

MEMORIAL DE CÁLCULO	ESTRUTURA
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LOCAL:	UNIDADE:
Rua Santos, 300 Bairro: Vila Rodrigues Cidade: Catanduva / SP	SENAC CATANDUVA

MEMORIAL DE CÁLCULO SENAC CATANDUVA – SÃO PAULO



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MEMORIAL DE CÁLCULO

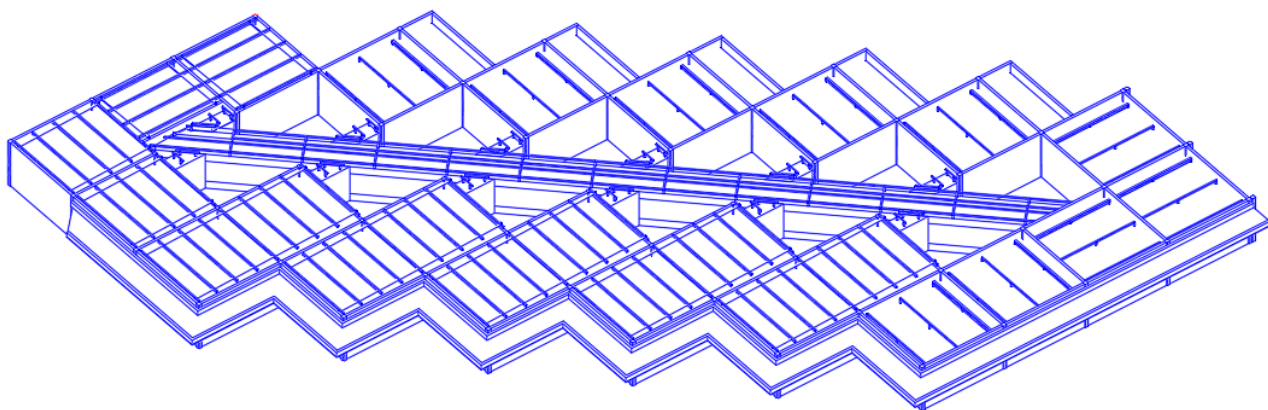
ESTRUTURA

1. OBJETIVO

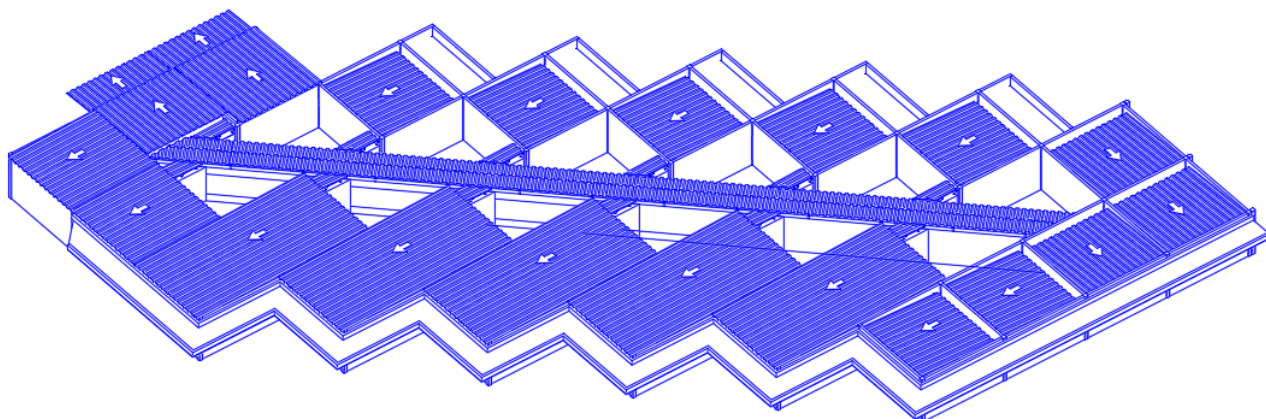
Esta Memória de Cálculo tem por objetivo apresentar o dimensionamento e cálculo estrutural da Cobertura da Unidade do SENAC CATANDUVA localizado na Rua Santos, 300 – Catanduva – SP.

Para detalhes construtivos, ver os projetos que trabalham em conjunto com essa memória de cálculo, listados abaixo:

- ESM_P01
- ESM_P02
- ESM_P03
- ESM_P04
- ESM_P05
- ESM_P06
- ESM_P07



VISTA TRIMÉTRICA – ESTRUTURA



VISTA TRIMÉTRICA – TELHAS

MEMORIAL DE CÁLCULO**ESTRUTURA****2. NORMAS TÉCNICAS**

Todos os cálculos estáticos, dimensionamentos estruturais e detalhamentos serão elaborados de acordo com as últimas edições e respectivos adendos/anexos dos seguintes códigos/normas, quando pertinente:

ABNT (ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS)

- NBR 117 – Cálculo e execução de estruturas de aço soldado;
- NBR 5584 – Perfis Estruturais soldados de aço-Padronização;
- NBR 6008/6009 – Perfis I e H de abas paralelas de aço laminado a quente-Padronização;
- NBR 6120 – Carga para Cálculo de Estruturas de Edificações;
- NBR 6123 – Forças devidas ao vento em edificações;
- NBR 6355 – Perfis Estruturais de aço formados a Frio-Padronização;
- NBR 8681 – Ações e segurança nas estruturas;
- NBR 8800 – Projeto e execução de Estruturas de Aço de Edifícios.
- NBR 14762 – Dimensionamento de Estruturas de Aço constituídas por perfis formado a frio.

AWS (AMERICAN WELDING SOCIETY)

- D1.1 – Código de Soldagem Estrutural.
- AWS-A 5.1 – Especificação para eletrodos de aço carbono, revestidos, para soldagem por arco elétrico.
- AWS-A 5.5 – Especificação para eletrodos de baixa liga, revestidos, para soldagem por arco submerso.
- AWS-A 5.17 – Especificação para eletrodos nus de aço carbono e fluxo, para soldagem por arco submerso.
- AWS-A 5.18 – Especificação para eletrodos de aço carbono, para soldagem por arco elétrico com proteção gasosa

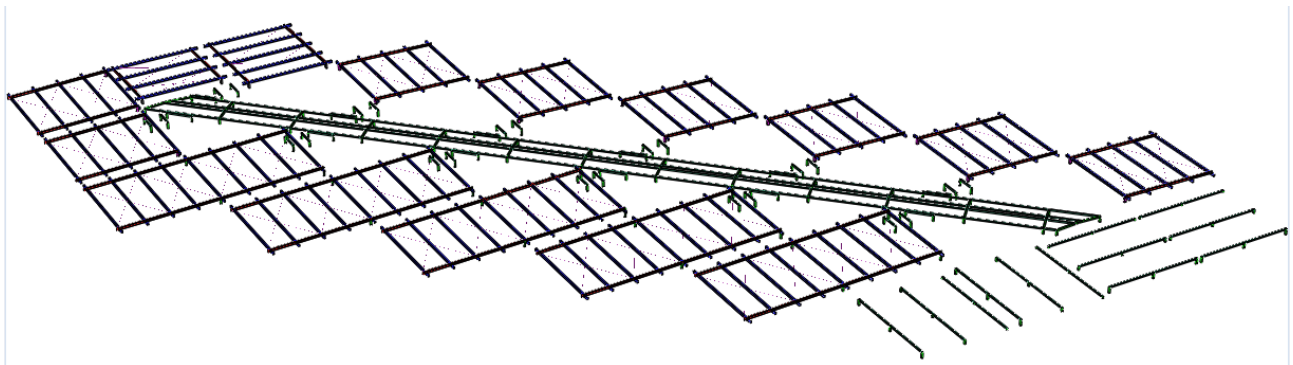
3. CARACTERÍSTICAS DO AÇO A SER EMPREGADO:

Item	Descrição	Especificação
1	Perfis Laminados tipo W, galvanizados a fogo	ASTM A572 Gr 50
2	Perfis Dobrados	ASTM A570 Gr 36
3	Chumbadores Químicos Hilti, com barras, porcas e arruelas galvanizadas	Hilti
4	Parafusos Galvanizados a quente	ASTM A325
5	Eletrodos	E70XX
6	Chapas Metálicas	ASTM A36

Soldas deverão ser executadas e inspecionadas conforme requisitos das especificações AWS - Structural Welding Code D1.1/96

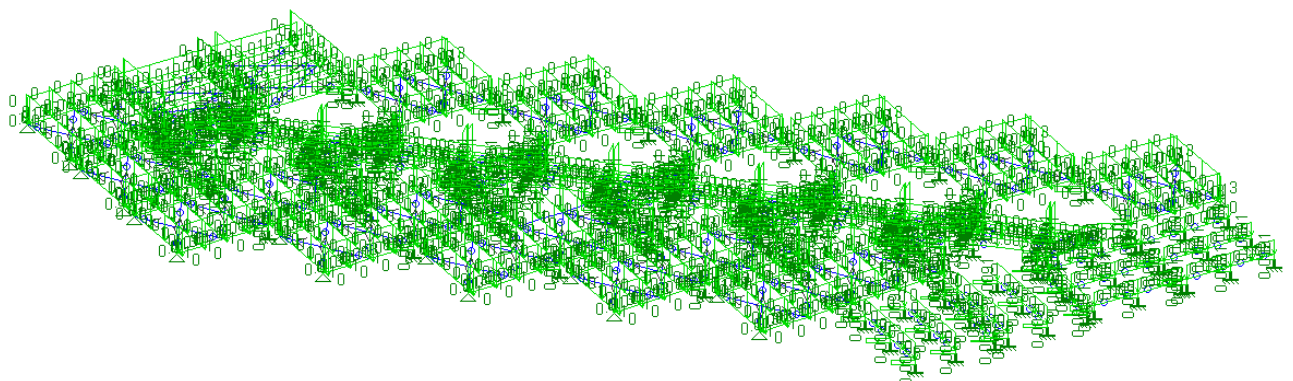
MEMORIAL DE CÁLCULO**ESTRUTURA****4. PROGRAMAS DE CÁLCULO**

Para a análise, a estrutura metálica foi modelada no software de análise estrutural **STRAP 2023** onde foram considerados todos os carregamentos atuantes levantados através dos documentos disponibilizados.

5. DIMENSIONAMENTO DA COBERTURA**TRIMÉTRICO****5.1. CARREGAMENTOS**

LISTA DE CARREGAMENTOS		
Nº	Nº nos result.	nome
1	1	PP
2	2	CP
3	3	AC
4	4	VT0

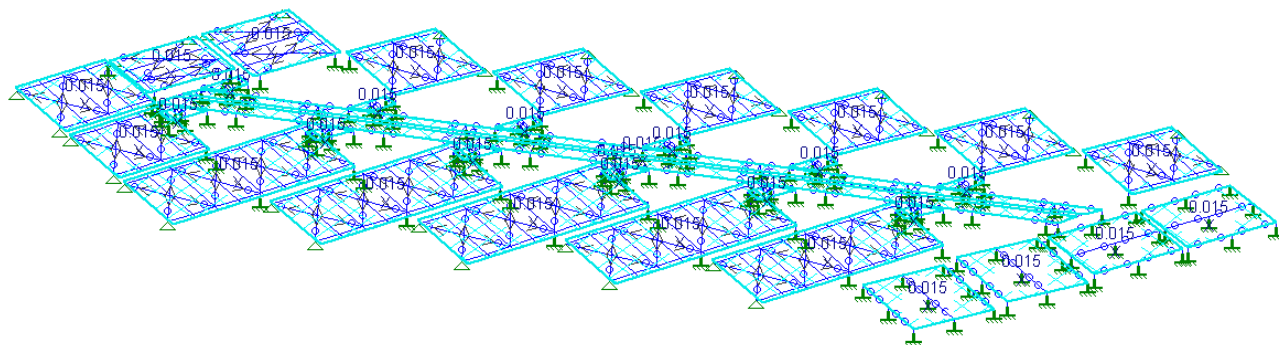
PP – PESO PRÓPRIO: Peso das barras definido pela geometria dos perfis.



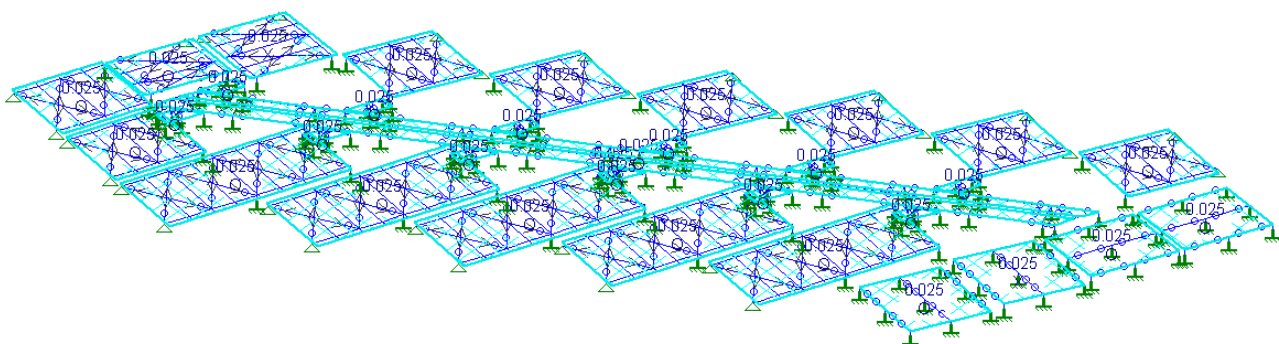
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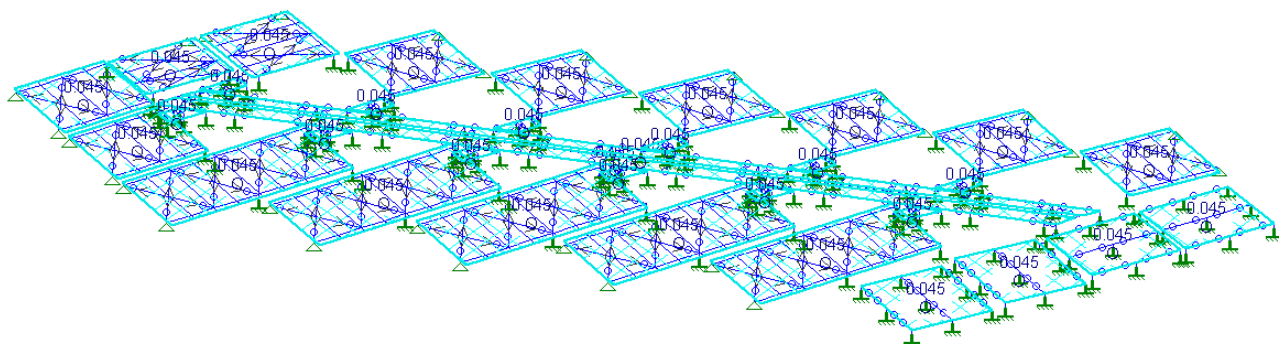
CP – CARGA PERMANENTE : 15 kg/m²



AC – CARGA ACIDENTAL (NORMA) : 25 kg/m²



VT 0 – CARGA DEVIDO AO VENTO (DIREÇÃO 0°) : 55 kg/m²



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Cargas devidas ao vento em edificações - NBR6123/88

Fator Topográfico : Terreno plano ou fracamente acidentado

Fator S_1 : 1.00

Fator de rugosidade e dimensões da edificação

Categoria "IV" Terrenos cobertos por obstáculos numerosos e poucos espaçados, em zona florestal, industrial ou urbanizada. A cota média do topo dos obstáculos é considerada igual a 10m.

Classe "C" Toda edificação ou parte de edificação para a qual a maior dimensão horizontal ou vertical exceda 50 metros.

Altura da edificação : 5.70 (h < 30m)

Fator S_2 : 0.74

Fator Estatístico

Grupo "2" Edificações para hotéis e residências. Edificações para comércio e indústria com alto fator de ocupação.

Fator S_3 : 1.00

Velocidade Básica (V_0) : 40

 [Abrir Mapa com Isoplefas](#)

Velocidade Característica (V_k) : 29.60

Pressão de Obstrução (q) : 54.75

X Sair OK

CARGA DE VENTO

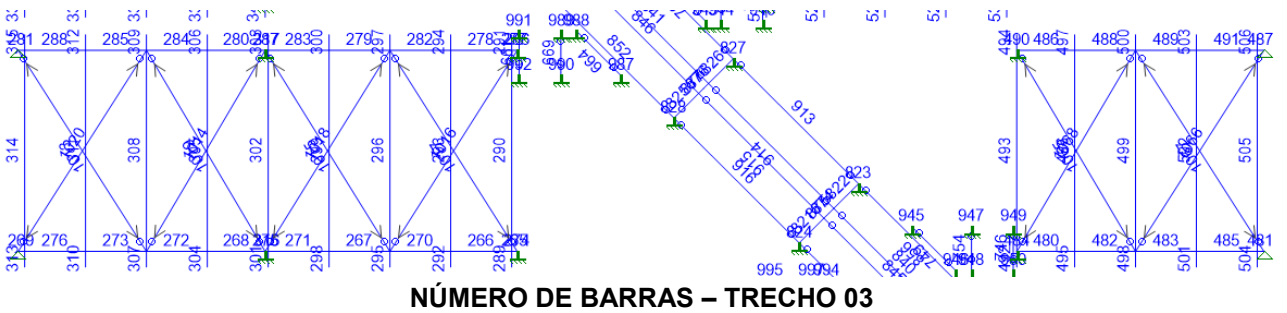
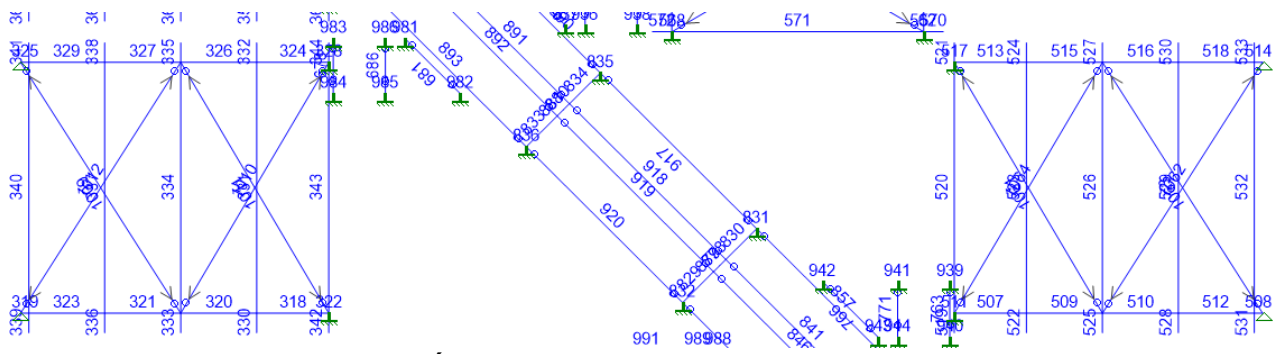
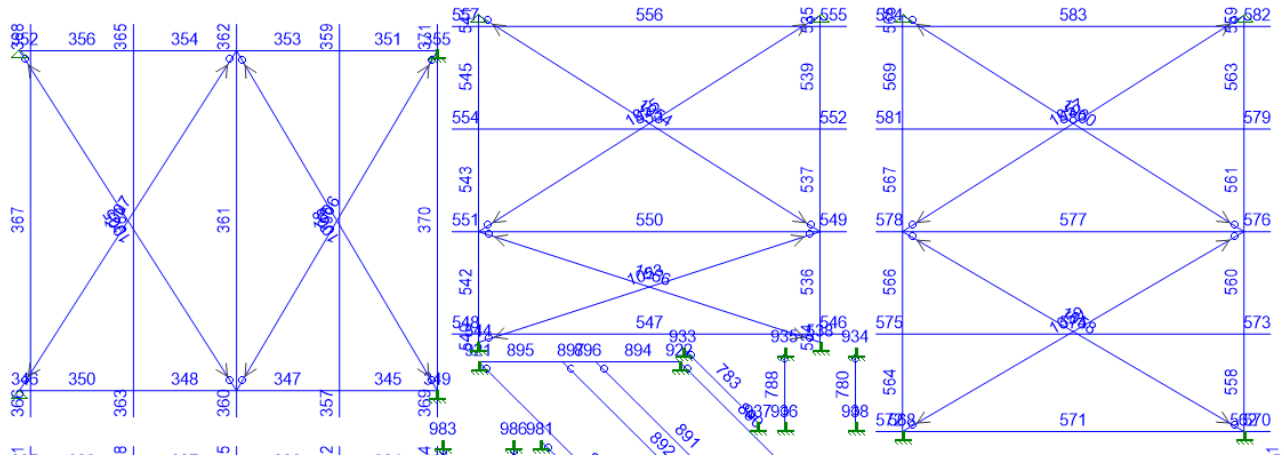
5.2. COMBINAÇÕES

Tabela de Combinações				
Comb.				
1	1 * 1.00	+ 2 * 1.00	+ 3 * 1.00	
2	1 * 1.00	+ 2 * 1.00	+ 3 * 1.00	+ 4 * 1.00
3	1 * 1.00	+ 2 * 1.00	+ 4 * 1.00	

MEMORIAL DE CÁLCULO

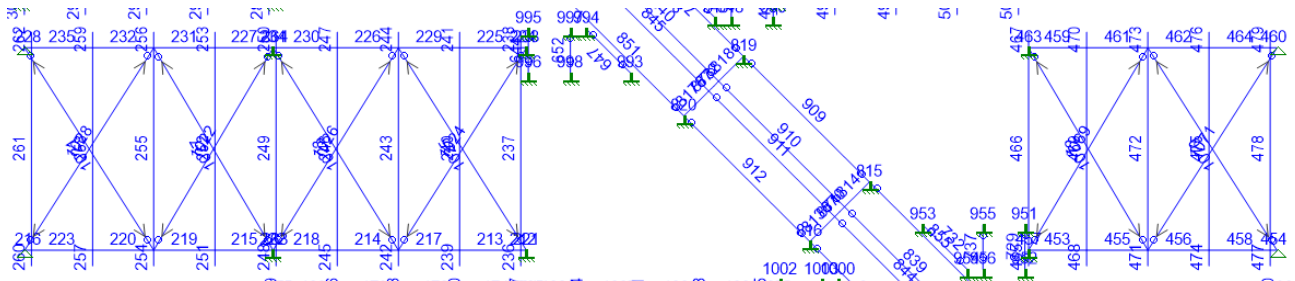
ESTRUTURA

5.3. NÚMERO DAS BARRAS

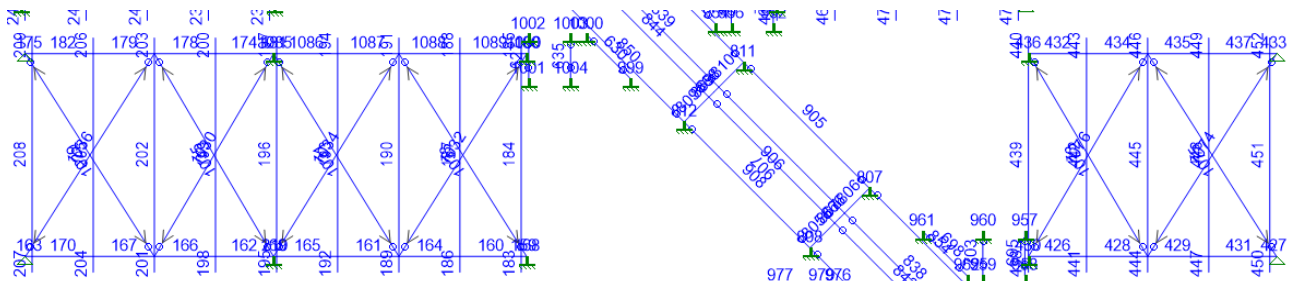


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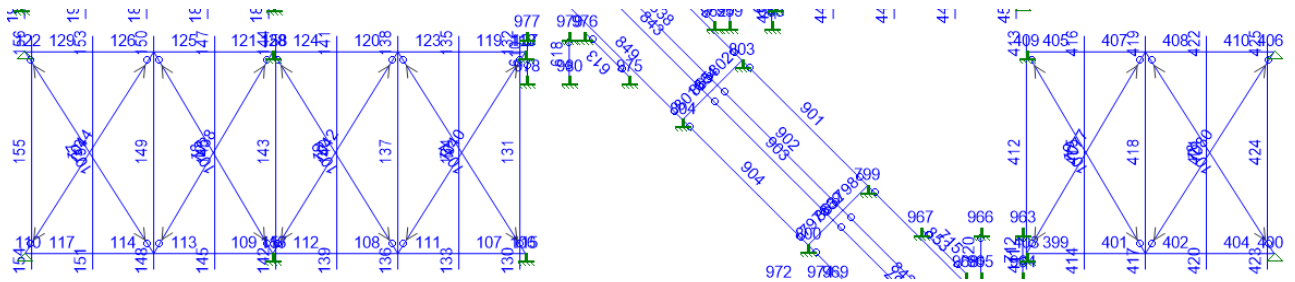
ESTRUTURA



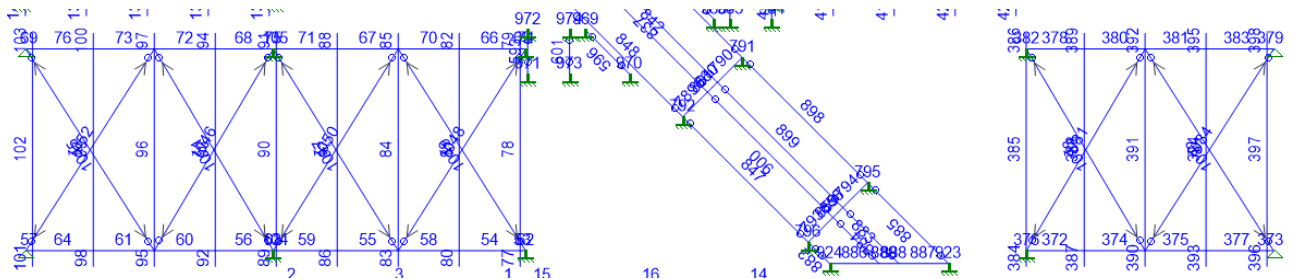
NÚMERO DE BARRAS – TRECHO 04



NÚMERO DE BARRAS – TRECHO 05

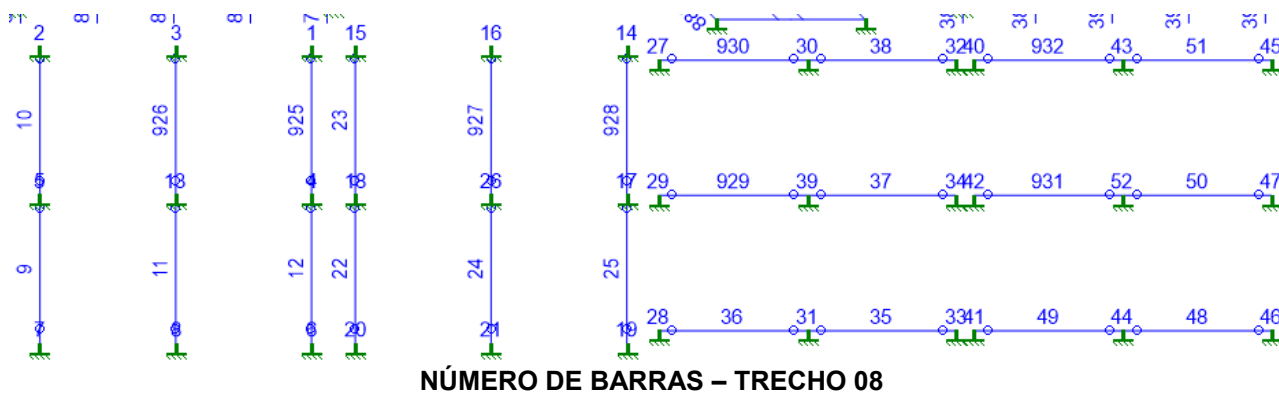


NÚMERO DE BARRAS – TRECHO 06

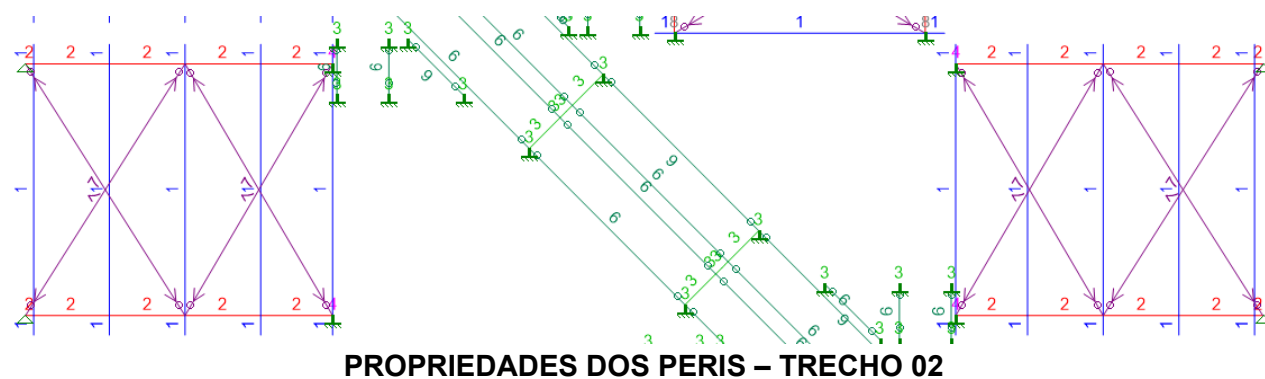
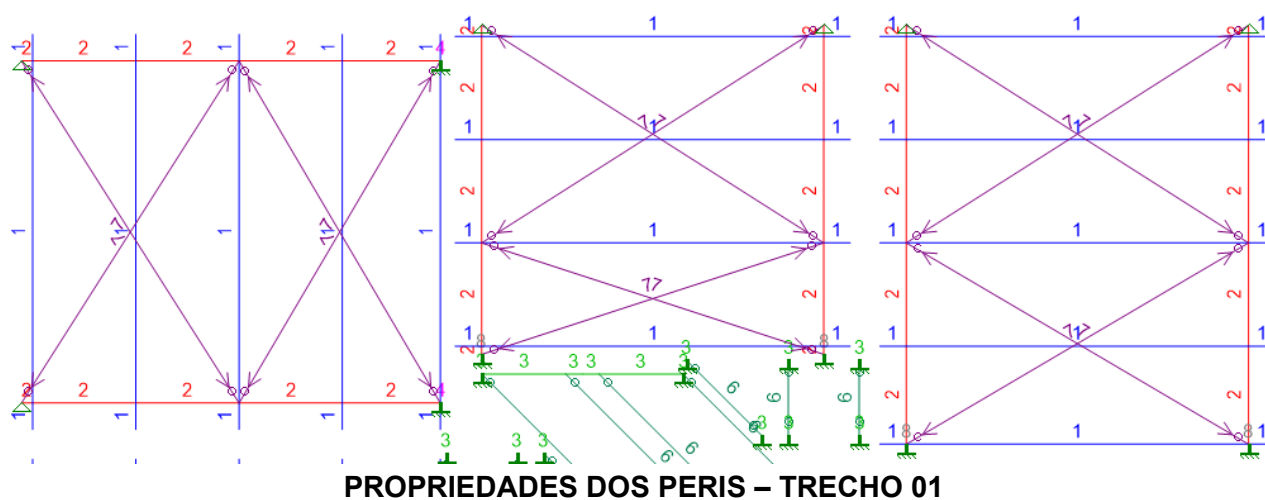


NÚMERO DE BARRAS – TRECHO 07

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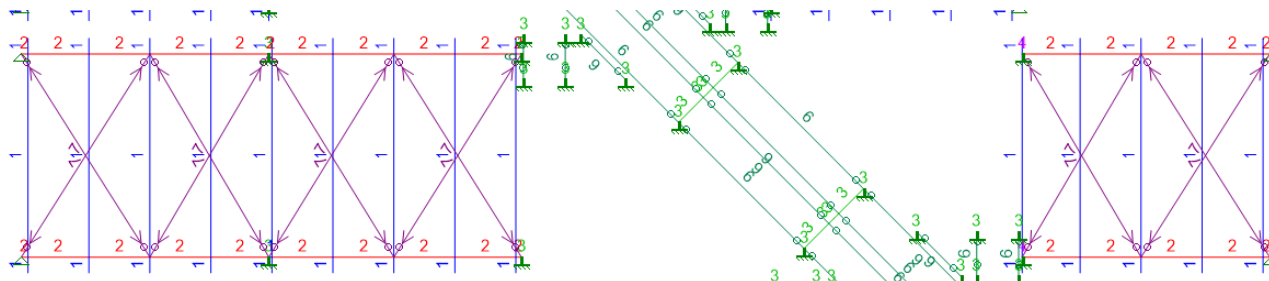


5.4. PROPRIEDADES DOS PERFIS

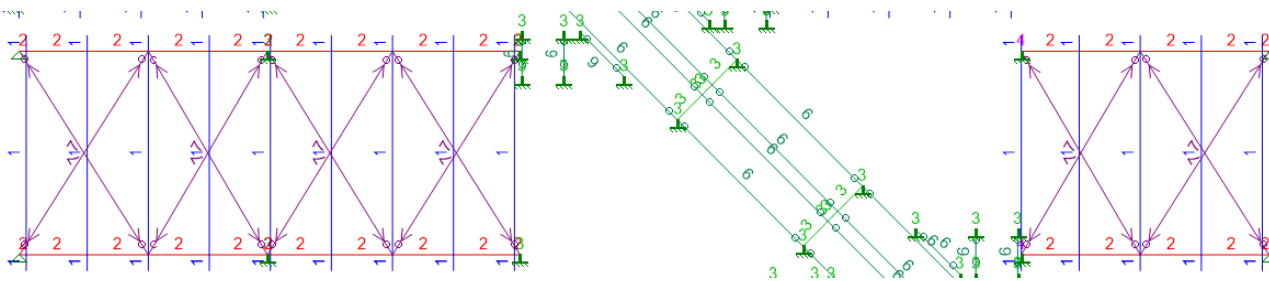


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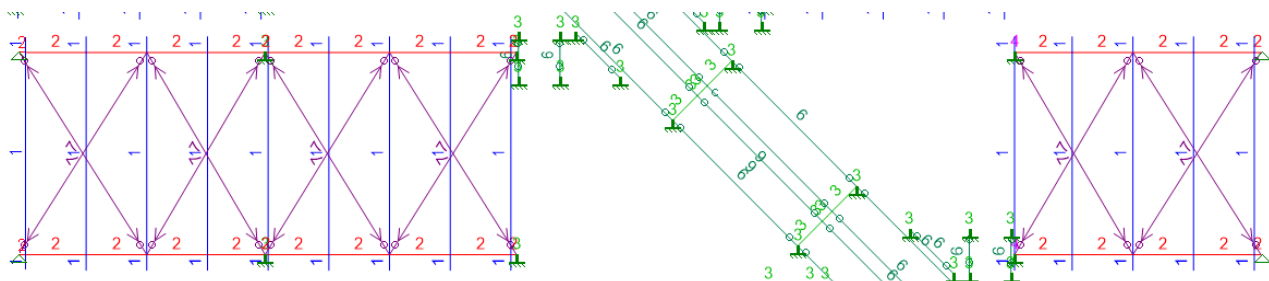
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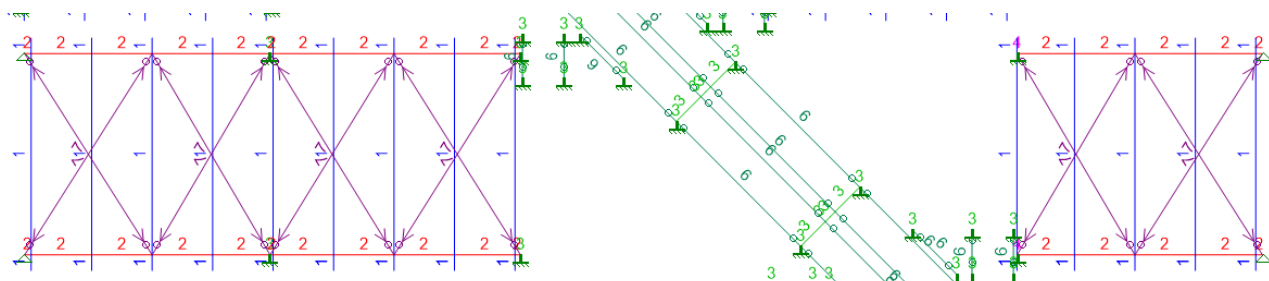
PROPRIEDADES DOS PERIS – TRECHO 03



PROPRIEDADES DOS PERIS – TRECHO 04



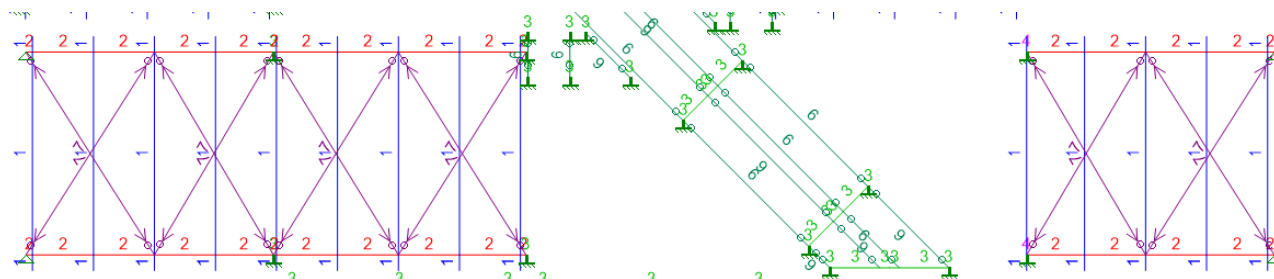
PROPRIEDADES DOS PERIS – TRECHO 05



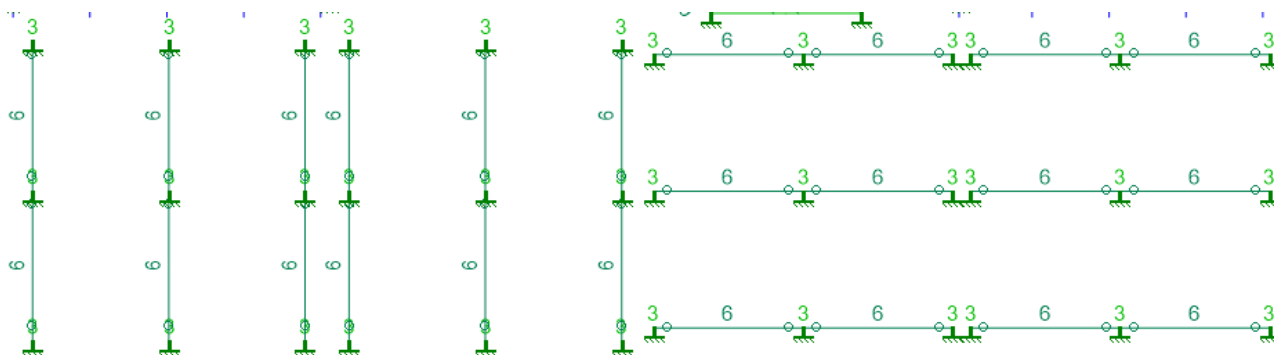
PROPRIEDADES DOS PERIS – TRECHO 06

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PROPRIEDADES DOS PERIS – TRECHO 07



PROPRIEDADES DOS PERIS – TRECHO 08

Nº	Descrição	Direção	Material	Área
1	Tubo ret 150x100x2.66	maior (I2>I3)	STEE	13.017
2	W 150x13.0	maior (I2>I3)	STEE	16.6
3	Tubo ret 100x100x3.00	maior (I2>I3)	STEE	11.64
4	Tubo ret 150x100x3.00	maior (I2>I3)	STEE	14.64
5	Tubo ret 150x150x4.76	maior (I2>I3)	STEE	27.654
6	Tubo ret 100x75x2.25	maior (I2>I3)	STEE	7.6725
7	Tubo 15.8x7.9	maior (I2>I3)	STEE	1.9607
8	Tubo ret 150x100x3.00	menor (I3>I2)	STEE	14.64

TABELA DE PROPRIEDADES DOS PERFIS

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5.5. DIMENSIONAMENTO

Resultados Gerais										
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT	
1	Tubo re100x100x3.00	2	9999	3	0.01	MI	0.00	0.00	0.00	0.01
2	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.00	0.01	0.01	0.01
3	Tubo re100x100x3.00	2	9999	6	0.02	MJ	0.00	0.01	0.01	0.02
4	Tubo re100x100x3.00	2	9999	3	0.02	MI	0.00	0.00	0.00	0.02
5	Tubo re100x100x3.00	2	9999	10	0.02	MJ	0.00	0.01	0.01	0.02
6	Tubo re100x100x3.00	2	9999	3	0.01	MI	0.00	0.00	0.00	0.01
7	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.00	0.01	0.01	0.01
8	Tubo re100x100x3.00	2	9999	6	0.02	MJ	0.00	0.01	0.01	0.02
9	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
10	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
11	Tubo ret100x75x2.25	2	268	110	0.00	MJ	0.07	0.58	0.58	0.63
						MI	0.01	0.05	0.00	
12	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
13	Tubo re100x100x3.00	2	9999	6	0.03	MJ	0.01	0.01	0.01	0.03
14	Tubo re100x100x3.00	1	9999	3	-0.01	MI	0.00	0.00	0.00	0.01
15	Tubo re100x100x3.00	1	9999	10	-0.01	MI	0.00	0.00	0.00	0.01
16	Tubo re100x100x3.00	1	9999	6	-0.01	MI	0.00	0.00	0.00	0.01
17	Tubo re100x100x3.00	1	9999	3	-0.01	MI	0.00	0.00	0.00	0.01
18	Tubo re100x100x3.00	1	9999	10	-0.01	MJ	0.00	0.01	0.01	0.01
19	Tubo re100x100x3.00	1	9999	3	-0.01	MI	0.00	0.00	0.00	0.01
20	Tubo re100x100x3.00	1	9999	10	-0.01	MI	0.00	0.00	0.00	0.01
21	Tubo re100x100x3.00	1	9999	6	-0.01	MI	0.00	0.00	0.00	0.01
22	Tubo ret100x75x2.25	1	650	110	0.00	MJ	0.03	0.24	0.24	0.25
						MI	0.00	0.02	0.00	
23	Tubo ret100x75x2.25	1	650	110	0.00	MJ	0.03	0.24	0.24	0.25
						MI	0.00	0.02	0.00	
24	Tubo ret100x75x2.25	1	340	110	0.00	MJ	0.06	0.46	0.46	0.48
						MI	0.00	0.03	0.00	
25	Tubo ret100x75x2.25	1	650	110	0.00	MJ	0.03	0.24	0.24	0.25
						MI	0.00	0.02	0.00	
26	Tubo re100x100x3.00	1	9999	6	-0.03	MJ	0.00	0.01	0.01	0.02
27	Tubo re100x100x3.00	2	9999	3	0.01	MI	0.00	0.00	0.00	0.01
28	Tubo re100x100x3.00	2	9999	10	0.01	MI	0.00	0.01	0.00	0.01
29	Tubo re100x100x3.00	2	9999	6	0.02	MI	0.00	0.01	0.00	0.02
30	Tubo re100x100x3.00	2	9999	3	0.02	MI	0.00	0.00	0.00	0.02
31	Tubo re100x100x3.00	2	9999	10	0.02	MI	0.00	0.01	0.00	0.02
32	Tubo re100x100x3.00	2	9999	3	0.01	MI	0.00	0.00	0.00	0.01
33	Tubo re100x100x3.00	2	9999	10	0.01	MI	0.00	0.01	0.00	0.01
34	Tubo re100x100x3.00	2	9999	6	0.02	MI	0.00	0.01	0.00	0.02
35	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
36	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
37	Tubo ret100x75x2.25	2	268	110	0.00	MJ	0.07	0.58	0.58	0.63
						MI	0.01	0.05	0.00	
38	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
39	Tubo re100x100x3.00	2	9999	6	0.03	MI	0.01	0.01	0.00	0.03

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40	Tubo re100x100x3.00	2	9999	3	0.01	MI	0.00	0.00	0.00	0.01
41	Tubo re100x100x3.00	2	9999	10	0.01	MI	0.00	0.01	0.00	0.01
42	Tubo re100x100x3.00	2	9999	6	0.02	MI	0.00	0.01	0.00	0.02
43	Tubo re100x100x3.00	2	9999	3	0.02	MI	0.00	0.00	0.00	0.02
44	Tubo re100x100x3.00	2	9999	10	0.02	MI	0.00	0.01	0.00	0.02
Resultados Gerais										
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT	
45	Tubo re100x100x3.00	2	9999	3	0.01	MI	0.00	0.00	0.00	0.01
46	Tubo re100x100x3.00	2	9999	10	0.01	MI	0.00	0.01	0.00	0.01
47	Tubo re100x100x3.00	2	9999	6	0.02	MI	0.00	0.01	0.00	0.02
48	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
49	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
50	Tubo ret100x75x2.25	2	268	110	0.00	MJ	0.07	0.58	0.58	0.63
						MI	0.01	0.05	0.00	
51	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30
						MI	0.00	0.02	0.00	
52	Tubo re100x100x3.00	2	9999	6	0.03	MI	0.01	0.01	0.00	0.03
53	W 150x13.0	2	682	165	0.02	MJ	0.08	0.40	0.40	0.41
						MI	0.00	0.01	0.00	
56	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51
						MI	0.00	0.01	0.00	
62	Tubo re100x100x3.00	2	2737	16	0.02	MJ	0.15	0.62	0.62	0.64
						MI	0.00	0.01	0.00	
63	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.12	0.12	0.17
						MI	0.01	0.02	0.00	
69	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51
						MI	0.00	0.01	0.00	
74	Tubo re100x100x3.00	2	2737	16	0.02	MJ	0.15	0.62	0.62	0.64
						MI	0.00	0.01	0.00	
75	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.12	0.12	0.17
						MI	0.00	0.01	0.00	
79	Tubo re150x100x2.66	2	856	161	0.00	MI	0.01	0.02	0.00	0.17
						MJ	0.02	0.16	0.16	
80	Tubo re150x100x2.66	2	370	161	0.00	MI	0.00	0.01	0.00	0.38
						MJ	0.04	0.37	0.37	
						MI	0.00	0.01	0.00	
85	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39
						MI	0.00	0.01	0.00	
86	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38
						MI	0.00	0.01	0.00	
91	Tubo re150x100x2.66	2	385	161	0.00	MJ	0.04	0.35	0.35	0.37
						MI	0.00	0.01	0.00	
92	Tubo re150x100x2.66	2	370	161	0.00	MI	0.00	0.01	0.00	0.38
						MJ	0.04	0.37	0.37	
97	Tubo re150x100x2.66	2	369	161	-0.01	MI	0.00	0.01	0.00	0.39
						MJ	0.04	0.37	0.37	
						MI	0.00	0.01	0.00	
98	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38
						MI	0.00	0.01	0.00	
103	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17
						MI	0.00	0.01	0.00	
105	W 150x13.0	2	682	165	0.02	MJ	0.08	0.40	0.40	0.41
						MI	0.00	0.01	0.00	
110	W 150x13.0	2	419	166	0.02	MI	0.00	0.01	0.00	0.51
						MJ	0.06	0.43	0.49	
						MI	0.00	0.01	0.00	

MEMORIAL DE CÁLCULO	ESTRUTURA
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115	Tubo re100x100x3.00	2	2737	16	0.02	MJ	0.15	0.62	0.62	0.64	
						MI	0.00	0.01	0.00		
116	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.12	0.12	0.17	
						MI	0.01	0.02	0.00		
122	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51	
						MI	0.00	0.01	0.00		
127	Tubo re100x100x3.00	2	2737	16	0.02	MJ	0.15	0.62	0.62	0.64	
						MI	0.00	0.01	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES						Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT		
128	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.12	0.12	0.17	
						MI	0.01	0.02	0.00		
130	Tubo re150x100x2.66	2	856	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
135	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
136	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
141	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
142	Tubo re150x100x2.66	2	385	161	0.00	MJ	0.04	0.35	0.35	0.37	
						MI	0.00	0.01	0.00		
147	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
148	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
153	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
154	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
157	W 150x13.0	2	682	165	0.02	MJ	0.08	0.40	0.40	0.41	
						MI	0.00	0.01	0.00		
158	W 150x13.0	2	682	165	0.02	MJ	0.08	0.40	0.40	0.41	
						MI	0.00	0.01	0.00		
159	W 150x13.0	2	679	165	0.02	MJ	0.08	0.40	0.40	0.41	
						MI	0.00	0.01	0.00		
162	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51	
						MI	0.00	0.01	0.00		
168	Tubo re100x100x3.00	2	2724	16	0.02	MJ	0.15	0.63	0.63	0.64	
						MI	0.00	0.01	0.00		
169	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.11	0.11	0.17	
						MI	0.01	0.02	0.00		
175	W 150x13.0	2	424	166	0.02	MJ	0.06	0.44	0.49	0.51	
						MI	0.00	0.01	0.00		
180	Tubo re100x100x3.00	2	2501	16	0.03	MJ	0.17	0.69	0.69	0.71	
						MI	0.00	0.01	0.00		
181	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.02	0.10	0.10	0.16	
						MI	0.01	0.02	0.00		
185	Tubo re150x100x2.66	2	856	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
186	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
191	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
192	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		

MEMORIAL DE CÁLCULO	ESTRUTURA
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195	Tubo re150x100x2.66	2	385	161	0.00	MI	0.00	0.01	0.00		
						MJ	0.04	0.35	0.35	0.37	
198	Tubo re150x100x2.66	2	370	161	0.00	MI	0.00	0.01	0.00		
						MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
201	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
206	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
207	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES						
					Axial	Dir	Cort	Mom	FLT	Combinada Axial+Mom	
212	W 150x13.0	2	682	165	0.02	MJ	0.08	0.40	0.40	0.41	
						MI	0.00	0.01	0.00		
215	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51	
						MI	0.00	0.01	0.00		
221	Tubo re100x100x3.00	2	2737	16	0.02	MJ	0.15	0.62	0.62	0.64	
						MI	0.00	0.01	0.00		
222	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.12	0.12	0.17	
						MI	0.01	0.02	0.00		
228	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51	
						MI	0.00	0.01	0.00		
233	Tubo re100x100x3.00	2	2737	16	0.02	MJ	0.15	0.62	0.62	0.64	
						MI	0.00	0.01	0.00		
234	Tubo re100x100x3.00	2	9999	11	0.07	MJ	0.01	0.12	0.12	0.17	
						MI	0.01	0.02	0.00		
238	Tubo re150x100x2.66	2	856	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
239	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
244	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
245	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
250	Tubo re150x100x2.66	2	385	161	0.00	MJ	0.04	0.35	0.35	0.37	
						MI	0.00	0.01	0.00		
251	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
256	Tubo re150x100x2.66	2	369	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
257	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
262	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
264	W 150x13.0	2	682	165	0.02	MJ	0.08	0.40	0.40	0.41	
						MI	0.00	0.01	0.00		
265	Tubo re150x100x2.66	2	669	274	0.03	MJ	0.09	0.69	0.69	0.72	
						MI	0.04	0.01	0.00		
268	W 150x13.0	2	417	166	0.02	MJ	0.06	0.43	0.50	0.51	
						MI	0.00	0.02	0.00		
274	Tubo re100x100x3.00	2	2692	16	0.02	MJ	0.15	0.63	0.63	0.67	
						MI	0.00	0.03	0.00		
275	Tubo re100x100x3.00	2	4113	11	0.07	MJ	0.01	0.13	0.13	0.54	
						MI	0.08	0.37	0.00		

MEMORIAL DE CÁLCULO	ESTRUTURA
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281	W 150x13.0	2	419	166	0.02	MJ	0.06	0.43	0.49	0.51	
286	Tubo re100x100x3.00	2	2745	16	0.02	MI	0.00	0.01	0.00		
						MJ	0.15	0.63	0.63	0.68	
287	Tubo re100x100x3.00	2	8673	11	0.07	MI	0.01	0.04	0.00		
						MJ	0.01	0.12	0.12	0.30	
						MI	0.05	0.15	0.00		
291	Tubo re150x100x2.66	2	855	161	-0.01	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
292	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
297	Tubo re150x100x2.66	2	370	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
298	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES						
					Axial	Dir	Cort	Mom	FLT	Combinada Axial+Mom	
303	Tubo re150x100x2.66	2	664	161	0.01	MJ	0.04	0.26	0.26	0.28	
						MI	0.00	0.01	0.00		
304	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
309	Tubo re150x100x2.66	2	369	161	-0.02	MJ	0.04	0.37	0.37	0.40	
						MI	0.00	0.01	0.00		
310	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
315	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
317	W 150x13.0	2	683	165	0.02	MJ	0.08	0.39	0.39	0.43	
						MI	0.02	0.03	0.00		
319	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
322	Tubo re150x100x3.00	2	3624	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
324	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
328	Tubo re150x100x3.00	2	3624	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
330	Tubo re150x100x2.66	2	381	161	0.00	MJ	0.04	0.36	0.36	0.37	
						MI	0.00	0.01	0.00		
335	Tubo re150x100x2.66	2	369	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
336	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
341	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
344	Tubo re150x100x2.66	2	3592	161	-0.01	MJ	0.01	0.09	0.09	0.10	
						MI	0.00	0.01	0.00		
346	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
349	Tubo re150x100x3.00	2	3624	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
351	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
355	Tubo re150x100x3.00	2	3624	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
359	Tubo re150x100x2.66	2	381	161	0.00	MJ	0.04	0.36	0.36	0.37	

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						MI	0.00	0.01	0.00		
360	Tubo re150x100x2.66	2	369	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
363	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
368	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
369	Tubo re150x100x2.66	2	3592	161	-0.01	MJ	0.01	0.09	0.09	0.10	
						MI	0.00	0.01	0.00		
372	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
376	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
378	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
382	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L'	Esbl	CAPACIDADES						Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT		
384	Tubo re150x100x2.66	2	3591	161	-0.01	MJ	0.01	0.09	0.09	0.10	
						MI	0.00	0.01	0.00		
387	Tubo re150x100x2.66	2	381	161	0.00	MJ	0.04	0.36	0.36	0.37	
						MI	0.00	0.01	0.00		
390	Tubo re150x100x2.66	2	370	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
393	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
396	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
400	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
403	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
406	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
409	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
411	Tubo re150x100x2.66	2	3591	161	-0.01	MJ	0.01	0.09	0.09	0.10	
						MI	0.00	0.01	0.00		
414	Tubo re150x100x2.66	2	381	161	0.00	MJ	0.04	0.36	0.36	0.37	
						MI	0.00	0.01	0.00		
417	Tubo re150x100x2.66	2	370	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
420	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
423	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
427	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
430	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
432	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
436	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		

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438	Tubo re150x100x2.66	2	3591	161	-0.01	MJ	0.01	0.09	0.09	0.10	
441	Tubo re150x100x2.66	2	381	161	0.00	MI	0.00	0.01	0.00		
						MJ	0.04	0.36	0.36	0.37	
						MI	0.00	0.01	0.00		
444	Tubo re150x100x2.66	2	370	161	-0.02	MJ	0.04	0.37	0.37	0.39	
447	Tubo re150x100x2.66	2	370	161	0.00	MI	0.00	0.01	0.00		
						MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
450	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
454	W 150x13.0	2	381	166	0.04	MI	0.00	0.01	0.00		
						MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
457	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
459	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
463	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
465	Tubo re150x100x2.66	2	3591	161	-0.01	MJ	0.01	0.09	0.09	0.10	
						MI	0.00	0.01	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L'	Esbl	CAPACIDADES						
					Axial	Dir	Cort	Mom	FLT	Combinada Axial+Mom	
468	Tubo re150x100x2.66	2	381	161	0.00	MJ	0.04	0.36	0.36	0.37	
						MI	0.00	0.01	0.00		
471	Tubo re150x100x2.66	2	370	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
476	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
477	Tubo re150x100x2.66	2	836	161	0.00	MI	0.00	0.01	0.00		
						MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
481	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
484	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
487	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
490	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
492	Tubo re150x100x2.66	2	3591	161	-0.01	MI	0.05	0.12	0.00		
						MJ	0.01	0.09	0.09	0.10	
						MI	0.00	0.01	0.00		
497	Tubo re150x100x2.66	2	381	161	0.00	MJ	0.04	0.36	0.36	0.37	
						MI	0.00	0.01	0.00		
498	Tubo re150x100x2.66	2	370	161	-0.02	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
503	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
504	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
508	W 150x13.0	2	381	166	0.04	MI	0.00	0.01	0.00		
						MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
511	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	
						MI	0.05	0.12	0.00		
513	W 150x13.0	2	381	166	0.04	MJ	0.06	0.39	0.52	0.54	
						MI	0.00	0.01	0.00		
517	Tubo re150x100x3.00	2	3623	10	0.03	MJ	0.18	0.81	0.81	0.94	

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521	Tubo re150x100x2.66	2	3594	161	-0.01	MI	0.05	0.12	0.00		
						MJ	0.01	0.09	0.09	0.10	
522	Tubo re150x100x2.66	2	381	161	0.00	MI	0.00	0.01	0.00		
						MJ	0.04	0.36	0.36	0.37	
525	Tubo re150x100x2.66	2	369	161	-0.02	MI	0.00	0.01	0.00		
						MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
528	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
531	Tubo re150x100x2.66	2	836	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
535	W 150x13.0	2	790	166	0.02	MJ	0.05	0.22	0.34	0.35	
538	Tubo re150x100x3.00	2	6903	9	0.02	MI	0.00	0.01	0.00		
540	W 150x13.0	2	790	166	0.02	MJ	0.10	0.39	0.39	0.40	
						MJ	0.05	0.22	0.34	0.35	
						MI	0.00	0.01	0.00		
544	Tubo re150x100x3.00	2	6903	9	0.02	MJ	0.10	0.39	0.39	0.40	
548	Tubo re150x100x2.66	2	858	161	0.00	MJ	0.02	0.16	0.16	0.16	
						MI	0.00	0.01	0.00		
549	Tubo re150x100x2.66	2	370	161	-0.01	MJ	0.04	0.37	0.37	0.39	
						MI	0.00	0.01	0.00		
554	Tubo re150x100x2.66	2	370	161	0.00	MJ	0.04	0.37	0.37	0.38	
						MI	0.00	0.01	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom	
					Axial	Dir	Cort	Mom	FLT		
557	Tubo re150x100x2.66	2	835	161	0.00	MJ	0.02	0.16	0.16	0.17	
						MI	0.00	0.01	0.00		
558	W 150x13.0	1	342	166	-0.24	MJ	0.07	0.44	0.58	0.80	
562	Tubo re150x100x3.00	1	3212	10	-0.03	MI	0.04	0.12	0.00	0.84	
						MJ	0.15	0.70	0.70		
565	W 150x13.0	1	342	166	-0.24	MJ	0.07	0.44	0.58	0.80	
568	Tubo re150x100x3.00	1	3212	10	-0.03	MI	0.04	0.12	0.00	0.84	
						MJ	0.15	0.70	0.70		
572	Tubo re150x100x2.66	1	2896	161	-0.05	MJ	0.02	0.11	0.11	0.14	
573	Tubo re150x100x2.66	1	9999	11	0.00	MJ	0.01	0.01	0.01	0.01	
574	Tubo re150x100x2.66	1	438	139	0.00	MJ	0.03	0.33	0.33	0.34	
						MI	0.00	0.01	0.00		
575	Tubo re150x100x2.66	1	9999	11	0.00	MJ	0.01	0.01	0.01	0.01	
576	Tubo re150x100x2.66	1	9999	11	0.00	MJ	0.01	0.01	0.01	0.01	
577	Tubo re150x100x2.66	1	427	139	-0.01	MJ	0.03	0.34	0.34	0.35	
578	Tubo re150x100x2.66	1	9999	11	0.00	MI	0.00	0.01	0.00		
						MJ	0.01	0.01	0.01	0.01	
579	Tubo re150x100x2.66	1	9999	11	0.00	MJ	0.01	0.01	0.01	0.01	
580	Tubo re150x100x2.66	1	428	139	0.00	MJ	0.03	0.34	0.34	0.35	
						MI	0.00	0.01	0.00		
581	Tubo re150x100x2.66	1	9999	11	0.00	MJ	0.01	0.01	0.01	0.01	
582	Tubo re150x100x2.66	1	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
583	Tubo re150x100x2.66	1	757	139	0.00	MJ	0.02	0.19	0.19	0.20	
584	Tubo re150x100x2.66	1	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
593	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
596	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
601	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
610	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
613	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
618	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	

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627	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
630	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
635	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
644	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
647	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
652	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
661	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
664	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
669	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
678	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
681	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
686	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
695	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
698	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
703	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
712	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
715	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
720	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
729	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
732	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
737	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
746	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
749	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
754	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
763	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
766	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES						
					Axial	Dir	Cort	Mom	FLT	Combinada Axial+Mom	
771	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
780	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.00	0.01	0.01	0.01	
783	Tubo ret100x75x2.25	2	9999	59	0.00	MJ	0.00	0.02	0.02	0.02	
788	Tubo ret100x75x2.25	2	9999	41	0.00	MJ	0.01	0.03	0.03	0.03	
789	Tubo re100x100x3.00	2	5648	61	0.01	MJ	0.02	0.07	0.07	0.08	
791	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		
792	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		
793	Tubo re100x100x3.00	2	8278	61	0.01	MJ	0.01	0.05	0.05	0.05	
795	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.02	0.04	0.04	0.07	
						MI	0.02	0.04	0.00		
796	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.02	0.04	0.04	0.07	
						MI	0.02	0.04	0.00		
797	Tubo re100x100x3.00	2	5641	61	0.01	MJ	0.02	0.07	0.07	0.08	
799	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		
800	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		
801	Tubo re100x100x3.00	2	5642	61	0.01	MJ	0.02	0.07	0.07	0.08	
803	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		
804	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		
805	Tubo re100x100x3.00	2	5643	61	0.01	MJ	0.02	0.07	0.07	0.08	
807	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11	
						MI	0.03	0.05	0.00		

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808	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
809	Tubo re100x100x3.00	2	5642	61	0.01	MI	0.03	0.05	0.00	
						MJ	0.02	0.07	0.07	0.08
811	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
812	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
813	Tubo re100x100x3.00	2	5642	61	0.01	MJ	0.02	0.07	0.07	0.08
815	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
816	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
817	Tubo re100x100x3.00	2	5642	61	0.01	MJ	0.02	0.07	0.07	0.08
819	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
820	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
821	Tubo re100x100x3.00	2	5643	61	0.01	MJ	0.02	0.07	0.07	0.08
823	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
824	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
825	Tubo re100x100x3.00	2	5643	61	0.01	MJ	0.02	0.07	0.07	0.08
827	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
828	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
829	Tubo re100x100x3.00	2	5644	61	0.01	MJ	0.02	0.07	0.07	0.08
831	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.03	0.05	0.05	0.11

Resultados Gerais

Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT	
832	Tubo re100x100x3.00	2	9999	10	0.01	MI	0.03	0.05	0.00	
						MJ	0.03	0.05	0.05	0.11
						MI	0.03	0.05	0.00	
833	Tubo re100x100x3.00	2	6213	61	0.01	MJ	0.02	0.07	0.07	0.07
835	Tubo re100x100x3.00	2	9999	10	0.01	MJ	0.02	0.05	0.05	0.10
836	Tubo re100x100x3.00	2	9999	10	0.01	MI	0.02	0.05	0.00	
						MJ	0.02	0.05	0.05	0.10
						MI	0.02	0.05	0.00	
837	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	
838	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	
839	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	
840	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23
841	Tubo ret100x75x2.25	2	601	165	0.00	MI	0.00	0.03	0.00	
						MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	
842	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	
843	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	
844	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23
						MI	0.00	0.03	0.00	

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845	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
846	Tubo ret100x75x2.25	2	600	165	0.00	MI	0.00	0.03	0.00	0.23	
847	Tubo ret100x75x2.25	2	600	165	0.00	MI	0.00	0.03	0.00		
						MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
848	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
849	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
850	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
851	Tubo ret100x75x2.25	2	600	165	0.00	MI	0.00	0.03	0.00	0.23	
						MJ	0.01	0.20	0.20		
852	Tubo ret100x75x2.25	2	600	165	0.00	MI	0.00	0.03	0.00	0.23	
						MJ	0.01	0.20	0.20		
						MI	0.00	0.03	0.00		
853	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
854	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
855	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23	
856	Tubo ret100x75x2.25	2	601	165	0.00	MI	0.00	0.03	0.00	0.23	
						MJ	0.01	0.20	0.20		
						MI	0.00	0.03	0.00		
857	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
882	Tubo ret100x75x2.25	2	9999	28	0.00	MJ	0.00	0.01	0.01	0.01	
883	Tubo ret100x75x2.25	2	9999	61	0.00	MJ	0.01	0.03	0.03	0.03	
884	Tubo ret100x75x2.25	2	6734	74	0.00	MJ	0.01	0.04	0.04	0.05	
						MI	0.00	0.01	0.00		
885	Tubo ret100x75x2.25	2	2260	107	0.00	MJ	0.01	0.08	0.08	0.10	
						MI	0.00	0.01	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES						Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT		
886	Tubo re100x100x3.00	2	9999	86	0.00	MJ	0.00	0.01	0.02	0.02	
890	Tubo ret100x75x2.25	2	2865	98	0.00	MJ	0.01	0.07	0.07	0.08	
						MI	0.00	0.01	0.00		
891	Tubo ret100x75x2.25	2	1216	131	0.00	MJ	0.01	0.13	0.13	0.14	
						MI	0.00	0.02	0.00		
892	Tubo ret100x75x2.25	2	911	144	0.00	MJ	0.01	0.15	0.15	0.18	
						MI	0.00	0.02	0.00		
893	Tubo ret100x75x2.25	2	494	177	0.00	MJ	0.02	0.23	0.23	0.26	
						MI	0.00	0.03	0.00		
895	Tubo re100x100x3.00	2	8713	86	0.01	MJ	0.01	0.04	0.04	0.04	
898	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
899	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
900	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
901	Tubo ret100x75x2.25	2	601	165	0.00	MI	0.00	0.03	0.00	0.23	
						MJ	0.01	0.20	0.20		
902	Tubo ret100x75x2.25	2	600	165	0.00	MI	0.00	0.03	0.00	0.23	
						MJ	0.01	0.20	0.20		
						MI	0.00	0.03	0.00		
903	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	

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904	Tubo ret100x75x2.25	2	600	165	0.00	MI	0.00	0.03	0.00		
						MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
905	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
906	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
907	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
908	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
909	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
910	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
911	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
912	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
913	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
914	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
915	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
916	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
917	Tubo ret100x75x2.25	2	601	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
918	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
919	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
920	Tubo ret100x75x2.25	2	600	165	0.00	MJ	0.01	0.20	0.20	0.23	
						MI	0.00	0.03	0.00		
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom	
					Axial	Dir	Cort	Mom	FLT		
921	Tubo re100x100x3.00	2	9999	10	0.00	MJ	0.02	0.04	0.04	0.04	
922	Tubo re100x100x3.00	2	9999	10	0.00	MJ	0.02	0.04	0.04	0.04	
923	Tubo re100x100x3.00	1	9999	10	0.00	MJ	0.01	0.01	0.01	0.01	
924	Tubo re100x100x3.00	1	9999	10	0.00	MJ	0.01	0.01	0.01	0.01	
925	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30	
						MI	0.00	0.02	0.00		
926	Tubo ret100x75x2.25	2	268	110	0.00	MJ	0.07	0.58	0.58	0.63	
						MI	0.01	0.05	0.00		
927	Tubo ret100x75x2.25	1	340	110	0.00	MJ	0.06	0.46	0.46	0.48	
						MI	0.00	0.03	0.00		
928	Tubo ret100x75x2.25	1	650	110	0.00	MJ	0.03	0.24	0.24	0.25	
						MI	0.00	0.02	0.00		
929	Tubo ret100x75x2.25	2	268	110	0.00	MJ	0.07	0.58	0.58	0.63	
						MI	0.01	0.05	0.00		
930	Tubo ret100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30	
						MI	0.00	0.02	0.00		
931	Tubo ret100x75x2.25	2	268	110	0.00	MJ	0.07	0.58	0.58	0.63	
						MI	0.01	0.05	0.00		

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932	Tubo re100x75x2.25	2	556	110	0.00	MJ	0.04	0.28	0.28	0.30	
						MI	0.00	0.02	0.00		
933	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
934	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
935	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
936	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
937	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
938	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
939	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
940	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
941	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
942	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
943	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
944	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
945	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
946	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
947	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
948	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
949	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
950	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
951	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
952	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
953	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
954	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
955	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
956	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
957	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
958	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
959	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
960	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
961	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
962	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
963	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
964	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
965	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
966	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
967	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
968	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES						
					Axial	Dir	Cort	Mom	FLT	Combinada Axial+Mom	
969	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
970	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
971	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
972	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
973	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
974	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
975	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
976	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
977	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
978	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
979	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
980	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
981	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
982	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
983	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	

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984	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
985	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
986	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
987	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
988	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
989	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
990	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
991	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
992	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
993	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
994	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
995	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
996	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
997	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
998	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
999	Tubo re100x100x3.00	2	9999	10	0.00	MI	0.00	0.00	0.00	0.00	
1000	Tubo re100x100x3.00	2	9999	11	0.00	MI	0.00	0.00	0.00	0.00	
1001	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
1002	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
1003	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
1004	Tubo re100x100x3.00	2	9999	12	0.00	MI	0.00	0.00	0.00	0.00	
1005	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02	
1006	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02	
1007	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02	
1008	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02	
1009	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02	
1010	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02	
1011	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02	
1012	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02	
1013	Tubo 15.8x7.9	2	9999	870	0.04	MI	0.00	0.00	0.00	0.04	
1014	Tubo 15.8x7.9	2	9999	852	0.00	MI	0.00	0.00	0.00	0.00	
1015	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01	
1016	Tubo 15.8x7.9	2	9999	868	0.03	MI	0.00	0.00	0.00	0.03	
1017	Tubo 15.8x7.9	3	9999	868	0.00	MI	0.00	0.00	0.00	0.00	
1018	Tubo 15.8x7.9	2	9999	863	0.04	MI	0.00	0.00	0.00	0.04	
1019	Tubo 15.8x7.9	2	9999	852	0.04	MI	0.00	0.00	0.00	0.04	
1020	Tubo 15.8x7.9	2	9999	870	0.00	MI	0.00	0.00	0.00	0.00	
1021	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01	
1022	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01	
1023	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01	
1024	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01	
Resultados Gerais											
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom	
					Axial	Dir	Cort	Mom	FLT		
1025	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01	
1026	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01	
1027	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01	
1028	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01	
1029	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01	
1030	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01	
1031	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01	
1032	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01	
1033	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01	
1034	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01	
1035	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01	
1036	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01	

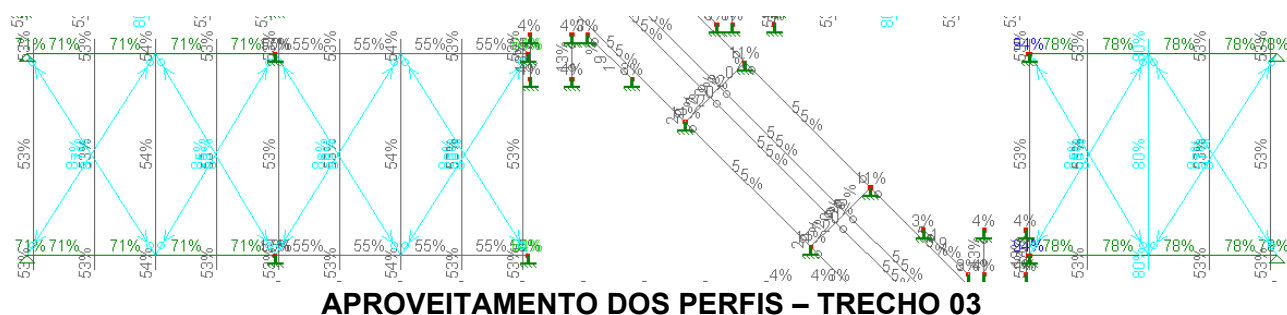
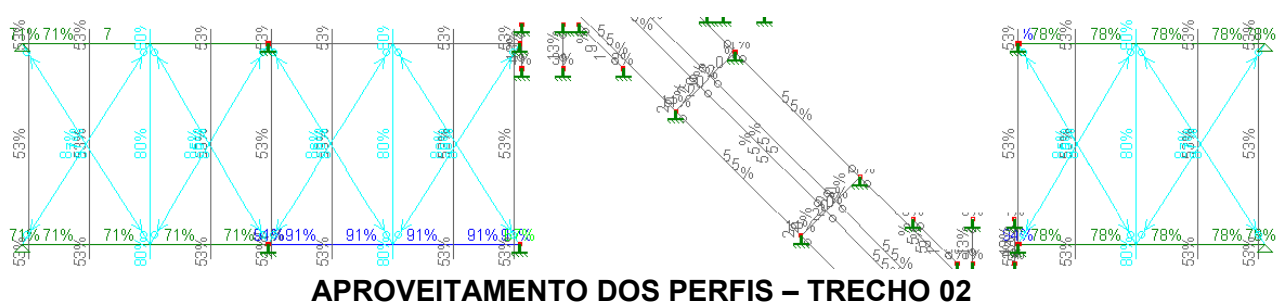
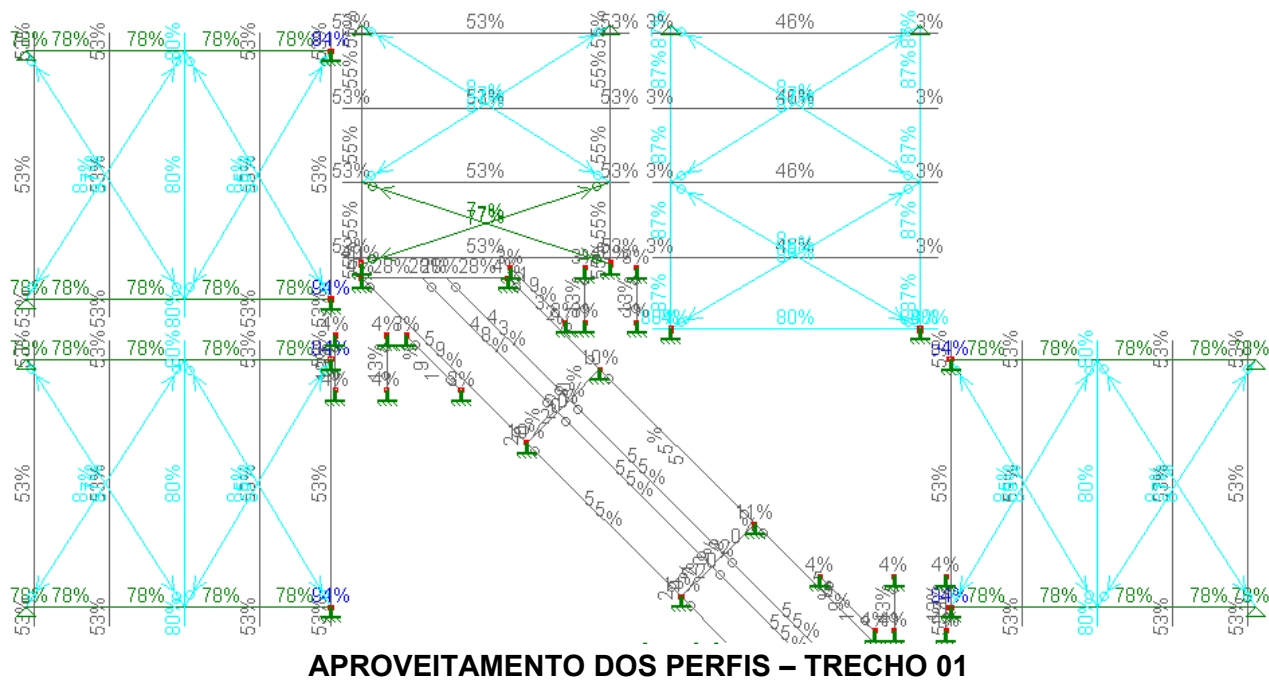
MEMORIAL DE CÁLCULO	ESTRUTURA
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1037	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1038	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01
1039	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01
1040	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01
1041	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01
1042	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01
1043	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01
1044	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1045	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1046	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01
1047	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01
1048	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01
1049	Tubo 15.8x7.9	2	9999	868	0.01	MI	0.00	0.00	0.00	0.01
1050	Tubo 15.8x7.9	2	9999	863	0.01	MI	0.00	0.00	0.00	0.01
1051	Tubo 15.8x7.9	2	9999	852	0.01	MI	0.00	0.00	0.00	0.01
1052	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1053	Tubo 15.8x7.9	2	9999	772	0.00	MI	0.00	0.00	0.00	0.00
1054	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1055	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1056	Tubo 15.8x7.9	2	9999	772	0.00	MI	0.00	0.00	0.00	0.00
1057	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1058	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1059	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1060	Tubo 15.8x7.9	2	9999	870	0.01	MI	0.00	0.00	0.00	0.01
1061	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1062	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1063	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1064	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1065	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1066	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1067	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1068	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1069	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1070	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1071	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1072	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1073	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1074	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1075	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1076	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1077	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1078	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1079	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1080	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
Resultados Gerais										
Barr	Seção	Co	Flec L/	Esbl	CAPACIDADES					Combinada Axial+Mom
					Axial	Dir	Cort	Mom	FLT	
1081	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1082	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1083	Tubo 15.8x7.9	2	9999	852	0.02	MI	0.00	0.00	0.00	0.02
1084	Tubo 15.8x7.9	2	9999	870	0.02	MI	0.00	0.00	0.00	0.02
1085	W 150x13.0	2	617	165	0.02	MJ	0.09	0.42	0.42	0.44
						MI	0.00	0.01	0.00	

MEMORIAL DE CÁLCULO

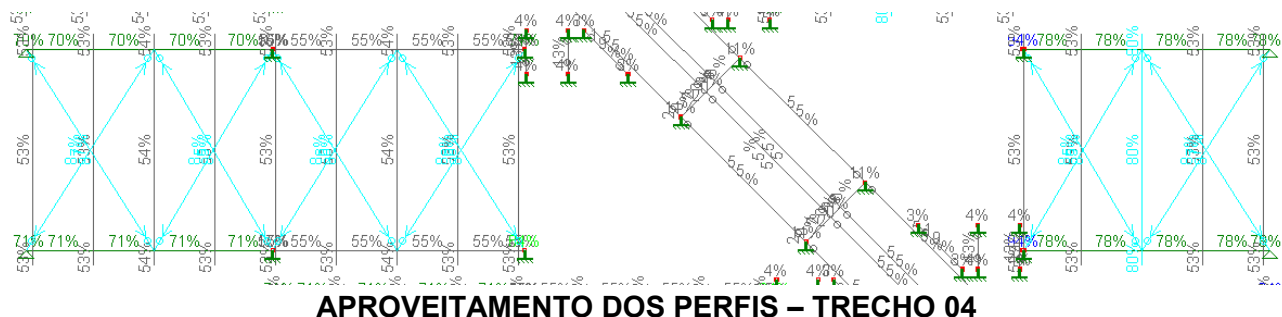
ESTRUTURA

5.6. ÍNDICE DE APROVEITAMENTO DOS PERFIS

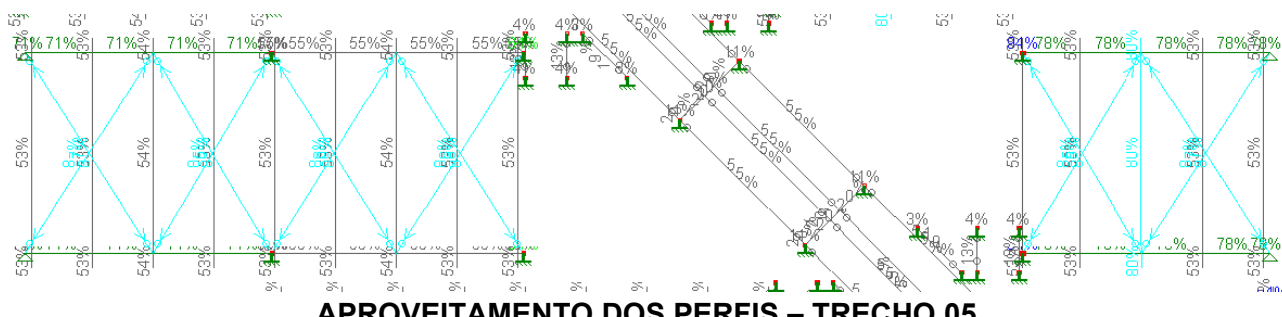


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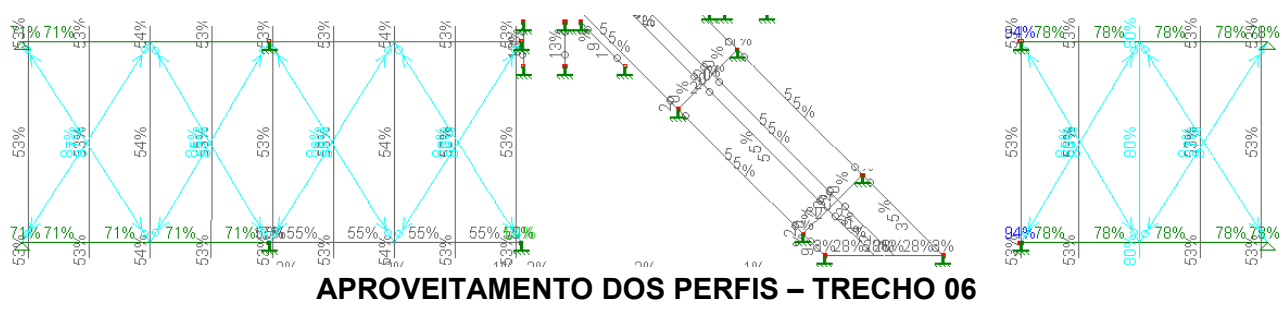
ESTRUTURA



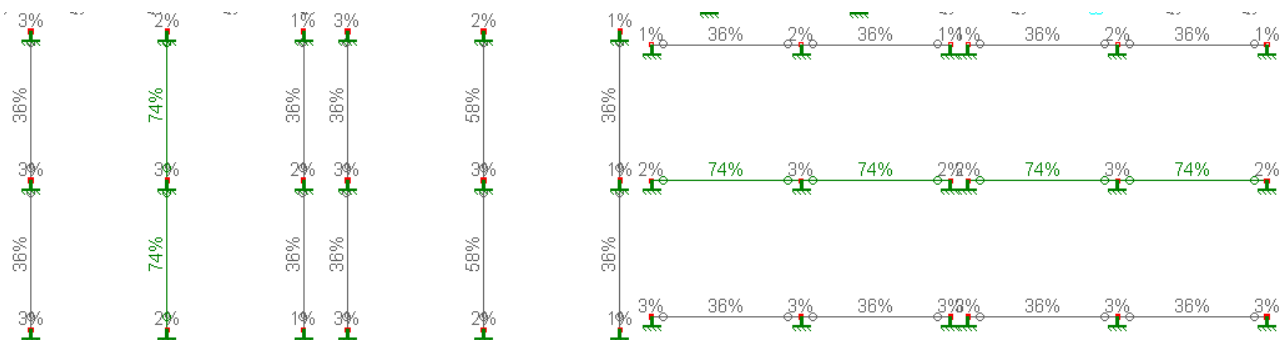
APROVEITAMENTO DOS PERFIS – TRECHO 04



APROVEITAMENTO DOS PERFIS – TRECHO 05



APROVEITAMENTO DOS PERFIS – TRECHO 06



APROVEITAMENTO DOS PERFIS – TRECHO 07

ÍNDICES DE APROVEITAMENTO ESTÃO ABAIXO DE 100%, ENTÃO OK

MEMORIAL DE CÁLCULO	ESTRUTURA
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6. CONCLUSÃO

A Estrutura proposta para a Cobertura da Unidade do SENAC CATANDUVA, atende todas às necessidades de suportaç o das cargas propostas e atende todos os requisitos das normas vigentes, estando apta a desempenhar seu papel estrutural com seguran a conforme demonstrado nos c culos.

Finalizamos afirmando que a Estrutura estar  apta a desempenhar seu papel estrutural com seguran a, conforme projetos espec ficos de estrutura ESM_P01 a ESM_P07.

7. ENCERRAMENTO

Encerramos o presente Memorial de C culo, digitado em 29 (vinte e nove) laudas, sendo esta  ltima datada e assinada.

S o Paulo, 31 de mar o de 2025.



Daniel Gonsales Encarna o
Eng. Civil: CREA 5061360706-SP

Daniel Gonsales Encarna o
Engenheiro Civil – CREA