

Dati

Carichi:  
 $f = 120000 \text{ N/m}$   
 $p = 60000 \text{ N/m}$

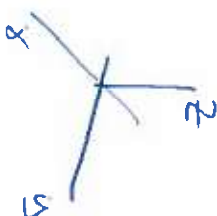
Fattori geometrici/sovraccarichi locali:  
 $b_2 = 0.95$   
 $b_3 = 0.95$

Geometria Struttura:  
 $a = 500 \text{ mm}$   
 $b = 100 \text{ mm}$   
 $c = 300 \text{ mm}$   
 $d = 100 \text{ mm}$

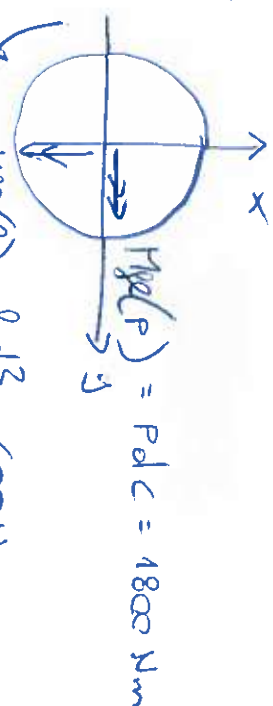
$D_1 = 45 \text{ mm}$  (sezione 1)  
 $D_2 = 45 \text{ mm}$  (sezione 2)  
 $D_3 = 80 \text{ mm}$  (sezione 3)

Materiale: 30NCR1303

$\sigma_{R1} = 1150 \text{ MPa}$   
 $\sigma_{R2} = 950 \text{ MPa}$   
 $\sigma_{R3} = 585 \text{ MPa}$



SEZ. 2



$$M_{T(P)} = Pd c = 1800 \text{ Nm}$$

$$M_{y_r(P)} = Pd^2 = 6000 \text{ Nm}$$

$$M_{y_z(P)} = Pd c = 1800 \text{ Nm}$$

$$M_{GR_{TOT}} = \sqrt{M_{y_r(P)}^2 + M_{y_z(P)}^2} = 1857 \text{ Nm}$$

$$\sigma = \frac{32 M_{GR_{TOT}}}{\pi D_3^3} = 212 \text{ MPa}$$

$$\sigma_{VM}(PT) = \sqrt{\sigma^2 + 3\tau^2} = 214 \text{ MPa}$$

$$\tau = \frac{16 M_T}{\pi D_3^3} = 17 \text{ MPa}$$

$$\sigma_{VM}(IPL) = \sqrt{(\sigma_{Ktg})^2 + 3(\tau_{Ktg})^2} = 267 \text{ MPa}$$

$$N = \frac{950}{267} = 3.56 \quad N_{PT} = \frac{950}{214} = 4.4$$



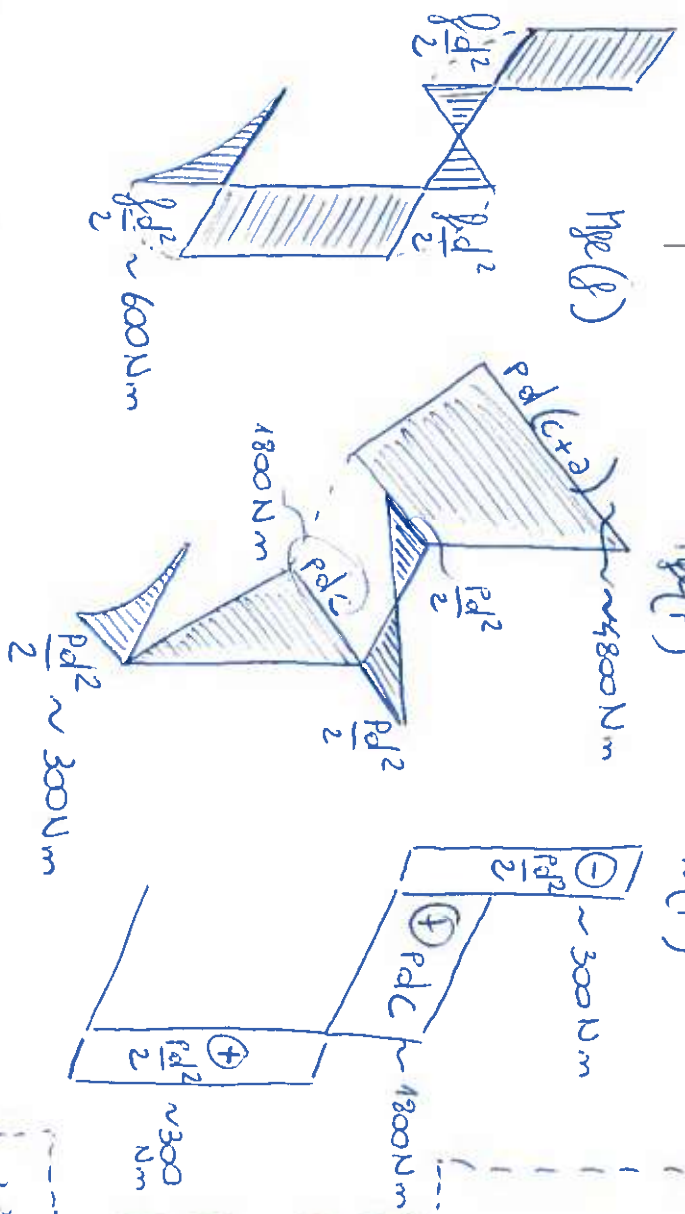
$$\sigma_{F_{y3}} = \frac{0.5 \sigma_a b_2 b_3}{1 + q(K_{I3} - 1)} = 415 \text{ MPa}$$

$$\tau_{F_{y3}} = \frac{0.25 \sigma_a b_2 b_3}{1 + q(K_{I3} - 1)} = 236 \text{ MPa}$$

HAIGH)  $\tau_{VM} = \tau_{F_{y3}}$

$$\sigma_{VM} = \frac{\sigma_{F_{y3}}}{1 + \frac{\sigma_{F_{y3}}}{\sigma_a}} = 305 \text{ MPa}$$

GOVERNARD)  $\sqrt{\sigma_0^2 + \left(\frac{\sigma_{VM}}{\sigma_{VM}}$



La sezione ③ è sottoposta al carico maggiorato MA ha un diametro quasi doppio rispetto alle sez. ① & ② (NB  $\sigma \propto \frac{1}{d^3}$ )

① & ② hanno lo stesso diametro nominale MA ② è sottoposta ad un carico maggiorato!