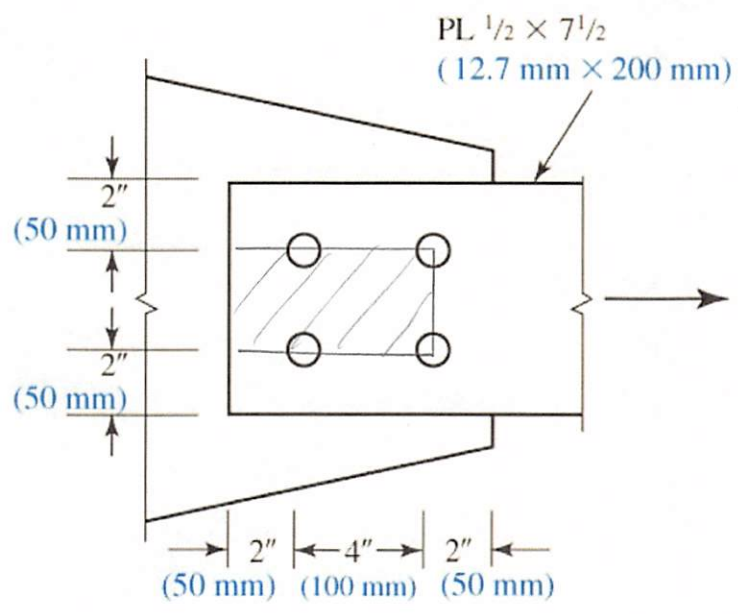


3.5-2 Determine the nominal block shear strength of the tension member shown in

Figure P3.5-2. The bolts are 1 inch in diameter, and

A36 ($F_y = 36 \text{ ksi (250 MPa)}$; $F_u = 58 \text{ ksi (400 MPa)}$) steel is used.



$$d_{\text{HOLE}} = 1 \text{ in} + \frac{3}{16} \text{ in} = 1\frac{3}{16} \text{ in}$$

$$A_{gv} = 2(\frac{1}{2} \text{ in})(6 \text{ in}) = 6 \text{ in}^2$$

$$A_{nv} = 2(\frac{1}{2} \text{ in})(6 \text{ in} - 1\frac{1}{2}(1\frac{3}{16} \text{ in})) = 4.2188 \text{ in}^2$$

$$A_{nt} = (\frac{1}{2} \text{ in})(3.5 \text{ in} - 1(1\frac{3}{16} \text{ in})) = 1.1563 \text{ in}^2$$

$$R_n = 0.6F_u A_{nv} + U_{BS} F_u A_{nt}$$

$$= 0.6(58 \text{ ksi})(4.2188 \text{ in}^2) + (1)(58 \text{ ksi})(1.1563 \text{ in}^2)$$

$$= \underline{213.89 \text{ k}}$$

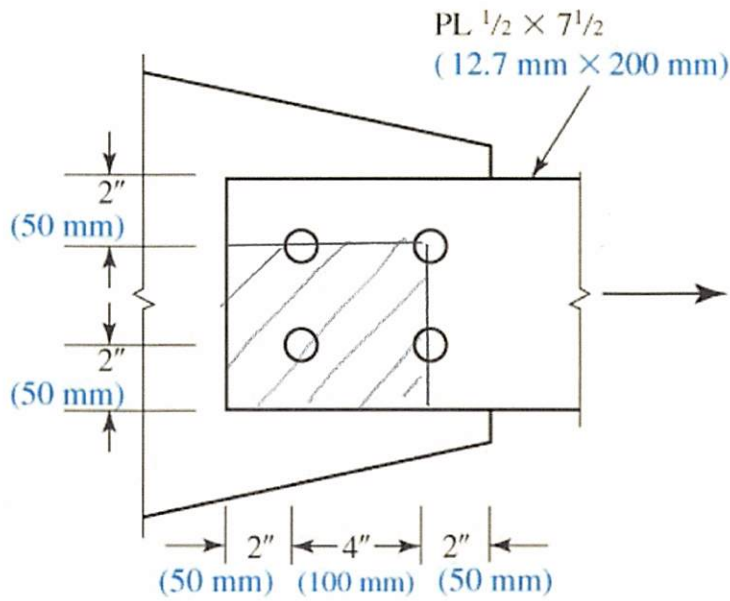
UPPER LIMIT

$$0.6F_y A_{gv} + U_{BS} F_u A_{nt}$$

$$= 0.6(36 \text{ ksi})(6 \text{ in}^2) + (1)(58 \text{ ksi})(1.1563 \text{ in}^2)$$

$$= \underline{\underline{196.67 \text{ k}^*}}$$

3.5-2 Determine the nominal block shear strength of the tension member shown in Figure P3.5-2. The bolts are 1 inch in diameter, and A36 ($F_y = 36$ ksi (250 MPa); $F_u = 58$ ksi (400 MPa)) steel is used.



$$A_{gv} = 6 \text{ in} \left(\frac{1}{2} \text{ in} \right) = 3 \text{ in}^2$$

$$A_{nv} = A_{gv} - 1\frac{1}{2} \text{ Holes} = 3 \text{ in}^2 - 1\frac{1}{2} \left(1\frac{3}{16} \text{ in} \right) \left(\frac{1}{2} \text{ in} \right) = 2.109 \text{ in}^2$$

$$A_{nt} = \left[\left(3\frac{1}{2} \text{ in} + 2 \text{ in} \right) - 1\frac{1}{2} \left(1\frac{3}{16} \text{ in} \right) \right] \frac{1}{2} \text{ in} = 1.859 \text{ in}^2$$

$$\begin{aligned}
 R_n &= \text{MIN} \left[0.6 F_u A_{nv}, 0.6 F_y A_{gv} \right] + F_u A_{nt} \\
 &= \text{MIN} \left[0.6 (58 \text{ ksi}) 2.109 \text{ in}^2, 0.6 (36 \text{ ksi}) 3 \text{ in}^2 \right] + 58 \text{ ksi} (1.859 \text{ in}^2) \\
 &= \text{MIN} \left[73.39 \text{ k}, 64.8 \text{ k} \right] + 107.82 \text{ k} \\
 &= \underline{\underline{172.62 \text{ k}}} \quad ** \text{ CONTROLS}
 \end{aligned}$$