

$$Z = d \left[1 - \frac{0.5 \cdot A_s \cdot f_y \cdot \gamma_{ms}}{b d \cdot f_k \cdot \gamma_{ms}} \right]$$

where $\gamma_{ms} = 1.15$
 $f_k = 7.0$

$$Z = 265 \left[1 - \frac{0.5 \times 503 \times 460 \times 2.0}{1000 \times 265 \times 7.0 \times 1.15} \right]$$

$$Z = 265 \times 0.892 \quad (\text{ie}) \quad Z < 0.95d.$$

$$Z = 236 \text{ mm}$$

$\therefore$ Moment of Resistance (M_d) based on steel = $\frac{f_y \cdot A_s \cdot Z}{\gamma_{ms}}$

$$M_d = \frac{460 \times 503 \times 236}{1.15 \times 10^6} = 47.53 \text{ kN.m.}$$

$\therefore M_d > M \quad \checkmark \quad \text{OK}$

Check Moment Capacity based on Blockwork in compression.

$$M_d = \frac{0.4 \cdot f_k \cdot b \cdot d^2}{\gamma_{ms}} = \frac{0.4 \times 7.0 \times 1000 \times (236)^2 \times 10^{-6}}{2.0}$$

$$M_d = 77.97 \text{ kNm} > M, \quad \checkmark \quad \text{OK}$$

Check Secondary Steel Requirement

$$A_s = \frac{0.05}{100} \times 1000 \times 236 = 118 \text{ mm}^2/\text{m.}$$

B503 gives $252 \text{ mm}^2/\text{m} \quad \checkmark \quad \text{OK.}$

Check Shear

$$v = \frac{V}{b d} = \frac{19.67 \times 10^3}{10^3 \times 236} = 0.083 \text{ N/mm}^2$$