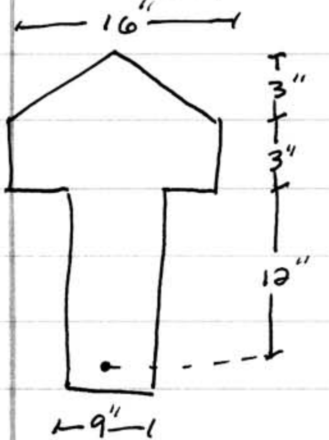
15-1 (c)



Given: $A_s = 2\,in^2$

$f_y = 60$ KSI

$f'_c = 3$ KSI

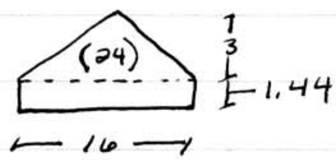
Find M_u

step 1: $A_c = \dfrac{A_s f_y}{0.85 f'_c}$ $\quad A_c = \dfrac{2(60)}{0.85(3)} = 47.06$

Step 2: Find where A_c lies on shape

$47.06 - 24 = 23.06\,in^2$

$16x = 23.06 \quad x = 1.44$



step 3: Since shape is not rectangular do not use $d - \frac{a}{2}$ but rather find centroid of area

$\bar{y} = \dfrac{\Sigma A d}{\Sigma A}$ I'll choose top as baseline
d is distance fr. centroid of shape to baseline

$\dfrac{24(2) + 23.04(3.72)}{24 + 23.04} = 2.84"$ fr. top

step 4: $z = d - y \qquad z = 18 - 2.84 \qquad z = 15.16"$

step 5: $M_u = \phi A_s f_y z \qquad 0.9(2)(60)15.16 = \cancel{1636.8}\ 1637.28$ KIN

$= 136.4$ KFT