

A/60

$$\bar{Y} = \frac{\sum A\bar{y}}{\sum A}$$

$$= \frac{2[(100)(500)(250)] + 500(100)(-50)}{2(100)(500) + 100(500)}$$

$$= 150 \text{ mm}$$

$$A = 2(100)(500) + 100(500)$$

$$= 15(10^4) \text{ mm}^2$$

$$\textcircled{1} + \textcircled{1} \quad I_{x_o} = 2\left[\frac{1}{12}(100)(500)^3 + 100(500)(250-150)^2\right]$$

$$= 30.8(10^8) \text{ mm}^4$$

$$I_{y_o} = 2\left[\frac{1}{12}(500)(100)^3 + 100(500)(150+50)^2\right] = 40.8(10^8) \text{ mm}^4$$

$$\textcircled{2} \quad I_{x_o} = \frac{1}{12}(500)(100)^3 + 100(500)(50+150)^2 = 20.4(10^8) \text{ mm}^4$$

$$I_{y_o} = \frac{1}{12}(100)(500)^3 = 10.42(10^8) \text{ mm}^4$$

Totals $\textcircled{1} + \textcircled{1} + \textcircled{2}$:

$$I_{x_o} = 51.2(10^8) \text{ mm}^4$$

$$I_{y_o} = 51.2(10^8) \text{ mm}^4$$

$$I_c = I_{x_o} + I_{y_o} = 102.5(10^8) \text{ mm}^4$$

$$k_c = \sqrt{I_c/A} = \sqrt{\frac{102.5(10^8)}{15(10^4)}} = \underline{261 \text{ mm}}$$

(Dim. in mm)