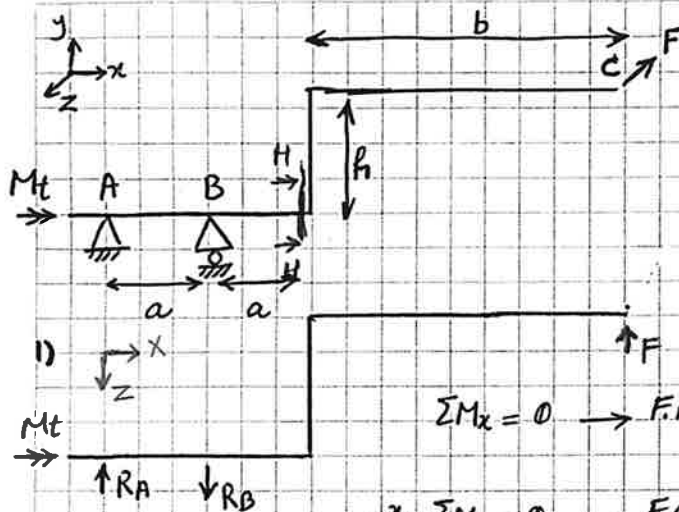


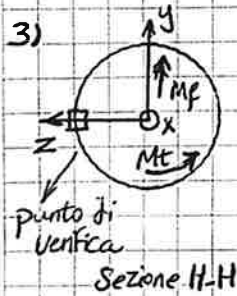
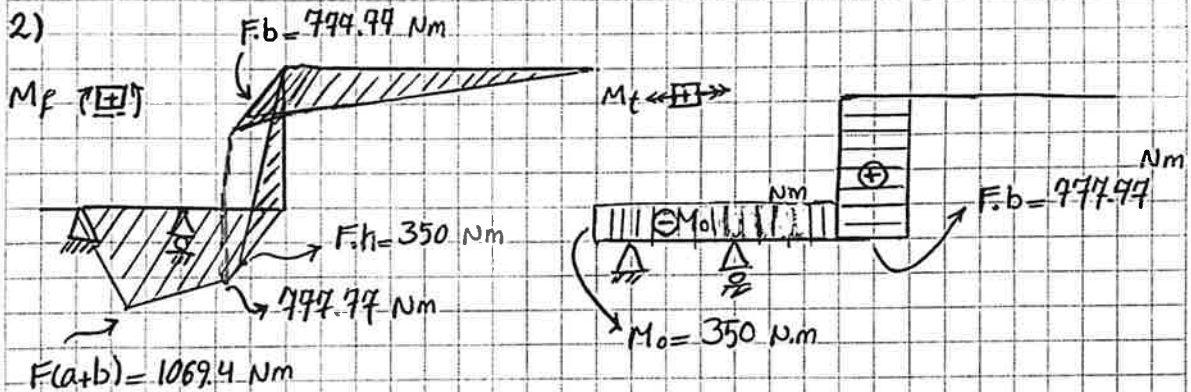


$M_0 = 350 \text{ Nm}$
 $D = 40 \text{ mm}$
 $b = 400 \text{ mm}$
 $K_t = K_{tt} = 1.8$
 $q = 0.9$
 $R_m = 700 \text{ MPa}$
 $a = 150 \text{ mm}$
 $r_1 = 180 \text{ mm}$
 $b_2 = b_3 = 0.85$
 $R_{sn} = 420 \text{ MPa}$

$$\sum M_x = 0 \rightarrow F \cdot h = M_t \rightarrow F = \frac{350 \times 10^3}{180} = 1944.44 \text{ N}$$

$$\sum M_B = 0 \rightarrow F \cdot (a+b) - R_A \cdot a = 0 \rightarrow R_A = \frac{F(a+b)}{a} = 4129.63 \text{ N}$$

$$\sum F_z = 0 \rightarrow R_A + F - R_B = 0 \rightarrow R_B = R_A + F = 9074.1 \text{ N}$$



Verifica Statica:

$$M_b = 777.77 \text{ Nm} \rightarrow \sigma = \frac{32 M_b}{\pi D^3} = 123.78 \text{ MPa}$$

$$M_t = 350 \text{ Nm} \rightarrow \tau = \frac{16 M_t}{\pi D^3} = 27.85 \text{ MPa}$$

$$\sigma_{VM}^* = \sqrt{\sigma_{max}^2 + 3\tau_{max}^2} = \sqrt{(K_t \sigma)^2 + 3(K_{tt} \tau)^2} = 239.14 \text{ MPa}$$

$y = \frac{420}{239.14} = 1.76$

$$\sigma_{GT}^* = \sqrt{\sigma_{max}^2 + 4\tau_{max}^2} = 244.34 \text{ MPa}$$

$y = \frac{420}{244.34} = 1.72$

Verificata ✓

4) Verifica a Fatica

M_t (variabile) $\rightarrow F$
 $\searrow M_b$ } Sinusoidale

$\sigma_a = 123.78 \text{ MPa}$
 $\sigma_m = 0$

$\tau_a = 27.85 \text{ MPa}$
 $\tau_m = 0$

$$K_{ff} = 1 + q(K_{tf} - 1) = 1.72$$

$$K_{ft} = 1.92$$

$$\sigma'_{FAF} = \frac{0.5 R_m b_2 b_3}{K_{ff}} = \frac{0.5 \cdot 700 \cdot 0.85 \cdot 0.85}{1.72} = 147 \text{ Mpa}$$

$$\tau'_{FAF} = \frac{0.3 R_m b_2 b_3}{K_{ff}} = \frac{0.3 \cdot 700 \cdot 0.85 \cdot 0.85}{1.72} = 88.21 \text{ Mpa}$$

$$H = \frac{\sigma'_{FAF}}{\tau'_{FAF}} = 1.67 \rightarrow \sigma_{GP}^* = \sqrt{\sigma_a^2 + H^2 \tau_a^2} = 132.20 \text{ Mpa}$$

$$\rightarrow \gamma_{GP} = \frac{\sigma'_{FAF}}{\sigma_{GP}^*} = 1.11$$

Non Verificata X