

CE388 - FUNDAMENTALS OF STEEL DESIGN

2011-2012 Spring Term

Homework II

Due date: 29 March 2012

Submit your homework at class time or alternatively to course instructors before 11:59am. Fifty percent penalty applies to homeworks submitted on 29 March 2012 between 11:59am and 17:00pm. Homeworks submitted thereafter will receive no credit.

1. Consider a pin ended I-section column constructed with this type of steel. Assuming that the material fully yields at 250 MPa ($\sigma_y=250$ MPa), calculate the following:

- a) Determine the initial elastic modulus (E) for this type of steel.
- b) On a single graph plot normalized stress (critical stress divided by the yield stress) versus slenderness (L/i) for the following cases:

Case 1: Consider the elastic critical stress

Case 2: Consider the tangent modulus critical stress

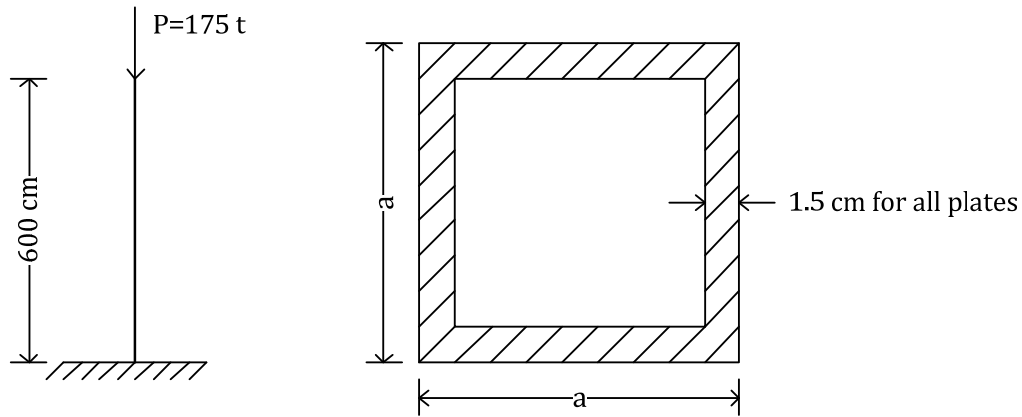
Your (L/i) values should change between zero and 300 for case 1 and between 80 and 300 for case 2.

Strain	Stress (MPa)
0	0
0.0001	20
0.0002	40
0.0003	60
0.0004	80
0.0005	100
0.0006	119
0.0007	137
0.0008	154
0.0009	169
0.0010	183
0.0011	196
0.0012	207
0.0013	217
0.0014	226
0.0015	233
0.0016	239
0.0017	244
0.0018	247
0.0019	249
0.0020	250
0.0021	250
0.0022	250
0.0030	250

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2. For the box column shown below determine the value of "a" such that the column can safely carry a load of 175 tons according to TS 648 Provisions. EY Loading, St37 Steel. Use recommended K values.



3. For the HEA 400 column shown below determine the allowable load P (P_{all}) according to TS 648 Provisions. EY Loading, St37 Steel.

