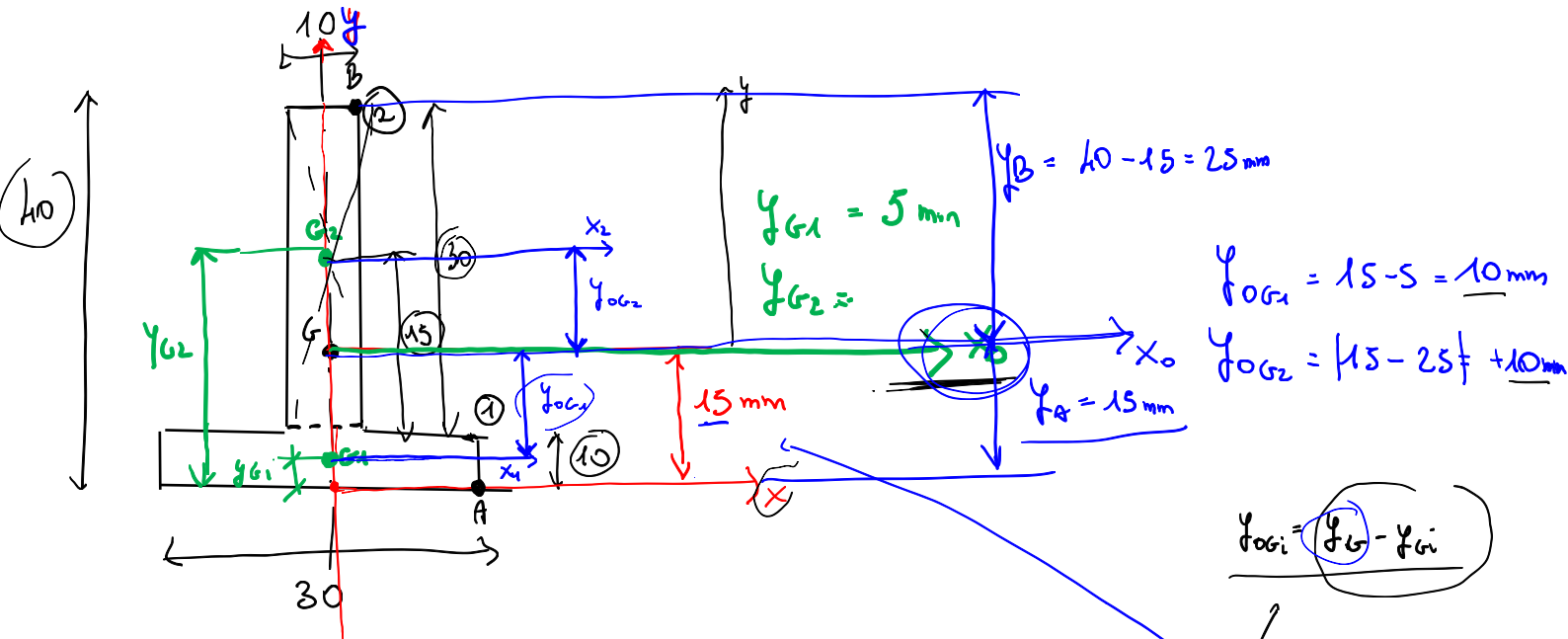


Es. 3.2 - INERZIA



ITEX	A_i [mm ²]	(y_{Gi}) [mm]	$S_{xi} = A_i \cdot (y_{Gi})$ [mm ³]	$I_{x_{Gi}} = \frac{b \cdot h^3}{12}$ [mm ⁴]	$A_i \cdot y_{Gi}^2$
①	300	5	$300 \cdot 5 = 1500$	$\frac{30 \cdot 10^3}{12} = 2500$	$300 \cdot 10^2 = 30000$
②	300	25	$300 \cdot 25 = 7500$	$\frac{10 \cdot 30^3}{12} = 22500$	$300 \cdot 10^2 = 30000$

$$y_G = \frac{\sum_i S_{xi}}{A_{TOT}} = \frac{(1500 + 7500) \text{ mm}^3}{600 \text{ mm}^2} = \frac{9000 \text{ mm}^3}{600} = 15 \text{ mm}$$

$$A_{TOT} = \sum A_i = (300 + 300) \text{ mm}^2 = 600 \text{ mm}^2$$

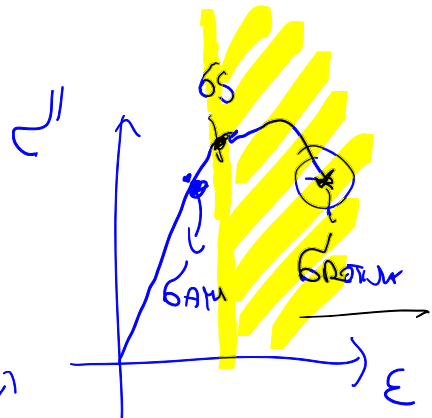
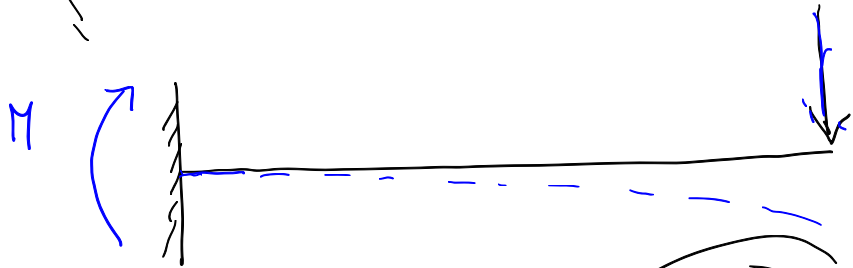
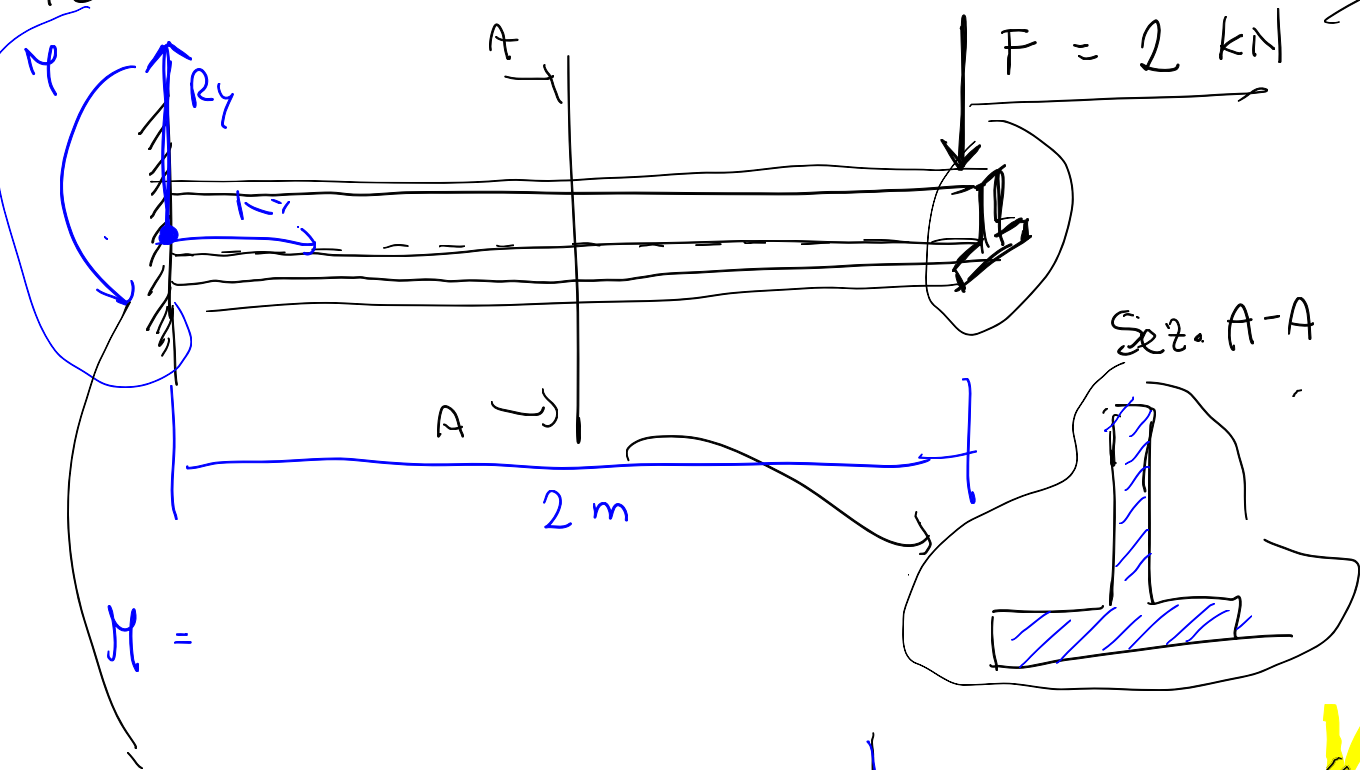
INERZIA RETANGOLO

$$\begin{aligned} I_{x_0} &= I_{x_1} + A_1 \cdot y_{0G1}^2 + I_{x_2} + A_2 \cdot y_{0G2}^2 = \\ &= 2500 + 30000 + 22500 + 30000 = \\ &= 85000 \text{ mm}^4 \end{aligned}$$

$$W_x = \frac{I_{x_0}}{y_{max}} = \frac{85000 \text{ mm}^4}{25 \text{ mm}} = 3400 \text{ mm}^3$$

Distanze max tra vertici delle figure (A e B)
 Distanze ESTERDORSO e INTRADORSO

ESERCIZIO - MOMENTO FLETTENTE



$$M = F \cdot 2m = 4 \text{ kN} \cdot \text{m}$$

MATERIALE

ACCIAIO $\rightarrow \sigma_s = 235 \frac{\text{N}}{\text{mm}^2}$



AMMISSIBILE

$$\sigma_{AMM} = \frac{\sigma_s}{k} = \frac{235}{1.5} \frac{\text{N}}{\text{mm}^2} = 157 \frac{\text{N}}{\text{mm}^2}$$

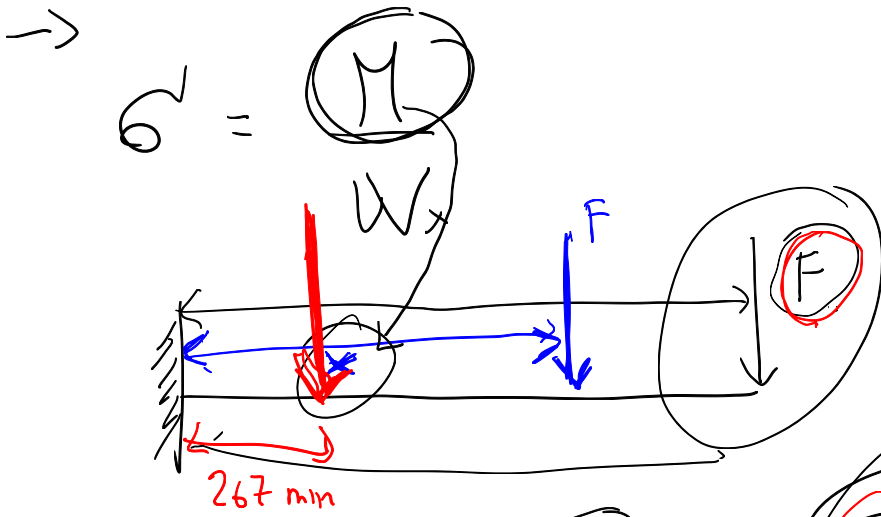
$k = 1.5$



$$\sigma = \frac{M}{W_x} = \frac{2 \cdot 10^3 \text{ N} \cdot 10^3 \text{ mm}}{3400 \text{ mm}^3} = 1176 \frac{\text{N}}{\text{mm}^2}$$

$$\sigma = \frac{M}{I_x} \cdot y_{\text{max}}$$

$\sigma >> \sigma_{AMM} \rightarrow$ La TRAVE si ROMPE!



$$M = F \cdot x \rightarrow \sigma = \frac{M}{W_x} = \frac{F \cdot x}{W_x} < \sigma_{amm}$$

braccio 'Ax'

$$x < \frac{\sigma_{amm} \cdot W_x}{F}$$

$$x > \frac{157 \frac{N}{mm^2} \cdot 3400 mm^3}{2000 N} = 266.9 mm$$

FORZA MAX

$$F_{max} < \frac{\sigma_{amm} \cdot W_x}{2 m}$$

OPPURE MODIFICO LA SEZIONE ⇒ INSPESSIRE

$$W_x > \frac{F \cdot 2 m}{\sigma_{amm}} = \frac{2000 \cdot 2000 mm}{157 \frac{N}{mm^2}} = 25800 mm^3 = 25.5 cm^3$$