[Module - I
Chapter - 1]

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* CURVED BEAMS *

Imp

1. * What is Curved Beam?
2. * Differences between Curved Beam and Straight beam? (SUM 06M)
3. * Stresses in Curved Beam.
4. * What are the assumptions made in finding stress distibution for a Curved flexural member. (06M)
5. * Stress in Closed Ring.

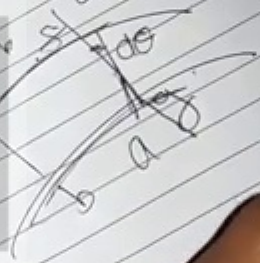
Mb

Mb

cylinder

$\sigma = E\epsilon$

i.e. $\sigma = E$



$M_b = -\int y \, dF$.

Substitute the value of dF

$M_b = \frac{E d\theta}{\theta} \int \left(y^2 \ldots \right) dA$

$= \frac{E d\theta}{\theta} \int \left(y - \text{[illegible]} \right) dA$

$= \frac{E d\theta}{\theta} \int y \, d\text{[illegible]}$ ... (iii)

Statical moment of area $\int y \, dA$ represent (A ... [illegible]

$M_b = \frac{E d\theta}{\theta} A \ldots$

$$M_b = -\frac{\sigma(y+r_n)}{y} \quad \text{(iv)}$$

$$\therefore \sigma = -\frac{M_b y}{(y+r_n)A_e}$$

$\therefore$ Bending stress at the outer fibre $\sigma_{bo} = -\frac{M_b C_o}{A_e r_o}$ $(\because r_n + C_o = r_o)$ (v)

$\therefore$ Bending stress at the inner fibre.

$$\sigma_{bi} = \frac{M_b C_i}{A_e(r_n - C_i)} \quad (\because r_o - C_i = r_i)$$

$$\sigma_{bi} = \frac{M_b C_i}{A_e r_i}$$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