

21.06 I Section

$$b_1 = 120 \text{ mm}, h_1 = 20 \text{ mm}$$

$$b_2 = 20 \text{ mm}, h_2 = 160 \text{ mm}$$

$$b_3 = 120 \text{ mm}, h_3 = 20 \text{ mm}$$

$$V = 100 \text{ kN}$$

Contd.

- Distance from neutral axis, $d_1 = (h_1 + h_2)/2$
 $= 90 \text{ mm}$,
- Area, $A_1 = b_1 \cdot h_1 = 2400 \text{ mm}^2$
- Distance from neutral axis, $d_3 = (h_2 + h_3)/2$
 $= 90 \text{ mm}$,
- Area, $A_3 = b_3 \cdot h_3 = 2400 \text{ mm}^2$

Contd.

- $I_{1 \text{ about NA}} = b_1 \cdot h_1^3 / 12 + A_1 \cdot d_1^2 = 1.95 \times 10^7 \text{ mm}^4$
- $I_{2 \text{ about NA}} = b_2 \cdot h_2^3 / 12 = 6.83 \times 10^6 \text{ mm}^4$
- $I_{3 \text{ about NA}} = b_3 \cdot h_3^3 / 12 + A_3 \cdot d_3^2 = 1.95 \times 10^7 \text{ mm}^4$
- $I_{\text{total about NA}} = I_1 + I_2 + I_3 = 4.59 \times 10^7 \text{ mm}^4$

Contd.

- $Q = b_2 \cdot h_2 / 2 \cdot h_2 / 4 + b_1 \cdot h_1 \cdot (h_2 + h_1) / 2$
 $= 2.80 \times 10^5 \text{ mm}^3$

- $\tau = V \cdot Q / (I_{\text{total}} \cdot b_2) = 0.03 \text{ kN/mm}^2$