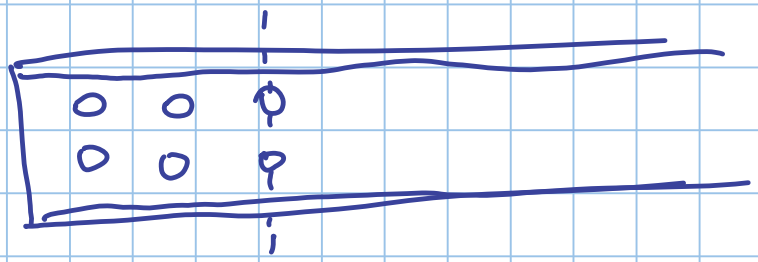
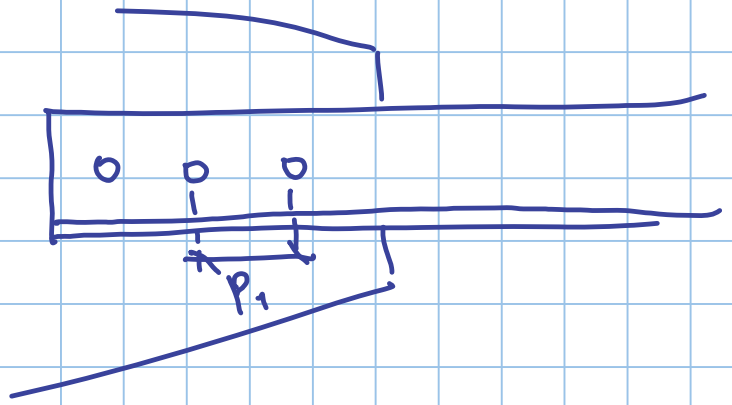
Titolo nota 30/10/2019



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



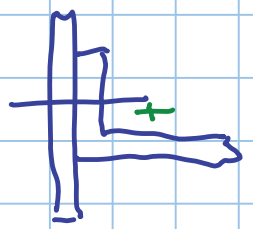
EC3 parte 1.8 parte 3.10.3

$$N_{u,Rd} = \beta\, A_{net}\, \frac{f_u}{\gamma_{M2}}$$

$\beta = 0.7$ se $p_1 > 5\,d_0$

$\beta = 0.4$ se $p_1 < 2.5\,d_0$ 2 bull

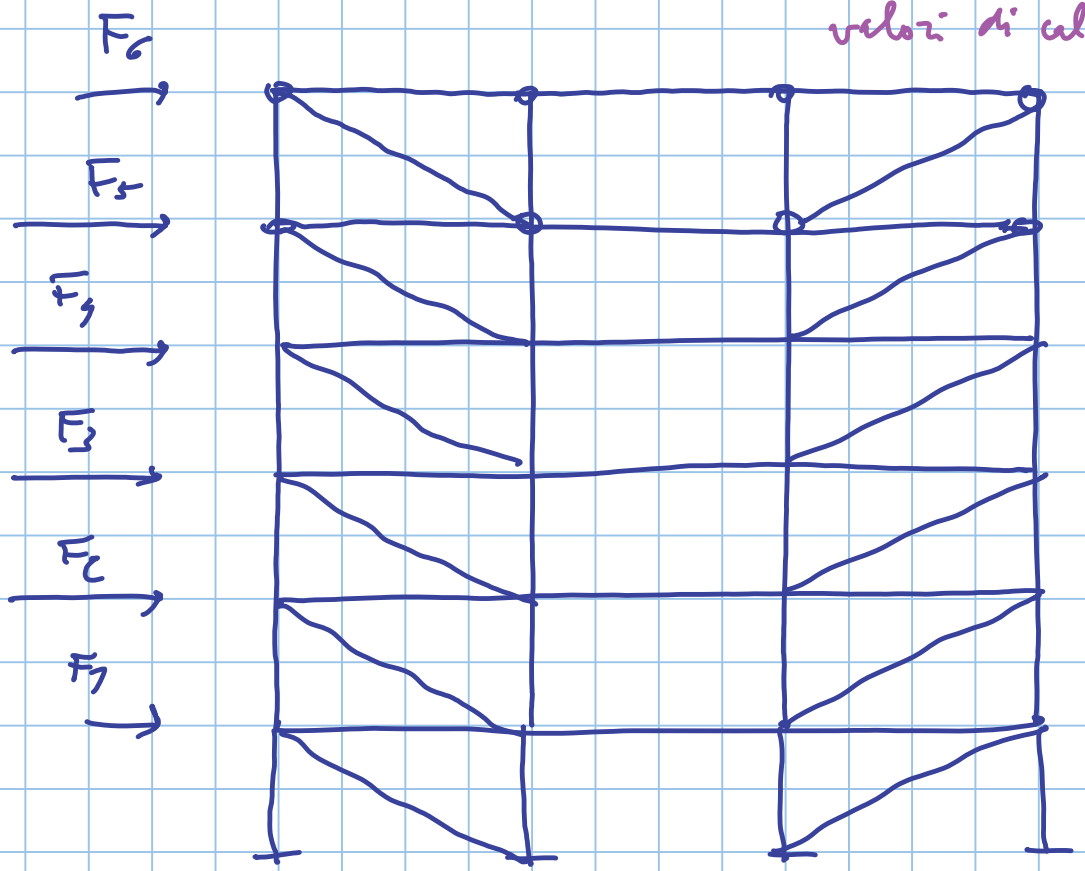
0.5 ≥ 3 bull



nel collegamento i bulloni trasmettono una forza eccentrica → M + N

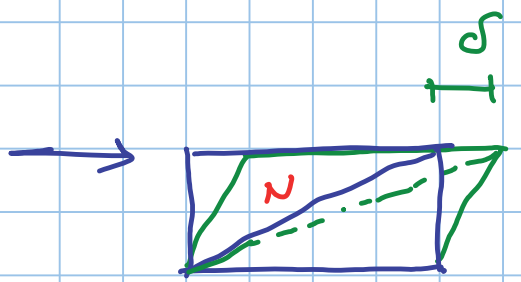
VERIFICA SLU

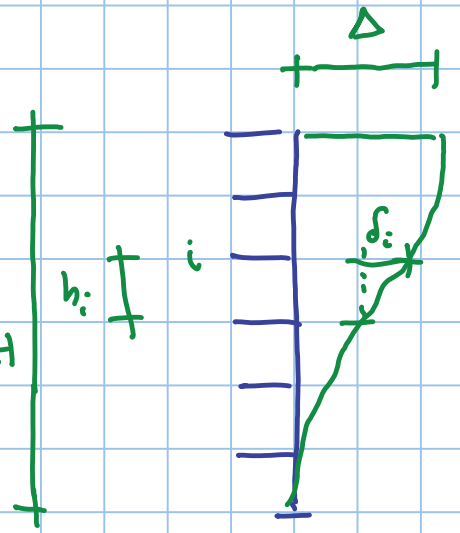
valori di calcolo



VERIFICA SLE

valori caratteristici



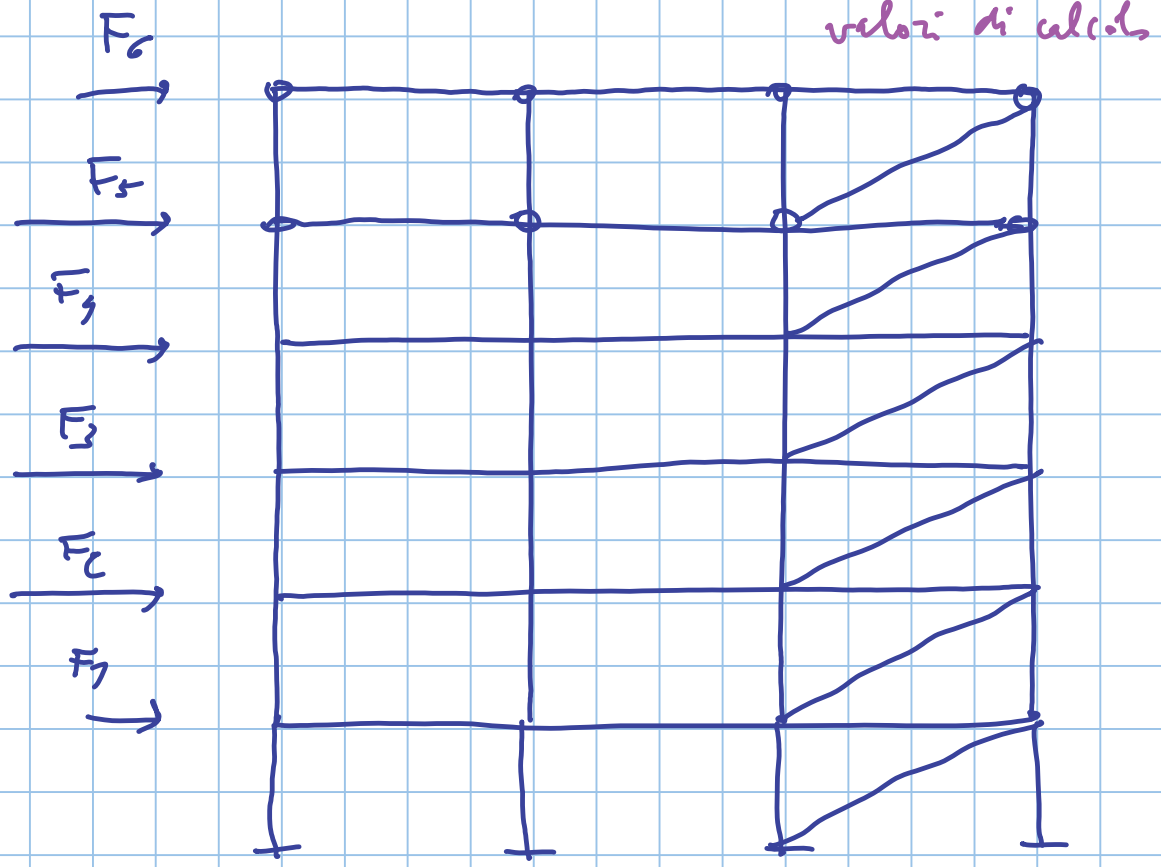


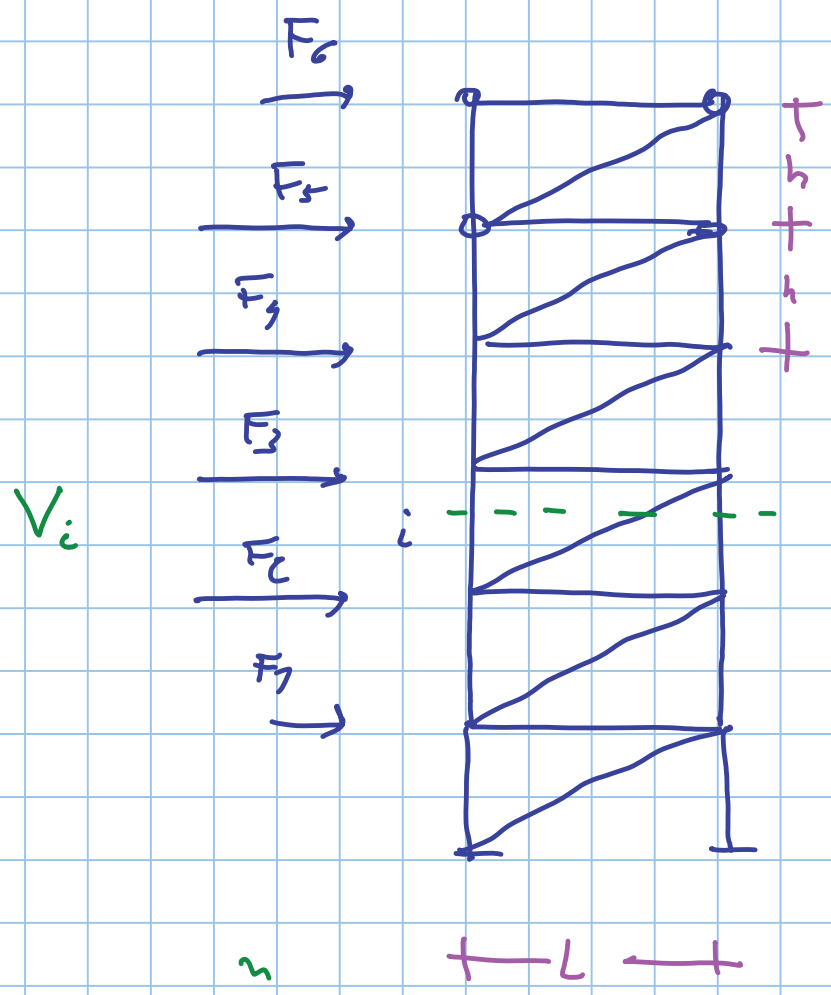
$$\Delta \leq \frac{1}{500} H$$

$$\delta_i \leq \frac{1}{300} h_i$$

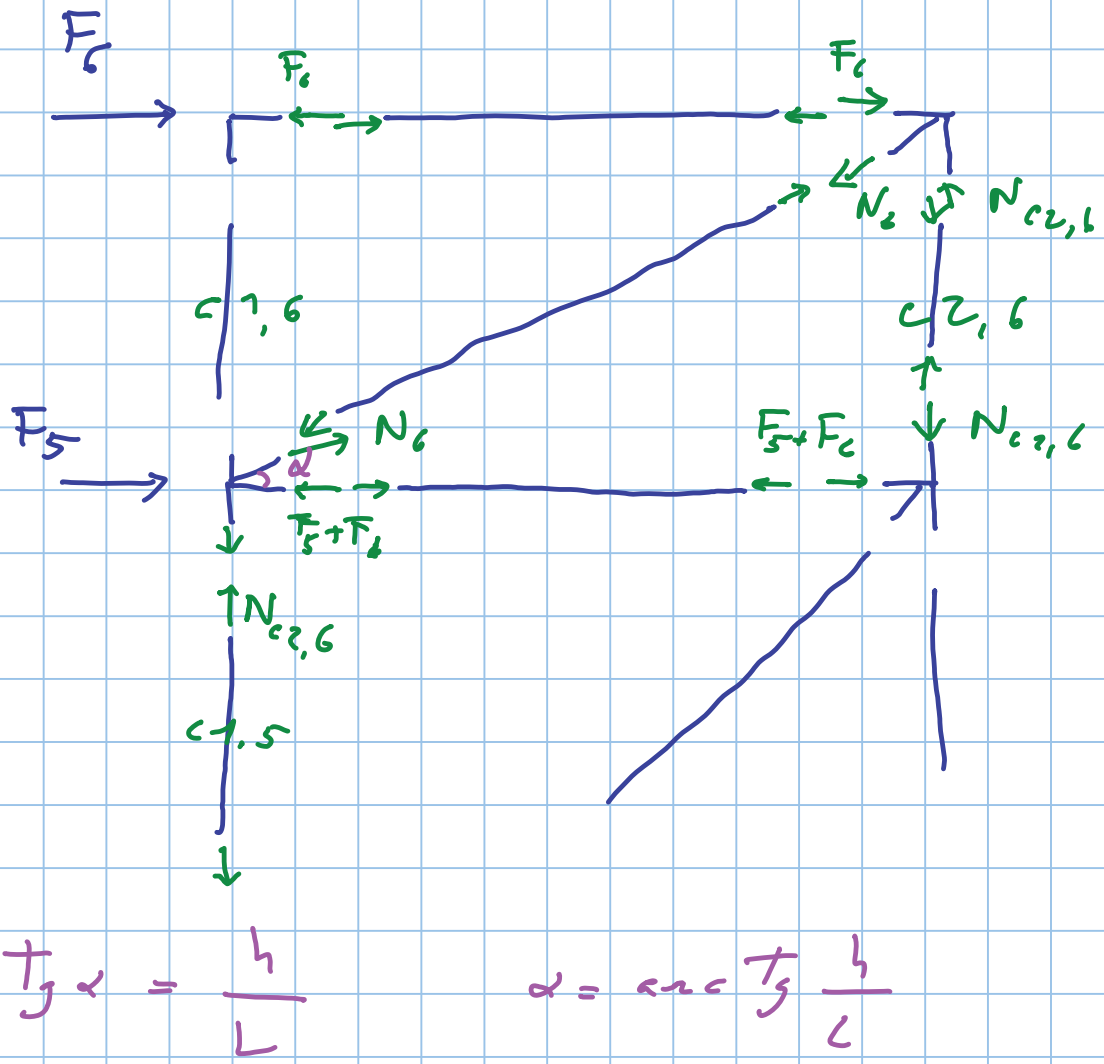
VERIFICA SLU

valori di calcolo





$$V_i = \sum_{j=i}^{n} F_j$$

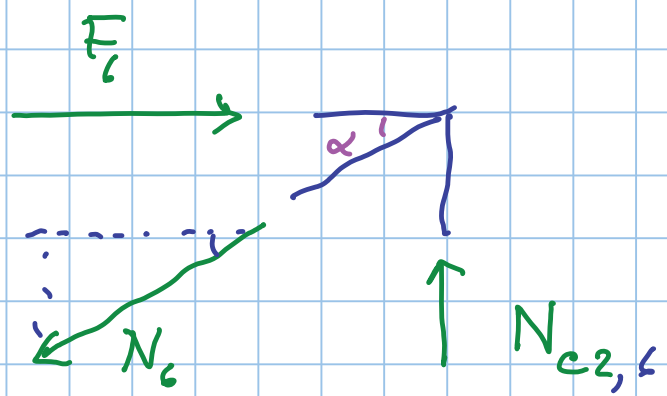


$$tg\,\alpha = \frac{h}{L} \qquad \alpha = arc\,tg\,\frac{h}{L}$$

$$N_б \cos\alpha = F_б$$

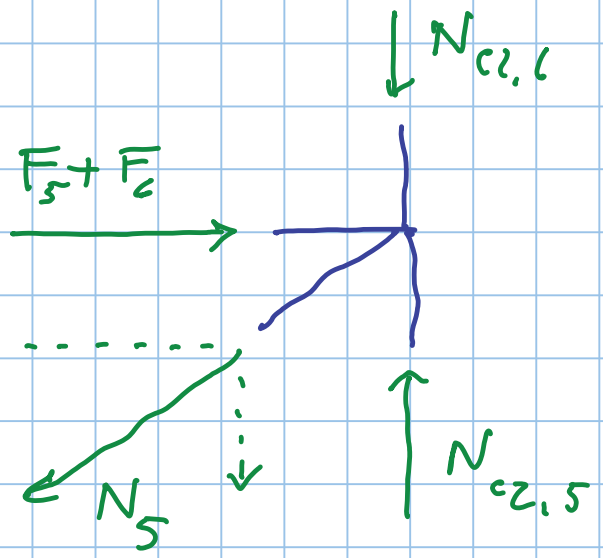
$$N_б = \frac{F_б}{\cos\alpha} = \frac{V_б}{\cos\alpha}$$

$$N_{c2} = N_б \sin\alpha = F_б \operatorname{tg}\alpha$$



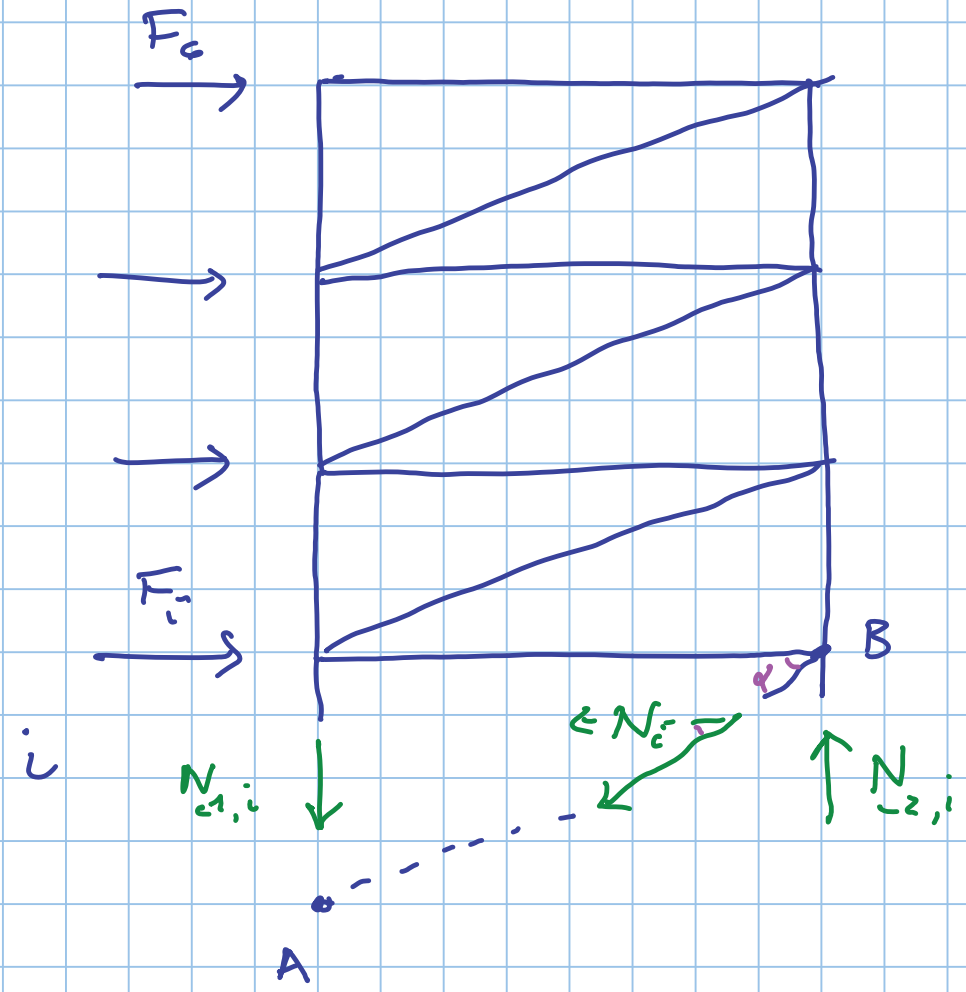
$$N_5 \cos\alpha = F_5 + F_6$$

$$N_5 = \frac{F_5 + F_6}{\cos\alpha} = \frac{V_5}{\cos\alpha}$$



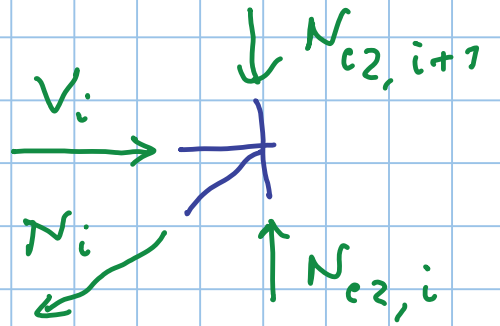
$$N_{c2,5} = N_{c2,6} + N_5 \sin\alpha =$$

$$= N_{c2,6} + V_5 \operatorname{tg}\alpha$$



equil. traslazione orizz

$$N_{c,i} = \frac{V_i}{\cos\alpha}$$

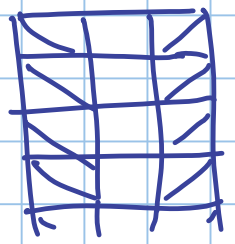


$$N_{c2,i} = N_{c2,i+1} + V_i \operatorname{tg}\alpha$$

eq. 2a t. A $N_{c2,i}$

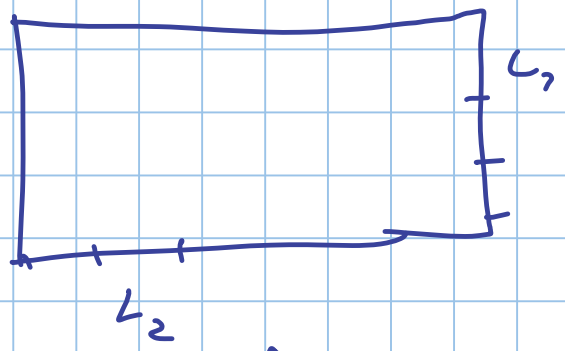
eq. 2a T. B $N_{c1,i}$

$$tg\,\alpha = \frac{3.60}{6.60}$$



$h = 3.60\ m$

$L_1 = 6.60\ m$



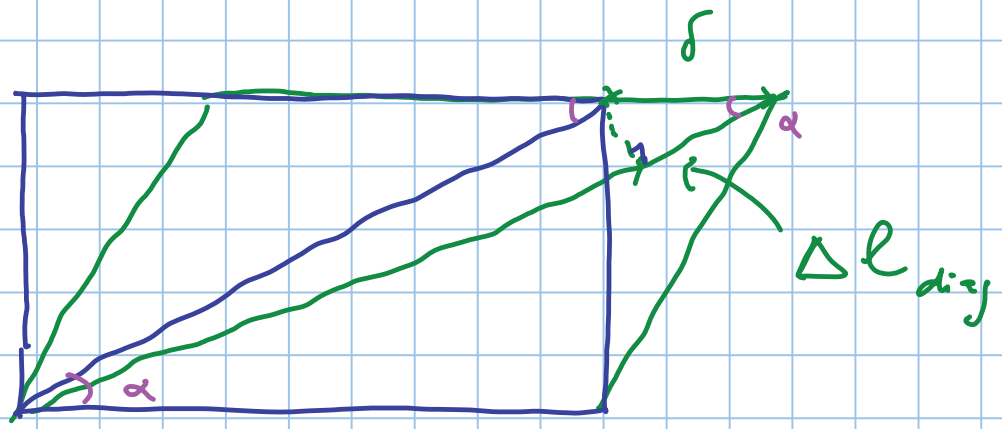
$$V_i = \sum_{j=i}^{n} F_j$$

$$N_{diag,i} = \frac{V_i}{\cos\alpha}$$

$$A_{c,nec} = \frac{N_{d,j} \times 1{,}05}{f_y}$$

$$N_{c2,i} = N_{c2,i+1} + V_i\, tg\,\alpha$$

h	3.6		α	0.499	rad		28.61	gradi		
L	6.6		cos α	0.878						
			sin α	0.479						
			tg α	0.545						
						mm2*10^2			compr	traz
piano	Fk	Vi,k	Ndiag,k	Ndiag,d	fy	Ac,nec		Nc2,k	Nc2,d	Nc1,d
6	41.87	41.87	47.7	71.5	275	2.73		22.8	34.3	0.0
5	83.75	125.62	143.1	214.6	275	8.20		91.4	137.0	34.3
4	83.75	209.37	238.5	357.7	275	13.66		205.6	308.3	137.0
3	83.75	293.12	333.9	500.8	275	19.12		365.4	548.2	308.3
2	83.75	376.87	429.3	643.9	275	24.59		571.0	856.5	548.2
1	41.87	418.74	477.0	715.5	275	27.32		799.4	1199.1	856.5



$$l_{diag} = \frac{h}{\sin\alpha}$$

$$\Delta l_{diag} = \frac{N_{diag}\, l_{diag}}{E\, A} = \frac{N_{diag}\, h}{E\, A \sin\alpha}$$

$$\delta = \frac{\Delta l_{diag}}{\cos\alpha} = \frac{N_{diag}\, h}{E A \sin\alpha \cos\alpha} \leq \frac{1}{k} h$$

$$k = 300$$

$$A \geq \frac{N_{diag}\, k}{E \sin\alpha \cos\alpha}$$

gioco foro - bullone

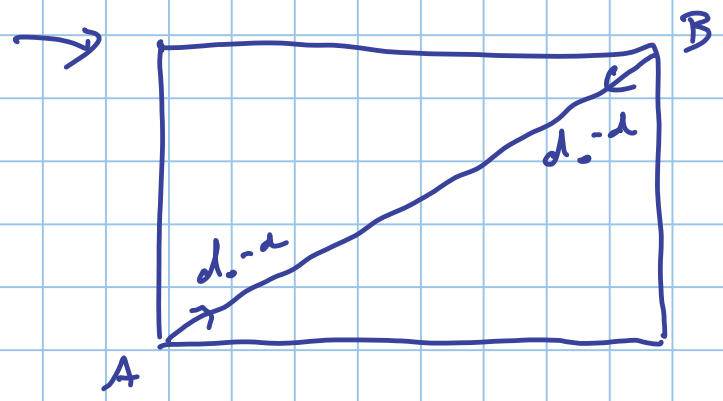
d = diametro bullone

d_0 = diametro foro

$d_0 > d$

Es. $d_0 = d + 1\ mm$

$d_0 - d = 1\ mm$



lo scorrimento provoca una variazione della distanza A-B = $2(d_0 - d) = \Delta_{fb}$ scorrimento foro-bullone

$$\Delta l_{dis} = \frac{N_{dis}\ h}{E\ A\ \sin\alpha} + \Delta f_b$$

$$\delta = \frac{N_{dis}\ h}{EA\ \sin\alpha\cos\alpha} + \frac{\Delta f_b}{\cos\alpha}$$

$$\delta \leq \frac{1}{K} h$$

$$\frac{N_{dis}\ h}{EA \sin\alpha \cos\alpha} + \underbrace{\frac{\Delta f_h}{\cos\alpha}} \leq \frac{1}{K} h$$

$$\frac{N_{dis}\ h}{EA \sin\alpha \cos\alpha} \leq \underbrace{\left(\frac{1}{K} - \frac{\Delta f_h}{h \cos\alpha}\right)}_{\frac{1}{K'}} h$$

$$K' = \frac{1}{\frac{1}{K} - \frac{\Delta f_h}{h \cos\alpha}}$$

$$A \geq \frac{N_{dis}\ K'}{E \sin\alpha \cos\alpha}$$

$$\delta = \frac{N_{Ed} \cdot h}{EA \cdot \sin\alpha \cdot \cos\alpha} + \frac{\Delta f_b}{\cos\alpha}$$

N_{Ed}: $\times 10^3$

h: $\times 10^3$

EA: $\times 10^2$