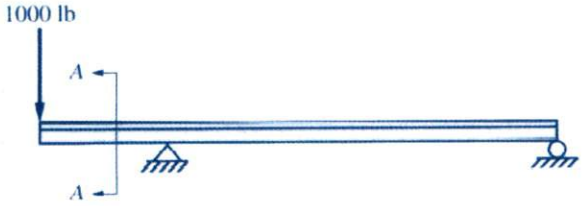
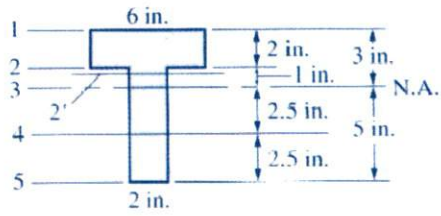
14-29

An overhanging beam having a T-section (I = 136 in.^{4}) is subjected to the concentrated load shown in Fig. P14-29. Determine the shear stresses in section A-A at the levels indicated. Show the distribution of shear stresses in the section with figures similar to those in Example 14-7.

Solution.

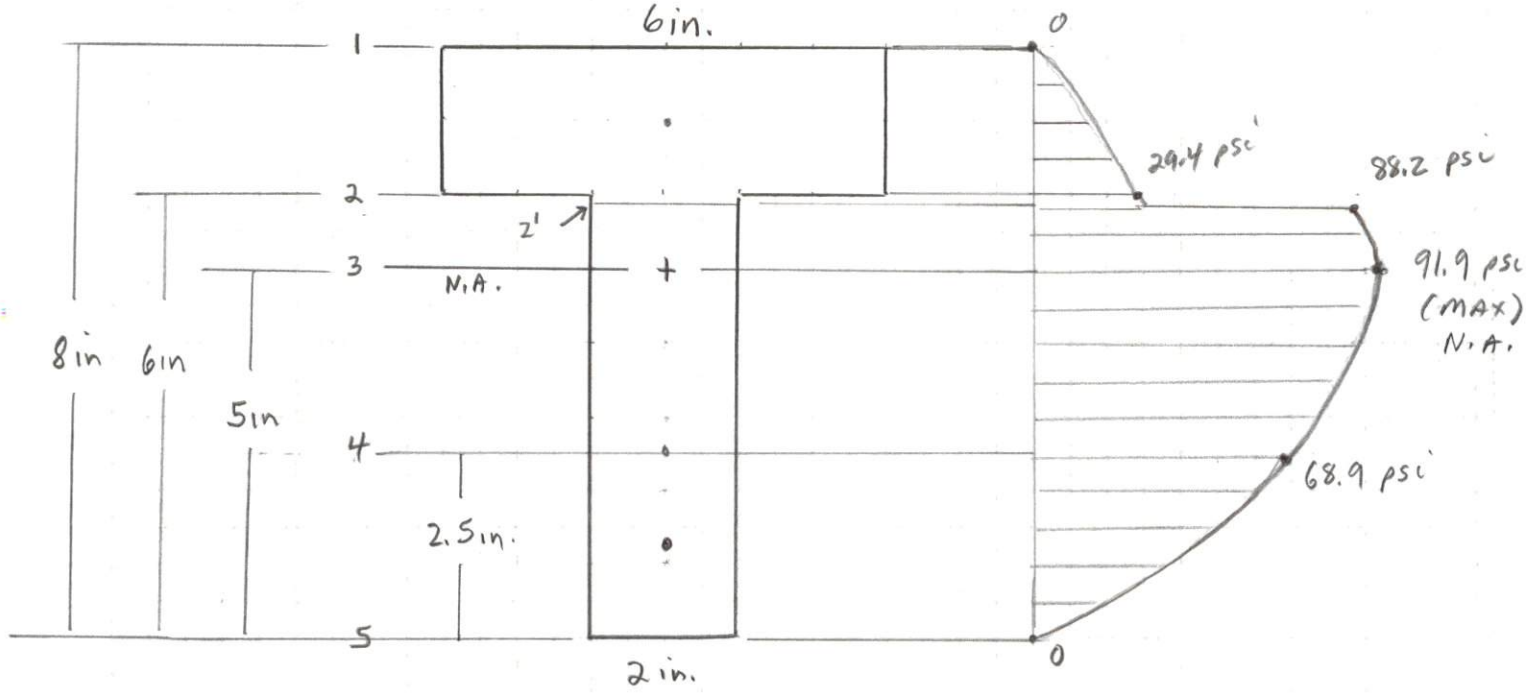




Section A-A

$I_{N.A.} = 136 \text{ in.}^4$

At section A-A, $V = -1000$ lb



$\tau_1 = 0$ psi

$$\tau_2 = \frac{VQ}{It} = \frac{(1000 \text{ lb})(6 \text{ in})(2 \text{ in})(2 \text{ in})}{136 \text{ in.}^4 (6 \text{ in})} = 29.4 \text{ psi}$$

$$\tau_{2'} = \frac{VQ}{It} = \frac{(1000 \text{ lb})(6 \text{ in})(2 \text{ in})(2 \text{ in})}{136 \text{ in.}^4 (2 \text{ in})} = 88.2 \text{ psi}$$

$$\tau_3 = \frac{VQ}{It} = \frac{1000 \text{ lb}(2 \text{ in})(5 \text{ in})(2.5 \text{ in})}{136 \text{ in.}^4 (2 \text{ in})} = 91.9 \text{ psi}$$

$$\tau_4 = \frac{VQ}{It} = \frac{1000 \text{ lb}(2 \text{ in})(2.5 \text{ in})(3.75 \text{ in})}{134 \text{ in.}^4 (2 \text{ in})} = 68.9 \text{ psi}$$

$\tau_5 = 0$ psi