

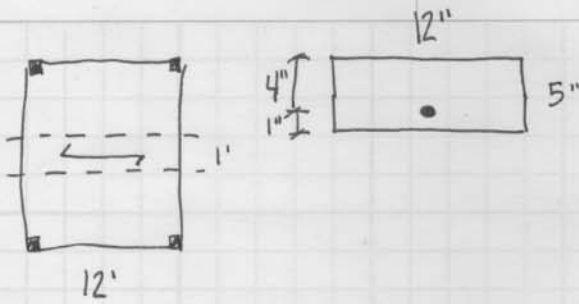
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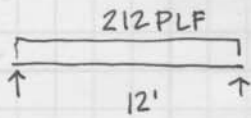
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13-4 (II)

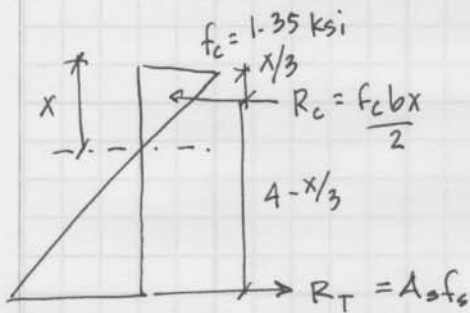


$$\begin{aligned} LL &= 150 \text{ PSF} \\ DL &= 62.5 \text{ PSF} \\ \hline TL &= 212.5 \text{ PSF} \end{aligned}$$

$$E_c = 3625 \text{ ksi} \quad n = 8$$



$$M = \frac{wL^2}{8} = \frac{(212.5 \#/ft)(12')^2}{8} = 3825 \text{ ft}\cdot\text{lb} = 45.9 \text{ k}\cdot\text{ft}$$



$$M_{\text{Resist}} = R_c \left(4 - \frac{x}{3}\right)$$

$$45.9 \text{ k}\cdot\text{ft} = \left(\frac{f_c b x}{2}\right) \left(4 - \frac{x}{3}\right)$$

$$45.9 \text{ k}\cdot\text{ft} = \frac{(1.35 \text{ ksi})(12 \text{ in})(x) \left(4 - \frac{x}{3}\right)}{2}$$

$$\frac{f_s}{n} = \frac{20 \text{ ksi}}{8} = 2.5 \text{ ksi}$$

$$0 = -2.7x^2 + 32.4x - 45.9 \text{ k}\cdot\text{ft}$$

$$x = \frac{-32.4 \pm \sqrt{(32.4)^2 - (4)(-2.7)(-45.9)}}{2(-2.7)}$$

$$x = 1.64 \text{ in}$$

$$M = 45.9 \text{ k}\cdot\text{ft} = R_T \left(4 - \frac{x}{3}\right) = A_s f_s \left(4 - \frac{1.64}{3}\right) = A_s (20 \text{ ksi}) \left(4 - \frac{1.64}{3}\right)$$

$$A_s = 0.66 \text{ in}^2$$