

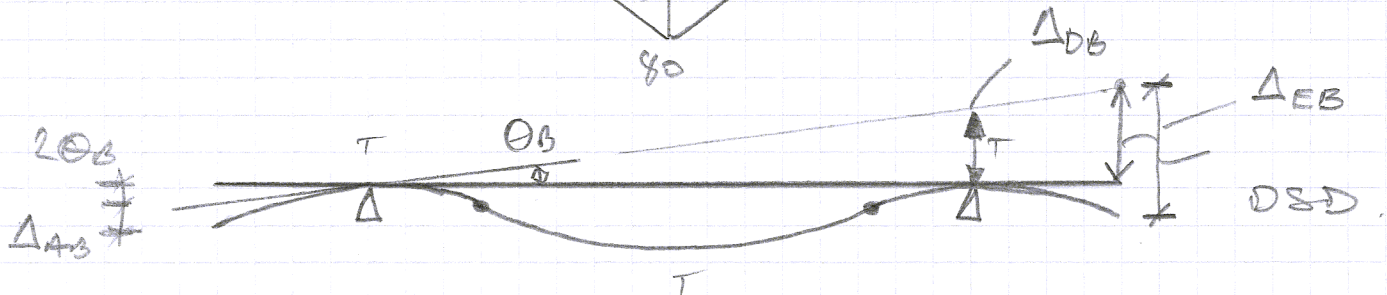
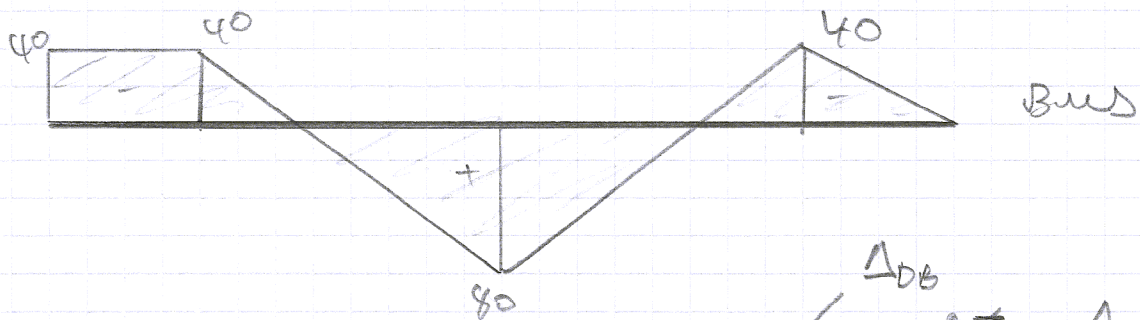
$$\sum M_{\text{about } B} = 0$$

$$\Rightarrow 40 + 8V_D - 60 \times 4 - 20 \times 10 = 0 \Rightarrow R_D = \underline{50 \text{ kN}}$$

$$\sum F_y = 0$$

$$\Rightarrow V_B + V_D = 60 + 20$$

$$\Rightarrow V_B = 80 - 50 = \underline{30 \text{ kN}}$$



$$\Delta_{DB} \text{ (m)} = \frac{1}{EI} \left[(-40)(8)(4) + (120)\left(\frac{1}{2}\right)(8)(4) \right] = \frac{840}{EI}$$

$$\Rightarrow \theta_B = \Delta_{DB}/8 = 80/EI$$

$$\Delta_{AB} \text{ (m)} = \frac{1}{EI} \left[(-40)(2)\left(\frac{2}{2}\right) \right] = \frac{-80}{EI}$$

- Refers to the fact that the vertical intercept is upwards.

$$\Rightarrow \delta_A = 2\theta_B + \Delta_{AB} = \frac{1}{EI} \left[2 \times 80 + 80 \right] = \frac{240}{EI}$$

$$\Rightarrow \delta_A = 0.06 \text{ m} = \underline{60 \text{ mm}}$$

$$\Delta_{EB} (\text{m}) = \frac{1}{EI} \left[(-40)(8)(4+2) + (120)\left(\frac{1}{2}\right)(8)(4+2) - (40)(2)\left(\frac{1}{2}\right)\left(\frac{2}{3} \cdot 2\right) \right]$$

$$= \frac{906.67}{EI}$$

$$\delta_E = \Delta_{EB} - 10\theta_B$$

$$= \frac{1}{EI} (906.67 - 10 \times 80)$$

$$= 106.67/EI$$

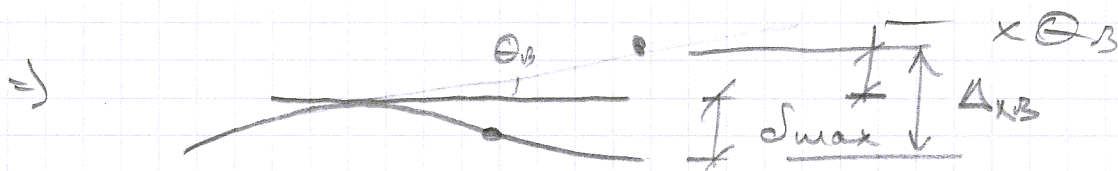
$$= 0.0266 \text{ m}$$

$$= 26.6 \text{ mm}$$

δ_{max} occurs @ centre:

$$-40\left(\frac{4}{3}\right)\left(\frac{1}{2}\right) + 80\left(\frac{8}{3}\right)\left(\frac{1}{2}\right) = \frac{320}{3} - \frac{80}{3} = 80$$

$$\Rightarrow d\theta_{BC} = 80/EI = \theta_B - \theta_{\text{max}} = \theta_B$$



where $x = 4 \text{ m}$.

$$\Rightarrow \delta_{\text{max}} = \Delta_{xB} - x\theta_B$$

$$\Delta_{xB} = \frac{1}{EI} \left[(-40)(4)(2) + (120)(4)\left(\frac{1}{2}\right)\left(\frac{1.8}{3}\right) \right] = 0$$

$$\Rightarrow \delta_{\text{max}} = \frac{1}{EI} [0 - 4 \times 80] = \frac{320}{EI}$$

$$= 0.08 \text{ m} = 80 \text{ mm}$$