

①/②

CASI:

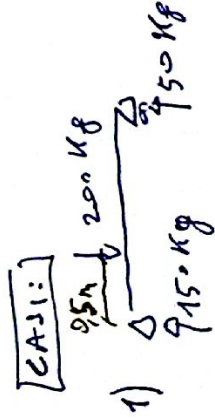
- 1) 3 cicli/giorno
- 2) 5 cicli/giorno
- 3) 2 cicli/giorno

TOTALE 10 cicli/giorno per 10 mesi/anno per 20 giorni/mese per 10 anni

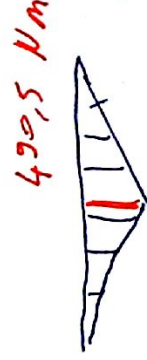
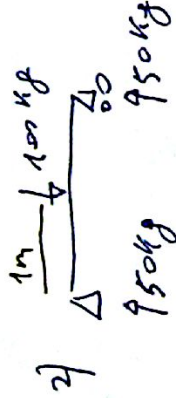
Quanti sono i cicli fatti in 10 anni?

$$10 \frac{\text{cicli}}{\text{giorno}} \times 10 \frac{\text{mesi}}{\text{anno}} \times 20 \frac{\text{giorni}}{\text{mese}} \times 10 \text{anni} = 20.000 \text{ cicli TOTALI}$$

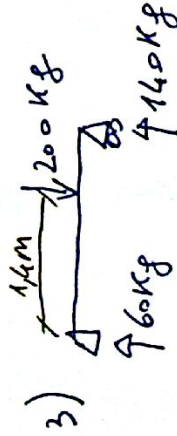
CASI:



$$\sigma_1 = \frac{735750 Nmm}{34100 mm^3} = 21,57 \frac{N}{mm^2}$$

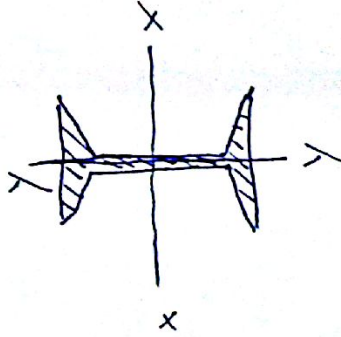


$$\sigma_2 = \frac{490500 Nmm}{34100 mm^3} = 14,38 \frac{N}{mm^2}$$



$$\sigma_3 = \frac{824040 Nmm}{34100 mm^3} = 24,16 \frac{N}{mm^2}$$

CARATTERISTICHE RIFILLO IPN 100



$$W_x = 34,1 \text{ cm}^3$$

$$W_y = 4,86 \text{ cm}^3$$

Per la verifica a fatica: $\sigma_s \cdot \Delta \sigma_{bet} \leq \frac{\Delta \sigma_r}{\gamma_m}$

$$\Delta \sigma_{bet} = \sigma_1 \left(\frac{N_1}{N_{bet}} \right)^3 + \sigma_2 \left(\frac{N_2}{N_{bet}} \right)^3 + \sigma_3 \left(\frac{N_3}{N_{bet}} \right)^3 = 2157 \left(\frac{3}{10} \right)^3 + 1438 \left(\frac{5}{10} \right)^3 + 2416 \left(\frac{2}{10} \right)^3 = 257 \text{ MPa}$$

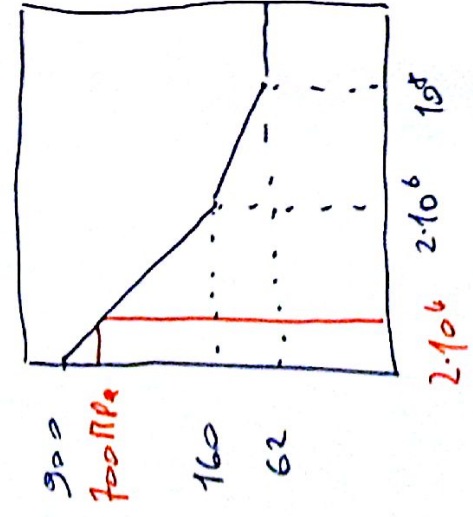
$$\Delta \sigma_{eff} = \sqrt{\frac{\sigma_1^3 n_1 + \sigma_2^3 n_2 + \sigma_3^3 n_3}{n_{TOT}}} = \sqrt{\frac{\sigma_1^3 n_1}{n_{TOT}} + \frac{\sigma_2^3 n_2}{n_{TOT}} + \frac{\sigma_3^3 n_3}{n_{TOT}}}$$

$$= \sqrt{\frac{21,57^3 \cdot 3}{10} + \frac{14,30^3 \cdot 5}{10} + \frac{24,16^3 \cdot 2}{10}} = 19,4 \text{ MPa}$$

$$\gamma_s \cdot \Delta \sigma_{eff} \leq \frac{\Delta \sigma_{br}}{\gamma_m}$$

con $\gamma_s = 1$ $\gamma_m = 1,3$ sempre

Dal diagramma 8-11 risulta:



curva 160 perché il profilo IPN 100 non presenta saldature

con $2 \cdot 10^6$ cicli: risultato $\Delta \sigma_{br} = 700 \text{ MPa}$

$$\gamma_s \cdot \Delta \sigma_{eff} \leq \frac{\Delta \sigma_{br}}{\gamma_m}$$

$$\Rightarrow 1 \cdot 19,4 \leq \frac{700}{1,3} \Rightarrow 19,4 \leq 538$$

VERIFICA