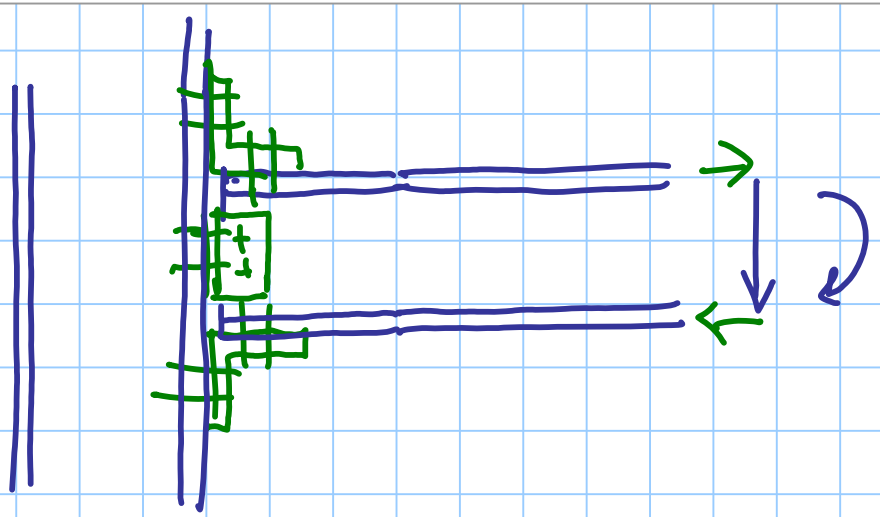
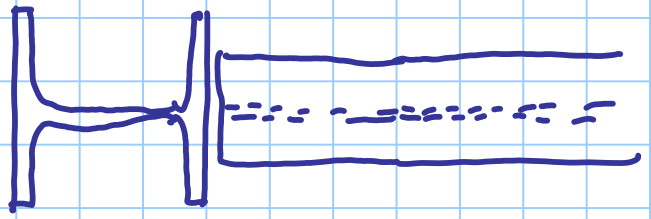
COLLEGAMENTI PER TRASMETTERE M, V

Titolo nota 22/01/2015

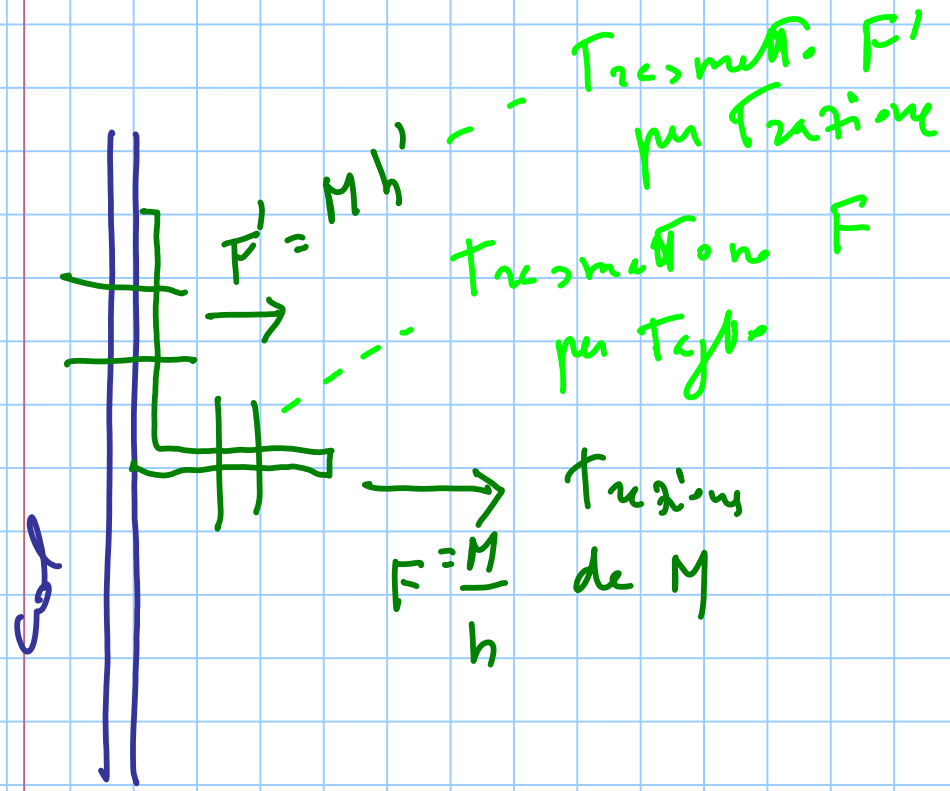


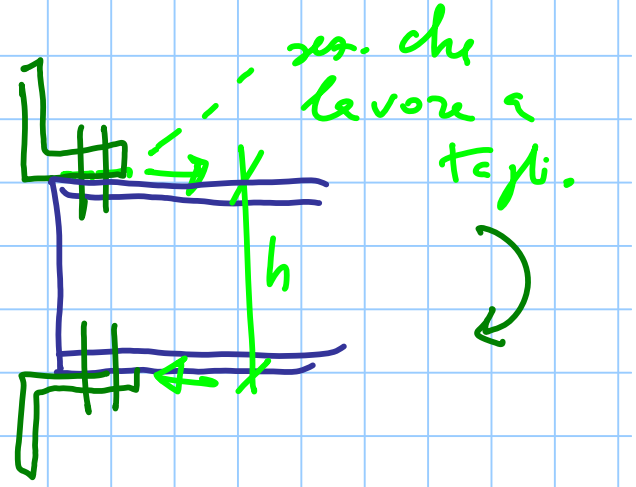


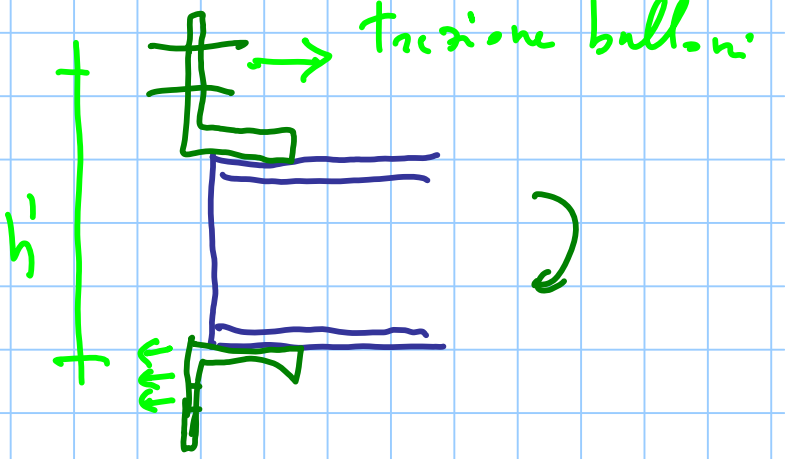
per trasmettere V

inf
sup

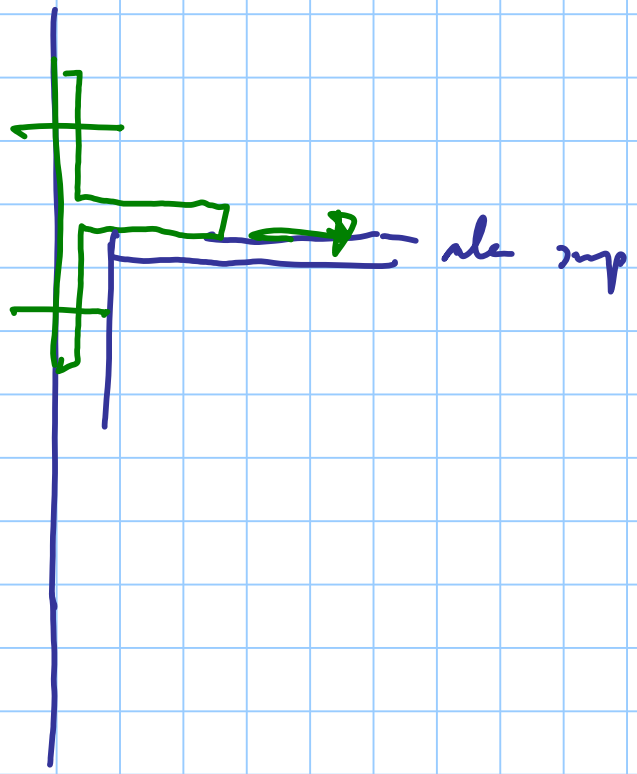
per trasmettere M


Trasmett. F'
per frazione
$F' = M h'$
Trasmettono F
per Taglio
Trazione
$F = \frac{M}{h}$ di M

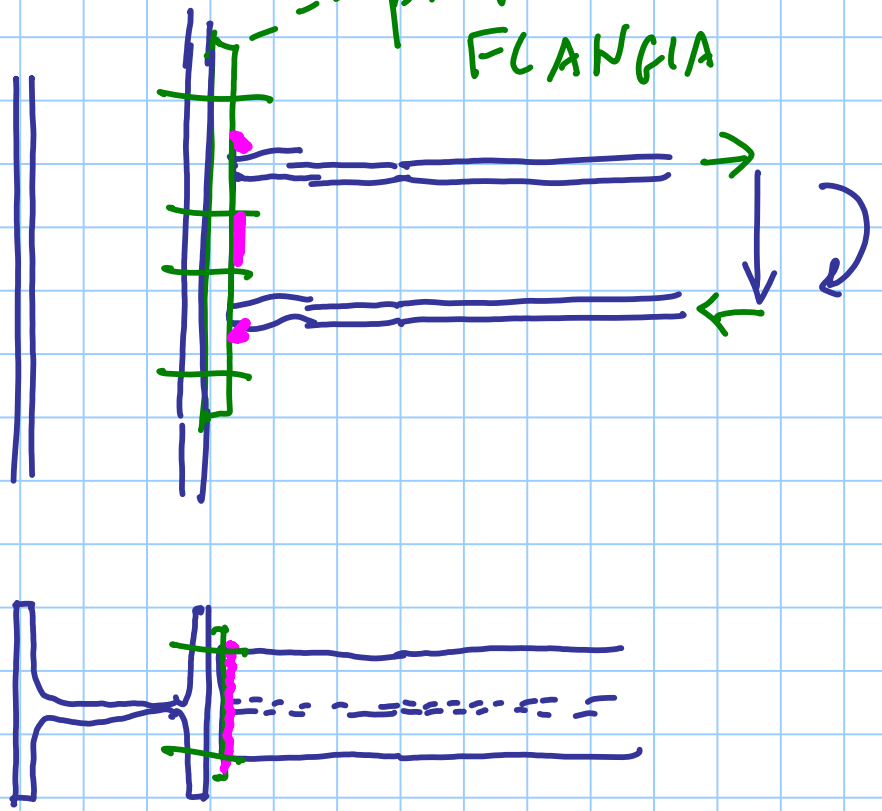

Vengono chiamate a
taglio.
h


Trazione bullone
h'

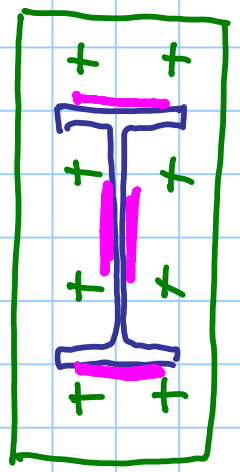
al posto di L un ⊢ (T STUB)

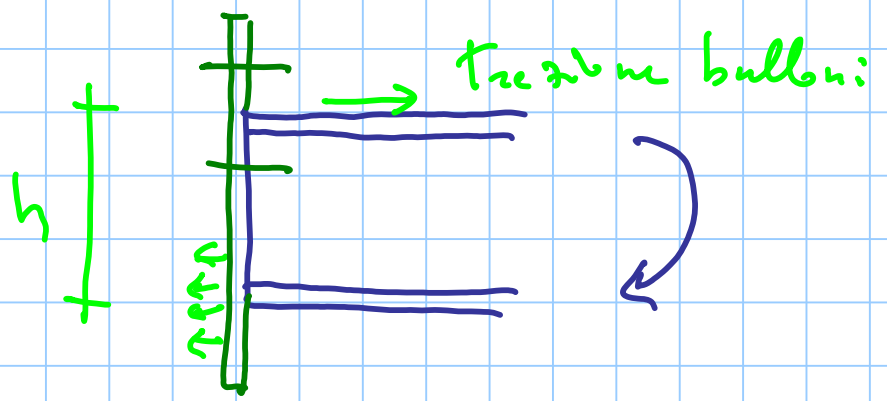


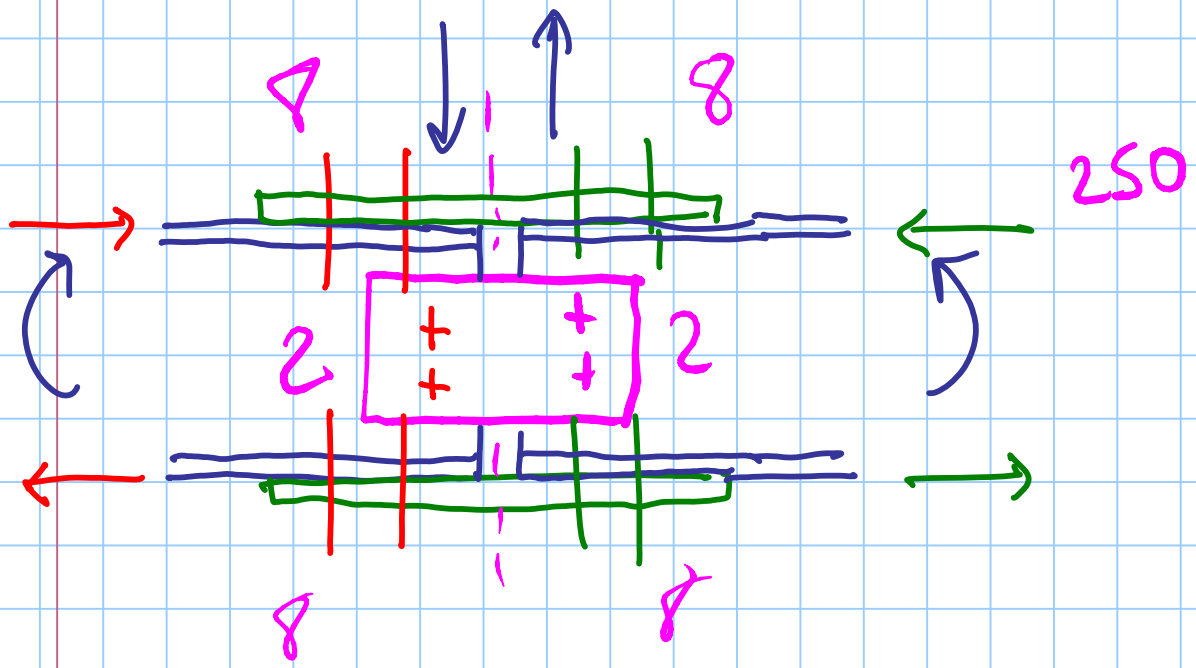
piatt. FLANGIA



COLLEGAMENTO FLANGIATO




h



TOT = 36 bulloni

IPE 240 S235

$W_{pl} = 366.6 \times 10^3\ mm^3$

$M_{Rd} = 82.0\ kN\,m$

$M_{Ed} = \underline{60}\ kN\,m$

$h = 240\ mm$; $t_f = 9.8\ mm$

$V_{Ed} = 140\ kN$

il momento flettente è trasmesso mediante taglio dai bulloni che collegano ala/piatti sup/inf

con $n_s = 1$

$$N = \frac{M}{h} = \frac{60.0}{0.24} = 250 \text{ kN}$$

se avessi bulloni M16 5.6 fil $\quad F_{v,Rd} = 37.7$ kN

$$n_b = \frac{250}{37.7} = 6.6 \text{ bulloni} \rightarrow 8 \text{ bulloni}$$

il taglio è trasmesso mediante i bulloni dei pioli a fianco all'anima

$n_s = 2$

$$n_b \geq \frac{140}{2 \times 37.7} = 1.86 \rightarrow$$

bulloni come sopra

2 bulloni

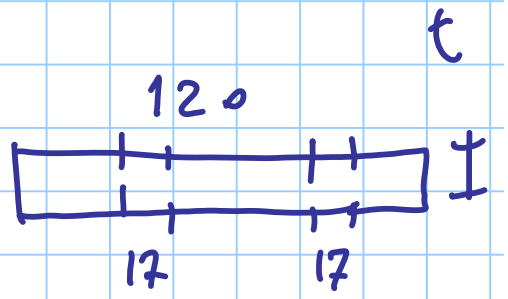
progett. del piatt. sup/inf

piatt. Tesa

$$250 \leq N_{pl,Rd} = A \frac{f_y}{\gamma_{M0}}$$

$$250 \leq N_{u,Rd} = 0.9\, A_{net} \frac{f_u}{\gamma_{M2}}$$

$$A \geq \frac{250 \times 1.05}{235} \times 10^3 = 1117 \text{ mm}^2$$



$$A_{net} \geq \frac{250 \times 10^3 \times 1.25}{0.9 \times 360} = 965 \text{ mm}^2$$

$120\ t \geq 1117\ mm^2$ $\qquad t \geq 9.3\ mm$

$\underbrace{(120 - 2\times 17)}_{86}\ t \geq 965\ mm^2$ $\qquad t \geq 11.2\ mm$

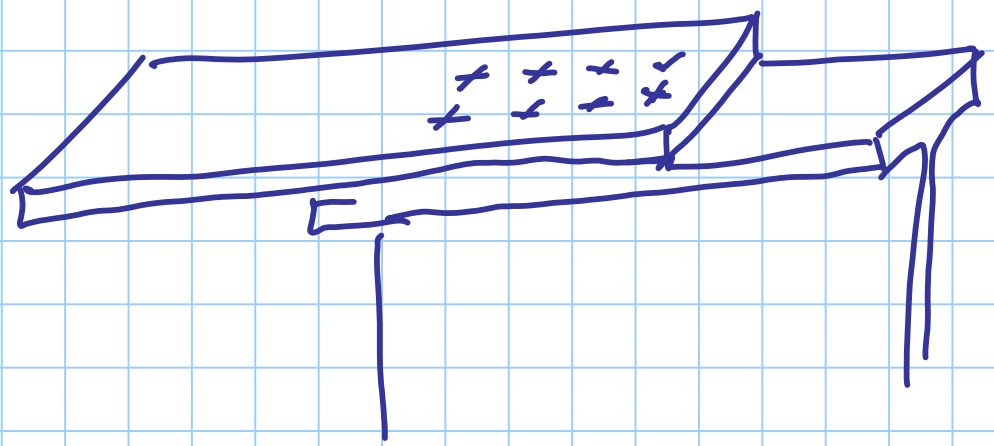
wolę $t = 12\ mm$

$$N_{pl,Rd} = 120 \times 12 \times \frac{235}{1.05} \times 10^{-3} = 322.3\ kN$$

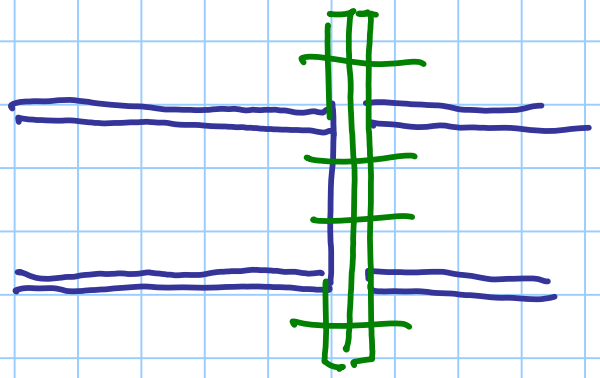
$$N_{u,Rd} = 0.9 \times 86 \times 12 \times \frac{360}{1.25} \times 10^{-3} = 267.5\ kN > 250$$

resistenza a taglio dei bulloni $8 \times 37.7 = 301.6$ kN

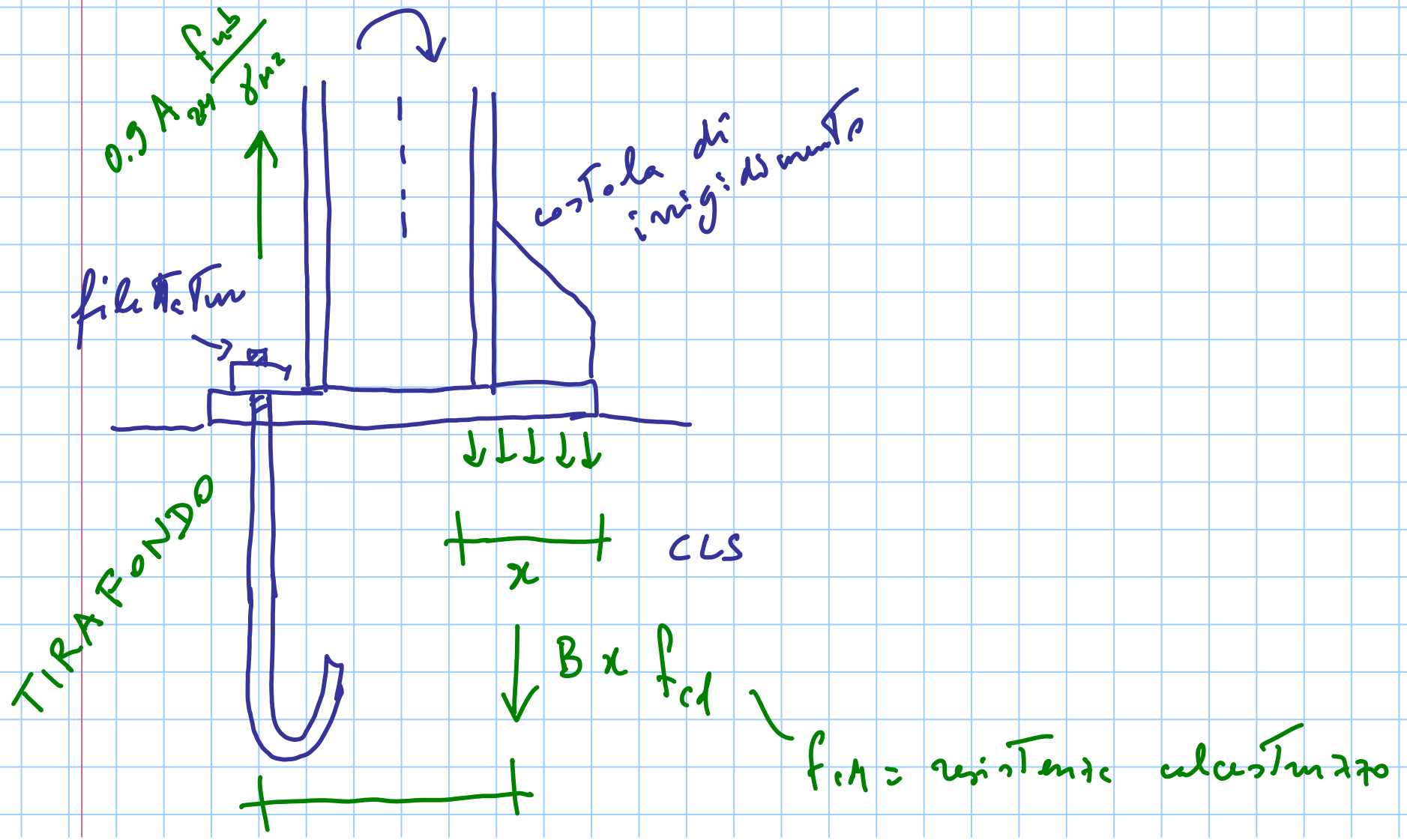
(ipotizzo) res. rifollamento $F_{b,Rd} = 284.5$ kN

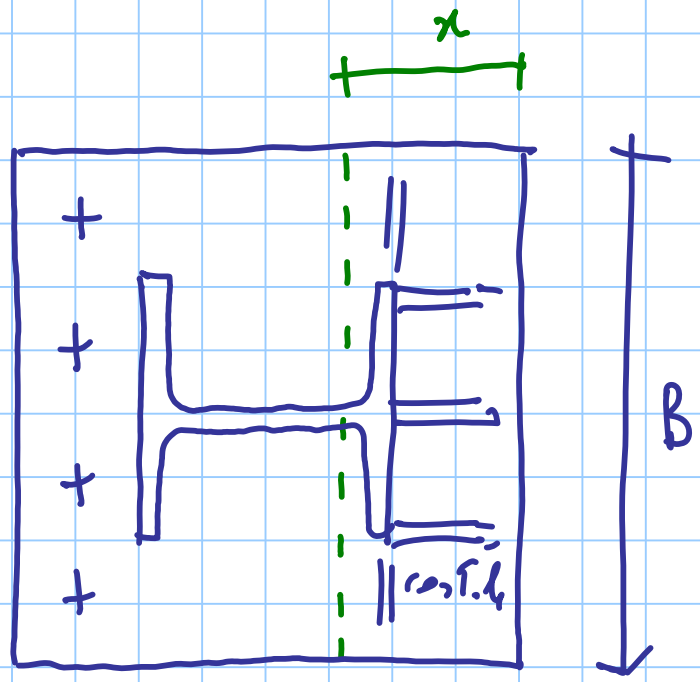


collegamento Trave - Trave flangiata



Collegamento colonna - fondazione





VERIFICA

1) calcolo x da equilibrio Traslazione

2) determino M_{Rd} come forze $\times$ braccio

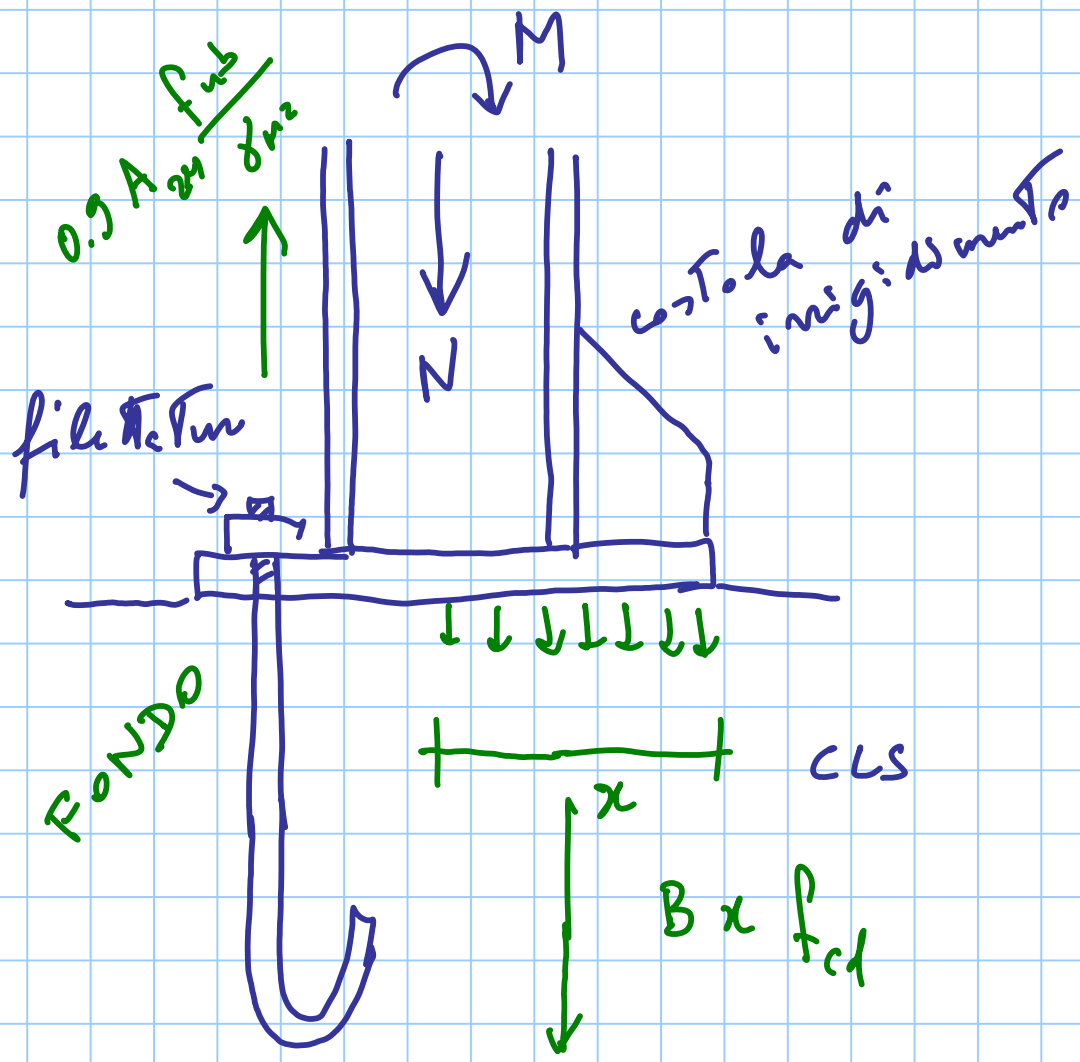
PROGETT- (dimensioni piatt. già definite)

1) ipotizz. un braccio

2) calc. lo $N = \frac{M}{br.}$ e progett. i Tirafondi

3) determino x da equilibrio Traslazione

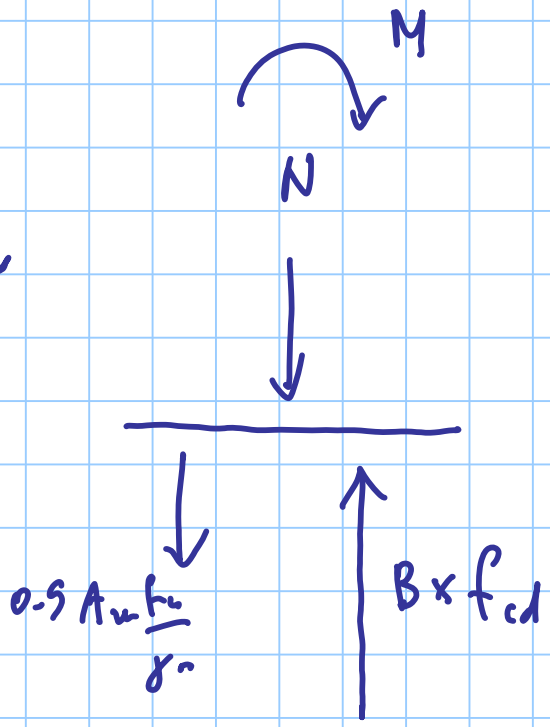
4) da x trovo braccio che confronto con valore ipotizzato


M
$0.9 A_{sh} f_{tk} / \gamma_{M2}$
N
controllo di irrigidimento
filetto Tirfon
FONDO
CLS
x
$B \times f_{cd}$

VERIFICA

1) calcolo x da equilibrio Traslazione

interviene anche N

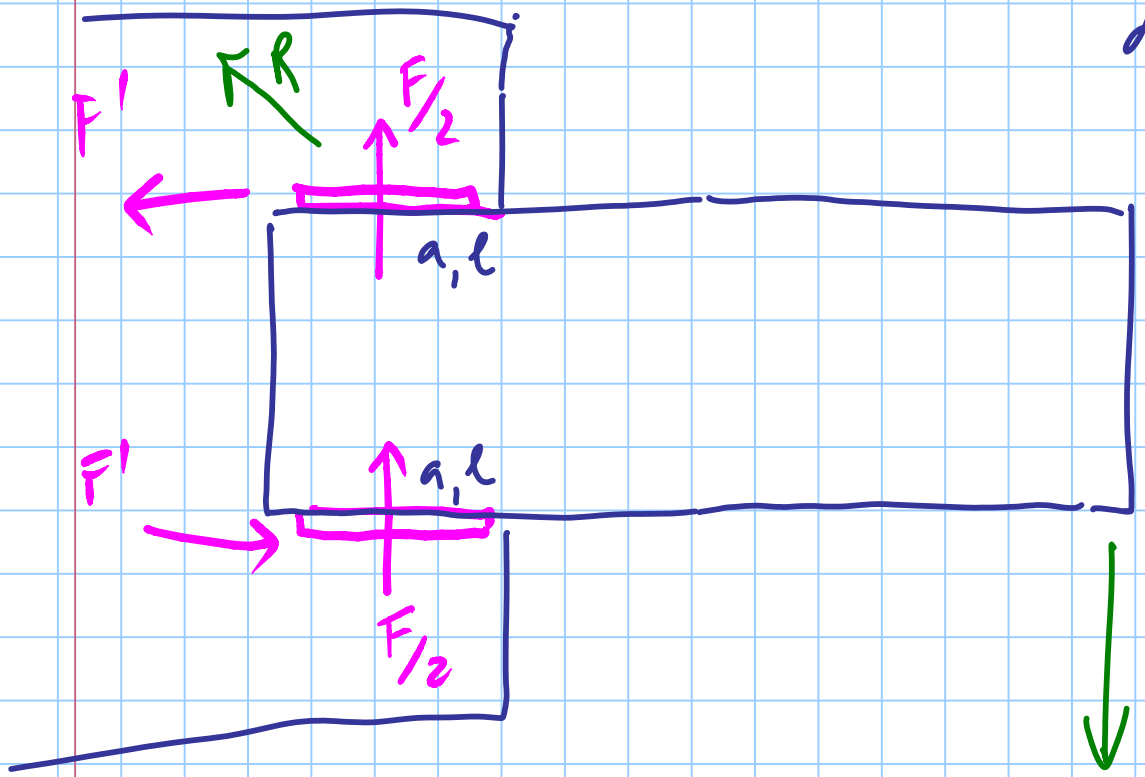


2) calcolo M_{Rd} come?

equilibrio alla rotazione

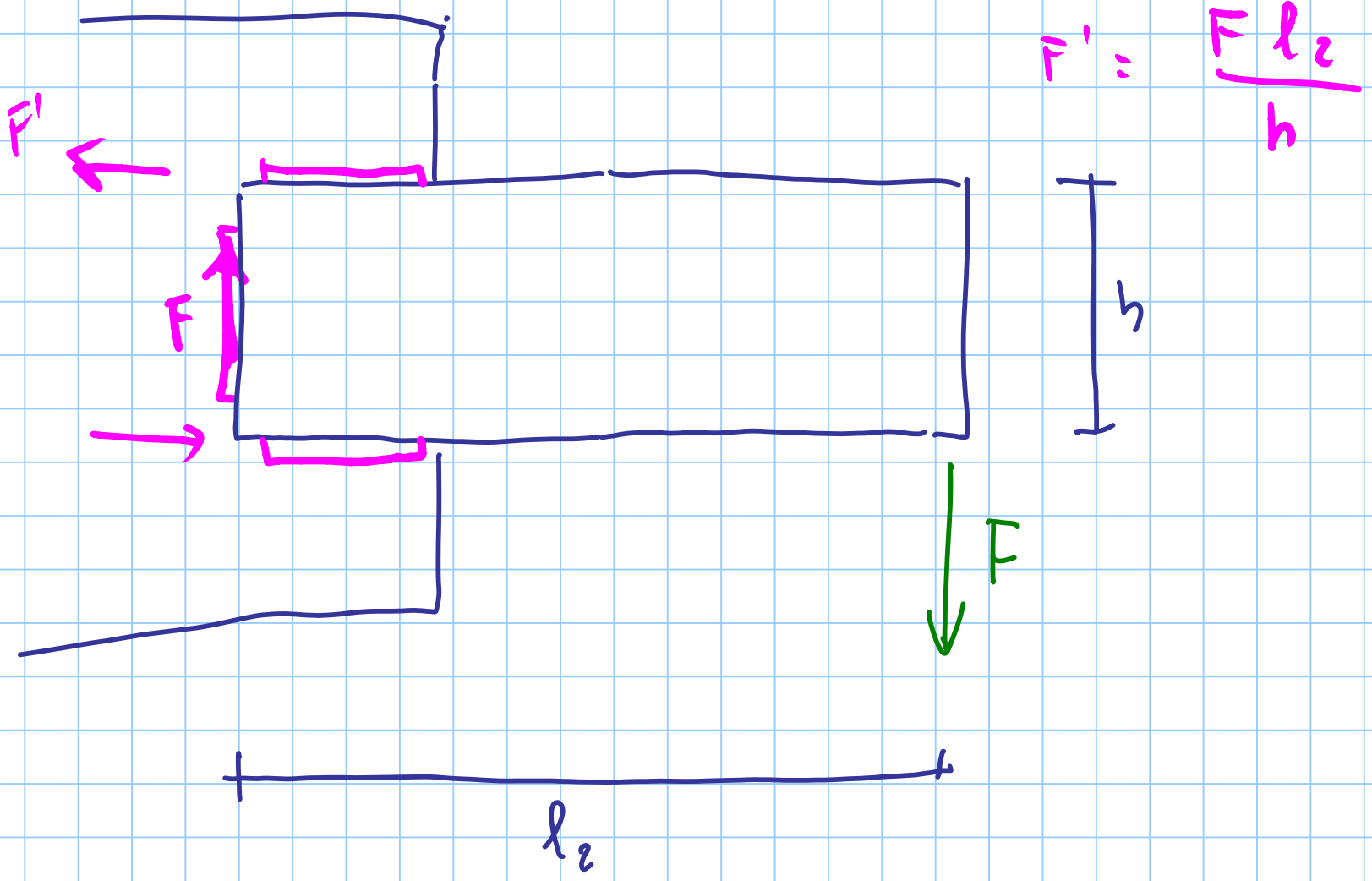
rispetto al baricentro delle colonne

dominio sfera (per comodità)

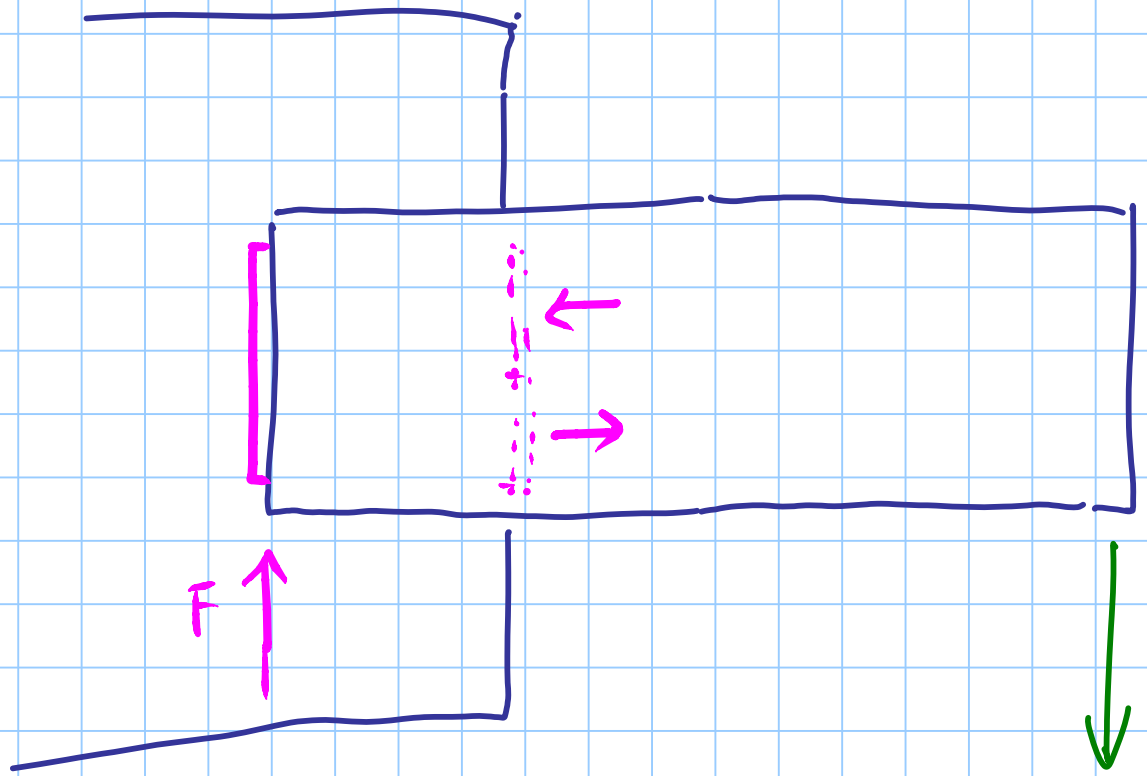


$$F' = \frac{F l_1}{h}$$

$$R_{Ed} = \sqrt{\left(\frac{F}{2}\right)^2 + \left(\frac{F l_1}{h}\right)^2} \leq R_{Rd} = a l f_{y,wd}$$



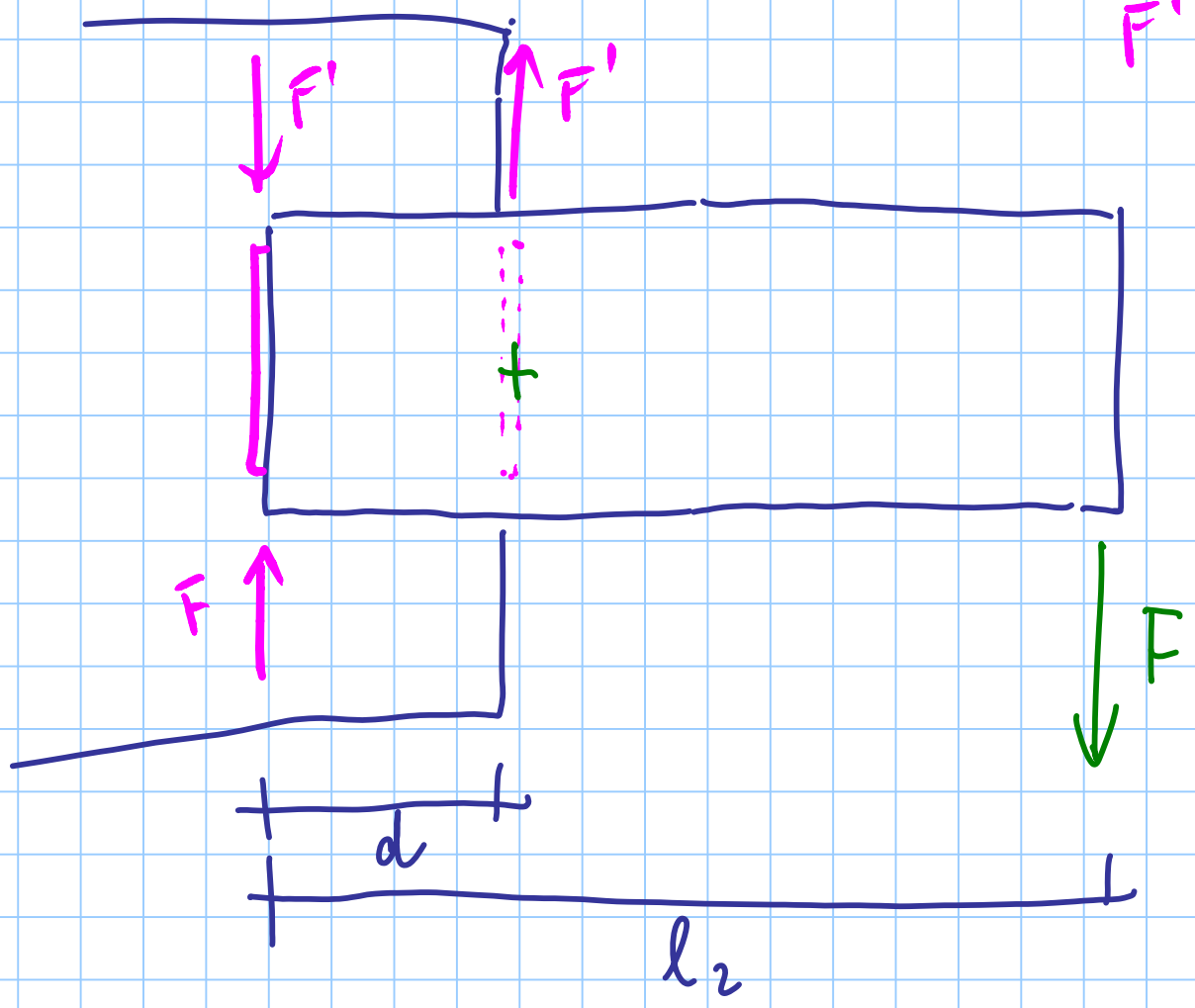
$$F' = \frac{F\,l_2}{h}$$



SOLUZIONE

- possibile

- non buona



$$F' = \frac{F\, l_2}{d}$$

PROGETTO

- sarebbe meglio fare più lungo il cordone di destra

$$F' = \frac{F(l_2 - d)}{d}$$