

## Traccia del 26/01/2023. Esercizio 3.

- Calcolo  $W$ ,  $W_P$ ,  $A$ .

$$W_{xx} = W_{yy} = \frac{\pi D^3}{32} \left[ 1 - \left( \frac{d}{D} \right)^4 \right] = \frac{\pi l^3 (1-d^4)}{32}$$

$$W_P = \frac{\pi D^3}{16} \left[ 1 - \left( \frac{d}{D} \right)^4 \right] = \frac{\pi l^3 (1-d^4)}{16}$$

$$A = \frac{\pi (D^2 - d^2)}{4} = \frac{\pi l^2 (1-d^2)}{4}$$

$$\{\tau_{38}\} = \frac{\pi}{32} (1-d^4)$$

- Calcolo  $M_f$  e  $\sigma_f$ .

$$M_{fA} = \beta l \cdot q \cdot \lambda l \quad \rightarrow \quad \sigma_{fA} = \frac{M_{fA}}{W_{xx}}$$

$$M_{fB} = 0 \quad \rightarrow \quad \sigma_{fB} = 0$$

$$M_{fC} = -\beta l \cdot q \cdot \lambda l \quad \rightarrow \quad \sigma_{fC} = \frac{M_{fC}}{W_{xx}}$$

- Calcolo  $M_t$  e  $\tau_{Mt}$

$$M_{tA} = M_{tB} = M_{tC} = (q \cdot \beta \cdot l) \left( l - \frac{\beta l}{2} \right)$$

$$\tau_{MtA} = \tau_{MtB} = \tau_{MtC} = \frac{M_t}{W_P}$$

- Calcolo  $T$  e  $\tau_T$

$$T = q \cdot \beta \cdot l$$

$$\tau_{TB} = q \cdot \beta \cdot l \cdot \frac{1}{A} \cdot \frac{4}{3} \left( 1 + \frac{1}{\frac{d}{D} + \frac{D}{d}} \right)$$

$$\tau_{TA} = \tau_{TC} = 0$$

• Calcolo tensioni principali.  $\rightarrow$  Es. 1.1.1. (vedi slide)

$$\sigma_{1-2A} = \frac{\sigma_{FA}}{2} \pm \sqrt{\left(\frac{\sigma_{FA}}{2}\right)^2 + \tau_{MtA}^2}$$

$$\sigma_{1-2B} = \frac{\sigma_{FB}}{2} \pm \sqrt{\left(\frac{\sigma_{FB}}{2}\right)^2 + \tau_{T_B}^2}$$