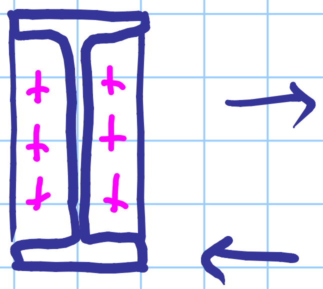
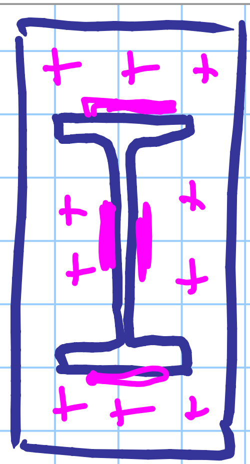
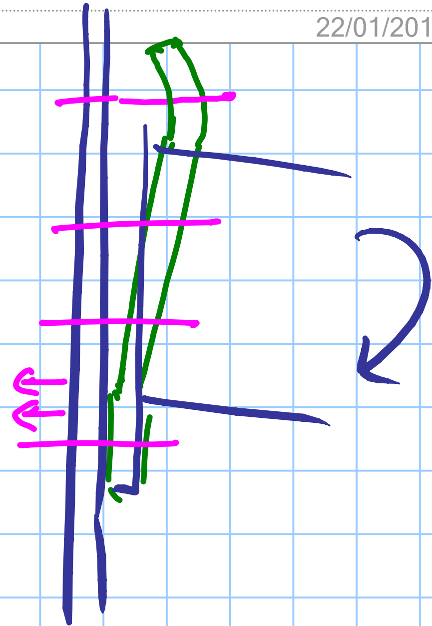
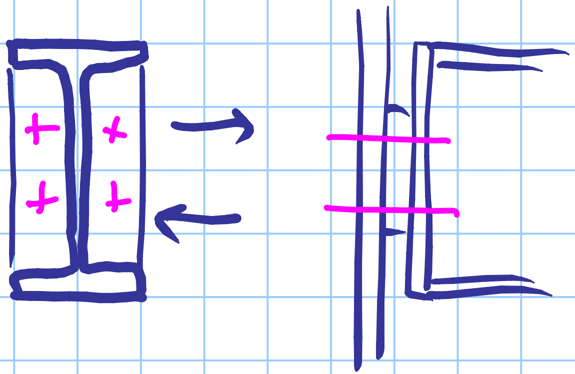
Titolo nota 22/01/2014



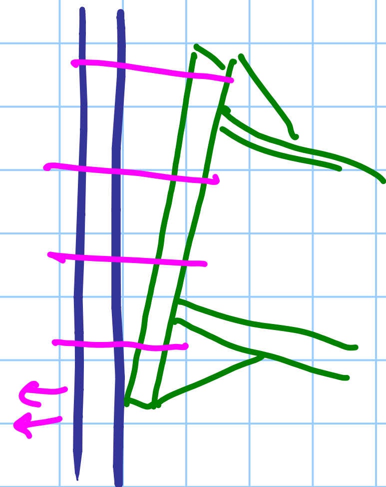


incastro

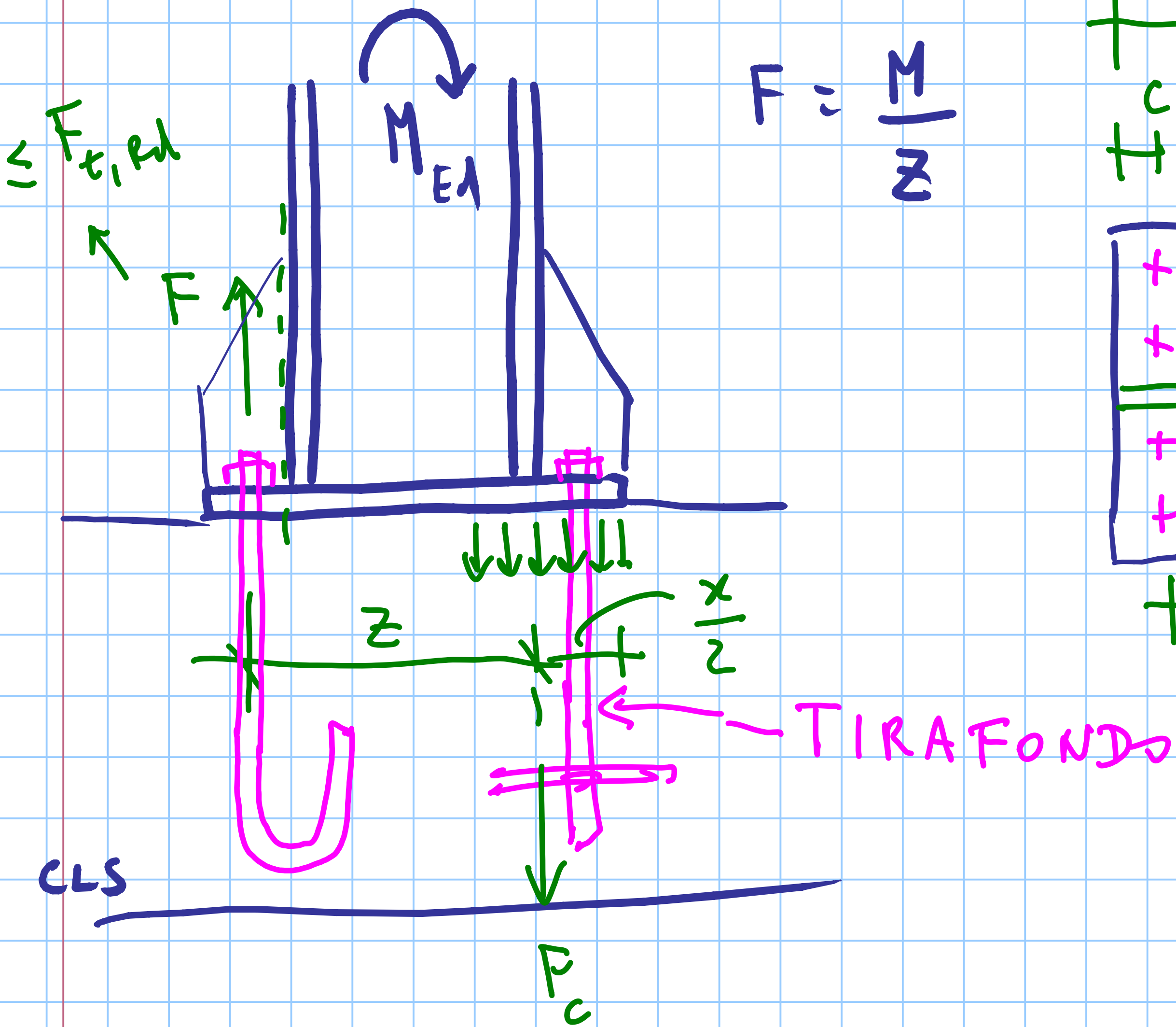




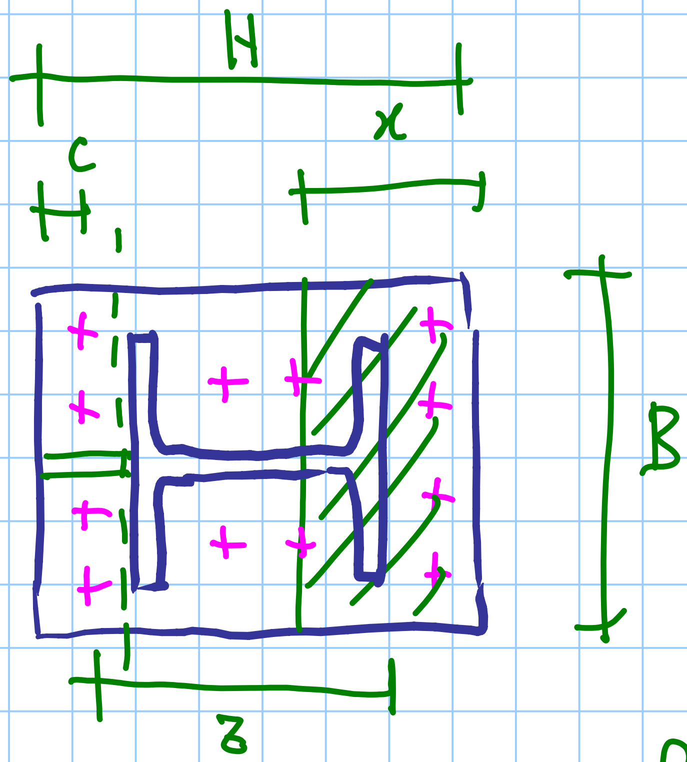
più vicino
a cerniera



COLONNA - FONDAZIONE



$$F = \frac{M}{z}$$



$$F = B\,x\,f_{cd}$$

↓

resistenza cls

VERIFICA determinare M_{Rd} e cfr con M_{Ed}

tirafondi: $F_{t,Rd} = 0.9\, A_{res} \frac{f_{ub}}{\gamma_{M2}} \quad n_b$

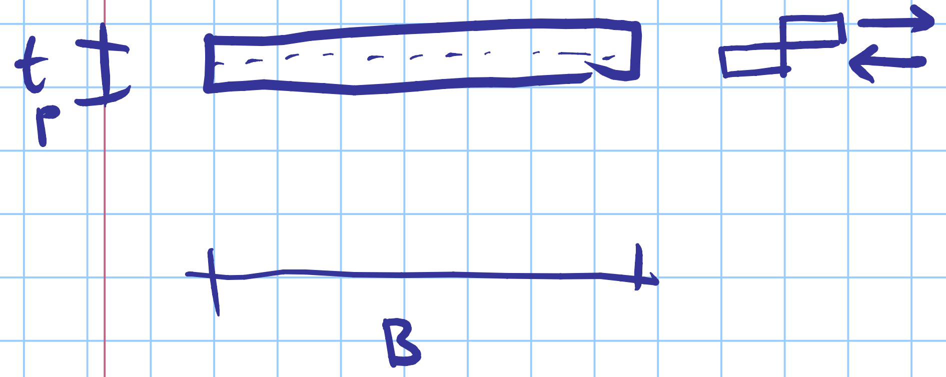
$F_c = F_t \leq B\, x\, f_{cd}$ $\qquad x = \frac{F_{t,Rd}}{B\, f_{cd}}$

$z = H - c - \frac{x}{2}$

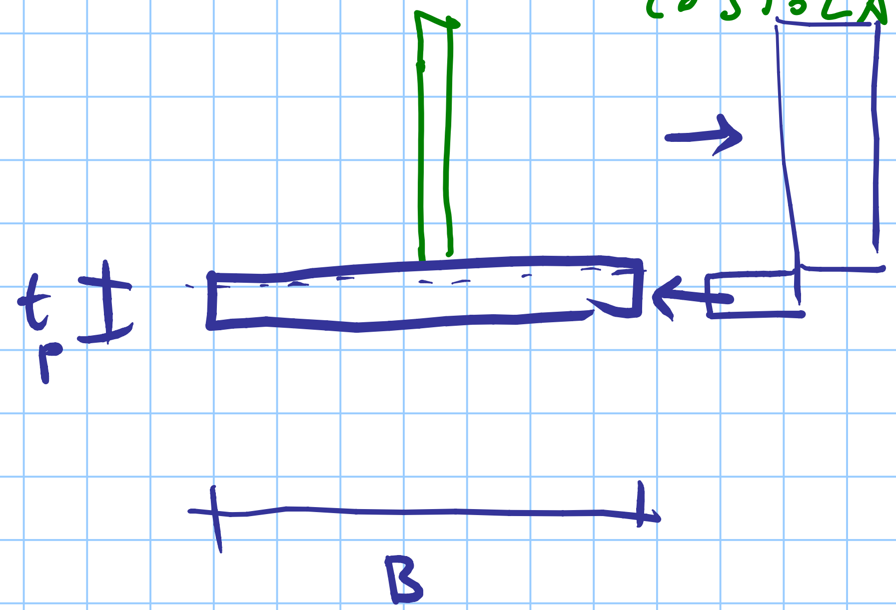
$M_{Rd} = F_{t,Rd} \cdot z$

Sezione resistente a flessione

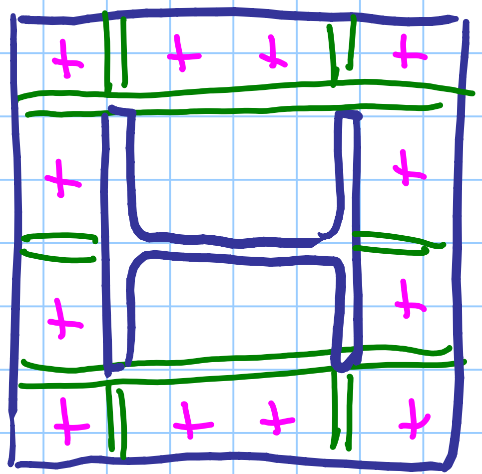
SENZA COSTOLA



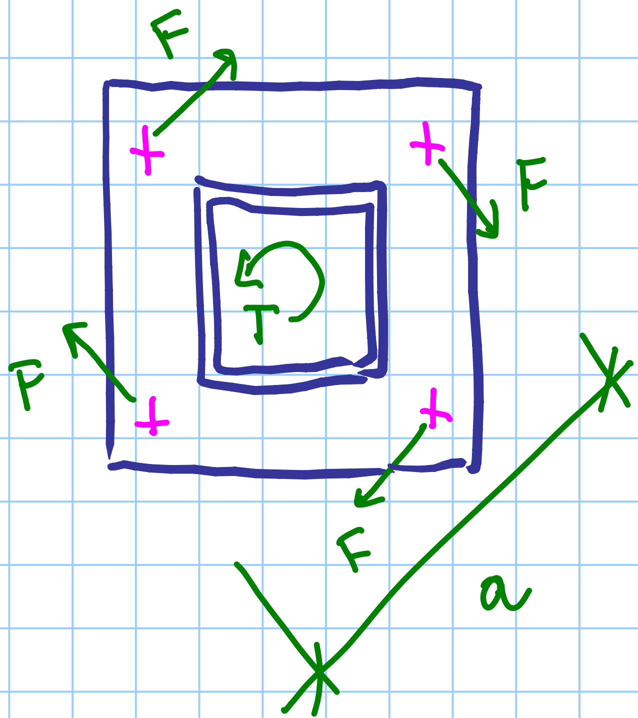
CON COSTOLA

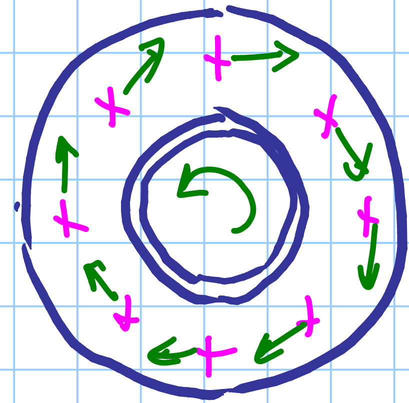


per Trasmettere bene momento in 2 piani

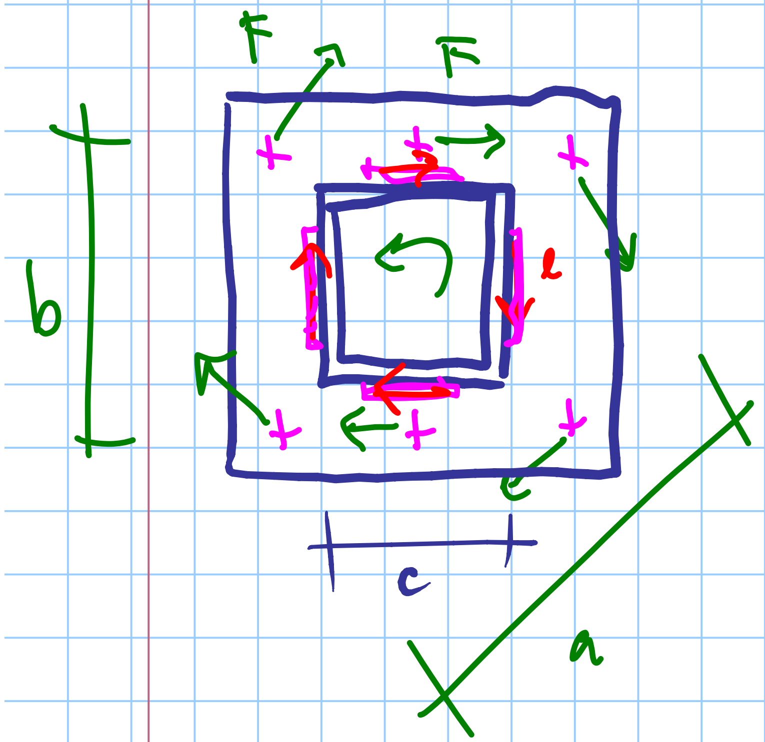


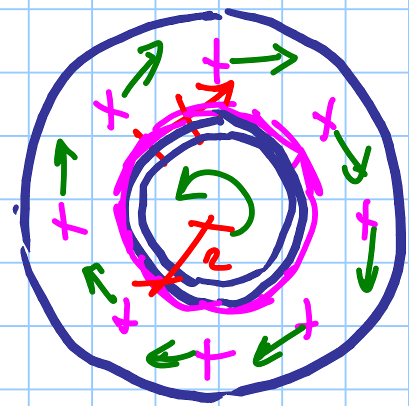
TORSIONE





$$T = 2 F a$$





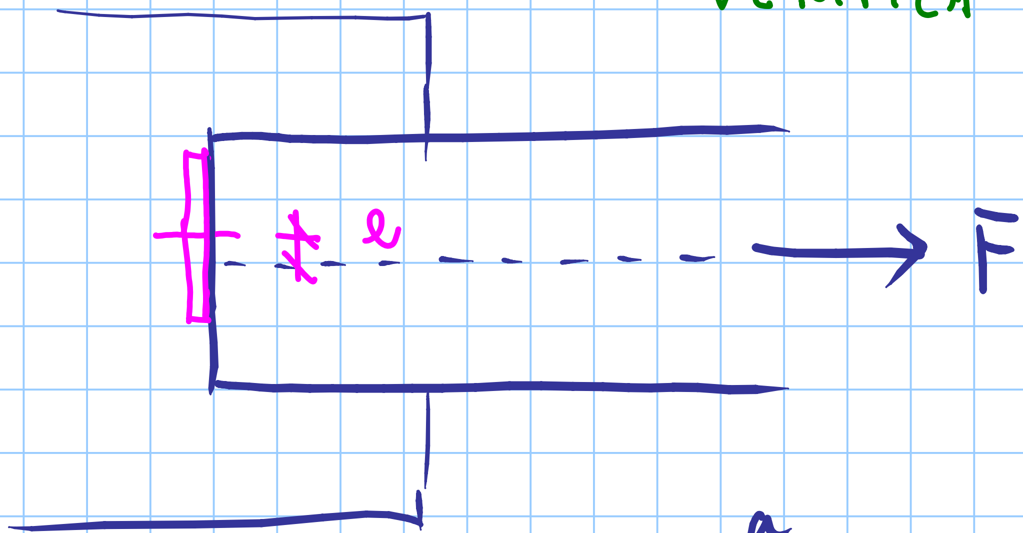
$$2\pi r \cdot a \cdot r \cdot f_{vwd} = T$$

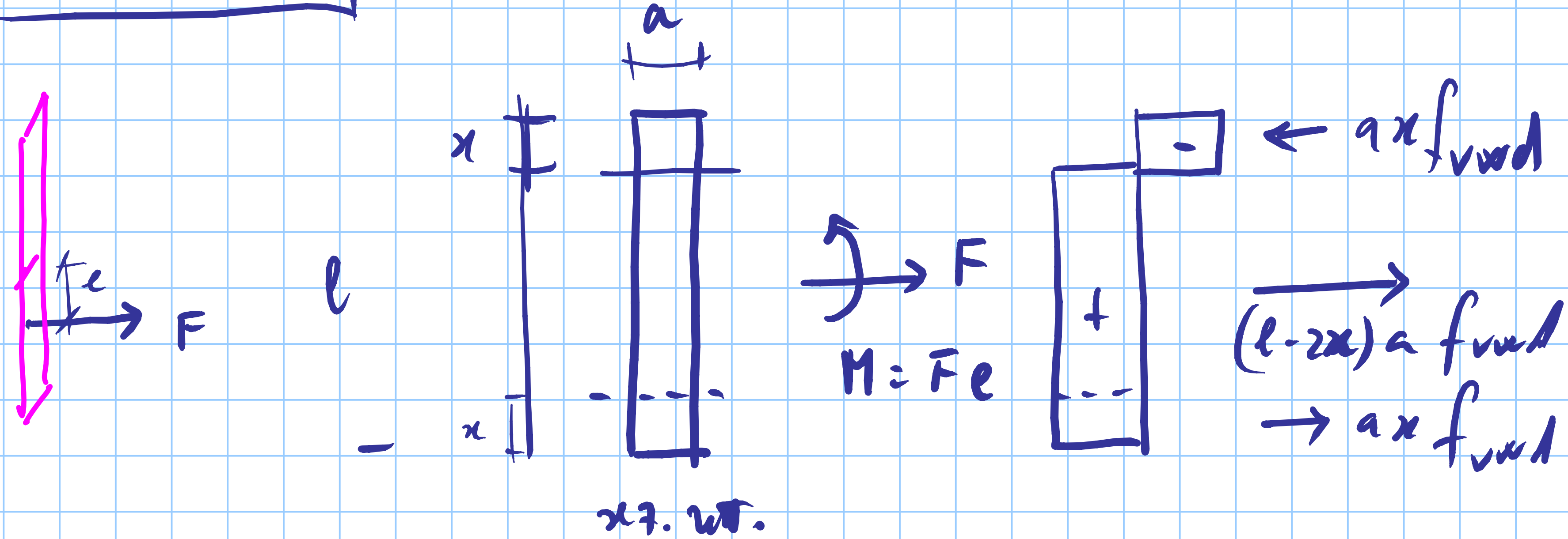
$$T = 2Fa + Fb$$

$$T = 2 \cdot al\, f_{vwd} \cdot c$$

VERIFICA CON N eccentrico

(modello sfera)





$$N_{Rd} = (\ell - 2x)\, a\, f_{vwd}$$

$$M_{Rd} = a x\, f_{vwd}\, (\ell - x)$$

$$e = \frac{M}{N} = \frac{\cancel{a}\, x\, \cancel{f_{vwd}}\, (\ell - x)}{(\ell - 2x)\, \cancel{a}\, \cancel{f_{vwd}}} = \frac{x(\ell - x)}{\ell - 2x}$$

$$(\ell - 2x)\, e = x(\ell - x)$$

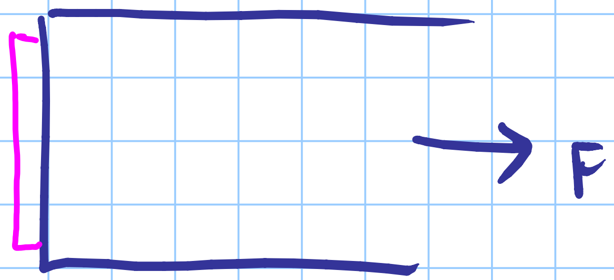
$$\ell e - 2xe = \ell x - x^2$$

$$x^2 + (-2e - \ell)x + \ell e = 0$$

$$x = \frac{2e + \ell \pm \sqrt{(-2e-\ell)^2 - 4\ell e}}{2} =$$

$$= \frac{2e + \ell + \sqrt{4e^2 + \ell^2}}{2}$$

VERIFICA CON N centrato



SFERA – ELLISSOIDE

SFERA $\quad F_{Rd} = a\, l\, f_{vwd}$

$$f_{vwd} = \frac{f_{wd}}{\sqrt{3}}$$

ELLISSOIDE

$$F \rightarrow \quad \sigma_{\perp} = \frac{F/\sqrt{2}}{a\, l}$$

$$\tau_{\perp} = \sigma_{\perp}$$

$$\sqrt{\sigma_\perp^2 + 3\tau_\perp^2 + 3\tau_\parallel^2} \leq f_{wd}$$

$$\sqrt{\frac{F^2/2}{a^2 l^2} + 3\,\frac{F^2/2}{a^2 l^2}} \leq f_{wd}$$

$$\sqrt{4\,\frac{F^2/2}{a^2 l^2}} \leq f_{wd} \qquad 2\,\frac{F/\sqrt{2}}{a l} \leq f_{wd}$$

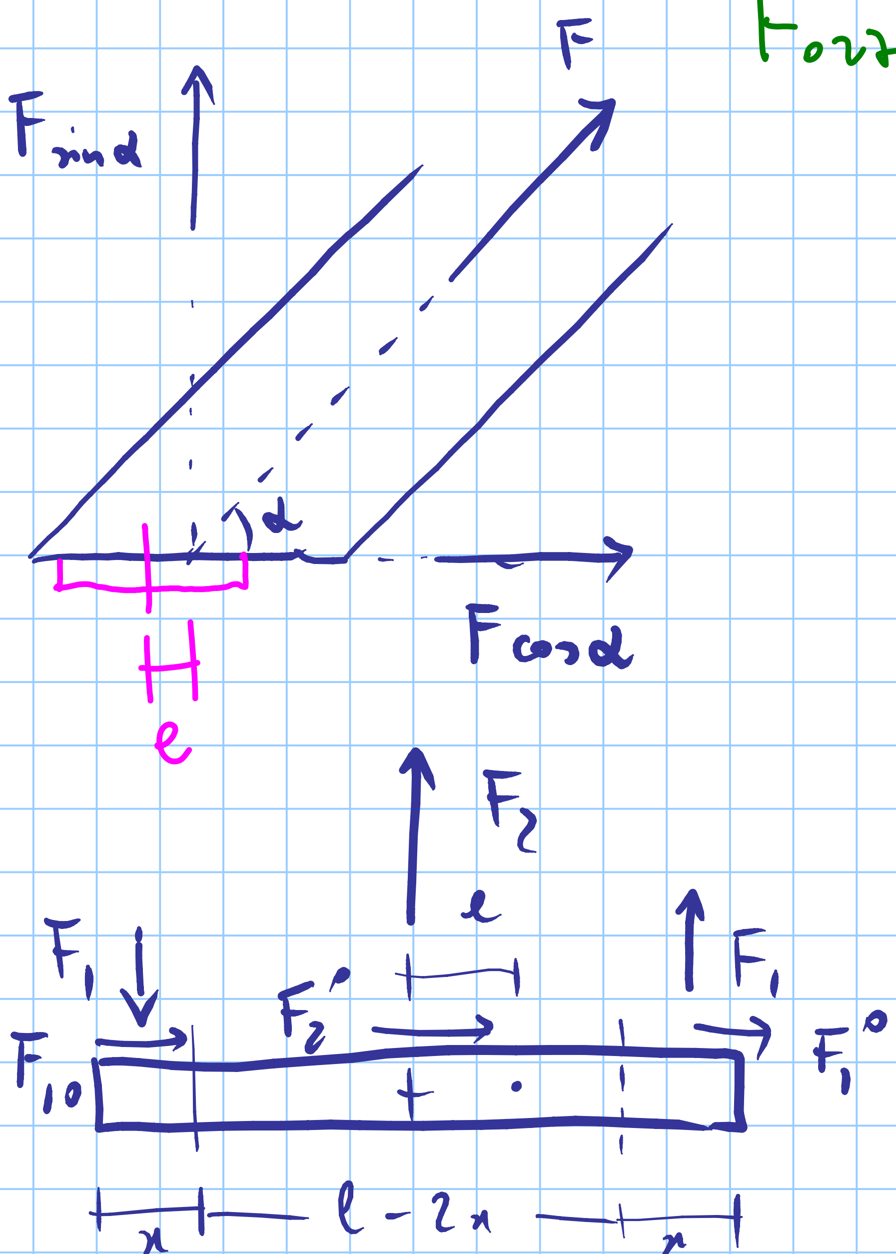
$$F \leq \frac{a l}{2}\sqrt{2}\, f_{wd} = \frac{a l}{\sqrt{2}}\, f_{wd}$$

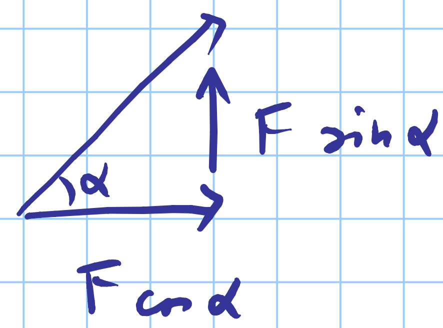
SFERA $\quad F_{Rd}^{sf} = a\,l\,\dfrac{f_{wd}}{\sqrt{3}}$

ELLISSOIDE $\quad F_{Rd}^{el} = a\,l\,\dfrac{f_{wd}}{\sqrt{2}}$ $\quad + 22.5\ \%$

$$\frac{F_{Rd}^{el}}{F_{Rd}^{sf}} = \frac{1/\sqrt{2}}{1/\sqrt{3}} = \frac{\sqrt{3}}{\sqrt{2}} = 1.225$$

Forza inclinata eccentrica



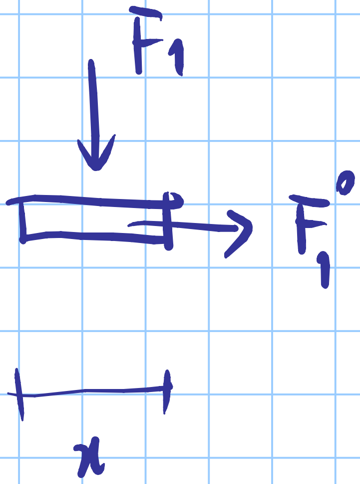


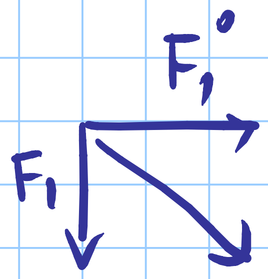
$$F_2 = F \sin\alpha$$

$$F_1 = F \sin\alpha \frac{x}{l - 2x}$$

$$F_1^o = F \cos\alpha \frac{x}{l}$$

$$F_2^o = F \cos\alpha \frac{l - 2x}{l}$$





$$F_1^{tot} = \sqrt{F_1^2 + F_1^{o\,2}} =$$

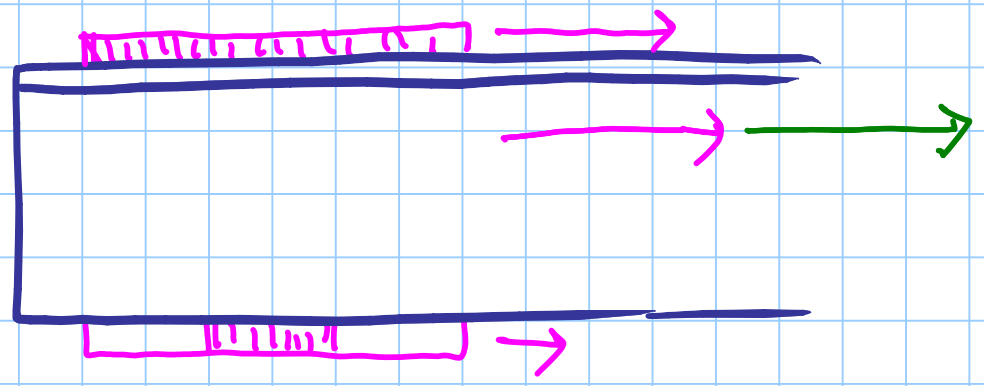
$$= \sqrt{\left(F \sin\alpha \frac{x}{l-2x}\right)^2 + \left(F \cos\alpha \frac{x}{l}\right)^2}$$

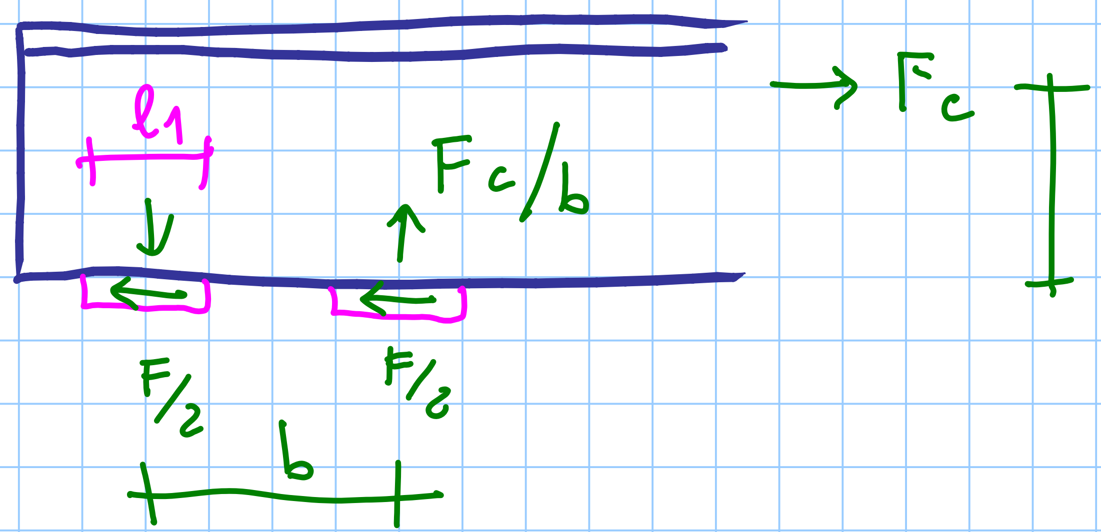
verifica $F_1^{tot} \leq a\, x\, f_{rvd}$

$$F_2^{\text{Tot}} = \sqrt{F_2^2 + F_2^{\bullet 2}} =$$

$$= \sqrt{(F \sin\alpha)^2 + \left(F \cos\alpha \, \frac{l-2x}{l}\right)^2}$$

$$\leq a(l-2x) f_{\text{Vord}}$$





$$\sqrt{\left(\frac{F}{2}\right)^2 + \left(\frac{F_c}{b}\right)^2} \le a\, l_1\, f_{vwd}$$