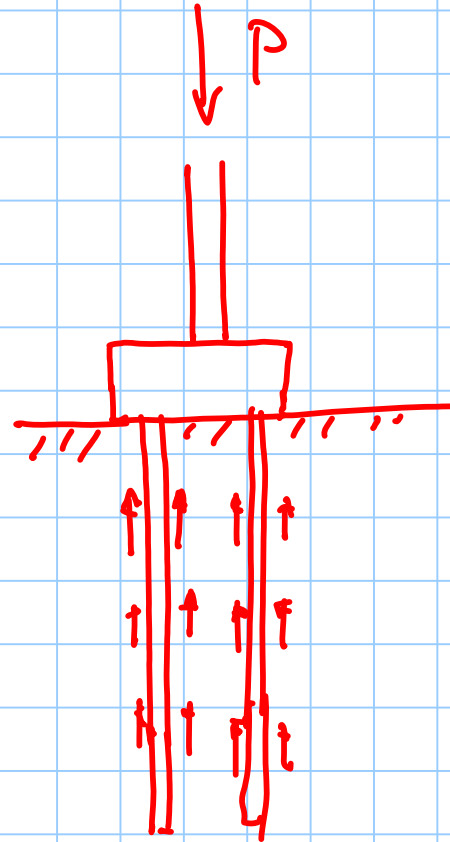
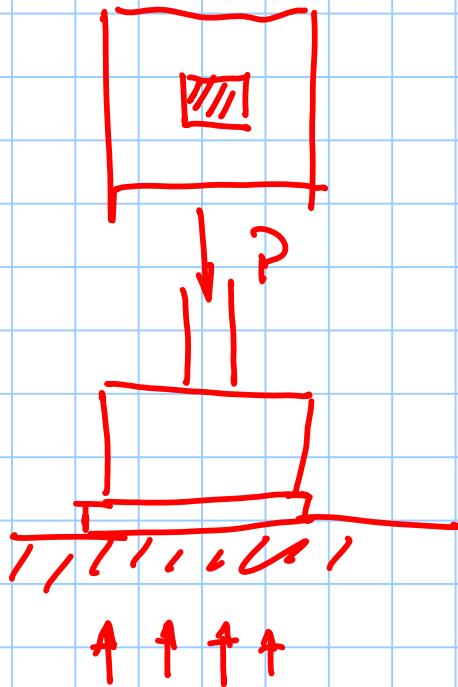
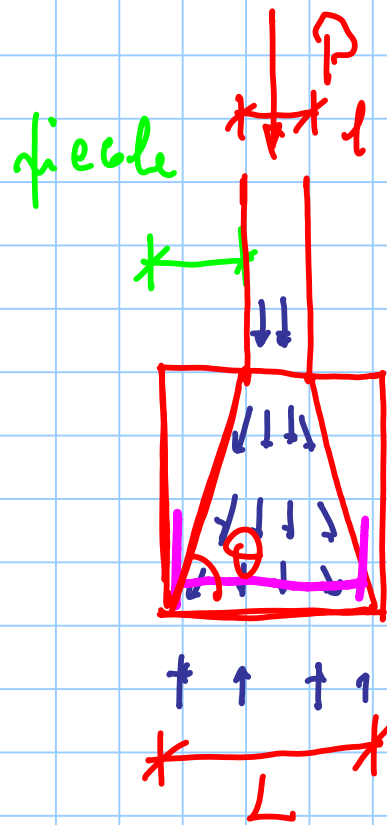


PLINTI

Titolo nota

05/06/2014





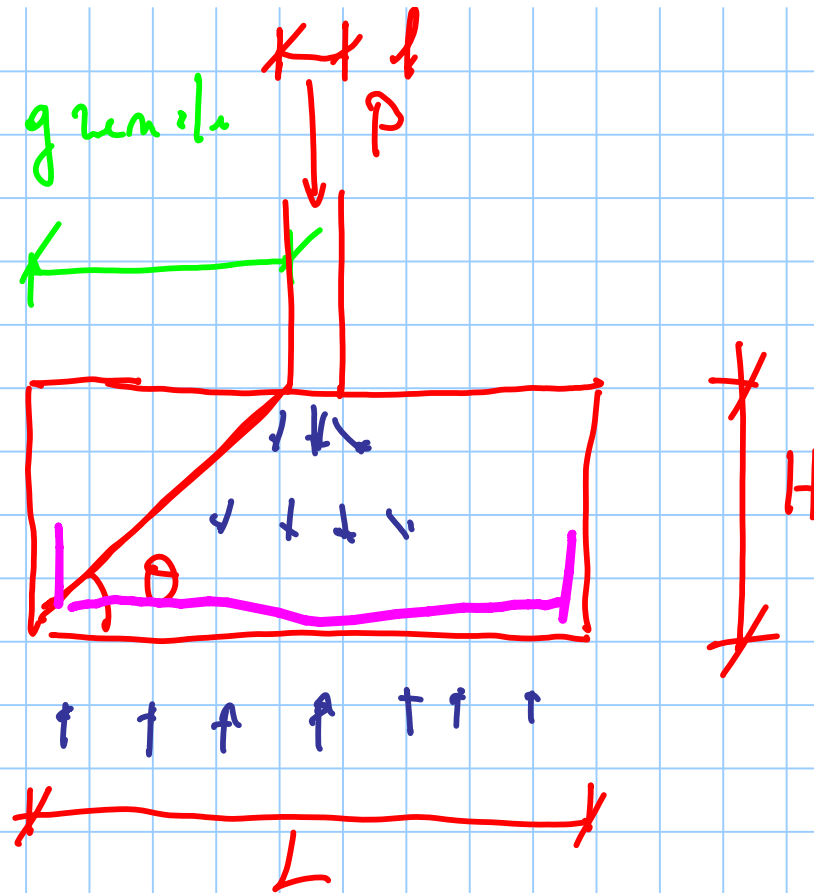
$$\Theta = \arctan\left(\frac{2H}{L-l}\right)$$

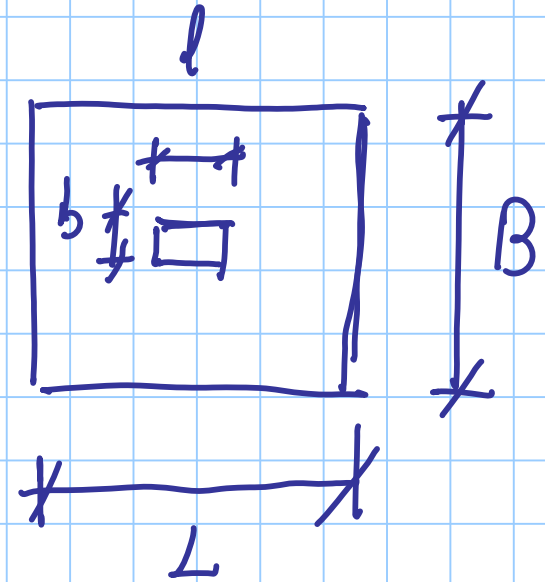
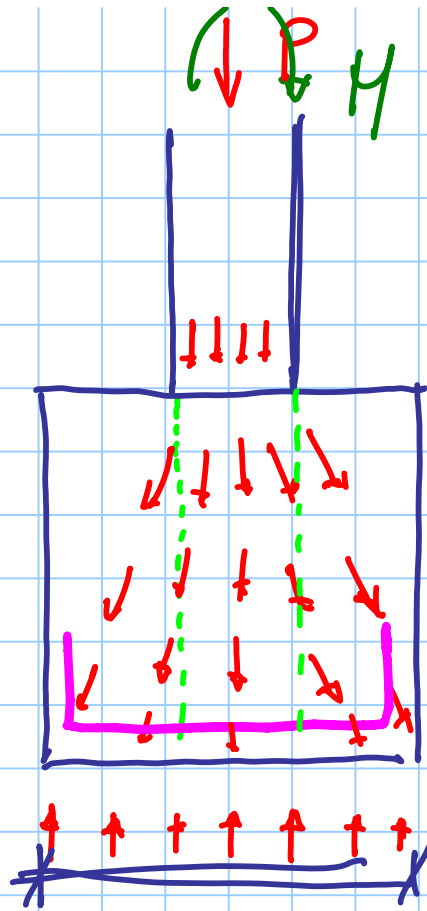
$$\Theta \geq 60^\circ$$

$$\Theta \leq 25^\circ$$

plant: large

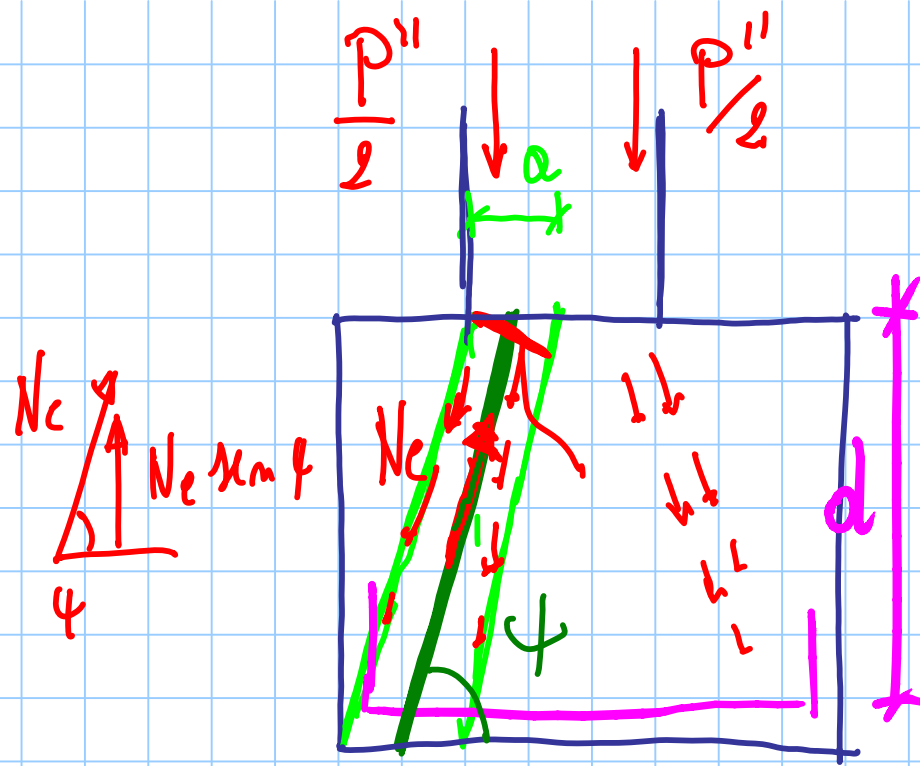
plant: small





$$p' = P \frac{bl}{BL}$$

$$p'' = \frac{P - p'}{l}$$



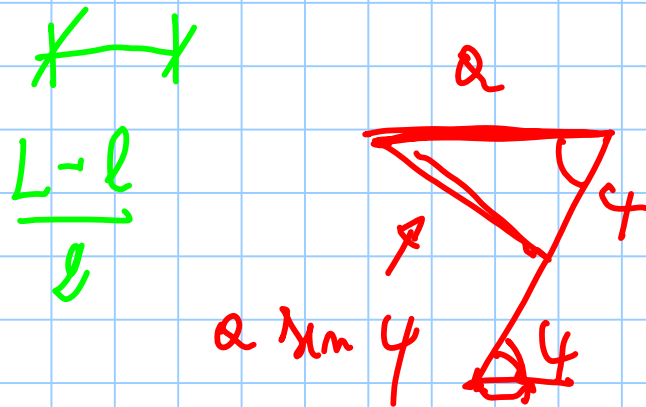
$$N_c \sin \psi = \frac{P''}{2}$$

$$N_{Rd,c} = b a \sin \psi f_{cd}$$

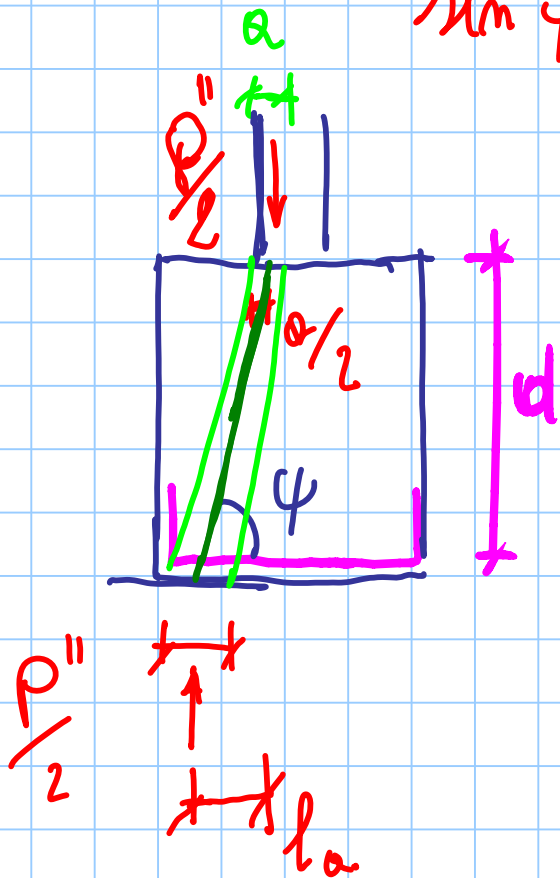
$$a \approx 0.4 d$$

$$N_{Rd,c} = 0.4 b d f_{cd} \sin \psi$$

$$\frac{P''}{2} = 0.4 b d f_{cd} \sin \psi^2$$



$$\frac{P''}{2} = 0,46d \frac{\sin^2 \varphi^2}{\sin^2 \varphi + \cos^2 \varphi} = 0,46d \frac{1}{1 + \cot^2 \varphi} \quad \text{fol}$$



$$\psi = \text{erf} \left(\frac{v}{v_a} \right)$$

$$t_g \varphi = \frac{d}{d_a}$$

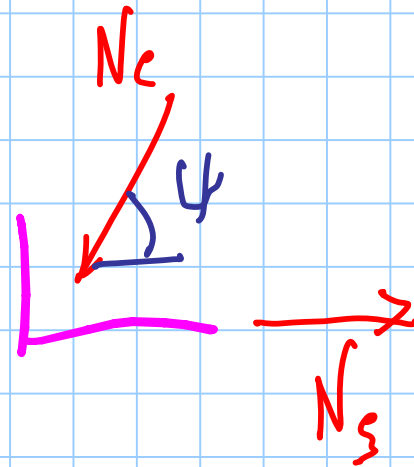
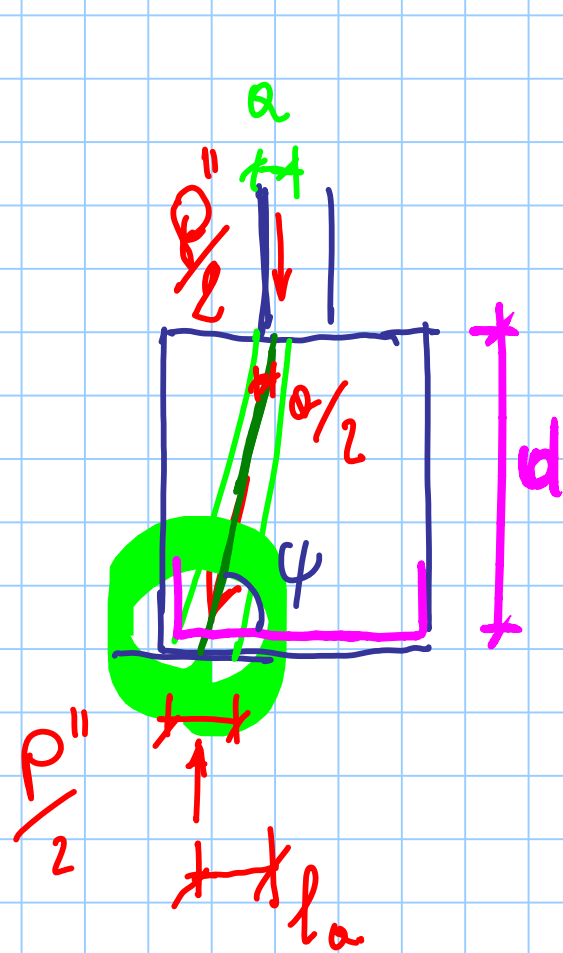
$$\cot \varphi = \frac{b}{d} = \lambda$$

$$\frac{P''}{2} = 0,4 b d \frac{f_{cd}}{1 + \lambda^2}$$

$$P''_{Rd,e} = 2 \times \left(0,4 b d \frac{f_{cd}}{1 + \lambda^2} \right)$$

$$P'''_{Rd,e} = 2 \times \left(0,4 d d \frac{f_{cd}}{1 + \lambda_b^2} \right)$$

$$P_{Rd,e} = P' + P''_{Rd,e} + P'''_{Rd,e} \geq P_{Ed}$$



$$N_c \cos \psi = N_s$$

$$\frac{P''}{2 \sin \psi} \cos \psi = \frac{P''}{2} \cot \psi = \frac{P''}{2} \lambda = N_s$$

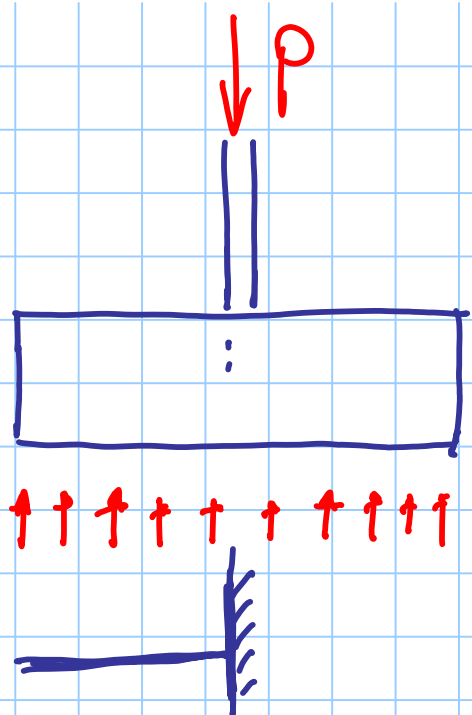
$$\frac{P''}{2} \lambda = A_3 f_y d$$

$$P_{Rd,s}'' = 2 \frac{A_{sl} f_{yd}}{\lambda_1} \geq P_{Ed}''$$

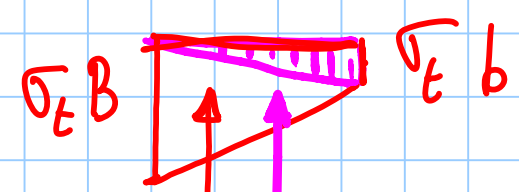
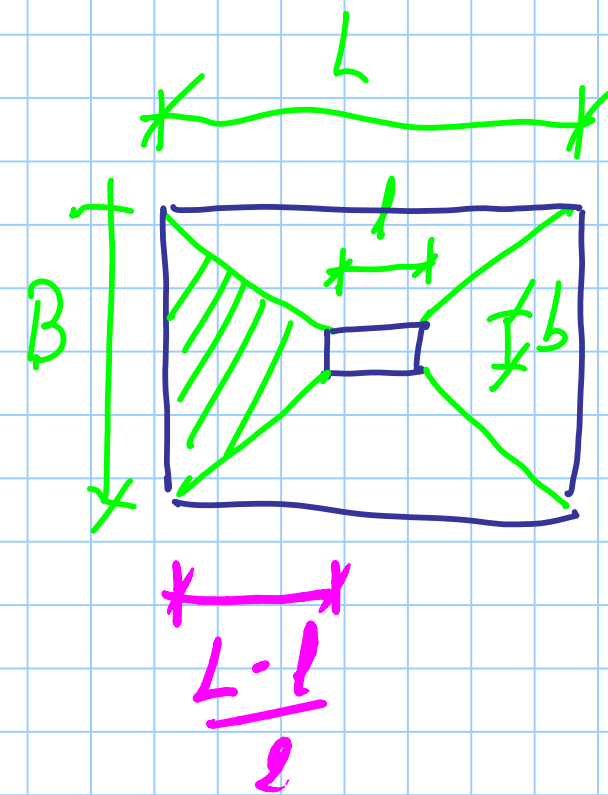
$$P_{Rd,s}^{III} = 2 \frac{A_{sb} f_{yd}}{\lambda_b} \geq P_{Ed}^{III}$$

$$P_{Rd,s} = P' + P_{Rd,s}'' + P_{Rd,s}^{III} \geq P_{Ed}$$





$$\sigma_t = \frac{P}{BL}$$



$$\frac{1}{2} \sigma_t B \frac{L-l}{2}$$

$$\frac{1}{2} \sigma_t b \frac{L-l}{2}$$

$$\frac{2}{3} \frac{L-l}{2} \times \frac{1}{3} \frac{L-l}{2}$$

$$M_{Ed} = \frac{1}{2} \sigma_t b \frac{(L-l)}{12} + \frac{1}{2} \sigma_t B \frac{(L-l)^2}{2} \frac{1}{3}$$

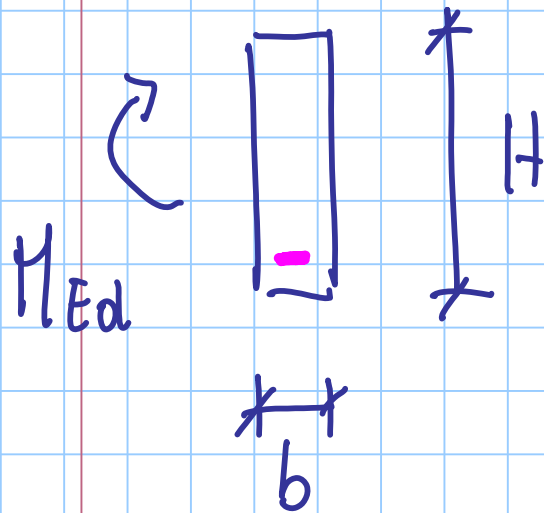
$$M_{Ed} = \frac{1}{2} \sigma_t b \frac{(L-l)^2}{12} + \frac{1}{2} \sigma_t B \frac{(L-l)^2}{2} \frac{1}{3}$$

$$\sigma_t = \frac{P}{BL}$$

$$= \frac{1}{2} \sigma_t b \frac{(L-l)^2}{12} + \sigma_t B \frac{(L-l)^2}{12}$$

$$= \sigma_t \frac{(L-l)^2}{12} \left(\frac{1}{2} b + B \right)$$

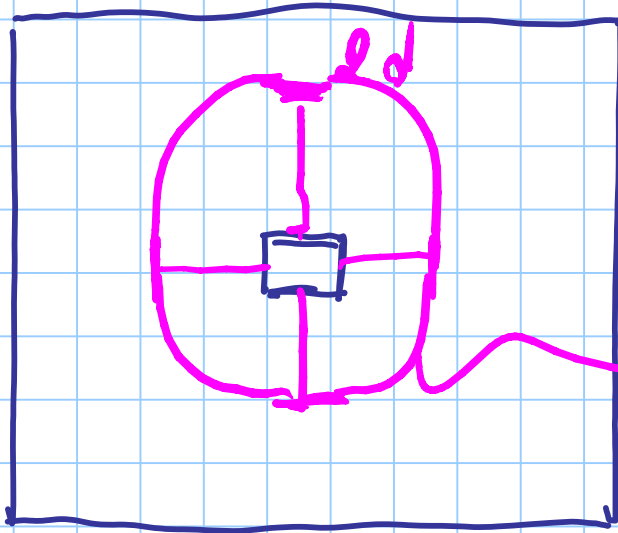
$$= \frac{P}{L} \frac{(L-l)^2}{12} \left(1 + \frac{b}{2B} \right)$$



$$M_{Ed} \leq M_{Rd} = \frac{b d^2}{\eta'^2}$$

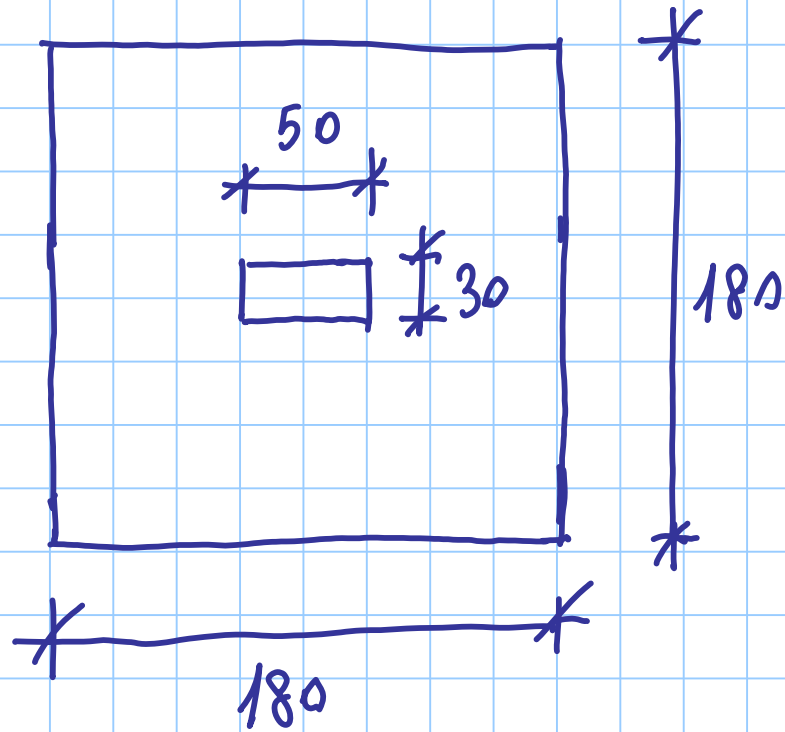
$$A_s = \frac{M_{Ed}}{0,9 d f_{yd}}$$

Verificare e dimensionamento



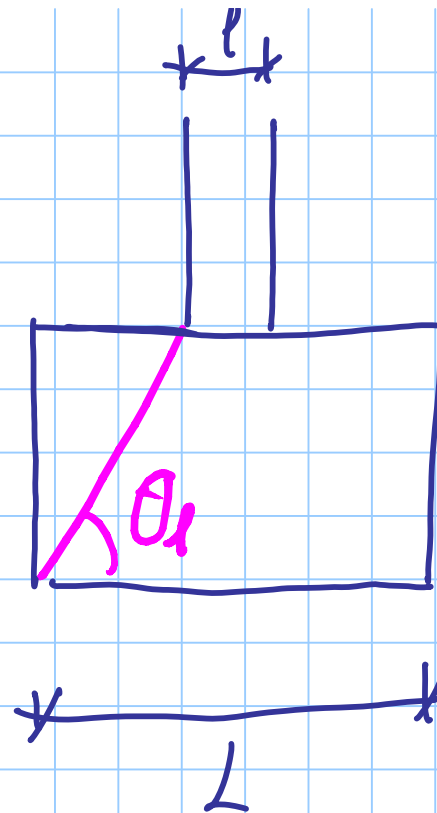
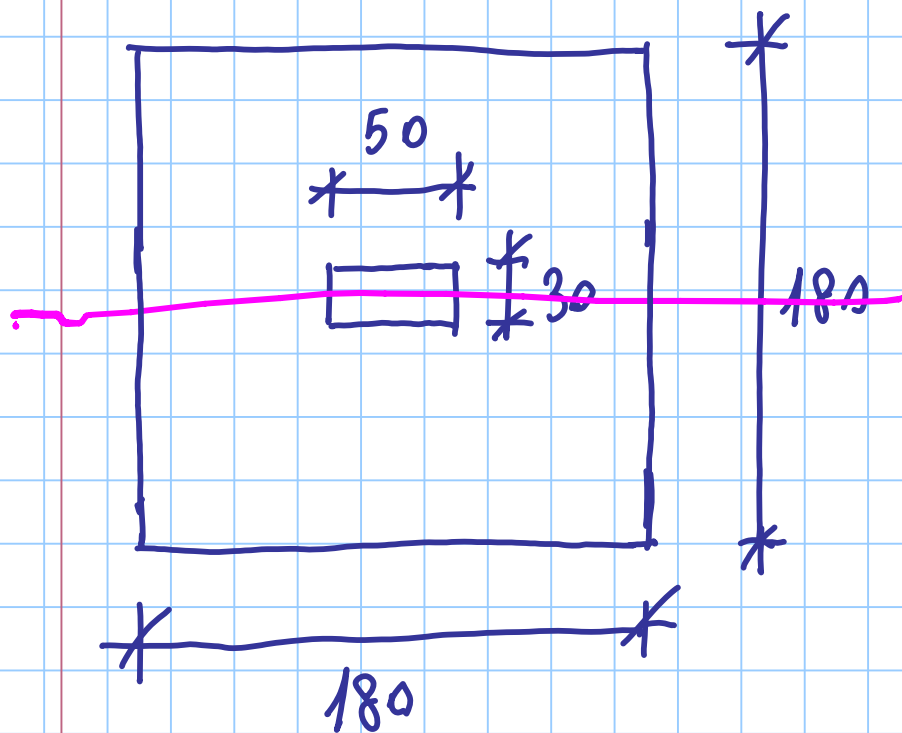
$$u_{en} = 2b + 2d + 4\pi d$$

$$N_{Ed} = \frac{P}{u_{en} d} \leq N_{Rd,e}$$



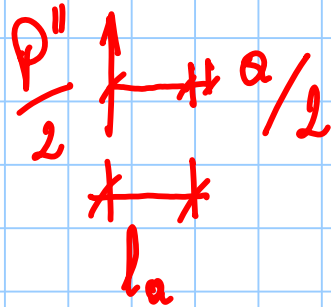
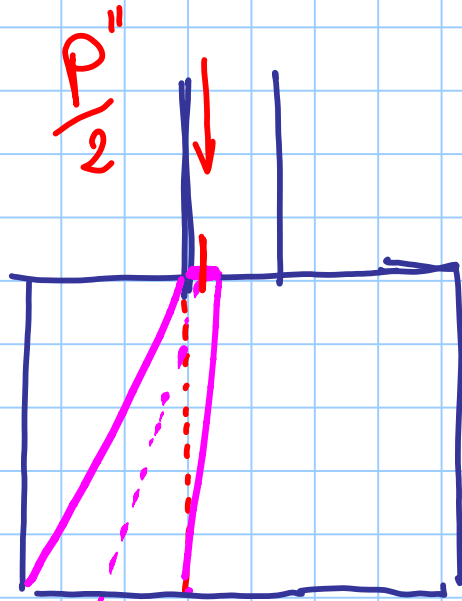
$$P_{Ed} = 1800 \text{ KN}$$

$$H = 100 \text{ cm}$$



$$\theta_1 = \arctan\left(\frac{2H}{L-l}\right) = \arctan\left(\frac{200}{180-50}\right) = 56,98^\circ$$

$$\theta_b = \arctan\left(\frac{2H}{B-b}\right) = \arctan\left(\frac{200}{180-30}\right) = 53,13^\circ$$



$$a = 0,2 d$$

$$\frac{a}{2} = \min \left(0,2 d, \frac{d}{4} \right) = 0,2 \times 95 = 19 \text{ cm}$$

$$\downarrow \frac{50}{4} = 12,5 \text{ cm}$$

$$\frac{L-d}{4} = \frac{180-50}{4} = 32,5$$

$$l_e = 32,5 + 12,5 = 45 \text{ cm}$$

$$\lambda = \frac{l_e}{d} = \frac{45}{95} = 0,473$$

$$P''_{Rd,e} = 2 \times \left(0,4 b d \frac{f_{ct}}{1 + \lambda^2} \right) = 2 \times 0,4 \times 30 \times 95 \times 14,1 \cdot \frac{1}{1 + 0,473^2} = 2627 \text{ KN}$$

$$\frac{a}{2} = \min \left(0,2d, \frac{b}{4} \right) = \min \left(19, \frac{30}{4} \right) = 7,5 \text{ cm}$$

$$\frac{B-b}{4} = \frac{180-30}{4} = 37,5 \text{ cm}$$

$$d_a = 37,5 + 7,5 = 45 \text{ cm} \quad \lambda = \frac{l_a}{d} = \frac{45}{95} = 0,473$$

$$P_{Rd,c}^{\text{III}} = 2 \times 0,4 \cdot l_d \cdot \frac{f_{cd}}{1 + \lambda^2} = 2 \times 0,4 \times 50 \times 95 \times \frac{16,1}{1 + 0,473^2} \cdot \frac{1}{10}$$

$$= 4378 \text{ kN}$$

$$P \leq P_{BL} = \frac{1800 \times 30 \times 50}{180 \times 180} = 83 \text{ kN}$$

$$P_{Rd} = 83 + 2627 + 4378 = 7088 \text{ kN} \geq 1800 \text{ kN}$$

piece

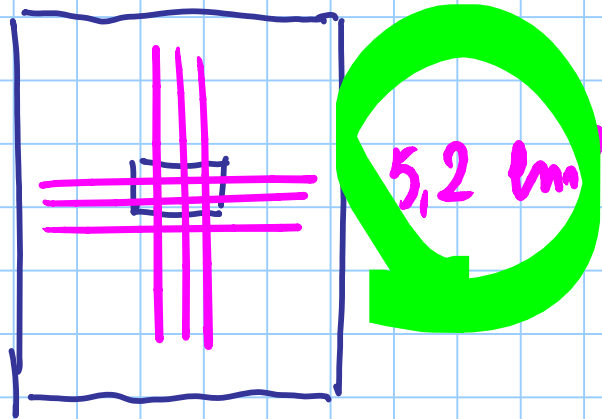
OK!

$$P''_{Rd,s} = \frac{2 A_{sl} f_{yd}}{\lambda} = P''_{Ed}$$

$$A_{sl} = \frac{\lambda P''_{Ed}}{2 f_{yd}} = \frac{0,473 \times 858,5}{2 \times 391,3} \times 10 = 5,2 \text{ cm}^2$$

$$P''_{Ed} = \frac{P_{Ed} - P'}{2} = \frac{1800 - 83}{2} = 858,5 \text{ KN}$$

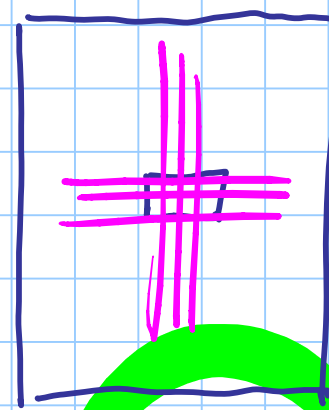
$$A_{sb} = 5,2 \text{ cm}^2$$



5,2 km

5,2 km²

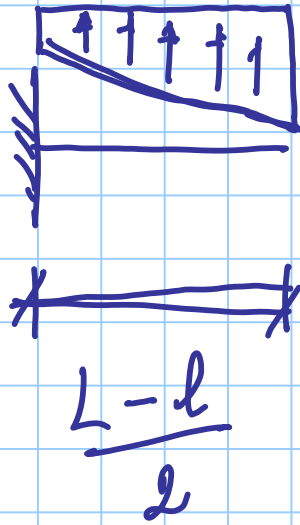
Totale



4,4 km²

6,2 km

Somme



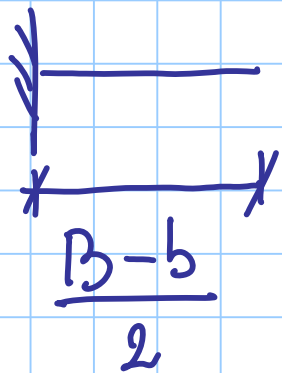
$$M_{Ed} = \frac{1}{12} \frac{P}{L} (L-l)^2 \left(1 + \frac{b}{2b}\right)$$

$$= \frac{1}{12} \frac{(1800-83)}{180} (180-50)^2 \left(1 + \frac{30}{2 \times 180}\right) \frac{1}{10^2}$$

$$= 145,5 \text{ KNm}$$

$$M_{Ed} \leq M_{Rd,c} = \frac{b d^2}{\gamma'_{sc}} = \frac{0,3 \times 0,95^2}{0,018^2} = 835,6 \text{ KNm} \quad \text{OK!}$$

$$A_{st} = \frac{M_{Ed}}{0,9 d f_{yd}} = \frac{145,5}{0,9 \times 0,95 \times 391,3} \times 10 = 4,35 \text{ cm}^2$$



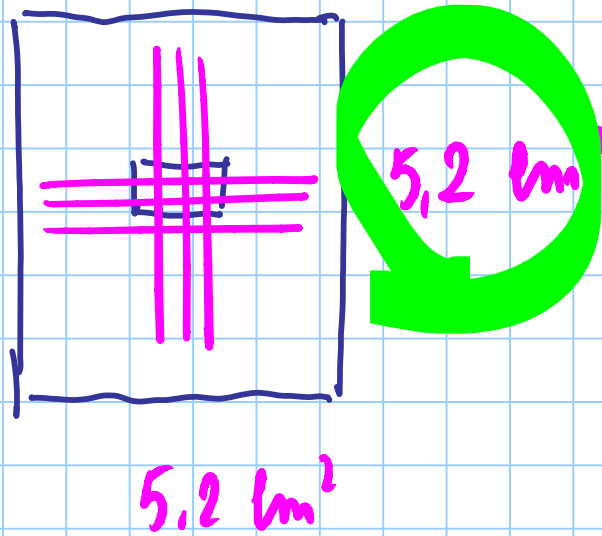
$$M_{Ed} = \frac{1}{12} \frac{P-P'}{B} (B-b)^2 \left(1 + \frac{L}{2L}\right)$$

$$= \frac{1}{12} \frac{1800-83}{180} (180-30)^2 \left(1 + \frac{50}{2 \times 180}\right) \frac{1}{10^2}$$

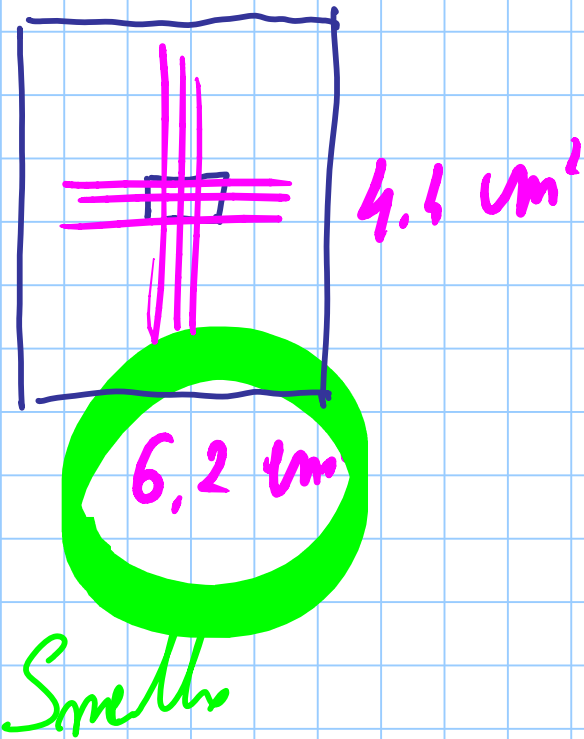
$$= 203,7 \text{ kNm}$$

$$M_{Ed} = M_{pd,v} : \frac{I d^2}{\eta'} = \frac{0,5 \times 0,95^2}{0,018^2} = 1392,7 \text{ kNm} \text{ OK!}$$

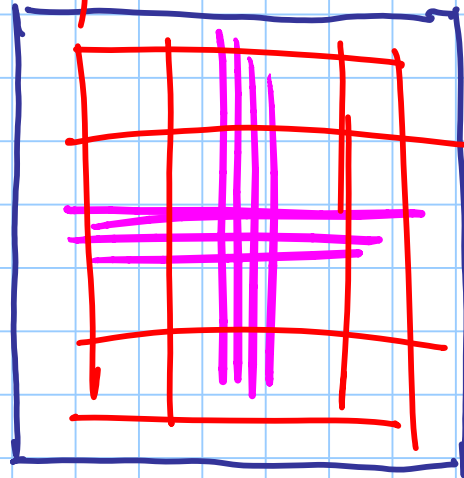
$$A_{sb} = \frac{M_{Ed}}{0,9 \sigma_{yd}} = \frac{203,7 \times 10}{0,9 \times 0,95 \times 391,3} = 6,1 \text{ cm}^2$$



Totale



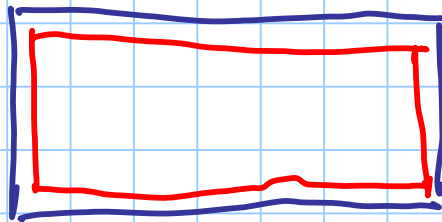
$\phi 14/25$ fuori coltello



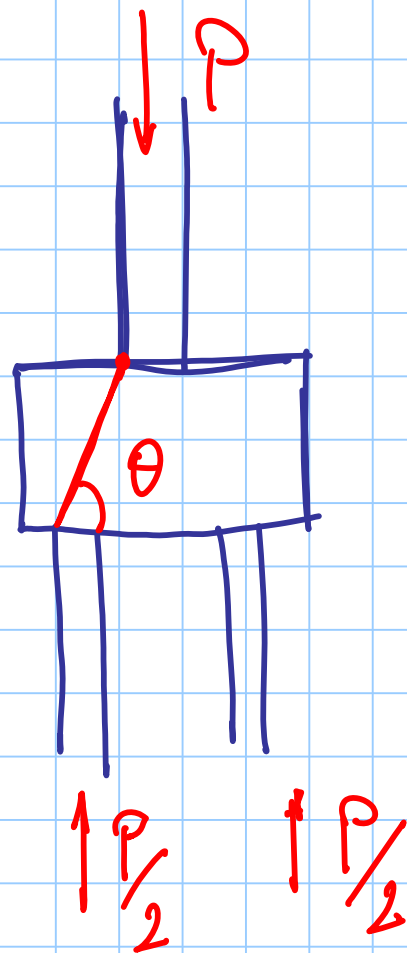
$5,2 \text{ m}^2$ $4 \phi 14$

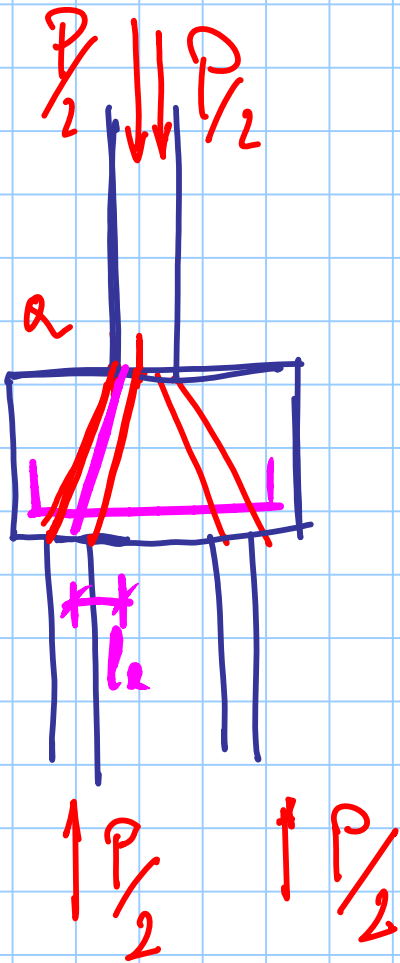
$6,2 \text{ m}^2$

$5 \phi 14$



Plinto e 2 pali



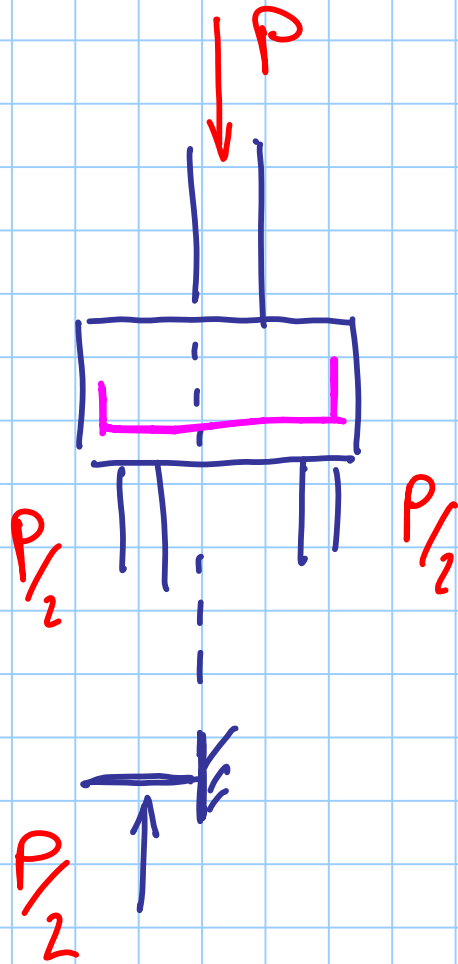


$$\lambda = \frac{l_e}{d}$$

Plinto e 2 fraali

$$P_{Rd,e} = 2 \cdot 0,4 b d \frac{f_{cd}}{1 + \lambda^2}$$

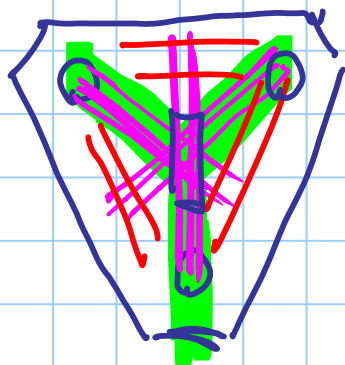
$$A_s = \frac{P \lambda}{2 f_{yd}}$$



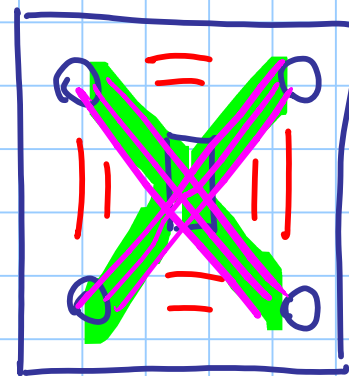
$$M_{Ed} \leq M_{Rd,e}$$

$$A_s = \frac{M_{Ed}}{0,9 d f_{yd}}$$

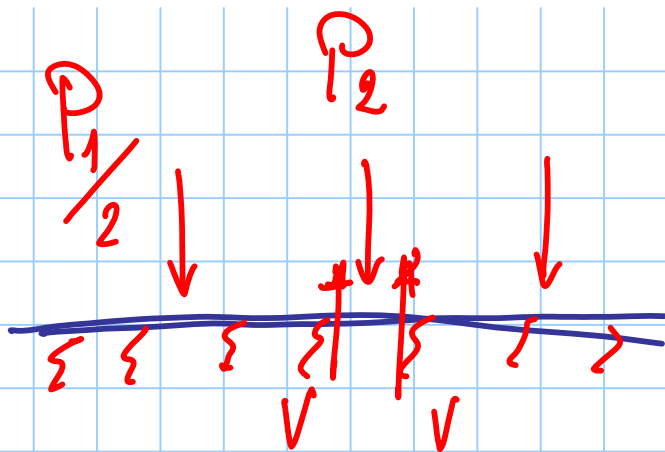
Plinto e 3 foli



Plinto e 4 foli

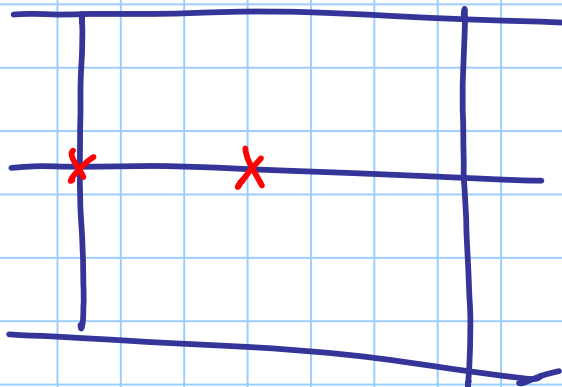


KK
a



$$I \geq 4 \sum I_{elur.}$$

$$V = 0,6 P_{max}$$



$$V = V_{Rd, max}$$

