If we assume that the bottom chord is braced at the panel points,

$$\frac{L}{r} = \frac{5(12)}{0.594} = 101 < 300 \qquad \text{(OK)}$$

ANSWER Use an MT6 × 5.

ASD SOLUTION

Load combination 3 will control. At an interior joint,

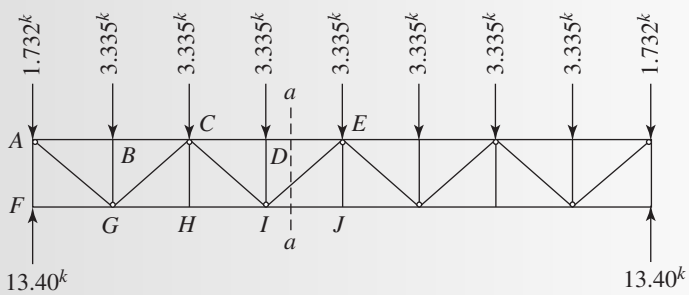
$$P_a = D + S = 1.335 + 2.0 = 3.335 \text{ kips}$$

At an exterior joint,

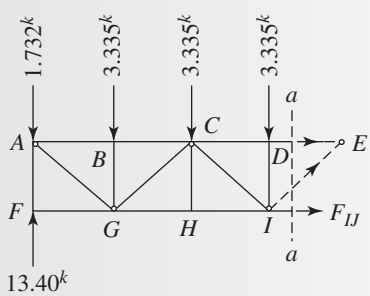
$$P_a = 0.7323 + 1.0 = 1.732 \text{ kips}$$

The loaded truss is shown in Figure 3.36a.

FIGURE 3.36



(a)



(b)

Member *IJ* is the bottom chord member with the largest force. For the free body shown in Figure 3.36b,

$$\sum M_E = 13.40(20) - 1.732(20) - 3.335(15 + 10 + 5) - 4F_{IJ} = 0$$

$$F_{IJ} = 33.33 \text{ kips}$$

For the gross section, $F_t = 0.6F_y = 0.6(36) = 21.6$ ksi

$$\text{Required } A_g = \frac{F_{IJ}}{F_t} = \frac{33.33}{21.6} = 1.54 \text{ in.}^2$$

For the net section, $F_t = 0.5F_u = 0.5(58) = 29.0$ ksi

$$\text{Required } A_e = \frac{F_{IJ}}{F_t} = \frac{33.33}{29.0} = 1.15 \text{ in.}^2$$

Try an MT6 × 5.4:

$$A_g = 1.59 \text{ in.}^2 > 1.54 \text{ in.}^2 \qquad \text{(OK)}$$

$$U = 1 - \frac{\bar{x}}{\ell} = 1 - \frac{1.86}{9} = 0.7933$$

$$A_e = A_g U = 1.59(0.7933) = 1.26 \text{ in.}^2 > 1.15 \text{ in.}^2 \qquad \text{(OK)}$$

Assuming that the bottom chord is braced at the panel points, we get

$$\frac{L}{r} = \frac{5(12)}{0.566} = 106 < 300 \qquad \text{(OK)}$$

ANSWER Use an MT6 × 5.4.

3.9 PIN-CONNECTED MEMBERS

When a member is to be pin-connected, a hole is made in both the member and the parts to which it is connected and a pin is placed through the holes. This provides a connection that is as moment-free as can be fabricated. Tension members connected in this manner are subject to several types of failure, which are covered in AISC D5 and D6 and discussed in the following paragraphs.

The eyebar is a special type of pin-connected member in which the end containing the pin hole is enlarged, as shown in Figure 3.37. The design strength is based on yielding of the gross section. Detailed rules for proportioning eyebars are given in AISC D6 and are not repeated here. These requirements are based on experience and test programs for forged eyebars, but they are conservative when applied to eyebars thermally cut from plates (the present fabrication method). Eyebars were widely used in the past as single tension members in bridge trusses or were linked in chainlike fashion in suspension bridges. They are rarely used today.

FIGURE 3.37