TRAZIONE

Titolo nota 14/01/2014

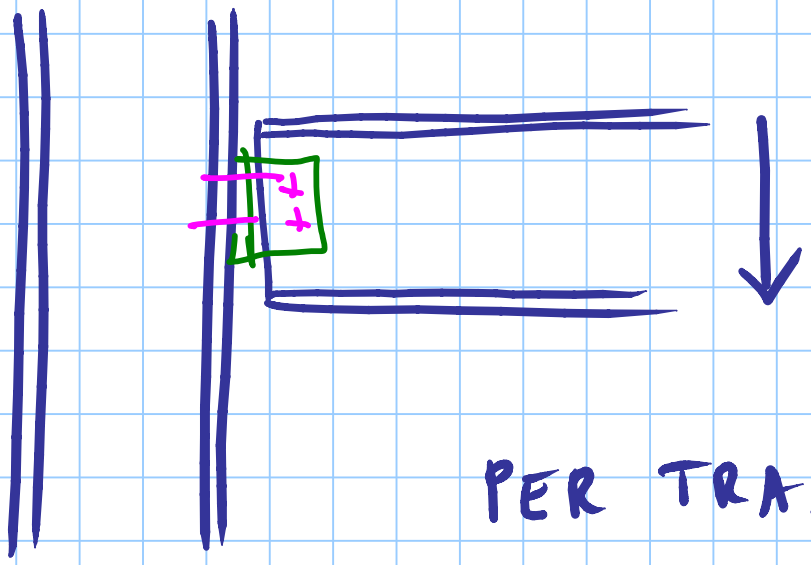
$$F_{t,Rd} = 0.9\, A_{res}\, \frac{f_{ub}}{\gamma_{M2}}$$

Trazione bullone

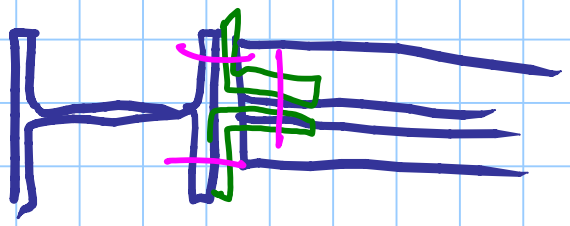
$$B_{p,Rd} = 0.6\, \pi\, d_m\, t\, \frac{f_u}{\gamma_{M2}}$$

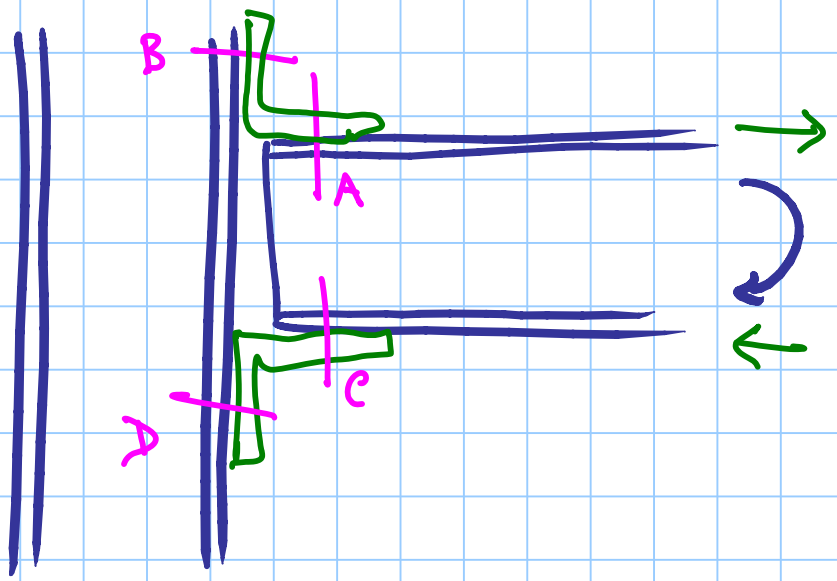
Punzonamento lamiera

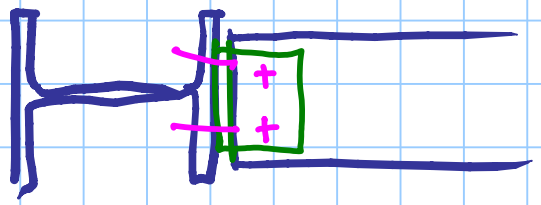
$$d_m \simeq 1.6\, d$$

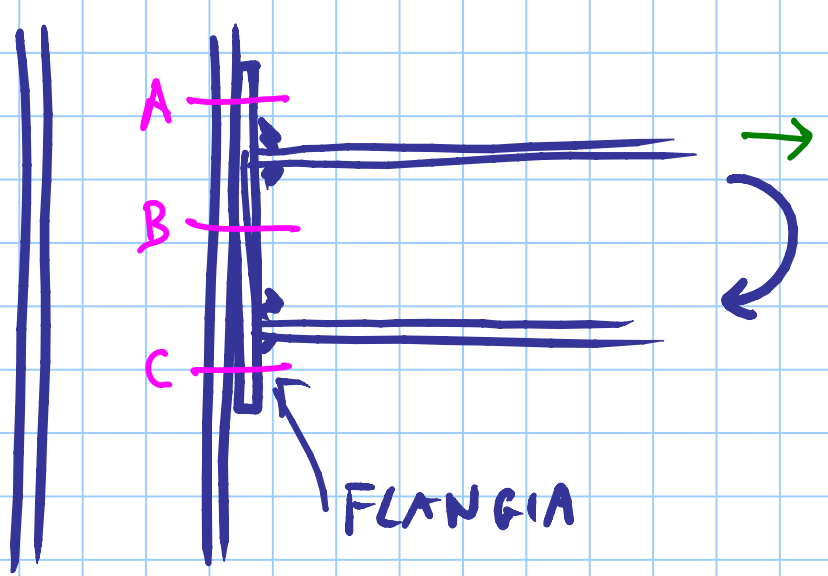


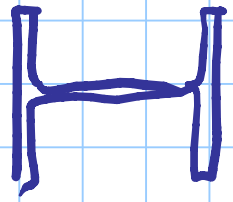
PER TRASMETTERE TAGLIO



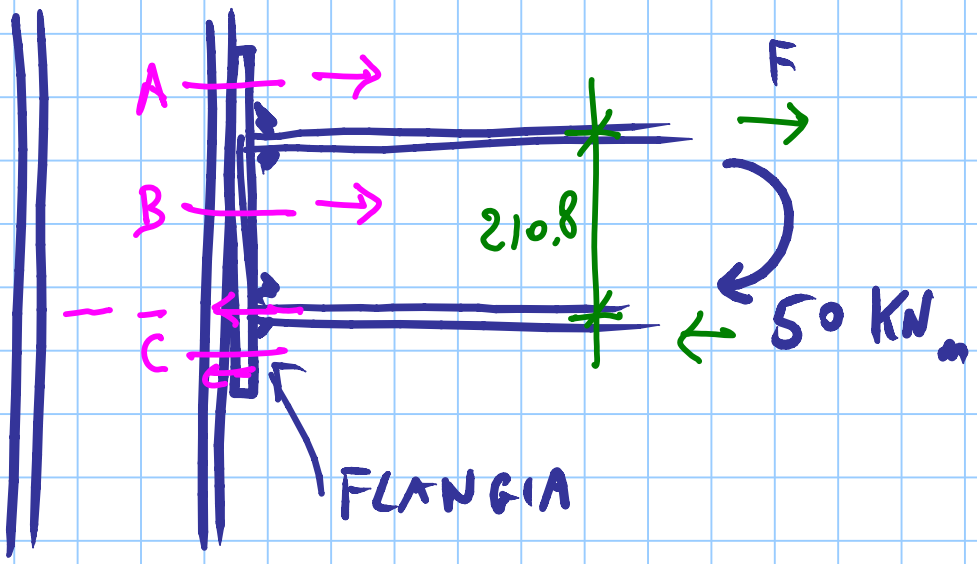


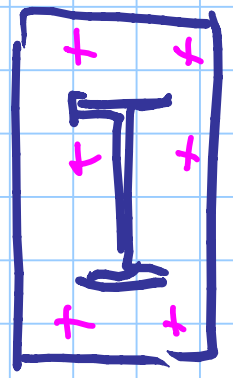






PER TRASMETTERE
MOMENTO FLETTENTE





IPE 220 S235

$M_{Rd} = 63.9\ KN_m$

$$F = \frac{50}{0.2108} = 237.2\ KN$$

$$F_{t,Ed} = \frac{F}{4} = 59.3\ KN$$

$210.8 = 220 - 9.2$

$h - t_f$

$$0.9\, A_{res}\, \frac{f_{ub}}{\gamma_{M2}} \geq F_{t,Ed}$$

provo con M20 e calcolo f_{ub}

$\downarrow$

$A_{res} = 245\ mm^2$

$$f_{ub} \geq \frac{F_{t,Ed}\ \gamma_{M2}}{0.9\ A_{res}} = \frac{59.3 \times 10^3 \times 1.25}{0.9 \times 245} = 336\ MPa$$

classe 4.6

prove sulle classe 5.6 $f_{ub} = 500$ MPa

$$A_{res} \geq \frac{F_{t,Ed}\ \gamma_{M2}}{0.9\ f_{ub}} = \frac{59.3 \times 10^3 \times 1.25}{0.9 \times 500} = 165\ mm^2$$

bulloni: M18 $A_{res} = 192\ mm^2$

RIFOLLAMENTO

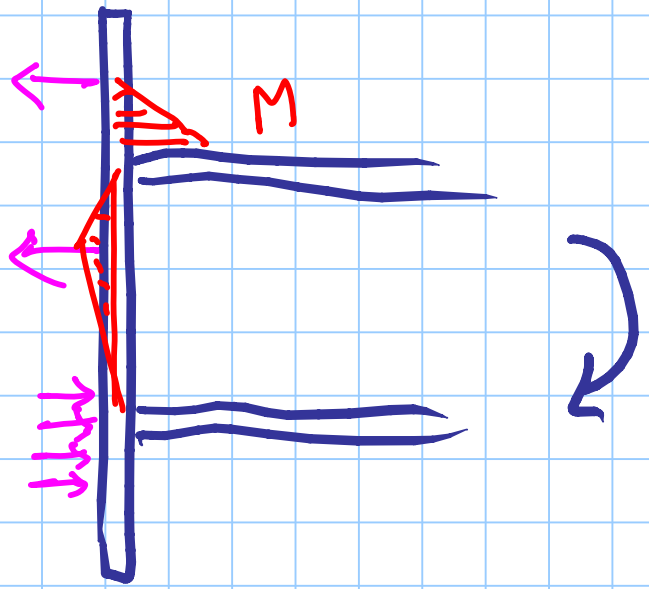
$$B_{p,Rd} = 0.6\ \pi\ d_m\ t\ \frac{f_u}{\gamma_{M2}} \geq F_{t,Ed}$$

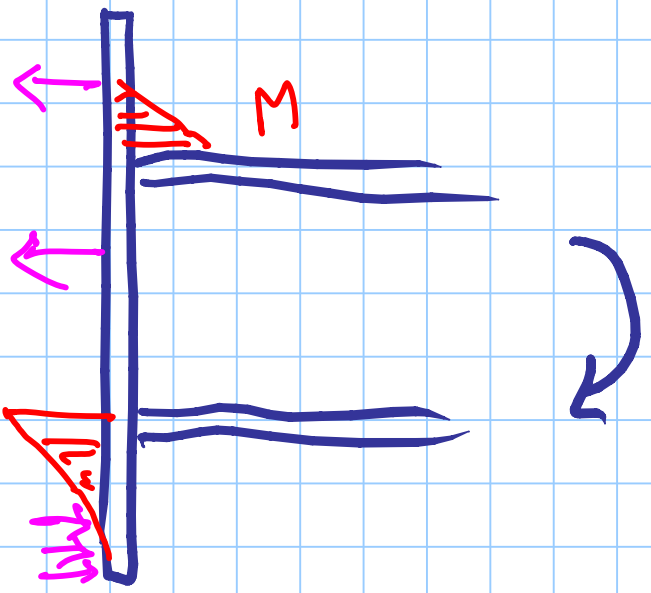
$d_m \simeq 1.6\ d$

$d_m = 28.8$ mm

(1.6×18)

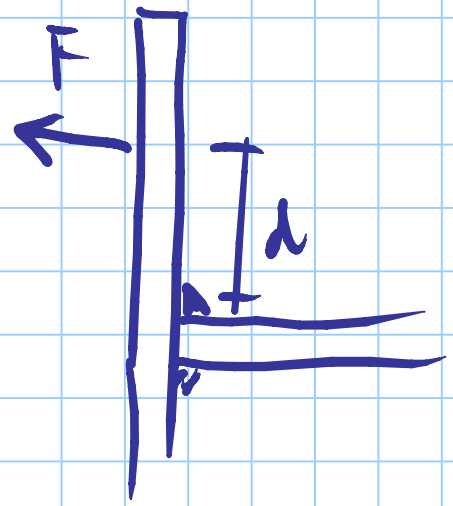
$$t \geq \frac{F_{t,Ed}\ \gamma_{M2}}{0.6\ \pi\ d_m\ f_u} = \frac{59.3 \times 10^3 \times 1.25}{0.6 \times 3.14 \times 28.8 \times 360} \simeq 3.8\ mm$$





verificare il piatto a flessione

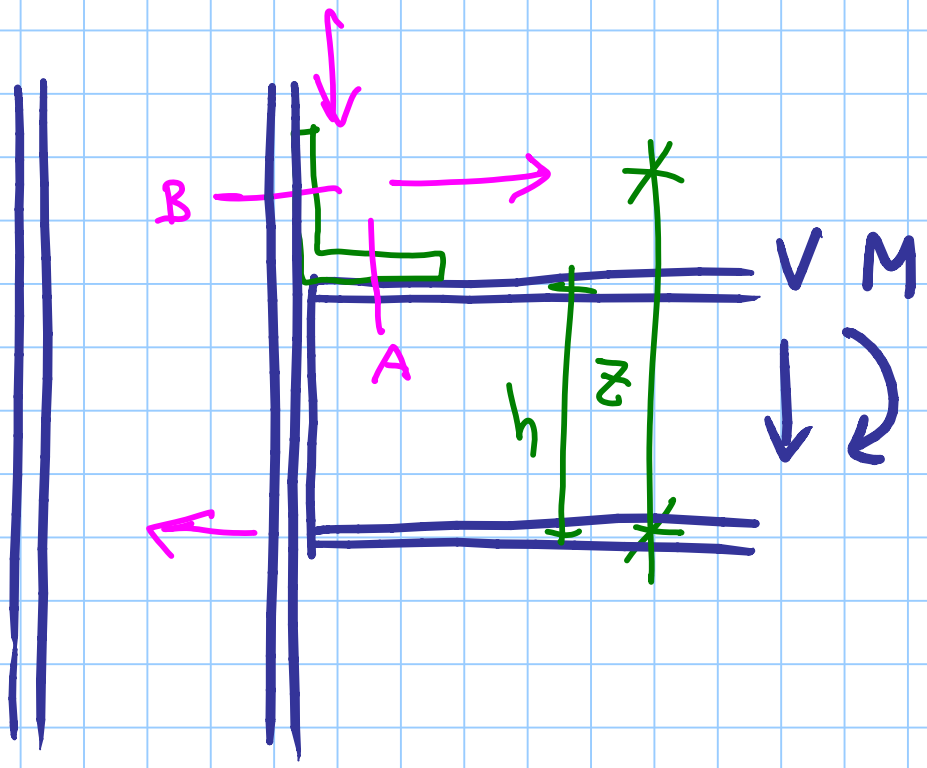
Flessione



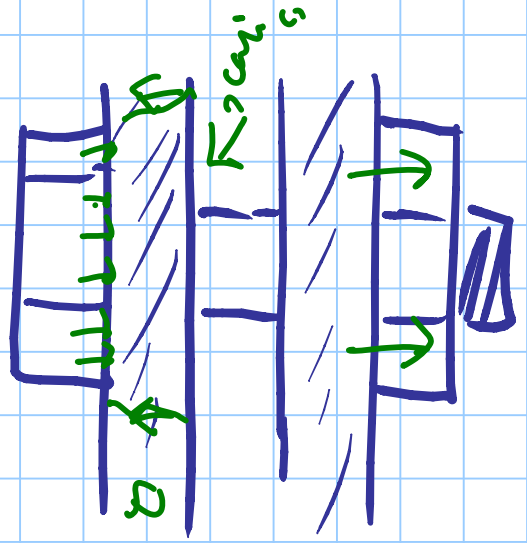
$$M_{Ed} = F \cdot d$$

$$M_{Rd} = \frac{b\,t^2}{4}\,\frac{f_y}{\gamma_{M0}}$$

inoltre: verifica saldature



COLLEGAMENTO NON BUONO



A $\Rightarrow$ $F_{V,Ed} = \frac{M}{h}$ $\quad F_{t,Ed} = V$

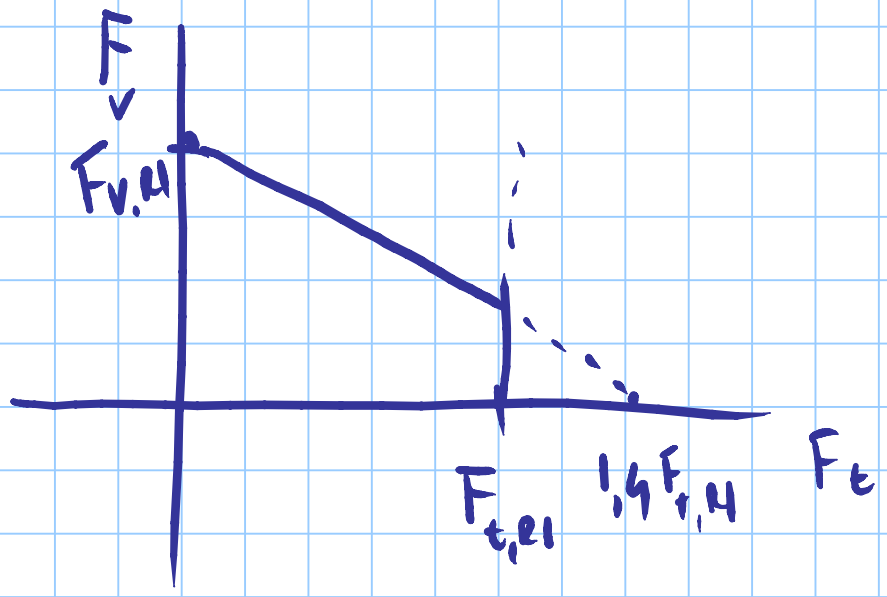
2bulloni

B $\Rightarrow$ $F_{t,Ed} = \frac{M}{2}$ $\quad F_{V,Ed} = V$

VERIFICA A TAGLIO + TRAZIONE

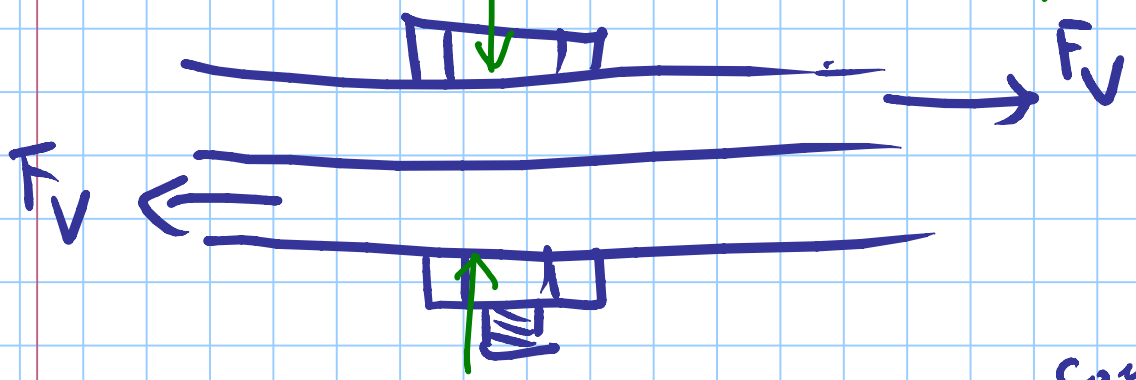
$$\frac{F_{v,Ed}}{F_{v,Rd}} + \frac{F_{t,Ed}}{1.4\,F_{t,Rd}} \leq 1$$

$$F_{t,Ed} \leq F_{t,Rd}$$



COLLEGAMENTO AD ATTRITO

$$F_{pc} = 0.7\, A_{res}\, \frac{f_{ub}}{\gamma_{M7}}$$

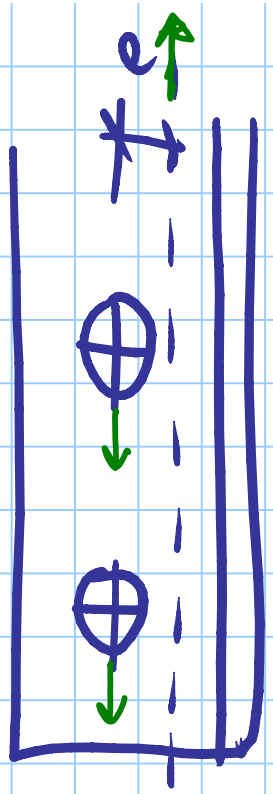


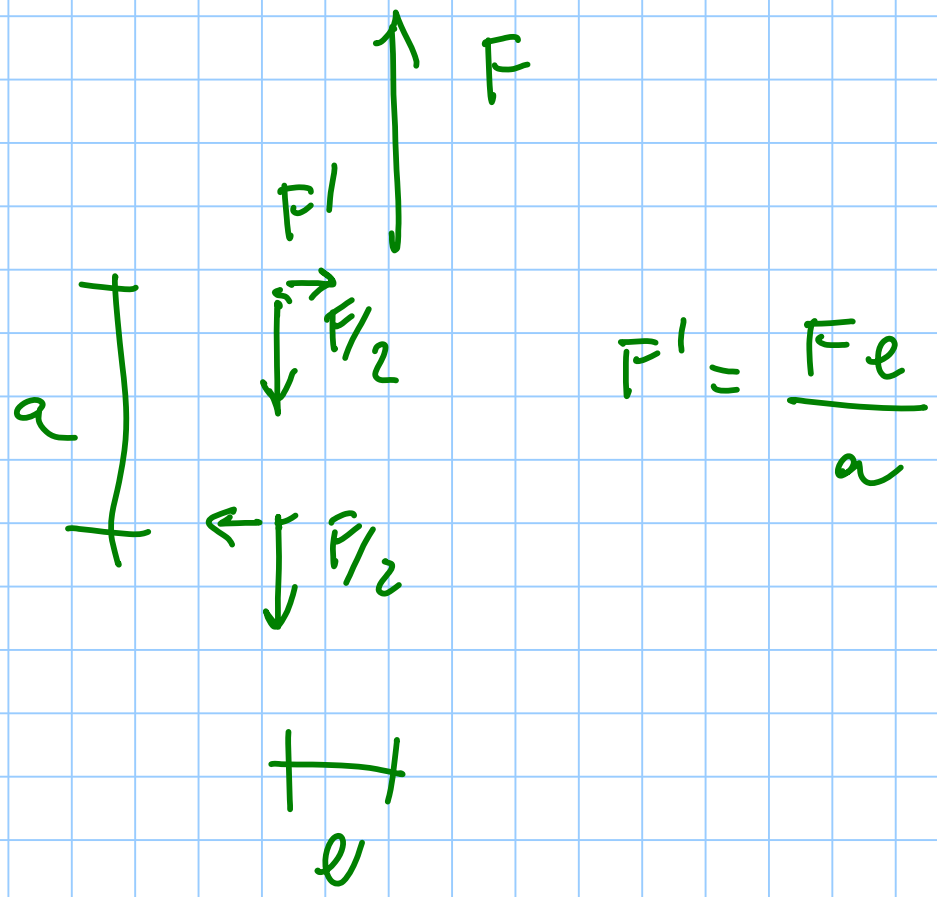
coeff. di attrito μ

$$F_{s,Rd} = \mu \frac{F_{pc}}{\gamma_{M3}}$$

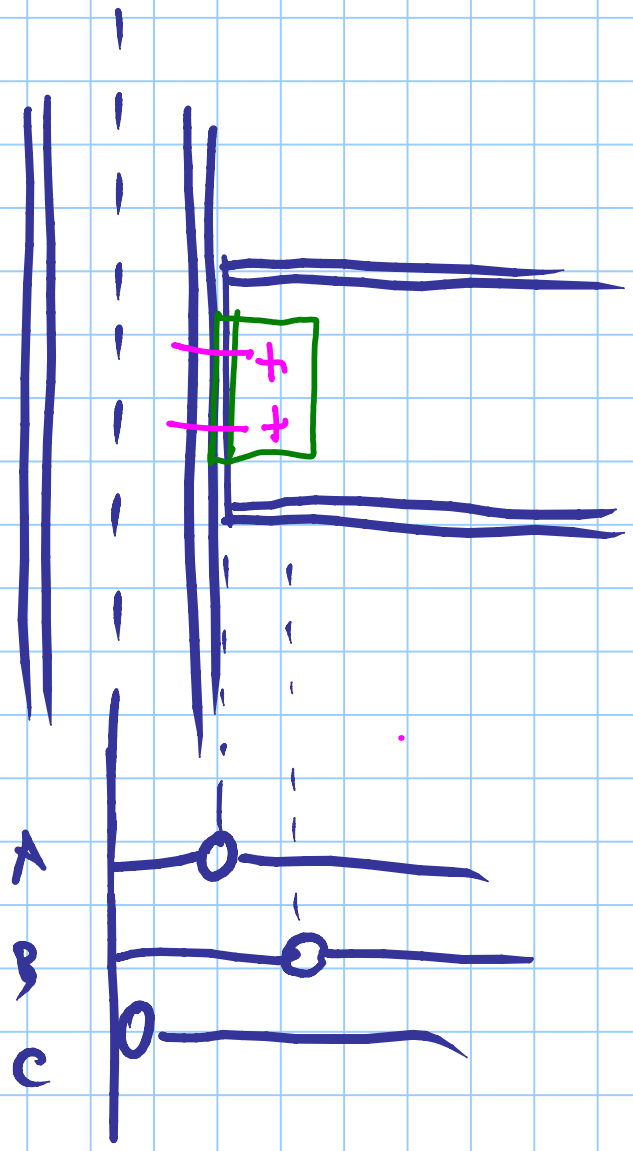
γ_{M3} — 1.1 SLE
1.25 SLU

μ = 0.3 normale
0.45





$$F' = \frac{F e}{a}$$



"CERNIERA"