

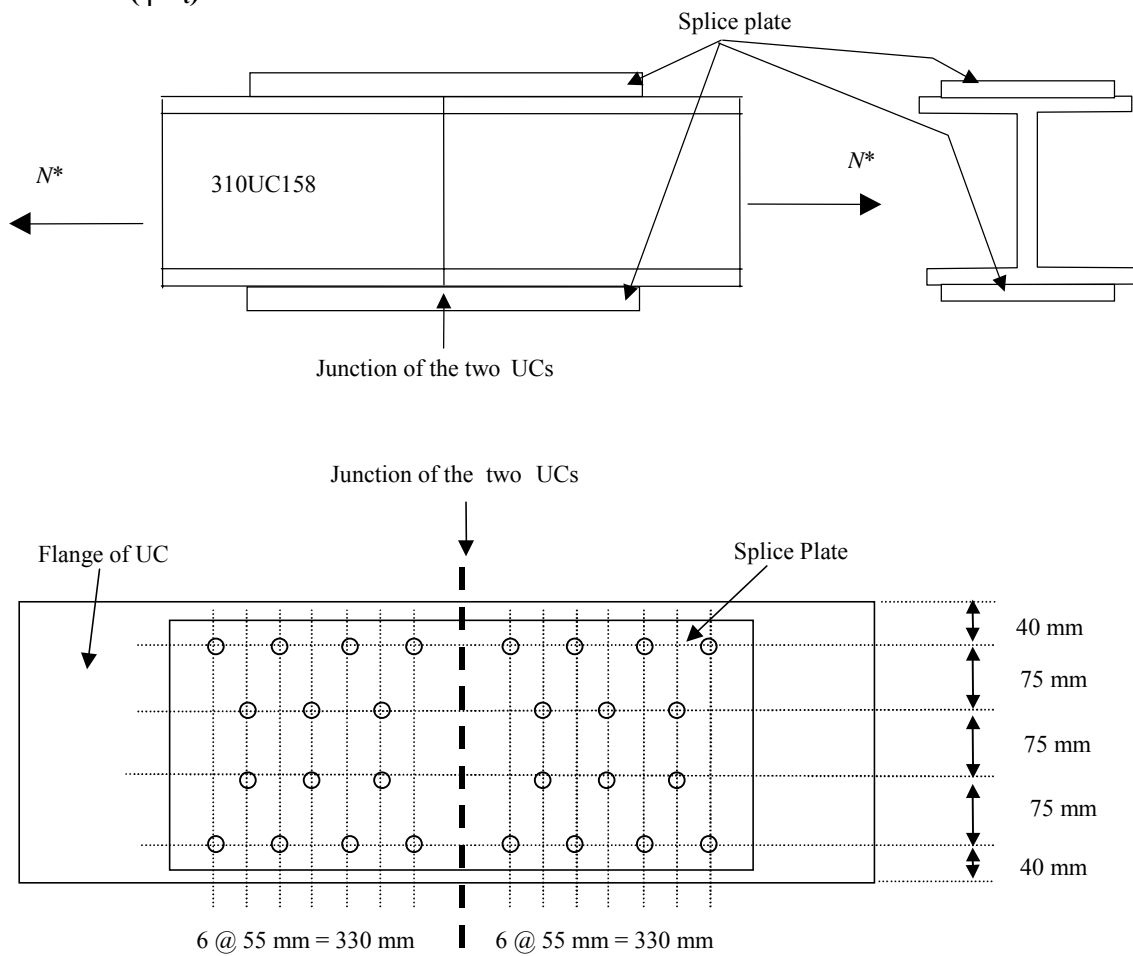


Steel Structures 1

Tutorial Set 1 - Tension

- 1) A Grade C350 $75 \times 75 \times 2.0$ SHS is being used as a brace member in a frame and is subjected to a design axial tension of $N^* = 150$ kN. **Determine the design section capacity in tension (ϕN_t) of the section and hence establish whether the member is adequate.** It may be assumed that there are no holes in the section, and that the end connection provides a concentric, uniform force distribution.

- 2) A tension splice connection is located between two 310UC158 sections in Grade 300 steel. The two splice plates are bolted to the top and bottom flanges of the UC. The arrangement of **26 mm diameter bolt holes** on each flange is shown in Figure 1. It may be assumed that the splice plates and the bolts are sufficient to take the design axial tension. **What is the design section capacity in tension (ϕN_t) of the bolted UC section?**



Plan

Figure 1: Bolted UC Tension Splice

- 3) As part of a truss, a **single** angle sections, Grade 300, are used as the diagonal members. Each angle is connected by one leg only to the web of a T-section as shown in Figure 2. The design axial tension in the member is $N^* = 600$ kN. The angles are bolted to the web of the T section by a single line of 16 mm bolts (allow 2 mm oversized holes). It may be assumed that the bolts have sufficient capacity. **Determine the minimum mass equal angle required.** Include the design section capacity (ϕN_t) of the section chosen.

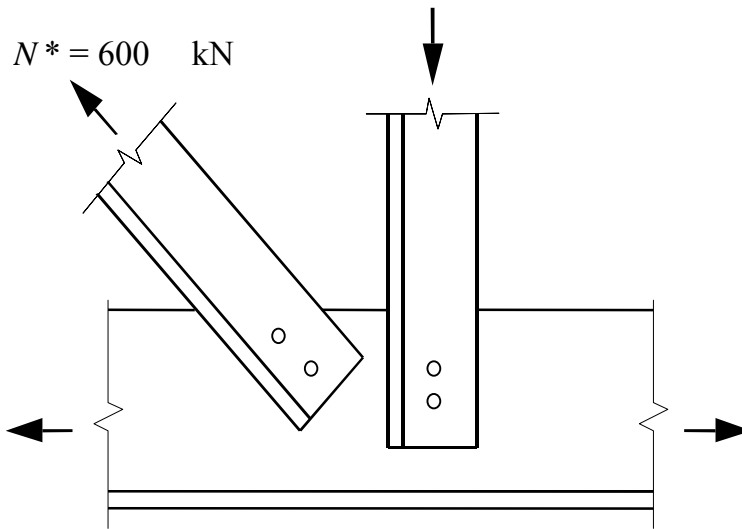


Figure 2: Detail of a Truss

It is anticipated that students should be able to complete these tutorial questions during the allocated tutorial time.

In the exam only annotated versions of the Standard AS 4100 and the OneSteel/Smorgon Steel section properties are permitted. Hence it is good practice to attempt these questions using just the standard AS 4100 and not referencing the lecture notes.

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Have you checked your USyd email account recently? Many regular email updates on Steel Structures are sent to your university email address, and you may be putting yourself at a disadvantage by not reading those messages. I would recommend that students check their USyd email account at least twice a week.