

Practice Midterm 1: Tension and Compression Members

10/11/01, 502 Davis Hall, 2 hours

Name _____

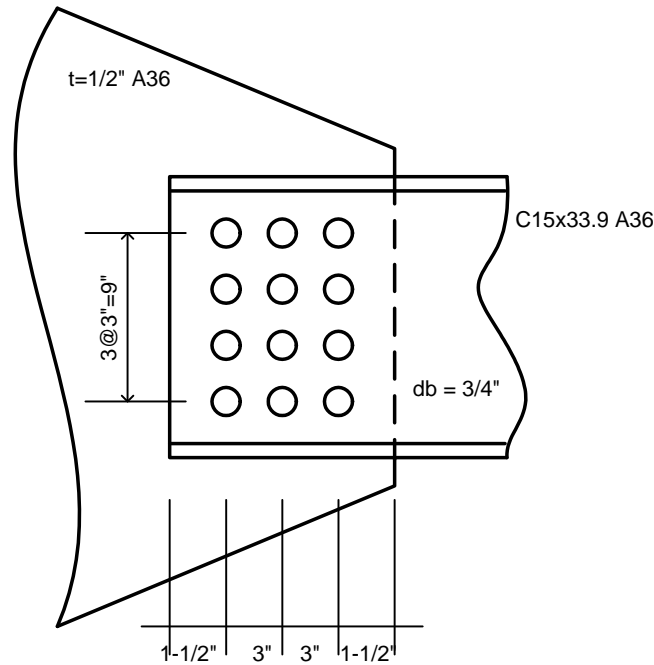
Problem	Points	Maximum
1		25
2		25
3		25
4		25
total		100

Honor Pledge:

I have neither give nor received aid during this examination, nor have I concealed any violation of the Honor Code.

Problem 1: (25%)

Determine the maximum allowable tensile load T_u (25% dead load and 75% live load) for a single C15x33.9 fastened to a 1/2-inch gusset plate as shown below. Use A572 gr. 50 steel for both the channel and the gusset plate. Assume the bolts have a 3/4-inch diameter. Check all applicable yielding, fracture and block-shear failure modes.



Problem 2: (25%)

Select a pair of A572 Gr. 50 angles to support a tensile dead load of 48 kips and live load of 32 kips and has a length of 24 feet. Assume the angles are back-to-back and separated by a 3/8-inch gusset plate. Assume the angles are welded to the gusset plate by both longitudinal and transverse welds. Make sure the slenderness ratio does not exceed 300.

Problem 3: (25%)

A 29-foot long column carries a 75 kips dead load and a 175 kips live load. It is in a braced frame, with both top and bottom pinned, and has an additional lateral support at mid-height in the weak direction.

1. Select the lightest A572 Gr. 50 W-section.
2. Select the lightest A572 Gr. 65 section.

Problem 4: (25%)

Column A-B is a W14x176 A572 Gr. 50 section. It carries a 385 kip dead load and a 1125 kip live load. It is a part of an unbraced frame, shown. In the plane perpendicular to this frame, the column bends about its weak axis and is supported laterally at points A, B, C and at mid-story-heights.

Is such column A-B adequate according to the AISC LRFD Code?

