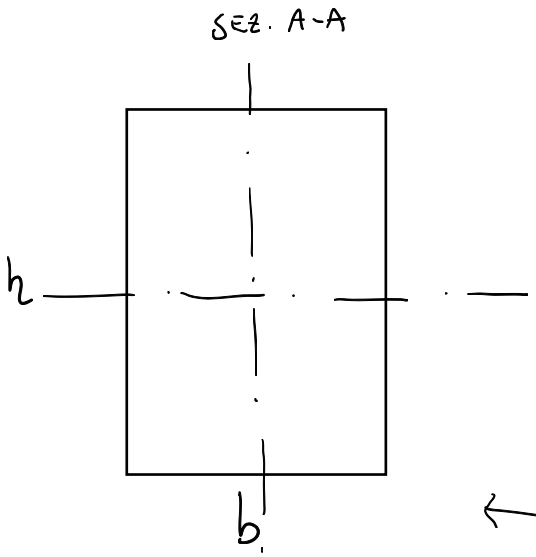
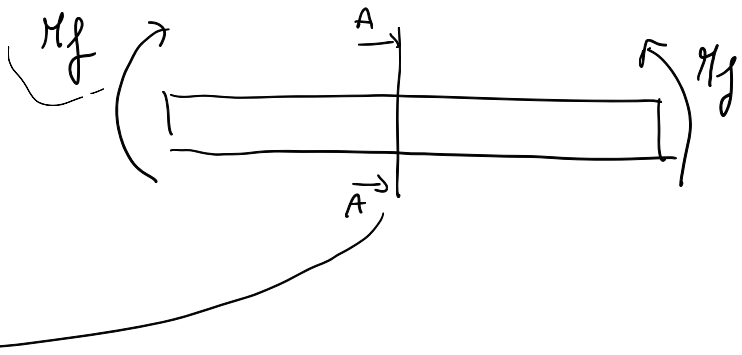
ESERCIZIO



$M_f = 5 \cdot 10^6 \ N \cdot mm$



$b/h = 0.7$

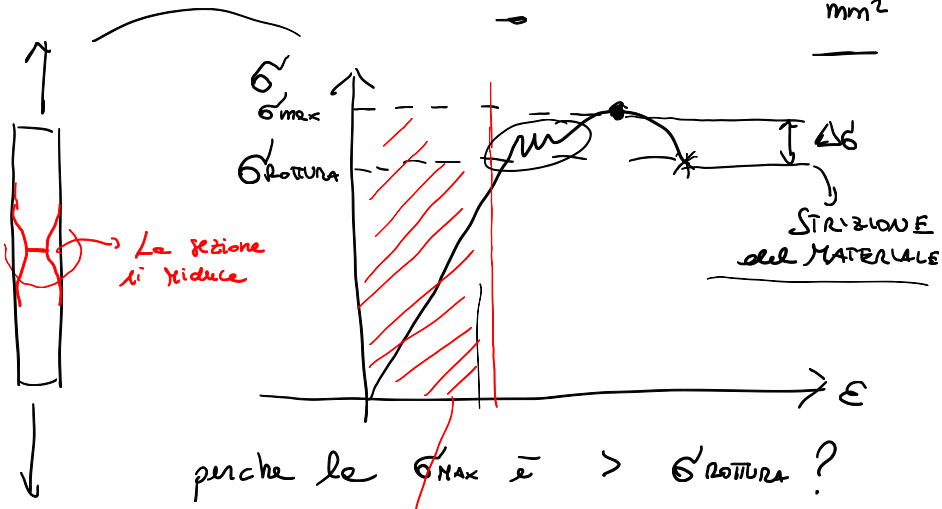
$\frac{b}{h} = \frac{7}{10}$

$$\boxed{b = \frac{7}{10} h}$$

MATERIALE Fe590

↓

ACCIAIO con CARICO di ROTTURA $\sigma_{ROTTURA} = 590 \ \frac{N}{mm^2}$



perche la σ_{MAX} è > $\sigma_{ROTTURA}$?

ZONA LINEARE ELASTICA

$\sigma_{ROTTURA} = 590 \ \frac{N}{mm^2}$

↓

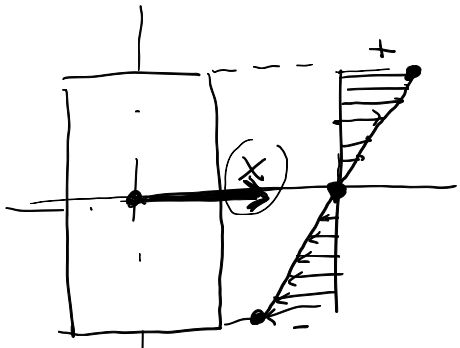
riduco la tensione limite che può agire sulle travi, attraverso un fattore di sicurezza $k = 3$

$$\sigma_{AMMISSIBILE} = \frac{\sigma_{ROTTURA}}{3} = \frac{590}{3} \ N/mm^2 =$$

$$= 197 \ \frac{N}{mm^2}$$

MATERIALE $\Rightarrow \quad \sigma_{AMM} = 197 \ N/mm^2$

FLESSIONE $\Rightarrow \quad \sigma = \dfrac{M_f \cdot y}{I_x}$

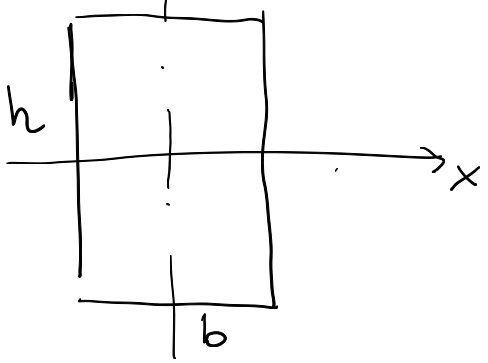


$$\sigma(y) = \frac{M_f \, y}{I_x}$$

y: distanza dal baricentro

$$\sigma_{max} = \frac{M_f \, y_{max}}{I_x} < \sigma_{AMM}$$

$$W = \frac{I_x}{y_{max}} \qquad \sigma_{max} = \frac{M_f}{W}$$



$$I_x = \frac{bh^3}{12} \qquad y_{max} = \frac{h}{2}$$

$$\Rightarrow \quad W = \frac{I_x}{y_{max}} = \frac{\frac{bh^3}{12}}{\frac{h}{2}} = \frac{bh^3}{12} \cdot \frac{2}{h} = \frac{bh^2}{6}$$

$$b = \frac{7}{10} h$$

$$W = \frac{bh^2}{6} = \frac{\frac{7}{10} h \cdot h^2}{6} = \frac{7}{60} \cdot h^3$$

$$\sigma_{max} = \frac{M_f}{W} = \frac{5 \cdot 10^6 \ N \cdot mm}{\frac{7}{60} \cdot h^3} < \sigma_{AMM}$$

$$\frac{5 \cdot 10^6}{\frac{\pi}{60} \cdot h^3} < 197 \Rightarrow h$$

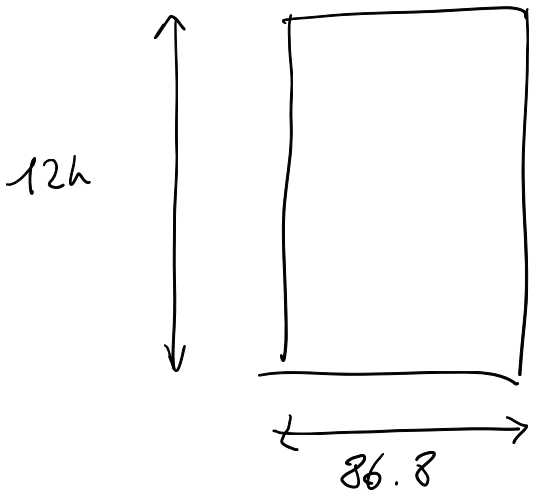
$$\frac{5 \cdot 10^6}{\frac{7}{60}} < 197 \cdot h^3 \Rightarrow 42.9 \cdot 10^6 < 197 \cdot h^3$$

$$197 \cdot h^3 > 42.9 \cdot 10^6$$

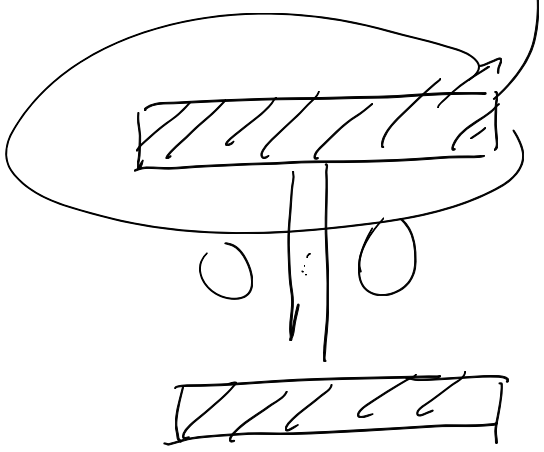
$$h^3 > \frac{42.9 \cdot 10^6}{197}$$

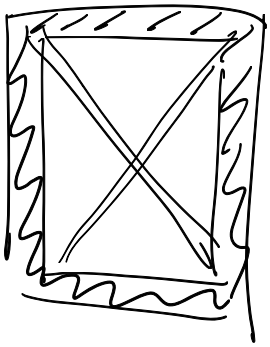
$$h > \sqrt[3]{\frac{42.9 \cdot 10^6}{197}} = 124 \text{ mm}$$

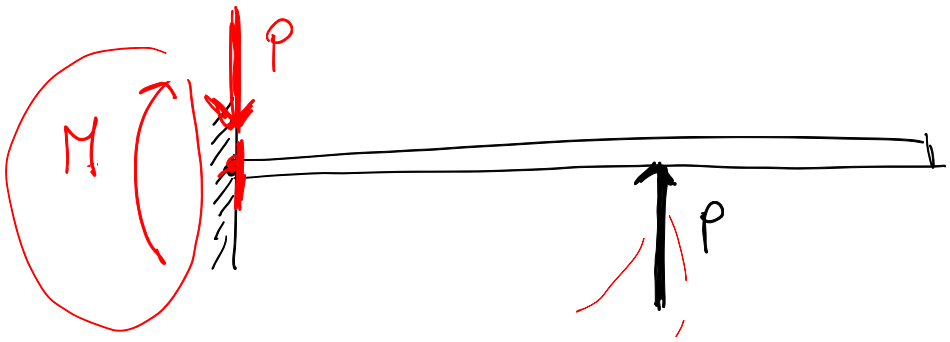
$$b = \frac{7}{10} h = \frac{7}{10} \cdot 124 \text{ mm} = 86.8 \text{ mm}$$

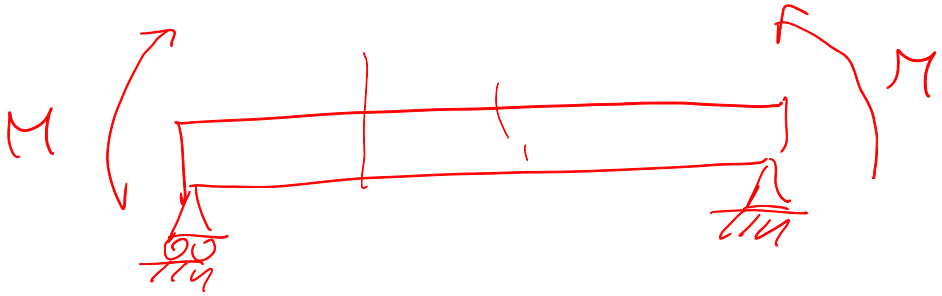


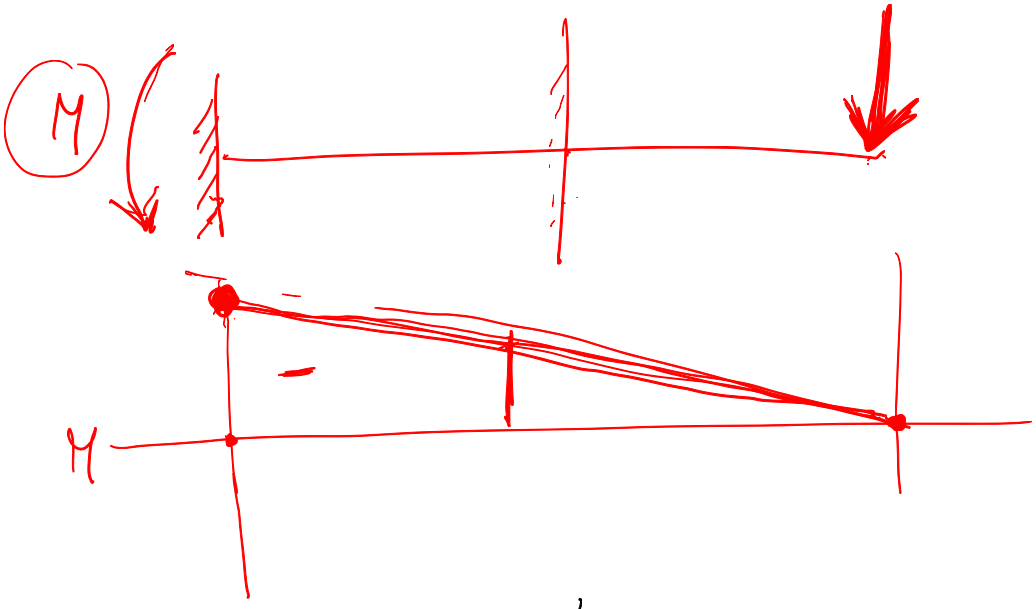
$$\sigma = \frac{M_f}{W}$$

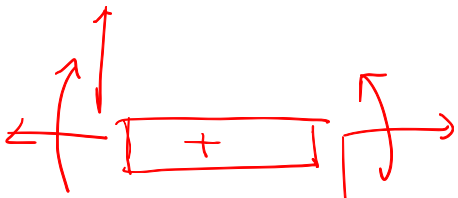


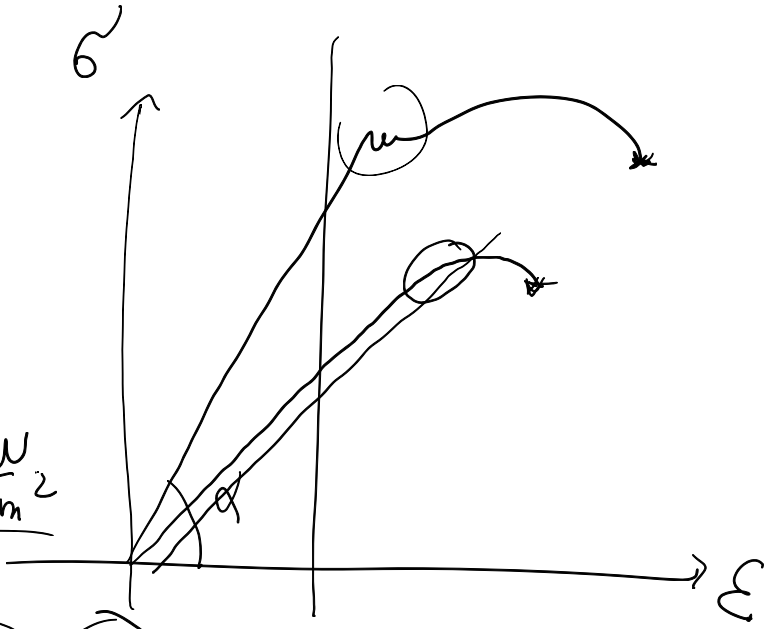












$E_{ACCIAIO} = 206000 \frac{N}{mm^2}$

$E_{ALLUM} = 70000 \frac{N}{mm^2}$

$\sigma =$

$\sigma = E\varepsilon \Rightarrow \varepsilon = \frac{\sigma}{E}$