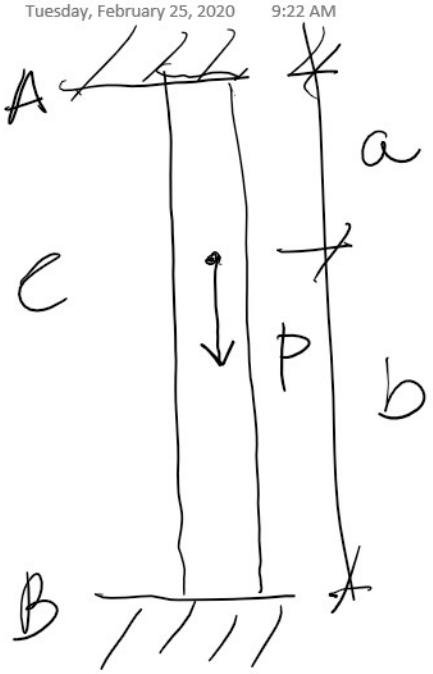
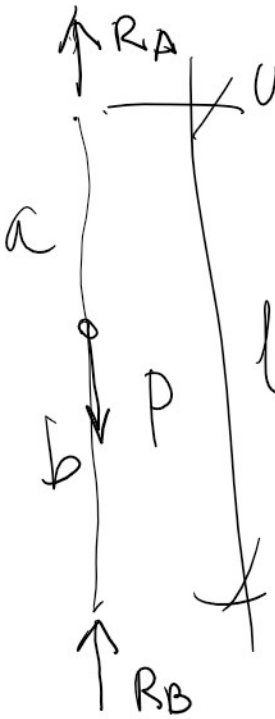
Aula PEF3207 - 24 mar 2020

Tuesday, February 25, 2020 9:22 AM



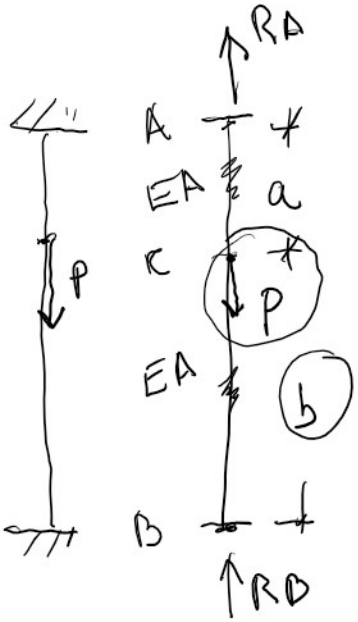


a) Det.o diagrama de força normal da barra

b) Calcular o deslocamento do ponto C

c) det das tensões nas AC e CB

Considerando
$P = 100\,kN$ e
$A = 10\,cm^2$
$l = 2m$ ($a = 50\,cm$)
$E = 200\,GPa$



$$\Delta l_i = \frac{N_i l_i}{EA_i}$$

Eq. $R_A + R_B = P$

$\delta_{AC} + \delta_{CB} = \phi$ Eq. Comp.

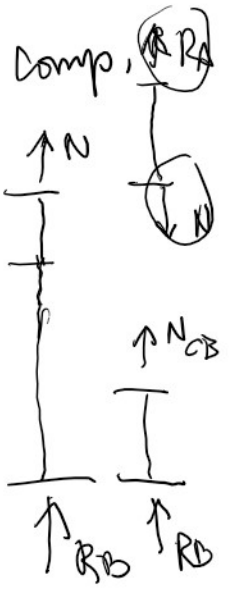
$$\frac{R_A \cdot a}{EA} + \frac{(-R_B) \cdot b}{EA} = \phi$$

$$R_A = \frac{R_B \cdot b}{a}$$

$$\frac{R_B b}{a} + R_B = P$$

$$R_B\left(\frac{b}{a} + 1\right) = P$$

$$R_B\left(\frac{b+a}{a}\right) = P$$



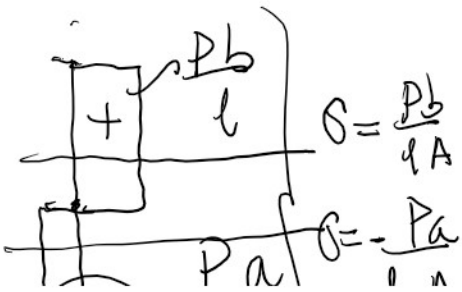
$R_B + N_{CB} = 0$

$N_{CB} = -R_B$

$$R_B = \frac{Pa}{l}$$

$$R_A = \frac{P \cdot b}{l}$$

(N)



$\sigma = \frac{Pb}{lA}$

$\sigma = -\frac{Pa}{l}$

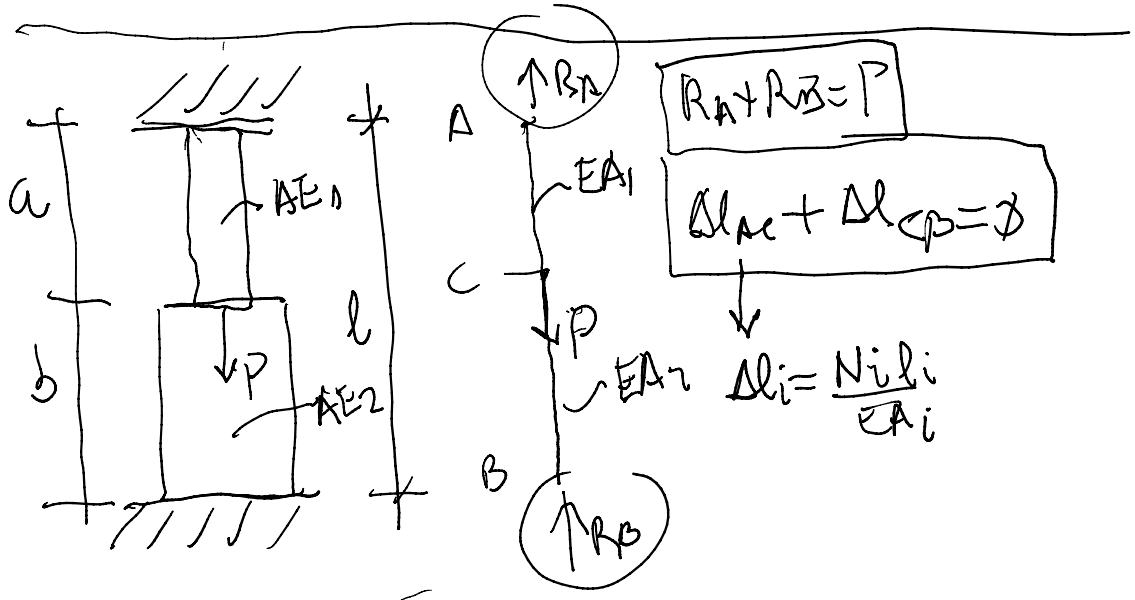
$R_A = \frac{P \cdot b}{l}$ $\quad a < b$

Dimensionamento de segurança

$\sigma_{act} \leq \sigma_{adm}$

AC $\quad \frac{Pb}{lA} \leq \left(\sigma_R = \sigma_u = 250\,MPa\right)$ $\quad (\gamma = 2)$

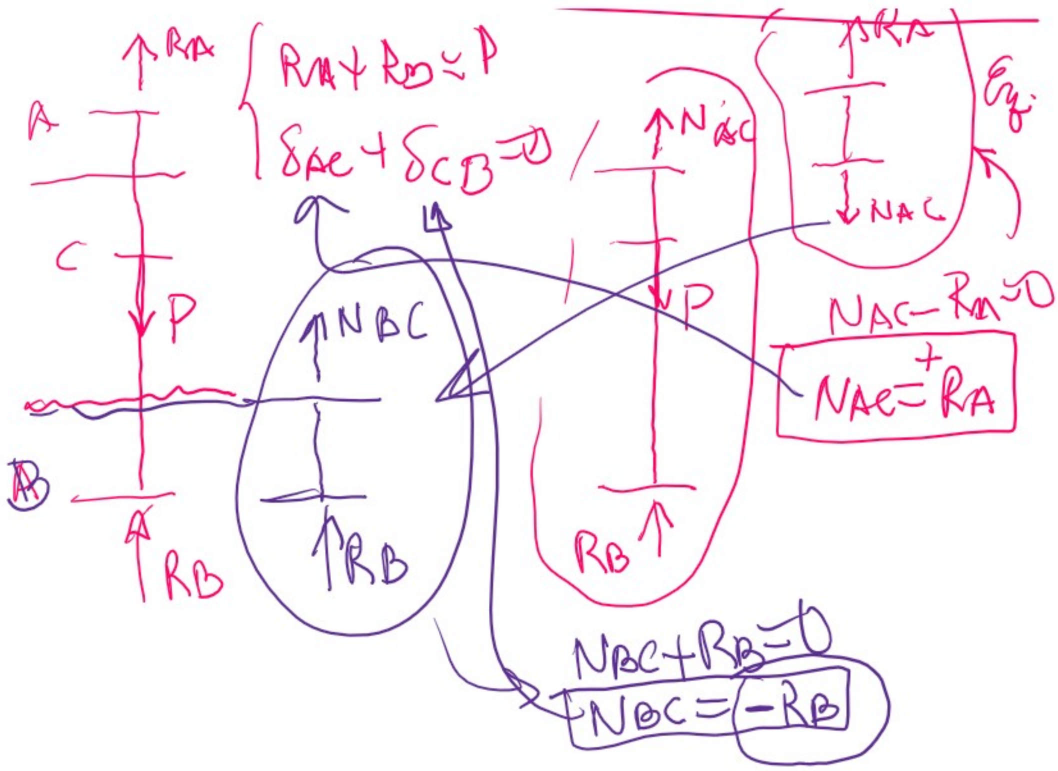
dado $P \rightarrow$ det. (A)

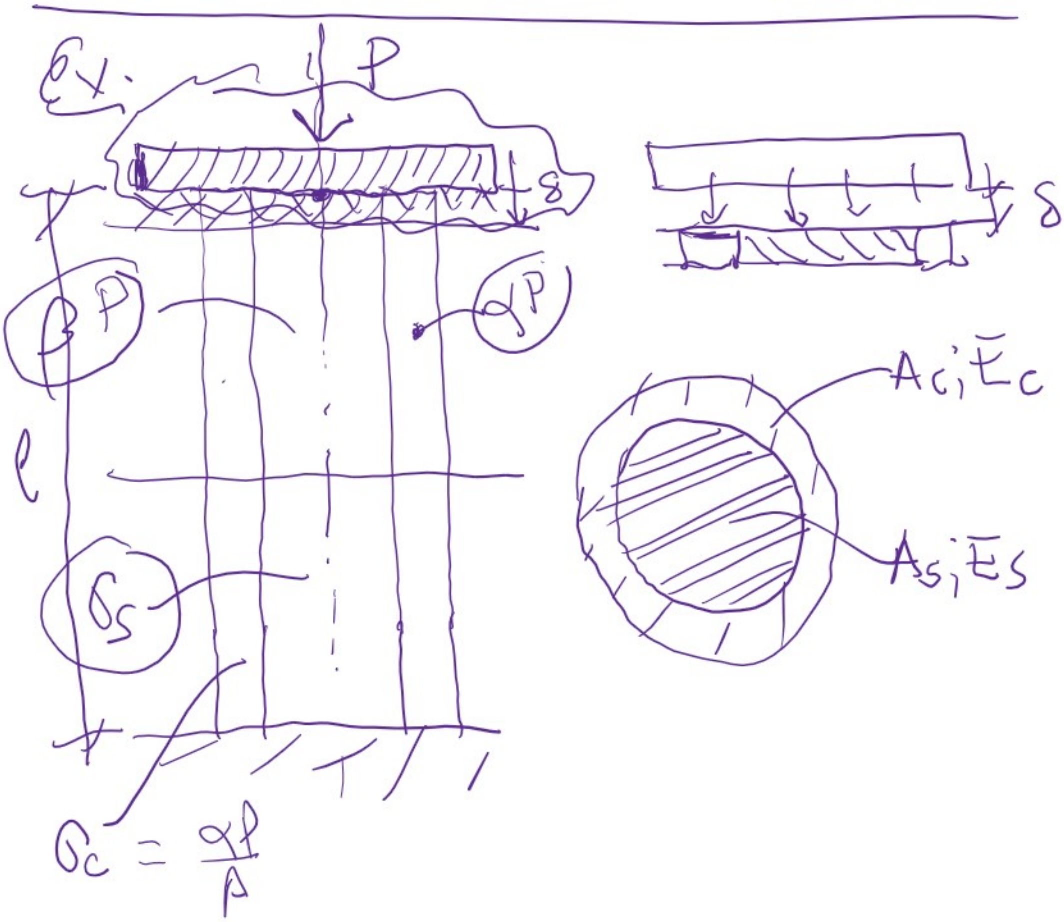


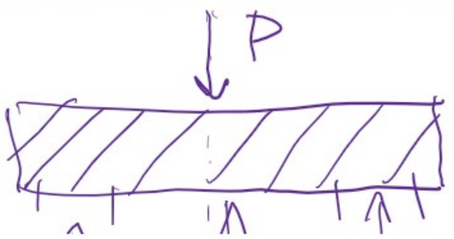
$$R_A = R_B \cdot \frac{b}{a} \cdot \frac{EA_1}{EA_2}$$

$$R_B = \frac{P \cdot a \cdot EA_2}{aEA_2 + bEA_1}$$

$$\frac{P \cdot a \cdot \cancel{EA}}{\cancel{EA}(a+b) = l} = \frac{Pa}{l}$$







Eq. Equilibrio

$P_c + P_s = P$

Eq Comp $\Delta l_c = \Delta l_s = \delta$

$$\frac{P_c \cdot l}{E_c A_c} = \frac{P_s \cdot l}{E_s A_s} \therefore P_c = P_s \cdot \frac{E_c A_c}{E_s A_s}$$

$$P_s \cdot \frac{E_c A_c}{E_s A_s} + P_s = P. \quad P_s = \frac{P}{\left(\frac{E_c A_c}{E_s A_s} + 1\right)} = P \cdot \frac{E_s A_s}{E_c A_c + E_s A_s}$$

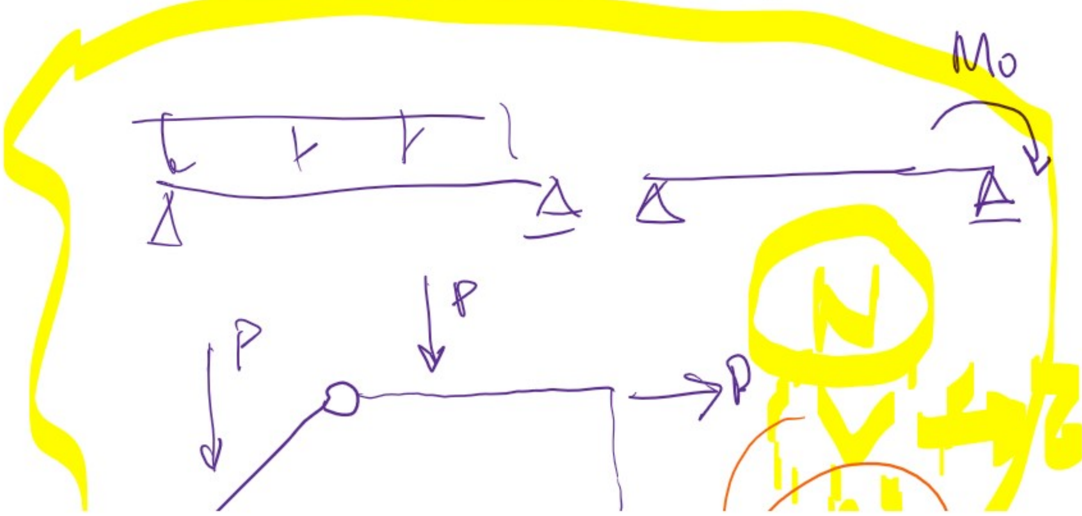
$P_s = \beta \cdot P$

CAP1 → Tensões σ e τ

CAP2 → Tensões/forças axiais

CAP3 → Torção

CAP4 → Esforços Solicitantes.
Revisão → efeitos



Cap5 → teo geral da flexão