

Composito del 14/02/2023. Ejercicio 3.

Calculo:

$$A = \frac{\pi d^2}{4}$$

$$W_{xx} = \frac{\pi d^3}{32} = W_{yy}$$

$$W_P = \frac{\pi d^3}{16}$$

• Mf e σ_f

$$M_{fA} = q \cdot l \cdot \beta l \rightarrow \sigma_{fA} = \frac{M_{fA}}{W_{xx}} = \frac{q \cdot \beta \cdot l^2 d^2}{\pi d^3} \cdot 32$$

$$M_{fB} = -q \cdot l \cdot \beta l \rightarrow \sigma_{fB} = \frac{M_{fB}}{W_{xx}} = \frac{-q \beta \cdot l^2 d^2}{\pi d^3} \cdot 32$$

$$M_{fC} = q \cdot d l \cdot \beta l \rightarrow \sigma_{fC} = \frac{M_{fC}}{W_{yy}} = \frac{q \cdot d \cdot \beta \cdot l^2 d^2}{\pi d^3} \cdot 32$$

$$M_{fD} = -q \cdot d l \cdot \beta l \rightarrow \sigma_{fD} = \frac{M_{fD}}{W_{yy}} = \frac{-q \cdot d \cdot \beta \cdot l^2 d^2}{\pi d^3} \cdot 32$$

• M_t e τ_{Mf}

$$M_{tA} = M_{tB} = M_{tC} = M_{tD} = -d l \cdot q \cdot d \frac{l}{2} + q \cdot l \cdot \frac{l}{2} = q \cdot \frac{l^2 d^2}{2} (1 - d^2)$$

$$\tau_{MfA} = \tau_{MfB} = \tau_{MfC} = \tau_{MfD} = \frac{M_t}{W_P} = \frac{q \cdot l^2 d^2}{2} \cdot \frac{(1 - d^2)}{\pi d^3} \cdot 16$$

• T e τ_T

$$T_y = q \cdot l = q \cdot l d$$

$$T_x = q \cdot d \cdot l = q \cdot d \cdot \lambda d$$

$$\tau_A = \frac{4}{3} \cdot \frac{T_x}{A} = \frac{4}{3} \cdot \frac{q \cdot d \cdot \lambda d}{\pi d^2} \cdot 4 = \tau_B$$

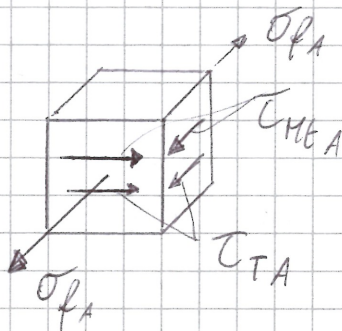
σ 1.38

$$\tau_C = \frac{4}{3} \cdot \frac{T_y}{A} = \frac{4}{3} \cdot \frac{q \cdot \lambda d}{\pi d^2} \cdot 4 = \tau_D$$

σ 1.38

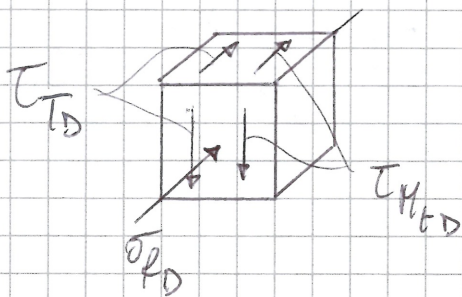
• tensioni principali

A)



$$\sigma_{1-2A} = \frac{\sigma_{fA}}{2} \pm \sqrt{\frac{\sigma_{fA}^2}{4} + (\tau_{ME A} + \tau_{TA})^2}$$

B)



$$\sigma_{1-2D} = \frac{\sigma_{fD}}{2} \pm \sqrt{\frac{\sigma_{fD}^2}{4} + (\tau_{MBD} + \tau_{TD})^2}$$

$$\{\tau_{33}\} = \frac{32 \cdot \beta \cdot \lambda^2}{\pi}$$

$$\{\tau_{34}\} = -\frac{32 \cdot \beta \cdot \lambda^2}{\pi}$$

$$\{\tau_{35}\} = \frac{32 \cdot \alpha \beta \lambda^2}{\pi}$$

$$\{\tau_{36}\} = -\frac{32 \cdot \alpha \beta \lambda^2}{\pi}$$

$$\{\tau_{37}\} = \frac{\lambda^2 (1 - \alpha^2) \cdot 8}{\pi} = \{\tau_{38}\} = \{\tau_{39}\} = \{\tau_{40}\}$$

$$\{\tau_{41}\} = \{\tau_{42}\} = \frac{16 \cdot \alpha \cdot \lambda}{3 \pi}$$

$$\{\tau_{43}\} = \{\tau_{44}\} = \frac{16 \cdot \lambda}{3 \pi}$$