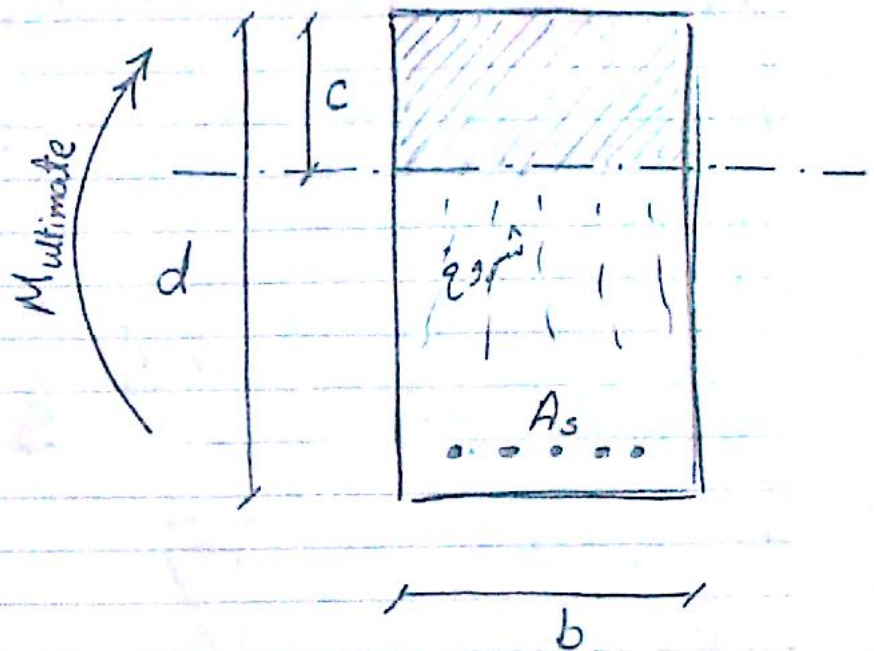


* Design of Beam Section *

no. (3)

$$\text{Area} = b \times c$$

$$\text{Area} = A_s$$

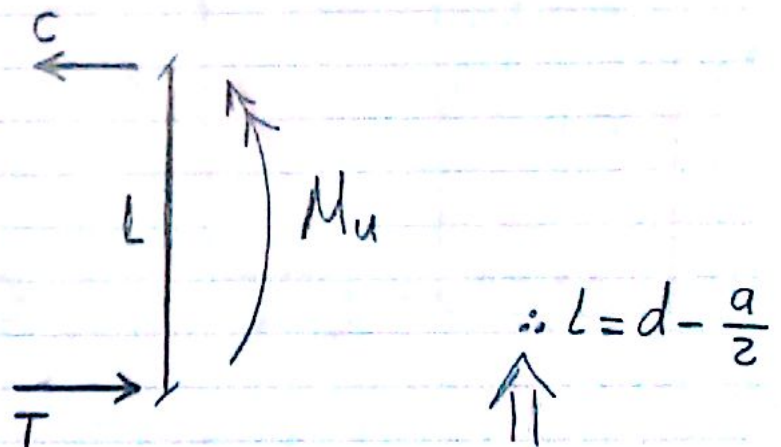


$$M_u = C \times L$$

$$M_u = T \times L$$

$$\gamma_c = 2,5 \text{ t/m}^3$$

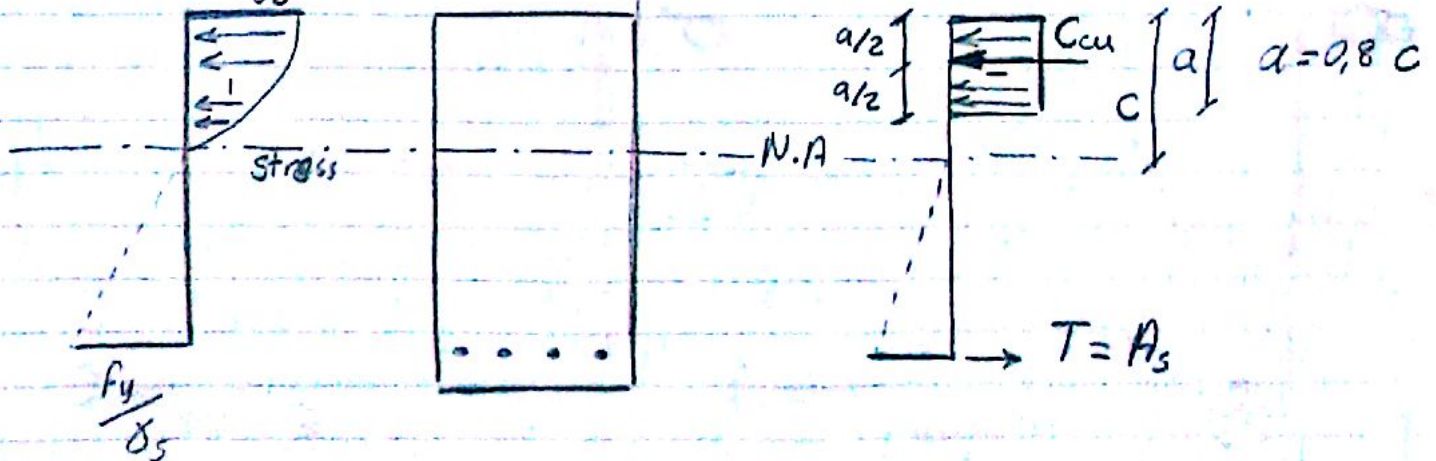
$$\left. \begin{array}{l} \gamma_c = 1,5 \\ \gamma_s = 1,15 \end{array} \right\} \text{Factor of safety}$$



$$0,67 \frac{f_{cu}}{\gamma_c}$$

$$C_{cu} = 0,67 \frac{f_{cu}}{\gamma_c} \times \text{Area}$$

$$b \times a$$



SMILE

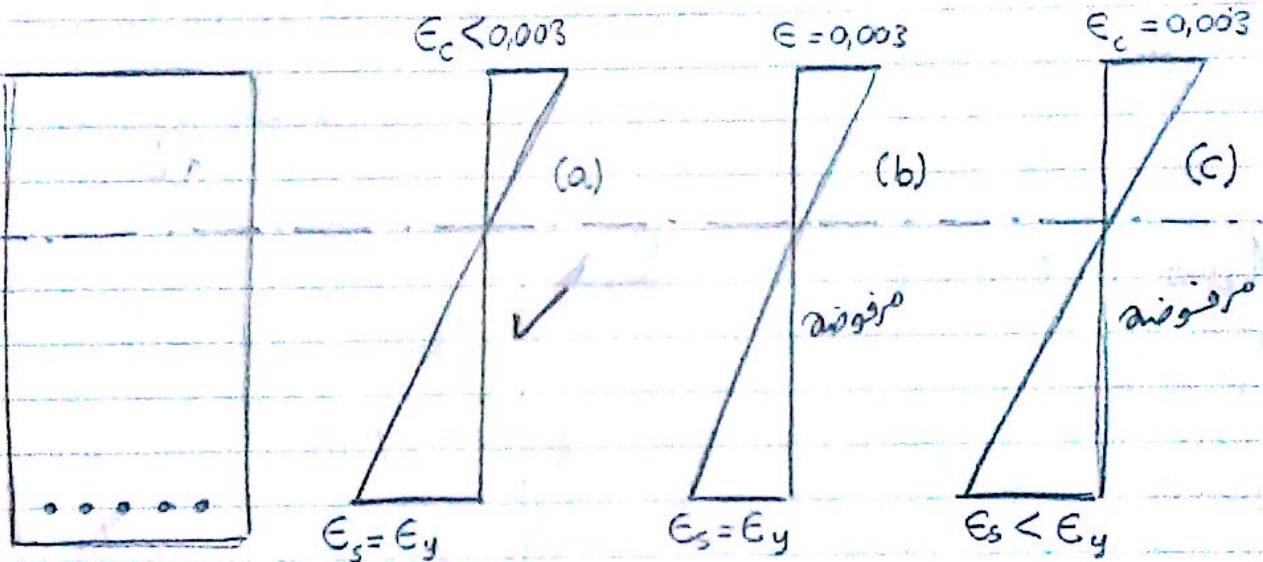
stress Area L

$$M_u = 0,67 \frac{f_{cu}}{1,5} * (b * d) * \left(d - \frac{a}{2}\right) \quad \text{--- (1)}$$

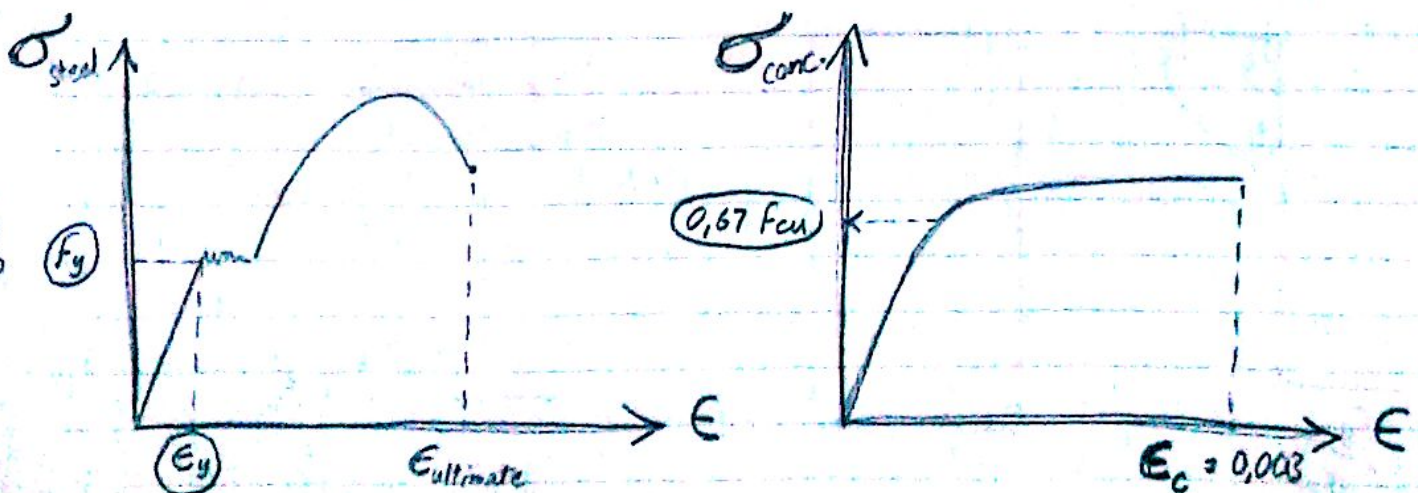
$$M_u = \frac{f_y}{\gamma_s} * A_s * \left(d - \frac{a}{2}\right) \quad \text{--- (2)}$$

Nb. (4)

strain



$$E_s = \frac{f_y}{\epsilon_y}, \quad E_c = 14000 \sqrt{f_{cu}}$$



$$\left(\frac{C}{d}\right) = \frac{E_c}{E_c + E_s} = \frac{0,003}{0,003 + E_y} = \frac{0,003}{0,003 + \left(\frac{3600/1,15}{2100}\right)} = X$$

\downarrow
 $\left(\frac{F_y/\gamma_s}{E_s}\right)$

$E_s = 2100 \text{ t/cm}^2$

From case ③

القسم المرن $\left(\frac{C}{d}\right)$

<

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From case ④

القسم المرن (a) X

مروني (b) X

مروني (c) X

$(X \Rightarrow \text{Constant})$