

## LAMPIRAN

Lampiran 1. Tabel Koefisien Respon Gempa Elastik Untuk  $T < T_0$

Tabel 1 Tabel koefisien respon gempa elastik untuk  $T < T_0$

$$C_{sm} = (SDS - A_s) \frac{T}{T_0} + A_s$$

T	C <sub>sm</sub>
0,000	0,496
0,010	0,526
0,020	0,556
0,030	0,586
0,040	0,616
0,050	0,645
0,060	0,675
0,070	0,705
0,080	0,735
0,090	0,765
0,100	0,795
0,110	0,825
0,120	0,855

Lampiran 2. Tabel Koefisien Respon Gempa Elastik Untuk  $T_0 \leq T \leq T_s$ Tabel 1 koefisien respon gempa elastik untuk  $T_0 \leq T \leq T_s$ 

Csm = SDS	
T	Csm
0.124	0.868
0.134	0.868
0.144	0.868
0.154	0.868
0.164	0.868
0.174	0.868
0.184	0.868
0.194	0.868
0.204	0.868
0.214	0.868
0.224	0.868
0.234	0.868
0.244	0.868
0.254	0.868
0.264	0.868
0.274	0.868
0.284	0.868
0.294	0.868
0.304	0.868
0.314	0.868
0.324	0.868
0.334	0.868
0.344	0.868
0.354	0.868
0.364	0.868
0.374	0.868
0.384	0.868
0.394	0.868
0.404	0.868
0.414	0.868
0.424	0.868
0.434	0.868
0.444	0.868
0.454	0.868
0.464	0.868
0.474	0.868
0.484	0.868
0.494	0.868
0.504	0.868
0.514	0.868
0.524	0.868
0.534	0.868

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T	Csm
0.544	0.868
0.554	0.868
0.564	0.868
0.574	0.868
0.584	0.868
0.594	0.868
0.604	0.868
0.614	0.868
0.124	0.868
0.134	0.868
0.144	0.868
0.154	0.868
0.164	0.868
0.174	0.868
0.184	0.868
0.194	0.868
0.204	0.868
0.214	0.868
0.224	0.868
0.234	0.868
0.244	0.868
0.254	0.868
0.264	0.868
0.274	0.868
0.284	0.868
0.294	0.868
0.304	0.868
0.314	0.868
0.324	0.868
0.334	0.868
0.344	0.868
0.354	0.868
0.364	0.868
0.374	0.868
0.384	0.868
0.394	0.868
0.404	0.868
0.414	0.868
0.424	0.868
0.434	0.868
0.444	0.868
0.454	0.868
0.464	0.868
0.474	0.868
0.484	0.868

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T	Csm
0.494	0.868
0.504	0.868
0.514	0.868
0.524	0.868
0.534	0.868
0.544	0.868
0.554	0.868
0.564	0.868
0.574	0.868
0.584	0.868
0.594	0.868
0.604	0.868
0.614	0.868
0.514	0.868

Lampiran 3. Tabel Koefisien Respon Gempa Elastik Untuk  $T > T_s$ Tabel 1 Tabel koefisien respon gempa elastik untuk  $T > T_s$ 

$C_{sm} = \frac{SD1}{T}$	
T	Csm
0.623	0.867
0.633	0.853
0.643	0.840
0.653	0.827
0.663	0.814
0.673	0.802
0.683	0.791
0.693	0.779
0.703	0.768
0.713	0.757
0.723	0.747
0.733	0.737
0.743	0.727
0.753	0.717
0.763	0.708
0.773	0.699
0.783	0.690
0.793	0.681
0.803	0.672
0.813	0.664
0.823	0.656
0.833	0.648
0.843	0.641
0.853	0.633
0.863	0.626
0.873	0.619
0.883	0.612
0.893	0.605
0.903	0.598
0.913	0.591
0.923	0.585
0.933	0.579
0.943	0.573
0.953	0.567
0.963	0.561
0.973	0.555
0.983	0.549
0.993	0.544
1.003	0.538
1.013	0.533
1.023	0.528
1.033	0.523
1.043	0.518
1.053	0.513

T	Csm
1.063	0.508
1.073	0.503
1.083	0.499
1.093	0.494
1.103	0.490
1.113	0.485
1.123	0.481
1.133	0.477
1.143	0.472
1.153	0.468
1.163	0.464
1.173	0.460
1.183	0.456
1.193	0.453
1.203	0.449
1.213	0.445
1.223	0.442
1.233	0.438
1.243	0.434
1.253	0.431
1.263	0.428
1.273	0.424
1.283	0.421
1.293	0.418
1.303	0.414
1.313	0.411
1.323	0.408
1.333	0.405
1.343	0.402
1.353	0.399
1.363	0.396
1.373	0.393
1.383	0.390
1.393	0.388
1.403	0.385
1.413	0.382
1.423	0.379
1.433	0.377
1.443	0.374
1.453	0.372
1.463	0.369
1.473	0.367
1.483	0.364
1.493	0.362
1.503	0.359
1.513	0.357
1.523	0.355
1.533	0.352
1.543	0.350

T	Csm
1.553	0.348
1.563	0.345
1.573	0.343
1.583	0.341
1.593	0.339
1.603	0.337
1.613	0.335
1.623	0.333
1.633	0.331
1.643	0.329
1.653	0.327
1.663	0.325
1.673	0.323
1.683	0.321
1.693	0.319
1.703	0.317
1.713	0.315
1.723	0.313
1.733	0.312
1.743	0.310
1.753	0.308
1.763	0.306
1.773	0.305
1.783	0.303
1.793	0.301
1.803	0.300
1.813	0.298
1.823	0.296
1.833	0.295
1.843	0.293
1.853	0.291
1.863	0.290
1.873	0.288
1.883	0.287
1.893	0.285
1.903	0.284
1.913	0.282
1.923	0.281
1.933	0.279
1.943	0.278
1.953	0.276
1.963	0.275
1.973	0.274
1.983	0.272
1.993	0.271
2.003	0.270
2.013	0.268
2.023	0.267
2.033	0.266

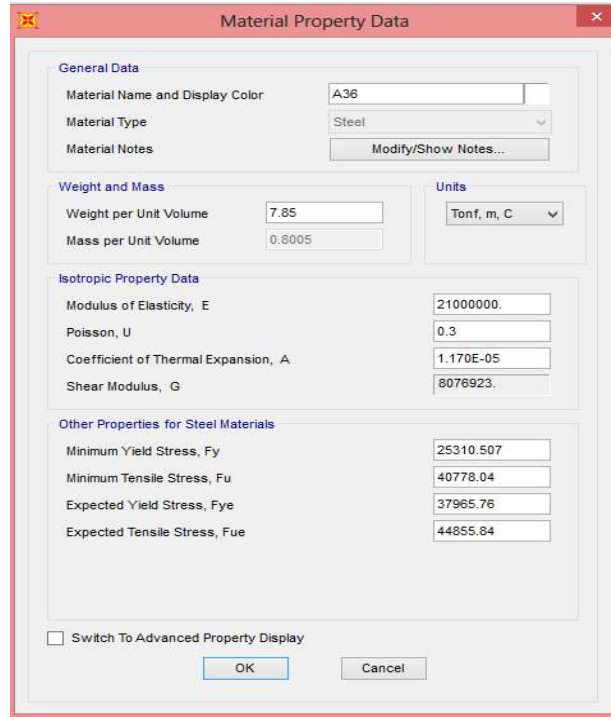
T	Csm
2.043	0.264
2.053	0.263
2.063	0.262
2.073	0.260
2.083	0.259
2.093	0.258
2.103	0.257
2.113	0.256
2.123	0.254
2.133	0.253
2.143	0.252
2.153	0.251
2.163	0.250
2.173	0.249
2.183	0.247
2.193	0.246
2.203	0.245
2.213	0.244
2.223	0.243
2.233	0.242
2.243	0.241
2.253	0.240
2.263	0.239
2.273	0.238
2.283	0.237
2.293	0.235
2.303	0.234
2.313	0.233
2.323	0.232
2.333	0.231
2.343	0.230
2.353	0.229
2.363	0.229
2.373	0.228
2.383	0.227
2.393	0.226
2.403	0.225
2.413	0.224
2.423	0.223
2.433	0.222
2.443	0.221
2.453	0.220
2.463	0.219
2.473	0.218
2.483	0.217
2.493	0.217
2.503	0.216
2.513	0.215
2.523	0.214



T	Csm
2.533	0.213
2.543	0.212
2.553	0.212
2.563	0.211
2.573	0.210
2.583	0.209
2.593	0.208
2.603	0.207
2.613	0.207
2.623	0.206
2.633	0.205
2.643	0.204
2.653	0.204
2.663	0.203
2.673	0.202
2.683	0.201
2.693	0.201
2.703	0.200
2.713	0.199
2.723	0.198
2.733	0.198
2.743	0.197
2.753	0.196
2.763	0.195
2.773	0.195
2.783	0.194
2.793	0.193
2.803	0.193
2.813	0.192
2.823	0.191
2.833	0.191
2.843	0.190
2.853	0.189
2.863	0.189
2.873	0.188
2.883	0.187
2.893	0.187
2.903	0.186
2.913	0.185
2.923	0.185
2.933	0.184
2.943	0.183
2.953	0.183
2.963	0.182
2.973	0.182
2.983	0.181
2.993	0.180
3.003	0.180
3.013	0.179

T	Csm
3.023	0.179
3.033	0.178
3.043	0.177
3.053	0.177
3.063	0.176
3.073	0.176
3.083	0.175
3.093	0.175
3.103	0.174
3.113	0.173
3.123	0.173
3.133	0.172
3.143	0.172
3.153	0.171
3.163	0.171
3.173	0.170
3.183	0.170
3.193	0.169
3.203	0.169
3.213	0.168
3.223	0.168
3.233	0.167
3.243	0.167
3.253	0.166
3.263	0.165
3.273	0.165
3.283	0.164
3.293	0.164
3.303	0.163
3.313	0.163
3.323	0.163
3.333	0.162
3.343	0.162
3.353	0.161
3.363	0.161
3.373	0.160
3.383	0.160
3.393	0.159
3.403	0.159
3.413	0.158
3.423	0.158
3.433	0.157
3.443	0.157
3.453	0.156
3.463	0.156
3.473	0.155
3.483	0.155
3.493	0.155
3.503	0.154

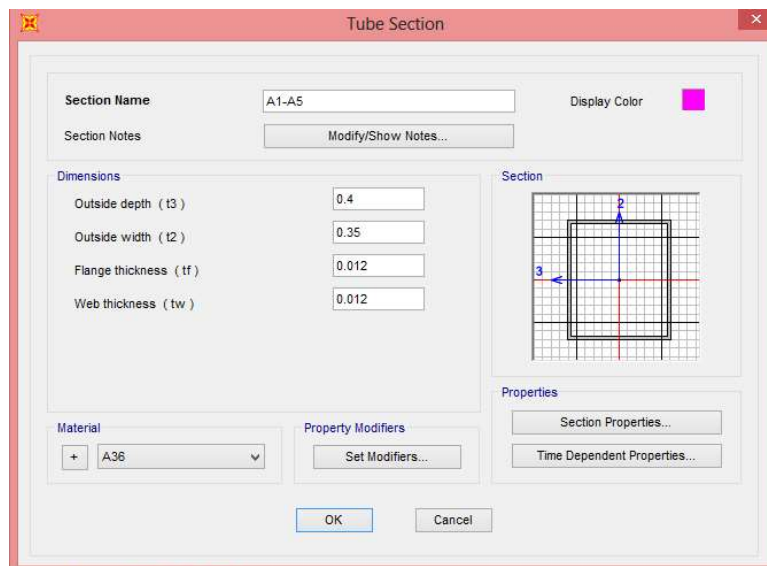
T	Csm
3.513	0.154
3.523	0.153
3.533	0.153
3.543	0.152
3.553	0.152
3.563	0.152
3.573	0.151
3.583	0.151
3.593	0.150
3.603	0.150
3.613	0.149
3.623	0.149
3.633	0.149
3.643	0.148
3.653	0.148
3.663	0.147
3.673	0.147
3.683	0.147
3.693	0.146
3.703	0.146
3.713	0.145
3.723	0.145
3.743	0.144
3.753	0.144
3.763	0.144
3.773	0.143
3.783	0.143
3.793	0.142
3.803	0.142
3.813	0.142
3.823	0.141
3.833	0.141
3.843	0.141
3.853	0.140
3.863	0.140
3.873	0.139
3.883	0.139
3.893	0.139
3.903	0.138
3.913	0.138
3.923	0.138
3.933	0.137
3.943	0.137
3.953	0.137
3.963	0.136
3.973	0.136
3.983	0.136
3.993	0.135
4	0.135

Lampiran 4. *Input Material Dan Profil-Profil Baja*

The image shows a software dialog box titled "Material Property Data". It is divided into several sections for inputting material properties:

- General Data:** Material Name and Display Color is set to "A36". Material Type is set to "Steel". There is a "Modify/Show Notes..." button.
- Weight and Mass:** Weight per Unit Volume is 7.85. Mass per Unit Volume is 0.8005. Units are set to "Tonf, m, C".
- Isotropic Property Data:** Modulus of Elasticity, E is 21000000. Poisson, U is 0.3. Coefficient of Thermal Expansion, A is 1.170E-05. Shear Modulus, G is 8076923.
- Other Properties for Steel Materials:** Minimum Yield Stress, Fy is 25310.507. Minimum Tensile Stress, Fu is 40778.04. Expected Yield Stress, Fye is 37965.76. Expected Tensile Stress, Fue is 44855.84.

At the bottom, there is a checkbox for "Switch To Advanced Property Display" (which is unchecked) and "OK" and "Cancel" buttons.

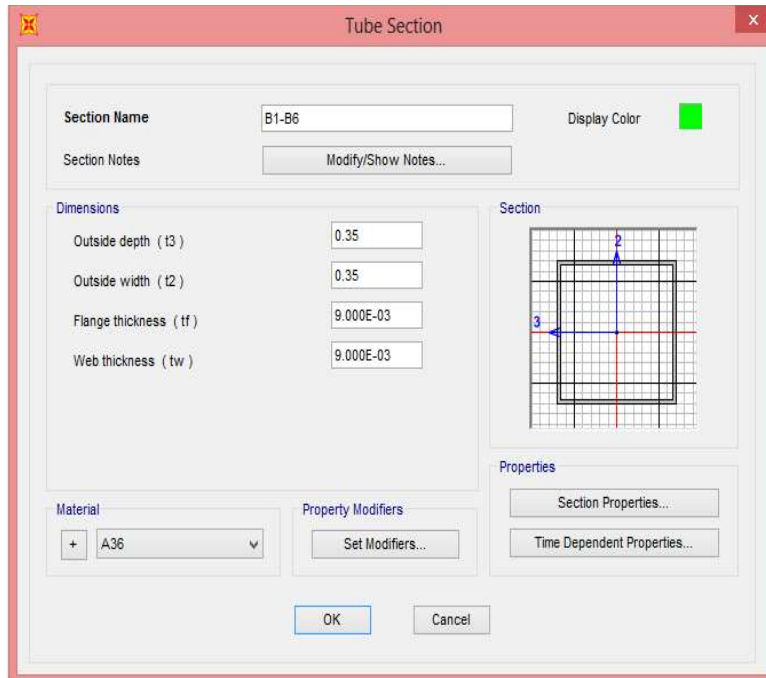
Gambar 1 *Input material property*

The image shows a software dialog box titled "Tube Section". It is used for defining the geometry and material of a tube section:

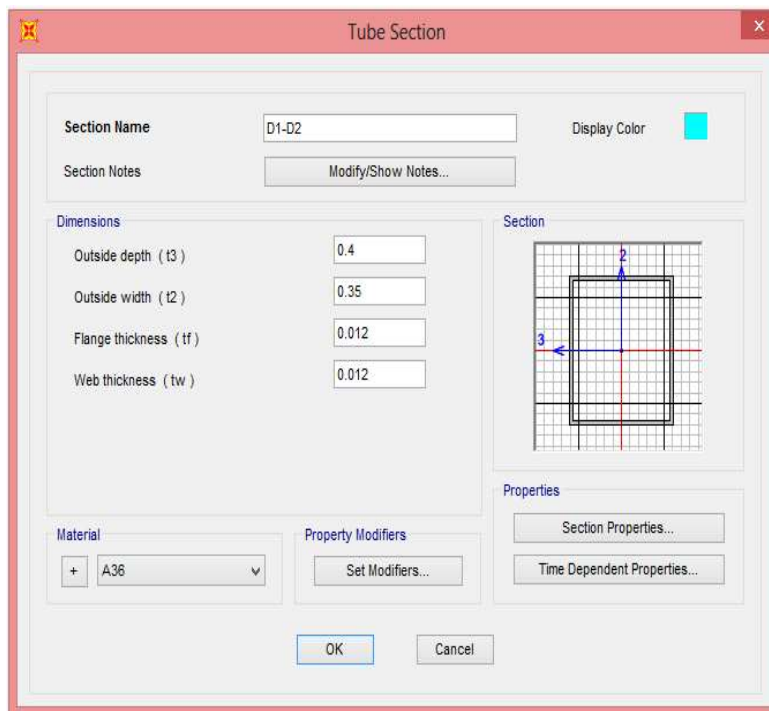
- Section Name:** A1-A5. Display Color is a purple square.
- Section Notes:** "Modify/Show Notes..." button.
- Dimensions:** Outside depth (t3) is 0.4. Outside width (t2) is 0.35. Flange thickness (tf) is 0.012. Web thickness (tw) is 0.012.
- Section:** A diagram showing a rectangular tube section on a grid with dimensions t2 and t3 indicated.
- Material:** Set to "A36".
- Property Modifiers:** "Set Modifiers..." button.
- Properties:** "Section Properties..." and "Time Dependent Properties..." buttons.

At the bottom, there are "OK" and "Cancel" buttons.

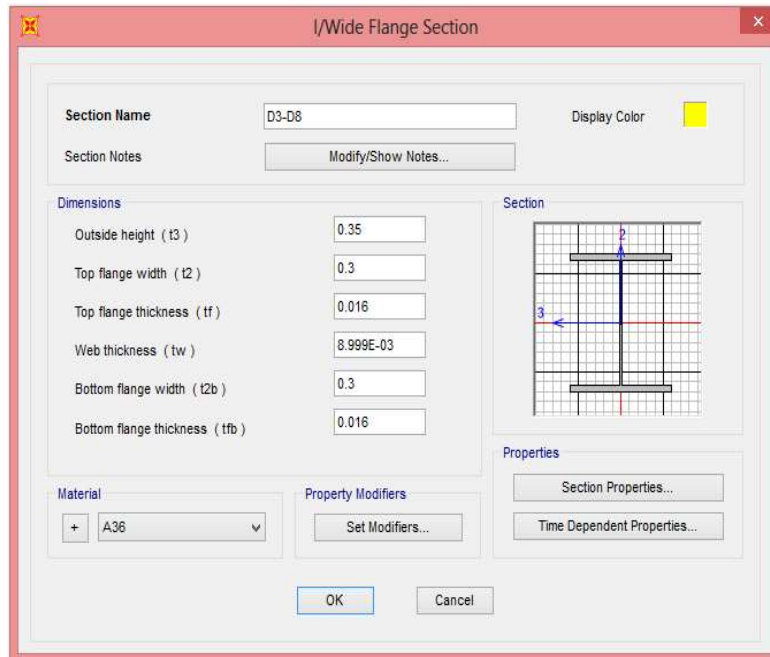
Gambar 2 *Tube section (400.350.12.12 mm)*



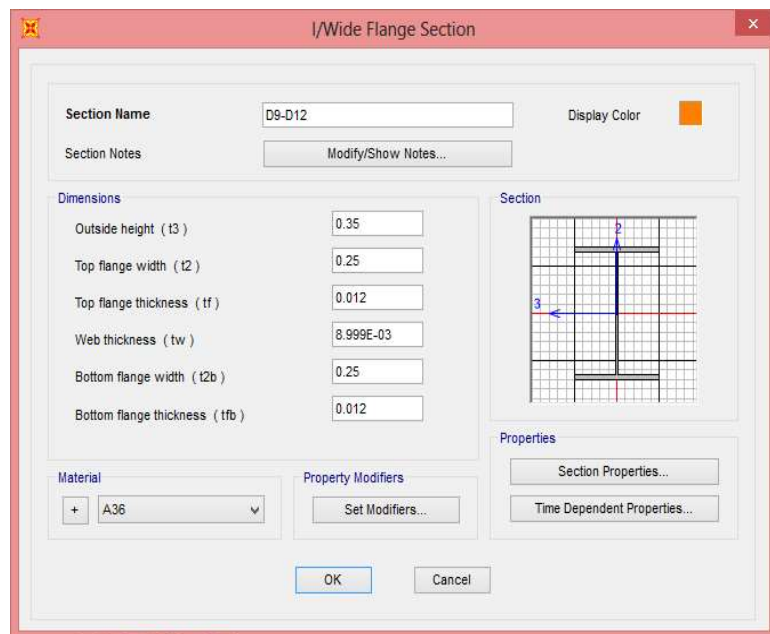
Gambar 3 Tube section (350.350.9.9 mm)



Gambar 4 Tube section (400.350.12.12 mm)



Gambar 5 I/Wide flange section (350.300.9.16 mm)



Gambar 6 I/Wide flange section (350.250.9.12 mm)

**I/Wide Flange Section**

Section Name:  Display Color: ■

Section Notes:

**Dimensions**

Outside height (t3):

Top flange width (t2):

Top flange thickness (tf):

Web thickness (tw):

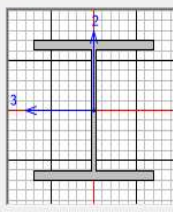
Bottom flange width (t2b):

Bottom flange thickness (tfb):

**Material**:

**Property Modifiers**:

**Section**



**Properties**

Gambar 7 I/Wide flange section (150.150.7.10 mm)

**I/Wide Flange Section**

Section Name:  Display Color: ■

Section Notes:

**Dimensions**

Outside height (t3):

Top flange width (t2):

Top flange thickness (tf):

Web thickness (tw):

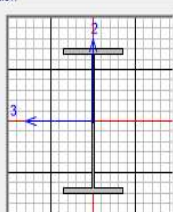
Bottom flange width (t2b):

Bottom flange thickness (tfb):

**Material**:

**Property Modifiers**:

**Section**



**Properties**

Gambar 8 I/Wide flange section (700.350.16.28 mm)

I/Wide Flange Section

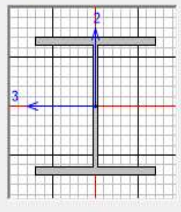
Section Name: PORTAL ATAS      Display Color: ■

Section Notes:

**Dimensions**

Outside height ( t3 )	<input type="text" value="0.35"/>
Top flange width ( t2 )	<input type="text" value="0.35"/>
Top flange thickness ( tf )	<input type="text" value="0.019"/>
Web thickness ( tw )	<input type="text" value="0.012"/>
Bottom flange width ( t2b )	<input type="text" value="0.35"/>
Bottom flange thickness ( tfb )	<input type="text" value="0.019"/>

**Section**



**Material**:  A36

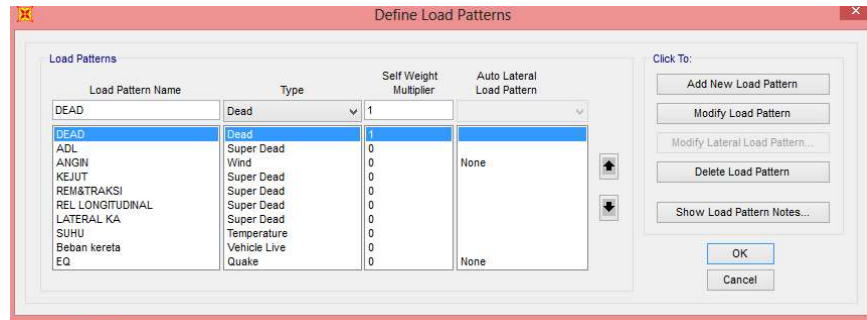
**Property Modifiers**:

**Properties**:

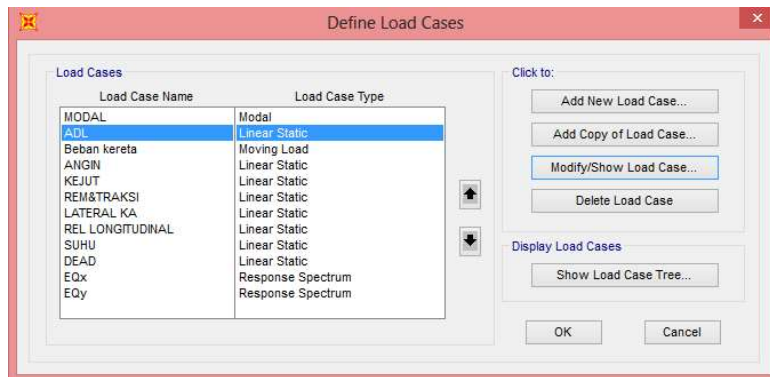
Gambar 9 I/Wide flange section (350.350.12.19 mm)



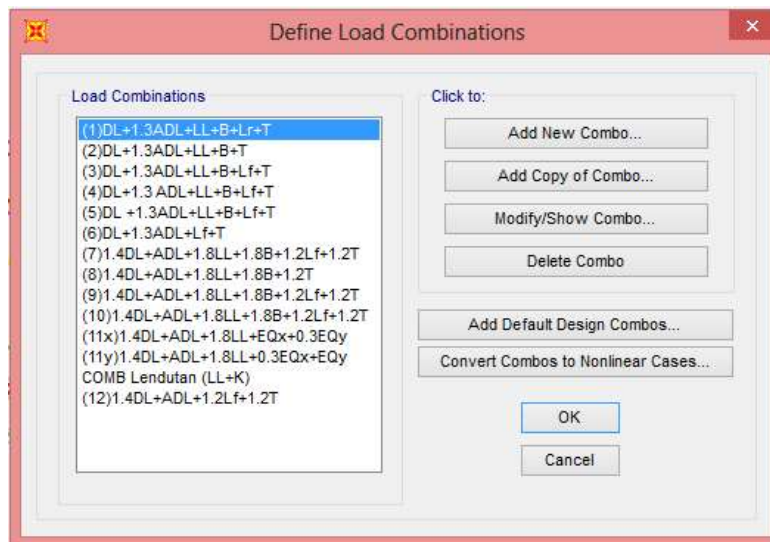
## Lampiran 5. Load Patterns, Load Cases dan Load Combinations



Gambar 1 Menetapkan jenis beban

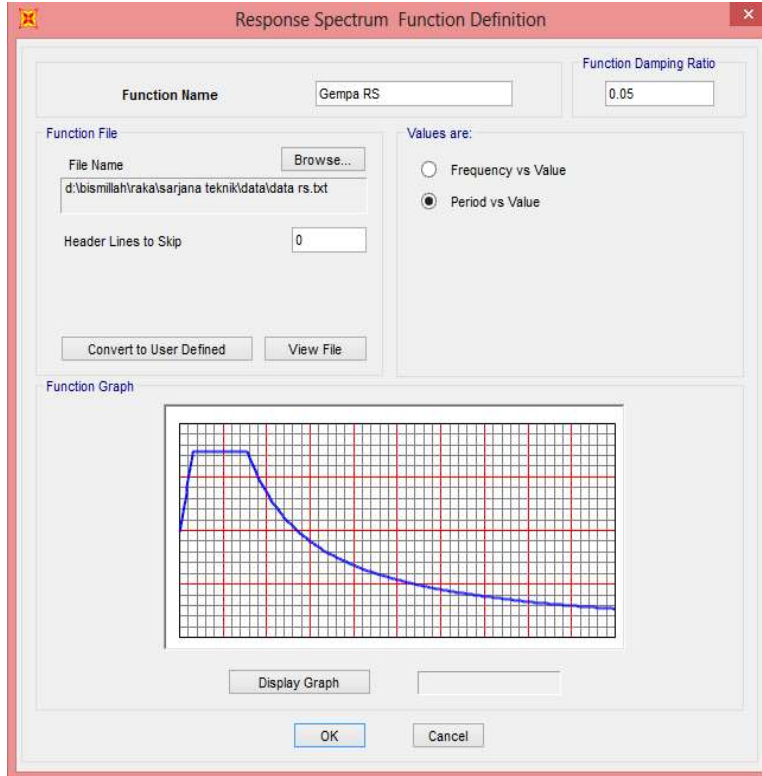


Gambar 2 Menetapkan beban yang terjadi



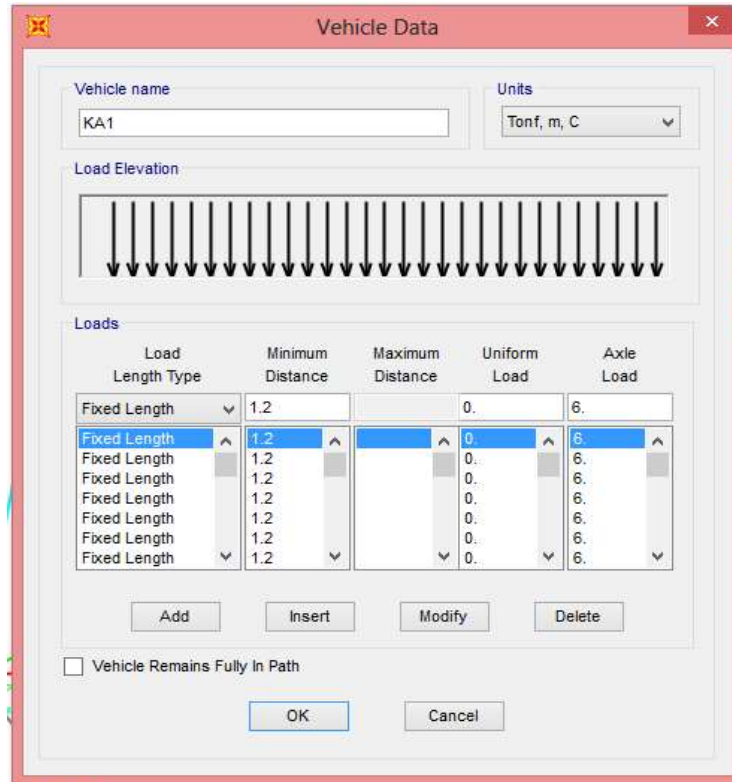
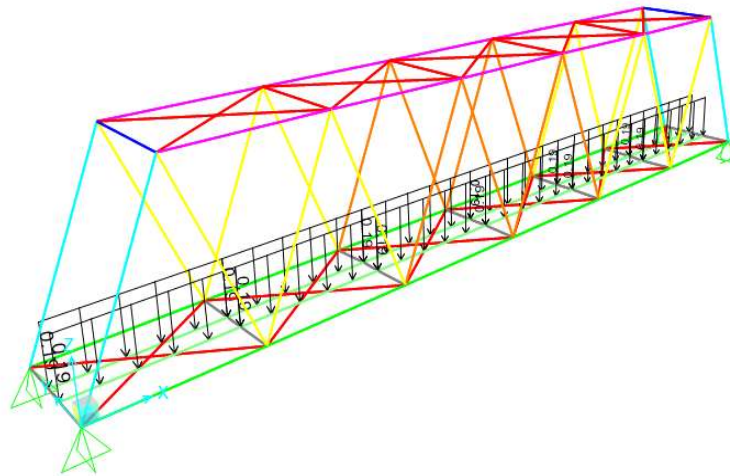
Gambar 3 Menetapkan kombinasi beban

## Lampiran 6. Respon Spektrum

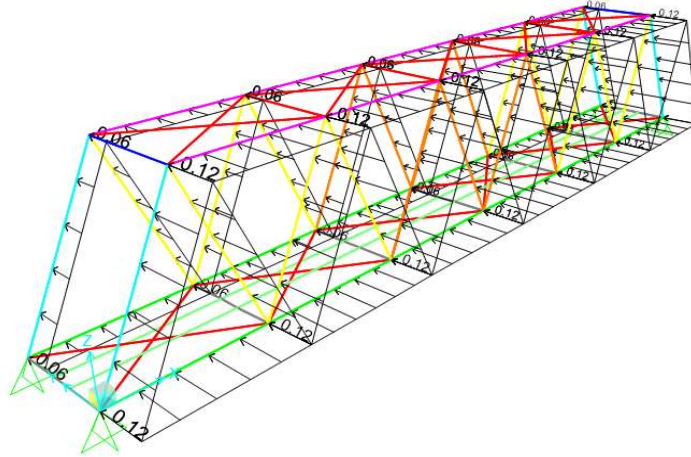


Gambar 1 Menetapkan respon spektrum

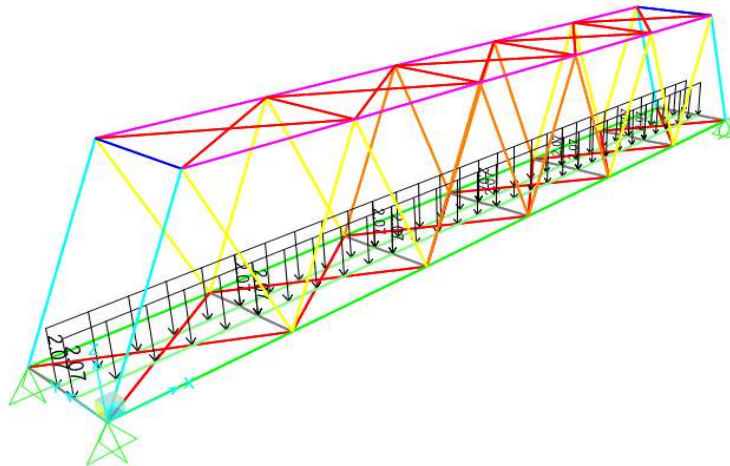
## Lampiran 7. Pembebanan Pada Model Struktur Jembatan

Gambar 1 Menetapkan *moving load*

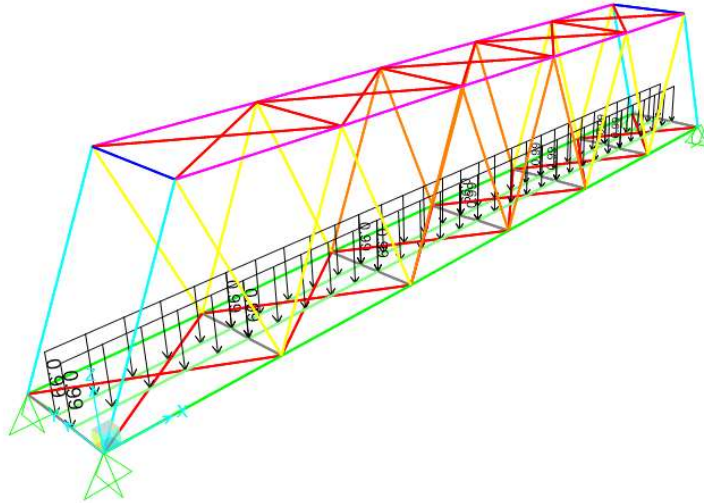
Gambar 2 Beban mati tambahan (ADL)



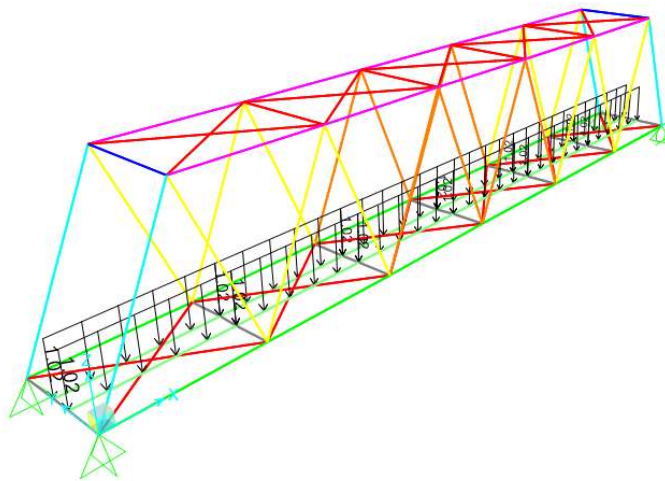
Gambar 3 Beban angin



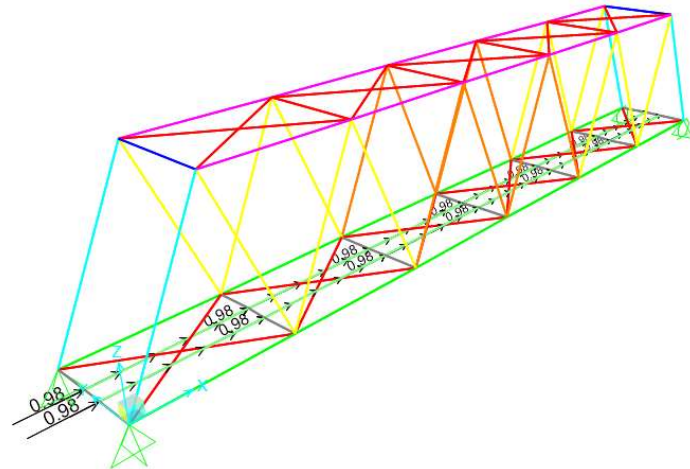
Gambar 4 Beban kejut



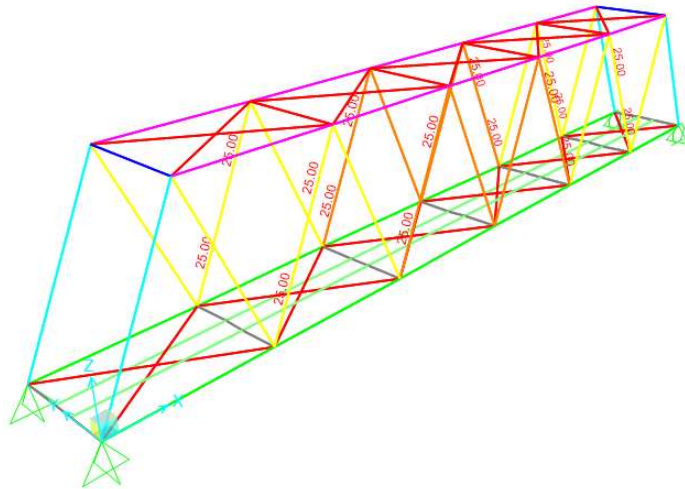
Gambar 5 Beban lateral kereta



Gambar 6 Beban rel longitudinal

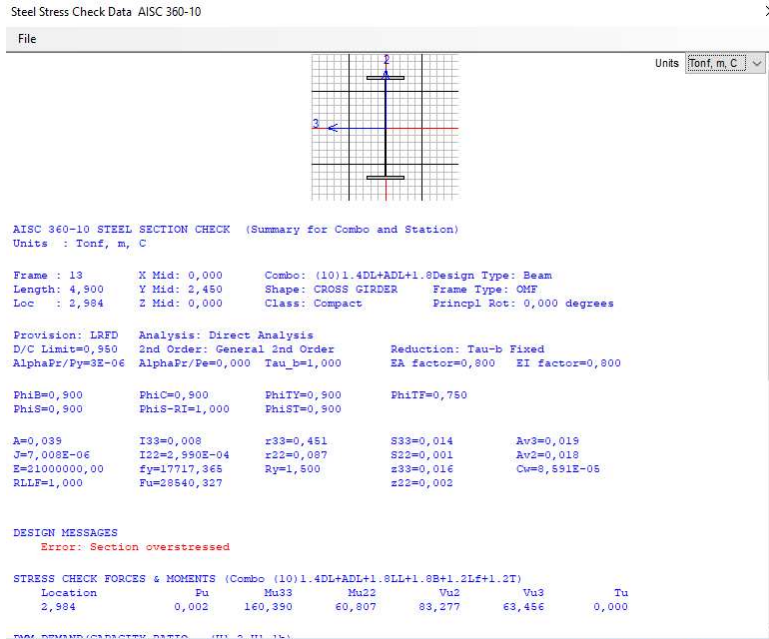


Gambar 7 Beban rem dan traksi

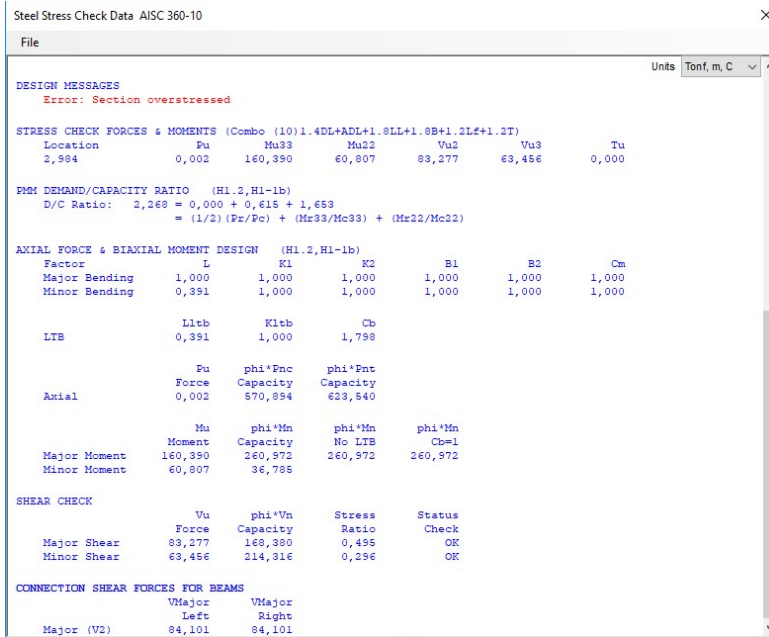


Gambar 8 Beban suhu

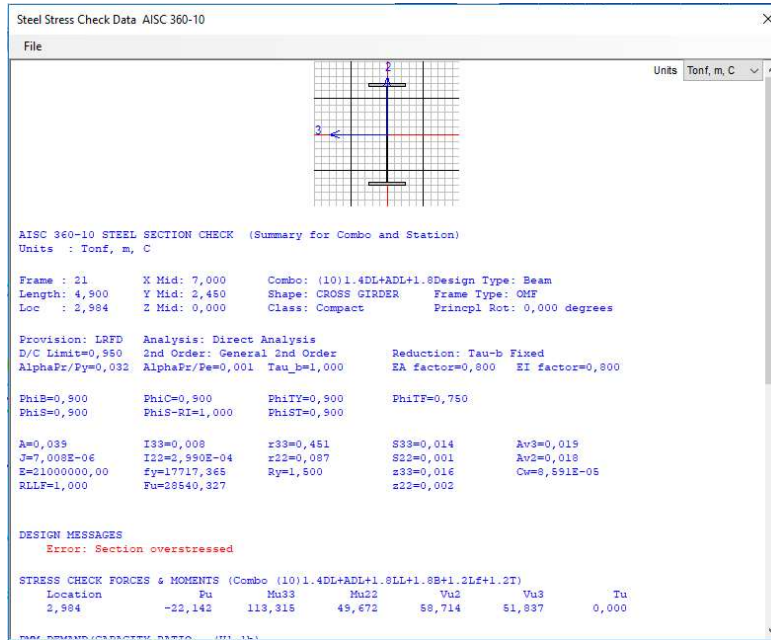
Lampiran 8. Hasil Run Batang/Frame Overstressed sebelum perkuatan



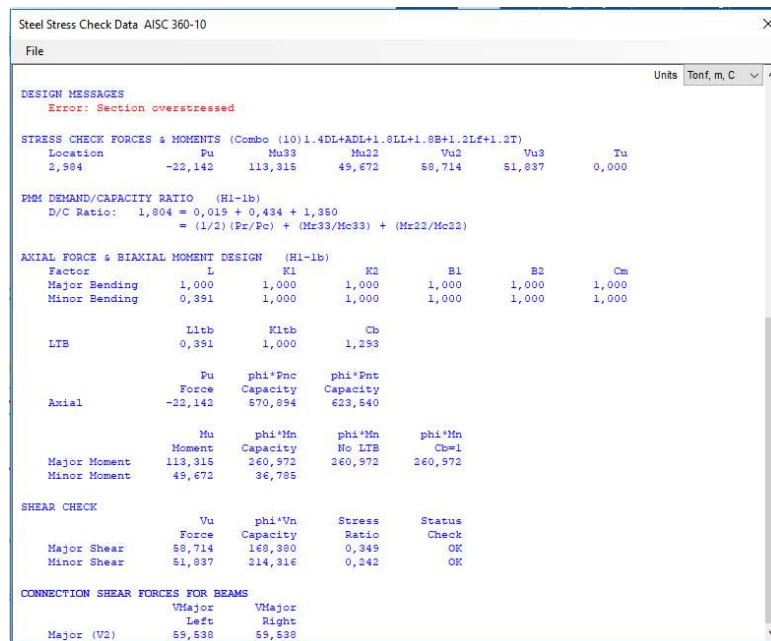
Gambar 1 Batang/frame 13 (IWF1100.400.16.28 mm)



Gambar 1 Lanjutan

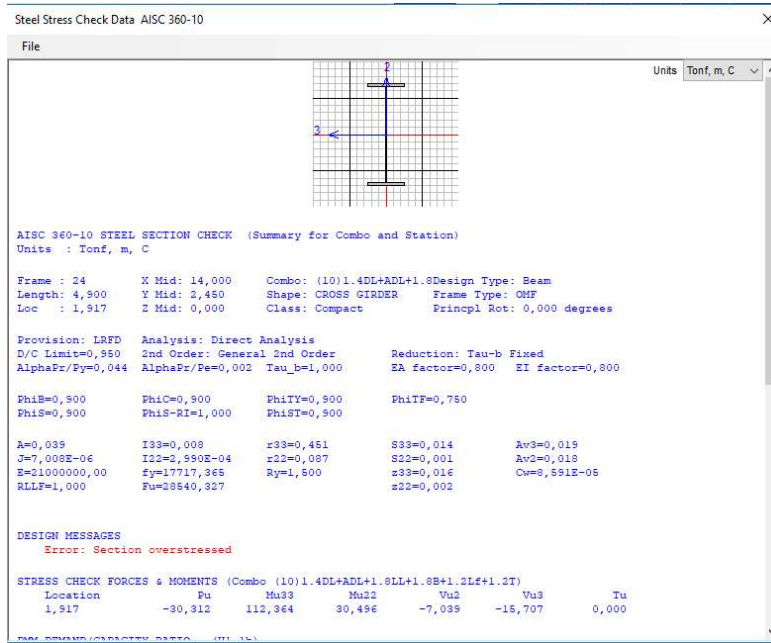


Gambar 2 Batang/frame 21 (IWF1100.400.16.28 mm)

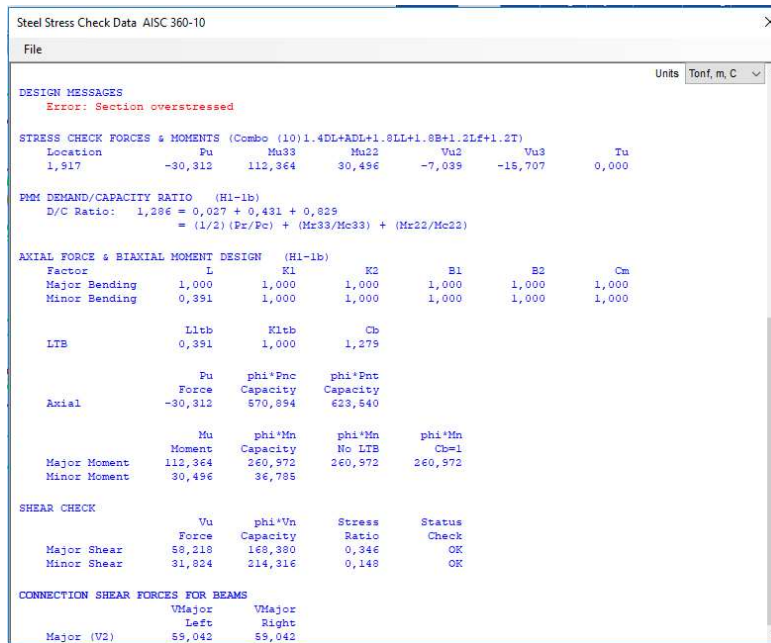


Gambar 2 Lanjutan

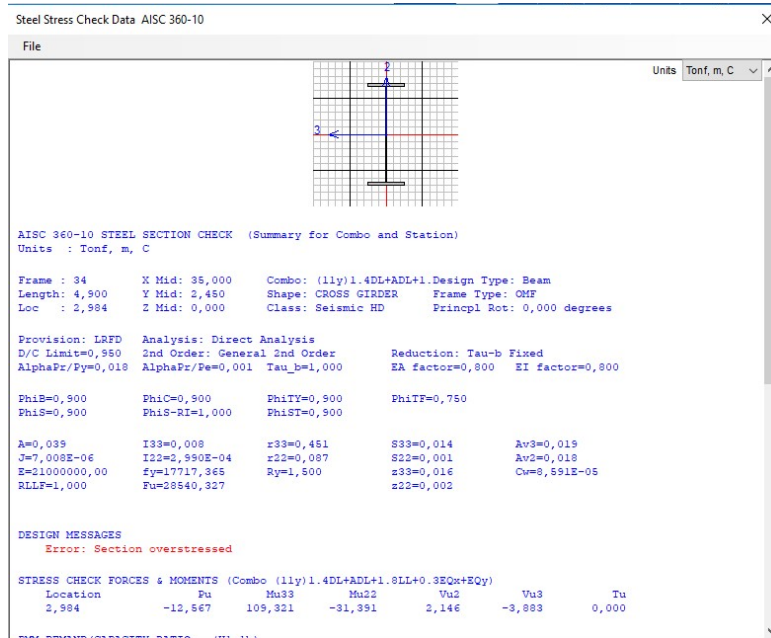




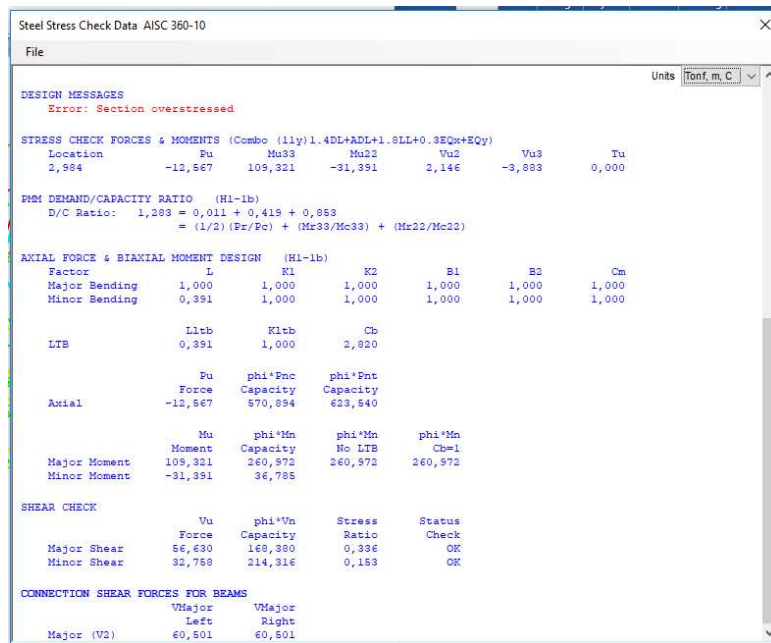
Gambar 3 Batang/frame 24 (IWF1100.400.16.28 mm)



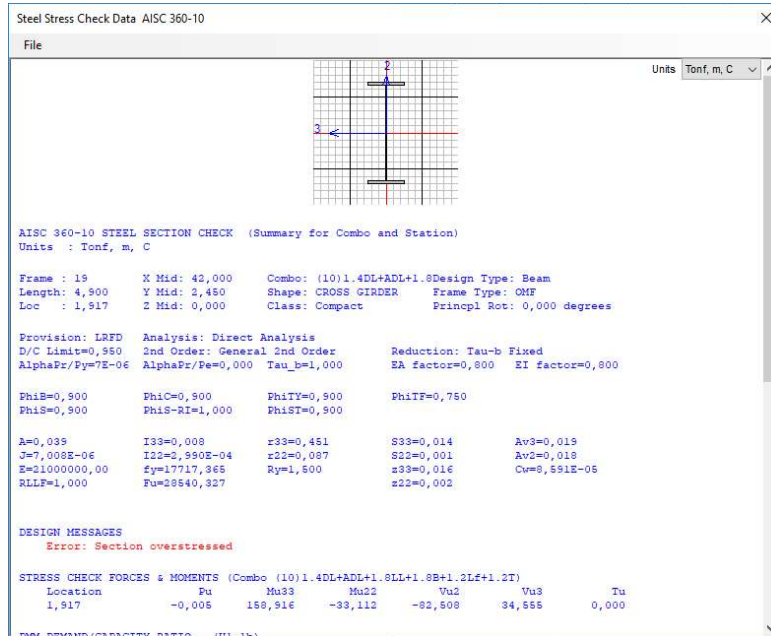
Gambar 3 Lanjutan



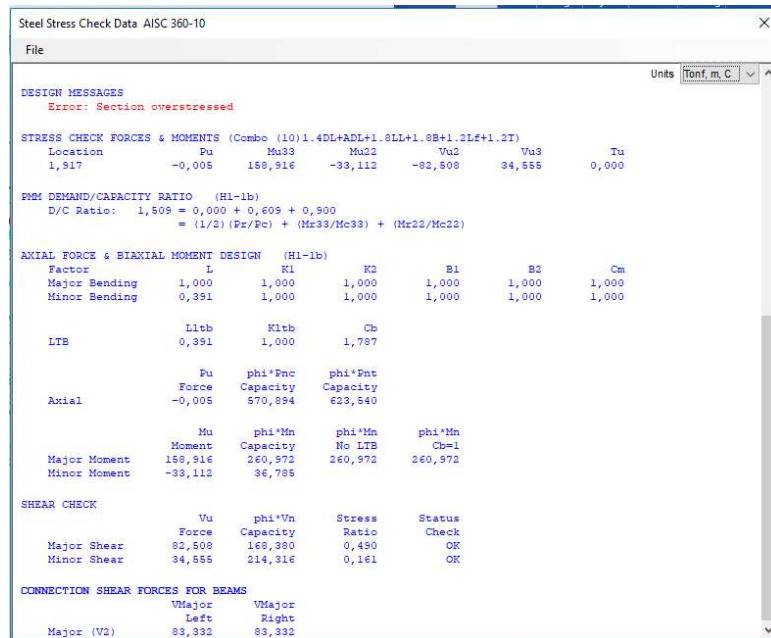
Gambar 4 Batang/frame 34 (IWF1100.400.16.28 mm)



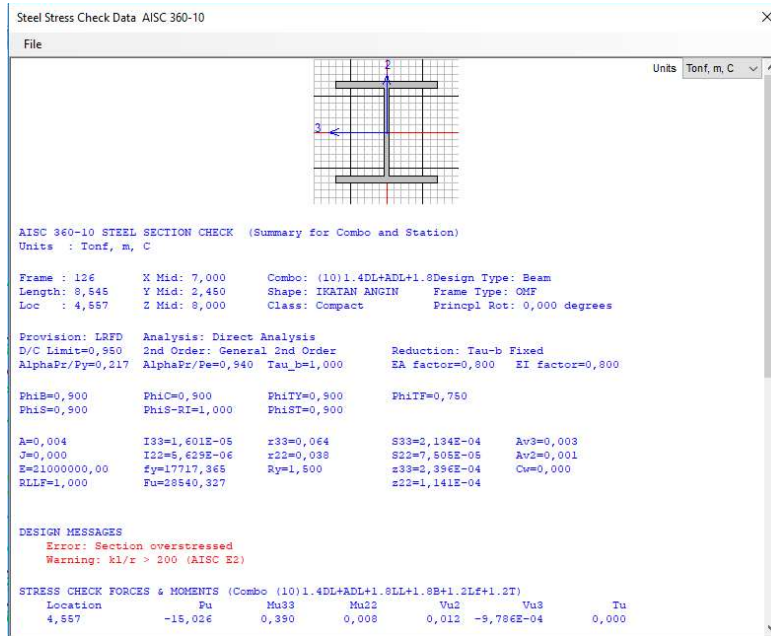
Gambar 4 Lanjutan



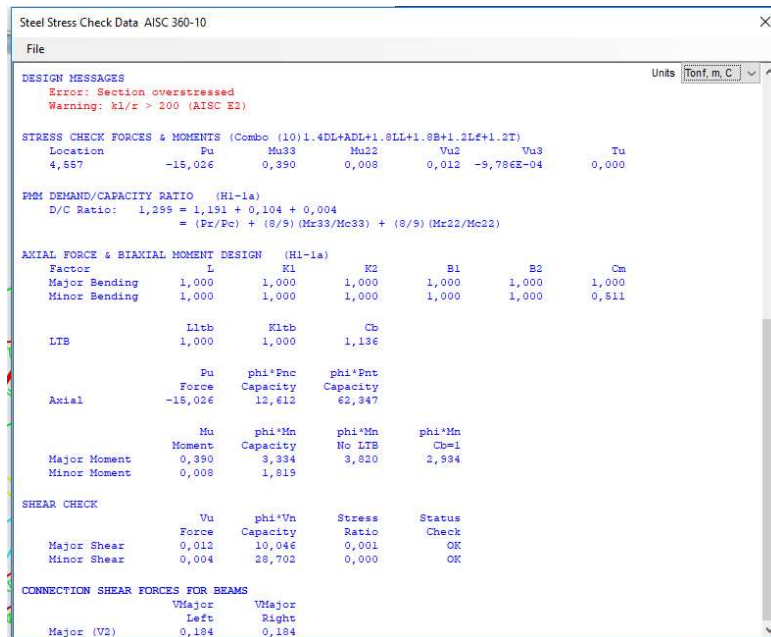
Gambar 5 Batang/frame 19 (IWF1100.400.16.28 mm)



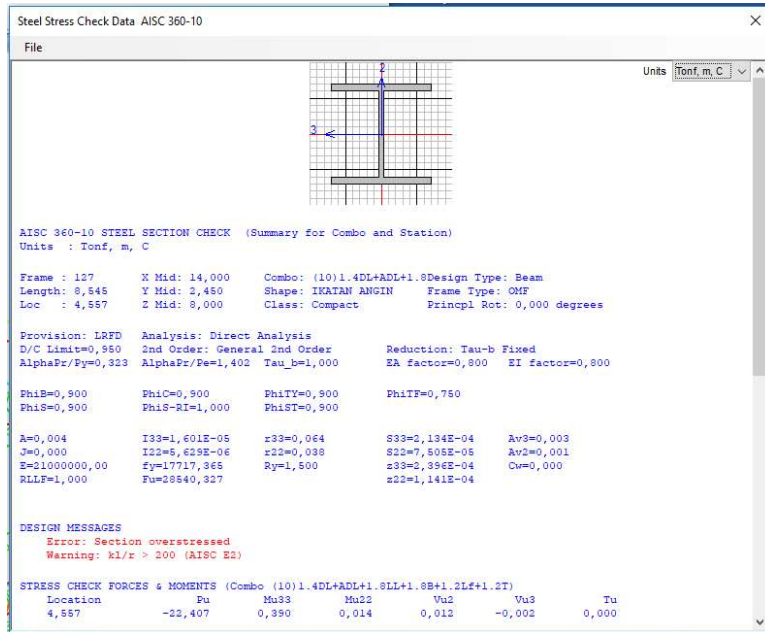
Gambar 5 Lanjutan



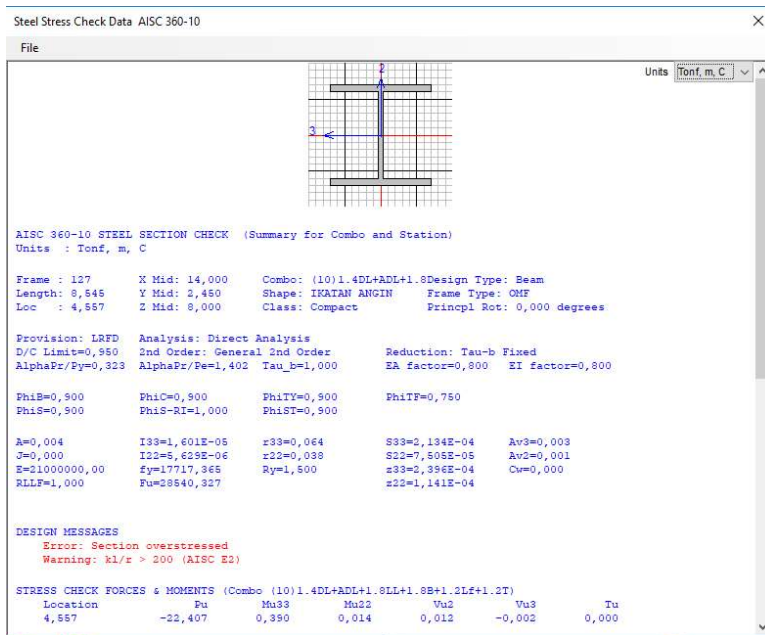
Gambar 6 Batang/frame 125 dan 126 (IWF150.150.7.10 mm)



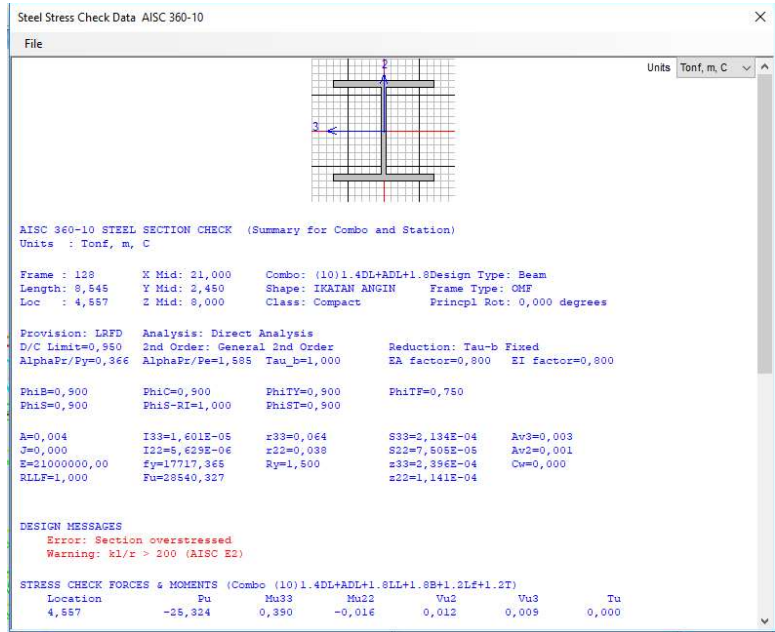
Gambar 6 Lanjutan



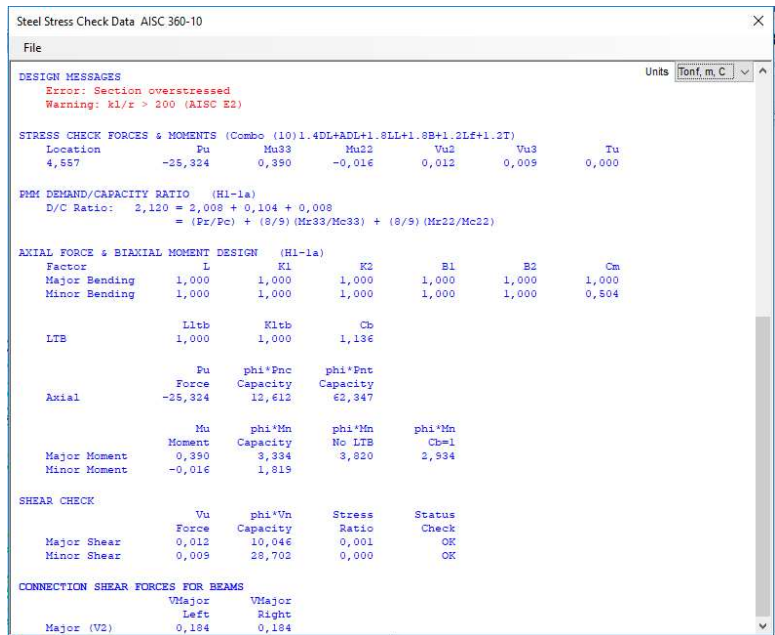
Gambar 7 Batang/frame 127 dan 134 (IWF150.150.7.10 mm)



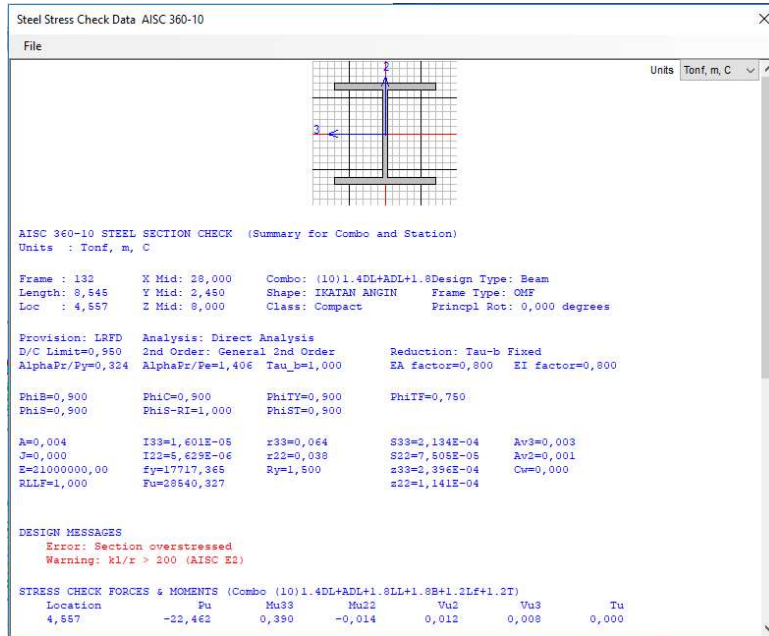
Gambar 7 Lanjutan



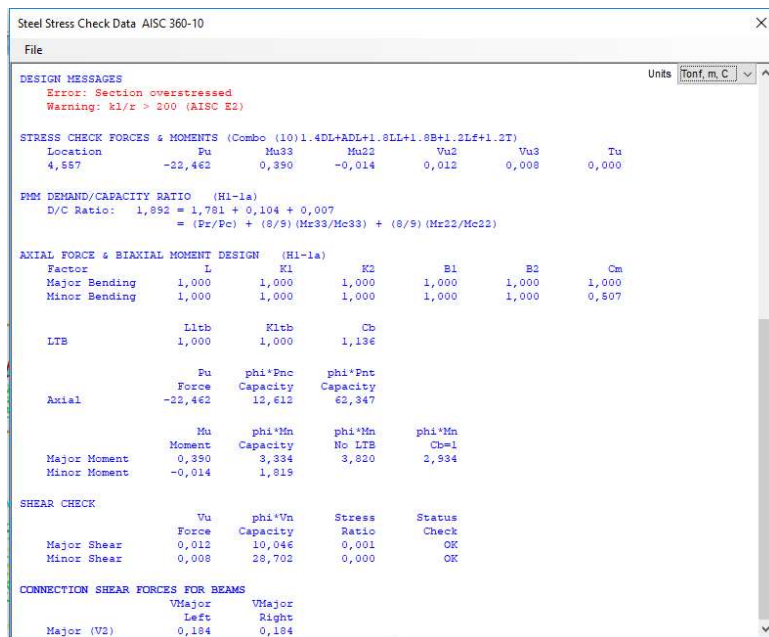
Gambar 8 Batang/frame 128 dan 133 (IWF150.150.7.10 mm)



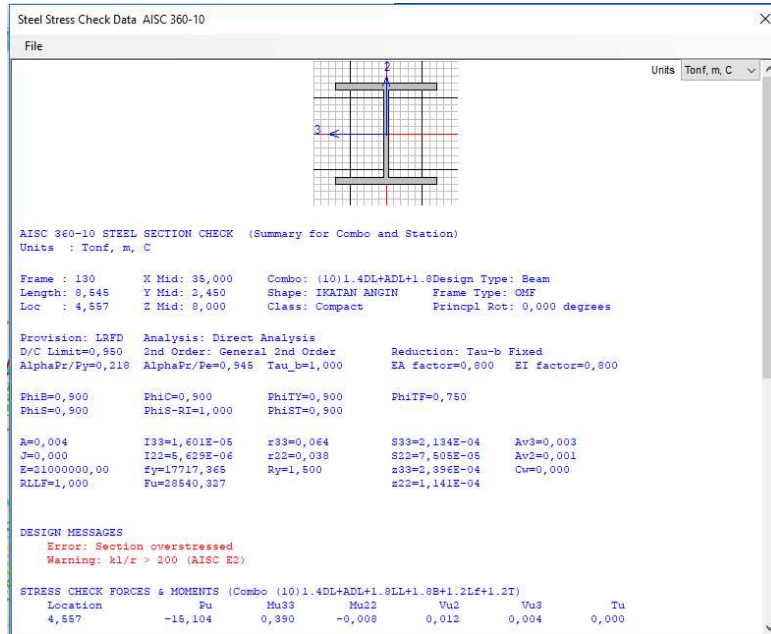
Gambar 8 Lanjutan



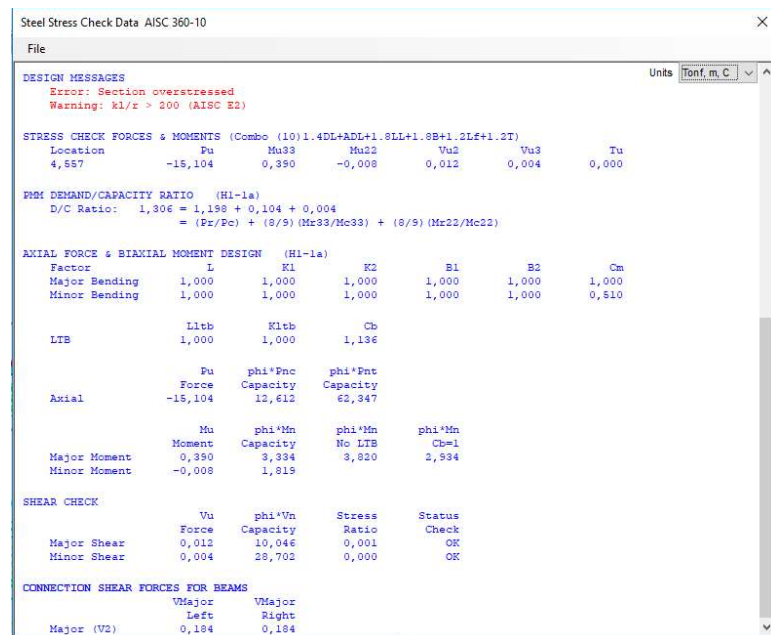
Gambar 9 Batang/frame 129 dan 132 (IWF150.150.7.10 mm)



Gambar 9 Lanjutan

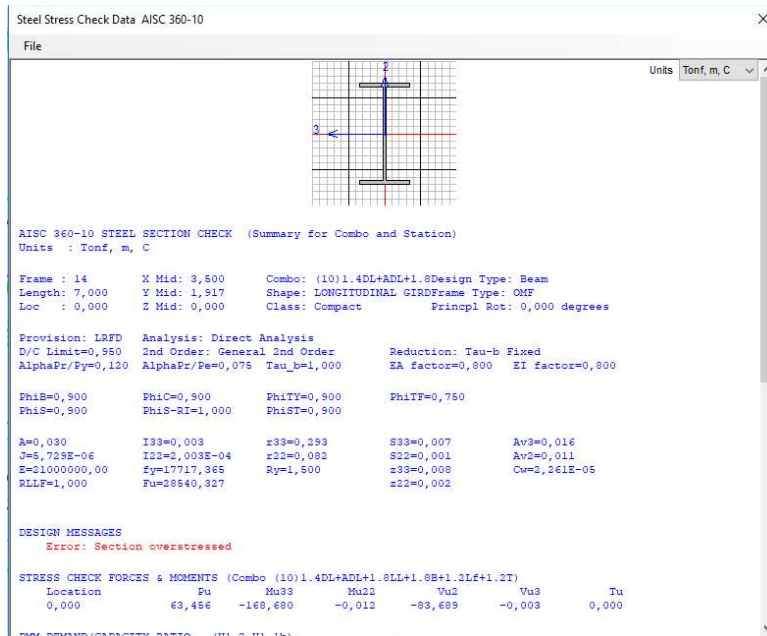


Gambar 10 Batang/frame 130 dan 131 (IWF150.150.7.10 mm)

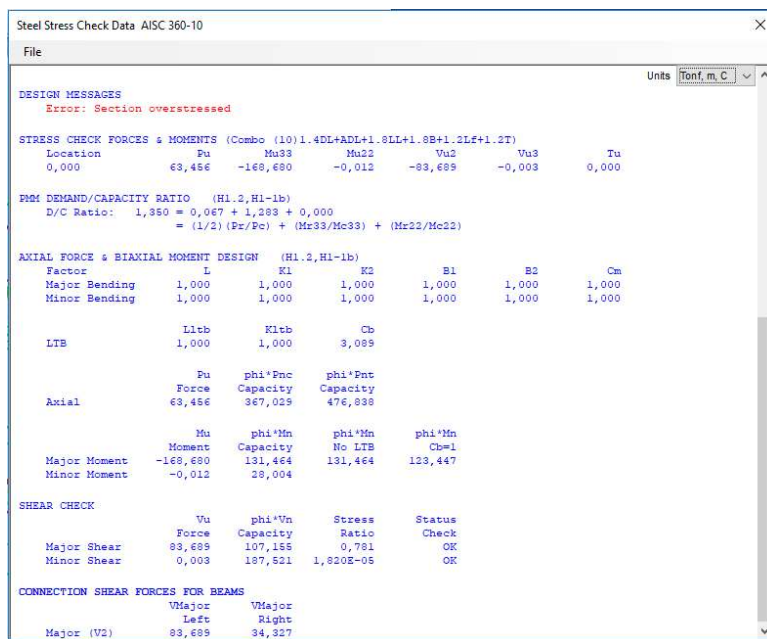


Gambar 10 Lanjutan

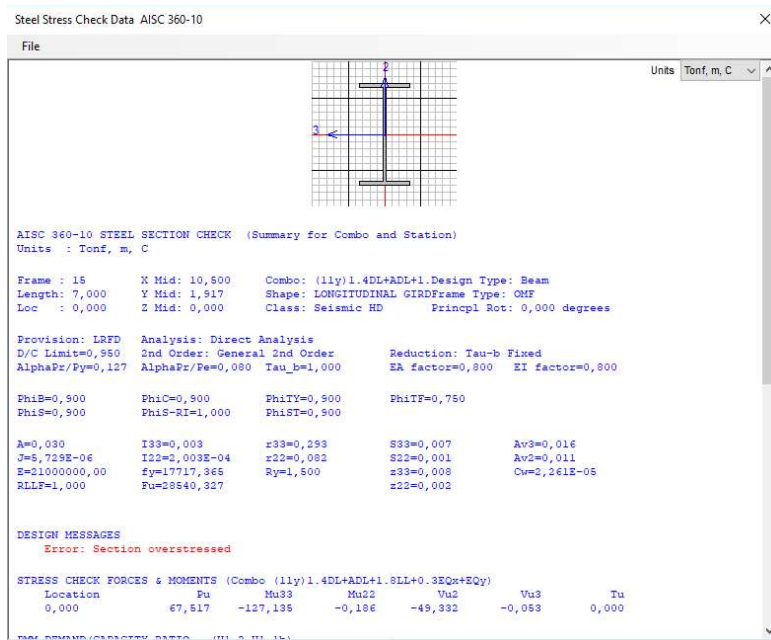




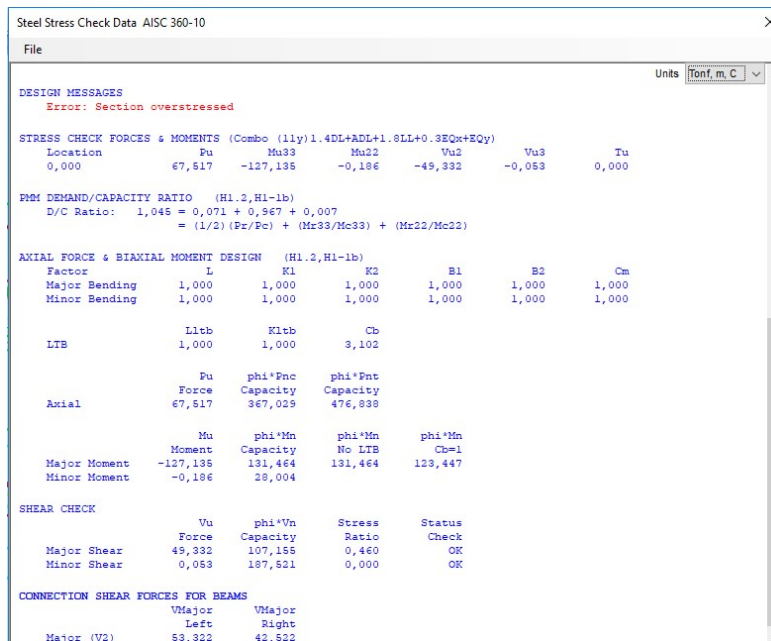
Gambar 11 Batang/frame 22 dan 14 (IWF700.350.16.28 mm)



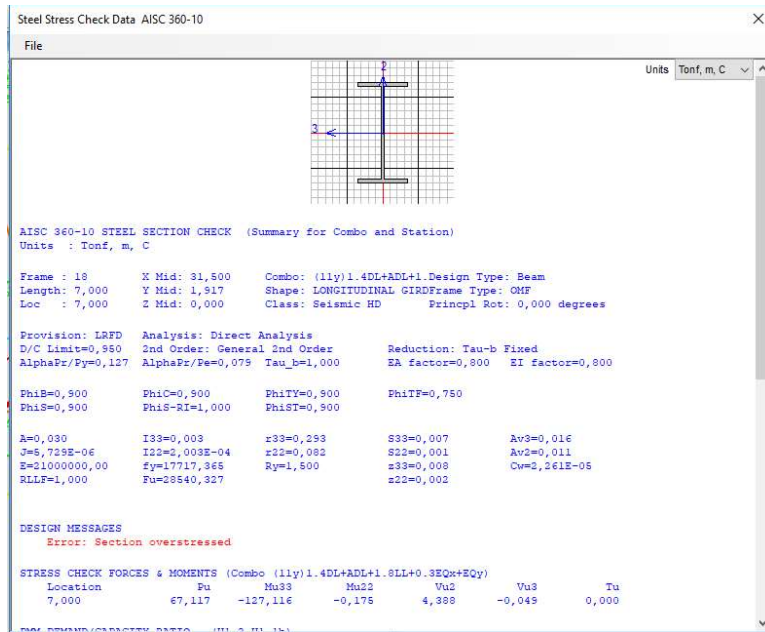
Gambar 11 Lanjutan



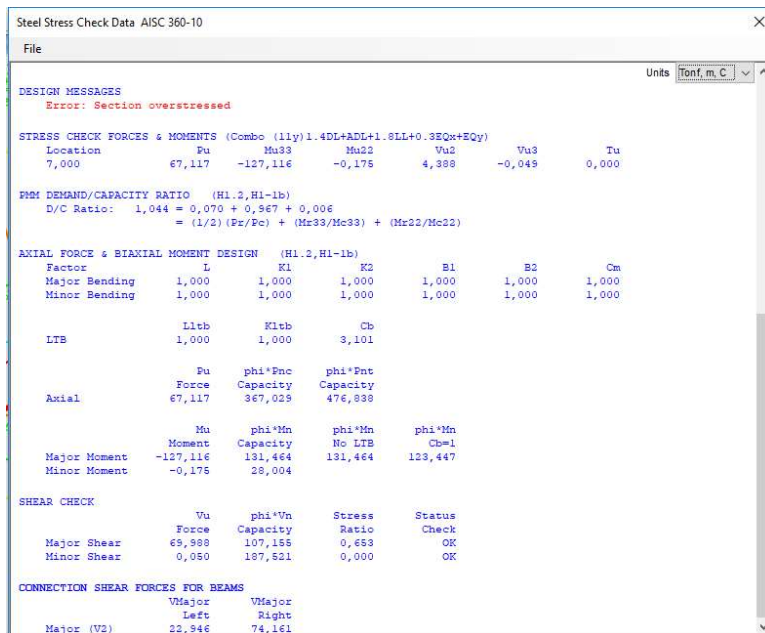
Gambar 12 Batang/frame 23 dan 15 (IWF700.350.16.28 mm)



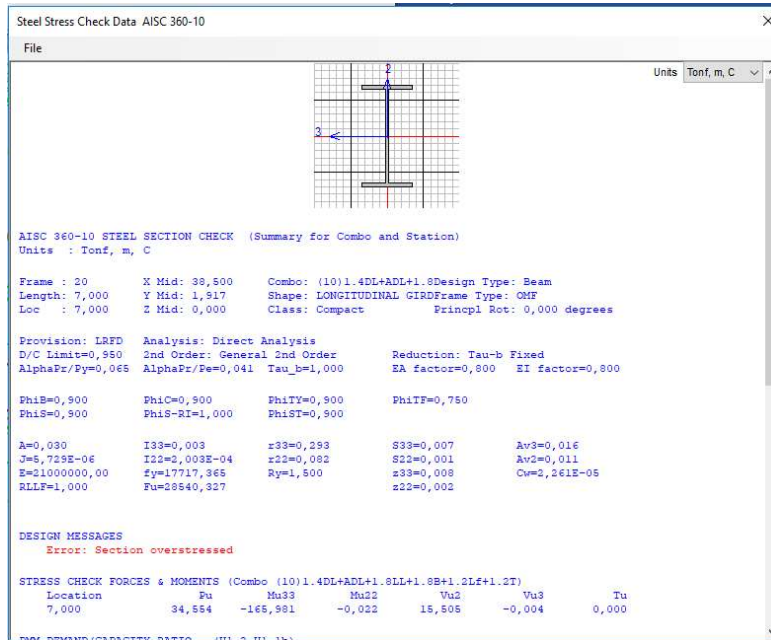
Gambar 12 Lanjutan



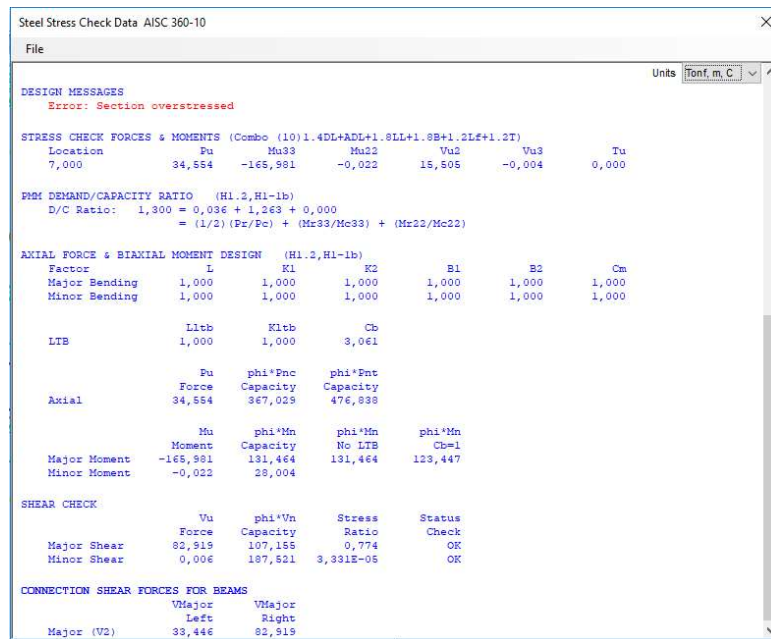
Gambar 13 Batang/frame 27 dan 18 (IWF700.350.16.28 mm)



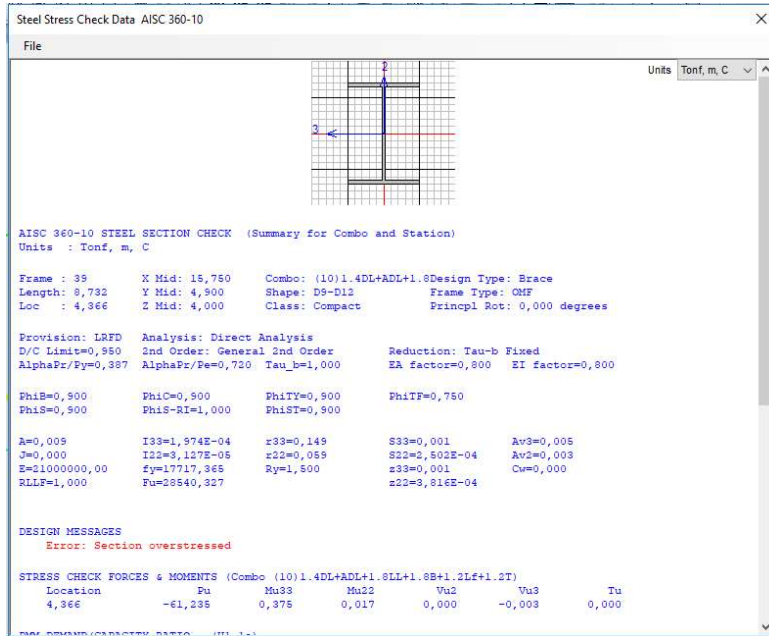
Gambar 13 Lanjutan



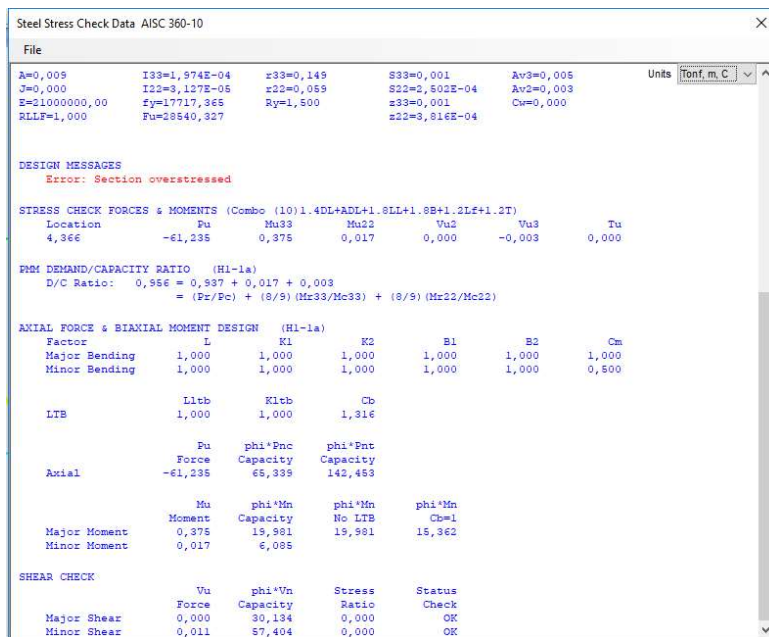
Gambar 14 Batang/frame 29 dan 20 (IWF700.350.16.28 mm)



Gambar 14 Lanjutan



Gambar 15 Batang/frame 35 dan 39 (IWF350.250.9.12 mm)



Gambar 15 Lanjutan