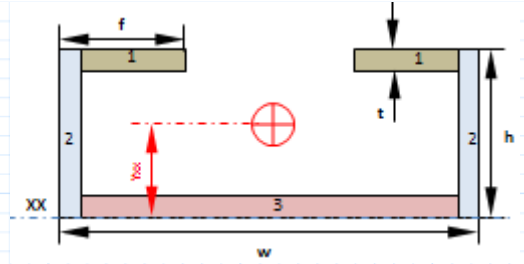


$$f := 0.06 \text{ m} \quad w := 0.225 \text{ m}$$

$$t := 0.008 \text{ m} \quad h := 0.1 \text{ m}$$



$$b_1 := (f - t) = 0.052 \text{ m} \quad d_1 := t = 0.008 \text{ m}$$

$$b_2 := t = 0.008 \text{ m} \quad d_2 := h = 0.1 \text{ m}$$

$$b_3 := w - (t \cdot 2) = 0.209 \text{ m} \quad d_3 := t = 0.008 \text{ m}$$

$$A_1 := b_1 \cdot d_1 = (4.16 \cdot 10^{-4}) \text{ m}^2 \quad d_{c1} := d_2 - \left(\frac{d_1}{2}\right) = 0.096 \text{ m}$$

$$A_2 := b_2 \cdot d_2 = 0.001 \text{ m}^2 \quad d_{c2} := \frac{d_2}{2} = 0.05 \text{ m}$$

$$A_3 := b_3 \cdot d_3 = 0.002 \text{ m}^2 \quad d_{c3} := \frac{d_3}{2} = 0.004 \text{ m}$$

$$y_{xx} := \frac{(2 \cdot (A_1 \cdot d_{c1}) + 2 \cdot (A_2 \cdot d_{c2}) + (A_3 \cdot d_{c3}))}{2 \cdot A_1 + 2 \cdot A_2 + A_3} = 0.041 \text{ m}$$

$$I_1 := \frac{(b_1 \cdot d_1^3)}{12} = (2.219 \cdot 10^{-9}) \text{ m}^4 \quad d_{y1} := d_{c1} - y_{xx} = 0.055 \text{ m}$$

$$I_2 := \frac{(b_2 \cdot d_2^3)}{12} = (6.667 \cdot 10^{-7}) \text{ m}^4 \quad d_{y2} := d_{c2} - y_{xx} = 0.009 \text{ m}$$

$$I_3 := \frac{(b_3 \cdot d_3^3)}{12} = (8.917 \cdot 10^{-9}) \text{ m}^4 \quad d_{y3} := y_{xx} - d_{c3} = 0.037 \text{ m}$$

$$I_{xx} := 2 \cdot (I_1 + A_1 \cdot d_{y1}^2) + 2 \cdot (I_2 + A_2 \cdot d_{y2}^2) + (I_3 + A_3 \cdot d_{y3}^2) = 6281348.491 \text{ mm}^4$$

$$d_{c4} := b_2 + \frac{b_1}{2} = 0.034 \text{ m}$$

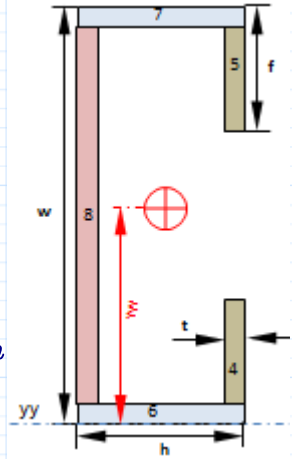
$$d_{c5} := b_2 + b_3 - \frac{b_1}{2} = 0.191 \text{ m}$$

$$d_{c6} := \frac{b_2}{2} = 0.004 \text{ m}$$

$$d_{c7} := b_2 + b_3 + \frac{b_2}{2} = 0.221 \text{ m}$$

$$d_{c8} := b_2 + \frac{b_3}{2} = 0.1125 \text{ m}$$

$$y_{yy} := \frac{\langle (A_1 \cdot d_{c6}) + (A_1 \cdot d_{c7}) + (A_2 \cdot d_{c4}) + (A_2 \cdot d_{c5}) + (A_3 \cdot d_{c8}) \rangle}{2 \cdot A_1 + 2 \cdot A_2 + A_3} = 0.1125 \text{ m}$$



$$I_4 := \frac{(d_1 \cdot b_1^3)}{12} = (9.374 \cdot 10^{-8}) \text{ m}^4$$

$$d_{y4} := d_{c4} - y_{yy} = -0.079 \text{ m}$$

$$I_5 := \frac{(d_2 \cdot b_2^3)}{12} = (4.267 \cdot 10^{-9}) \text{ m}^4$$

$$d_{y5} := d_{c5} - y_{yy} = 0.079 \text{ m}$$

$$I_6 := \frac{d_3 \cdot b_3^3}{12} = (6.086 \cdot 10^{-6}) \text{ m}^4$$

$$d_{y6} := y_{yy} - d_{c6} = 0.109 \text{ m}$$

$$d_{y7} := d_{c7} - y_{yy} = 0.109 \text{ m}$$

$$d_{y8} := y_{yy} - d_{c8} = 0 \text{ m}$$

$$I_{yy} := (I_4 + A_1 \cdot d_{y4}^2) + (I_4 + A_1 \cdot d_{y5}^2) + (I_5 + A_2 \cdot d_{y6}^2) + (I_5 + A_2 \cdot d_{y7}^2) + (I_6 + A_3 \cdot d_{y8}^2)$$

$$I_{yy} = 30244822 \text{ mm}^4$$

Section Modulus

$$W := \frac{I_{xx}}{y_{xx}} = (1.548 \cdot 10^5) \text{ mm}^3$$

$$W := \frac{I_{yy}}{y_{yy}} = (2.688 \cdot 10^5) \text{ mm}^3$$

$$P := 15000 \text{ N}$$

$$L := 0.750 \text{ m}$$

$$E := 210 \text{ GPa}$$

Deflection

$$\delta_x := \frac{(P \cdot L^3)}{48 \cdot E \cdot I_{xx}} = 0.0999 \text{ mm}$$

$$\delta_y := \frac{(P \cdot L^3)}{48 \cdot E \cdot I_{yy}} = 0.0208 \text{ mm}$$