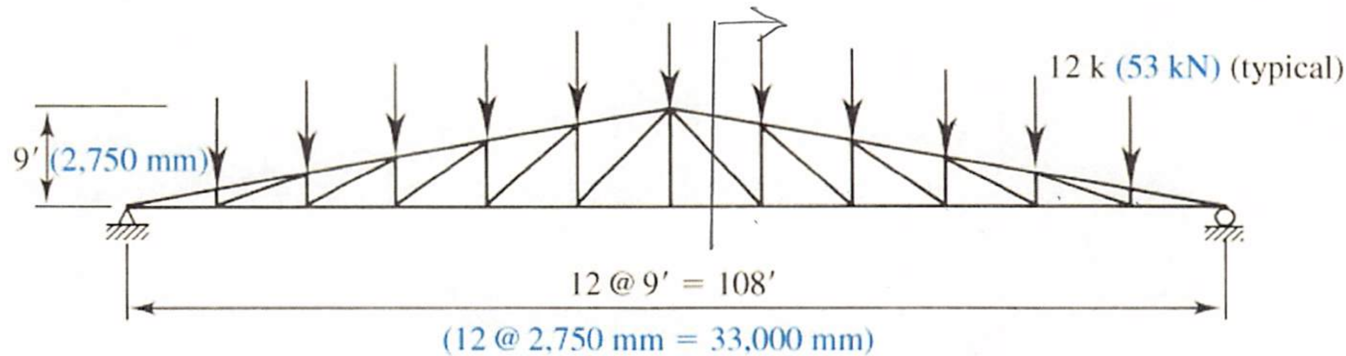
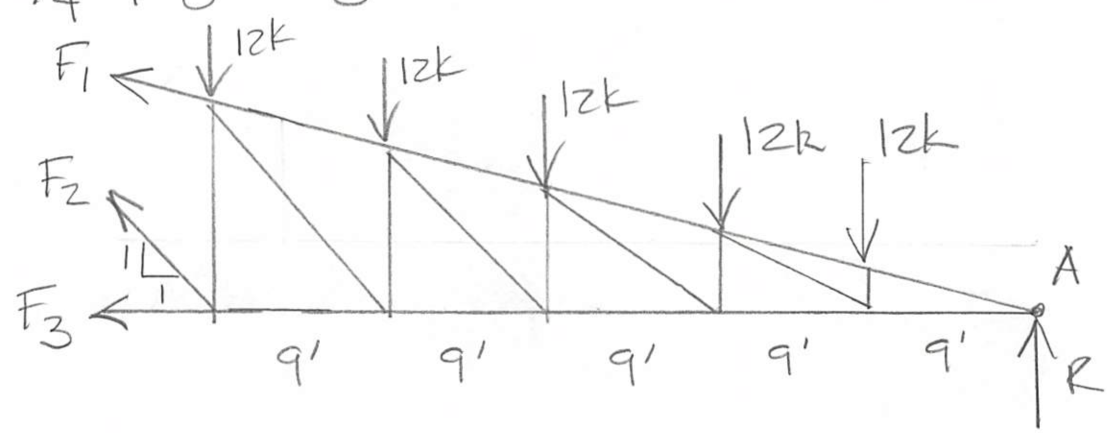
3.8-2 Use LRFD and select single-angle shapes for the web tension members of the truss loaded as shown in Figure P3.8-2. The loads are *factored loads*. Assume that a single line of at least four $^3/_4$-inch-diameter (M20) bolts will be used for each connection. Use A572 Grade 50 ($F_y = 50$ ksi (345 MPa); $F_u = 65$ ksi (450 MPa)) steel.



$d_{HOLES} = 3/4'' + 1/8'' = 7/8''$



$$\circlearrowleft + \sum M_A = 0 = 12^k(9' + 18' + 27' + 36' + 45') - \frac{1}{\sqrt{2}} F_2 (45')$$

$$\underline{F_2 = 50.92^k}$$

$$\text{REQ. } A_g = \frac{P_U}{0.9 F_Y} = \frac{50.92^k}{0.9(50\text{ksi})} = 1.132 \text{ IN}^2$$

$$\text{REQ } A_e = \frac{P_U}{0.75 F_U} = \frac{50.92k}{0.75(65\text{ksi})} = 1.045 \text{ IN}^2$$

$$\text{REQ } r_{min} = \frac{L}{300} = \frac{12.73 \text{ ft}(12 \text{ in/ft})}{300} = 0.509 \text{ in}$$

3.8-2

* CASE 2 $U = 0.8$

TRY: L 3½ x 2½ x ¼ $A_g = 1.45 in^2$ $r_{min} = 0.541 in.$ $t = 1/4 in$

- $A_g >$ REQ. A_g ✓
- $A_e = U A_n = (0.8)(1.45 in - 1(1/4")(7/8"))$
  $= 0.985 in^2 <$ REQ A_e N. G.

TRY L 3½ x 3 x ¼ $A_g = 1.58 in^2$ $r_{min} = 0.628 in$

- $A_g >$ REQ A_g ✓
- $A_e = U A_n = (0.8)[1.58 in^2 - 1(7/8 in)(0.25 in)]$
  $= 1.089 in^2 >$ REQ A_e ✓
- $r_{min} = 0.628 in >$ REQ $r_{min} = 0.509 in$ ✓ O.K.

Use L 3½ x 3 x ¼