Major Exam CEL332 2008

Answer the Short Questions First, before doing the Numerieal Problems. Always Assume fy = 250 Mpa. Submit the Part 1 answer sheet to get the book.

1) What are the following 3

a) Allowable Tensile Stress in Uniaxial Teusion
b) Allowable Tensile Stress in Bending
e) Allowable Average Shear Stress
d) Allowable Maximum Shear Stress
e) Allowable Stress in Bearing
f) Allowable Stress in Compression in Bending

2) Explain the possible failure phenomena of the following beam under two point loading that the beam bas to be designed for. a) I Girder steel beam (like in the problem in 10.4) b) Under reinforced Concrete beam. Explain with appropriate diagram. For conerete beam, draw appropriatc load-deflection diagram for the two modcs of failure. 8

3) A Simply Supported Beam of 20 m Length. It has a Uniaxial Compression P_{ax} , a UDL of w including self weight and three Concentrated Vertical Load P_1 at equal interval of l/4. Draw the Mending Moment, Shear Force Diagram. 3

4) Name different type of support conditions (beam to column) and plot their behavior in the moment curvature graph. 5

5) Under the following d/tw conditions, mention the number of stiffeners required: a)d/tw = 75 b) d/tw = 200 c) d/tw = 500 3

6) Compare the differencces between a joint with rivets and welding. 3

Open Book Question:

7) Calculate the Maximum deflection for Problem 2. 5

8) Design the web-splice for the following condition using moment and shear plates. M=1400 kNm, V = 150 kN. Diagram shown. Ixx = 635,000 cm^4. 7

9) A Column transmits a load of 450 kN to an ISMB 450 beam through a bearing plate of 140 mm (same as its flange width). Determine the length of bearing plate so that the web is safe. 10

10) Design the rivets connecting the augles of a bracket with the flange of a column as shown in Fig. below for hot driven shop rivet using 22mm dia @ 75 mm pitch. 8

11) A beam of 20 m span consists of ISMB 600 and two flanges of 300 x 15 mm. Determine the

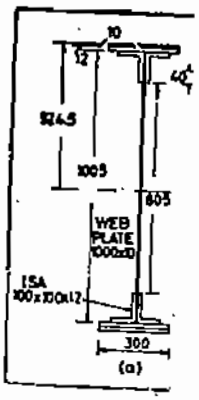
maximum moment this beam could carry, if the compression flange is torsionally restrained at the ends only and if

a) the cover plates are provided one on each flange

b) both the cover plates are provided on the compression side and one of them is curtailed at 2 m from either end.

The Flange Plates are connected to the beam by 22 mm dia rivets, 2 rivets on a section in each case. 15

12) In both the cases above, what are the maximum width of cover plate that would be allowed for plate thickness of 15 mm. 5



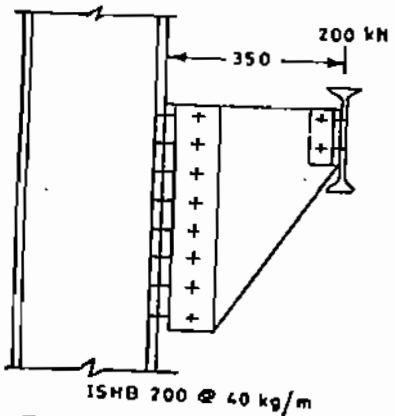


Fig. 6-20 Bracket Connection