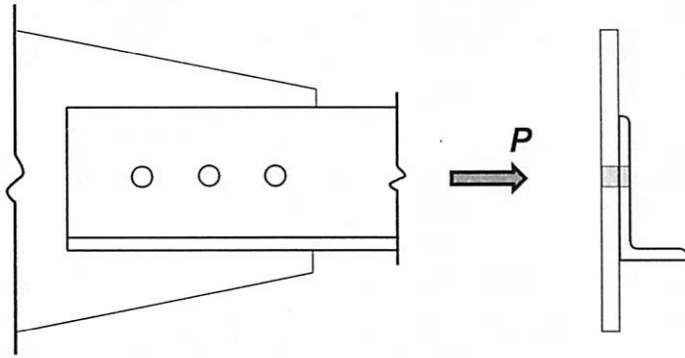


3.6-2

1/2

Classroom Example 3.6-2: Use **LRFD** to select a single angle of **A572** Grade 50 steel ($F_y = 50$ ksi, $F_u = 65$ ksi) to support a dead load of 15 k and the live load is 40 k. The tension member is 15 ft. long. Assume $\frac{3}{4}$ -in.-diameter bolts located on a single gage line of at least ~~three~~ **four** bolts.



$$d_{\text{hole}} = d_b + \frac{1}{8} \text{ in} = \frac{3}{4} \text{ in} + \frac{1}{8} \text{ in} = \frac{7}{8} \text{ in}$$

$$P_u = 1.2D + 1.6L = 1.2(15\text{k}) + 1.6(40\text{k}) = 82\text{k}$$

$$\text{REQUIRED } A_g = \frac{P_u}{\phi F_y} = \frac{82\text{k}}{0.9(50\text{ksi})} = 1.8222\text{ in}^2$$

$$\text{REQUIRED } A_e = \frac{P_u}{\phi F_u} = \frac{82\text{k}}{0.75(65\text{ksi})} = 1.6821\text{ in}^2$$

$$\text{REQUIRED } A_n = \frac{A_e}{U} = \frac{1.6821\text{ in}^2}{0.8} = 2.1026$$

CASE 8 TABLE D3.1
ASSUME $U = 0.80$

$$r_{\text{min}} = \frac{L}{300} = \frac{15\text{ft}(12\text{in}/\text{ft})}{300} = 0.60$$

CLASSROOM EXAMPLE 3.6-2

$$A_n + A_{\text{HOLE}} = 2.1026 \text{ in}^2 + A_{\text{HOLES}}$$

2/2

THICKNESS (in) $A_{\text{HOLES}} (\text{in}^2)$ REQ. $A_g (\text{in}^2)$

TABLE 1-7 ANGLE

1/4

 $(7/8 \text{ in})(1/4 \text{ in})$

2.3214

ALL TOO SMALL*

5/16

 $(7/8 \text{ in})(5/16 \text{ in})$

2.3760

L 4 x 4 x 5/16 $A = 2.40 \text{ in}^2$ $r = 0.638$

3/8

 $(7/8 \text{ in})(3/8 \text{ in})$

2.4307

L 4 x 3 x 3/8 $A = 2.49 \text{ in}^2$ $r = 0.636$

7/16

 $(7/8 \text{ in})(7/16 \text{ in})$

2.4854

L 3 1/2 x 3 x 7/16 $A = 2.67 \text{ in}^2$ $r = 0.620$

1/2

 $(7/8 \text{ in})(1/2 \text{ in})$

2.5401

L 3 x 3 x 1/2 $A = 2.76 \text{ in}^2$ $r = 0.58$ USE L 4 x 4 x 5/16