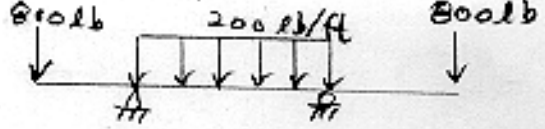
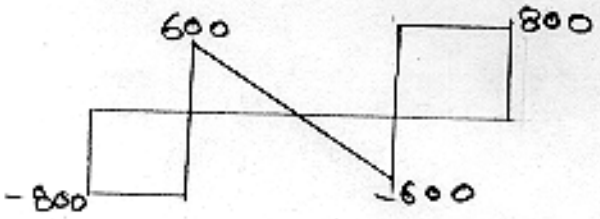
7-18

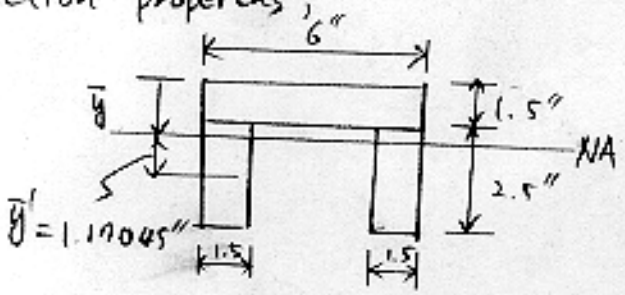
Shear Force;





$V_{max} = 800$ lb

Section properties;



$$\bar{y} = \frac{\Sigma \bar{y} A}{\Sigma A} = \frac{2.15(2.5)(3) + 0.75(6)(1.5)}{2.5(3) + 6(1.5)}$$

$$= 1.6591 \text{ (in)}$$

$$I = \frac{1}{12}(3)(2.5^3) + 3(2.5)(2.15 - 1.6591)^2 + \frac{1}{12}(6)(1.5^3) + 6(1.5)(1.6591 - 0.75)^2$$

$$= 21.4516 \text{ in}^4$$

$$Q_{max} = 1.11045\,(2.3409)(3)$$

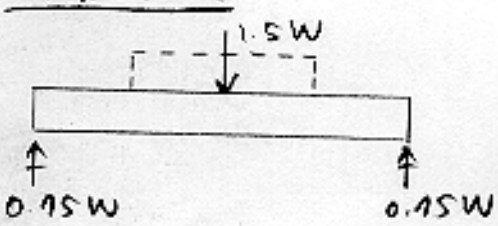
$$= 8.2198 \text{ (in}^3\text{)}$$

$$\tau_{max} = \frac{V \cdot Q_{max}}{I \cdot t} = \frac{800\,(8.2198)}{21.4516 \times (3)}$$

$$= 99.8 \text{ psi}$$

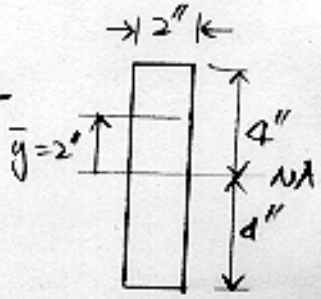
7-21

Shear Force



$V_{max} = 0.15W$

Section Properties;



$$I = \frac{1}{12}(2)(8^3) = 85.333 \text{ in}^4$$

$$Q_{max} = \Sigma \bar{y}_i A_i = 2(4)(2) = 16 \text{ (in}^3\text{)}$$

Allowable shear stress

$$\tau_{max} = \tau_{allow} = \frac{V Q_{max}}{I \cdot t}$$

$$400 = \frac{0.15w(16)}{85.333(2)}$$

$$w = 5689 \text{ lb/ft} = 5.69 \text{ kip/ft}$$