= 15.13 | Asapo[+]=
14.82

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 168. 13.39 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 168. .23 59.04 5 11.8 13.1 404.1 .0 .0 .0 .0 .03 N

----- G E O M E T R I A E C A R G A S -----
Vao= 4 /L= 1.98 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 5.5 tf* m | M.[+] Max= 13.0 tf* m - Abcis.= 198 | M.[-] =
.0 tf* m
[tf,cm] | As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04
x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
[tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
15657.4
[cm2 ] | Asapo[+]= 14.82 | Asapo[+]=
15.13

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 118. 20.58 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 118. .93 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .06 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
-
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .0 tf* m | M.[+] Max= 12.8 tf* m - Abcis.= 0 | M.[-] =
6.4 tf* m | [tf,cm] As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
x/dMx= .50 | | |
[tf,cm] M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
15657.4 | [cm2 ] Asapo[+]= 15.13 | Asapo[+]=
14.82 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 119. 21.10 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 119. 1.06 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .06 N

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
-
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = 6.4 tf* m | M.[+] Max= 13.0 tf* m - Abcis.= 198 | M.[-] =
.0 tf* m | [tf,cm] As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
x/dMx= .50 | | |
[tf,cm] M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
15657.4 | [cm2 ] Asapo[+]= 14.82 | Asapo[+]=
15.13 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 119. 21.09 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 119. .86 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .05 N

----- G E O M E T R I A E C A R G A S -----
Vao= 7 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
-
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A      | M.[-] = .0 tf* m | M.[+] Max= 13.1 tf* m - Abcis.= 0 | M.[-] =
5.7 tf* m | [tf,cm] As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
x/dMx= .50 | | |
[tf,cm] M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
15657.4 | [cm2 ] Asapo[+]= 15.13 | Asapo[+]=
14.82 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	20.79	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	.89	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.05	N	

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

Vao= 8 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 5.7 tf* m	M.[+] Max= 11.8 tf* m - Abcis.= 198	M.[-] =
.0 tf* m		
[tf,cm] As = 15.60 -SRAS- [5 B 20.0mm]	AsL= .00 -----	As = 15.60
-SRAS- [5 B 20.0mm]		
AsL= .00 -----	As = 15.60 -SRAS- [5 B 20.0mm]	AsL= .00
-----	x/d = .04	
x/d = .04		
x/dMx= .50	x/dMx= .50	Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5
[tf,cm] M[-]Min = 15657.4	M[+]Min = 15657.4	M[-]Min =
15657.4		
[cm2] Asapo[+]= 14.82		Asapo[+]=
15.13		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	19.67	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	1.09	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.06	N	

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

Vao= 9 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = .0 tf* m	M.[+] Max= 11.8 tf* m - Abcis.= 0	M.[-] =
5.9 tf* m		
[tf,cm] As = 15.60 -SRAS- [5 B 20.0mm]	AsL= .00 -----	As = 15.60
-SRAS- [5 B 20.0mm]		
AsL= .00 -----	As = 15.60 -SRAS- [5 B 20.0mm]	AsL= .00
-----	x/d = .04	
x/d = .04		
x/dMx= .50	x/dMx= .50	Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5
[tf,cm] M[-]Min = 15657.4	M[+]Min = 15657.4	M[-]Min =
15657.4		
[cm2] Asapo[+]= 15.13		Asapo[+]=
14.82		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	118.	20.02	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	118.	.88	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.05	N	

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

Vao=10 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 5.9 tf* m	M.[+] Max= 13.2 tf* m - Abcis.= 198	M.[-] =
.0 tf* m		

[tf,cm]	As = 15.60	-SRAS-	[5 B 20.0mm]	AsL= .00	-----	As = 15.60
-SRAS-	[5 B 20.0mm]					
	AsL= .00	-----	x/d = .04	As = 15.60	-SRAS-	[5 B 20.0mm]
	x/d = .04			AsL= .00		
			x/dMx= .50	Arm.Lat.= [2 X 34 B 6.3mm]	- LN= 16.5	
x/dMx= .50						
[tf,cm]	M[-]Min = 15657.4			M[+]Min = 15657.4		M[-]Min =
15657.4						
[cm2]	Asapo[+]= 14.82					Asapo[+]=
15.13						

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	20.96	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	.95	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.06	N	

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

Vao=11 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A														
A															
	M.[-] =	.0 tf* m													
4.6 tf* m															
[tf,cm]	As = 15.60	-SRAS-	[5 B 20.0mm]	AsL= .00	-----	As = 15.60									
-SRAS-	[5 B 20.0mm]														
	AsL= .00	-----	x/d = .04	As = 15.60	-SRAS-	[5 B 20.0mm]	AsL= .00								
	x/d = .04														
			x/dMx= .50	Arm.Lat.= [2 X 34 B 6.3mm]	- LN= 16.5										
x/dMx= .50															
[tf,cm]	M[-]Min = 15657.4			M[+]Min = 15657.4		M[-]Min =									
15657.4															
[cm2]	Asapo[+]= 15.13					Asapo[+]=									
14.82															

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	20.00	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	1.31	59.04	5	11.8	13.1	404.1	.3	.0	.0	.0	.06	N	

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

Vao=12 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -															
FLEXAO-	E S Q U E R D A														
A															
	M.[-] =	4.7 tf* m													
.0 tf* m															
[tf,cm]	As = 15.60	-SRAS-	[5 B 20.0mm]	AsL= .00	-----	As = 2.24									
-SRAS-	[3 B 10.0mm]														
	AsL= .00	-----	x/d = .04	As = 15.60	-SRAS-	[5 B 20.0mm]	AsL= .00								
	x/d = .00														
			x/dMx= .50	Arm.Lat.= [2 X 34 B 6.3mm]	- LN= 16.5										
x/dMx= .50															
[tf,cm]	M[-]Min = 15657.4			M[+]Min = 15657.4		M[-]Min =									
15657.4															
[cm2]	Asapo[+]= 14.82					Asapo[+]=									
15.60															

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	12.53	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	.22	59.04	5	11.8	13.1	404.1	.0	.0	.0	.0	.03	N	

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

0	0	1	-3.412	-3.412	.80	.00	0	B24	.00	.00	8024	0
0	0	2	15.511	15.511	.80	.00	0	B19	.00	.00	8019	0
0	0	3	4.065	4.065	.80	.00	0	B12	.00	.00	8012	0
0	0	4	24.265	24.265	.80	.00	0	B6	.00	.00	8006	0
0	0	5	-10.915	-10.915	.80	.00	0	B4	.00	.00	8004	0
0	0	6	30.135	30.135	.80	.00	0	B1	.00	.00	8001	0
0	0	7	-11.215	-11.215	.80	.00	0	B2	.00	.00	8002	0
0	0	8	28.900	28.900	.80	.00	0	B3	.00	.00	8003	0
0	0	9	-9.751	-9.751	.80	.00	0	B5	.00	.00	8005	0
0	0	10	29.269	29.269	.80	.00	0	B8	.00	.00	8008	0
0	0	11	-10.741	-10.741	.80	.00	0	B11	.00	.00	8011	0
0	0	12	23.237	23.237	.80	.00	0	B18	.00	.00	8018	0
0	0	13	-1.007	-1.008	.80	.00	0	B32	.00	.00	8032	0
0	0	0	0	0								

Viga= 8 V8 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 9.5 tf* m - Abcis.= 0 | M.[-] =
 5.1 tf* m | [tf,cm] | As = 2.24 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 15.60
 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 ----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
 15657.4 |
 [cm2] | Asapo[+]= 15.60 | Asapo[+]=
 14.82

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 119. 17.81 522.51 2 45. .0 2.9 2.9 5.0 12.0 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.- 119. .64 59.04 5 11.8 13.1 404.1 .1 .0 .0 .0 .04 N

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

Vao= 2 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 5.1 tf* m | M.[+] Max= 12.0 tf* m - Abcis.= 198 | M.[-] =
 .0 tf* m | [tf,cm] | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60
 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 ----- | x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
 15657.4 |

[cm²]| Asapo[+]= 14.82
15.13

|

| Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	19.55	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	1.15	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.06	N	

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

Vao= 3 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = .0 tf* m | M.[+] Max= 11.9 tf* m - Abcis.= 0 | M.[-] =

6.4 tf* m | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60

-SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00

----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =

15657.4 |

[cm²]| Asapo[+]= 15.13 | Asapo[+]=

14.82

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	20.39	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	.87	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.05	N	

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

Vao= 4 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T

A | M.[-] = 6.3 tf* m | M.[+] Max= 13.7 tf* m - Abcis.= 199 | M.[-] =

.0 tf* m | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60

-SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00

----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5 |

x/dMx= .50 |

[tf,cm] | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =

15657.4 |

[cm²]| Asapo[+]= 14.82 | Asapo[+]=

15.13

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	119.	21.64	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswminNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	119.	.92	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.06	N	

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

Vao= 5 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .0 tf* m | M.[+] Max= 13.7 tf* m - Abcis.= 0 | M.[-] =
6.5 tf* m
[tf,cm]| As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
x/dMx= .50
| M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
[tf,cm]| 15657.4
[cm2 ]| Asapo[+]= 15.13 | Asapo[+]=
14.82

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 119. 21.52 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 119. 1.11 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .06 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 6 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 6.5 tf* m | M.[+] Max= 12.0 tf* m - Abcis.= 198 | M.[-] =
.0 tf* m
[tf,cm]| As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
x/dMx= .50
| M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
[tf,cm]| 15657.4
[cm2 ]| Asapo[+]= 14.82 | Asapo[+]=
15.13

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 119. 20.68 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 119. .77 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .05 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 7 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex=
2.08 /FLt.Ex= .01 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .0 tf* m | M.[+] Max= 12.0 tf* m - Abcis.= 0 | M.[-] =
5.7 tf* m
[tf,cm]| As = 15.60 -SRAS- [ 5 B 20.0mm] | AsL= .00 ----- | As = 15.60
-SRAS- [ 5 B 20.0mm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [ 5 B 20.0mm ] | AsL= .00
----- x/d = .04 | x/dMx= .50 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
x/dMx= .50
| M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
[tf,cm]| 15657.4
[cm2 ]| Asapo[+]= 15.13 | Asapo[+]=
14.82

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 119. 19.97 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 119. .80 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .05 N

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

Vao= 8 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 5.7 tf* m | M.[+] Max= 12.6 tf* m - Abcis.= 198 | M.[-] =
 .0 tf* m | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60
 [tf,cm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 -SRAS- [5 B 20.0mm] | x/d = .04 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
 ----- x/dMx= .50 | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
 [tf,cm] | Asapo[+]= 14.82 | Asapo[+]=
 15.13

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 119. 20.33 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 119. 1.17 59.04 5 11.8 13.1 404.1 .3 .0 .0 .0 .06 N

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

Vao= 9 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .0 tf* m | M.[+] Max= 12.7 tf* m - Abcis.= 0 | M.[-] =
 6.0 tf* m | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60
 [tf,cm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 -SRAS- [5 B 20.0mm] | x/d = .04 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
 ----- x/dMx= .50 | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
 [tf,cm] | Asapo[+]= 15.13 | Asapo[+]=
 14.82

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 119. 20.58 522.51 2 45. .0 2.9 2.9 5.0 12.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 119. .95 59.04 5 11.8 13.1 404.1 .2 .0 .0 .0 .06 N

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

Vao=10 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /Flt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 6.0 tf* m | M.[+] Max= 13.1 tf* m - Abcis.= 198 | M.[-] =
 .0 tf* m | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00 ----- | As = 15.60
 [tf,cm] | AsL= .00 ----- x/d = .04 | As = 15.60 -SRAS- [5 B 20.0mm] | AsL= .00
 -SRAS- [5 B 20.0mm] | x/d = .04 | Arm.Lat.=[2 X 34 B 6.3mm] - LN= 16.5 |
 ----- x/dMx= .50 | M[-]Min = 15657.4 | M[+]Min = 15657.4 | M[-]Min =
 [tf,cm] | Asapo[+]= 15.13 | Asapo[+]=
 14.82

x/dMx= .50													
[tf,cm] M[-]Min = 15657.4													
15657.4													
[cm2] Asapo[+]= 14.82													
15.13													
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt AsSus
[tf,cm]	0.-	118.	20.76	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0 .0
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia AdPla
[tf,cm]	0.-	118.	.94	59.04	5	11.8	13.1	404.1	.2	.0	.0	.0	.06 N
----- G E O M E T R I A E C A R G A S -----													
Vao=11 /L= 1.99 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]													
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----													
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -													
FLEXAO- E S Q U E R D A	M E I O D O V A O							D I R E I T					
A	M.[-] = .0 tf* m							M.[+] Max= 13.1 tf* m - Abcis.= 0					
4.3 tf* m	M.[-] =							M.[-] =					
[tf,cm] As = 15.60 -SRAS- [5 B 20.0mm]	AsL= .00 -----							As = 15.60					
-SRAS- [5 B 20.0mm]	AsL= .00 -----							AsL= .00					
----- x/d = .04	x/dMx= .50							Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5					
x/dMx= .50	[tf,cm] M[-]Min = 15657.4							M[+]Min = 15657.4					
15657.4	[cm2] Asapo[+]= 15.13							Asapo[+]=					
14.82													
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt AsSus
[tf,cm]	0.-	119.	19.67	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0 .0
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia AdPla
[tf,cm]	0.-	119.	1.33	59.04	5	11.8	13.1	404.1	.3	.0	.0	.0	.06 N
----- G E O M E T R I A E C A R G A S -----													
Vao=12 /L= 2.39 /B= .25 /H= 4.16 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= 2.08 /FLt.Ex= .01 [M]													
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----													
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -													
FLEXAO- E S Q U E R D A	M E I O D O V A O							D I R E I T					
A	M.[-] = 4.3 tf* m							M.[+] Max= 3.6 tf* m - Abcis.= 238					
.0 tf* m	M.[-] =							M.[-] =					
[tf,cm] As = 15.60 -SRAS- [5 B 20.0mm]	AsL= .00 -----							As = 2.24					
-SRAS- [3 B 10.0mm]	AsL= .00 -----							AsL= .00					
----- x/d = .04	x/dMx= .50							Arm.Lat.= [2 X 34 B 6.3mm] - LN= 16.5					
Dir.=10B 10.0mm x/dMx= .50	[tf,cm] M[-]Min = 15657.4							M[+]Min = 15657.4					
15657.4	[cm2] Asapo[+]= 14.82							Asapo[+]=					
15.60													
CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt AsSus
[tf,cm]	0.-	198.	12.49	522.51	2	45.	.0	2.9	2.9	5.0	12.0	2	.0 .0
T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia AdPla
[tf,cm]	0.-	198.	.34	59.04	5	11.8	13.1	404.1	.1	.0	.0	.0	.03 N
REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:			
0	0	0	0	0	0	0	B24	.00	.00	8024	0		
0	0	0	0	0	0	0	B36	.00	.00	8036	0		

0	0	3	-9.725	-9.725	.80	.00	0	B42	.00	.00	8042	0
0	0	4	30.026	30.026	.80	.00	0	B47	.00	.00	8047	0
0	0	5	-12.199	-12.199	.80	.00	0	B50	.00	.00	8050	0
0	0	6	30.141	30.141	.80	.00	0	B52	.00	.00	8052	0
0	0	7	-10.128	-10.128	.80	.00	0	B54	.00	.00	8054	0
0	0	8	28.784	28.784	.80	.00	0	B53	.00	.00	8053	0
0	0	9	-10.646	-10.646	.80	.00	0	B51	.00	.00	8051	0
0	0	10	29.528	29.528	.80	.00	0	B48	.00	.00	8048	0
0	0	11	-10.511	-10.511	.80	.00	0	B44	.00	.00	8044	0
0	0	12	22.967	22.967	.80	.00	0	B37	.00	.00	8037	0
0	0	13	-1.960	-1.960	.03	.00	0	B32	.00	.00	8032	0

Viga= 9 V9 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.89 /B= .40 /H= .25 /BCs= .68 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 3.2 tf* m | M.[+] Max= .8 tf* m - Abcis.= 92 | M.[-] =
1.5 tf* m | [tf,cm]| As = 5.92 -SRAS- [5 B 12.5mm] | AsL= .00 ----- | As = 2.70
-SRAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .23 | As = 2.63 -STAS- [4 B 10.0mm] | AsL= .00
----- x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 154.7 | M[+]Min = 154.7 | M[-]Min =
154.7 | Asapo[+]= .66 | Asapo[+]=
1.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M [tf,cm] 0.- 174. 9.68 39.71 2 45. 4.6 4.6 4.6 5.0 10.0 4 .0 .0
T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M [tf,cm] 0.- 174. .07 2.68 5 7.7 28.1 13.1 .2 .0 .0 .0 .27 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.61 /B= .40 /H= .25 /BCs= .71 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 4.8 tf* m | M.[+] Max= 2.9 tf* m - Abcis.= 162 | M.[-] =
4.6 tf* m | [tf,cm]| As = 9.96 -SRAS- [8 B 12.5mm] | AsL= .00 ----- | As = 9.43
-SRAS- [8 B 12.5mm] | AsL= .00 ----- x/d = .38 | As = 5.36 -STAS- [7 B 10.0mm] | AsL= .00
----- x/d = .36 | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 2.1 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 161.2 | M[+]Min = 161.2 | M[-]Min =
161.2 | Asapo[+]= 1.75 | Asapo[+]=
1.75

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	246.	14.09	39.71	2	45.	11.6	4.6	16.1	8.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	246.	.37	2.68	5	7.7	28.1	13.1	1.1	3.6	.3	.1	.49	N	

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

Vao= 3 /L= 2.25 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 4.7 tf* m	M.[+] Max= 1.9 tf* m - Abcis.= 144	M.[-] =
3.6 tf* m		
[tf,cm] As = 9.60 -SRAS- [8 B 12.5mm]	AsL= .00 -----	As = 7.06
-SRAS- [6 B 12.5mm]		
AsL= .00 -----	As = 3.44 -STAS- [5 B 10.0mm]	AsL= .00
----- x/d = .26		
x/dMx= .50	Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.4	
[tf,cm] M[-]Min = 151.5	M[+]Min = 151.5	M[-]Min =
151.5		
[cm2] Asapo[+]= 1.68		Asapo[+]=
1.68		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	210.	12.75	39.71	2	45.	9.4	4.6	12.0	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	210.	.21	2.68	5	7.7	28.1	13.1	.6	3.6	.3	.1	.40	N	

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

Vao= 4 /L= 2.25 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 3.6 tf* m	M.[+] Max= 2.1 tf* m - Abcis.= 145	M.[-] =
4.1 tf* m		
[tf,cm] As = 7.03 -SRAS- [6 B 12.5mm]	AsL= .00 -----	As = 8.23
-SRAS- [4 B 16.0mm]		
AsL= .00 -----	As = 3.94 -STAS- [5 B 10.0mm]	AsL= .00
----- x/d = .31		
x/dMx= .50	Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.6	
[tf,cm] M[-]Min = 151.5	M[+]Min = 151.5	M[-]Min =
151.5		
[cm2] Asapo[+]= 1.68		Asapo[+]=
1.68		

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	210.	12.52	39.71	2	45.	9.1	4.6	12.1	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	210.	.24	2.68	5	7.7	28.1	13.1	.7	3.6	.3	.1	.41	N	

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

Vao= 5 /L= 2.25 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		
M.[-] = 4.1 tf* m	M.[+] Max= 2.1 tf* m - Abcis.= 144	M.[-] =
3.6 tf* m		

[tf,cm] | As = 8.15 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 6.90
 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 3.94 -STAS- [5 B 10.0mm] | AsL= .00
 ----- | x/d = .26 | x/d = .31 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.6 |
 x/dMx= .50 | x/dMx= .50 |
 [tf,cm] | M[-]Min = 151.4 | M[+]Min = 151.4 | M[-]Min =
 151.4 |
 [cm2] | Asapo[+]= 1.68 | Asapo[+]= 1.68

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
 E N S A G E M
 [tf,cm] 0.- 210. 12.62 39.71 2 45. 9.2 4.6 12.4 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 210. .26 2.68 5 7.7 28.1 13.1 .8 3.6 .3 .1 .41 N

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

 Vao= 6 /L= 2.25 /B= .40 /H= .25 /BCs= .74 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.7 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 150 | M.[-] =
 2.8 tf* m |
 [tf,cm] | As = 7.24 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 5.26
 -SRAS- [7 B 10.0mm] | AsL= .00 ----- | As = 3.09 -STAS- [4 B 10.0mm] | AsL= .00
 ----- | x/d = .19 | x/d = .27 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 |
 x/dMx= .50 | x/dMx= .50 |
 [tf,cm] | M[-]Min = 166.8 | M[+]Min = 166.8 | M[-]Min =
 148.7 |
 [cm2] | Asapo[+]= 1.68 | Asapo[+]= 1.68
 .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.- 210. 10.97 39.71 2 45. 6.6 4.6 8.6 6.3 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
 E N S A G E M
 [tf,cm] 0.- 210. .18 2.68 5 7.7 28.1 13.1 .6 3.6 .3 .1 .33 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	6.908	6.908	.80	.33	1	B25	.00	.00	8025
0	0	2	12.073	12.073	.80	.33	1	B17	.00	.00	8017
0	0	3	18.891	18.891	.80	.33	1	B9	.00	.00	8009
0	0	4	16.870	16.870	.80	.33	1	B7	.00	.00	8007
0	0	5	17.692	17.692	.80	.33	1	B10	.00	.00	8010
0	0	6	16.151	16.151	.80	.33	1	B16	.00	.00	8016
0	0	7	6.124	6.124	.80	.33	1	B31	.00	.00	8031

=====

Viga= 10 V10 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 2.25 /B= .40 /H= .25 /BCs= .74 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 - - - - -

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.0 tf* m | M.[+] Max= 2.4 tf* m - Abcis.= 107 | M.[-] =
 4.3 tf* m |

[tf,cm]	As = 5.64	-SRAS-	[7 B 10.0mm]	AsL= .00	-----	As = 8.53
-SRAS-	[7 B 12.5mm]					
	AsL= .00	-----	x/d = .21	As = 4.29	-STAS-	[6 B 10.0mm]
	x/d = .32			AsL= .00		
			x/dMx= .50	Arm.Lat.= [2 X 1 B 5.0mm]	- LN= 1.6	
x/dMx= .50						
[tf,cm]	M[-]Min = 129.3			M[+]Min = 166.7		M[-]Min =
166.7						
[cm2]	Asapo[+]= 1.07					Asapo[+]=
1.68						
CISALHAMENTO- EN S A G E M						
[tf,cm]	Xi	Xf	Vsd	VRd2	MdC	Ang.
	0.- 105.	11.45	39.71	2	45.	7.4
	105.- 210.	13.00	39.71	2	45.	9.8
						4.6
						10.4
						6.3
						10.0
						4
						.0
						.0
						.0
T O R C A O- EN S A G E M						
[tf,cm]	Xi	Xf	Tsd	TRd2	%dT	he
	0.- 105.	.24	2.68	5	7.7	28.1
	105.- 210.	.27	2.68	5	7.7	28.1
						13.1
						.7
						3.6
						.3
						.1
						.38
						N
						.43
						N
G E O M E T R I A E C A R G A S						
Vao= 2 /L= 2.25 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .01 [M]						
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----						
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -						
FLEXAO-	E S Q U E R D A			M E I O	D O	V A O
A						D I R E I T
	M.[-] = 4.3 tf* m			M.[+] Max= 2.1 tf* m	Abcis.= 145	M.[-] =
3.8 tf* m						
[tf,cm]	As = 8.45	-SRAS-	[7 B 12.5mm]	AsL= .00	-----	As = 7.46
-SRAS-	[6 B 12.5mm]					
	AsL= .00	-----	x/d = .32	As = 3.85	-STAS-	[5 B 10.0mm]
	x/d = .28			AsL= .00		
			x/dMx= .50	Arm.Lat.= [2 X 1 B 5.0mm]	- LN= 1.6	
x/dMx= .50						
[tf,cm]	M[-]Min = 151.6			M[+]Min = 151.6		M[-]Min =
151.6						
[cm2]	Asapo[+]= 1.68					Asapo[+]=
1.68						
CISALHAMENTO- EN S A G E M						
[tf,cm]	Xi	Xf	Vsd	VRd2	MdC	Ang.
	0.- 210.	12.85	39.71	2	45.	9.6
						4.6
						12.4
						6.3
						10.0
						4
						.0
						.0
T O R C A O- EN S A G E M						
[tf,cm]	Xi	Xf	Tsd	TRd2	%dT	he
	0.- 210.	.23	2.68	5	7.7	28.1
						13.1
						.7
						3.6
						.3
						.1
						.41
						N
G E O M E T R I A E C A R G A S						
Vao= 3 /L= 2.24 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .01 [M]						
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----						
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -						
FLEXAO-	E S Q U E R D A			M E I O	D O	V A O
A						D I R E I T
	M.[-] = 3.9 tf* m			M.[+] Max= 2.1 tf* m	Abcis.= 144	M.[-] =
3.9 tf* m						
[tf,cm]	As = 7.60	-SRAS-	[7 B 12.5mm]	AsL= .00	-----	As = 7.52
-SRAS-	[6 B 12.5mm]					
	AsL= .00	-----	x/d = .28	As = 3.83	-STAS-	[5 B 10.0mm]
	x/d = .28			AsL= .00		
			x/dMx= .50	Arm.Lat.= [2 X 1 B 5.0mm]	- LN= 1.6	
x/dMx= .50						
[tf,cm]	M[-]Min = 151.3			M[+]Min = 151.3		M[-]Min =
151.3						
[cm2]	Asapo[+]= 1.68					Asapo[+]=
1.68						
CISALHAMENTO- EN S A G E M						
[tf,cm]	Xi	Xf	Vsd	VRd2	MdC	Ang.
	0.- 209.	12.46	39.71	2	45.	9.0
						4.6
						11.8
						6.3
						10.0
						4
						.0
						.0
T O R C A O- EN S A G E M						
[tf,cm]	Xi	Xf	Tsd	TRd2	%dT	he
	0.- 209.	.22	2.68	5	7.7	28.1
						13.1
						.7
						3.6
						.3
						.1
						.40
						N

----- G E O M E T R I A E C A R G A S -----
 Vao= 4 /L= 2.25 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.8 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 145 | M.[-] =
 4.1 tf* m | [tf,cm] As = 7.47 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 8.19
 -SRAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .28 | As = 3.81 -STAS- [5 B 10.0mm] | AsL= .00
 ----- x/d = .31 | x/dMx= .50 | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.6 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 151.6 | M[+]Min = 151.6 | M[-]Min =
 151.6 | |
 [cm2] | Asapo[+]= 1.68 | | Asapo[+]=
 1.68 | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	210.	12.41	39.71	2	45.	8.9	4.6	11.4	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	210.	.20	2.68	5	7.7	28.1	13.1	.6	3.6	.3	.1	.39	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 5 /L= 2.25 /B= .40 /H= .25 /BCs= .67 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 4.1 tf* m | M.[+] Max= 2.3 tf* m - Abcis.= 144 | M.[-] =
 3.7 tf* m | [tf,cm] As = 8.07 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 7.11
 -SRAS- [6 B 12.5mm] | AsL= .00 ----- x/d = .31 | As = 4.12 -STAS- [6 B 10.0mm] | AsL= .00
 ----- x/d = .27 | x/dMx= .50 | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.7 |
 x/dMx= .50 | |
 [tf,cm] | M[-]Min = 151.5 | M[+]Min = 151.5 | M[-]Min =
 151.5 | |
 [cm2] | Asapo[+]= 1.68 | | Asapo[+]=
 1.68 | |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	105.	12.77	39.71	2	45.	9.5	4.6	12.8	8.0	10.0	4	.0	.0	
	105.-	210.	12.16	39.71	2	45.	8.5	4.6	11.4	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	105.	.26	2.68	5	7.7	28.1	13.1	.8	3.6	.3	.1	.42	N	
	105.-	210.	.23	2.68	5	7.7	28.1	13.1	.7	3.6	.3	.1	.39	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 6 /L= 2.25 /B= .40 /H= .25 /BCs= .74 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = 3.8 tf* m | M.[+] Max= 1.6 tf* m - Abcis.= 150 | M.[-] =
 2.7 tf* m | [tf,cm] As = 7.42 -SRAS- [6 B 12.5mm] | AsL= .00 ----- | As = 5.11
 -SRAS- [5 B 12.5mm] | AsL= .00 ----- x/d = .28 | As = 3.09 -STAS- [4 B 10.0mm] | AsL= .00
 ----- x/d = .19 | |

$x/dMx = .50$ | Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.1 |
 $[tf, cm]$ | M[-]Min = 166.8 | M[+]Min = 166.8 | M[-]Min =
 148.7 |
 $[cm^2]$ | Asapo[+]= 1.68 | Asapo[+]=
 .77 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf, cm]	0.-	210.	11.12	39.71	2	45.	6.9	4.6	8.7	6.3	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf, cm]	0.-	210.	.18	2.68	5	7.7	28.1	13.1	.6	3.6	.3	.1	.34	N	

REAC.	AP010	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	8.165	8.165	.80	.33	1	B25	.00	.00	8025
0	0	2	18.198	18.198	.80	.33	1	B38	.00	.00	8038
0	0	3	17.018	17.018	.80	.33	1	B45	.00	.00	8045
0	0	4	17.382	17.382	.80	.33	1	B49	.00	.00	8049
0	0	5	17.723	17.723	.80	.33	1	B46	.00	.00	8046
0	0	6	16.380	16.380	.80	.33	1	B39	.00	.00	8039
0	0	7	5.910	5.910	.80	.33	1	B31	.00	.00	8031
0	0	0	0	0							0

Viga= 11 V11 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .8 tf* m | M.[+] Max= .6 tf* m - Abcis.= 72 | M.[-] =
 1.2 tf* m | [tf, cm] | As = 1.99 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 2.37
 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.34 -STAS- [5 B 8.0mm] | AsL= .00
 ----- x/d = .09 | x/d = .08 |
 $x/dMx = .50$ |
 $[tf, cm]$ | M[-]Min = 116.6 | M[+]Min = 138.3 | M[-]Min =
 138.3 |
 $[cm^2]$ | Asapo[+]= .58 | Asapo[+]=
 1.42 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf, cm]	0.-	126.	6.96	39.71	2	45.	.3	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf, cm]	0.-	126.	.00	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.18	N	

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

 Vao= 2 /L= 1.42 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
 .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .9 tf* m | M.[+] Max= .4 tf* m - Abcis.= 103 | M.[-] =
 1.0 tf* m | [tf, cm] | As = 2.20 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.22
 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.18 -STAS- [5 B 8.0mm] | AsL= .00
 ----- x/d = .09 | x/d = .08 |

```

x/dMx= .50
[tf,cm] M[-]Min = 129.0
129.0
[cm2 ] Asapo[+]= 1.42
1.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 127. 5.64 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 127. .01 2.68 5 7.7 28.1 13.1 .0 .0 .0 .0 .14 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.69 /B= .40 /H= .25 /BCs= .65 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .20 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 117 | M.[-] =
1.0 tf* m | As = 2.55 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 2.33
[tf,cm] | As = 2.55 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 2.33
-SRAS- [ 5 B 8.0mm] | AsL= .00 ----- | AsL= .00
| AsL= .00 ----- | AsL= .00
----- x/d = .09 x/d = .10 | As = 2.50 -STAS- [ 5 B 8.0mm ] | AsL= .00
----- x/dMx= .50 |
x/dMx= .50 |
[tf,cm] M[-]Min = 147.8 | M.[+]Min = 147.8 | M[-]Min =
136.1 |
[cm2 ] Asapo[+]= 1.42 | Asapo[+]=
.62

CISALHAMENTO- Xi Xf Vsd VRd2 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. 4.84 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 154. .01 2.68 5 7.7 28.1 13.1 .0 .0 .0 .0 .12 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
0 0 0 1 4.307 4.307 .80 .33 0 B50 .00 .00 8050 0
0 0 0 2 8.794 8.794 .80 .33 1 B45 .00 .00 8045 0
0 0 0 3 7.377 7.377 .80 .33 1 B40 .00 .00 8040 0
0 0 0 4 3.419 3.419 .25 .05 2 V15 .00 .00 0 0
0 0 0 0

=====
Viga= 12 V12 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= .95 /B= .40 /H= .25 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /Flt.Ex= .01 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) -
- - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .5 tf* m | M.[+] Max= .0 tf* m - Abcis.= 127 | M.[-] =
.5 tf* m | As = 2.09 -SRAS- [ 5 B 8.0mm] | AsL= .00 ----- | As = 2.09
[tf,cm] | As = 2.09 -SRAS- [ 5 B 8.0mm] | AsL= .00 ----- | As = 2.09
-SRAS- [ 5 B 8.0mm] | AsL= .00 ----- | AsL= .00
| AsL= .00 ----- | AsL= .00
----- x/d = .08 x/d = .08 | As = 2.07 -STAS- [ 4 B 8.0mm ] | AsL= .00
----- x/dMx= .50 |
x/dMx= .50 |
[tf,cm] M[-]Min = 122.6 | M.[+]Min = 122.6 | M[-]Min =
122.6 |

```


FLEXAO-| E 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.= 75 | M.[-] =

.9 tf* m

[tf,cm]| As = 2.08 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.08

-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .08 | As = 2.06 -STAS- [4 B 8.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 122.1 | M[+]Min = 122.1 | M[-]Min =

122.1 |

[cm2]| Asapo[+]= 1.42 | Asapo[+]=

1.42 |

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

E N S A G E M

[tf,cm] 0.- 102. 3.58 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .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.- 102. .06 2.68 5 7.7 28.1 13.1 .2 .0 .0 .0 .11 N

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

Vao= 5 /L= 1.16 /B= .40 /H= .25 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .6 tf* m | M.[+] Max= .4 tf* m - Abcis.= 90 | M.[-] =

.5 tf* m

[tf,cm]| As = 2.08 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.08

-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .08 | As = 2.06 -STAS- [4 B 8.0mm] | AsL= .00

----- x/d = .08 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 121.9 | M[+]Min = 121.9 | M[-]Min =

121.9 |

[cm2]| Asapo[+]= 1.42 | Asapo[+]=

1.42 |

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

E N S A G E M

[tf,cm] 0.- 101. 4.65 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .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.- 101. .12 2.68 5 7.7 28.1 13.1 .4 .0 .0 .0 .16 N

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

Vao= 6 /L= 1.17 /B= .40 /H= .25 /BCs= .58 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=

.13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = .7 tf* m | M.[+] Max= .2 tf* m - Abcis.= 99 | M.[-] =

.3 tf* m

[tf,cm]| As = 2.23 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 1.92

-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .09 | As = 2.20 -STAS- [5 B 8.0mm] | AsL= .00

----- x/d = .07 | x/dMx= .50 |

x/dMx= .50 |

[tf,cm]| M[-]Min = 130.2 | M[+]Min = 130.2 | M[-]Min =

113.0 |

[cm2]| Asapo[+]= 1.42 | Asapo[+]=

.73 |

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

E N S A G E M

[tf,cm] 0.- 102. 3.56 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 102. .03 2.68 5 7.7 28.1 13.1 .1 .0 .0 .0 .10 N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn		Pilares:
0	0	1	1.427	1.427	.80	.33	1	B26	.00	.00	8026	0
0	0	2	3.444	3.444	.80	.33	1	B21	.00	.00	8021	0
0	0	3	6.394	6.394	.80	.33	1	B14	.00	.00	8014	0
0	0	4	4.437	4.437	.80	.33	1	B13	.00	.00	8013	0
0	0	5	5.790	5.790	.80	.33	1	B15	.00	.00	8015	0
0	0	6	5.540	5.540	.80	.33	1	B20	.00	.00	8020	0
0	0	7	1.825	1.825	.80	.33	1	B30	.00	.00	8030	0

Viga= 13 V13 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.16 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .1 tf* m | M.[+] Max= .4 tf* m - Abcis.= 49 | M.[-] =
.9 tf* m | As = 1.72 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 2.22
[tf,cm] | AsL= .00 ----- | As = 2.20 -STAS- [5 B 8.0mm] | AsL= .00
-SRAS- [5 B 8.0mm] | x/d = .07 | x/dMx= .50 |
----- x/d = .08 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 101.7 | M[+]Min = 130.0 | M[-]Min =
130.0 |
[cm2] | Asapo[+]= 2.20 | Asapo[+]=
1.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 101. 3.95 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M
E N S A G E M
[tf,cm] 0.- 101. .06 2.68 5 7.7 28.1 13.1 .2 .0 .0 .0 .12 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.16 /B= .40 /H= .25 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .7 tf* m | M.[+] Max= .3 tf* m - Abcis.= 90 | M.[-] =
.5 tf* m | As = 2.08 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.08
[tf,cm] | AsL= .00 ----- | As = 2.06 -STAS- [4 B 8.0mm] | AsL= .00
-SRAS- [5 B 8.0mm] | x/d = .08 | x/dMx= .50 |
----- x/d = .08 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 121.9 | M[+]Min = 121.9 | M[-]Min =
121.9 |
[cm2] | Asapo[+]= 1.42 | Asapo[+]=
1.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 101. 4.74 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	101.	.08	2.68	5	7.7	28.1	13.1	.3	.0	.0	.0	.15	N

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

Vao= 3 /L= 1.16 /B= .40 /H= .25 /BCs= .54 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

FLEXAO- E S Q U E R D A	M E I O D O V A O	D I R E I T
A		

M.[-] =	.7 tf* m	M.[+] Max=	.3 tf* m - Abcis.= 90	M.[-] =

.5 tf* m	As = 2.08 -SRAS-	[5 B 8.0mm]	AsL= .00	-----	As = 2.08

-SRAS-	[5 B 8.0mm]	AsL= .00	-----	x/d = .08	As = 2.06 -STAS-	[4 B 8.0mm]	AsL= .00

-----	x/d = .08						

		x/dMx= .50			

x/dMx= .50					

[tf,cm]	M[-]Min = 122.0		M[+]Min = 122.0		M[-]Min =

122.0					

[cm2]	Asapo[+]= 1.42				Asapo[+]=

1.42					


```

----- | AsL= .00 ----- x/d = .08 | As = 2.06 -STAS- [ 4 B 8.0mm ] | AsL= .00
----- | x/d = .08 | | |
x/dMx= .50 | x/dMx= .50 | |
| | |
[tf,cm] | M[-]Min = 121.9 | M[+]Min = 121.9 | M[-]Min =
121.9 | | |
[cm2 ] | Asapo[+]= 1.42 | | | Asapo[+]=
1.42 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	101.	4.45	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	101.	.12	2.68	5	7.7	28.1	13.1	.4	.0	.0	.0	.16	N	

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

Vao= 6 /L= 1.16 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .7 tf* m | M.[+] Max= .2 tf* m - Abcis.= 99 | M.[-] =
.2 tf* m | As = 2.22 -SRAS- [ 5 B 8.0mm ] | AsL= .00 ----- | As = 1.92
[tf,cm] | AsL= .00 ----- x/d = .08 | As = 2.20 -STAS- [ 5 B 8.0mm ] | AsL= .00
----- | x/d = .07 | | |
x/dMx= .50 | x/dMx= .50 | |
| | |
[tf,cm] | M[-]Min = 129.9 | M[+]Min = 129.9 | M[-]Min =
112.9 | | |
[cm2 ] | Asapo[+]= 1.42 | | | Asapo[+]=
.73 | | |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	101.	3.64	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	101.	.06	2.68	5	7.7	28.1	13.1	.2	.0	.0	.0	.11	N	

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	2.094	2.094	.80	.33	1	B26	.00	.00	8026
0	0	2	6.118	6.118	.80	.33	1	B33	.00	.00	8033
0	0	3	5.055	5.055	.80	.33	1	B40	.00	.00	8040
0	0	4	5.031	5.031	.80	.33	1	B43	.00	.00	8043
0	0	5	5.472	5.472	.80	.33	1	B41	.00	.00	8041
0	0	6	5.670	5.670	.80	.33	1	B35	.00	.00	8035
0	0	7	1.574	1.574	.80	.33	1	B30	.00	.00	8030

Viga= 14 V14 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= .63 /B= .25 /H= 2.20 /BCs= .00 /BCi= .27 /TpS= 6 /Esp.LS= .00 /Esp.LI= .25 FSp.Ex= 1.10 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 2.5 tf* m | M.[+] Max= .0 tf* m - Abcis.= 63 | M.[-] =
6.2 tf* m | As = 8.31 -STAS- [ 3 B 20.0mm ] | AsL= .00 ----- | As = 8.31
[tf,cm] | AsL= .00 ----- | | |
-STAS- [ 3 B 20.0mm ] | | |

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```

----- | AsL= .00 ----- x/d = .04 | As = 8.31 -SRAS- [ 3 B 20.0mm ] | AsL= .00
----- | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 18 B 6.3mm] - LN= 8.8 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 4425.1 | M[+]Min = 4481.4 | M[-]Min =
4425.1 |
[cm2 ] | Asapo[+]= 2.77 | Asapo[+]=
7.84 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	11.	8.92	273.03	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	11.	.59	28.94	5	11.2	13.1	208.1	.2	.0	.0	.0	.05	N	

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

Vao= 2 /L= 2.28 /B= .25 /H= 2.20 /BCs= .39 /BCi= .30 /TpS= 11 /Esp.LS= .25 /Esp.LI= .25 FSp.Ex= 1.10 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 5.0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 227 | M.[-] =
4.3 tf* m | As = 8.93 -STAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 8.93
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 8.93 -STAS- [ 3 B 20.0mm ] | AsL= .00
- - - - - | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 18 B 6.3mm] - LN= 5.9 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 5406.5 | M[+]Min = 5051.7 | M[-]Min =
5406.5 |
[cm2 ] | Asapo[+]= 7.84 | Asapo[+]=
7.84 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	148.	9.28	273.03	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	148.	.92	28.94	5	11.2	13.1	208.1	.4	.0	.0	.0	.07	N	

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

Vao= 3 /L= 1.44 /B= .25 /H= 2.20 /BCs= .36 /BCi= .29 /TpS= 11 /Esp.LS= .25 /Esp.LI= .25 FSp.Ex= 1.10 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 4.4 tf* m | M.[+] Max= .0 tf* m - Abcis.= 144 | M.[-] =
2.9 tf* m | As = 8.79 -STAS- [ 3 B 20.0mm] | AsL= .00 ----- | As = 8.79
[tf,cm] | AsL= .00 ----- x/d = .04 | As = 8.79 -STAS- [ 3 B 20.0mm ] | AsL= .00
- - - - - | x/d = .04 | x/dMx= .50 | Arm.Lat.= [2 X 18 B 6.3mm] - LN= 6.2 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 5189.2 | M[+]Min = 4914.1 | M[-]Min =
5189.2 |
[cm2 ] | Asapo[+]= 7.84 | Asapo[+]=
2.93 |

```

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	64.	6.33	273.03	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	64.	.71	28.94	5	11.2	13.1	208.1	.3	.0	.0	.0	.05	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	-4.998	-4.998	.25	.00	2 V15	.00	.00	0

0	0	0	2	12.600	12.600	.80	.00	1	B22	.00	.00	8022	0
0	0	0	3	11.149	11.149	.80	.00	1	B23	.00	.00	8023	0
0	0	0	4	2.324	2.324	.81	.00	1	B29	.00	.00	8029	0

Viga= 15 V15 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1B /L= 1.50 /B= .25 /H= 2.20 /BCs= .55 /BCi= .55 /TpS= 10 /Esp.LS= .25 /Esp.LI= .25 FSp.Ex= 1.10 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO | M[-]= 48.40 tf* m | As = 11.00 -STAS- [6 B 16.0mm]
 BAL.ESQ | x/d = .03 | AsL= .00 -Arm.Lat.= [2 X 18 B 6.3mm]
 1.0
 [tf,cm] | M[-]Min= 7199.9 - x/dMx =1.00 | | %
 Baric.Armad.= 0

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	109.	3.47	273.03	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.8	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	109.	.72	28.94	5	11.2	13.1	208.1	.3	.0	.0	.0	.04	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 1.44 /B= .25 /H= 2.20 /BCs= .34 /BCi= .28 /TpS= 10 /Esp.LS= .25 /Esp.LI= .25 FSp.Ex= 1.10 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A
 A | M.[-] = 48.4 tf* m | M.[+] Max= .0 tf* m - Abcis.= 144 | M.[-] =
 5.3 tf* m | As = 11.00 -STAS- [4 B 20.0mm] | AsL= .00 ----- | As = 8.68
 [tf,cm] | AsL= .00 ----- x/d = .03 | As = 8.68 -STAS- [3 B 20.0mm] | AsL= .00
 -STAS- [3 B 20.0mm] | AsL= .00 ----- x/dMx= .50 | Arm.Lat.= [2 X 18 B 6.3mm] - LN= 6.5 |
 ----- x/d = .04 |
 x/dMx= .50
 [tf,cm] | M[-]Min = 5026.6 | M[+]Min = 4809.7 | M[-]Min =
 5026.6
 [cm2] | Asapo[+]= 2.89 | | Asapo[+]=
 7.84

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	64.	9.74	273.03	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	64.	.85	28.94	5	11.2	13.1	208.1	.4	.0	.0	.0	.06	N	

----- G E O M E T R I A E C A R G A S -----
 Vao= 3 /L= 2.20 /B= .25 /H= 2.20 /BCs= .41 /BCi= .30 /TpS= 10 /Esp.LS= .25 /Esp.LI= .25 FSp.Ex= 1.10 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T A
 A | M.[-] = 5.2 tf* m | M.[+] Max= .0 tf* m - Abcis.= 219 | M.[-] =
 4.2 tf* m | As = 9.07 -STAS- [3 B 20.0mm] | AsL= .00 ----- | As = 9.07
 [tf,cm] | AsL= .00 ----- x/d = .04 | As = 9.07 -STAS- [3 B 20.0mm] | AsL= .00
 -STAS- [3 B 20.0mm] | AsL= .00 ----- x/dMx= .50 | Arm.Lat.= [2 X 18 B 6.3mm] - LN= 5.7 |
 ----- x/d = .04 |
 x/dMx= .50

[tf,cm]	M[-]Min = 5617.5	M[+]Min = 5183.1	M[-]Min =
5617.5			
[cm2]	Asapo[+]= 7.84		Asapo[+]=
3.02			

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	139.	10.24	273.03	2	45.	.0	2.9	2.9	6.3	20.0	2	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	139.	.66	28.94	5	11.2	13.1	208.1	.3	.0	.0	.0	.06	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	1.663	1.663	.80	.00	1 B27	.00	.00	8027
0	0	2	14.272	14.272	.80	.00	1 B34	.00	.00	8034
0	0	3	5.629	5.629	.81	.00	1 B29	.00	.00	8029
0	0	0	0							0

Viga= 16 V16 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.69 /B= .40 /H= .25 /BCs= .65 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .7 tf* m | M.[+] Max= .5 tf* m - Abcis.= 84 | M.[-] =
.9 tf* m | As = 2.06 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 2.56
[tf,cm] | AsL= .00 ----- x/d = .08 | As = 2.50 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 120.9 | M[+]Min = 147.9 | M[-]Min =
147.9 |
[cm2] | Asapo[+]= .63 | | Asapo[+]=
1.42 |

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	154.	4.31	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	154.	.04	2.68	5	7.7	28.1	13.1	.1	.0	.0	.0	.12	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.42 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /FLt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.0 tf* m | M.[+] Max= .4 tf* m - Abcis.= 103 | M.[-] =
.9 tf* m | As = 2.21 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.20
[tf,cm] | AsL= .00 ----- x/d = .09 | As = 2.18 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 128.9 | M[+]Min = 128.9 | M[-]Min =
128.9 |
[cm2] | Asapo[+]= 1.42 | | Asapo[+]=
1.42 |

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

[tf,cm]	0.- 126.	5.53	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0		
T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.- 126.	.13	2.68	5	7.7	28.1	13.1	.4	.0	.0	.0	.19	N		
----- G E O M E T R I A E C A R G A S -----															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -															
FLEXAO-	E S Q U E R D A					M E I O D O V A O					D I R E I T				
A	M.[-] = 1.3 tf* m					M.[+] Max= .6 tf* m - Abcis.= 115					M.[-] =				
.8 tf* m	As = 2.62 -SRAS- [6 B 8.0mm]					AsL= .00 -----					As = 2.24				
[tf,cm]	-SRAS- [5 B 8.0mm]					As = 2.59 -STAS- [5 B 8.0mm]					AsL= .00				
-SRAS-	AsL= .00 -----					x/d = .09									
-----	x/d = .08					x/dMx= .50					Arm.Lat.=[2 X 1 B 5.0mm] - LN= 1.1				
x/dMx=	.50														
[tf,cm]	M[-]Min = 138.3					M[+]Min = 138.3					M[-]Min =				
116.6															
[cm2]	Asapo[+]= 1.68										Asapo[+]=				
.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	0.- 126.	6.87	39.71	2	45.	.1	4.6	4.6	5.0	10.0	4	.0	.0		
[tf,cm]															
T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.- 126.	.17	2.68	5	7.7	28.1	13.1	.5	3.6	.3	.1	.24	N		
REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn					Pilares:	
0	0	1	2.760	2.760	.25	.05	2 V14	.00	.00	0	0				
0	0	2	6.925	6.925	.80	.33	1 B14	.00	.00	8014	0				
0	0	3	8.570	8.570	.80	.33	1 B9	.00	.00	8009	0				
0	0	4	4.173	4.173	.80	.33	0 B4	.00	.00	8004	0				
0	0	0	0	0											
=====															
Viga= 17 V17 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao															
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM															
----- G E O M E T R I A E C A R G A S -----															
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----															
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -															
FLEXAO-	E S Q U E R D A					M E I O D O V A O					D I R E I T				
A	M.[-] = .7 tf* m					M.[+] Max= .6 tf* m - Abcis.= 57					M.[-] =				
1.3 tf* m	As = 1.98 -SRAS- [4 B 8.0mm]					AsL= .00 -----					As = 2.36				
[tf,cm]	-SRAS- [5 B 8.0mm]					As = 2.33 -STAS- [5 B 8.0mm]					AsL= .00				
-SRAS-	AsL= .00 -----					x/d = .08									
-----	x/d = .09					x/dMx= .50									
x/dMx=	.50														
[tf,cm]	M[-]Min = 116.4					M[+]Min = 137.8					M[-]Min =				
137.8															
[cm2]	Asapo[+]= .58										Asapo[+]=				
1.42															
CISALHAMENTO-	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
E N S A G E M	0.- 125.	6.89	39.71	2	45.	.2	4.6	4.6	5.0	10.0	4	.0	.0		
[tf,cm]															
T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.- 125.	.01	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.18	N		

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 1.42 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .8 tf* m | M.[+] Max= .5 tf* m - Abcis.= 103 | M.[-] =
 .7 tf* m | As = 2.21 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.21
 [tf,cm] | AsL= .00 ----- x/d = .08 | As = 2.18 -STAS- [5 B 8.0mm] | AsL= .00
 -SRAS- [5 B 8.0mm] | x/dMx= .50 |
 ----- x/d = .08 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 129.1 | M[+]Min = 129.1 | M[-]Min =
 129.1 |
 [cm2] | Asapo[+]= 1.42 | Asapo[+]=
 1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	127.	4.98	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

----- G E O M E T R I A E C A R G A S -----
 Vao= 3 /L= 1.42 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
 A | M.[-] = .7 tf* m | M.[+] Max= .3 tf* m - Abcis.= 101 | M.[-] =
 .7 tf* m | As = 2.38 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.22
 [tf,cm] | AsL= .00 ----- x/d = .09 | As = 2.35 -STAS- [5 B 8.0mm] | AsL= .00
 -SRAS- [5 B 8.0mm] | x/dMx= .50 |
 ----- x/d = .09 |
 x/dMx= .50 |
 [tf,cm] | M[-]Min = 138.8 | M[+]Min = 138.8 | M[-]Min =
 130.0 |
 [cm2] | Asapo[+]= 1.42 | Asapo[+]=
 .59

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	127.	3.84	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	127.	.01	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.10	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0 0 0	1	3.977	3.977	.80	.33	0	B54	.00	.00	8054 0
0 0 0	2	8.354	8.354	.80	.33	1	B49	.00	.00	8049 0
0 0 0	3	6.079	6.079	.80	.33	1	B43	.00	.00	8043 0
0 0 0	4	2.670	2.670	.80	.33	1	B34	.00	.00	8034 0

Viga= 18 V18 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 1.70 /B= .40 /H= .25 /BCs= .65 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = .9 tf* m | M.[+] Max= .6 tf* m - Abcis.= 84 | M.[-] =
.9 tf* m
[tf,cm]| As = 2.06 -SRAS- [ 4 B 8.0mm] | AsL= .00 ----- | As = 2.56
-SRAS- [ 4 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 2.50 -STAS- [ 5 B 8.0mm ] | AsL= .00
----- x/d = .10 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 121.0 | M[+]Min = 148.1 | M[-]Min =
148.1
[cm2 ]| Asapo[+]= .63 | Asapo[+]=
1.42

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```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 155. 4.93 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .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.- 155. .01 2.68 5 7.7 28.1 13.1 .0 .0 .0 .0 .13 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.41 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .20 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 1.0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 103 | M.[-] =
.8 tf* m
[tf,cm]| As = 2.21 -SRAS- [ 4 B 10.0mm] | AsL= .00 ----- | As = 2.20
-SRAS- [ 5 B 8.0mm] | AsL= .00 ----- x/d = .09 | As = 2.18 -STAS- [ 5 B 8.0mm ] | AsL= .00
----- x/d = .08 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 128.7 | M[+]Min = 128.7 | M[-]Min =
128.7
[cm2 ]| Asapo[+]= 1.42 | Asapo[+]=
1.42

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 126. 5.17 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .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.- 126. .05 2.68 5 7.7 28.1 13.1 .2 .0 .0 .0 .15 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=
.13 /FLt.Ex= .20 [M]

```

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -

```

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T
A
| M.[-] = 1.1 tf* m | M.[+] Max= .6 tf* m - Abcis.= 101 | M.[-] =
.8 tf* m
[tf,cm]| As = 2.37 -SRAS- [ 5 B 8.0mm] | AsL= .00 ----- | As = 1.99
-SRAS- [ 4 B 8.0mm] | AsL= .00 ----- x/d = .09 | As = 2.34 -STAS- [ 5 B 8.0mm ] | AsL= .00
----- x/d = .08 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 138.3 | M[+]Min = 138.3 | M[-]Min =
116.6
[cm2 ]| Asapo[+]= 1.42 | Asapo[+]=
.58

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M
E N S A G E M
[tf,cm] 0.- 126. 6.51 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0

```

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.05	2.68	5	7.7	28.1	13.1	.2	.0	.0	.0	.18	N

REAC.	AP0IO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	1	3.394	3.394	.25	.05	2	V14	.00	.00	0
0	0	2	7.110	7.110	.80	.33	1	B13	.00	.00	8013
0	0	3	7.933	7.933	.80	.33	1	B7	.00	.00	8007
0	0	4	4.245	4.245	.80	.33	0	B2	.00	.00	8002

Viga= 19 V19 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.42 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = .7 tf* m | M.[+] Max= .3 tf* m - Abcis.= 72 | M.[-] = .8 tf* m
[tf,cm]| As = 2.22 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.38
-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .08 | As = 2.35 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .09 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 130.0 | M[+]Min = 138.7 | M[-]Min = 138.7
[cm2]| Asapo[+]= .59 | Asapo[+]= 1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	127.	4.02	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	127.	.03	2.68	5	7.7	28.1	13.1	.1	.0	.0	.11	N	

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.41 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = .8 tf* m | M.[+] Max= .5 tf* m - Abcis.= 102 | M.[-] = 1.0 tf* m
[tf,cm]| As = 2.20 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 2.20
-SRAS- [5 B 8.0mm] | AsL= .00 ----- x/d = .08 | As = 2.18 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .08 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 128.7 | M[+]Min = 128.7 | M[-]Min = 128.7
[cm2]| Asapo[+]= 1.42 | Asapo[+]= 1.42

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	5.71	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O - E N S A G E M	Xi	Xf	Tsd	TRd2 %dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.02	2.68	5	7.7	28.1	13.1	.0	.0	.0	.15	N	

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

Vao= 3 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = 1.3 tf* m | M.[+] Max= .6 tf* m - Abcis.= 115 | M.[-] =
.7 tf* m | [tf,cm] | As = 2.37 -SRAS- [5 B 8.0mm] | AsL= .00 ----- | As = 1.99
-SRAS- [4 B 8.0mm] | AsL= .00 ----- x/d = .09 | As = 2.34 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .08 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 138.2 | M[+]Min = 138.2 | M[-]Min =
116.6 |
[cm2] | Asapo[+]= 1.42 | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	126.	6.99	39.71	2	45.	.3	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	126.	.01	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.18	N	

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
0	0	0	2.725	2.725	.80	.33	1 B23	.00	.00	8023
0	0	0	6.677	6.677	.80	.33	1 B15	.00	.00	8015
0	0	0	8.934	8.934	.80	.33	1 B10	.00	.00	8010
0	0	0	4.030	4.030	.80	.33	0 B5	.00	.00	8005

Viga= 20 V20 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

Vao= 1 /L= 1.70 /B= .40 /H= .25 /BCs= .66 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R E I T
A | M.[-] = .9 tf* m | M.[+] Max= .5 tf* m - Abcis.= 84 | M.[-] =
.9 tf* m | [tf,cm] | As = 2.06 -SRAS- [4 B 8.0mm] | AsL= .00 ----- | As = 2.56
-SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .08 | As = 2.51 -STAS- [5 B 8.0mm] | AsL= .00
----- x/d = .10 | x/dMx= .50 |
x/dMx= .50 |
[tf,cm] | M[-]Min = 121.0 | M[+]Min = 148.2 | M[-]Min =
148.2 |
[cm2] | Asapo[+]= .63 | Asapo[+]=

CISALHAMENTO- E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus	M
[tf,cm]	0.-	155.	4.76	39.71	2	45.	.0	4.6	4.6	5.0	10.0	4	.0	.0	

T O R C A O- E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla	M
[tf,cm]	0.-	155.	.02	2.68	5	7.7	28.1	13.1	.0	.0	.0	.0	.13	N	

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

Vao= 2 /L= 1.41 /B= .40 /H= .25 /BCs= .57 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex= .13 /Flt.Ex= .20 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T				
A														
M.[-] = 1.1 tf* m					M.[+] Max= .4 tf* m - Abcis.= 102					M.[-] =				
.9 tf* m														
[tf,cm] As = 2.21 -SRAS- [4 B 10.0mm]					AsL= .00 -----					As = 2.20				
-SRAS- [5 B 8.0mm]														
AsL= .00 -----					x/d = .09					As = 2.18 -STAS- [5 B 8.0mm]				
-----					x/dMx= .50									
x/dMx= .50														
[tf,cm] M[-]Min = 128.7					M[+]Min = 128.7					M[-]Min =				
128.7														
[cm2] Asapo[+]= 1.42										Asapo[+]=				
1.42														
CISALHAMENTO- EN S A G E M														
[tf,cm] Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M														
0.- 126. 5.64 39.71 2 45. .0 4.6 4.6 5.0 10.0 4 .0 .0														
T O R C A O- EN S A G E M														
[tf,cm] Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M														
0.- 126. .01 2.68 5 7.7 28.1 13.1 .0 .0 .0 .0 .15 N														
----- G E O M E T R I A E C A R G A S -----														
Vao= 3 /L= 1.41 /B= .40 /H= .25 /BCs= .61 /BCi= .00 /TpS= 2 /Esp.LS= .25 /Esp.LI= .00 FSp.Ex=														
.13 /FLt.Ex= .20 [M]														
-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----														
- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) -														
FLEXAO- E S Q U E R D A					M E I O D O V A O					D I R E I T				
A														
M.[-] = 1.2 tf* m					M.[+] Max= .6 tf* m - Abcis.= 101					M.[-] =				
.8 tf* m														
[tf,cm] As = 2.37 -SRAS- [5 B 8.0mm]					AsL= .00 -----					As = 1.99				
-SRAS- [4 B 8.0mm]														
AsL= .00 -----					x/d = .09					As = 2.34 -STAS- [5 B 8.0mm]				
-----					x/dMx= .50									
x/dMx= .50														
[tf,cm] M[-]Min = 138.3					M[+]Min = 138.3					M[-]Min =				
116.6														
[cm2] Asapo[+]= 1.42										Asapo[+]=				
.58														
CISALHAMENTO- EN S A G E M														
[tf,cm] Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M														
0.- 126. 6.85 39.71 2 45. .1 4.6 4.6 5.0 10.0 4 .0 .0														
T O R C A O- EN S A G E M														
[tf,cm] Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M														
0.- 126. .04 2.68 5 7.7 28.1 13.1 .1 .0 .0 .0 .19 N														
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:														
0 0 0 1 3.305 3.305 .25 .05 2 V15 .00 .00 0 0														
0 0 0 2 7.321 7.321 .80 .33 1 B41 .00 .00 8041 0														
0 0 0 3 8.567 8.567 .80 .33 1 B46 .00 .00 8046 0														
0 0 0 4 4.292 4.292 .80 .33 0 B51 .00 .00 8051 0														
0 0 0 0														
=====														
=====														

6 ELEVATÓRIA DE LODO ADENSADO

6 ELEVATÓRIA DE LODO ADENSADO

6.1 Caracterização da obra

As Elevatórias de Lodo Adensado e de Água do Filtrado constituem-se, cada um, por um poço cilíndrico de concreto armado com 2 m de diâmetro e uma profundidade de variando de 2,50 m a 2,70 m, tendo ao lado um poço de manobra de seção quadrada medindo 1,30 m x 1,30 m. As plantas EG0112-D-EAF-HID-01-00 e EG0112-D-ELAD-HID-01-00 trazem esses detalhes.

As estruturas de todos os elementos acima são em concreto armado, conforme já mencionado, e as fundações em estacas escavadas do tipo hélice contínua.

6.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônicos e hidráulico, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR 6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, foi observado o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN tendo em vista a experiência dessa companhia de saneamento na operação, manutenção e especificação desse tipo de obra.

A Classe de Agressividade Ambiental adotada, conforme as especificações da CORSAN, foi a III indicada na Tabela 6.1 da NBR 6118/2003, correspondendo a agressividade *forte*.

Para esta classe a NBR 6118 estabelece o seguinte:

- i) Especificações para o concreto:
 - Classe de concreto: $\geq C30$ – $f_{ck} \geq 30\text{Mpa}$ (300 kgf/cm^2);
 - $E_{cs} = 0,85 E_{ci} = 26072\text{ Mpa}$ (260720 kgf/cm^2);
 - Fator água cimento máximo = 0,55.
- j) Especificações para cobrimentos de armaduras (CORSAN):
 - Vigas e pilares: 45 mm
 - Lajes : 45 mm

Como carregamentos específicos deste projeto têm-se:

- xi) Peso específico aparente do lodo: 1,2 tf/m³.

Para efeito do cálculo das pressões nas paredes e lajes de fundo o nível de lodo foi considerado como com a altura máxima das próprias paredes admitindo-se, à favor da segurança, a possibilidade deste enchimento máximo.

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, elaborados, respectivamente, pelas empresa FS Sondagens.

6.3 Concepção geral do(s) modelo(S) estrutural(is)

O projeto da estrutura das elevatórias e do poço de manobra foi modelada no Cad TQS para a determinação de esforços e dimensionamento das lajes de fundo dos poços no fundo e das paredes como vigas. A parede de superfície cilíndrica do poço teve seus esforços determinados através da formulação de cascas cilíndricas encontrada em Montoya, 7ª Ed., 1973.

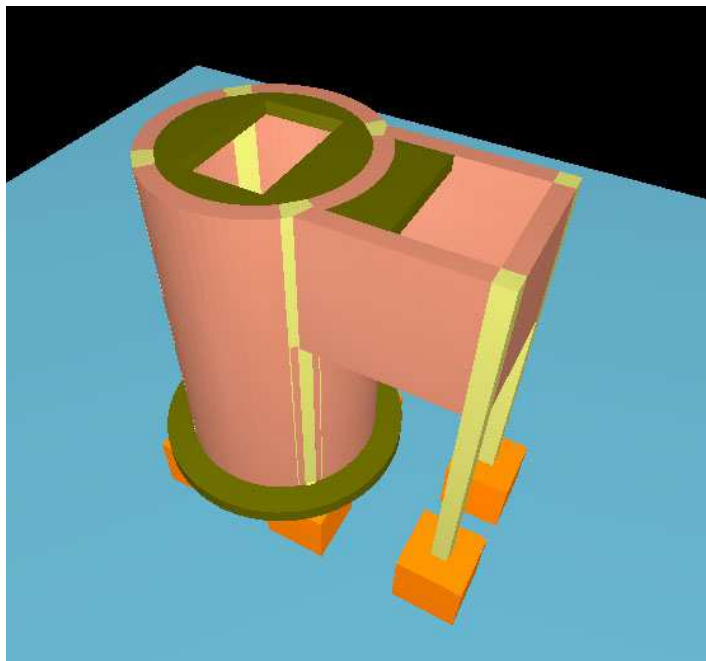


Figura 1 – Vista geral do modelo da Elevatória de Lodo Adensado.

6.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento (laje de fundo do decantador e vigas paredes), discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito, os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais. Neste modelo de pórtico, as lajes horizontais são tratadas como diafragmas rígidos e os esforços são distribuídos entre os pilares de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito

de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária, parcial ou total, e, posteriormente, final de detalhamento e desenho. O dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. De uma forma geral os procedimentos são os seguintes:

- 17º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.
- 18º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 19º. Detalhamento final e desenho.
- 20º. Emissão de plantas.

6.5 Memorial de Desenvolvimento e resultados do projeto.

6.5.1 Esforços na casca cilíndrica:

Tabela 1 – Esforços na casca cilíndrica.

Z	x	N(kgf)	M(kgfm)	Q
0,10	3,66	282,31	115,88	-392,42
0,20	3,56	908,18	30,97	-127,93
0,30	3,46	1631,32	-20,37	35,58
0,40	3,36	2301,85	-46,46	122,14
0,50	3,26	2842,74	-55,14	154,94
0,60	3,16	3227,43	-52,99	153,76
0,70	3,06	3460,87	-45,07	133,93
0,80	2,96	3565,02	-34,93	106,37
0,90	2,86	3568,55	-24,84	78,09
1,00	2,76	3500,22	-16,05	53,06
1,10	2,66	3385,20	-9,11	33,03
1,20	2,56	3243,48	-4,08	18,28
1,30	2,46	3089,60	-0,75	8,25
1,40	2,36	2933,23	1,20	1,98
1,50	2,26	2780,08	2,14	-1,57
1,60	2,16	2632,94	2,39	-3,35
1,70	2,06	2492,59	2,23	-4,11
1,80	1,96	2358,61	1,86	-4,38
1,90	1,86	2229,97	1,41	-4,50
2,00	1,76	2105,40	0,99	-4,62
2,10	1,66	1983,68	0,62	-4,77
2,20	1,56	1863,78	0,34	-4,92
2,30	1,46	1744,88	0,14	-4,99
2,40	1,36	1626,39	0,01	-4,90
2,50	1,26	1507,95	-0,06	-4,56
2,60	1,16	1389,33	-0,10	-3,96
2,70	1,06	1270,44	-0,10	-3,08
2,80	0,96	1151,26	-0,09	-1,97
2,90	0,86	1031,81	-0,08	-0,69
3,00	0,76	912,14	-0,06	0,65
3,10	0,66	792,31	-0,04	1,96
3,20	0,56	672,36	-0,02	3,12
3,30	0,46	552,35	-0,01	4,04
3,40	0,36	432,29	0,00	4,62
3,50	0,26	312,23	0,00	4,83
3,60	0,16	192,16	0,00	4,64

6.5.2 Esforços e Dimensionamento em Vigas:

JOAO SOARES VIEGAS FILHO
 (V15.8.56) Pg 1
 AV. REPUBLICA, 440 AREAL
 32283060
 T Q S Projeto: 0005 - Fundo
 25/10/11
 CAD/Vigas
 15:36:40

R E L G E R - Relatorio geral de vigas

PELOTAS 96077-230 RS

 fck=300.kgf/cm2 - Aco: 50A - Esforços

Caracteristicos
 L E G E N D A
 G E O M E T R I A
 Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
 Repeticoes
 NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :
 Fator de Alternancia de Cargas
 Cob : Cobrimento / TpS : Tipo da Secao / BCs :
 Mesa Colaborante Superior
 BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
 Espessura Laje 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-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-
 torcao p/NR estribos selecionado
 Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal
 de torcao no lado h
 ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao
 plastica no vao - S[sim] N[nao]
 R E A C O E S D E A P O I O
 DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre /
 segue / vigas
 M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
 =====

Viga= 1 V1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.65 /B= .20 /H= 2.60 /BCs= .00 /BCi= .20 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= 1.30 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 = | M.[-] = 1.6 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 82 | M.[-]
 = 2.6 tf* m
 [tf,cm]| As = 7.80 -STAS- [4 B 16.0mm] | AsL= .00 ----- | As =
 7.80 -STAS- [4 B 16.0mm]
 | AsL= .00 ----- x/d = .04 | As = 7.80 -SRAS- [4 B 16.0mm] | AsL=
 .00 ----- x/d = .04

Grampos Dir.= 4B 10.0mm x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 10.4 |
 [tf,cm] | M[-]Min = 4893.0 | M[+]Min = 4893.0 | M[-]
]Min = 4893.0
 [cm2] | Asapo[+]= 2.60 |
 Asapo[+]= 7.80 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 140. 28.22 259.16 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0
 T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
 M E N S A G E M
 [tf,cm] 0.- 140. .35 15.50 5 8.1 8.1 248.1 .2 .0 .0 .0 .13 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 5.650 5.645 .25 .00 0 PC2 .00 .00 20 0
 0 0 0 0
 2 20.156 20.151 .25 .00 0 PC4 .00 .00 50 0
 0 0 0 0

Viga= 101 V101 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 1.80 /B= .20 /H= 2.60 /BCs= .00 /BCi= .24 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= 1.30 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 = | M.[-] = 1.1 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 89 | M.[-]
 = 1.6 tf* m
 [tf,cm] | As = 7.93 -STAS- [4 B 16.0mm] | AsL= .00 ----- | As =
 7.93 -STAS- [4 B 16.0mm]
 | AsL= .00 ----- x/d = .03 | As = 7.93 -SRAS- [4 B 16.0mm] | AsL=
 .00 ----- x/d = .03
 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 10.4 |
 [tf,cm] | M[-]Min = 5027.1 | M.[+]Min = 5187.2 | M[-]
]Min = 5027.1
 [cm2] | Asapo[+]= 2.64 |
 Asapo[+]= 7.41 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 155. 9.76 259.16 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0
 T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
 M E N S A G E M
 [tf,cm] 0.- 155. .60 15.50 5 8.1 8.1 248.1 .3 .0 .0 .0 .07 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 1.66 /B= .20 /H= 2.60 /BCs= .00 /BCi= .23 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= 1.30 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 = | M.[-] = 2.6 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 82 | M.[-]
 = .7 tf* m
 [tf,cm] | As = 7.90 -STAS- [4 B 16.0mm] | AsL= .00 ----- | As =
 7.90 -STAS- [4 B 16.0mm]
 | AsL= .00 ----- x/d = .03 | As = 7.90 -SRAS- [4 B 16.0mm] | AsL=
 .00 ----- x/d = .03
 | x/dMx= .50 | Arm.Lat.=[2 X 17 B 6.3mm] - LN= 10.4 |
 [tf,cm] | M[-]Min = 5027.1 | M.[+]Min = 5187.2 | M[-]
]Min = 5027.1
 [cm2] | Asapo[+]= 2.64 |
 Asapo[+]= 7.41 |

[tf,cm] | M[-]Min = 4992.6 | M[+]Min = 5109.8 | M[-]
]Min = 4992.6
 [cm2] | Asapo[+]= 7.41 |
 Asapo[+]= 7.41

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 141. 18.92 259.16 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
 M E N S A G E M
 [tf,cm] 0.- 141. .22 15.50 5 8.1 8.1 248.1 .1 .0 .0 .0 .09 N

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

Vao= 3 /L= 1.80 /B= .20 /H= 2.60 /BCs= .00 /BCi= .24 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= 1.30 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)

FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R
 E I T A

| M.[-] = .7 tf* m | M.[+] Max= 1.9 tf* m - Abcis.= 89 | M.[-]

= 1.5 tf* m |

[tf,cm] | As = 7.93 -STAS- [4 B 16.0mm] | AsL= .00 ----- | As =

7.93 -STAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .03 | As = 7.93 -SRAS- [4 B 16.0mm] | AsL=

.00 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.= [2 X 17 B 6.3mm] - LN= 10.4 |

|

x/dMx= .50 |

[tf,cm] | M[-]Min = 5027.1 | M[+]Min = 5187.2 | M[-]

]Min = 5027.1 |

[cm2] | Asapo[+]= 7.41 |

Asapo[+]= 2.64 |

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.- 155. 6.92 259.16 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
 M E N S A G E M
 [tf,cm] 0.- 155. .59 15.50 5 8.1 8.1 248.1 .3 .0 .0 .0 .06 N

REAC. APOIO - No.		Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
0	0	1	6.964	6.960	.25	.00	PC4	.00	.00
		0							
0	0	2	19.129	19.120	.25	.00	PC3	.00	.00
		0							
0	0	3	7.530	7.521	.25	.00	PC1	.00	.00
		0							
0	0	4	4.946	4.941	.25	.00	PC2	.00	.00
		0							

=====

JOAO SOARES VIEGAS FILHO
 (V15.8.56) Pg 1
 AV. REPUBLICA, 440 AREAL
 32283060

R E L G E R - Relatorio geral de vigas

PELOTAS 96077-230 RS

T Q S Projeto: 0003 - Manobra
 25/10/11
 CAD/Vigas
 15:36:34

fck=300.kgf/cm2 - Aco: 50A

- Esforços

Caracteristicos

L E G E N D A

G E O M E T R I A

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

NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :

Fator de Alternancia de Cargas

Cob : Cobrimento / TpS : Tipo da Secao / BCs :

Mesa Colaborante Superior

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

Espessura Laje 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.Dupla / STAS :

Secao Te Armadura Simples

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

Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :

Armadura e/d que chega no extremo

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

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :

Armad.transv.minima-cisalhamento

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

Espacamento selecionado

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

Armadura transversal-Suspensao

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

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

torcao

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

Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / 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

Viga= 201 V201

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

/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

G E O M E T R I A

E C A R G A S

Vao= 1 /L= 1.81 /B= .20 /H= 1.04 /BCs= .00 /BCi= .20 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= .52 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R

E I T A | M.[-] = .0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 90 | M.[-]

= .0 tf* m | AsL= .00 ----- | As =

[tf,cm]| As = .45 -STAS- [2 B 6.3mm] | AsL= .00 ----- | As =

3.12 -STAS- [4 B 10.0mm] | AsL= .00 ----- | AsL=

.00 ----- x/d = .04 | As = 3.12 -SRAS- [4 B 10.0mm] | AsL=

| Grampos Esq.= 2B 8.0mm x/dMx= .50 | Arm.Lat.=[2 X 7 B 6.3mm] - LN= 4.3 |

Grampos Dir.= 2B 8.0mm x/dMx= .50 |

|

[tf,cm] | M[-]Min = 782.9 | M[+]Min = 782.9 | M[-]
]Min = 782.9
[cm2] | Asapo[+]= 3.12 |
Asapo[+]= 3.12

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 157. 1.34 100.30 2 45. .0 2.3 2.3 6.3 25.0 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.- 157. .03 5.76 5 8.1 8.1 92.1 .1 .0 .0 .0 .02 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
1 .953 .942 .27 .00 0 PC2 .00 .00 20 0
0 0 0 0
2 .923 .912 .20 .00 0 P1 .00 .00 1 0
0 0 0 0

Viga= 202 V202 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.81 /B= .20 /H= 1.04 /BCs= .00 /BCi= .20 /TpS= 9 /Esp.LS= .00 /Esp.LI= .20
FSp.Ex= .52 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
FLEXAO- | E S Q U E R D A | M E I O D O V A O | D I R
E I T A
= | M.[-] = .0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 90 | M.[-]
[tf,cm] | As = .45 -STAS- [2 B 6.3mm] | AsL= .00 ----- | As =
3.12 -STAS- [4 B 10.0mm] | AsL= .00 ----- | AsL=
| AsL= .00 ----- x/d = .00 | As = 3.12 -SRAS- [4 B 10.0mm] | AsL=
.00 ----- x/d = .04
| Grampos Esq.= 2B 8.0mm x/dMx= .50 | Arm.Lat.=[2 X 7 B 6.3mm] - LN= 4.3 |
Grampos Dir.= 2B 8.0mm x/dMx= .50
[tf,cm] | M[-]Min = 782.9 | M[+]Min = 782.9 | M[-]
]Min = 782.9
[cm2] | Asapo[+]= 3.12 |
Asapo[+]= 3.12

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 157. 1.37 100.30 2 45. .0 2.3 2.3 6.3 25.0 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.- 157. .04 5.76 5 8.1 8.1 92.1 .1 .0 .0 .0 .02 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
1 .956 .946 .27 .00 0 PC4 .00 .00 50 0
0 0 0 0
2 .980 .970 .20 .00 0 P2 .00 .00 2 0
0 0 0 0

Viga= 203 V203 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
/Fat.Alt=1.00 /Cob/S=4.5 .0 CM

----- G E O M E T R I A E C A R G A S -----
Vao= 1 /L= 1.80 /B= .20 /H= 1.04 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .52 /FLt.Ex= .01 [M]

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

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

```

      | M.[-] =      .2 tf* m      | M.[+] Max=      .1 tf* m - Abcis.= 89 | M.[-]
=      .2 tf* m
[tf,cm]| As = 3.12 -SRAS- [ 4 B 10.0mm] | AsL=      .00 ----- | As =
3.12 -SRAS- [ 4 B 10.0mm]
      | AsL=      .00 ----- x/d = .04 | As = 3.12 -SRAS- [ 4 B 10.0mm ] | AsL=
.00 ----- x/d = .04
      | x/dMx= .50 | Arm.Lat.=[2 X 7 B 6.3mm] - LN= 4.3 |
x/dMx= .50
      |
[tf,cm]| M[-]Min = 782.9 | M[+]Min = 782.9 | M[-]
]Min = 782.9
[cm2 ]| Asapo[+]= 1.04 |
Asapo[+]= 2.96

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 152. .68 100.30 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
M E N S A G E M
[tf,cm] 0.- 152. .02 5.76 5 8.1 8.1 92.1 .0 .0 .0 .0 .01 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 1.65 /B= .20 /H= 1.04 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .52 /FLt.Ex= .01 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O
) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A
      | M.[-] =      .2 tf* m      | M.[+] Max=      .0 tf* m - Abcis.= 165 | M.[-]
=      .1 tf* m
[tf,cm]| As = 3.12 -SRAS- [ 4 B 10.0mm] | AsL=      .00 ----- | As =
3.12 -SRAS- [ 4 B 10.0mm]
      | AsL=      .00 ----- x/d = .04 | As = 3.12 -SRAS- [ 4 B 10.0mm ] | AsL=
.00 ----- x/d = .04
      | x/dMx= .50 | Arm.Lat.=[2 X 7 B 6.3mm] - LN= 4.3 |
x/dMx= .50
      |
[tf,cm]| M[-]Min = 782.9 | M[+]Min = 782.9 | M[-]
]Min = 782.9
[cm2 ]| Asapo[+]= 2.96 |
Asapo[+]= 2.96

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 138. .63 100.30 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0

```

```

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
M E N S A G E M
[tf,cm] 0.- 138. .01 5.76 5 8.1 8.1 92.1 .0 .0 .0 .0 .01 N

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 1.80 /B= .20 /H= 1.04 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .52 /FLt.Ex= .01 [M]

```

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

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O
) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A
      | M.[-] =      .2 tf* m      | M.[+] Max=      .1 tf* m - Abcis.= 89 | M.[-]
=      .2 tf* m
[tf,cm]| As = 3.12 -SRAS- [ 4 B 10.0mm] | AsL=      .00 ----- | As =
3.12 -SRAS- [ 4 B 10.0mm]
      | AsL=      .00 ----- x/d = .04 | As = 3.12 -SRAS- [ 4 B 10.0mm ] | AsL=
.00 ----- x/d = .04
      | x/dMx= .50 | Arm.Lat.=[2 X 7 B 6.3mm] - LN= 4.3 |
x/dMx= .50
      |
[tf,cm]| M[-]Min = 782.9 | M[+]Min = 782.9 | M[-]
]Min = 782.9
[cm2 ]| Asapo[+]= 2.96 |
Asapo[+]= 1.04

```

```

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

```

[tf,cm]	0.-	152.	.68	100.30	2	45.	.0	2.3	2.3	6.3	25.0	2	.0	.0
T O R C A O- M E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla
[tf,cm]	0.-	152.	.03	5.76	5	8.1	8.1	92.1	.0	.0	.0	.0	.01	N
REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn					
Pilares:														
	1	.483	.472	.29	.00	0	PC4	.00	.00	50	0			
0	0	0	0	.903	.893	.28	.00	0	PC3	.00	.00	40	0	
0	0	0	0	.870	.856	.28	.00	0	PC1	.00	.00	10	0	
0	0	0	0	.483	.470	.28	.00	0	PC2	.00	.00	20	0	
0	0	0	0											

Viga= 204 V204 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.66 /B= .20 /H= 1.04 /BCs= .00 /BCi= .20 /TpS= 9 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= .52 /FLt.Ex= .01 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A | M.[-] = .1 tf* m | M.[+] Max= .2 tf* m - Abcis.= 82 | M.[-]
 = .1 tf* m | As = 3.12 -STAS- [4 B 10.0mm] | AsL= .00 ----- | As =
 [tf,cm]| As = 3.12 -STAS- [4 B 10.0mm] | AsL= .00 ----- | AsL=
 3.12 -STAS- [4 B 10.0mm] | As = 3.12 -SRAS- [4 B 10.0mm] | AsL=
 .00 ----- x/d = .04 | Arm.Lat.= [2 X 7 B 6.3mm] - LN= 4.3 |
 x/dMx= .50 | M[+]Min = 782.9 | M[-]
 [tf,cm]| M[-]Min = 782.9 |
]Min = 782.9 |
 [cm2]| Asapo[+]= 1.04 |
 Asapo[+]= 1.04 |

CISALHAMENTO- M E N S A G E M	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus
[tf,cm]	0.-	137.	.76	100.30	2	45.	.0	2.3	2.3	6.3	25.0	2	.0	.0
T O R C A O- M E N S A G E M	Xi	Xf	Tsd	TRd2	%dT	he	b-nuc	h-nuc	Asw-1R	AswmnNR	Asl-b	Asl-h	ComDia	AdPla
[tf,cm]	0.-	137.	.10	5.76	5	8.1	8.1	92.1	.2	.0	.0	.0	.02	N
REAC. APOIO -	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn					
Pilares:														
	1	.299	.298	.28	.00	0	PC2	.00	.00	20	0			
0	0	0	0	.211	.210	.29	.00	0	PC4	.00	.00	50	0	
0	0	0	0											

Viga= 205 V205 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=4.5 .0 CM

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

 Vao= 1 /L= 1.50 /B= .20 /H= 1.04 /BCs= .00 /BCi= .20 /TpS= 9 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= .52 /FLt.Ex= .10 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A | M.[-] = .0 tf* m | M.[+] Max= .3 tf* m - Abcis.= 75 | M.[-]
 = .0 tf* m | As = .45 -STAS- [2 B 6.3mm] | AsL= .00 ----- | As =
 [tf,cm]| As = .45 -STAS- [2 B 6.3mm] | AsL= .00 ----- | AsL=
 .45 -STAS- [2 B 6.3mm] | As = .45 -SRAS- [2 B 6.3mm] | AsL=
 .00 ----- x/d = .04 | Arm.Lat.= [2 X 7 B 6.3mm] - LN= 4.3 |
 x/dMx= .50 | M[+]Min = 782.9 | M[-]
 [tf,cm]| M[-]Min = 782.9 |
]Min = 782.9 |
 [cm2]| Asapo[+]= 1.04 |
 Asapo[+]= 1.04 |

```

      | AsL= .00 ----- x/d = .00 | As = 3.12 -SRAS- [ 4 B 10.0mm ] | AsL=
.00 ----- x/d = .00
      | Grampos Esq.= 2B 8.0mm x/dMx= .50 | Arm.Lat.=[2 X 7 B 6.3mm] - LN= 4.3 |
Grampos Dir.= 2B 8.0mm x/dMx= .50
      |
[tf,cm] | M[-]Min = 782.9 | M[+]Min = 782.9 | M[-
]Min = 782.9
[cm2 ] | Asapo[+]= 3.12 |
Asapo[+]= 3.12

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 130. 1.17 100.30 2 45. .0 2.3 2.3 6.3 25.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla
M E N S A G E M
[tf,cm] 0.- 130. .03 5.76 5 8.1 8.1 92.1 .0 .0 .0 .0 .02 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
      1 .835 .835 .20 .00 0 P2 .00 .00 2 0
0 0 0 0
      2 .757 .757 .20 .00 0 P1 .00 .00 1 0
0 0 0 0
=====
=====

```

6.5.3 Pilares:

JOAO SOARES VIEGAS FILHO LISPIL - Listagem dos resultados -P-A-S- por pil
 (V15.8.56) Pg 1
 AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
 32283060
 T Q S Projeto: 0001 - ETE Novo Mundo Elev Lodo Adensado
 25/10/11
 CAD/Pilar Engeplus
 15:36:56

AS RESULTANTE POR BITOLAS fck = .300 [tf,cm] fck(opc.) = .300

SEL = Quantidade Efetiva de Barras na Secao
 Nb = Quantidades de Barras Dimensionadas na Secao
 NbH = Numero de Barras lado H
 NbB = Numero de Barras lado B

```

PILAR:P1
num. 1 Esforço de
Calculo do Dimensionamento
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
LANÇE B(cm) H(cm) ROS SEL BITL BITE Nb NbH NbB AS(cm) R0 ASnec | LBDALM LAMDBA | FNd (tf) Mxd
(tf,cm) Myd (tf,cm) |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tampa
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L. 3 20.0 20.0 .8 4 10.0 5.0 4 2 0 3.14 .8 1.60 | 40.9 13.0 | .8
1.7 -3.5 | 12.5 6.3 4 2 0 4.91 1.2 1.60 |
| 9 (COMBINAÇÃO= 1) | 16.0 6.3 4 2 0 8.04 2.0 1.60 | CASO PÓRTICO =
(A)** | 20.0 6.3 4 2 0 12.57 3.1 1.60 | **VER NOTA
| 25.0 8.0 4 2 0 19.63 4.9 1.60 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS
Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmavN Gmavm
4.5 30.0 1.15 1.40 8.00 .40 1.40 1.40 1.40 1.40
TipoAço ClasseAço ExcMin ExcMax K12 K37

```

50	A	2.0	15.0	1	1										
Manobra															
L. 2 **AVISO*.....PÉ-DIREITO DUPLO.....*															
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS															
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm						
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40						
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37										
50	A	2.0	15.0	1	1										
Fundo															
L. 1 **AVISO*.....PÉ-DIREITO DUPLO.....*															
L. 1	20.0	20.0	.8	4	10.0	5.0	4	2	0	3.14	.8	1.60	35.0	53.5	3.5
-12.4	-12.4				12.5	6.3	4	2	0	4.91	1.2	1.60			CASO PÓRTICO =
13 (COMBINAÇÃO=	3)				16.0	6.3	4	2	0	8.04	2.0	1.60			**VER NOTA
(A)**					20.0	6.3	4	2	0	12.57	3.1	1.60			
					25.0	8.0	4	2	0	19.63	4.9	1.60			
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS															
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm						
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40						
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37										
50	A	2.0	15.0	1	1										
Fundacao															
PILAR:P2															
num. 2															
Calculo do Dimensionamento															
Esforco de															
LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd
(tf,cm)	Myd (tf,cm)														
Tampa															
L. 3	20.0	20.0	.8	4	10.0	5.0	4	2	0	3.14	.8	1.60	35.0	13.0	.8
-1.7	-3.4				12.5	6.3	4	2	0	4.91	1.2	1.60			CASO PÓRTICO =
9 (COMBINAÇÃO=	1)				16.0	6.3	4	2	0	8.04	2.0	1.60			**VER NOTA
(A)**					20.0	6.3	4	2	0	12.57	3.1	1.60			
					25.0	8.0	4	2	0	19.63	4.9	1.60			
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS															
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm						
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40						
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37										
50	A	2.0	15.0	1	1										

|L. 2 **AVISO*.....PÉ-DIREITO DUPLO.....*

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmapv
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

Fundo | . . . | . . . |

L. 1	20.0	20.0 .8	4	10.0	5.0	4	2	0	3.14	.8	1.60	35.0	53.5		3.7
-13.0		-13.0													
				12.5	6.3	4	2	0	4.91	1.2	1.60				CASO PÓRTICO =
13 (COMBINAÇÃO=	3)			16.0	6.3	4	2	0	8.04	2.0	1.60				**VER NOTA
(A)**															
				20.0	6.3	4	2	0	12.57	3.1	1.60				
				25.0	8.0	4	2	0	19.63	4.9	1.60				

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmapv
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

Fundacao

PILAR:PC1
 num. 3
 Esforço de
 Calculo do Dimensionamento

LANCE B(cm) H(cm) ROS SEL BITL BITE Nb NbH NbB AS(cm) RO ASnec | LBDALM LAMDBA | FND (tf) Mxd
 (tf,cm) Myd (tf,cm) |

[illegible]

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmapv
4,5	30,0	1,15	1,40	8,00	,40	1,40	1,40	1,40	1,40

50	A	2.0	15.0	1	1

Manobra														
L.	2	19.9	30.7	.8	6	10.0	5.0	6	3	0	4.71	.8	2.23	35.0
6.0			6.9											31.9
						12.5	6.3	6	3	0	7.36	1.3	2.23	2.9
9	(COMBINAÇÃO=	1)				16.0	6.3	6	3	0	12.06	2.2	2.23	CASO PÓRTICO =
(A)**						20.0	6.3	6	3	0	18.85	3.4	2.23	**VER NOTA
						25.0	8.0	6	3	0	29.45	5.3	2.23	

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundo

L.	1	25.0	25.0	1.0	6	10.0	5.0	6	3	0	4.71	1.0	1.96	35.0
-47.9			47.9											21.0
						12.5	6.3	6	3	0	7.36	1.5	1.96	21.3
13	(COMBINAÇÃO=	3)												CASO PÓRTICO =

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:PC2														
num. 4														
Calculo do Dimensionamento														
Esforço de														
LANCE	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA
(tf,cm)		Myd (tf,cm)												FNd (tf)
														Mxd

Tampa														
L.	3	19.9	30.3	.9	6	10.0	5.0	6	3	0	4.71	.9	2.21	35.0
3.8			-4.3											13.4
						12.5	6.3	6	3	0	7.36	1.3	2.21	1.8
9	(COMBINAÇÃO=	1)				16.0	6.3	6	3	0	12.06	2.2	2.21	CASO PÓRTICO =
(A)**						20.0	6.3	6	3	0	18.85	3.4	2.21	**VER NOTA
						25.0	8.0	6	3	0	29.45	5.3	2.21	

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Manobra

L.	2	19.9	30.3	.9	6	10.0	5.0	6	3	0	4.71	.9	2.21	35.0
-10.7			12.3											53.4
														5.1

9 (COMBINAÇÃO= 1)	12.5	6.3	6	3	0	7.36	1.3	2.21		CASO PÓRTICO =
(A)**	16.0	6.3	6	3	0	12.06	2.2	2.21		**VER NOTA
	20.0	6.3	6	3	0	18.85	3.4	2.21		
	25.0	8.0	6	3	0	29.45	5.3	2.21		

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37

50	A	2.0	15.0	1	1

Fundo

L. 1	25.0	25.0	1.0	6	10.0	5.0	6	3	0	4.71	1.0	1.96	35.0	1.8	26.5
59.5	-59.5			12.5	6.3	6	3	0	7.36	1.5	1.96				CASO PÓRTICO =

9 (COMBINAÇÃO= 1)	12.5	6.3	6	3	0	7.36	1.5	1.96		CASO PÓRTICO =

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37

50	A	2.0	15.0	1	1

Fundacao

PILAR:PC3

num. 5

Esforço de

Calculo do Dimensionamento

LANCE (tf, cm)	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	R0	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
Myd (tf, cm)																

Tampa

L. 3	19.9	30.3	.9	6	10.0	5.0	6	3	0	4.71	.9	2.21	35.0	13.4	1.2
2.4	2.8			12.5	6.3	6	3	0	7.36	1.3	2.21				CASO PÓRTICO =

9 (COMBINAÇÃO= 1)	12.5	6.3	6	3	0	7.36	1.3	2.21		CASO PÓRTICO =

(A)**	16.0	6.3	6	3	0	12.06	2.2	2.21		**VER NOTA

	20.0	6.3	6	3	0	18.85	3.4	2.21		

	25.0	8.0	6	3	0	29.45	5.3	2.21		

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37

50	A	2.0	15.0	1	1

Manobra

L. 2	19.9	30.3	.9	6	10.0	5.0	6	3	0	4.71	.9	2.21	35.2	31.9	2.9
6.1	7.0			12.5	6.3	6	3	0	7.36	1.3	2.21				CASO PÓRTICO =

13 (COMBINAÇÃO= 3)	12.5	6.3	6	3	0	7.36	1.3	2.21		CASO PÓRTICO =

(A)**	16.0	6.3	6	3	0	12.06	2.2	2.21		**VER NOTA

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VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS											
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm		
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40		
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37						
50	A	2.0	15.0	1	1						
Fundo											
.....											
.....											
L. 1	25.0	25.0	1.0	6	10.0	5.0	6	3	0	4.71 1.0 1.96	35.0 21.0 25.3
57.0	-57.0										
			12.5	6.3	6	3	0	7.36	1.5	1.96	CASO PÓRTICO =
9 (COMBINAÇÃO= 1)											
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS											
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm		
4.5	30.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40		
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37						
50	A	2.0	15.0	1	1						
Fundacao											
.....											
.....											
=====											
Nota A:											
Este carregamento listado é, dentre os inúmeros carregamentos analisados, o que provocou a seleção desta											
armadura em primeiro lugar. Não necessariamente, este carregamento é o que necessita a maior											
quantidade de armadura na seção, pois o dimensionamento é feito de forma indireta, por verificação.											
Exemplificando,											
temos duas configurações de armaduras válidas para o lance, uma correspondendo a 17 cm2 e outra a 20 cm2.											
Um carregamento inicial necessitou de 18 cm2 e, por esta razão foi selecionada a configuração de 20 cm2 como											
a definitiva. Outros carregamentos posteriores necessitaram, por exemplo, de 19 cm2, 19.5 cm2											
(sempre inferiores aos 20 cm2), mas a listagem com o carregamento mais desfavorável foi feita com aquele											
que necessitou os 18 cm2, pois foi o primeiro a requisitar os 20 cm2. A pesquisa do carregamento exato que provoca maior											
armadura na seção não é realizada automaticamente para não aumentar de forma significativa o tempo de processamento.											
Se o usuário quiser calcular a real necessidade de armadura para um carregamento específico, ele poderá fazê-lo											
facilmente no Editor de Esforços e Armaduras, comando do próprio Cad/Pilar.											
=====											
=====											

7 TRATAMENTO QUÍMICO

7 TRATAMENTO QUÍMICO

7.1 Caracterização da obra

A estrutura da Unidade de Tratamento Químico está constituída por um reservatório de contenção onde estão localizados dois tanques de produtos químicos, um abrigo para bombas dosadoras e duas plataformas para abrigo de equipamentos. O reservatório mede internamente, em planta, 4,60 m x 7,00 m, com uma profundidade de 1,20 m. No seu interior existe um poço de drenagem com 80 x 80 cm rebaixado 40 cm em relação do ao fundo do reservatório. Os tanques ficam a céu aberto.

O abrigo das bombas, medindo em planta 3,30 m x 4,54 m e um pé direito de 2,60 m, tem seu piso localizado na cota 3,00, é aberto lateralmente e coberto com telhas autoportantes de fibrocimento. No seu interior localiza-se um poço com 0,66 m x 1,80 m com 0,60 m de profundidade.

As plataformas, com piso na cota 3,75, em número de duas, têm 1,00 m x 1,50 m com 2,60 m de pé direito, tem paredes de alvenaria nas laterais e fundo e cobertura em fibrocimento.

O desenvolvimento do projeto estrutural tomou como base o projeto arquitetônico constante das plantas integrantes do arquivo EG0112-D-TRQ-ARQ-01-00.

7.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônicos e hidráulico, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, foi observado o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN tendo em vista a experiência dessa companhia de saneamento na operação, manutenção e especificação desse tipo de obra.

A Classe de Agressividade Ambiental adotada foi a CAA II correspondendo na Tabela 6.1 da NBR 6118/2003 à agressividade moderada característica dos ambientes urbanos, correspondendo ao tipo de local onde a ETE Novo Mundo está implantada e ao tipo de utilização do prédio da Casa dos Sopradores.

Para a CAA II a NBR 6118 estabelece o seguinte:

- k) Especificações para o concreto:
 - Classe de concreto: $\geq C20$ – $f_{ck} \geq 25\text{Mpa}$ (250 kgf/cm²);
 - $E_{cs} = 0,85 E_{ci} = 23800 \text{ Mpa}$ (238000 kgf/cm²);
 - Fator água cimento máximo = 0,6.
- l) Especificações para cobrimentos de armaduras:
 - Vigas e pilares: 30 mm
 - Lajes : 25 mm

Como carregamentos específicos deste projeto têm-se:

- xii) Tanques de produtos químicos: 10 tf cada, incluindo peso próprio, distribuídos em sua área de projeção.

xiii) Bombas dosadoras: 50 kg cada..

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, elaborados, respectivamente, pelas empresas Fundasolos Engenharia de Solos e Fundações Ltda, datado de 1982, e RW – Geologia e Geotecnia Ltda, de setembro de 2010.

7.3 Concepção geral do(s) modelo(S) estrutural(is)

A concepção estrutural para a superestrutura foi a normalmente adotada para este tipo de obra foi a de lajes vigas e pilares. A modelagem foi realizada com a utilização do CAD/TQS versão 15.

A fundações foram projetadas na forma de estacas escavadas do tipo hélice contínua encimadas por blocos de concreto armado.

A Figura 3 ilustra o modelo adotado.

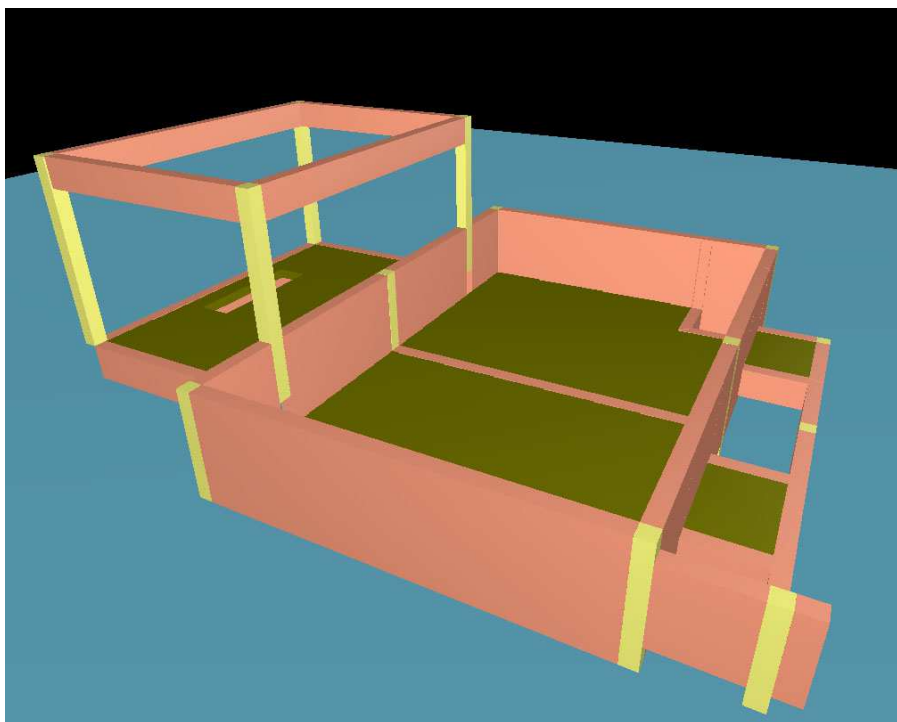


Figura 1 — Vista tridimensional do modelo de estrutura da Unidade de Tratamento Químico, modelado no CAD/TQS (pilares em amarelo; vigas em rosa, lajes em verde).

7.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento, discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito, os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais devidos ao vento. Neste modelo de pórtico, as lajes são tratadas como diafragmas rígidos e os esforços são distribuídos entre os pilares contraventantes de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária, parcial ou total, e, posteriormente, final de detalhamento e desenho. O dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. Na tipologia estrutural e na modelagem adotada na estrutura da Casa do Sopradores a sequência de projeto envolveu os seguintes passos:

- 21º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.
- 22º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 23º. Detalhamento final e desenho.
- 24º. Emissão de plantas.

7.5 Memorial de Desenvolvimento e resultados do projeto

A estrutura da Unidade de Tratamento Químico foi discretizada no TQS em um pavimento de fundação e um pavimento na cota 520. Este último somente contém as vigas de travamento dos pilares que sustentam a cobertura do abrigo das bombas dosadoras. A estrutura está composta por lajes, vigas e pilares e a fundação são estacas do tipo hélice contínua sob blocos.

A Figura 4 mostra os momentos fletores resultantes do carregamento imposto e que serviram de base para o dimensionamento. As lajes foram dimensionadas usando a calculadora do próprio TQS.

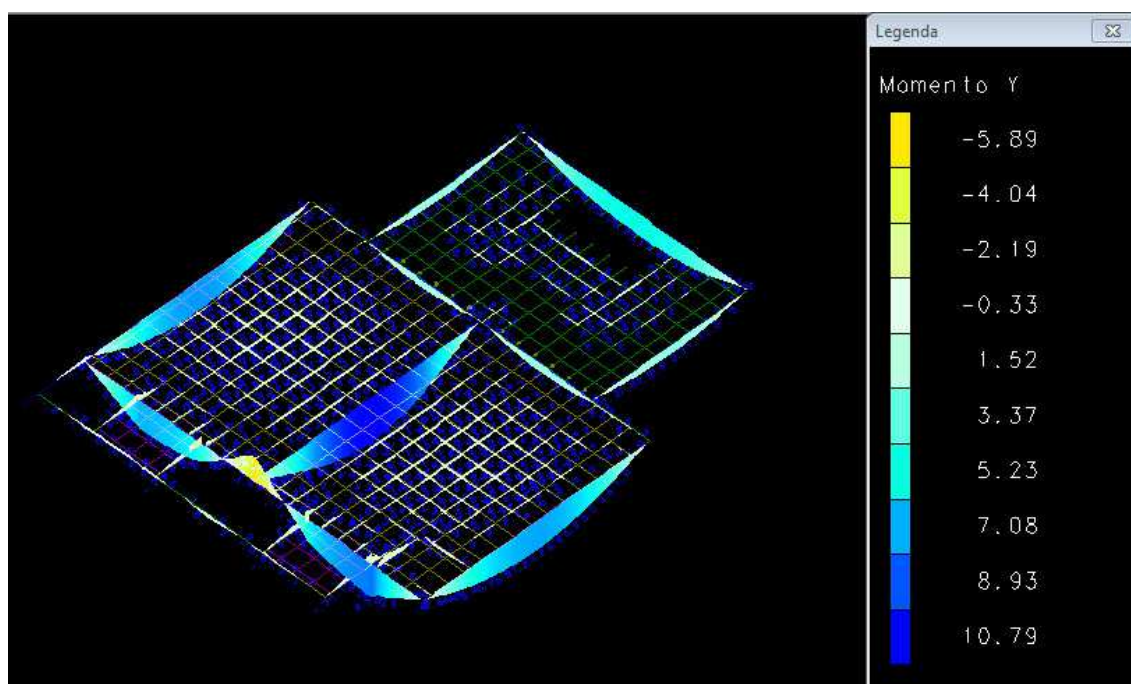


Figura 2 - Imagem do modelador do CAD/TQS com o Pavimento de Fundação.

7.5.1 Memória de cálculo das vigas

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.9.8)
Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
32283060
T Q S Projeto: 0002 - Fundação
26/04/12
CAD/Vigas
18:14:01

fck=250.kgf/cm2 - Aco: 50A - Esforços

Caracteristicos
L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet :
Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt :
Fator de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs :
Mesa Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI :
Espessura Laje Inferior

```

FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S :
Cobrim/Cobr.superior adicional
C A R G A S
MESq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q :
Cortante Adicional (valor unico)
A R M A D U R A S - F L E X A O
SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS :
Secao Te Armadura Simples
STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx :
Profund. relativa da LN Maxima
AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo :
Armadura e/d que chega no extremo
A R M A D U R A S - C I S A L H A M E N T O
MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin :
Armad.transv.minima-cisalhamento
Asw[C+T]: Arm.tran.calculada cisalh+torcao / Bit : Bitola selecionada / Esp :
Espacamento selecionado
NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus :
Armadura transversal-Suspensao
A R M A D U R A S - T O R C A O
%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de
torcao
b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-
torcao p/NR estribos selecionado
Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal
de torcao no lado h
ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao
plastica no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte :Codigo se pilar morre /
segue / vigas
M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo
=====
=====

```

```

Viga= 1 V2B 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= 3.29 /B= .18 /H= .50 /BCs= .51 /BCi= .18 /TpS= 10 /Esp.LS= .15 /Esp.LI= .15
FSp.Ex= .25 /FLt.Ex= .09 [M]

```

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

```

* * * * *
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.[-] = 1.1 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 219 | M.[-]
.0 tf* m
[tf,cm]| As = 1.72 -STAS- [ 3 B 10.0mm] | AsL= .00 ----- | As =
.00 -STAS- [ 0 B 6.3mm]
| AsL= .00 ----- x/d = .07 | As = 2.09 -STAS- [ 3 B 10.0mm ] | AsL=
.00 ----- x/d = .00 x/dMx= .50 |
| Grampos Dir.= 1B 6.3mm x/dMx= .50 |
| [tf,cm]| M[-]Min = 223.3 | M[+]Min = 177.9 | M[-]
]Min = 141.4
[cm2 ]| Asapo[+]= .52 |
Asapo[+]= 2.09

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 311. 6.93 35.93 2 45. .4 1.8 1.9 5.0 20.0 2 2.6 1.9

```

```

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
1 -1.958 -1.984 .18 .00 2 V113 .00 .00 0 0
0 0 0
2 4.951 4.833 .18 .00 2 V114 .00 .00 0 0
0 0 0
=====
=====

```

Viga= 2 VB4 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

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

 Vao= 1 /L= 1.40 /B= .18 /H= .75 /BCs= .32 /BCi= .18 /TpS= 10 /Esp.LS= .15 /Esp.LI= .15
 FSp.Ex= .38 /FLt.Ex= .09 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = .0 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 70 | M.[-]
 = .0 tf* m
 [tf,cm]| As = .00 -STAS- [0 B 6.3mm] | AsL= .00 ----- | As =
 .00 -STAS- [0 B 6.3mm] | AsL= .00 ----- x/d = .00 | As = 2.34 -STAS- [3 B 10.0mm] | AsL=
 .00 ----- x/d = .00 | Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 3 B 8.0mm] - LN= 2.1 |
 Grampos Dir.= 2B 6.3mm x/dMx= .50 |
 [tf,cm]| M[-]Min = 318.2 | M[+]Min = 363.3 | M[-]
]Min = 318.2
 [cm2]| Asapo[+]= 2.34 |
 Asapo[+]= 2.34

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 122. 5.17 55.46 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 3.687 3.636 .18 .00 2 V2B .00 .00 0 0
 0 0 0 0
 2 3.579 3.526 .18 .00 2 VB1 .00 .00 0 0
 0 0 0 0

=====

Viga= 3 V3B 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= 1.40 /B= .18 /H= .75 /BCs= .32 /BCi= .18 /TpS= 11 /Esp.LS= .15 /Esp.LI= .15
 FSp.Ex= .38 /FLt.Ex= .09 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = .0 tf* m | M.[+] Max= .5 tf* m - Abcis.= 70 | M.[-]
 = .0 tf* m
 [tf,cm]| As = .00 -STAS- [0 B 6.3mm] | AsL= .00 ----- | As =
 .00 -STAS- [0 B 6.3mm] | AsL= .00 ----- x/d = .00 | As = 2.34 -STAS- [3 B 10.0mm] | AsL=
 .00 ----- x/d = .00 | Grampos Esq.= 2B 6.3mm x/dMx= .50 | Arm.Lat.=[2 X 3 B 8.0mm] - LN= 2.1 |
 Grampos Dir.= 2B 6.3mm x/dMx= .50 |
 [tf,cm]| M[-]Min = 318.2 | M[+]Min = 363.3 | M[-]
]Min = 318.2
 [cm2]| Asapo[+]= 2.34 |
 Asapo[+]= 2.34

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 122. 2.22 55.46 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 1.570 1.566 .18 .00 2 V2B .00 .00 0 0
 0 0 0 0
 2 1.588 1.578 .18 .00 2 VB1 .00 .00 0 0
 0 0 0 0

=====

Viga= 5 VB1 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

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

 Vao= 1 /L= 3.29 /B= .18 /H= .50 /BCs= .51 /BCi= .18 /TpS= 11 /Esp.LS= .15 /Esp.LI= .15
 FSp.Ex= .25 /FLt.Ex= .09 [M]

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

 - - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = .4 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 219 | M.[-]
 = .0 tf* m
 [tf,cm]| As = 1.60 -STAS- [2 B 10.0mm] | AsL= .00 ----- | As =
 .00 -STAS- [0 B 6.3mm] | AsL= .00 ----- x/d = .06 | As = 2.09 -STAS- [3 B 10.0mm] | AsL=
 .00 ----- x/d = .00
 | x/dMx= .50 |
 Grampos Dir.= 1B 6.3mm x/dMx= .50 |
 [tf,cm]| M[-]Min = 197.2 | M[+]Min = 177.9 | M[-]
]Min = 141.4
 [cm2]| Asapo[+]= .70 |
 Asapo[+]= 2.09 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 311. 7.03 35.93 2 45. .4 1.8 1.8 5.0 20.0 2 2.5 1.8

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 1.403 1.343 .18 .00 2 V113 .00 .00 0 0
 0 0 0 0
 2 5.023 4.913 .18 .00 2 V114 .00 .00 0 0
 0 0 0 0

=====

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= .73 /B= .18 /H= .90 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
 FSp.Ex= .45 /FLt.Ex= .09 [M]

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

 - - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = .9 tf* m | M.[+] Max= .0 tf* m - Abcis.= 73 | M.[-]
 = 6.2 tf* m
 [tf,cm]| As = 2.43 -SRAS- [2 B 12.5mm] | AsL= .00 ----- | As =
 2.43 -SRAS- [2 B 12.5mm] | AsL= .00 ----- x/d = .04 | As = 2.43 -SRAS- [2 B 12.5mm] | AsL=
 .00 ----- x/d = .06
 | x/dMx= .50 | Arm.Lat.=[2 X 4 B 8.0mm] - LN= 4.5 |
 x/dMx= .50 |
 [tf,cm]| M[-]Min = 458.2 | M[+]Min = 458.2 | M[-]
]Min = 458.2
 [cm2]| Asapo[+]= 1.41 |
 Asapo[+]= .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.- 19. 10.42 67.17 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 -6.943 -7.072 .80 .13 1 B1 .00 .00 8001 0
 0 0 0 0
 2 7.443 7.315 .80 .13 1 B2 .00 .00 8002 0
 0 0 0 0

=====

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= 4.78 /B= .18 /H= 1.40 /BCs= .00 /BCi= .18 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
 FSp.Ex= .70 /FLt.Ex= .09 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = 5.3 tf* m | M.[+] Max= 6.9 tf* m - Abcis.= 278 | M.[-]
 = .0 tf* m
 [tf,cm]| As = 3.78 -STAS- [3 B 12.5mm] | AsL= .00 ----- | As =
 .53 -STAS- [2 B 6.3mm] | AsL= .00 ----- x/d = .04 | As = 3.78 -SRAS- [3 B 12.5mm] | AsL=
 .00 ----- x/d = .00
 | x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 6.8 |
 [tf,cm]| M[-]Min = 1108.8 | M[+]Min = 1108.8 | M[-]
]Min = 1108.8
 [cm2]| Asapo[+]= 3.78 |
 Asapo[+]= 3.78

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
 M E N S A G E M
 [tf,cm] 0.- 398. 9.55 106.23 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 6.555 6.450 .80 .00 1 B2 .00 .00 8002 0
 0 0 0 0
 2 3.882 3.814 .80 .00 1 B3 .00 .00 8003 0
 0 0 0 0

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= .99 /B= .18 /H= .40 /BCs= .28 /BCi= .00 /TpS= 5 /Esp.LS= .10 /Esp.LI= .00
 FSp.Ex= .20 /FLt.Ex= .09 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = .0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 99 | M.[-]
 = 1.0 tf* m
 [tf,cm]| As = .00 -SRAS- [0 B 6.3mm] | AsL= .00 ----- | As =
 1.23 -SRAS- [2 B 10.0mm] | AsL= .00 ----- x/d = .00 | As = 1.23 -STAS- [2 B 10.0mm] | AsL=
 .00 ----- x/d = .06
 | x/dMx= .50 |
 [tf,cm]| M[-]Min = 120.7 | M[+]Min = 100.6 | M[-]
]Min = 120.7
 [cm2]| Asapo[+]= .41 |
 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.- 81. 1.83 28.12 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
 Pilares:
 1 -.503 -.526 .18 .00 2 V111 .00 .00 0 0
 0 0 0 0
 2 1.277 1.256 .18 .00 2 V112 .00 .00 0 0
 0 0 0 0

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

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

 Vao= 1 /L= 2.79 /B= .18 /H= .50 /BCs= .46 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00
 FSp.Ex= .25 /FLt.Ex= .09 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = 2.9 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 279 | M.[-]
 = .0 tf* m
 [tf,cm]| As = 2.16 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As =
 .34 -SRAS- [2 B 6.3mm] | AsL= .00 ----- x/d = .09 | As = 1.98 -STAS- [3 B 10.0mm] | AsL=
 .00 ----- x/d = .00
 | x/dMx= .50 |
 [tf,cm]| M[-]Min = 274.3 | M[+]Min = 174.6 | M[-]
]Min = 141.4
 [cm2]| Asapo[+]= .49 |
 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.-	249.	4.03	35.93	2	45.	.0	1.8	1.8	5.0	20.0	2	.0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
0	0	1	2.876	2.264	.80	.25	0 B4	.00	.00 8004 0
0	0	2	.372	-.240	.80	.25	0 B5	.00	.00 8005 0

Viga= 105 V105 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= .99 /B= .18 /H= .40 /BCs= .28 /BCi= .00 /TpS= 8 /Esp.LS= .10 /Esp.LI= .00
 FSp.Ex= .20 /FLt.Ex= .09 [M]

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

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 | M.[-] = .0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 99 | M.[-]
 = .5 tf* m
 [tf,cm]| As = .00 -SRAS- [0 B 6.3mm] | AsL= .00 ----- | As =
 1.23 -SRAS- [2 B 10.0mm] | AsL= .00 ----- x/d = .00 | As = 1.23 -STAS- [2 B 10.0mm] | AsL=
 .00 ----- x/d = .06
 | x/dMx= .50 |
 [tf,cm]| M[-]Min = 120.7 | M[+]Min = 100.6 | M[-]
]Min = 120.7
 [cm2]| Asapo[+]= .41 |
 Asapo[+]= .41

CISALHAMENTO-	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus
M E N S A G E M	[tf,cm]	0.-	81.	1.02	28.12	2	45.	.0	1.8	1.8	5.0	20.0	2	.0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
0	0	1	-.073	-.085	.18	.00	2 V111	.00	.00 0 0
0	0	2	.482	.480	.18	.00	2 V112	.00	.00 0 0

Viga= 106 V106 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= .50 /BCs= 1.06 /BCi= .00 /TpS= 2 /Esp.LS= .20 /Esp.LI= .00
 FSp.Ex= .25 /FLt.Ex= .10 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 = | M.[-] = .0 tf* m | M.[+] Max= 22.5 tf* m - Abcis.= 214 | M.[-]
 = .0 tf* m
 [tf,cm]| As = 2.80 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As =
 2.80 -SRAS- [4 B 10.0mm]
 | AsL= .00 ----- x/d = .00 | As = 17.22 -STAS- [4 B 25.0mm] | AsL=
 .00 ----- x/d = .00
 | x/dMx= .50 |
 [tf,cm]| M[-]Min = 157.1 | M[+]Min = 222.9 | M[-]
]Min = 157.1
 [cm2]| Asapo[+]= 6.53 |
 Asapo[+]= 5.74

CISALHAMENTO-	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus
M E N S A G E M														
[tf,cm]	0.-	133.	17.38	39.92	2	45.	7.0	2.1	7.0	8.0	12.0	2	.0	.0
	133.-	265.	8.78	39.92	2	45.	1.2	2.1	2.1	5.0	17.0	2	.0	.0
	265.-	398.	20.71	39.92	2	45.	9.4	2.1	9.4	8.0	10.0	2	.0	.0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
	1	12.398	12.138	.80	.25	1	B7	.00	.00 8007 0
0 0 0	2	13.571	13.271	.80	.25	1	B8	.00	.00 8008 0
0 0 0	0	0							

Viga= 107 V107 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao
 /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----

 Vao= 1 /L= .99 /B= .18 /H= .40 /BCs= .28 /BCi= .00 /TpS= 5 /Esp.LS= .10 /Esp.LI= .00
 FSp.Ex= .20 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
 E I T A
 = | M.[-] = .0 tf* m | M.[+] Max= .0 tf* m - Abcis.= 99 | M.[-]
 = .5 tf* m
 [tf,cm]| As = .00 -SRAS- [0 B 6.3mm] | AsL= .00 ----- | As =
 1.23 -SRAS- [2 B 10.0mm]
 | AsL= .00 ----- x/d = .00 | As = 1.23 -STAS- [2 B 10.0mm] | AsL=
 .00 ----- x/d = .06
 | x/dMx= .50 |
 [tf,cm]| M[-]Min = 120.7 | M[+]Min = 100.6 | M[-]
]Min = 120.7
 [cm2]| Asapo[+]= .41 |
 Asapo[+]= .41

CISALHAMENTO-	Xi	Xf	Vsd	VRd2	MdC	Ang.	Asw[C]	Aswmin	Asw[C+T]	Bit	Esp	NR	AsTrt	AsSus
M E N S A G E M														
[tf,cm]	0.-	81.	1.03	28.12	2	45.	.0	1.8	1.8	5.0	20.0	2	.0	.0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
	1	-.184	-.195	.18	.00	2	V111	.00	.00 0 0
0 0 0	2	.494	.491	.18	.00	2	V112	.00	.00 0 0
0 0 0	0	0							

=====

Viga= 108 V108 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= .71 /B= .18 /H= .40 /BCs= .25 /BCi= .00 /TpS= 8 /Esp.LS= .10 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O

) - - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R

E I T A | M.[-] = .7 tf* m | M.[+] Max= .0 tf* m - Abcis.= 71 | M.[-]

= 1.9 tf* m | [tf,cm]| As = 1.19 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As =

1.81 -SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .06 | As = 1.19 -STAS- [2 B 10.0mm] | AsL=

.00 ----- x/d = .10 | x/dMx= .50 |

| [tf,cm]| M[-]Min = 112.3 | M[+]Min = 98.2 |

]Min = 112.3 | [cm2]| Asapo[+]= .30 |

Asapo[+]= .30 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus

M E N S A G E M [tf,cm] 0.- 50. 2.71 28.12 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn

Pilares: 1 -1.403 -1.435 .80 .28 1 B9 .00 .00 8009 0

0 0 0 0 1.939 1.907 .18 .00 2 V112 .00 .00 0 0

0 0 0 0

=====

=====

Viga= 109 V109 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao

/Fat.Alt=1.00 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 2.79 /B= .18 /H= .50 /BCs= .46 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00
FSp.Ex= .25 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O

) - - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R

E I T A | M.[-] = 3.3 tf* m | M.[+] Max= 1.0 tf* m - Abcis.= 279 | M.[-]

= .0 tf* m | [tf,cm]| As = 2.42 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As =

.34 -SRAS- [2 B 6.3mm] | AsL= .00 ----- x/d = .11 | As = 1.98 -STAS- [3 B 10.0mm] | AsL=

.00 ----- x/d = .00 | x/dMx= .50 |

| [tf,cm]| M[-]Min = 274.3 | M[+]Min = 174.6 |

]Min = 141.4 | [cm2]| Asapo[+]= .49 |

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.- 249. 4.41 35.93 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn

Pilares: 1 3.147 2.535 .80 .25 0 B12 .00 .00 8012 0

0 0 0 0 .297 -.315 .80 .25 0 B13 .00 .00 8013 0

0 0 0 0

=====

Viga= 110 V110 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= 4.78 /B= .18 /H= 1.40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .70 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O

) - - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A

| M.[-] = .0 tf* m | M.[+] Max= 9.2 tf* m - Abcis.= 239 | M.[-]
= .0 tf* m

[tf,cm]| As = .53 -SRAS- [2 B 6.3mm] | AsL= .00 ----- | As =
.53 -SRAS- [2 B 6.3mm]

| AsL= .00 ----- x/d = .00 | As = 3.78 -SRAS- [3 B 12.5mm] | AsL=
.00 ----- x/d = .00

| x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 6.8 |
x/dMx= .50

| [tf,cm]| M[-]Min = 1108.8 | M[+]Min = 1108.8 |
]Min = 1108.8

[cm2]| Asapo[+]= 3.78 |
Asapo[+]= 3.78

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus

M E N S A G E M
[tf,cm] 0.- 398. 9.06 106.23 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn

Pilares:

1 6.465 6.374 .80 .00 1 B10 .00 .00 8010 0
0 0 0

2 6.309 6.202 .80 .00 1 B11 .00 .00 8011 0
0 0 0

=====

Viga= 111 V111 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= 1.93 /B= .18 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

* * * * *
Diagrama M[-] nao usual. Verificar apoios com M[-] Max.
* * * * *

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O

) - - - - - FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A

| M.[-] = .2 tf* m | M.[+] Max= .0 tf* m - Abcis.= 220 | M.[-]
= .2 tf* m

[tf,cm]| As = 1.08 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As =
1.08 -SRAS- [2 B 10.0mm]

| AsL= .00 ----- x/d = .05 | As = 1.08 -SRAS- [2 B 10.0mm] | AsL=
.00 ----- x/d = .05

| x/dMx= .50 | x/dMx= .50 |
x/dMx= .50

| [tf,cm]| M[-]Min = 90.5 | M[+]Min = 90.5 |
]Min = 90.5

[cm2]| Asapo[+]= .36 |
Asapo[+]= 1.03

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.- 169. .54 28.12 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .1

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.03 /B= .18 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .20 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O )
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A | M.[-] = .1 tf* m | M.[+] Max= .1 tf* m - Abcis.= 303 | M.[-]
= .0 tf* m | | |
[tf,cm]| As = 1.08 -SRAS- [ 2 B 10.0mm] | AsL= .00 ----- | As =
.22 -SRAS- [ 2 B 6.3mm] | | |
| AsL= .00 ----- x/d = .05 | As = 1.08 -SRAS- [ 2 B 10.0mm ] | AsL=
.00 ----- x/d = .00 | | |
| x/dMx= .50 | | |
x/dMx= .50 | | |
| | |
[tf,cm]| M[-]Min = 90.5 | M[+]Min = 90.5 | M[-]
]Min = 90.5 | | |
[cm2 ]| Asapo[+]= 1.03 | | |
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.- 279. .68 28.12 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .3

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
	1	.388	.360	.80	.28	1	B9	.00	.00 8009 0
0 0 0	2	.825	.639	.80	.28	1	B6	.00	.00 8006 0
0 0 0	3	.314	.246	.80	.28	1	B1	.00	.00 8001 0
0 0 0	0	0							

Viga= 112 V112 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= 3.59 /B= .18 /H= 1.40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00
FSp.Ex= .70 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O )
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A | M.[-] = .0 tf* m | M.[+] Max= 6.9 tf* m - Abcis.= 119 | M.[-]
= 8.1 tf* m | | |
[tf,cm]| As = .53 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- | As =
3.78 -SRAS- [ 2 B 16.0mm] | | |
| AsL= .00 ----- x/d = .00 | As = 3.78 -SRAS- [ 3 B 12.5mm ] | AsL=
.00 ----- x/d = .04 | | |
| x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 6.8 |
x/dMx= .50 | | |
| | |
[tf,cm]| M[-]Min = 1108.8 | M[+]Min = 1108.8 | M[-]
]Min = 1108.8 | | |
[cm2 ]| Asapo[+]= 3.78 | | |
Asapo[+]= 3.59 | | |

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 279. 12.47 106.23 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 3.59 /B= .18 /H= 1.40 /BCs= .00 /BCi= .27 /TpS= 6 /Esp.LS= .00 /Esp.LI= .20
FSp.Ex= .70 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O )
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A | M.[-] = .0 tf* m | M.[+] Max= 6.9 tf* m - Abcis.= 119 | M.[-]
= 8.1 tf* m | | |
[tf,cm]| As = .53 -SRAS- [ 2 B 6.3mm] | AsL= .00 ----- | As =
3.78 -SRAS- [ 2 B 16.0mm] | | |
| AsL= .00 ----- x/d = .00 | As = 3.78 -SRAS- [ 3 B 12.5mm ] | AsL=
.00 ----- x/d = .04 | | |
| x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 6.8 |
x/dMx= .50 | | |
| | |
[tf,cm]| M[-]Min = 1108.8 | M[+]Min = 1108.8 | M[-]
]Min = 1108.8 | | |
[cm2 ]| Asapo[+]= 3.78 | | |
Asapo[+]= 3.59 | | |

```

```

      | M.[-] =      8.4 tf* m      | M.[+] Max=      5.9 tf* m - Abcis.= 239 | M.[-]
=      .0 tf* m      |
[tf,cm]| As =      4.05 -STAS- [ 2 B 16.0mm] | AsL=      .00 ----- | As =
.57 -STAS- [ 2 B 6.3mm] | AsL=      .00 ----- x/d = .03 | As =      4.05 -SRAS- [ 2 B 16.0mm ] | AsL=
.00 ----- x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 6.8 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 1204.3 | M[+]Min = 1349.8 | M[-]
]Min = 1204.3 |
[cm2 ]| Asapo[+]= 3.59 |
Asapo[+]= 4.05 |

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 279. 12.22 106.23 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

```

```

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
      1 6.889 6.716 .80 .00 1 B10 .00 .00 8010 0
0 0 0 0
      2 16.927 16.405 .80 .00 1 B7 .00 .00 8007 0
0 0 0 0
      3 3.446 3.310 .80 .00 1 B2 .00 .00 8002 0
0 0 0 0
=====
=====

```

```

Viga= 113 V113 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= 1.22 /B= .18 /H= 1.40 /BCs= .00 /BCi= .21 /TpS= 9 /Esp.LS= .00 /Esp.LI= .20
FSp.Ex= .70 /FLt.Ex= .09 [M]

```

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

* * * * *
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.= 121 | M.[-]
=      .8 tf* m      |
[tf,cm]| As =      .57 -STAS- [ 2 B 6.3mm] | AsL=      .00 ----- | As =
3.87 -STAS- [ 2 B 16.0mm] | AsL=      .00 ----- x/d = .00 | As =      3.87 -SRAS- [ 2 B 16.0mm ] | AsL=
.00 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 6.8 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 1143.9 | M[+]Min = 1191.2 | M[-]
]Min = 1143.9 |
[cm2 ]| Asapo[+]= 1.29 |
Asapo[+]= 3.59 |

```

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 42. 1.76 106.23 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0

```

```

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 2.37 /B= .18 /H= 1.49 /BCs= .00 /BCi= .23 /TpS= 6 /Esp.LS= .00 /Esp.LI= .15
FSp.Ex= .70 /FLt.Ex= .09 [M]

```

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

* * * * *
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=      1.3 tf* m - Abcis.= 237 | M.[-]
=      .1 tf* m      |

```

```
[tf,cm]| As = 4.13 -STAS- [ 2 B 16.0mm] | AsL= .00 ----- | As =
4.13 -STAS- [ 2 B 16.0mm] | AsL=
| AsL= .00 ----- x/d = .03 | As = 4.13 -SRAS- [ 2 B 16.0mm ] | AsL=
.00 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 8.0mm] - LN= 7.2 |
x/dMx= .50 |
|
[tf,cm]| M[-]Min = 1304.7 | M[+]Min = 1366.8 | M[-]
]Min = 1304.7 |
[cm2 ]| Asapo[+]= 4.13 |
Asapo[+]= 4.01 |
```

```
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 157. 3.23 113.26 2 45. .0 1.8 1.8 5.0 20.0 2 1.4 .4
```

----- G E O M E T R I A E C A R G A S -----

```
Vao= 3 /L= 2.37 /B= .18 /H= 1.49 /BCs= .00 /BCi= .23 /TpS= 6 /Esp.LS= .00 /Esp.LI= .15
FSp.Ex= .70 /FLt.Ex= .09 [M]
```

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```
* * * * *
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.[-] = .9 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 237 | M.[-]
= .1 tf* m
[tf,cm]| As = 4.13 -STAS- [ 2 B 16.0mm] | AsL= .00 ----- | As =
4.13 -STAS- [ 2 B 16.0mm] | AsL=
| AsL= .00 ----- x/d = .03 | As = 4.13 -SRAS- [ 2 B 16.0mm ] | AsL=
.00 ----- x/d = .03 | x/dMx= .50 | Arm.Lat.=[2 X 6 B 8.0mm] - LN= 7.2 |
x/dMx= .50 |
|
[tf,cm]| M[-]Min = 1304.7 | M[+]Min = 1366.8 | M[-]
]Min = 1304.7 |
[cm2 ]| Asapo[+]= 3.82 |
Asapo[+]= 4.13 |
```

```
CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 157. 2.52 113.26 2 45. .0 1.8 1.8 5.0 20.0 2 1.0 .3
```

----- G E O M E T R I A E C A R G A S -----

```
Vao= 4 /L= 1.22 /B= .18 /H= 1.40 /BCs= .00 /BCi= .21 /TpS= 9 /Esp.LS= .00 /Esp.LI= .20
FSp.Ex= .70 /FLt.Ex= .09 [M]
```

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```
- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O )
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A
| M.[-] = .7 tf* m | M.[+] Max= .4 tf* m - Abcis.= 121 | M.[-]
= .0 tf* m
[tf,cm]| As = 3.87 -STAS- [ 2 B 16.0mm] | AsL= .00 ----- | As =
.57 -STAS- [ 2 B 6.3mm] | AsL=
| AsL= .00 ----- x/d = .03 | As = 3.87 -SRAS- [ 2 B 16.0mm ] | AsL=
.00 ----- x/d = .00 | x/dMx= .50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 6.8 |
x/dMx= .50 |
|
[tf,cm]| M[-]Min = 1143.9 | M[+]Min = 1191.2 | M[-]
]Min = 1143.9 |
[cm2 ]| Asapo[+]= 3.59 |
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.- 42. 2.28 106.23 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0
```

```
REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn
Pilares:
1 -.608 -.976 .80 .00 1 B11 .00 .00 8011 0
0 0 0 0
```

0	0	0	2	-1.902	-2.154	.80	.00	0	B12	.00	.00	8012	0
0	0	0	3	-1.341	-1.354	.80	.00	1	B8	.00	.00	8008	0
0	0	0	4	-.768	-1.018	.80	.00	0	B4	.00	.00	8004	0
0	0	0	5	-1.262	-1.630	.80	.00	1	B3	.00	.00	8003	0

Viga= 114 V114 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= 4.24 /B= .18 /H= .50 /BCs= .60 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00
FSp.Ex= .25 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R
E I T A
= | M.[-] = .0 tf* m | M.[+] Max= 7.9 tf* m - Abcis.= 176 | M.[-]
[tf,cm]| As = .86 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As =
.86 -SRAS- [2 B 8.0mm] | AsL= .00 ----- x/d = .00 | As = 5.78 -STAS- [3 B 16.0mm] | AsL=
.00 ----- x/d = .00 x/dMx= .50 |
x/dMx= .50 |
[tf,cm]| M[-]Min = 141.4 | M[+]Min = 183.4 | M[-]
]Min = 141.4 |
[cm2]| Asapo[+]= 2.30 |
Asapo[+]= 2.30 |

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus
M E N S A G E M
[tf,cm] 0.- 110. 7.37 35.93 2 45. .7 1.8 1.8 5.0 20.0 2 .0 .0
110.- 174. 5.96 35.93 2 45. .0 1.8 2.5 5.0 15.0 2 .0 2.5
174.- 250. .92 35.93 2 45. .0 1.8 1.8 5.0 20.0 2 .0 .0
250.- 314. 7.07 35.93 2 45. .5 1.8 2.5 5.0 15.0 2 .0 2.5
314.- 394. 7.85 35.93 2 45. 1.0 1.8 1.8 5.0 20.0 2 .0 .0

REAC. APOIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn
Pilares:									
0	0	0	0	0	.25	0	B13	.00	.00
0	0	0	0	0	.25	0	B5	.00	.00

7.5.2 Memória de Cálculo dos Pilares:

JOAO SOARES VIEGAS FILHO LISPIL - Listagem dos resultados -P-A-S- por pil (V15.9.8)
Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS
32283060
T Q S Projeto: 0001 - 11_ETEP_Tratamento químico
26/04/12
CAD/Pilar
18:14:44

AS RESULTANTE POR BITOLAS fck = .250 [tf,cm] fck(opc.) = .250

SEL = Quantidade Efetiva de Barras na Secao
Nb = Quantidades de Barras Dimensionadas na Secao
NbH = Numero de Barras lado H
NbB = Numero de Barras lado B

PILAR:P2													Esforço de			
num. 2																
Calculo do Dimensionamento																
LANCE	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
(tf,cm)		Myd (tf,cm)														
Nivel 520																
.....																
L. 1	18.0	20.02.2	4	16.0	6.3	4	2	0	8.04	2.2	7.32		81.7	55.3		3.0
-9.3		-71.9														
				20.0	6.3	4	2	0	12.57	3.5	7.50					CASO PÓRTICO =
13 (COMBINAÇÃO=	1)			25.0	8.0	4	2	0	19.63	5.5	7.93					**VER NOTA
(A)**																
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]		fck[MPa]	GamaAço	GamaConcreto		AsMax[%]		AsMin[%]		GmapN	GmapM	GmavN	Gmavm			
3.0		25.0	1.15	1.40		8.00		.40		1.47	1.47	1.40	1.40			
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37											
50	A	2.0	15.0	1	1											
Fundacao																

L. 1	18.0	20.0	.9	4	10.0	5.0	4	2	0	3.14	.9	1.97	78.4	55.8	3.0
12.2		37.6													
24	(COMBINAÇÃO=	10)			12.5	6.3	4	2	0	4.91	1.4	2.00			CASO PÓRTICO =
(A)**					16.0	6.3	4	2	0	8.04	2.2	2.01			**VER NOTA
					20.0	6.3	4	2	0	12.57	3.5	2.05			
					25.0	8.0	4	2	0	19.63	5.5	2.08			

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
3.0	25.0	1.15	1.40	8.00	.40	1.47	1.47	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

PILAR:P4
num. 4

Esforco de

Calculo do Dimensionamento

LANCE	B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FND (tf)	Mxd
(tf,cm)		Myd (tf,cm)														

Nível 520

L. 1	18.0	20.0	2.2	4	16.0	6.3	4	2	0	8.04	2.2	7.23	82.5	55.3	3.0
-8.2		72.5													
13	(COMBINAÇÃO=	1)			20.0	6.3	4	2	0	12.57	3.5	7.45			CASO PÓRTICO =
(A)**					25.0	8.0	4	2	0	19.63	5.5	7.88			**VER NOTA

VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS

Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	GmavM
3.0	25.0	1.15	1.40	8.00	.40	1.47	1.47	1.40	1.40

TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37
50	A	2.0	15.0	1	1

Fundacao

Nota A:

Este carregamento listado é, dentre os inúmeros carregamentos analisados, o que provocou a seleção desta

armadura em primeiro lugar. Não necessariamente, este carregamento é o que necessita a maior quantidade de

armadura na seção, pois o dimensionamento é feito de forma indireta, por verificação.

Exemplificando,

temos duas configurações de armaduras válidas para o lance, uma correspondendo a 17 cm2 e outra a 20 cm2.

Um carregamento inicial necessitou de 18 cm2 e, por esta razão foi selecionada a configuração de 20 cm2 como

a definitiva. Outros carregamentos posteriores necessitaram, por exemplo, de 19 cm2, 19.5 cm2

(sempre

inferiores aos 20 cm2), mas a listagem com o carregamento mais desfavorável foi feita com aquele que necessitou

os 18 cm2, pois foi o primeiro a requisitar os 20 cm2. A pesquisa do carregamento exato que provoca maior

armadura na seção não é realizada automaticamente para não aumentar de forma significativa o tempo de processamento.

Se o usuário quiser calcular a real necessidade de armadura para um carregamento específico, ele poderá fazê-lo

facilmente no Editor de Esforços e Armaduras, comando do próprio Cad/Pilar.

=====

8 CASA DE SOPRADORES

8 CASA DOS SOPRADORES

8.1 Caracterização da obra

A Casa dos Sopradores integra o projeto da Estação de Tratamento de Esgoto de Novo Mundo caracterizando-se por ser um prédio destinado ao abrigo de equipamentos com 9,70 m x 18,00 m, em planta, e 7,20 m de pé direito. A estrutura é em concreto armado, constituída por lajes de piso e cobertura, apoiadas em vigas e pilares. A cobertura é em telhas de fibro cimento e o fechamento lateral é em alvenaria de tijolos cerâmicos furados. O desenvolvimento do projeto estrutural tomou como base o projeto arquitetônico constante das plantas integrantes do arquivo 045-SES-ETE-ARQ-01a02-00. Sobre a laje de piso existem quatro equipamentos denominados sopradores. Para manuseio desses equipamentos existe uma pequena ponte rolante munida de talha elétrica.

8.2 Condicionantes de projeto

Os condicionantes do projeto estrutural são constituídos pela geometria e especificações constantes dos projetos arquitetônicos e hidráulico, bem como pelo que preconizam as normas brasileira vigentes, em especial a NBR 6118/2003 (Projeto de Estruturas de Concreto – Procedimentos), a NBR 6120/80 (Cargas para o cálculo de estruturas de edificações), NBR 6123/1988 (Forças devido ao vento em edificações), NBR 6122/1996 (Projeto e Execução de Fundações) e NBR 8681/2003 (Ações e Segurança Nas Estruturas – Procedimentos). Além disso, dadas a natureza do projeto, foi observado, também, como um referencial adicional, o que dispõe a “Especificação para Elaboração de Projetos de Estruturas de Concreto” da CORSAN.

A Classe de Agressividade Ambiental adotada foi a CAA II correspondendo na Tabela 6.1 da NBR 6118/2003 à agressividade moderada característica dos ambientes urbanos, correspondendo ao tipo de local onde a ETE Novo Mundo está implantada e ao tipo de utilização do prédio da Casa dos Sopradores.

Para a CAA II a NBR 6118 estabelece o seguinte:

- m) Especificações para o concreto:
 - Classe de concreto: $\geq$ C20 – $f_{ck} \geq 25\text{Mpa}$ (250 kgf/cm²);
 - $E_{cs} = 0,85$ $E_{ci} = 23800$ Mpa (238000 kgf/cm²);
 - Fator água cimento máximo = 0,6.
- n) Especificações para cobrimentos de armaduras:
 - Vigas e pilares: 30 mm
 - Lajes : 25 mm

Como carregamentos específicos deste projeto têm-se:

- xiv) Sopradores: 2 tf cada, distribuídos em sua área de projeção.
- xv) Talha elétrica: 2 tf de capacidade de carga.

As fundações foram projetadas a partir de relatórios de sondagem de percussão, tipo SPT, elaborados, respectivamente, pela empresa FS Sondagens de Cachoeirinha-RS.

8.3 Concepção geral do(s) modelo(S) estrutural(is)

A concepção estrutural para a superestrutura foi a normalmente adotada para este tipo de prédio sendo constituída por lajes vigas e pilares. A modelagem foi realizada com a utilização do CAD/TQS versão 15.

A fundações foram projetadas na forma de estacas pré-moldadas de concreto armado.

A Figura 3 ilustra o modelo adotado.

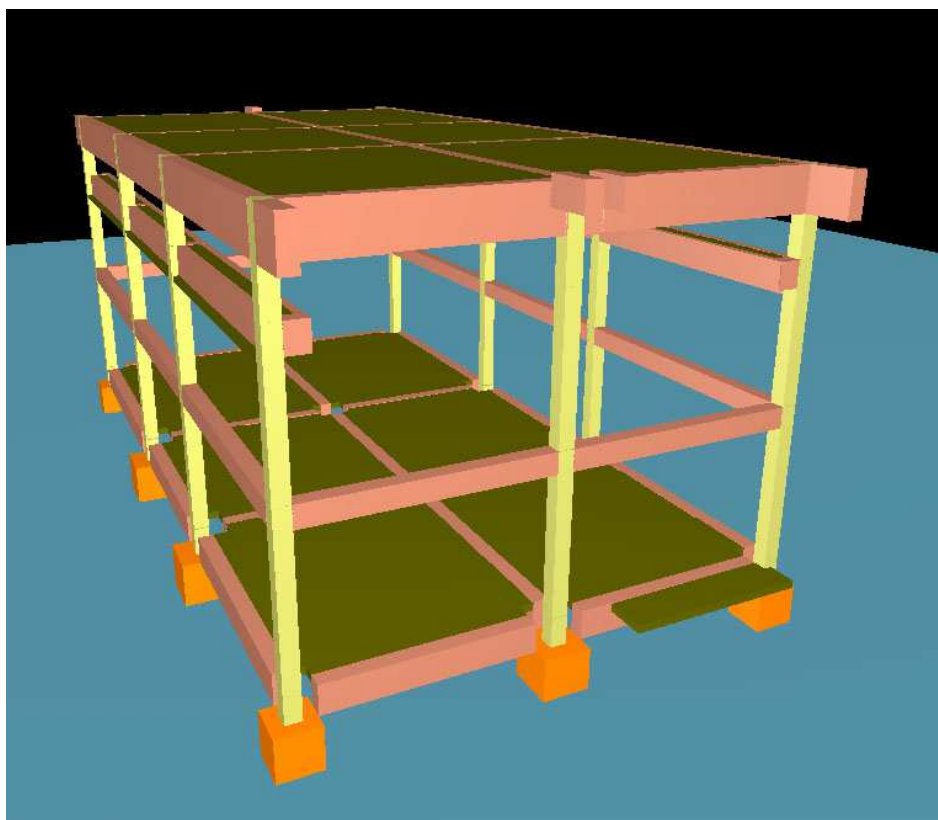


Figura 3 — Vista tridimensional do modelo de estrutural da Casa dos Sopradores, modelado no CAD/TQS (pilares em amarelo; vigas em rosa, lajes em verde e blocos em laranja).

8.4 Metodologia de projeto

A metodologia adotada é a utilizada pelo CAD/TQS com a configuração de modelos e dos parâmetros de projeto.

O lançamento geométrico e de carregamento da estrutura é feito graficamente a partir do qual são construídos os arquivos de entrada de dados no sistema.

Os dados de carregamento são objeto de combinações que visam atender o que estabelecem as normas NBR 6118 e NBR 8681 relativamente aos ELU (Estados Limites Últimos) e ELS (Estados Limites de Serviço). O sistema, no nível de pavimento, discretiza as lajes e vigas em grelhas, distribuindo os esforços nas mesmas e resolvendo os sistemas de equações resultantes matricialmente. Isto feito,

os resultados são transferidos para um modelo de pórtico espacial que trata a estrutura de barras constituída por vigas e pilares como um todo, inclusive com a consideração dos esforços horizontais devidos ao vento. Neste modelo de pórtico, as lajes são tratadas como diafragmas rígidos e os esforços são distribuídos entre os pilares contraventantes de acordo com suas respectivas rigidezes. Resolvido o pórtico, os esforços resultantes são individualizados nas vigas e pilares que lhes correspondem. O próximo passo é o dimensionamento de vigas e pilares que é feito de forma automática pelo sistema obedecendo aos critérios estabelecidos pelo projetista. Esses resultados podem ser objeto de edição interativa, intermediária, parcial ou total, e, posteriormente, final de detalhamento e desenho. O dimensionamento das lajes é feito de forma interativa com a utilização de editor de esforços e armaduras.

O processamento é feito de diferentes maneiras automática e/ou manual. Os resultados são fornecidos através de relatórios analíticos e de interfaces gráficas. Na tipologia estrutural e na modelagem adotada na estrutura da Casa do Sopradores a sequência de projeto envolveu os seguintes passos:

- 25º. Estabelecimento dos critérios de projeto e lançamento gráfico da estrutura com suas cargas.
- 26º. Processamento global com as seguintes análises de resultados:
 - a. Análise visual e dos valores das deformações das vigas e lajes em modelo elástico;
 - b. Análise visual das deformações e solicitações no pórtico;
 - c. Edição interativa das armaduras das lajes;
 - d. Exame visual da armadura de vigas e seus diagramas; edição interativa de vigas;
 - e. Análise de lajes e vigas através de modelo de grelha não-linear com verificação visual de deformações imediata e lenta, bem como da fissuração.
 - f. Exame visual das armaduras e taxas de armadura dos pilares e edição interativa se necessário;
 - g. Análise das fundações e edição interativa se necessário.
- 27º. Detalhamento final e desenho.
- 28º. Emissão de plantas.

8.5 Memorial de Desenvolvimento e resultados do projeto

8.5.1 Pavimento de fundação:

O pavimento com esta denominação está no nível +2,78 m incorporando na sua modelagem as lajes, vigas, sóculos, blocos de fundação e estacas.

A Figura 4 ilustra o modelo estrutural do pavimento com as distribuição de geral de cargas nas lajes em verde (permanente: 0,1 tf/m²; acidental: 0,3 tf/m²) e em laranja as cargas adicionais devido aos sopradores (permanente: 0,3 tf/m² – considerada desta forma em virtude de seu tempo de permanência na estrutural). As vigas periféricas receberam um carregamento distribuído linearmente devido às alvenarias (permanente: 1,35 tf/m – parede dupla, tipo Eckert, rebocada em ambos lados). A laje pequena laje em balanço recebeu carregamento periférico da alvenaria e da laje de cobertura local (faixa laranja na borda - 0,2/0,1 tf/m).

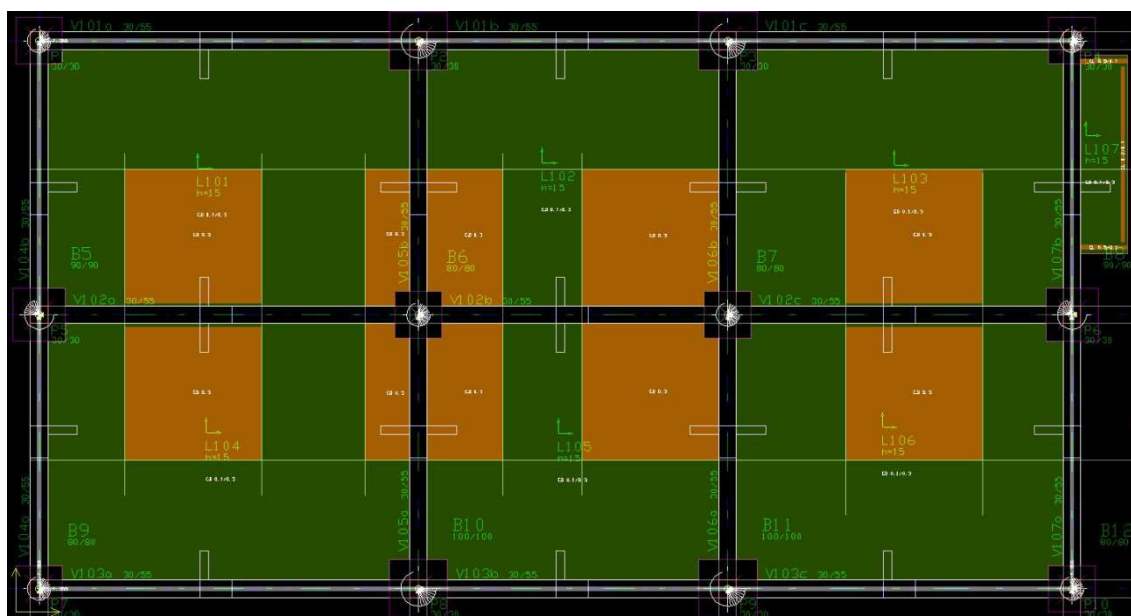


Figura 4 - Imagem do modelador do CAD/TQS com o Pavimento de Fundação.

8.5.1.1 Lajes e Vigas

Como já mencionado o pavimento foi modelado através da sua discretização em grelhas com malha de 35 x 35 cm ajustada nas extremidades de forma simétrica às dimensões das lajes. A altura adotada para as lajes foi a constante do projeto arquitetônico e igual a 15 cm mantida para minimizar o efeito das deformações sobre os equipamentos.

As deformações foram avaliadas, preliminarmente, em modelo elástico e após o dimensionamento final confirmadas com o uso de modelo não-linear tanto físico (diagrama tensão deformação do concreto) quanto geométrico (rigidez avaliada a cada incremento de carregamento). A não linearidade foi simulada no CAD/TQS através de 12 carregamentos incrementais, sendo que nos 5 primeiros foi inserido os peso

próprio, nos 5 subsequentes as demais cargas permanentes e nos 2 últimos as cargas acidentais. Nos dois primeiros carregamentos foram considerados fatores ϕ de majoração para considerar a deformação lenta de, respectivamente, 1,5 e 1,3.

Na

Figura 5 são mostradas as deformações oriundas do modelo não-linear limitadas em 0,61 cm ($< 470 \text{ cm}/350 = 1,34$) incluindo a deformação lenta.

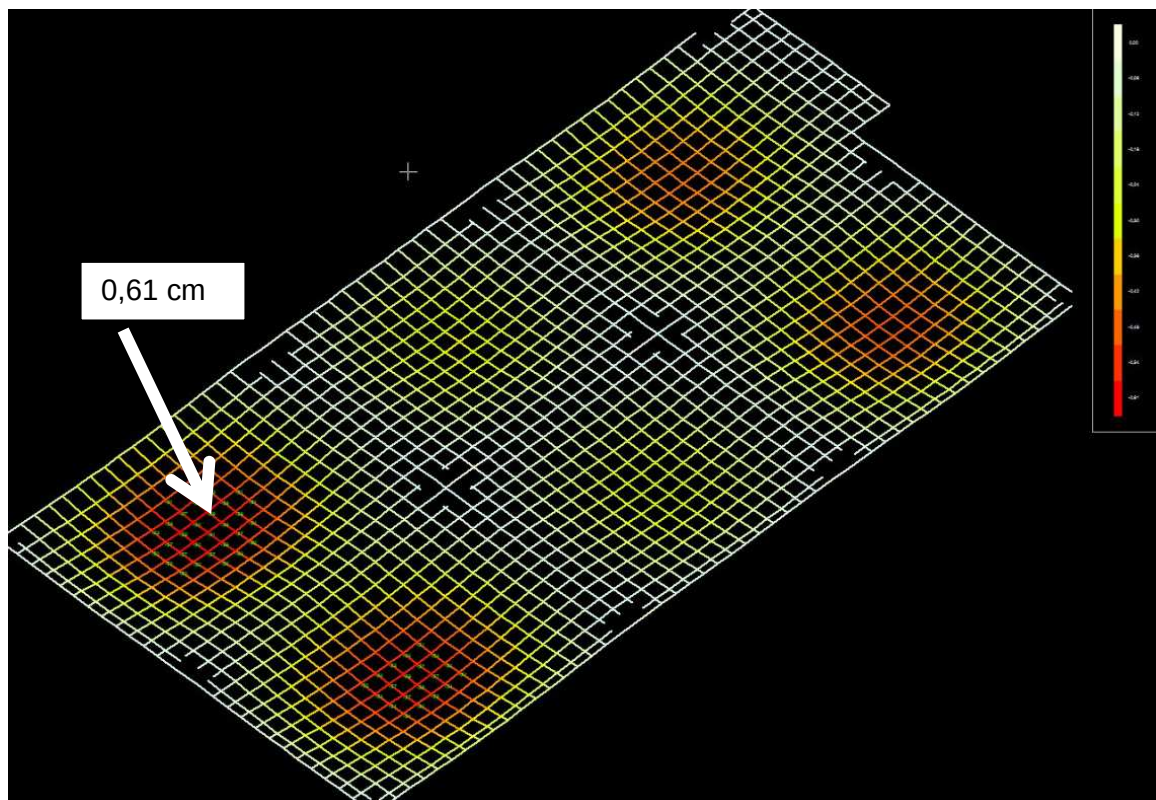


Figura 5 - Deformações por processo de grelha não-linear.

8.5.1.2 Lajes – determinação de esforços e dimensionamento:

As lajes tiveram seus esforços determinados, como já dito, através de um modelo de grelhas. Os resultados obtidos são apresentados através de editor gráfico de esforços e armaduras, o que dificulta a apresentação dos mesmos em texto. A título de ilustração a Figura 6 apresenta os diagramas de momentos fletores em ambas direções com seus valores máximos. Embora os valores adotados para as armaduras tenham sido obtidos no próprio editor gráfico, a Figura, por sua vez, apresenta os mesmos feitos em planilha eletrônica corroborando os valores dados pelo CAD/ um dimensionamento testemunho feito em

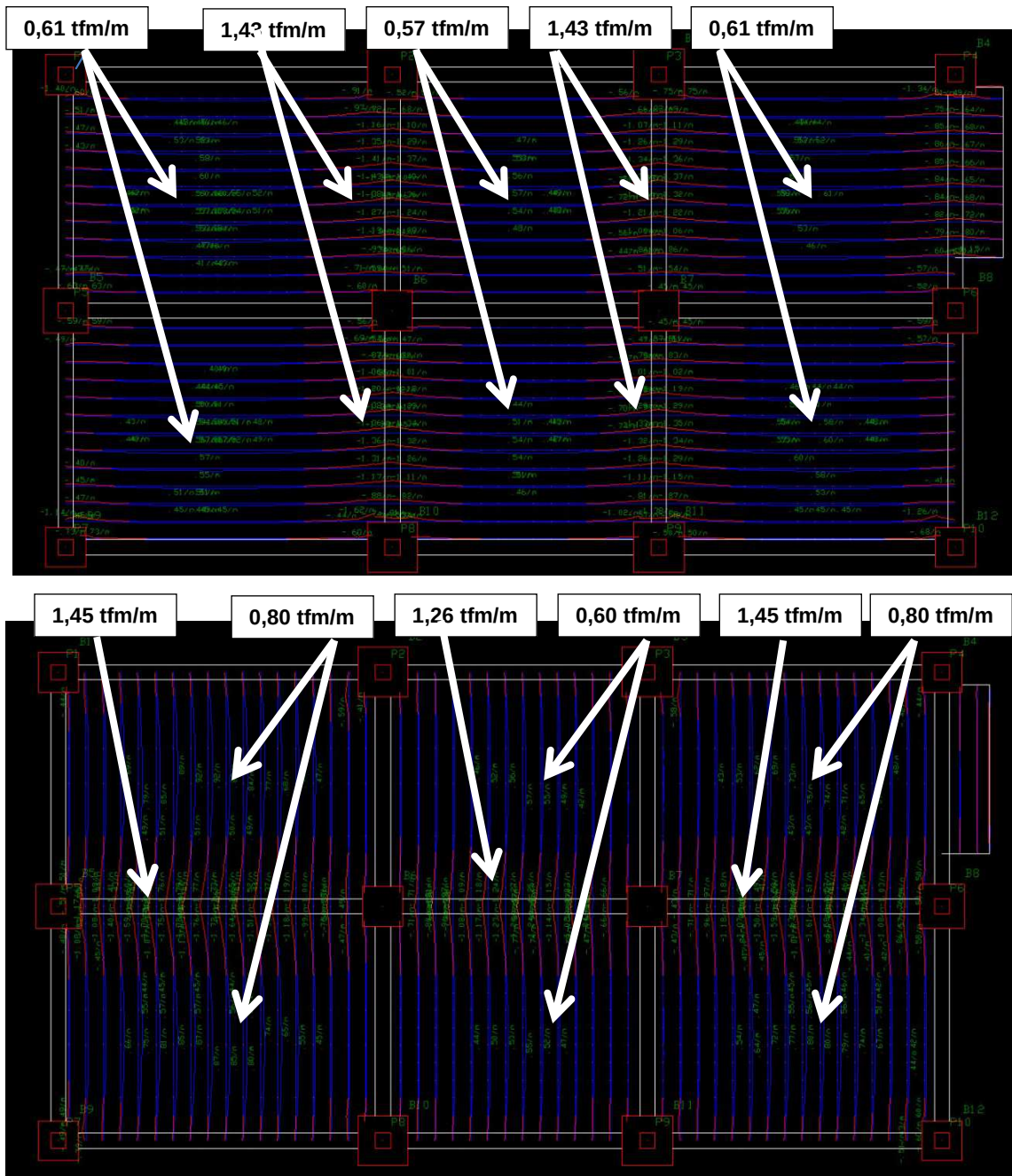


Figura 6 - Momentos fletores na direção longitudinal (superior - M_y em notação vetorial) e na direção transversal (inferior - M_x em notação vetorial).

fck =	250	kgf/cm2	fctk =	1,80	fctd =	1,28	DIMENSIONAMENTO A FLEXÃO SIMPLES											
Aço	50	kgf/mm2	fctm =	2,56														
Eci =	28000	Mpa	280000	kgf/cm2														
Ecs =	23800	Mpa	238000	kgf/cm2														
Es =	210000	Mpa	2100000	kgf/cm2	As retração: nb = 1,5 wmax = 0,1 mm													
n =	8,82																	
M=	80	tfc/m										b =	100	cm	Δt=	5	oC	
bw=	100	cm										h =	15	cm	εcs=	0,00005	εt=	
h=	15	cm	d'=	3	cm	diametro	6,3	mm										
d=	12,00	cm	δ =	0,25	As retr=			3,45	cm2									
kxlim	0,62	kclim	24,73	kslim	0,428													
dmin	4,45																	
kc	180,00	pmin=	0,150%	Asmin =	2,25	cm2												
kx	0,066	x =	0,79	cm														
ks	0,331	diametro			As1	barras	espaçam	Asexist	Ace =									
As	2,20	As =	2,20	6,3	0,31	8	13	2,49	p =	0,002078	772,5 cm2							
simples		As' =	0,00	12,5	1,23	0		0,00	p' =	0								
Dupla																		
d'	3	cm	Estádio II	kxii =	0,190	Fissura:			w1 =	0,068	mm							
M1		tfc/m		k2 =	0,017				w2 =	0,309	mm							
M2		tfc/m		σs=	2340,47													
As		cm2																
A's		cm2																

fck =	250	kgf/cm2	fctk =	1,80	fctd =	1,28	DIMENSIONAMENTO A FLEXÃO SIMPLES						
Aço	50	kgf/mm2	fctm =	2,56									
Eci =	28000	Mpa	280000	kgf/cm2									
Ecs =	23800	Mpa	238000	kgf/cm2									
Es =	210000	Mpa	2100000	kgf/cm2									
n =	8,82												
M=	143	tfc/m											
bw=	100	cm											
h=	15	cm	d'=	3	cm								
d=	12,00	cm	δ =	0,25									
kxlim	0,62	kclim	24,73	kslim	0,428								
dmin	5,95												
kc	100,70	ρmin=	0,150%	Asmin =	2,25	cm2							
kx	0,120	x =	1,44	cm									
ks	0,338			diametro	As1	barras	espaçam	Asexist					
As	4,03	As =	4,03	8	0,50	9	11	4,52	ρ =	0,00377	Ace =	900	cm2
	simples	As' =	0,00	12,5	1,23	0		0,00	ρ' =	0			
Dupla													
d'	3	cm	Estádio II	kxii =	0,256				Fissura:	w1 =	0,075	mm	
M1		tfc/m		k2 =	0,030					w2 =	0,234	mm	
M2		tfc/m		σs=	2169,431								
As		cm2											
A's		cm2											

Figura 7 - Planilhas com dimensionamento da lajes.

As armaduras respectivamente indicadas para os momentos positivos e negativos formam 6.3 c/12 e 8.0 c/12.

8.5.1.2.1 Vigas

A vigas tiveram seus esforços determinados pela resolução do pórtico tridimensional e foram dimensionadas de forma automática pelo TQS. Posteriormente as armaduras foram editadas em editor de armaduras de modo a que melhor se adequassem à execução.

O relatório de dimensionamento denominado de Relatório Geral de Vigas está inserido no Anexo 8.6.1

8.5.2 Pavimento de Nível 5,83 m (N583)

Este pavimento é composto apenas de vigas externas de amarração e apoio das alvenarias sendo apenas este o seu carregamento (1,25 tf/m).

O relatório de dimensionamento das vigas está incluso no Anexo 8.6.2.

8.5.3 Pavimento de Nível 8,50 m (N850)

Este pavimento corresponde ao nível da Talha e Trole Elétricos com capacidade para 2 tf. Está constituído pelas lajes laterais de apoio do trilho de rolagem do equipamento apoiadas sobre duas vigas: uma na prumada interna da parede e outra na extremidade do console de apoio.

As lajes, devido ao pequeno vão foram armadas com uma armadura acima da de dimensionamento visando dar maior rigidez ao conjunto formada transversalmente por estribos tde 8.0 c12 e longitudinalmente por uma armadura de distribuição e montagem de 6.3.

As vigas foram dimensionadas para receberem o carregamento do equipamento de sustentação da talha colocado de modo a maximizarem os esforços. Devido às dimensões propostas no projeto arquitetônico para essas vigas e que foram mantidas no projeto estrutural entendeu-se adotar esta forma de carregamento, mais simples, ao invés de cargas móveis. O console de apoio foi inicialmente dimensionado pelo TQS como viga em balanço e verificado através de modelos de console, tendo sua forma e armadura editados de modo conveniente.

As maiores deformações foram nas vigas V302 e V303 alcançando, incluída a deformação lenta, a 0,57 cm ($<650/400=1,62$ cm conforme tabela 13.2 da NBR 6118 para pontes rolantes). Devido à forma como foi feito o carregamento dessas vigas essa deformação não deverá alcançar nem mesmo ao valor máximo previsto no modelo.

O relatório de dimensionamento das vigas está incluso no Anexo 8.6.3.

8.5.4 Pavimento de Nível 10.10 m (N1010) – Cobertura

O pavimento de nível 10.10 corresponde à cobertura da Casa dos Sopradores sendo composto por lajes e vigas, conforme mostra a parte superior da Figura 3.

O modelo adotado para a estrutura é semelhante ao adotado para o pavimento de fundação estando este pavimento dividido em 6 lajes que recebem carregamento permante de 0,1 tf/m² correspondendo ao peso da cobertura e revestimento da própria laje e um carregamento accidental de 0,05 tf/m² correspondendo ao que preconiza a NBR 6120 para forros não destinados a depósito. Foi adotada uma espessura de 12 cm para a laje conforme consta do projeto arquitetônico.

As deformações máximas do pavimento, incluindo vigas e lajes , analisadas primeiramente por modelo elástico e depois de armadas por modelo de grelha não linear ficaram em 1,24 cm ($< 470/250=1,88$ cm) na L402 e 1,20 cm ($< 536/250=2,14$ cm) na V404b, já considerada a deformação lenta.

8.5.4.1 Lajes

Os momentos fletores máximos positivos e negativos alcançaram de uma forma geral a ordem de 0,6 tfm/m resultando em uma armadura de 6.3 c/12 para os positivos e 8 c/18 para os negativos.

8.5.4.2 Vigas

O dimensionamento das vigas está contido no Anexo

8.5.5 Pilares

Os pilares tiveram seus esforços determinados a partir dos resultados do pórtico espacial.

O mesmo aconteceu com seus deslocamentos, decorrentes das combinações de serviço, inclusive devidas ao vento. A Figura 8 ilustra os deslocamentos máximos previstos de 0,30 cm ($< 732/1700 = 0,43$ cm) que atendem aos limites normativos.

Os esforços resultantes das diferentes combinações de carregamento e utilizados nos dimensionamentos das armaduras, foram aqueles responsáveis pela maior envoltória de áreas de aço de armaduras simétricas para cada pilar e são sumarizados no Relatório Geral de Pilares. Este relatório é apresentado no Anexo 8.6.5.

8.5.6 Blocos de Fundação:

Os blocos de fundação foram dimensionados a partir da envoltória de cargas na fundação e seu relatório consta do Anexo .

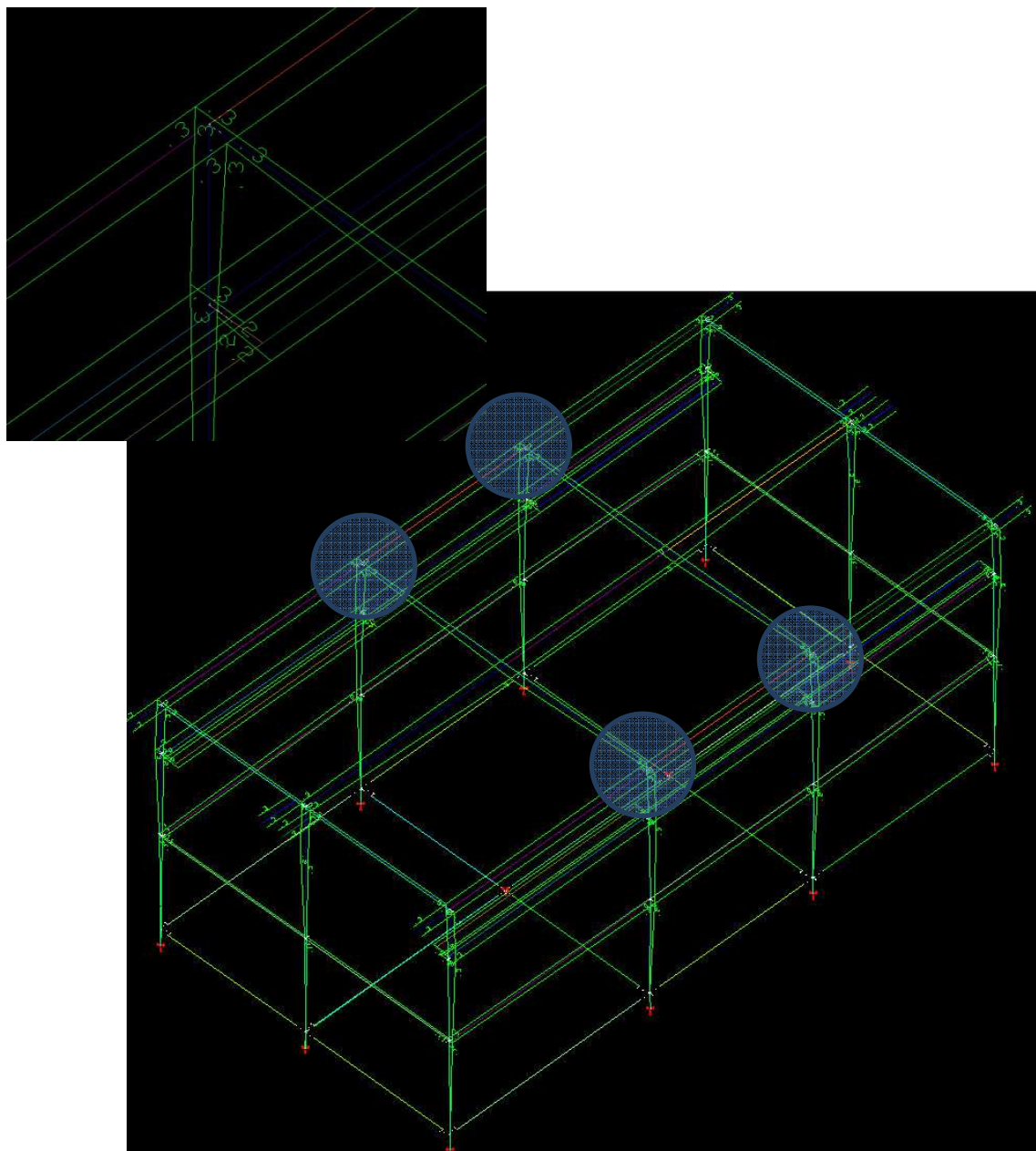


Figura 8 - Deslocamentos máximos em condições de serviço (ELS) resultantes da resolução do pórtico espacial.

8.6 Anexos

8.6.1 Relatório Geral de Dimensionamento das Vigas do Pavimento de Fundação

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.8.56) Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS 32283060
T Q S Projeto: 0002 - Fundação 22/10/11
CAD/Vigas 15:37:11

fck=250.kgf/cm2 - Aco: 50A - Esforços Característicos

LEGENDA

GEOMETRIA

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet : Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI : Espessura Laje Infetior
FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S : Cobrim/Cobr.superior adicional

CARGAS

MEsq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q : Cortante Adicional (valor unico)

ARMADURAS - FLEXAO

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

ARMADURAS - CISCALHAMENTO

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin : Armad.transv.minima-cisalhamento
Asw[C+T] : Arm.transcalculada cisalh+torcao / Bit : Bitola selecionada / Esp : Espacamento selecionado
NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura transversal-Suspensao

ARMADURAS - TORCAO

%dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de torcao

b-nuc : Largura do nucleo

/ h-nuc : Altura do nucleo

Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao p/NR estribos selecionado

Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h

ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica no vao - S[sim] N[nao]

REACOES DE APOIO

DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre / segue / vigas

M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

Viga= 101 V101

Eng.E=Nao / Eng.D=Nao / Repet= 1 / NAnd= 1 / Red V Ext=Nao / Fat.Alt=1.00 / Cob/S=3.0 .0 CM

GEOMETRIA E CARGAS

Vao= 1 /L= 5.93 /B= .30 /H= .55 /BCs= .74 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

ARMADURAS (FLEXAO E CISCALHAMENTO) - DIREITA

FLEXAO-ESQUERDA MEIO DO VAO DIREITA
| M.[-] = 4.4 tf*m | M.[+] Max= 6.0 tf*m - Abcis.= 261 | M.[-] = 9.0 tf*m
[tf,cm] As = 3.15 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 6.30 -SRAS- [4 B 16.0mm]
| AsL= .00 ----- x/d = .07 | As = 4.10 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .14
| x/dMx= .50 | Arm.Lat.= [2 X 3 B 5.0mm] - LN= 1.9 | x/dMx= .50

[tf,cm] M[-]Min = 408.9 | M[+]Min = 350.7 | M[-]Min = 536.4
[cm2] Asapo[+] = 1.02 | Asapo[+] = 2.56

CISCALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus MENSAGEM
[tf,cm] 0.- 560. 11.16 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

TORCAO- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla MENSAGEM
[tf,cm] 0.- 560. .81 7.17 5 9.7 20.3 45.3 1.0 2.0 .2 .5 .26 N

GEOMETRIA E CARGAS

Vao= 2 /L= 4.63 /B= .30 /H= .55 /BCs= .58 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

ARMADURAS (FLEXAO E CISCALHAMENTO) - DIREITA

FLEXAO-ESQUERDA MEIO DO VAO DIREITA
| M.[-] = 6.1 tf*m | M.[+] Max= 1.4 tf*m - Abcis.= 265 | M.[-] = 5.3 tf*m
[tf,cm] As = 4.26 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.71 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .10 | As = 3.30 -STAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .08
| x/dMx= .50 | Arm.Lat.= [2 X 3 B 5.0mm] - LN= 1.5 | x/dMx= .50

[tf,cm] M[-]Min = 447.4 | M[+]Min = 333.0 | M[-]Min = 447.4

[cm2]| Asapo[+]= 2.55 | | Asapo[+]= 2.55

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.- 430. 7.92 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 430. .42 7.17 5 9.7 20.3 45.3 .5 2.0 .2 .5 .18 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.33 /B= .30 /H= .55 /BCs= .70 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 6.8 tf* m | M.[+] Max= 4.6 tf* m - Abcis.= 330 | M.[-] = 3.7 tf* m
[tf,cm] As = 4.75 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 3.10 -SRAS- [4 B 10.0mm]
| AsL= .00 ----- x/d = .11 | As = 3.58 -STAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .06
| x/dMx=.50 | Arm.Lat.=[2 X 3 B 5.0mm] - LN= 1.5 | | x/dMx=.50
[tf,cm] M[-]Min = 513.0 | M[+]Min = 346.4 | M[-]Min = 397.5
[cm2]| Asapo[+]= 2.55 | | Asapo[+]= .89

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 500. 9.60 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 500. .55 7.17 5 9.7 20.3 45.3 .7 2.0 .2 .5 .22 N

REAC.	POIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	6.854	6.412	.80	.23	0 B1	.00	.00	8001	0	0	0 0 0
2	13.222	12.945	1.00	.34	0 B2	.00	.00	8002	0	0	0 0 0
3	11.708	11.458	1.00	.34	0 B3	.00	.00	8003	0	0	0 0 0
4	5.657	5.219	.80	.23	0 B4	.00	.00	8004	0	0	0 0 0

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= 5.98 /B= .30 /H= .55 /BCs= 1.20 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.8 tf* m | M.[+] Max= 10.1 tf* m - Abcis.= 258 | M.[-] = 9.6 tf* m
[tf,cm] As = 3.87 -SRAS- [2 B 16.0mm] | AsL= .00 ----- | As = 6.53 -SRAS- [4 B 16.0mm]
| AsL= .00 ----- x/d = .09 | As = 6.57 -STAS- [4 B 16.0mm] | AsL= .00 ----- x/d = .15
| x/dMx=.50 | | x/dMx=.50
[tf,cm] M[-]Min = 520.6 | M[+]Min = 381.3 | M[-]Min = 751.2
[cm2]| Asapo[+]= 1.64 | | Asapo[+]= 2.35

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.- 565. 13.25 66.39 2 45. .9 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 565. .06 7.17 5 9.7 20.3 45.3 .1 .0 .0 .0 .21 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 4.83 /B= .30 /H= .55 /BCs= .88 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 11.1 tf* m | M.[+] Max= .4 tf* m - Abcis.= 265 | M.[-] = 8.2 tf* m
[tf,cm] As = 7.62 -SRAS- [4 B 16.0mm] | AsL= .00 ----- | As = 5.51 -SRAS- [3 B 16.0mm]
| AsL= .00 ----- x/d = .18 | As = 3.78 -STAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .13
| x/dMx=.50 | | x/dMx=.50
[tf,cm] M[-]Min = 604.2 | M[+]Min = 361.8 | M[-]Min = 604.2
[cm2]| Asapo[+]= 2.35 | | Asapo[+]= 2.35

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.- 450. 10.92 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 450. .01 7.17 5 9.7 20.3 45.3 .0 .0 .0 .0 .17 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.38 /B= .30 /H= .55 /BCs= 1.11 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 7.3 tf* m | M.[+] Max= 7.9 tf* m - Abcis.= 327 | M.[-] = 4.4 tf* m
[tf,cm] | As = 4.87 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.32 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .12 | As = 5.09 -STAS- [3 B 16.0mm] | AsL= .00 ----- x/d = .08
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] | M[-]Min = 711.2 | M[+]Min = 376.4 | M[-]Min = 499.6
[cm2] | Asapo[+] = 2.35 | | Asapo[+] = 1.27

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 505. 11.42 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 505. .11 7.17 5 9.7 20.3 45.3 .1 .0 .0 .0 .18 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	8.827	8.093	.90	.28	0 B5	.00	.00 8005	0	0 0 0 0	0
2	17.008	15.680	.80	.23	1 B6	.00	.00 8006	0	0 0 0 0	0
3	14.362	13.172	.80	.23	1 B7	.00	.00 8007	0	0 0 0 0	0
4	7.420	6.742	.90	.28	0 B8	.00	.00 8008	0	0 0 0 0	0

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= 5.93 /B= .30 /H= .55 /BCs= .74 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.4 tf* m | M.[+] Max= 6.0 tf* m - Abcis.= 261 | M.[-] = 8.9 tf* m
[tf,cm] | As = 3.15 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 6.26 -SRAS- [4 B 16.0mm]
| AsL= .00 ----- x/d = .07 | As = 4.06 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .14
| x/dMx= .50 | Arm.Lat.= [2 X 3 B 5.0mm] - LN= 1.9 | x/dMx= .50
|
[tf,cm] | M[-]Min = 408.9 | M[+]Min = 350.7 | M[-]Min = 536.4
[cm2] | Asapo[+] = 1.02 | | Asapo[+] = 2.55

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.- 560. 10.89 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 560. .71 7.17 5 9.7 20.3 45.3 .9 2.0 .2 .5 .24 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 4.63 /B= .30 /H= .55 /BCs= .58 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 6.2 tf* m | M.[+] Max= 1.4 tf* m - Abcis.= 265 | M.[-] = 5.4 tf* m
[tf,cm] | As = 4.31 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.77 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .10 | As = 3.30 -STAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .08
| x/dMx= .50 | Arm.Lat.= [2 X 3 B 5.0mm] - LN= 1.5 | x/dMx= .50
|
[tf,cm] | M[-]Min = 447.4 | M[+]Min = 333.0 | M[-]Min = 447.4
[cm2] | Asapo[+] = 2.55 | | Asapo[+] = 2.55

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.- 430. 8.34 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 430. .40 7.17 5 9.7 20.3 45.3 .5 2.0 .2 .5 .18 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.33 /B= .30 /H= .55 /BCs= .70 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 7.1 tf* m | M.[+] Max= 4.8 tf* m - Abcis.= 330 | M.[-] = 3.6 tf* m

[tf,cm] As = 4.96 -SRAS- [4 B 12.5mm] | AsL = .00 ----- | As = 3.10 -SRAS- [4 B 10.0mm]
 | AsL = .00 ----- x/d = .11 | As = 3.58 -STAS- [3 B 12.5mm] | AsL = .00 ----- x/d = .06
 | | x/dMx = .50 | Arm.Lat.=[2 X 3 B 5.0mm] - LN= 1.6 | | x/dMx = .50
 [tf,cm] M[-]Min = 513.0 | M[+]Min = 346.4 | M[-]Min = 397.5
 [cm2] Asapo[+] = 2.55 | | Asapo[+] = .89

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 500. 9.72 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 500. .63 7.17 5 9.7 20.3 45.3 .8 2.0 .2 .5 .22 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	6.212	5.794	.80	.23	0 B9	.00	.00 8009	0	0	0 0 0
2	13.324	13.034	1.00	.34	0 B10	.00	.00 8010	0	0	0 0 0
3	11.979	11.703	1.00	.34	0 B11	.00	.00 8011	0	0	0 0 0
4	5.510	5.071	.80	.23	0 B12	.00	.00 8012	0	0	0 0 0

Viga= 104 V104 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 4.18 /B= .30 /H= .55 /BCs= .61 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 | M.[-] = 3.0 tf* m | M.[+] Max= 3.3 tf* m - Abcis.= 148 | M.[-] = 6.6 tf* m
 [tf,cm] As = 3.20 -SRAS- [4 B 10.0mm] | AsL = .00 ----- | As = 4.60 -SRAS- [4 B 12.5mm]
 | AsL = .00 ----- x/d = .06 | As = 3.40 -STAS- [3 B 12.5mm] | AsL = .00 ----- x/d = .10
 | | x/dMx = .50 | Arm.Lat.=[2 X 3 B 5.0mm] - LN= 1.4 | | x/dMx = .50
 [tf,cm] M[-]Min = 417.0 | M[+]Min = 337.2 | M[-]Min = 467.0
 [cm2] Asapo[+] = 3.40 | | Asapo[+] = 2.58

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 385. 8.71 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 385. .88 7.17 5 9.7 20.3 45.3 1.1 2.0 .2 .5 .21 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 4.18 /B= .30 /H= .55 /BCs= .61 /BCi= .00 /TpS= 5 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 | M.[-] = 6.5 tf* m | M.[+] Max= 3.4 tf* m - Abcis.= 297 | M.[-] = 3.1 tf* m
 [tf,cm] As = 4.58 -SRAS- [4 B 12.5mm] | AsL = .00 ----- | As = 3.22 -SRAS- [4 B 10.0mm]
 | AsL = .00 ----- x/d = .10 | As = 3.42 -STAS- [3 B 12.5mm] | AsL = .00 ----- x/d = .06
 | | x/dMx = .50 | Arm.Lat.=[2 X 3 B 5.0mm] - LN= 1.4 | | x/dMx = .50
 [tf,cm] M[-]Min = 467.0 | M[+]Min = 337.2 | M[-]Min = 417.0
 [cm2] Asapo[+] = 2.59 | | Asapo[+] = 3.42

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 385. 8.73 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 385. .95 7.17 5 9.7 20.3 45.3 1.2 2.0 .2 .5 .22 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.100	2.292	.80	.23	0 B9	.00	.00 8009	0	0	0 0 0
2	10.647	10.462	.90	.28	0 B5	.00	.00 8005	0	0	0 0 0
3	4.232	2.424	.80	.23	0 B1	.00	.00 8001	0	0	0 0 0

Viga= 105 V105 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----
 Vao= 1 /L= 4.13 /B= .30 /H= .55 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 2.9 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 145 | M.[-] = 6.3 tf* m
[tf,cm] As = 3.52 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 4.19 -SRAS- [4 B 12.5mm]
| AsL= .00 ----- x/d = .08 | As = 3.87 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .10
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] M[-]Min = 532.2 | M[+]Min = 364.7 | M[-]Min = 623.6
[cm2] Asapo[+] = 3.87 | | Asapo[+] = 2.35

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.- 380. 9.28 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 380. .23 7.17 5 9.7 20.3 45.3 .3 .0 .0 .0 .16 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 4.13 /B= .30 /H= .55 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-ESQUERDA | MEIO DO VAO | DIREITA
| M.[-] = 6.2 tf* m | M.[+] Max= 4.2 tf* m - Abcis.= 291 | M.[-] = 2.9 tf* m
[tf,cm] As = 4.15 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 3.52 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .10 | As = 3.87 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .08
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] M[-]Min = 623.6 | M[+]Min = 364.7 | M[-]Min = 532.2
[cm2] Asapo[+] = 2.35 | | Asapo[+] = 3.87

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 380. 9.35 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 380. .22 7.17 5 9.7 20.3 45.3 .3 .0 .0 .0 .16 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.054	3.138	1.00	.34	0 B10	.00	.00 8010	0	0	0 0
2	12.604	11.820	.80	.23	1 B6	.00	.00 8006	0	0	0 0
3	3.959	3.053	1.00	.34	0 B2	.00	.00 8002	0	0	0 0

Viga= 106 V106 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= 4.13 /B= .30 /H= .55 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-ESQUERDA | MEIO DO VAO | DIREITA
| M.[-] = 2.9 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 145 | M.[-] = 6.2 tf* m
[tf,cm] As = 3.52 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 4.15 -SRAS- [4 B 12.5mm]
| AsL= .00 ----- x/d = .08 | As = 3.87 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .10
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] M[-]Min = 532.2 | M[+]Min = 364.7 | M[-]Min = 623.6
[cm2] Asapo[+] = 3.87 | | Asapo[+] = 2.35

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.- 380. 9.15 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 380. .18 7.17 5 9.7 20.3 45.3 .2 .0 .0 .0 .15 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 4.13 /B= .30 /H= .55 /BCs= .92 /BCi= .00 /TpS= 2 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-ESQUERDA | MEIO DO VAO | DIREITA
| M.[-] = 6.1 tf* m | M.[+] Max= 4.2 tf* m - Abcis.= 291 | M.[-] = 2.8 tf* m
[tf,cm] As = 4.15 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 3.52 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .10 | As = 3.87 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .08
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] M[-]Min = 623.6 | M[+]Min = 364.7 | M[-]Min = 532.2
[cm2] Asapo[+] = 2.35 | | Asapo[+] = 3.87

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M

[tf,cm] 0.- 380. 9.23 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 380. .15 7.17 5 9.7 20.3 45.3 .2 .0 .0 .0 .15 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.137	3.226	1.00	.34	0 B11	.00	.00 8011	0	0 0 0 0	
2	12.440	11.651	.80	.23	1 B7	.00	.00 8007	0	0 0 0 0	
3	3.939	3.043	1.00	.34	0 B3	.00	.00 8003	0	0 0 0 0	

Viga= 107 V107

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 4.18 /B= .30 /H= .55 /BCs= .61 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 |M.[+]= 2.9 tf* m |M.[+] Max= 3.1 tf* m - Abcis.= 148 |M.[+]= 7.2 tf* m
 [tf,cm] As = 3.18 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.04 -SRAS- [3 B 16.0mm]
 | AsL= .00 ----- x/d = .06 | As = 3.38 -STAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .11
 | x/dMx=.50 | Arm.Lat.=[2 X 3 B 5.0mm] - LN= 1.4 | x/dMx=.50
 [tf,cm] M[-]Min = 417.0 | M[+]Min = 337.2 | M[-]Min = 467.0
 [cm2] Asapo[+]= 3.38 | Asapo[+]= 2.55

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.- 385. 9.13 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 385. .76 7.17 5 9.7 20.3 45.3 .9 2.0 .2 .5 .21 N

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 4.18 /B= .30 /H= .55 /BCs= .61 /BCi= .00 /TpS= 8 /Esp.LS= .15 /Esp.LI= .00 FSp.Ex= .28 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 |M.[+]= 7.9 tf* m |M.[+] Max= 4.5 tf* m - Abcis.= 297 |M.[+]= 3.7 tf* m
 [tf,cm] As = 5.52 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.01 -SRAS- [4 B 10.0mm]
 | AsL= .00 ----- x/d = .13 | As = 3.38 -STAS- [3 B 12.5mm] | AsL= .00 ----- x/d = .06
 | x/dMx=.50 | Arm.Lat.=[2 X 3 B 5.0mm] - LN= 1.7 | x/dMx=.50
 [tf,cm] M[-]Min = 467.0 | M[+]Min = 337.2 | M[-]Min = 374.5
 [cm2] Asapo[+]= 2.55 | 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.- 385. 11.83 66.39 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 385. .40 7.17 5 9.7 20.3 45.3 .5 2.0 .2 .5 .20 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	3.880	2.130	.80	.23	0 B12	.00	.00 8012	0	0 0 0 0	
2	13.352	12.994	.90	.28	0 B8	.00	.00 8008	0	0 0 0 0	
3	6.087	4.338	.80	.23	0 B4	.00	.00 8004	0	0 0 0 0	

8.6.2 Relatório Geral de Dimensionamento das Vigas do Pavimento de Nível 5,83 (N583)

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.8.56) Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS 32283060
T Q S Projeto: 0003 - ETE NOVO MUNDO Casa dos Sopradores 22/10/11
CAD/Vigas 15:36:59

fck=250.kgf/cm² - Aco: 50A - Esforços Característicos

L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet : Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI : Espessura Laje Inferior
FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S : Cobrim/Cobr.superior adicional
C A R G A S
MEsq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q : Cortante Adicional (valor unico)
A R M A D U R A S - F L E X A O
SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS : Secao Te Armadura Simples
STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx : Profund. relativa da LN Maxima
AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo : Armadura e/d que chega no extremo
A R M A D U R A S - C I S A L H A M E N T O
MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin : Armad.transv.minima-cisalhamento
Asw[C+T] : Arm.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-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao p/NR estribos selecionado
Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacidade/adaptacao plastica no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre / segue / vigas
M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

Viga= 201 V201 Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

G E O M E T R I A E C A R G A S
Vao= 1 /L= 6.44 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.5 tf*m | M.[+] Max= 3.2 tf*m - Abcis.= 323 | M.[-] = 6.1 tf*m
[tf,cm] As = 4.38 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 6.03 -SRAS- [3 B 16.0mm]
| AsL= .00 ----- x/d = .15 | As = 3.08 -SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .20
| x/dMx= .50 | x/dMx= .50
| M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+] = .77 | Asapo[+] = 1.71

C I S A L H A M E N T O - X i X f V s d V R d 2 M d C A n g . A s w [C] A s w m n N R A s l - b A s l - h C o m D i a A d P l a M E N S A G E M
[tf,cm] 0.- 620. 7.63 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - X i X f T s d T R d 2 % d T h e b - n u c h - n u c A s w - 1 R A s w m n N R A s l - b A s l - h C o m D i a A d P l a M E N S A G E M
[tf,cm] 0.- 620. .08 4.53 5 8.6 21.1 31.1 .1 .0 .0 .0 .18 N

G E O M E T R I A E C A R G A S
Vao= 2 /L= 5.24 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.4 tf*m | M.[+] Max= 1.5 tf*m - Abcis.= 265 | M.[-] = 4.2 tf*m
[tf,cm] As = 4.29 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 4.02 -SRAS- [2 B 16.0mm]
| AsL= .00 ----- x/d = .14 | As = 1.80 -SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .14
| x/dMx= .50 | x/dMx= .50
| M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+] = 1.71 | Asapo[+] = 1.71

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 500. 6.06 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 500. .00 4.53 5 8.6 21.1 31.1 .0 .0 .0 .0 .13 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.84 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitações provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.1 tf* m | M.[+] Max= 2.7 tf* m - Abcis.= 342 | M.[-] = 3.8 tf* m
[tf,cm] | As = 4.97 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.68 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .17 | As = 2.53 -SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .12
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] | M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+] = 1.71 | | Asapo[+] = .63

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 560. 6.97 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 560. .09 4.53 5 8.6 21.1 31.1 .2 .0 .0 .0 .17 N

REAC.	POIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.891	4.611	.30	.03	0 P1	.00	.00	1 0 0 0 0 0	0	0	0
2	9.360	9.321	.30	.03	0 P2	.00	.00	2 0 0 0 0 0	0	0	0
3	8.763	8.744	.30	.03	0 P3	.00	.00	3 0 0 0 0 0	0	0	0
4	4.475	4.147	.30	.03	0 P4	.00	.00	4 0 0 0 0 0	0	0	0

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= 6.44 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitações provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.5 tf* m | M.[+] Max= 3.2 tf* m - Abcis.= 323 | M.[-] = 6.1 tf* m
[tf,cm] | As = 4.39 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 6.02 -SRAS- [3 B 16.0mm]
| AsL= .00 ----- x/d = .15 | As = 3.08 -SRAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .20
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] | M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+] = .77 | | Asapo[+] = 1.71

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 620. 7.63 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 620. .08 4.53 5 8.6 21.1 31.1 .1 .0 .0 .0 .18 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 5.24 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitações provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.5 tf* m | M.[+] Max= 1.5 tf* m - Abcis.= 265 | M.[-] = 4.2 tf* m
[tf,cm] | As = 4.30 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 4.01 -SRAS- [2 B 16.0mm]
| AsL= .00 ----- x/d = .14 | As = 1.80 -SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .14
| x/dMx= .50 | | x/dMx= .50
|
[tf,cm] | M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+] = 1.71 | | Asapo[+] = 1.71

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 500. 6.06 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 500. .00 4.53 5 8.6 21.1 31.1 .0 .0 .0 .0 .13 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.84 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.1 tf* m | M.[+] Max= 2.7 tf* m - Abcis.= 342 | M.[-] = 3.8 tf* m
[tf,cm] | As = 4.98 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.68 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .17 | As = 2.53 -SRAS- [2 B 12.5mm] | AsL= .00 ----- x/d = .12
| x/dMx= .50 | | x/dMx= .50
[tf,cm] | M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+]= 1.71 | | Asapo[+]= .63

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 560. 6.97 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 560. .09 4.53 5 8.6 21.1 31.1 .2 .0 .0 .0 .17 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.892	4.612	.30	.03	0 P7	.00	.00	7	0	0 0 0 0
2	9.363	9.323	.30	.03	0 P8	.00	.00	8	0	0 0 0 0
3	8.760	8.741	.30	.03	0 P9	.00	.00	9	0	0 0 0 0
4	4.474	4.146	.30	.03	0 P10	.00	.00	10	0	0 0 0 0

Viga= 203 V203

Eng.E=Nao /Eng.D=Nao /Repet= 1 /NAnd= 1 /Red V Ext=Nao /Fat.Alt=1.00 /Cob/S=3.0 .0 CM

----- G E O M E T R I A E C A R G A S -----

Vao= 1 /L= 4.64 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.7 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 155 | M.[-] = 4.9 tf* m
[tf,cm] | As = 4.59 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 4.71 -SRAS- [4 B 12.5mm]
| AsL= .00 ----- x/d = .15 | As = 1.96 -SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .16
| x/dMx= .50 | | x/dMx= .50
[tf,cm] | M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+]= .49 | | Asapo[+]= 1.71

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 440. 6.56 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 440. .16 4.53 5 8.6 21.1 31.1 .3 .0 .0 .0 .17 N

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 4.64 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 4.9 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 311 | M.[-] = 4.7 tf* m
[tf,cm] | As = 4.72 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 4.58 -SRAS- [4 B 12.5mm]
| AsL= .00 ----- x/d = .16 | As = 1.96 -SRAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .15
| x/dMx= .50 | | x/dMx= .50
[tf,cm] | M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2] | Asapo[+]= 1.71 | | 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.- 440. 6.57 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 440. .16 4.53 5 8.6 21.1 31.1 .3 .0 .0 .0 .18 N

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.360	2.570	.30	.03	0 P7	.00	.00	7	0	0 0 0 0
2	7.458	7.449	.30	.03	0 P5	.00	.00	5	0	0 0 0 0
3	4.358	2.568	.30	.03	0 P1	.00	.00	1	0	0 0 0 0

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= 4.64 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
|M.[+]= 4.7 tf* m |M.[+] Max= 2.1 tf* m - Abcis.= 155 |M.[+]= 4.8 tf* m
[tf,cm] As = 4.59 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 4.63 -SRAS- [ 4 B 12.5mm]
| AsL= .00 ----- x/d = .15 | As = 1.95 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- x/d = .16
| x/dMx= .50 | | x/dMx= .50
| | |
[tf,cm] M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2 ] Asapo[+]= .49 | | Asapo[+]= 1.71

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 440. 6.52 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 440. .14 4.53 5 8.6 21.1 31.1 .2 .0 .0 .0 .17 N

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 4.64 /B= .30 /H= .40 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

```

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
|M.[+]= 4.8 tf* m |M.[+] Max= 2.1 tf* m - Abcis.= 311 |M.[+]= 4.7 tf* m
[tf,cm] As = 4.71 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 4.59 -SRAS- [ 4 B 12.5mm]
| AsL= .00 ----- x/d = .16 | As = 1.93 -SRAS- [ 3 B 10.0mm ] | AsL= .00 ----- x/d = .15
| x/dMx= .50 | | x/dMx= .50
| | |
[tf,cm] M[-]Min = 150.9 | M[+]Min = 150.9 | M[-]Min = 150.9
[cm2 ] Asapo[+]= 1.71 | | Asapo[+]= .48

```

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 440. 6.54 46.86 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 440. .14 4.53 5 8.6 21.1 31.1 .2 .0 .0 .0 .17 N

REAC.	AP0IO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	4.367	2.598	.30 .03	0 P10	.00 .00	10	0 0 0 0 0 0			
2	7.436	7.424	.30 .03	0 P6	.00 .00	6	0 0 0 0 0 0			
3	4.353	2.584	.30 .03	0 P4	.00 .00	4	0 0 0 0 0 0			

=====

8.6.3 Relatório Geral de Dimensionamento das Vigas do Pavimento de Nível 8,50 (N850)

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.8.56) Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS 32283060
T Q S Projeto: 0004 - Nível850 22/10/11
CAD/Vigas 15:36:38

fck=250.kgf/cm2 - Aco: 50A - Esforços Característicos

L E G E N D A
G E O M E T R I A
Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet : Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI : Espessura Laje 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-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao p/NR estribos selecionado
Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacida/ adaptacao plastica no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre / segue / vigas
M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

Viga= 3 C3 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= .47 /B= .30 /H= .50 /BCs= .49 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
FLEXAO | M[-] = 3.04 tf*m | As = 2.59 -SRAS- [4 B 10.0mm]
BAL.ESQ | Grampo ESQ = 1 B 6.3mm x/d = .06 | AsL = .00 -Arm.Lat.= [2 X 2 B 5.0mm] .3
[tf,cm] | M[-]Min= 323.3 - x/dMx = .50 | % Baric.Armad.= 1

C I S A L H A M E N T O - Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus **M E N S A G E M**
[tf,cm] 0.- 40. 8.74 59.88 2 45. .0 3.1 5.2 6.3 12.0 2 .0 4.2

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.- 40. .34 6.31 5 9.4 20.6 40.6 .5 1.9 .2 .4 .20 N

R E A C . A P O I O - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 6.240 6.228 .14 .00 0 P3 .00 .00 3 0 0 0 0 0

Viga= 4 C4 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= .47 /B= .30 /H= .50 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

A R M A D U R A S (F L E X A O E C I S A L H A M E N T O)
FLEXAO | M[-] = 3.00 tf*m | As = 2.42 -SRAS- [3 B 10.0mm]
BAL.ESQ | x/d = .06 | AsL = .00 -Arm.Lat.= [2 X 3 B 6.3mm] .3
[tf,cm] | M[-]Min= 280.2 - x/dMx = .50 | % Baric.Armad.= 1

C I S A L H A M E N T O - Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus **M E N S A G E M**
[tf,cm] 0.- 40. 4.24 59.88 2 45. .0 3.1 4.3 6.3 12.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla **M E N S A G E M**
[tf,cm] 0.- 40. 1.58 6.31 5 9.4 20.6 40.6 2.2 1.9 .4 .9 .32 N

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 3.026 2.985 .14 .00 0 P4 .00 .00 4 0 0 0 0 0

Viga= 5 C5 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= .47 /B= .30 /H= .50 /BCs= .39 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M[-]= 3.00 tf* m | As = 2.42 -SRAS- [3 B 10.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 -Arm.Lat.= [2 X 3 B 6.3mm] .3
[tf,cm] | M[-]Min= 280.2 - 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.- 40. 4.15 59.88 2 45. .0 3.1 4.6 6.3 12.0 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.- 40. 1.66 6.31 5 9.4 20.6 40.6 2.3 1.9 .5 .9 .33 N

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 2.248 2.211 .14 .00 0 P7 .00 .00 7 0 0 0 0 0

Viga= 6 C6 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= .47 /B= .30 /H= .50 /BCs= .49 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M[-]= 3.00 tf* m | As = 2.59 -SRAS- [4 B 10.0mm]
BAL.ESQ | Grampo ESQ = 2 B 6.3mm x/d = .06 | AsL= .00 -Arm.Lat.= [2 X 2 B 5.0mm] .3
[tf,cm] | M[-]Min= 323.3 - 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.- 40. 9.33 59.88 2 45. .0 3.1 5.9 6.3 10.0 2 .0 4.6

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.- 40. .50 6.31 5 9.4 20.6 40.6 .7 1.9 .2 .4 .23 N

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 5.129 5.119 .14 .00 0 P8 .00 .00 8 0 0 0 0 0

Viga= 7 C7 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= .47 /B= .30 /H= .50 /BCs= .49 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M[-]= 3.00 tf* m | As = 2.59 -SRAS- [4 B 10.0mm]
BAL.ESQ | Grampo ESQ = 2 B 6.3mm x/d = .06 | AsL= .00 -Arm.Lat.= [2 X 2 B 5.0mm] .3
[tf,cm] | M[-]Min= 323.3 - 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.- 40. 9.35 59.88 2 45. .0 3.1 5.6 6.3 10.0 2 .0 4.6

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.- 40. .35 6.31 5 9.4 20.6 40.6 .5 1.9 .2 .4 .21 N

REAC. APOIO - No. Maximos Minimios Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 4.946 4.934 .14 .00 0 P9 .00 .00 9 0 0 0 0 0

Viga= 8 C8 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= .47 /B= .30 /H= .50 /BCs= .39 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO |M[-]= 3.00 tf*m |As = 2.42 -SRAS- [3 B 10.0mm]
 BAL.ESQ | x/d = .06 | AsL = .00 -Arm.Lat.= [2 X 3 B 6.3mm] .3
 [tf,cm] |M[-]Min= 280.2 - 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.- 40. 4.23 59.88 2 45. .0 3.1 4.3 6.3 12.0 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.- 40. 1.58 6.31 5 9.4 20.6 40.6 2.2 1.9 .4 .9 .32 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 1 2.617 2.575 .14 .00 0 P10 .00 .00 10 0 0 0 0 0

Viga= 20 C1 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= .47 /B= .30 /H= .50 /BCs= .39 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO |M[-]= 3.00 tf*m |As = 2.42 -SRAS- [3 B 10.0mm]
 BAL.ESQ | x/d = .06 | AsL = .00 -Arm.Lat.= [2 X 3 B 6.3mm] .3
 [tf,cm] |M[-]Min= 280.2 - 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.- 40. 4.04 59.88 2 45. .0 3.1 4.4 6.3 12.0 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.- 40. 1.61 6.31 5 9.4 20.6 40.6 2.2 1.9 .5 .9 .32 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 1 2.887 2.850 .14 .00 0 P1 .00 .00 1 0 0 0 0 0

Viga= 21 C2 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= .47 /B= .30 /H= .50 /BCs= .49 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO |M[-]= 3.07 tf*m |As = 2.59 -SRAS- [4 B 10.0mm]
 BAL.ESQ | Grampo ESQ = 1 B 6.3mm x/d = .06 | AsL = .00 -Arm.Lat.= [2 X 2 B 5.0mm] .3
 [tf,cm] |M[-]Min= 323.3 - 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.- 40. 8.82 59.88 2 45. .0 3.1 5.4 6.3 10.0 2 .0 4.3

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.- 40. .42 6.31 5 9.4 20.6 40.6 .6 1.9 .2 .4 .21 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 1 6.303 6.294 .14 .00 0 P2 .00 .00 2 0 0 0 0 0

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= 6.50 /B= .17 /H= .67 /BCs= .66 /BCi= .33 /TpS= 10 /Esp.LS= .12 /Esp.LI= .12 FSp.Ex= .34 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-|ESQUERDA |MEIO DO VAO |DIREITA
 |M.[-]= 2.6 tf*m |M.[+]Max= 4.8 tf*m - Abcis.= 270 |M.[-]= 6.4 tf*m
 [tf,cm] |As = 2.50 -STAS- [4 B 10.0mm] |AsL = .00 ----- |As = 3.56 -STAS- [3 B 12.5mm]
 |AsL = .00 ----- x/d = .04 |As = 2.99 -STAS- [4 B 10.0mm] |AsL = .00 ----- x/d = .06
 | x/dMx = .50 |Arm.Lat.= [2 X 4 B 6.3mm] - LN= 1.4 | x/dMx = .50
 |
 [tf,cm] |M[-]Min = 450.6 |M.[+]Min = 465.7 |M[-]Min = 652.2
 [cm2] |Asapo[+]= .75 |Asapo[+]= 1.74

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M

[tf,cm] 0.- 207. 7.27 46.47 2 45. .0 1.7 2.8 6.3 22.0 2 .0 .0
207.- 413. 3.48 46.47 2 45. .0 1.7 1.7 6.3 25.0 2 .0 .0
413.- 620. 9.00 46.47 2 45. .4 1.7 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 207. .57 2.58 5 6.8 8.1 58.1 1.4 1.4 .1 .8 .38 N
207.- 413. .16 2.58 5 6.8 8.1 58.1 .4 1.4 .1 .4 .14 N
413.- 620. .56 2.58 5 6.8 8.1 58.1 1.4 1.4 .1 .8 .41 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 5.30 /B= .17 /H= .67 /BCs= .49 /BCi= .28 /TpS= 10 /Esp.LS= .12 /Esp.LI= .12 FSp.Ex= .34 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.3 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 265 | M.[-] = 4.7 tf* m
[tf,cm] As = 2.87 -STAS- [3 B 12.5mm] | AsL= .00 ----- | As = 2.78 -STAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .06 | As = 2.57 -STAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .06
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 6.3mm] - LN= 1.5 | x/dMx= .50
[tf,cm] M[-]Min = 507.5 | M[+]Min = 393.3 | M[-]Min = 507.5
[cm2] Asapo[+]= 1.72 | Asapo[+]= 1.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 167. 6.90 46.47 2 45. .0 1.7 2.4 5.0 15.0 2 .0 .0
167.- 333. 2.05 46.47 2 45. .0 1.7 1.7 5.0 22.0 2 .0 .0
333.- 500. 6.49 46.47 2 45. .0 1.7 2.2 5.0 17.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 167. .50 2.58 5 6.8 8.1 58.1 1.2 1.4 .1 .7 .34 N
167.- 333. .10 2.58 5 6.8 8.1 58.1 .2 .0 .0 .0 .08 N
333.- 500. .46 2.58 5 6.8 8.1 58.1 1.1 1.4 .1 .7 .32 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.90 /B= .17 /H= .67 /BCs= .61 /BCi= .32 /TpS= 10 /Esp.LS= .12 /Esp.LI= .12 FSp.Ex= .34 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.5 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 344 | M.[-] = 2.3 tf* m
[tf,cm] As = 3.36 -STAS- [3 B 12.5mm] | AsL= .00 ----- | As = 2.45 -STAS- [4 B 10.0mm]
| AsL= .00 ----- x/d = .06 | As = 2.89 -STAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .04
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 6.3mm] - LN= 1.4 | x/dMx= .50
[tf,cm] M[-]Min = 613.7 | M[+]Min = 446.8 | M[-]Min = 430.9
[cm2] Asapo[+]= 1.74 | Asapo[+]= .72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 187. 8.52 46.47 2 45. .1 1.7 3.1 5.0 12.0 2 .0 .0
187.- 373. 3.37 46.47 2 45. .0 1.7 1.7 5.0 22.0 2 .0 .0
373.- 560. 6.52 46.47 2 45. .0 1.7 2.5 5.0 15.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 187. .60 2.58 5 6.8 8.1 58.1 1.5 1.4 .1 .8 .42 N
187.- 373. .16 2.58 5 6.8 8.1 58.1 .4 1.4 .1 .4 .13 N
373.- 560. .51 2.58 5 6.8 8.1 58.1 1.2 1.4 .1 .7 .34 N

REAC.	APPIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	5.184	4.930	.30	.00	0 P1	.00	.00	1	0	0 0 0 0
2	11.186	11.102	.30	.00	0 P2	.00	.00	2	0	0 0 0 0
3	10.546	10.443	.30	.00	0 P3	.00	.00	3	0	0 0 0 0
4	4.656	4.376	.30	.00	0 P4	.00	.00	4	0	0 0 0 0

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= 6.44 /B= .14 /H= .40 /BCs= .62 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .07 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 1.2 tf* m | M.[+] Max= 2.2 tf* m - Abcis.= 323 | M.[-] = 2.6 tf* m
[tf,cm] As = 1.12 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 2.73 -SRAS- [4 B 10.0mm]
| AsL= .00 ----- x/d = .08 | As = 2.06 -STAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .20
| x/dMx= .50 | Arm.Lat.= [2 X 2 B 5.0mm] - LN= 1.2 | x/dMx= .50

[tf,cm] M[-]Min = 105.1 | M[+]Min = 95.6 | M[-]Min = 201.2
[cm2] Asapo[+]= .51 | | Asapo[+]= .84

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 620. 4.42 21.87 2 45. .5 1.4 1.6 5.0 20.0 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.- 620. .11 .66 5 5.1 5.1 31.1 .8 1.1 .0 .2 .34 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 5.24 /B= .14 /H= .40 /BCs= .45 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .07 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 2.4 tf* m | M.[+] Max= 1.5 tf* m - Abcis.= 265 | M.[-] = 2.5 tf* m
[tf,cm] As = 2.41 -SRAS- [3 B 10.0mm] | AsL= .00 ----- | As = 2.51 -SRAS- [4 B 10.0mm]
| AsL= .00 ----- x/d = .17 | As = 1.43 -STAS- [2 B 10.0mm] | AsL= .00 ----- x/d = .18
| | x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.1 | | x/dMx= .50
| | |
[tf,cm] M[-]Min = 162.0 | M[+]Min = 90.8 | M[-]Min = 162.0
[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.- 500. 4.36 21.87 2 45. .4 1.4 1.4 5.0 20.0 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.- 500. .04 .66 5 5.1 5.1 31.1 .3 1.1 .0 .2 .25 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.84 /B= .14 /H= .40 /BCs= .58 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .07 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 2.6 tf* m | M.[+] Max= 2.0 tf* m - Abcis.= 293 | M.[-] = 1.1 tf* m
[tf,cm] As = 2.71 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 1.09 -SRAS- [2 B 10.0mm]
| AsL= .00 ----- x/d = .20 | As = 1.94 -STAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .08
| | x/dMx= .50 | Arm.Lat.= [2 X 2 B 5.0mm] - LN= 1.2 | | x/dMx= .50
| | |
[tf,cm] M[-]Min = 191.3 | M[+]Min = 94.4 | M[-]Min = 102.0
[cm2] Asapo[+]= .84 | | Asapo[+]= .48

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 560. 4.29 21.87 2 45. .4 1.4 1.5 5.0 20.0 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.- 560. .10 .66 5 5.1 5.1 31.1 .7 1.1 .0 .2 .33 N

REAC.	POIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	2.707	2.670	.30	.03	2 C1	.00	.00	0	0	0 0 0 0
2	6.123	6.113	.30	.03	2 C2	.00	.00	0	0	0 0 0 0
3	6.060	6.047	.30	.03	2 C3	.00	.00	0	0	0 0 0 0
4	2.846	2.805	.30	.03	2 C4	.00	.00	0	0	0 0 0 0

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= 6.44 /B= .14 /H= .40 /BCs= .62 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .07 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 1.2 tf* m | M.[+] Max= 2.1 tf* m - Abcis.= 323 | M.[-] = 2.8 tf* m
[tf,cm] As = 1.15 -SRAS- [2 B 10.0mm] | AsL= .00 ----- | As = 2.88 -SRAS- [4 B 10.0mm]
| AsL= .00 ----- x/d = .08 | As = 2.02 -STAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .21
| | x/dMx= .50 | Arm.Lat.= [2 X 2 B 5.0mm] - LN= 1.1 | | x/dMx= .50
| | |
[tf,cm] M[-]Min = 105.1 | M[+]Min = 95.6 | M[-]Min = 201.2
[cm2] Asapo[+]= .51 | | 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.- 620. 4.71 21.87 2 45. .7 1.4 1.5 5.0 20.0 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.- 620. .09 .66 5 5.1 5.1 31.1 .7 1.1 .0 .2 .33 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 5.24 /B= .14 /H= .40 /BCs= .45 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .07 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 2.6 tf*m | M.[+] Max= 1.4 tf*m - Abcis.= 265 | M.[-] = 2.5 tf*m
[tf,cm] | As = 2.65 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 2.47 -SRAS- [2 B 12.5mm]
| AsL= .00 ----- x/d = .20 | As = 1.43 -STAS- [2 B 10.0mm] | AsL= .00 ----- x/d = .18
| x/dMx= .50 | Arm.Lat.= [2 X 1 B 5.0mm] - LN= 1.0 | x/dMx= .50
[tf,cm] | M[-]Min = 162.0 | M[+]Min = 90.8 | M[-]Min = 162.0
[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.- 500. 4.69 21.87 2 45. .7 1.4 1.4 5.0 20.0 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.- 500. .03 .66 5 5.1 5.1 31.1 .2 1.1 .0 .2 .27 N

----- G E O M E T R I A E C A R G A S -----
Vao= 3 /L= 5.84 /B= .14 /H= .40 /BCs= .58 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .20 /FLt.Ex= .07 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 2.6 tf*m | M.[+] Max= 2.0 tf*m - Abcis.= 293 | M.[-] = 1.1 tf*m
[tf,cm] | As = 2.68 -SRAS- [3 B 12.5mm] | AsL= .00 ----- | As = 1.09 -SRAS- [2 B 10.0mm]
| AsL= .00 ----- x/d = .19 | As = 1.89 -STAS- [3 B 10.0mm] | AsL= .00 ----- x/d = .08
| x/dMx= .50 | Arm.Lat.= [2 X 2 B 5.0mm] - LN= 1.2 | x/dMx= .50
[tf,cm] | M[-]Min = 191.3 | M[+]Min = 94.4 | M[-]Min = 102.0
[cm2] | Asapo[+] = .83 | | 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.- 560. 4.70 21.87 2 45. .7 1.4 1.5 5.0 20.0 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.- 560. .09 .66 5 5.1 5.1 31.1 .7 1.1 .0 .2 .32 N

REAC.	AP0IO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	2.869	2.832	.30	.03	2 C5	.00	.00	0	0	0 0 0 0
2	6.570	6.561	.30	.03	2 C6	.00	.00	0	0	0 0 0 0
3	6.581	6.569	.30	.03	2 C7	.00	.00	0	0	0 0 0 0
4	2.921	2.879	.30	.03	2 C8	.00	.00	0	0	0 0 0 0

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= 6.50 /B= .17 /H= .67 /BCs= .66 /BCi= .33 /TpS= 11 /Esp.LS= .12 /Esp.LI= .12 FSp.Ex= .34 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 2.7 tf*m | M.[+] Max= 4.9 tf*m - Abcis.= 270 | M.[-] = 6.6 tf*m
[tf,cm] | As = 2.50 -STAS- [4 B 10.0mm] | AsL= .00 ----- | As = 3.58 -STAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .04 | As = 2.99 -STAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .06
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 6.3mm] - LN= 1.4 | x/dMx= .50
[tf,cm] | M[-]Min = 450.6 | M[+]Min = 465.7 | M[-]Min = 652.2
[cm2] | Asapo[+] = .75 | | Asapo[+] = 1.73

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 207. 8.13 46.47 2 45. .0 1.7 2.7 6.3 22.0 2 .0 .0
207.- 413. 3.54 46.47 2 45. .0 1.7 1.7 6.3 25.0 2 .0 .0
413.- 620. 9.68 46.47 2 45. .7 1.7 3.3 6.3 17.0 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.- 207. .56 2.58 5 6.8 8.1 58.1 1.4 1.4 .1 .8 .39 N
207.- 413. .15 2.58 5 6.8 8.1 58.1 .4 1.4 .1 .4 .14 N
413.- 620. .54 2.58 5 6.8 8.1 58.1 1.3 1.4 .1 .8 .42 N

----- G E O M E T R I A E C A R G A S -----
Vao= 2 /L= 5.30 /B= .17 /H= .67 /BCs= .49 /BCi= .28 /TpS= 11 /Esp.LS= .12 /Esp.LI= .12 FSp.Ex= .34 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.4 tf* m | M.[+] Max= 1.1 tf* m - Abcis.= 265 | M.[-] = 4.8 tf* m
[tf,cm] As = 2.95 -STAS- [3 B 12.5mm] | AsL= .00 ----- | As = 2.77 -STAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .06 | As = 2.57 -STAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .06
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 6.3mm] - LN= 1.5 | x/dMx= .50
|
[tf,cm] M[-]Min = 507.5 | M[+]Min = 393.3 | M[-]Min = 507.5
[cm2] Asapo[+]= 1.72 | Asapo[+]= 1.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 167. 7.89 46.47 2 45. .0 1.7 2.3 5.0 17.0 2 .0 .0
167.- 333. 2.07 46.47 2 45. .0 1.7 1.7 5.0 22.0 2 .0 .0
333.- 500. 7.29 46.47 2 45. .0 1.7 2.1 5.0 17.0 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.- 167. .48 2.58 5 6.8 8.1 58.1 1.2 1.4 .1 .7 .35 N
167.- 333. .09 2.58 5 6.8 8.1 58.1 .2 .0 .0 .0 .08 N
333.- 500. .44 2.58 5 6.8 8.1 58.1 1.1 1.4 .1 .6 .33 N

----- G E O M E T R I A E C A R G A S -----

Vao= 3 /L= 5.90 /B= .17 /H= .67 /BCs= .61 /BCi= .32 /TpS= 11 /Esp.LS= .12 /Esp.LI= .12 FSp.Ex= .34 /FLt.Ex= .09 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.6 tf* m | M.[+] Max= 4.1 tf* m - Abcis.= 344 | M.[-] = 2.3 tf* m
[tf,cm] As = 3.36 -STAS- [3 B 12.5mm] | AsL= .00 ----- | As = 2.44 -STAS- [4 B 10.0mm]
| AsL= .00 ----- x/d = .06 | As = 2.88 -STAS- [4 B 10.0mm] | AsL= .00 ----- x/d = .04
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 6.3mm] - LN= 1.4 | x/dMx= .50
|
[tf,cm] M[-]Min = 613.7 | M[+]Min = 446.8 | M[-]Min = 430.9
[cm2] Asapo[+]= 1.74 | Asapo[+]= .72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 187. 9.55 46.47 2 45. .6 1.7 3.4 6.3 17.0 2 .0 .0
187.- 560. 7.09 46.47 2 45. .0 1.7 2.4 6.3 25.0 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.- 187. .57 2.58 5 6.8 8.1 58.1 1.4 1.4 .1 .8 .43 N
187.- 560. .49 2.58 5 6.8 8.1 58.1 1.2 1.4 .1 .7 .34 N

REAC.	POIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	5.799	5.545	.30	.00	0 P7	.00	.00	7	0	0	0
2	12.377	12.292	.30	.00	0 P8	.00	.00	8	0	0	0
3	11.857	11.753	.30	.00	0 P9	.00	.00	9	0	0	0
4	5.062	4.781	.30	.00	0 P10	.00	.00	10	0	0	0

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8.6.4 Relatório Geral de Dimensionamento das Vigas do Pavimento de Nível 10,10 (N1010) - Cobertura

JOAO SOARES VIEGAS FILHO R E L G E R - Relatório geral de vigas (V15.8.56) Pg 1
AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS 32283060
T Q S Projeto: 0005 - Nível 1010 22/10/11
CAD/Vigas 15:36:16

fck=250.kgf/cm2 - Aco: 50A - Esforços Característicos

LEGENDA

GEOMETRIA

Eng.E : Engastamento a Esquerda / Eng.D : Engastamento a Direita / Repet : Repeticoes
NAnd : N.de Andares / Red V Ext : Reducao de Cortante no Extremo / Fat.Alt : Fator de Alternancia de Cargas
Cob : Cobrimento / TpS : Tipo da Secao / BCs : Mesa Colaborante Superior
BCi : Mesa Colaborante Inferior / Esp.LS : Espessura Laje Superior / Esp.LI : Espessura Laje Inferior
FSp.Ex : Distancia Face Superior Eixo / FLt.Ex : Distancia Face Lateral ao Eixo / Cob/S : Cobrim/Cobr.superior adicional
C A R G A S

MEsq : Momento Adicional a Esquerda / MDir : Momento Adicional a Direita / Q : Cortante Adicional (valor unico)

A R M A D U R A S - F L E X A O

SRAS : Secao Retangular Armad.Simples / SRAD : Secao Retangular Armad.Dupla / STAS : Secao Te Armadura Simples

STAD : Secao Te Armadura Dupla / x/d : Profund. relativa da Linha Neutra / x/dMx : Profund. relativa da LN Maxima

AsL : Armadura de Compressao / Bit.de Fiss.: Bitola de fissuracao / Asapo : Armadura e/d que chega no extremo

A R M A D U R A S - C I S A L H A M E N T O

MdC : Modelo de Calculo (I ou II) / Ang. : Angulo da biela de compressao / Aswmin : Armad.transv.minima-cisalhamento

Asw[C+T]: Arm.trans.calculada cisalh+torcao / Bit : Bitola selecionada / Esp : Espacamento selecionado
 NR : Numero de ramos do estribo / AsTrt : Armadura transversal de Tirante / AsSus : Armadura transversal-Suspensao
A R M A D U R A S - T O R C A O
 %dT : % limite de TRd2 para desprezar o M de torcao (Tsd) / he : Espessura do nucleo de torcao
 b-nuc : Largura do nucleo / h-nuc : Altura do nucleo
 Asw-1R : Armadura de torcao calculada para 1 Ramo de estribo / AswmnNR : Armad.transv.minima-torcao p/NR estribos selecionado
 Asl-b : Armadura longitudinal de torcao no lado b / Asl-h : Armadura longitudinal de torcao no lado h
 ComDia : Valor da compressao diagonal (cisalhamento+torcao) / AdPla : Capacidade/adaptacao plastica no vao - S[sim] N[nao]
R E A C O E S D E A P O I O
 DEPEV : Distancia do eixo do pilar ao eixo efetivo de apoio -viga / Morte : Codigo se pilar morre / segue / vigas
 M.I.Mx : Momento Imposto Maximo / M.I.Mn : Momento Imposto Minimo

Viga= 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= 1B /L= 1.05 /B= .30 /H= .82 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO |M[-]= 8.07 tf*m |As = 3.69 -SRAS- [3 B 12.5mm]
 BAL.ESQ | x/d = .05 |AsL= .00 -Arm.Lat.= [2 X 5 B 8.0mm] .7
 [tf,cm] |M[-]Min= 634.0 - x/dMx = 1.00 | % Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmn Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 90. 1.16 101.54 2 45. .0 3.1 3.1 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= 6.50 /B= .30 /H= .82 /BCs= .69 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-|ESQUERDA |MEIO DO VAO |DIREITA
 |M.[-]= 8.1 tf*m |M.[+] Max= 4.1 tf*m - Abcis.= 270 |M.[-]= 4.7 tf*m
 [tf,cm] |As = 4.61 -SRAS- [4 B 12.5mm] |AsL= .00 ----- |As = 4.61 -SRAS- [4 B 12.5mm]
 |AsL= .00 ----- x/d = .07 |As = 4.61 -STAS- [4 B 12.5mm] |AsL= .00 ----- x/d = .07
 | x/dMx = .50 |Arm.Lat.= [2 X 5 B 8.0mm] - LN= 1.8 | x/dMx = .50
 [tf,cm] |M[-]Min = 993.7 |M.[+]Min = 755.1 |M[-]Min = 993.7
 [cm2] |Asapo[+]= 4.61 | Asapo[+]= 3.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmn Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 620. 6.28 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 620. 1.08 11.92 5 11.0 19.0 71.0 .9 2.3 .2 .8 .13 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 3 /L= 5.30 /B= .30 /H= .82 /BCs= .62 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-|ESQUERDA |MEIO DO VAO |DIREITA
 |M.[-]= 4.2 tf*m |M.[+] Max= .6 tf*m - Abcis.= 265 |M.[-]= 3.4 tf*m
 [tf,cm] |As = 4.48 -SRAS- [4 B 12.5mm] |AsL= .00 ----- |As = 4.48 -SRAS- [4 B 12.5mm]
 |AsL= .00 ----- x/d = .06 |As = 4.48 -STAS- [4 B 12.5mm] |AsL= .00 ----- x/d = .06
 | x/dMx = .50 |Arm.Lat.= [2 X 5 B 8.0mm] - LN= 2.0 | x/dMx = .50
 [tf,cm] |M[-]Min = 928.7 |M.[+]Min = 737.6 |M[-]Min = 928.7
 [cm2] |Asapo[+]= 3.72 | Asapo[+]= 3.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmn Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 500. 4.61 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 500. .81 11.92 5 11.0 19.0 71.0 .7 2.3 .2 .8 .11 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 4 /L= 5.90 /B= .30 /H= .82 /BCs= .65 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-|ESQUERDA |MEIO DO VAO |DIREITA
 |M.[-]= 3.8 tf*m |M.[+] Max= 3.3 tf*m - Abcis.= 344 |M.[-]= 8.1 tf*m
 [tf,cm] |As = 4.54 -SRAS- [4 B 12.5mm] |AsL= .00 ----- |As = 4.54 -SRAS- [4 B 12.5mm]
 |AsL= .00 ----- x/d = .06 |As = 4.54 -STAS- [4 B 12.5mm] |AsL= .00 ----- x/d = .06

| x/dMx= .50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 1.9 | x/dMx= .50
[tf,cm] | M[-]Min= 961.3 | M[+]Min= 746.6 | M[-]Min= 961.3
[cm2] | Asapo[+]= 3.72 | Asapo[+]= 4.54

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 560. 5.63 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 560. 1.01 11.92 5 11.0 19.0 71.0 .9 2.3 .2 .8 .12 N

----- G E O M E T R I A E C A R G A S -----
Vao= 5B /L= 1.05 /B= .30 /H= .82 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M[-]= 8.07 tf*m | As = 3.69 -SRAS- [3 B 12.5mm]
BAL.DIR | x/d = .05 | AsL= .00 -Arm.Lat.=[2 X 5 B 8.0mm] .7
[tf,cm] | M[-]Min= 634.0 - x/dMx=1.00 | % Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 90. 1.16 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	3.645	3.523	.30	.00	1 P1	.00	.00	1	0	0 0 0 0 0
2	7.737	7.611	.30	.00	1 P2	.00	.00	2	0	0 0 0 0 0
3	6.916	6.811	.30	.00	1 P3	.00	.00	3	0	0 0 0 0 0
4	3.501	3.376	.30	.00	1 P4	.00	.00	4	0	0 0 0 0 0

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= 1B /L= .97 /B= .30 /H= .50 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M[-]= 3.00 tf*m | As = 2.25 -SRAS- [3 B 10.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 - .6
[tf,cm] | M[-]Min= 235.7 - 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.- 90. .80 59.88 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	.574	.574	.14	.00	2 V408	.00	.00	0	0	0 0 0 0 0

Viga= 403 V403 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= .97 /B= .30 /H= .50 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M[-]= 3.00 tf*m | As = 2.25 -SRAS- [3 B 10.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 - .6
[tf,cm] | M[-]Min= 235.7 - 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.- 90. .80 59.88 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

REAC.	APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	.574	.574	.14	.00	2 V411	.00	.00	0	0	0 0 0 0 0

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= 6.50 /B= .30 /H= .62 /BCs= 1.28 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .31 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A

| M.[-] = 2.4 tf* m | M.[+] Max= 8.2 tf* m - Abcis.= 325 | M.[-] = 2.7 tf* m
[tf,cm] As = 3.18 -SRAS- [4 B 10.0mm] | AsL= .00 ----- | As = 5.50 -SRAS- [3 B 16.0mm]
| AsL= .00 ----- x/d = .06 | As = 4.65 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .11
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 8.0mm] - LN= 1.3 | x/dMx= .50
[tf,cm] M[-]Min = 500.6 | M[+]Min = 491.1 | M[-]Min = 935.3
[cm2] Asapo[+] = 1.16 | Asapo[+] = 2.65

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.- 620. 7.59 75.50 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 620. .08 8.38 5 10.1 19.9 51.9 .1 .0 .0 .0 .11 N

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 5.30 /B= .30 /H= .62 /BCs= .94 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .31 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 2.8 tf* m | M.[+] Max= 3.7 tf* m - Abcis.= 265 | M.[-] = 1.8 tf* m
[tf,cm] As = 4.36 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 4.36 -SRAS- [3 B 16.0mm]
| AsL= .00 ----- x/d = .09 | As = 3.93 -STAS- [2 B 16.0mm] | AsL= .00 ----- x/d = .09
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 8.0mm] - LN= 1.0 | x/dMx= .50
[tf,cm] M[-]Min = 749.6 | M[+]Min = 464.7 | M[-]Min = 749.6
[cm2] Asapo[+] = 2.65 | Asapo[+] = 2.65

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.- 500. 5.41 75.50 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 500. .02 8.38 5 10.1 19.9 51.9 .0 .0 .0 .0 .07 N

----- G E O M E T R I A E C A R G A S -----

Vao= 3 /L= 5.90 /B= .30 /H= .62 /BCs= 1.19 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .31 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -

FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 1.6 tf* m | M.[+] Max= 6.6 tf* m - Abcis.= 295 | M.[-] = 2.2 tf* m
[tf,cm] As = 5.20 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = 3.52 -SRAS- [3 B 12.5mm]
| AsL= .00 ----- x/d = .11 | As = 4.38 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .07
| x/dMx= .50 | Arm.Lat.= [2 X 4 B 8.0mm] - LN= 1.1 | Grampos Dir.= 1B 6.3mm x/dMx= .50
[tf,cm] M[-]Min = 887.3 | M[+]Min = 485.0 | M[-]Min = 608.3
[cm2] Asapo[+] = 2.65 | Asapo[+] = 4.38

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.- 560. 6.47 75.50 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 560. .08 8.38 5 10.1 19.9 51.9 .1 .0 .0 .0 .10 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:

1	4.713	4.574	.30	.00	1	P5	.00	.00	5	0	0	0	0
2	9.285	9.064	.30	.00	2	V409	.00	.00	0	0	0	0	0
3	8.094	7.898	.30	.00	2	V410	.00	.00	0	0	0	0	0
4	4.323	4.191	.30	.00	1	P6	.00	.00	6	0	0	0	0

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= 1B /L= .97 /B= .30 /H= .38 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .19 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -

FLEXAO | M.[-] = 1.73 tf* m | As = 1.71 -SRAS- [3 B 10.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 - .6
[tf,cm] | M[-]Min= 136.1 - 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.- 90. .67 44.26 2 45. .0 3.1 3.1 5.0 12.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:

1	.479	.479	.14	.00	2	V408	.00	.00	0	0	0	0	0


```

=====
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= 1B /L= .97 /B= .30 /H= .50 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .25 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO | M[-]= 3.00 tf*m | As = 2.25 -SRAS- [ 3 B 10.0mm]
BAL.ESQ | x/d = .06 | AsL= .00 - .6
[tf,cm] | M[-]Min= 235.7 - 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.- 90. .80 59.88 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
1 .574 .574 .14 .00 2 V411 .00 .00 0 0 0 0 0 0 0

=====

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= 1B /L= 1.05 /B= .30 /H= .82 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO | M[-]= 8.07 tf*m | As = 3.69 -SRAS- [ 3 B 12.5mm]
BAL.ESQ | x/d = .05 | AsL= .00 -Arm.Lat.= [ 2 X 5 B 8.0mm] .7
[tf,cm] | M[-]Min= 634.0 - x/dMx = 1.00 | | % Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 90. 1.16 101.54 2 45. .0 3.1 3.1 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= 6.50 /B= .30 /H= .82 /BCs= .69 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
|M.[-]= 8.1 tf*m | M.[+] Max= 4.2 tf*m - Abcis.= 270 | M.[-]= 4.9 tf*m
[tf,cm] | As = 4.61 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 4.61 -SRAS- [ 4 B 12.5mm]
| AsL= .00 ----- x/d = .07 | As = 4.61 -STAS- [ 4 B 12.5mm ] | AsL= .00 ----- x/d = .07
| x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 1.8 | | x/dMx= .50
|
[tf,cm] | M[-]Min = 993.7 | M.[+]Min = 755.1 | M.[-]Min = 993.7
[cm2 ] | Asapo[+]= 4.61 | | Asapo[+]= 3.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 620. 6.85 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 620. 1.05 11.92 5 11.0 19.0 71.0 .9 2.3 .2 .8 .13 N

----- G E O M E T R I A   E   C A R G A S -----
Vao= 3 /L= 5.30 /B= .30 /H= .82 /BCs= .62 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S ( F L E X A O E C I S A L H A M E N T O ) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
|M.[-]= 4.4 tf*m | M.[+] Max= .6 tf*m - Abcis.= 265 | M.[-]= 3.6 tf*m
[tf,cm] | As = 4.48 -SRAS- [ 4 B 12.5mm] | AsL= .00 ----- | As = 4.48 -SRAS- [ 4 B 12.5mm]
| AsL= .00 ----- x/d = .06 | As = 4.48 -STAS- [ 4 B 12.5mm ] | AsL= .00 ----- x/d = .06
| x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 2.0 | | x/dMx= .50
|
[tf,cm] | M[-]Min = 928.7 | M.[+]Min = 737.6 | M.[-]Min = 928.7
[cm2 ] | Asapo[+]= 3.72 | | Asapo[+]= 3.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 500. 5.24 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 500. .79 11.92 5 11.0 19.0 71.0 .7 2.3 .2 .8 .12 N

----- G E O M E T R I A   E   C A R G A S -----

```

Vao= 4 /L= 5.90 /B= .30 /H= .82 /BCs= .65 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 3.9 tf* m | M.[+] Max= 3.4 tf* m - Abcis.= 344 | M.[-] = 8.1 tf* m
[tf,cm] As = 4.54 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 4.54 -SRAS- [4 B 12.5mm]
| AsL= .00 ----- x/d = .06 | As = 4.54 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .06
| x/dMx=.50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 1.9 | x/dMx=.50
[tf,cm] M[-]Min = 961.3 | M[+]Min = 746.6 | M[-]Min = 961.3
[cm2] Asapo[+]= 3.72 | Asapo[+]= 4.54

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 560. 6.30 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 560. .98 11.92 5 11.0 19.0 71.0 .8 2.3 .2 .8 .12 N

----- G E O M E T R I A E C A R G A S -----

Vao= 5B /L= 1.05 /B= .30 /H= .82 /BCs= .00 /BCi= .00 /TpS= 1 /Esp.LS= .00 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO | M.[-] = 8.07 tf* m | As = 3.69 -SRAS- [3 B 12.5mm]
BAL.DIR | x/d = .05 | AsL= .00 -Arm.Lat.=[2 X 5 B 8.0mm] .7
[tf,cm] M[-]Min= 634.0 - x/dMx=1.00 | % Baric.Armad.= 1

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 90. 1.16 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

REAC.	POIO	No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	3.645	3.518	.30	.00	1 P7	.00	.00	7 0 0 0 0 0	0	0	
2	8.593	8.451	.30	.00	1 P8	.00	.00	8 0 0 0 0 0	0	0	
3	7.780	7.659	.30	.00	1 P9	.00	.00	9 0 0 0 0 0	0	0	
4	3.682	3.550	.30	.00	1 P10	.00	.00	10 0 0 0 0 0	0	0	

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= 1 /L= 4.70 /B= .30 /H= .82 /BCs= .65 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = .0 tf* m | M.[+] Max= 3.6 tf* m - Abcis.= 78 | M.[-] = 5.5 tf* m
[tf,cm] As = .70 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 4.54 -SRAS- [3 B 16.0mm]
| AsL= .00 ----- x/d = .00 | As = 4.54 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .06
| Grampos Esq.= 1B 6.3mm x/dMx=.50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 1.9 | x/dMx=.50
[tf,cm] M[-]Min = 634.0 | M[+]Min = 746.2 | M[-]Min = 959.9
[cm2] Asapo[+]= 4.54 | Asapo[+]= 3.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 440. 7.48 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O - Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
[tf,cm] 0.- 440. 1.25 11.92 5 11.0 19.0 71.0 1.1 2.3 .2 .8 .13 N

----- G E O M E T R I A E C A R G A S -----

Vao= 2 /L= 4.70 /B= .30 /H= .82 /BCs= .65 /BCi= .00 /TpS= 5 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
| M.[-] = 5.5 tf* m | M.[+] Max= 3.6 tf* m - Abcis.= 352 | M.[-] = .0 tf* m
[tf,cm] As = 4.54 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = .70 -SRAS- [2 B 8.0mm]
| AsL= .00 ----- x/d = .06 | As = 4.54 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .00
| x/dMx=.50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 1.9 | Grampos Dir.= 1B 6.3mm x/dMx=.50
[tf,cm] M[-]Min = 959.9 | M[+]Min = 746.2 | M[-]Min = 634.0
[cm2] Asapo[+]= 3.72 | Asapo[+]= 4.54

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
[tf,cm] 0.- 440. 7.61 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 440. 1.24 11.92 5 11.0 19.0 71.0 1.1 2.3 .2 .8 .13 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 1 1.979 1.128 .30 .00 1 P7 .00 .00 7 0 0 0 0 0
 2 10.038 9.905 .30 .00 1 P5 .00 .00 5 0 0 0 0 0
 3 1.919 1.067 .30 .00 1 P1 .00 .00 1 0 0 0 0 0

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= 9.40 /B= .30 /H= .82 /BCs= 2.18 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 | M.[-] = 4.8 tf* m | M.[+] Max= 36.2 tf* m - Abcis.= 470 | M.[-] = 4.8 tf* m
 [tf,cm] | As = 4.25 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 4.25 -SRAS- [4 B 12.5mm]
 | AsL= .00 ----- x/d = .06 | As = 15.26 -STAS- [5 B 20.0mm] | AsL= .00 ----- x/d = .06
 | x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 2.5 | x/dMx= .50
 [tf,cm] | M[-]Min = 924.4 | M[+]Min = 929.8 | M[-]Min = 924.4
 [cm2] | Asapo[+] = 3.81 | | Asapo[+] = 3.81

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.- 910. 17.05 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 910. .11 11.92 5 11.0 19.0 71.0 .1 .0 .0 .0 .18 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 1 11.468 10.847 .30 .00 1 P8 .00 .00 8 0 0 0 0 0
 2 12.179 11.545 .30 .00 1 P2 .00 .00 2 0 0 0 0 0

Viga= 410 V410 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= 9.40 /B= .30 /H= .82 /BCs= 2.18 /BCi= .00 /TpS= 2 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 | M.[-] = 4.5 tf* m | M.[+] Max= 33.7 tf* m - Abcis.= 470 | M.[-] = 4.5 tf* m
 [tf,cm] | As = 4.25 -SRAS- [4 B 12.5mm] | AsL= .00 ----- | As = 4.25 -SRAS- [4 B 12.5mm]
 | AsL= .00 ----- x/d = .06 | As = 14.19 -STAS- [5 B 20.0mm] | AsL= .00 ----- x/d = .06
 | x/dMx= .50 | Arm.Lat.= [2 X 5 B 8.0mm] - LN= 2.3 | x/dMx= .50
 [tf,cm] | M[-]Min = 924.4 | M[+]Min = 929.8 | M[-]Min = 924.4
 [cm2] | Asapo[+] = 3.55 | | Asapo[+] = 3.55

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 910. 16.24 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswmnNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 910. .20 11.92 5 11.0 19.0 71.0 .2 .0 .0 .0 .18 N

REAC. APOIO - No. Maximos Minimos Largura DEPEV Morte Nome M.I.Mx M.I.Mn Pilares:
 1 10.877 10.275 .30 .00 1 P9 .00 .00 9 0 0 0 0 0
 2 11.599 10.983 .30 .00 1 P3 .00 .00 3 0 0 0 0 0

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= 4.70 /B= .30 /H= .82 /BCs= .65 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 | M.[-] = .0 tf* m | M.[+] Max= 3.6 tf* m - Abcis.= 78 | M.[-] = 5.4 tf* m
 [tf,cm] | As = .70 -SRAS- [2 B 8.0mm] | AsL= .00 ----- | As = 4.54 -SRAS- [3 B 16.0mm]
 | AsL= .00 ----- x/d = .00 | As = 4.54 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .06

| Grampos Esq.= 1B 6.3mm x/dMx=.50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 1.9 | x/dMx=.50
 [tf,cm] M[-]Min = 634.0 | M[+]Min = 746.2 | M[-]Min = 959.9
 [cm2] Asapo[+]= 4.54 | Asapo[+]= 3.72

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 440. 7.40 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 440. 1.18 11.92 5 11.0 19.0 71.0 1.0 2.3 .2 .8 .12 N

----- G E O M E T R I A E C A R G A S -----
 Vao= 2 /L= 4.70 /B= .30 /H= .82 /BCs= .65 /BCi= .00 /TpS= 8 /Esp.LS= .12 /Esp.LI= .00 FSp.Ex= .41 /FLt.Ex= .15 [M]

-----Solicitacoes provenientes de modelo de grelha e/ou portico espacial -----

- - - - - A R M A D U R A S (F L E X A O E C I S A L H A M E N T O) - - - - -
 FLEXAO-| E S Q U E R D A | M E I O D O V A O | D I R E I T A
 | M.[-]= 5.4 tf*m | M.[+] Max= 3.6 tf*m - Abcis.= 391 | M.[-]= .0 tf*m
 [tf,cm] As = 4.54 -SRAS- [3 B 16.0mm] | AsL= .00 ----- | As = .70 -SRAS- [2 B 8.0mm]
 | AsL= .00 ----- x/d = .06 | As = 4.54 -STAS- [4 B 12.5mm] | AsL= .00 ----- x/d = .00
 | x/dMx=.50 | Arm.Lat.=[2 X 5 B 8.0mm] - LN= 1.9 | Grampos Dir.= 1B 6.3mm x/dMx=.50
 [tf,cm] M[-]Min = 959.9 | M[+]Min = 746.2 | M[-]Min = 634.0
 [cm2] Asapo[+]= 3.72 | Asapo[+]= 4.54

CISALHAMENTO- Xi Xf Vsd VRd2 MdC Ang. Asw[C] Aswmin Asw[C+T] Bit Esp NR AsTrt AsSus M E N S A G E M
 [tf,cm] 0.- 440. 7.39 101.54 2 45. .0 3.1 3.1 6.3 20.0 2 .0 .0

T O R C A O- Xi Xf Tsd TRd2 %dT he b-nuc h-nuc Asw-1R AswminNR Asl-b Asl-h ComDia AdPla M E N S A G E M
 [tf,cm] 0.- 440. 1.16 11.92 5 11.0 19.0 71.0 1.0 2.3 .2 .8 .12 N

REAC. APOIO - No.	Maximos	Minimos	Largura	DEPEV	Morte	Nome	M.I.Mx	M.I.Mn	Pilares:
1	1.564	.720	.30	.00	1	P10	.00	.00	10 0 0 0 0 0
2	9.820	9.691	.30	.00	1	P6	.00	.00	6 0 0 0 0 0
3	1.676	.833	.30	.00	1	P4	.00	.00	4 0 0 0 0 0

=====

8.6.5 Relatório Geral de Pilares

JOAO SOARES VIEGAS FILHO LISPIL - Listagem dos resultados -P-A-S- por pil (V15.8.56) Pg 1
 AV. REPUBLICA, 440 AREAL PELOTAS 96077-230 RS 32283060
 T Q S Projeto: 0001 - ETE NOVO MUNDO Casa dos Sopradores 22/10/11
 CAD/Pilar 15:38:34

AS RESULTANTE POR BITOLAS fck = .250 [tf,cm] fck(opc.) = .250

SEL = Quantidade Efetiva de Barras na Secao
 Nb = Quantidades de Barras Dimensionadas na Secao
 NbH = Numero de Barras lado H
 NbB = Numero de Barras lado B

PILAR:P1

num. 1

Esforço de Calculo do Dimensionamento

LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)
Cobertura																
L. 3	30.0	30.0	8	6	12.5	6.3	6	2	1	7.36	.8	6.63				
	10.0	5.0	10	4	1	7.85	.9	6.66	73.1	16.6	8.2	369.7	-243.7			
	16.0	6.3	4	2	0	8.04	.9	6.02								
	20.0	6.3	4	2	0	12.57	1.4	6.08								
	25.0	8.0	4	2	0	19.63	2.2	6.30								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmapV Gmavm																
	3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	1.40					
TipoAço ClasseAço ExcMin ExcMax K12 K37																
	50	A	2.0	15.0	1	1										
Nivel850																
L. 2	30.0	30.0	14	10	12.5	6.3	10	4	1	12.27	1.4	11.18				
	10.0	5.0	16	5	3	12.57	1.4	11.68	72.6	30.3	20.2	681.2	215.3			
	16.0	6.3	6	2	1	12.06	1.3	12.00								
	20.0	6.3	4	2	0	12.57	1.4	10.25								
	25.0	8.0	4	2	0	19.63	2.2	10.70								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmapV Gmavm																
	3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	1.40					
TipoAço ClasseAço ExcMin ExcMax K12 K37																
	50	A	2.0	15.0	1	1										
Nivel583																
L. 1	30.0	30.0	14	10	12.5	6.3	4	2	0	4.91	.5	3.87				
	10.0	5.0	8	3	1	6.28	.7	4.48	42.8	40.1	44.4	244.6	505.8			
	16.0	6.3	4	2	0	8.04	.9	3.95								
	20.0	6.3	4	2	0	12.57	1.4	4.04								
	25.0	8.0	4	2	0	19.63	2.2	4.21								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmapV Gmavm																
	3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	1.40					
TipoAço ClasseAço ExcMin ExcMax K12 K37																
	50	A	2.0	15.0	1	1										
Fundacao																

PILAR:P2

num. 2

Esforço de Calculo do Dimensionamento

LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)
Cobertura																
L. 3	30.0	30.0	13	6	16.0	6.3	6	3	0	12.06	1.3	11.12				
	10.0	5.0	10	4	1	12.27	1.4	12.16	72.2	16.6	28.4	764.1	-71.3			
	16.0	6.3	4	2	0	12.57	1.4	11.31								
	20.0	6.3	4	2	0	12.57	1.4	11.87								
	25.0	8.0	4	2	0	19.63	2.2	11.87								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmapV Gmavm																
	3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	1.40					
TipoAço ClasseAço ExcMin ExcMax K12 K37																
	50	A	2.0	15.0	1	1										
Nivel850																
L. 2	30.0	30.0	8	6	12.5	6.3	4	2	0	4.91	.5	3.60				
	10.0	5.0	6	3	0	4.71	.5	3.60	35.0	69.5	53.7	318.8	-128.8			
	16.0	6.3	4	2	0	8.04	.9	3.60								
	20.0	6.3	4	2	0	12.57	1.4	3.60								
	25.0	8.0	4	2	0	19.63	2.2	3.60								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm] fck[MPa] GamaAço GamaConcreto AsMax[%] AsMin[%] GmapN GmapM GmapV Gmavm																
	3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40	1.40					
TipoAço ClasseAço ExcMin ExcMax K12 K37																
	50	A	2.0	15.0	1	1										
Fundacao																

PILAR:P4		Esforo de Calculo do Dimensionamento															
num. 4																	
LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)	
Cobertura																	
	10.0	5.0	10	3	2	7.85	.9	6.86	74.9	16.6	7.6	385.8	207.9				
L. 3	30.0	30.0	8	6	12.5	6.3	6	2	1	7.36	.8	6.75	CASO PÓRTICO = 18 (COMBINAÇÃO= 6)				
	16.0	6.3	4	2	0	8.04	.9	6.28		**VER NOTA (A)**							
	20.0	6.3	4	2	0	12.57	1.4	6.36									
	25.0	8.0	4	2	0	19.63	2.2	6.53									
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																	
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm								
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40								
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37												
50	A	2.0	15.0	1	1												
Nivel850																	
	10.0	5.0	16	5	3	12.57	1.4	11.98	73.7	30.3	19.1	692.9	-196.4				
L. 2	30.0	30.0	14	10	12.5	6.3	10	4	1	12.27	1.4	11.46	CASO PÓRTICO = 29 (COMBINAÇÃO= 15)				
	16.0	6.3	8	3	3	16.08	1.8	11.81		**VER NOTA (A)**							

PILAR:P6		Esforo de Calculo do Dimensionamento														
num.	6															
LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)
Cobertura																
L. 3 **AVISO*.....PÉ-DIREITO DUPLO.....*																
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapN	Gmavm							
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40							
TipoAço		ClasseAço	ExcMin	ExcMax	K12	K37										
50	A	2.0	15.0	1	1											
Nivel850																
L. 2 **AVISO*.....PÉ-DIREITO DUPLO.....*																
10.0 5.0 10 4 1 7.85 .9 35.0 46.9 EFEITOS LOCAIS: ESFORÇOS PÓRTICO ESPACIAL																
12.5 6.3 6 3 0 7.36 .8																
L. 2 30.0 30.0 .9 4 16.0 6.3 4 2 0 8.04 .9																

PILAR:P7 num. 7		Esforço de Cálculo do Dimensionamento														
LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)
Cobertura																
L. 3	30.0	30.0	.8	6	12.5	6.3	6	2	1	7.36	.8	6.61	CASO PÓRTICO = 19 (COMBINAÇÃO= 7)			
	16.0	6.3	4	2	0	8.04	.9	5.95	**VER NOTA (A)**							
	20.0	6.3	4	2	0	12.57	1.4	6.03								
	25.0	8.0	4	2	0	19.63	2.2	6.25								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto		AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm						
3.0	25.0	1.15	1.40		8.00	.40	1.40	1.40	1.40	1.40						
TipoAço	ClasseAço	ExcMin	ExcMax		K12	K37										
50	A	2.0	15.0		1	1										
Nível850																
L. 2	30.0	30.0	1.4	10	12.5	6.3	10	4	1	12.27	1.4	11.18	CASO PÓRTICO = 30 (COMBINAÇÃO= 16)			
	16.0	6.3	6	2	1	12.06	1.3	12.00	**VER NOTA (A)**							
	20.0	6.3	4	2	0	12.57	1.4	10.25								
	25.0	8.0	4	2	0	19.63	2.2	10.66								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto		AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm						
3.0	25.0	1.15	1.40		8.00	.40	1.40	1.40	1.40	1.40						
TipoAço	ClasseAço	ExcMin	ExcMax		K12	K37										
50	A	2.0	15.0		1	1										
Nível583																
L. 1	30.0	30.0	1.4	10	12.5	6.3	4	2	0	4.91	.5	3.60	CASO PÓRTICO = 27 (COMBINAÇÃO= 13)			
	*	5		0	**VER NOTA (A)**											
	16.0	6.3	4	2	0	8.04	.9	3.60								
	20.0	6.3	4	2	0	12.57	1.4	3.60								
	25.0	8.0	4	2	0	19.63	2.2	3.73								
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto		AsMax[%]	AsMin[%]	GmapN	GmapM	GmavN	Gmavm						
3.0	25.0	1.15	1.40		8.00	.40	1.40	1.40	1.40	1.40						
TipoAço	ClasseAço	ExcMin	ExcMax		K12	K37										
50	A	2.0	15.0		1	1										
Fundacao																

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* 3 0 **VER NOTA (A)**														
16.0	6.3	4	2	0	8.04	.9	3.60							
20.0	6.3	4	2	0	12.57	1.4	3.60							
25.0	8.0	4	2	0	19.63	2.2	3.60							
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS														
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm					
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40					
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37									
50	A	2.0	15.0	1	1									
Nivel 583														
12.5	6.3	14	5	2	17.18	1.9	15.11	41.0	69.5	91.6	727.7	-324.2		
L. 1	30.0	30.01.8	8	16.0	6.3	8	3	1	16.08	1.8	15.14		CASO PÓRTICO = 19 (COMBINAÇÃO= 7)	
20.0	6.3	6	2	1	18.85	2.1	16.26						**VER NOTA (A)**	
25.0	8.0	4	2	0	19.63	2.2	13.90							
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS														
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm					
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40					
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37									
50	A	2.0	15.0	1	1									
Fundacao														

PILAR:P9

num. 9

Esforço de Calculo do Dimensionamento

LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)
Cobertura																
10.0	5.0	16	5	3	12.57	1.4	11.78	72.1	16.6	26.4	-776.0	63.5				
12.5	6.3	12	4	2	14.73	1.6	11.79							CASO PÓRTICO = 19 (COMBINAÇÃO= 7)		
L. 3	30.0	30.01.3	6	16.0	6.3	6	3	0	12.06	1.3	10.30			**VER NOTA (A)**		
20.0	6.3	4	2	0	12.57	1.4	10.50									
25.0	8.0	4	2	0	19.63	2.2	10.99									
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm							
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40							
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37											
50	A	2.0	15.0	1	1											
Nivel850																
10.0	5.0	6	3	0	4.71	.5	3.60	35.0	69.5	50.9	-330.1	122.2				
L. 2	30.0	30.0.8	6	12.5	6.3	4	2	0	4.91	.5	3.60			CASO PÓRTICO = 15 (COMBINAÇÃO= 3)		
* 3 0 **VER NOTA (A)**																
16.0	6.3	4	2	0	8.04	.9	3.60									
20.0	6.3	4	2	0	12.57	1.4	3.60									
25.0	8.0	4	2	0	19.63	2.2	3.60									
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm							
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40							
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37											
50	A	2.0	15.0	1	1											
Nivel 583																
10.0	5.0	16	5	3	12.57	1.4	12.57	42.2	69.5	86.1	693.8	283.4				
12.5	6.3	12	4	2	14.73	1.6	12.77							CASO PÓRTICO = 19 (COMBINAÇÃO= 7)		
L. 1	30.0	30.01.8	8	16.0	6.3	8	3	1	16.08	1.8	12.50			**VER NOTA (A)**		
20.0	6.3	4	2	0	12.57	1.4	10.77									
25.0	8.0	4	2	0	19.63	2.2	11.42									
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm							
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40							
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37											
50	A	2.0	15.0	1	1											
Fundacao																

PILAR:P10

num. 10

Esforço de Calculo do Dimensionamento

LANCE B(cm)	H(cm)	ROS	SEL	BITL	BITE	Nb	NbH	NbB	AS(cm)	RO	ASnec	LBDALM	LAMDBA	FNd (tf)	Mxd (tf,cm)	Myd (tf,cm)
Cobertura																
10.0	5.0	10	3	2	7.85	.9	6.76	74.6	16.6	7.7	-384.9	205.4				
L. 3	30.0	30.0.8	6	12.5	6.3	6	2	1	7.36	.8	6.71			CASO PÓRTICO = 19 (COMBINAÇÃO= 7)		
16.0	6.3	4	2	0	8.04	.9	6.22							**VER NOTA (A)**		
20.0	6.3	4	2	0	12.57	1.4	6.30									
25.0	8.0	4	2	0	19.63	2.2	6.47									
VALORES CÁLCULOS DEFINIDOS ARQUIVO CRITÉRIOS																
Cobrimento[cm]	fck[MPa]	GamaAço	GamaConcreto	AsMax[%]	AsMin[%]	GmapN	GmapM	GmapV	Gmavm							
3.0	25.0	1.15	1.40	8.00	.40	1.40	1.40	1.40	1.40							
TipoAço	ClasseAço	ExcMin	ExcMax	K12	K37											
50	A	2.0	15.0	1	1											
Nivel850																

(ex: CA50 para CA60)

BLOCO: 1 - B1 Retang. (1x)

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 40.0	FN= 36.6	TensLimP= 476.2	
		TensPil = 68.3	
Xbl = 80.0 Ybl = 80.0		dutil = 63.0	
Alt = 80.0 Vol = .512	-----	TensLimE= 225.0	AnguloX= 87.7
Xpil= 30.0 Ypil= 30.0	FE= 37.9	TensEst = 50.7	AnguloY= 87.7
Formas: 2.56 m2	F1= 37.9		

| ARMADURAS [cm2,cm] | Peso Próprio: 1.3 tf (x1) |

| Prin.X: 1.2 = 3 {10.0 C/ 25.0 Prin.Y: 1.2 = 3 {10.0 C/ 25.0 |
 | AsXfdZ: 3.3 AsYfdZ: 3.3 |
 | AsCin : .0 Laterl: 1.6 = 6 { 6.3 C/ 12.5 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	36.62	.00	.00
Caso 2:	34.65	.00	.00
Caso 3:	34.65	.00	.00
Caso 4:	32.13	.00	.00
Caso 5:	34.65	.00	.00
Caso 6:	34.65	.00	.00

BLOCO: 2 - B2 Retang. (1x)

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 60.0	FN= 68.1	TensLimP= 589.3	
		TensPil = 127.2	
Xbl = 100.0 Ybl = 100.0		dutil = 72.0	
Alt = 90.0 Vol = .900	-----	TensLimE= 225.0	AnguloX= 84.1
Xpil= 30.0 Ypil= 30.0	FE= 70.4	TensEst = 42.3	AnguloY= 84.1
Formas: 3.60 m2	F1= 70.4		

| ARMADURAS [cm2,cm] | Peso Próprio: 2.3 tf (x1) |

| Prin.X: 1.5 = 4 {10.0 C/ 25.0 Prin.Y: 1.5 = 4 {10.0 C/ 25.0 |
 | AsXfdZ: 7.4 AsYfdZ: 7.4 |
 | AsCin : .0 Laterl: 3.7 = 6 {10.0 C/ 15.0 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	68.13	.00	.00
Caso 2:	67.70	.00	.00
Caso 3:	67.70	.00	.00
Caso 4:	65.98	.00	.00
Caso 5:	67.70	.00	.00
Caso 6:	67.70	.00	.00

BLOCO: 3 - B3 Retang. (1x)

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 60.0	FN= 63.8	TensLimP= 589.3	
		TensPil = 119.2	
Xbl = 100.0 Ybl = 100.0		dutil = 72.0	
Alt = 90.0 Vol = .900	-----	TensLimE= 225.0	AnguloX= 84.1
Xpil= 30.0 Ypil= 30.0	FE= 66.1	TensEst = 39.7	AnguloY= 84.1
Formas: 3.60 m2	F1= 66.1		

ARMADURAS [cm2,cm] | Peso Próprio: 2.3 tf (x1) |

Prin.X: 1.5 = 4 {10.0 C/ 25.0 Prin.Y: 1.5 = 4 {10.0 C/ 25.0 |

AsXfdZ: 7.0 AsYfdZ: 7.0 |

AsCin : .0 Laterl: 3.5 = 7 { 8.0 C/ 12.5 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	63.83	.00	.00
Caso 2:	63.41	.00	.00
Caso 3:	63.41	.00	.00
Caso 4:	61.81	.00	.00
Caso 5:	63.41	.00	.00
Caso 6:	63.41	.00	.00

BLOCO: 4 - B4 Retang. (1x)

GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 40.0 | FN= 36.9 | TensLimP= 476.2 |

TensPil = 68.8 |

Xbl = 80.0 Ybl = 80.0 | dutil = 63.0 |

Alt = 80.0 Vol = .512 | TensLimE= 225.0 | AnguloX= 87.7 |

Xpil= 30.0 Ypil= 30.0 | FE= 38.1 | TensEst = 51.1 | AnguloY= 87.7 |

Formas: 2.56 m2 | F1= 38.1 |

ARMADURAS [cm2,cm] | Peso Próprio: 1.3 tf (x1) |

Prin.X: 1.2 = 3 {10.0 C/ 25.0 Prin.Y: 1.2 = 3 {10.0 C/ 25.0 |

AsXfdZ: 3.3 AsYfdZ: 3.3 |

AsCin : .0 Laterl: 1.6 = 6 { 6.3 C/ 12.5 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	36.87	.00	.00
Caso 2:	35.06	.00	.00
Caso 3:	35.06	.00	.00
Caso 4:	32.43	.00	.00
Caso 5:	35.06	.00	.00
Caso 6:	35.06	.00	.00

BLOCO: 5 - B5 Retang. (1x)

GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 50.0 | FN= 47.0 | TensLimP= 535.7 |

TensPil = 87.7 |

Xbl = 90.0 Ybl = 90.0 | dutil = 63.0 |

Alt = 80.0 Vol = .648 | TensLimE= 225.0 | AnguloX= 85.5 |

Xpil= 30.0 Ypil= 30.0 | FE= 48.6 | TensEst = 41.9 | AnguloY= 85.5 |

Formas: 2.88 m2 | F1= 48.6 |

ARMADURAS [cm2,cm] | Peso Próprio: 1.6 tf (x1) |

Prin.X: 1.3 = 4 {10.0 C/ 25.0 Prin.Y: 1.3 = 4 {10.0 C/ 25.0 |

AsXfdZ: 5.0 AsYfdZ: 5.0 |

AsCin : .0 Laterl: 2.5 = 5 { 8.0 C/ 15.0 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	47.00	.00	.00
Caso 2:	46.93	.00	.00
Caso 3:	46.93	.00	.00
Caso 4:	45.69	.00	.00
Caso 5:	46.93	.00	.00

Caso 6: 46.93 .00 .00

BLOCO: 6 - B6

Retang. (1x)

```

-----
| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |
-----
| Estacas= 1 fi = 40.0 | FN= 31.7 | TensLimP= 589.3 | |
| | | TensPil = 533.2 | |
| Xbl = 80.0 Ybl = 80.0 | | dutil = 63.0 |
| Alt = 80.0 Vol = .512 |-----| TensLimE= 225.0 | AnguloX= 81.0 |
| Xpil= .0 Ypil= .0 | FE= 33.0 | TensEst = 45.3 | AnguloY= 81.0 |
| Formas: 2.56 m2 | F1= 33.0 | |
-----
| ARMADURAS [cm2,cm] | Peso Próprio: 1.3 tf (x1) |
-----
| Prin.X: 1.2 = 3 {10.0 C/ 25.0 Prin.Y: 1.2 = 3 {10.0 C/ 25.0 |
| AsXfdZ: 4.0 AsYfdZ: 4.0 |
| AsCin : .0 Laterl: 2.0 = 4 { 8.0 C/ 20.0 |
-----

```

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	31.74	.00	.00
Caso 2:	31.56	.00	.00
Caso 3:	31.56	.00	.00
Caso 4:	29.53	.00	.00
Caso 5:	31.56	.00	.00
Caso 6:	31.56	.00	.00

BLOCO: 7 - B7

Retang. (1x)

```

-----
| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |
-----
| Estacas= 1 fi = 40.0 | FN= 28.8 | TensLimP= 589.3 | |
| | | TensPil = 484.6 | |
| Xbl = 80.0 Ybl = 80.0 | | dutil = 63.0 |
| Alt = 80.0 Vol = .512 |-----| TensLimE= 225.0 | AnguloX= 81.0 |
| Xpil= .0 Ypil= .0 | FE= 30.1 | TensEst = 41.3 | AnguloY= 81.0 |
| Formas: 2.56 m2 | F1= 30.1 | |
-----
| ARMADURAS [cm2,cm] | Peso Próprio: 1.3 tf (x1) |
-----
| Prin.X: 1.2 = 3 {10.0 C/ 25.0 Prin.Y: 1.2 = 3 {10.0 C/ 25.0 |
| AsXfdZ: 3.6 AsYfdZ: 3.6 |
| AsCin : .0 Laterl: 1.8 = 6 { 6.3 C/ 12.5 |
-----

```

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	28.84	.00	.00
Caso 2:	28.65	.00	.00
Caso 3:	28.65	.00	.00
Caso 4:	26.77	.00	.00
Caso 5:	28.65	.00	.00
Caso 6:	28.65	.00	.00

BLOCO: 8 - B8

Retang. (1x)

```

-----
| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |
-----
| Estacas= 1 fi = 50.0 | FN= 46.8 | TensLimP= 535.7 | |
| | | TensPil = 87.3 | |
| Xbl = 90.0 Ybl = 90.0 | | dutil = 63.0 |
| Alt = 80.0 Vol = .648 |-----| TensLimE= 225.0 | AnguloX= 85.5 |
| Xpil= 30.0 Ypil= 30.0 | FE= 48.4 | TensEst = 41.7 | AnguloY= 85.5 |
| Formas: 2.88 m2 | F1= 48.4 | |
-----
| ARMADURAS [cm2,cm] | Peso Próprio: 1.6 tf (x1) |
-----

```

```

Prin.X: 1.3 = 4 {10.0 C/ 25.0 Prin.Y: 1.3 = 4 {10.0 C/ 25.0 |
AsXfdZ: 5.0 AsYfdZ: 5.0 |
AsCin : .0 Laterl: 2.5 = 5 { 8.0 C/ 15.0 |

```

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos:	6	N	Mx	My [tf,m]
Caso 1:	46.77	.00	.00	
Caso 2:	46.68	.00	.00	
Caso 3:	46.68	.00	.00	
Caso 4:	45.40	.00	.00	
Caso 5:	46.68	.00	.00	
Caso 6:	46.68	.00	.00	

BLOCO: 9 - B9 Retang. (1x)

```

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

```

```

| Estacas= 1 fi = 40.0 | FN= 36.8 | TensLimP= 476.2 |
| | TensPil = 68.7 |
| Xbl = 80.0 Ybl = 80.0 | | dutil = 63.0 |
| Alt = 80.0 Vol = .512 |-----| TensLimE= 225.0 | AnguloX= 87.7 |
| Xpil= 30.0 Ypil= 30.0 | FE= 38.1 | TensEst = 51.0 | AnguloY= 87.7 |
| Formas: 2.56 m2 | F1= 38.1 |

```

```

| ARMADURAS [cm2,cm] | Peso Próprio: 1.3 tf (x1) |

```

```

Prin.X: 1.2 = 3 {10.0 C/ 25.0 Prin.Y: 1.2 = 3 {10.0 C/ 25.0 |
AsXfdZ: 3.3 AsYfdZ: 3.3 |
AsCin : .0 Laterl: 1.6 = 6 { 6.3 C/ 12.5 |

```

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos:	6	N	Mx	My [tf,m]
Caso 1:	36.81	.00	.00	
Caso 2:	34.87	.00	.00	
Caso 3:	34.87	.00	.00	
Caso 4:	32.33	.00	.00	
Caso 5:	34.87	.00	.00	
Caso 6:	34.87	.00	.00	

BLOCO: 10 - B10 Retang. (1x)

```

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

```

```

| Estacas= 1 fi = 60.0 | FN= 68.5 | TensLimP= 589.3 |
| | TensPil = 127.8 |
| Xbl = 100.0 Ybl = 100.0 | | dutil = 72.0 |
| Alt = 90.0 Vol = .900 |-----| TensLimE= 225.0 | AnguloX= 84.1 |
| Xpil= 30.0 Ypil= 30.0 | FE= 70.7 | TensEst = 42.5 | AnguloY= 84.1 |
| Formas: 3.60 m2 | F1= 70.7 |

```

```

| ARMADURAS [cm2,cm] | Peso Próprio: 2.3 tf (x1) |

```

```

Prin.X: 1.5 = 4 {10.0 C/ 25.0 Prin.Y: 1.5 = 4 {10.0 C/ 25.0 |
AsXfdZ: 7.4 AsYfdZ: 7.4 |
AsCin : .0 Laterl: 3.7 = 6 {10.0 C/ 15.0 |

```

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos:	6	N	Mx	My [tf,m]
Caso 1:	68.47	.00	.00	
Caso 2:	68.04	.00	.00	
Caso 3:	68.04	.00	.00	
Caso 4:	66.30	.00	.00	
Caso 5:	68.04	.00	.00	
Caso 6:	68.04	.00	.00	

BLOCO: 11 - B11

Retang. (1x)

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 60.0	FN= 64.5	TensLimP= 589.3	
	TensPil = 120.3		
Xbl = 100.0 Ybl = 100.0		dutil = 72.0	
Alt = 90.0 Vol = .900	-----	TensLimE= 225.0	AnguloX= 84.1
Xpil= 30.0 Ypil= 30.0	FE= 66.7	TensEst = 40.1	AnguloY= 84.1
Formas: 3.60 m2	F1= 66.7		

| ARMADURAS [cm2,cm] | Peso Próprio: 2.3 tf (x1) |

| Prin.X: 1.5 = 4 {10.0 C/ 25.0 Prin.Y: 1.5 = 4 {10.0 C/ 25.0 |
 | AsXfdZ: 7.0 AsYfdZ: 7.0 |
 | AsCin : .0 Laterl: 3.5 = 7 { 8.0 C/ 12.5 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	64.46	.00	.00
Caso 2:	64.04	.00	.00
Caso 3:	64.04	.00	.00
Caso 4:	62.40	.00	.00
Caso 5:	64.04	.00	.00
Caso 6:	64.04	.00	.00

BLOCO: 12 - B12

Retang. (1x)

| GEOMETRIA[cm,m3] | CARGAS[tf,m] | TENSOES[kgf/cm2] | VERIF.[cm,graus] |

Estacas= 1 fi = 40.0	FN= 34.6	TensLimP= 476.2	
	TensPil = 64.6		
Xbl = 80.0 Ybl = 80.0		dutil = 63.0	
Alt = 80.0 Vol = .512	-----	TensLimE= 225.0	AnguloX= 87.7
Xpil= 30.0 Ypil= 30.0	FE= 35.9	TensEst = 48.1	AnguloY= 87.7
Formas: 2.56 m2	F1= 35.9		

| ARMADURAS [cm2,cm] | Peso Próprio: 1.3 tf (x1) |

| Prin.X: 1.2 = 3 {10.0 C/ 25.0 Prin.Y: 1.2 = 3 {10.0 C/ 25.0 |
 | AsXfdZ: 3.1 AsYfdZ: 3.1 |
 | AsCin : .0 Laterl: 1.5 = 5 { 6.3 C/ 15.0 |

- Armaduras para fendilhamento e cintamento detalhadas na armadura lateral.

Carregamentos: 6	N	Mx	My [tf,m]
Caso 1:	34.63	.00	.00
Caso 2:	32.67	.00	.00
Caso 3:	32.67	.00	.00
Caso 4:	30.20	.00	.00
Caso 5:	32.67	.00	.00
Caso 6:	32.67	.00	.00

Volume total de concreto: 7.97 m3.

Area total de formas: 35.52 m2.

----- LISTAGEM DOS CRITÉRIOS DE PROJETO DE BLOCOS -----

* Coeficientes *

GamaC = 1.40

GamaS = 1.15

GamaF = 1.40

GamaN = 1.20

Coefficiente de efeito Rusch = .90

Coefficiente de redução de altura útil = .90

----- CRITÉRIOS DE CÁLCULO E DETALHAMENTO -----

Cobrimento para pilares (cm) = 3.000
 Considerar seção do pilar: RETANGULAR
 FCK para ESTACAS (kgf/cm²) <= 180.00 (usado para cálc. de fctd_inf_est)
 Considerar Peso própr no dimens/detalhamento: SIM
 Número de bitolas p/ traspasse = 40.00
 Bitola da arm a partir da qual coloca raio de dobramento (mm) = 6
 Espacamento maximo fretagem 1 estaca (cm) = 15.00
 Lastro de concreto magro = 5.00
 Critério de altura de dobra: 1
 Valor mínimo p/ arm principal (cm²/m) = 1.50
 Valor min p/ arm suspensao ou malha (cm²/m) = 1.50
 Valor min p/ arm lateral ou de pele (cm²/m) = 1.50
 Valor min p/ arm de porta-estribo (cm²/m) = 1.50
 Critério de armadura lateral: 2
 Critério de armadura porta-estribo: 2

--- DIMENSÕES LIMITES ASSOCIADAS ÀS ESTACAS ---

Numero de dimensoes definidas = 8
 Const p/ determ dist em função dos diâmetros da estaca = 25.00

 | diam lim sup estaca | dist lim inf borda est |

20.00	30.00	
25.00	35.00	
30.00	40.00	
35.00	45.00	
40.00	50.00	
45.00	55.00	
50.00	65.00	
60.00	75.00	

----- BLOCOS SOBRE 1 ESTACA -----

Porc p/ As da arm lateral-pele sobre area As calc = .00
 Coeficiente p/ tensao admissivel de compressao no concreto = 1.40
 Verificação de tensão última: NBR 6118 - 2003.
 Cálculo de Armaduras Principais: SIM