AE 670 Aerospace Structural Analysis-I
Assignment No. 8

8.1 A built-up beam with the cross section shown is subjected to a vertical shear force of 10000 in.-lb. The flange angles are steel ($E = 30 \times 10^6$ psi) and the web is aluminum ($E = 10 \times 10^6$ psi). Determine the shear stress at the center of the web.
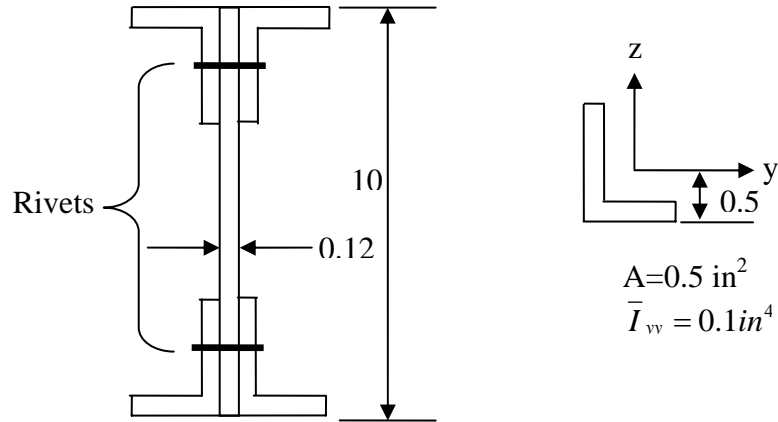
Rivets

10

0.12

z

y

0.5

$A = 0.5 \text{ in}^2$

$\bar{I}_{yy} = 0.1 in^4$

Figure 1

8.2 The angle section shown is loaded by a vertical force of 10,000 lb through the shear center. Determine the shear stress at A.
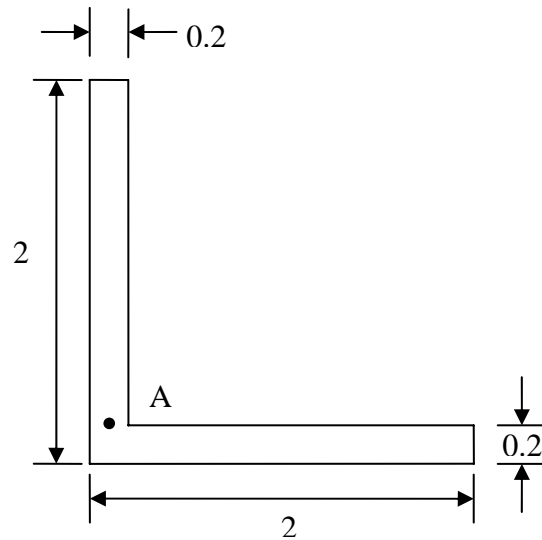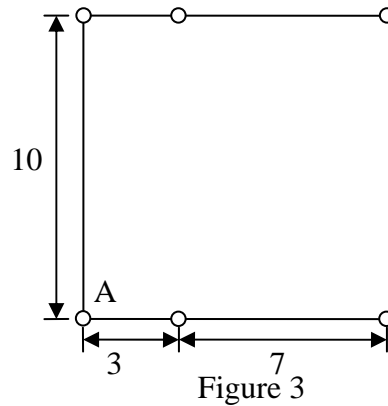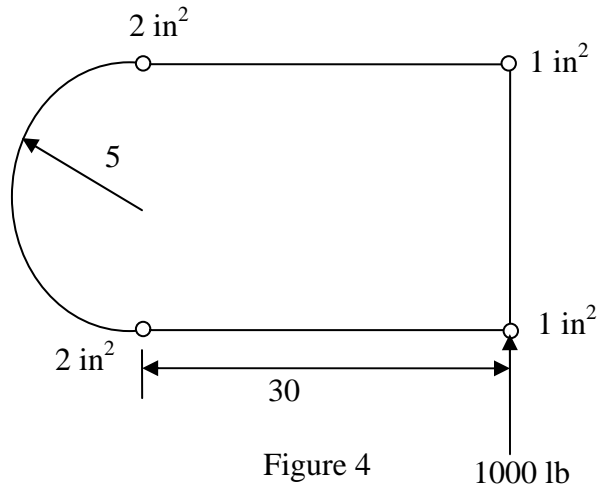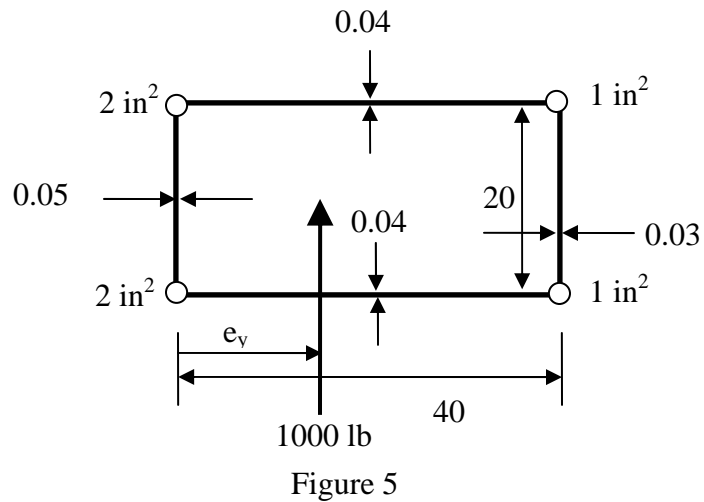
0.2

2

A

0.2

2

Figure 2

8.3 Determine the shear center of the idealized section shown. The area of all longitudinals is 1 in^2.



Figure 3

8.4 Determine the shear-flow distribution in the idealized section shown.

Figure 4   1000 lb

8.5 (a) Determine the shear-flow distribution for a 1000-lb shear force at the shear center of the idealized section shown. (b) Compute the horizontal location of the shear center.

Figure 5

8.6 An idealized section is subjected to a vertical shear force of 1000 lb, as shown. All longitudinals have an area of 1 in.^{2}, and all webs are 0.01 in. thick. Determine the shear-flow distribution.

Figure 6
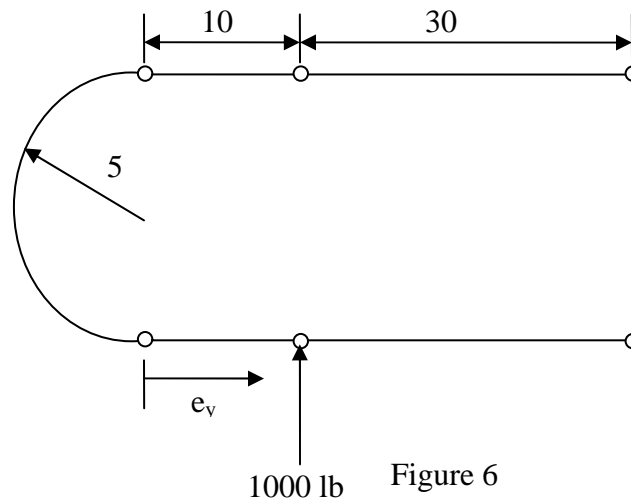
8.7 Determine the horizontal location of the shear center of the section in Prob.8.6.

8.8 Determine the shear flows and forces in the longitudinals at the large end of the tapered beam shown when the tip is subjected to a 5000 lb vertical shear force in the plane of symmetry. The areas of all longitudinals are 1 in.^{2}.
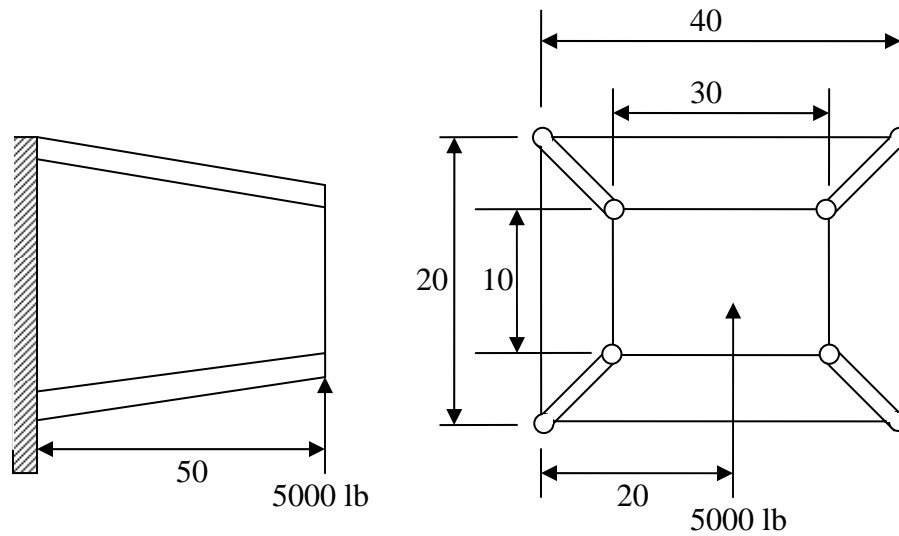

Figure 7