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ARCH 324 - Structures 2, Winter 2009

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Given: $A_s = 2\text{ in}^2$
$f_y = 60\text{ KSI}$
$f'_c = 3\text{ KSI}$

Find $Mu$

**Step 1:**

$$Ac = \frac{As f_y}{0.85f'_c} = \frac{2(60)}{0.85(3)} = 47.04$$

**Step 2:**

Find where $Ac$ lies on shape

$$47.04 - 24 = 23.04\text{ in}^2$$

$$16 \times 23.04 \times x = 1.44$$

$$x = 1.44$$

**Step 3:**

Since shape is not rectangular do not use $\frac{a}{2}$ but rather find centroid of area

$$\bar{y} = \frac{\sum Ad}{\sum A}$$

I'll choose top as baseline

d is distance from centroid of shape to baseline

$$\frac{24(2) + 23.04(3.72)}{24 + 23.04} = 2.84\text{ in from top}$$

**Step 4:**

$$z = d - \bar{y}$$

$$z = 18 - 2.84 = 15.16\text{ in}$$

**Step 5:**

$$Mu = \phi A_s f_y z = 0.9(2)(60)(15.16) = \frac{1637.28}{8\text{ KIN}} = 134.4\text{ KFT}$$