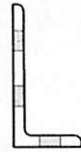
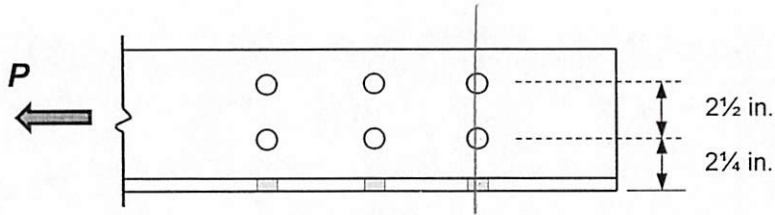


Classroom Problem 3.2-2: Compute the maximum acceptable tensile service load on a single angle $L6 \times 4 \times \frac{3}{4}$ of A572 Grade 50 steel that is connected along both legs. The 4-in. leg contains a single-gage line of $\frac{7}{8}$ -in.-diameter bolts, and the 6-in. leg contains a double-gage line of $\frac{7}{8}$ in.-diam bolts. The live load is three times the dead load.



FROM TABLE 1-7 (1-46)
 $A_g = 6.94 \text{ in}^2$

FROM TABLE 2-4 $F_y = 50 \text{ ksi}$
 $F_u = 65 \text{ ksi}$

$$d_{\text{hole}} = d_b + \frac{1}{8} \text{ in} = \frac{7}{8} \text{ in} + \frac{1}{8} \text{ in} = 1 \text{ in}$$

$$A_n = A_g - 3 \text{ holes} = 6.94 \text{ in}^2 - 3 \left(\frac{3}{4} \text{ in} \right) 1 \text{ in} = 4.69 \text{ in}^2 \quad * A_e = A_n$$

YIELDING $P_n = F_y A_g = 50 \text{ ksi} (6.94 \text{ in}^2) = 347 \text{ k}$

$$\phi_t P_n = 0.90 (347 \text{ k}) = 312.3 \text{ k}$$

RUPTURE $P_n = F_u A_e = 65 \text{ ksi} (4.69 \text{ in}^2) = 304.85 \text{ k}$

$$\phi_t P_n = 0.75 (304.85 \text{ k}) = \underline{228.6 \text{ k}}$$

FACTOR LOAD $1.2D + 1.6L = 1.2D + 1.6(3D) = 6D$

$$\therefore P_u \leq \phi_t P_n \Rightarrow 6D = 228.6 \text{ k} \quad D = 38.1 \text{ k} \quad L = 114.3 \text{ k}$$

TOTAL SERVICE 152.4 k