

$$\bar{y} = \frac{2(10)(300)(150) + 250(10)(305)}{2(10)(300) + 250(10)}$$

$$= 195.6 \text{ mm}$$

$$Q = 250(10)(305 - 195.6)$$

$$= 273.5 \times 10^3 \text{ mm}^3$$

$$I = \frac{1}{12}(250)(10)^3 + 250(10)(305 - 195.6)^2$$

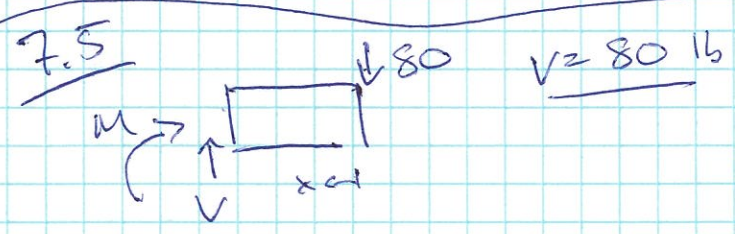
$$+ \frac{1}{12}(10)(300)^3 + 2(10)(300)(195.6 - 150)^2$$

$$= 87.4 \times 10^6 \text{ mm}^4$$

$$q = \frac{VQ}{I} = \frac{850 \text{ kN}(273.5 \times 10^3 \text{ mm}^3)}{87.4 \times 10^6 \text{ mm}^4}$$

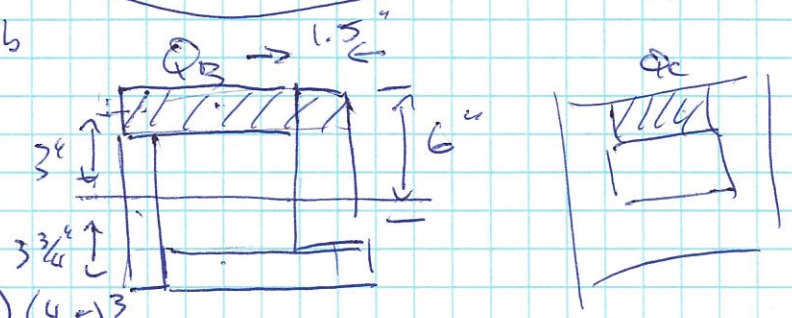
$$= 2.66 \text{ MN/m}$$

$$q_B = q_C = \frac{1}{2}q = 1.33 \text{ MN/m}$$



$$I = \frac{1}{12}(7.5)(7.5)^3 - \frac{1}{12}(4.5)(4.5)^3$$

$$= 229.5 \text{ in}^4$$



$$Q_B = 7.5(1.5)(3) = 33.75 \text{ in}^3$$

$$Q_C = 4.5(1.5)(3) = 20.25 \text{ in}^3$$

$$q_B = \frac{80 \text{ lb}(33.75 \text{ in}^3)}{229.5 \text{ in}^4} = 11.8 \text{ lb/in}$$

$$q_C = \frac{80(20.25)}{229.5} = 7.1 \text{ lb/in}$$

$$F = qS$$

$$30 \text{ lb} = qS$$

$$S = 30/q$$

$$S_B = \frac{30}{11.8/2} = 2.5 \text{ in} = 5 \text{ in}$$

$$S_C = \frac{30}{7.1/2} = 4.2 \text{ in} = 8.4 \text{ in}$$

$$q = \frac{VQ}{I}$$

$$V = \frac{qI}{Q}$$

$$F = qS$$



$$\sigma_1 = \frac{Pr}{t} \Rightarrow \frac{20 \text{ ksi} \cdot \frac{1}{2} \text{ in}}{24 \text{ in}} = \frac{10 \text{ ksi}}{24 \text{ in}} = 0.417 \text{ ksi}$$

$$P = 417 \text{ psi}$$