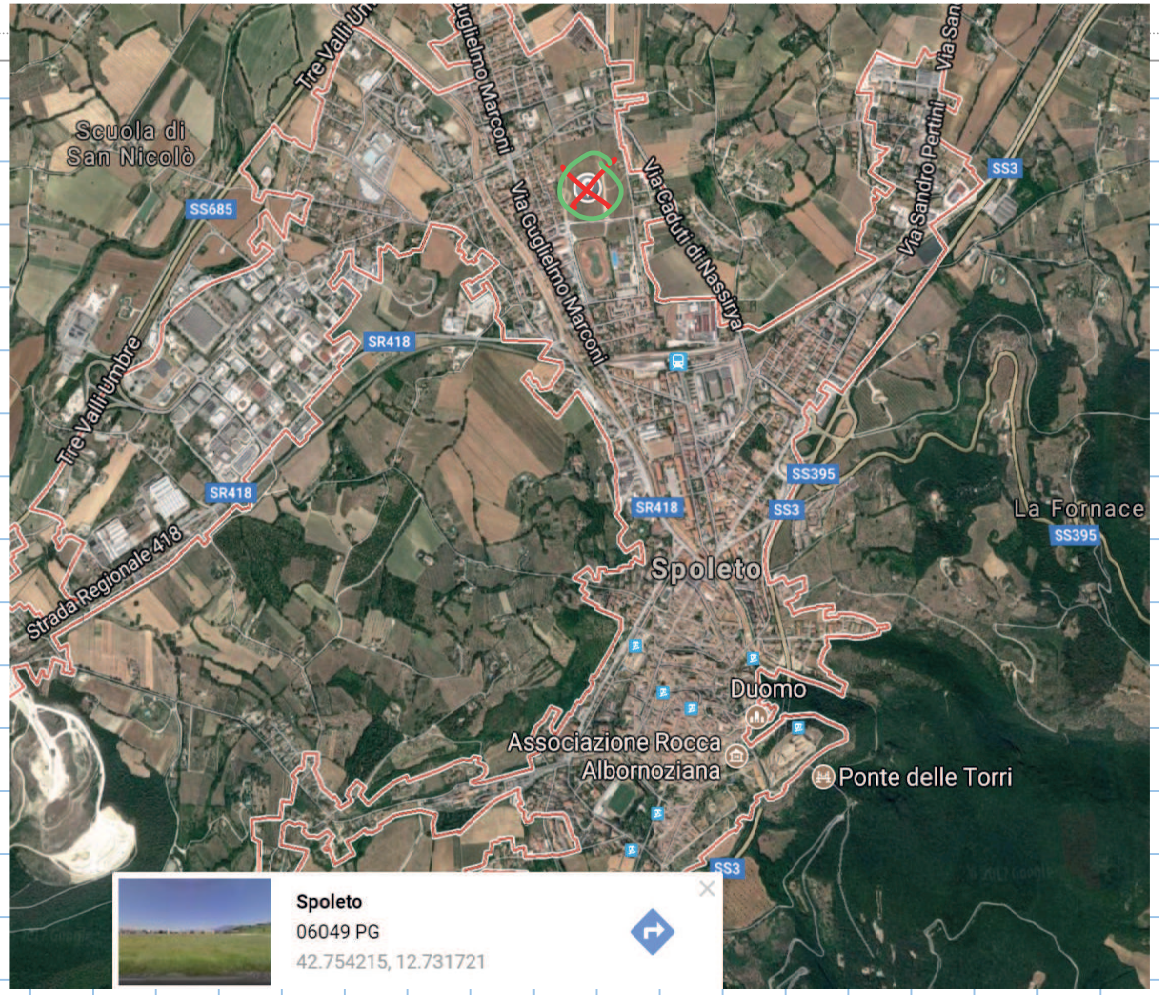
Titolo nota

25/10/2017



distanza da mare 120 km

quota 286 m

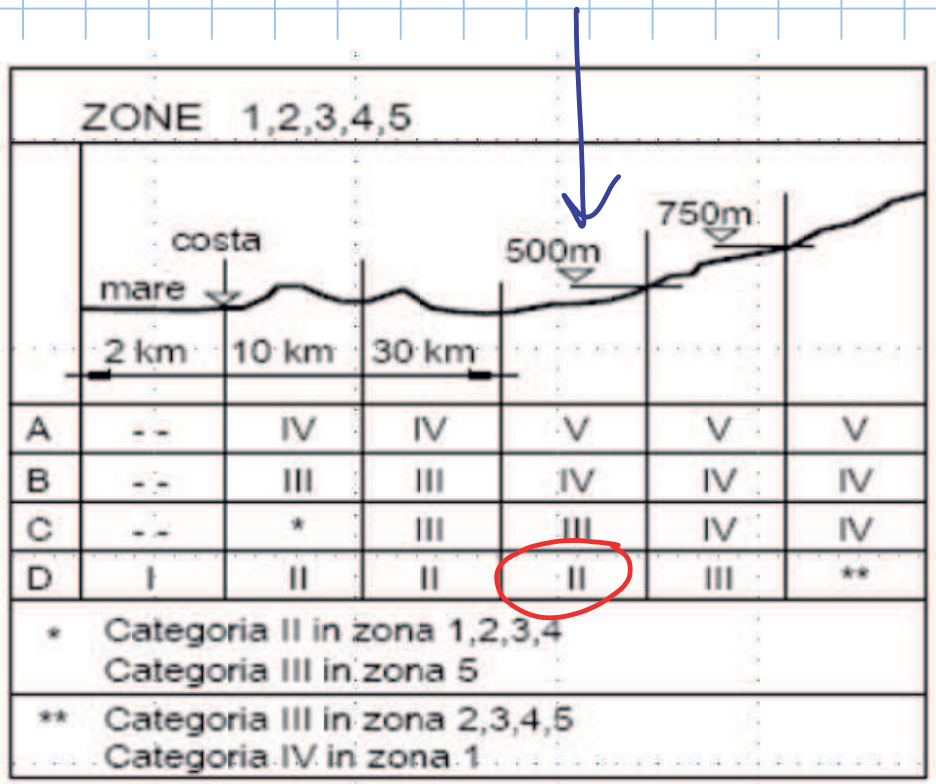
zona sismica = 3

classe di rugosità = D

ZONE 1,2,3,4,5	costa mare		500m		750m	
	2 km	10 km	30 km			
A	- -	IV	IV	V	V	V
B	- -	III	III	IV	IV	IV
C	- -	*	III	III	IV	IV
D	I	II	II	II	III	**

* Categoria II in zona 1,2,3,4
Categoria III in zona 5

** Categoria III in zona 2,3,4,5
Categoria IV in zona 1



A	- -	IV	IV	V	V	V
B	- -	III	III	IV	IV	IV
C	- -	*	III	III	IV	IV
D	I	II	II	II	III	**

* Categoria II in zona 1,2,3,4
Categoria III in zona 5

** Categoria III in zona 2,3,4,5
Categoria IV in zona 1

classe di esposizione II

per calcolo c_e

$K_r = 0.19$

$z_0 = 0.05$

$z_{min} = 4\ m$

Tab. 3.3.I -*Valori dei parametri* $v_{b,0}$, a_0, k_s

Zona	Descrizione	$v_{b,0}$ [m/s]	a_0 [m]	k_s
1	Valle d'Aosta, Piemonte, Lombardia, Trentino Alto Adige, Veneto, Friuli Venezia Giulia (con l'eccezione della provincia di Trieste)	25	1000	0,40
2	Emilia Romagna	25	750	0,45
3	Toscana, Marche, Umbria, Lazio, Abruzzo, Molise, Puglia, Campania, Basilicata, Calabria (esclusa la provincia di Reggio Calabria)	27	500	0,37
4	Sicilia e provincia di Reggio Calabria	28	500	0,36
5	Sardegna (zona a oriente della retta congiungente Capo Teulada con l'Isola di Maddalena)	28	750	0,40
6	Sardegna (zona a occidente della retta congiungente Capo Teulada con l'Isola di Maddalena)	28	500	0,36
7	Liguria	28	1000	0,54
8	Provincia di Trieste	30	1500	0,50
9	Isole (con l'eccezione di Sicilia e Sardegna) e mare aperto	31	500	0,32

Zona 3

$v_{b,0} = 27$ m/s

$a_0 = 500$ m

$K_s = 0.37$

quota $= 286$ m < 500 m $\rightarrow$ $v_b = 27$ m/s

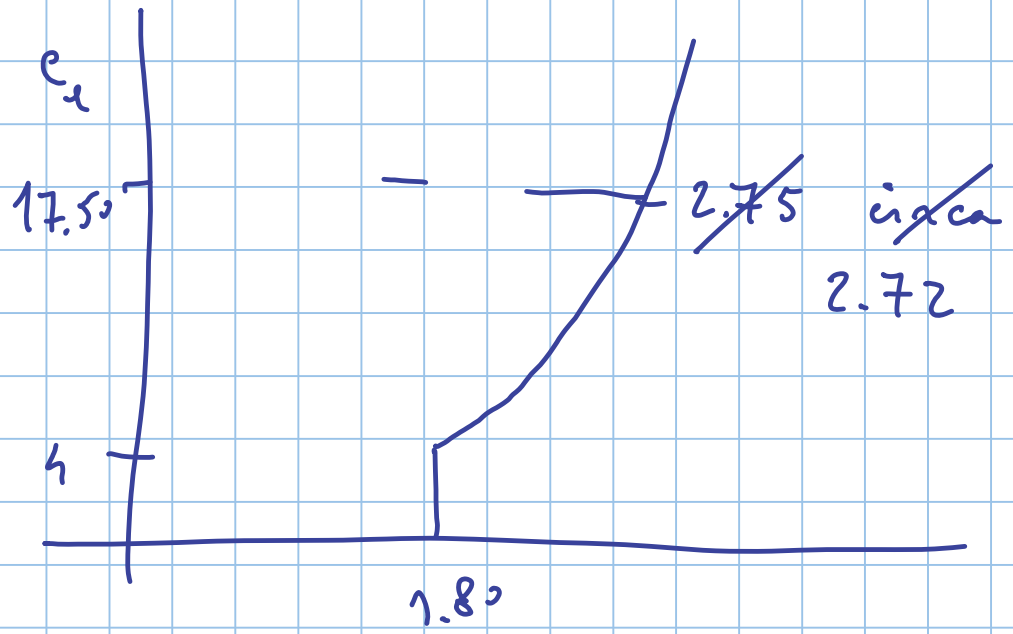
$$q_2 = \frac{1}{2} \rho v_2^2 = \frac{1}{2} \times 1.25 \times 27^2 = 456 \text{ N/m}^2 = 0.456 \text{ kN/m}^2$$

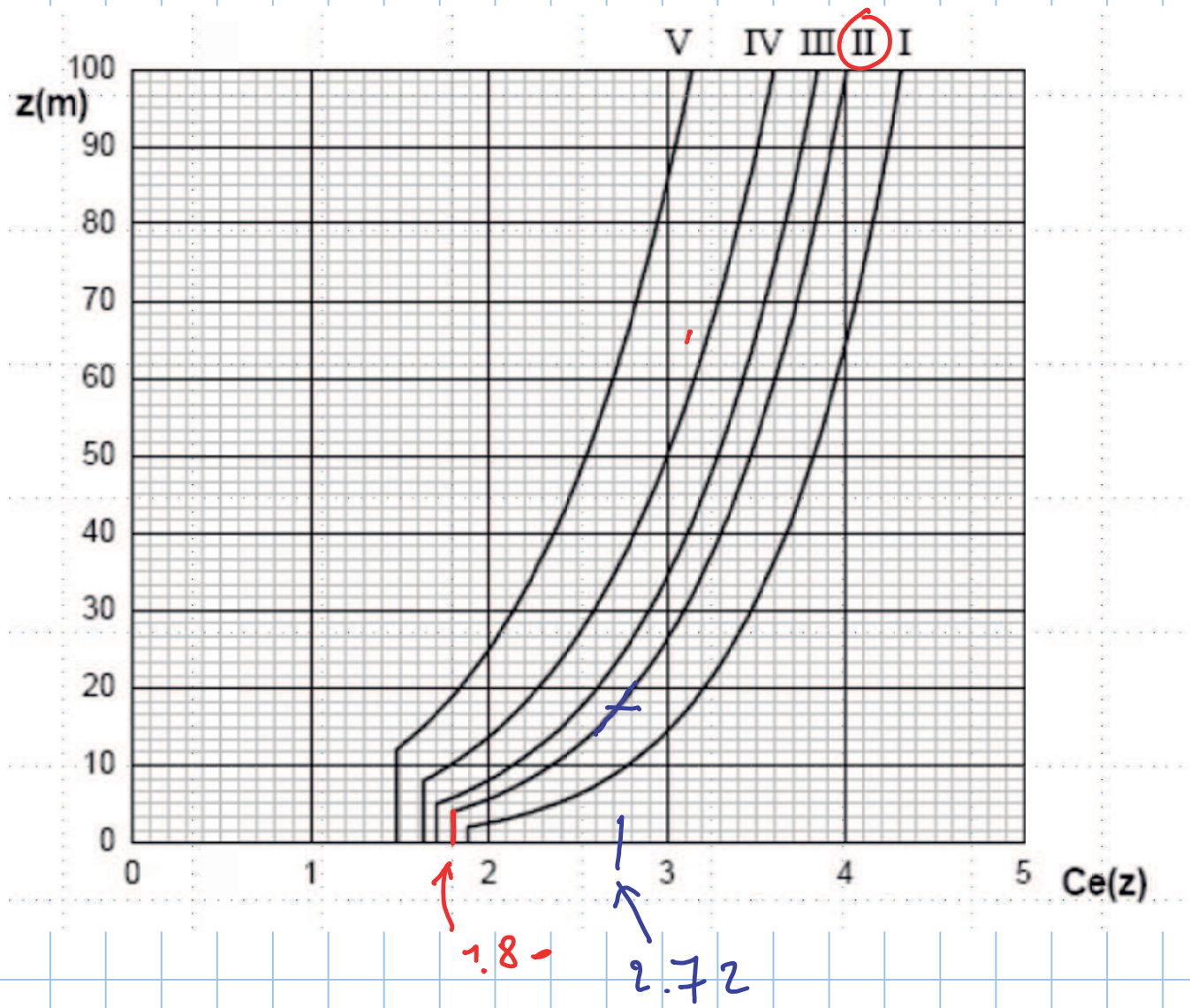
$z_{min} = 4\ m$ $\quad K_2 = 0.19$ $\quad z_0 = 0.05$

$$c_e(z) = k_r^2\, c_t \ln\left(\frac{z}{z_0}\right)\left[7 + c_t \ln\left(\frac{z}{z_0}\right)\right] \quad \text{per } z \geq z_{min}$$

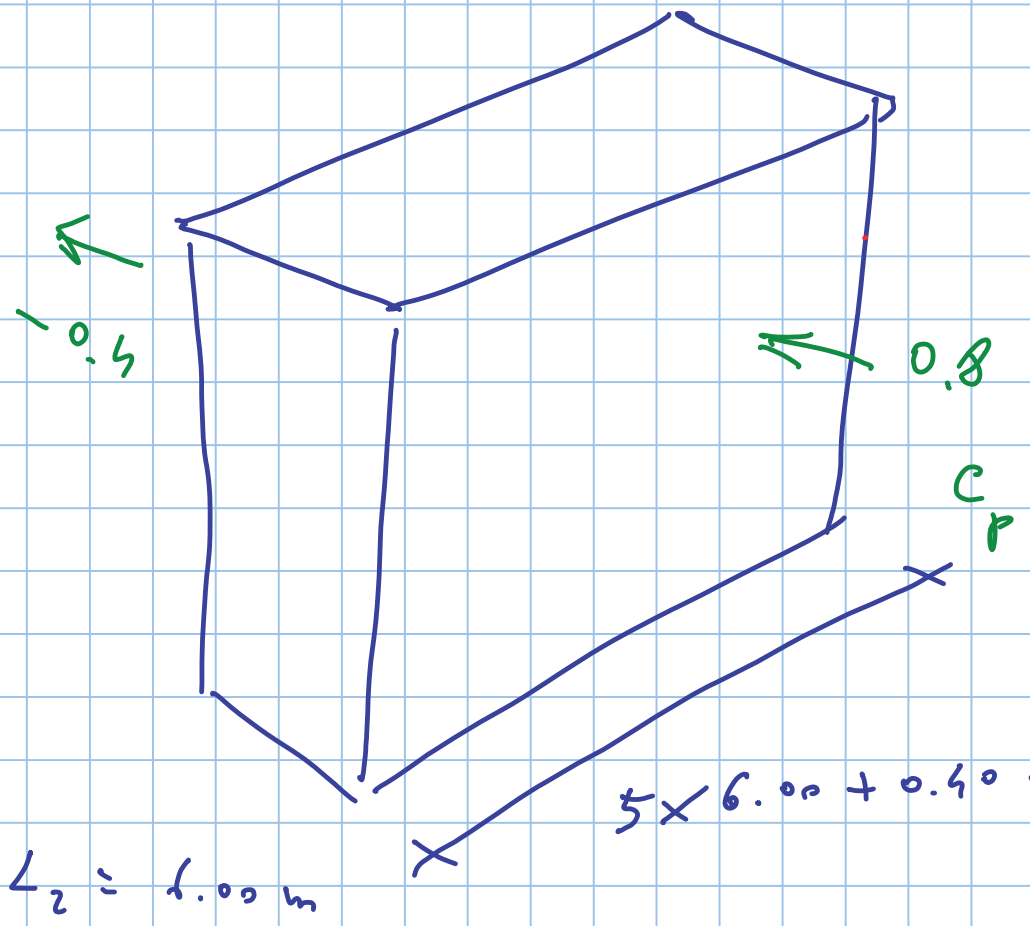
$c_t = 1$

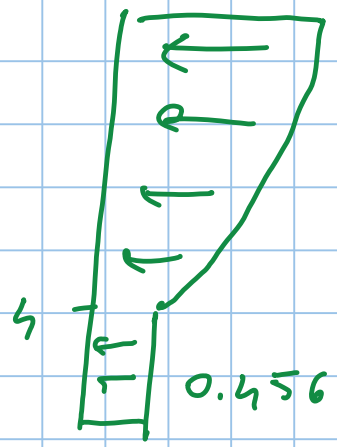
$$c_e(z_{min}) = 0.19^2 \underbrace{\ln\left(\frac{4}{0.05}\right)}_{4.38}\left[7 + \ln\left(\frac{4}{0.05}\right)\right] = 1.80$$




V
IV
III
II
I
z(m)
100
90
80
70
60
50
40
30
20
10
0
0
1
2
3
4
5
Ce(z)
1.8
2.72

AZIONE nell'ala.

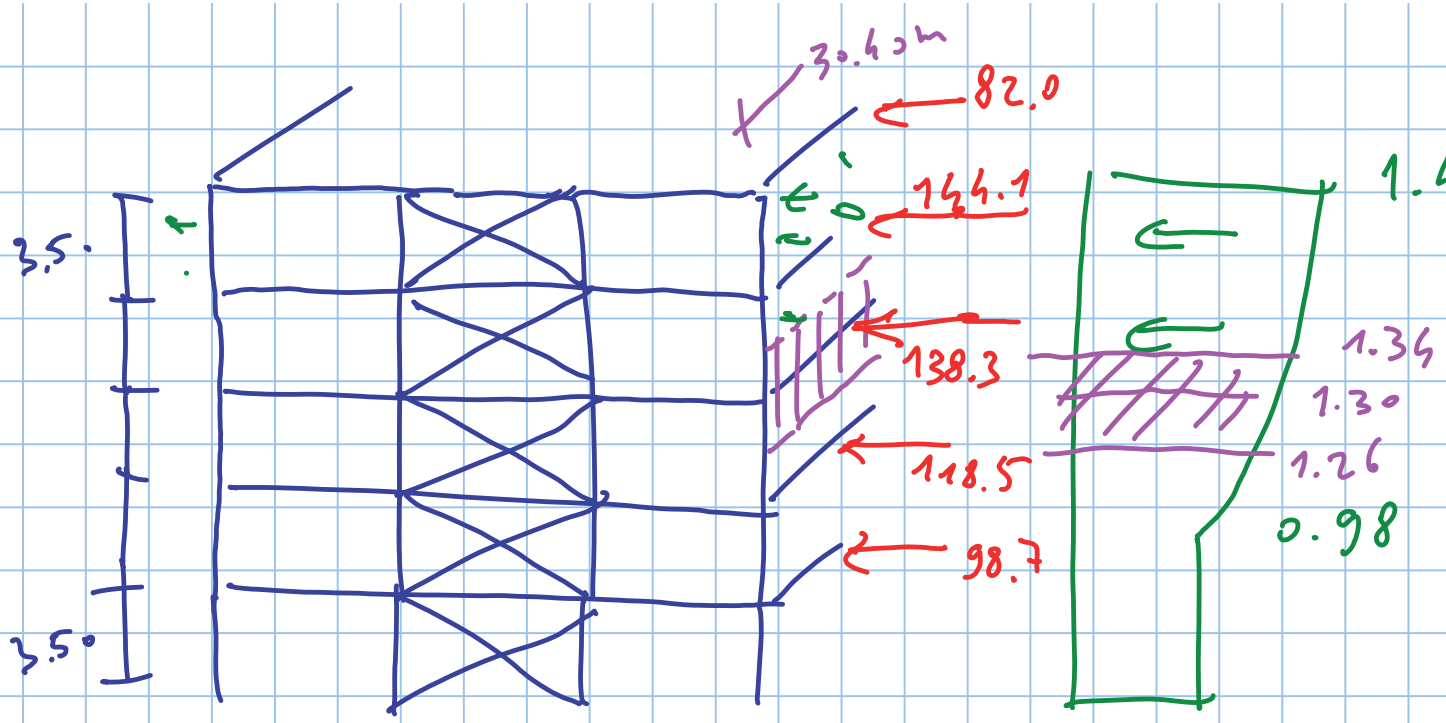




$0.456 \times 2.72 \times 1.2 =$

$= 1.48$ kN/m²

$0.456 \times 1.80 \times 1.2 = 0.98$ kN/m²



$$\int p_h \, dA =$$

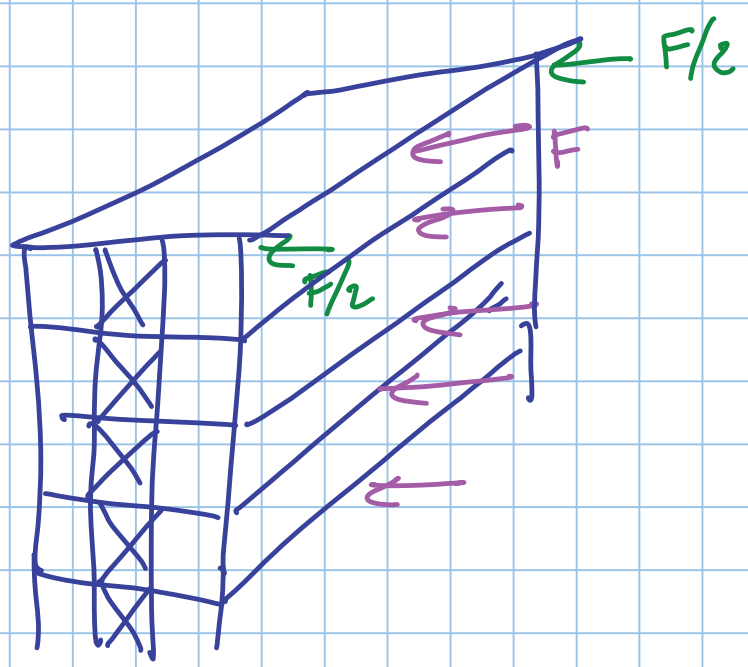
$$= \int p_h \, L \, dz =$$

$$= p_{k,med.} \cdot L \cdot \Delta z$$

30.40 / 3.50

forza complessiva di 3° impalcato

$$1.30 \times 30.40 \times 3.50 = 138.3 \text{ KN}$$



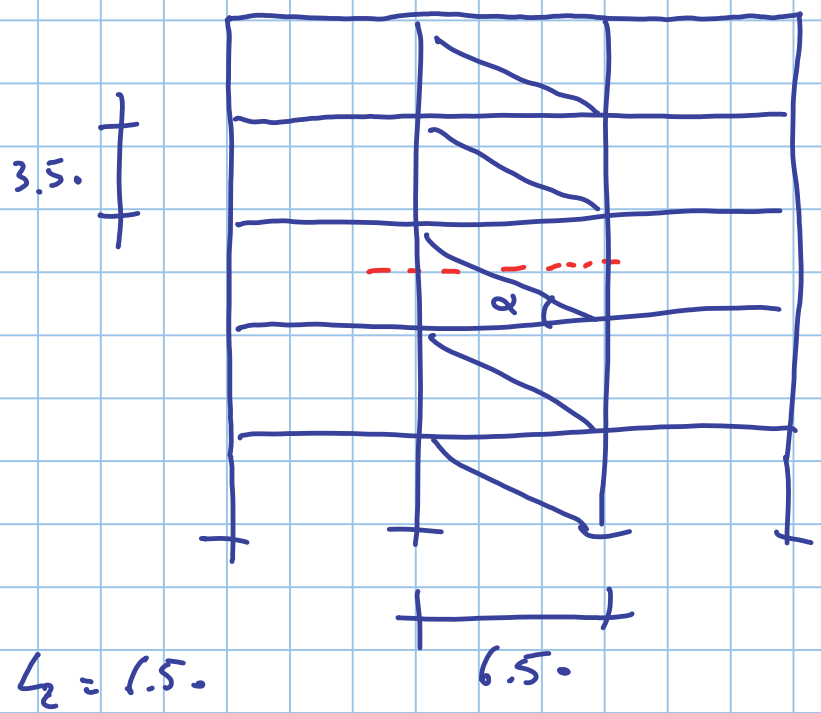
41.0

72.1

69.2

59.3

49.4



F_K

← 41.0

← 72.1

← 69.2

← 59.3

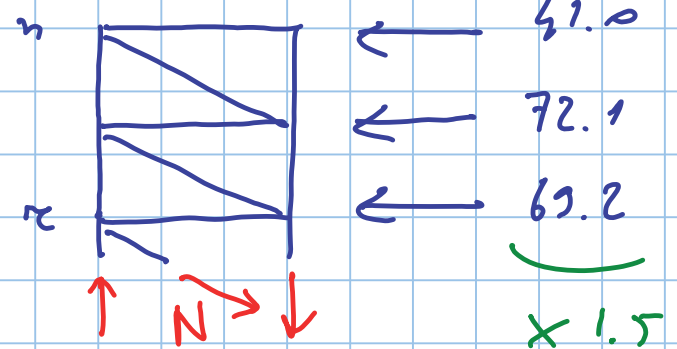
← 49.4

$L_2 = 1.5.$

$$\alpha = \operatorname{arctg} \frac{3.50}{6.50} = 0.53 \text{ rad} = 28.3^\circ$$

$$\cos \alpha = 0.88$$

$$F_d = \gamma_F F_K = 1.5 \; F_K$$



Equilibrio

Traslación horizontal

$$\sum_{i=n}^{n} F_i = N \cos \alpha$$

$$N = \frac{\sum F}{\cos \alpha} = \frac{41.0 + 72.1 + 69.2}{0.88} \times 1.5 = 207.2 \text{ KN}$$

DIMENSIONAMENTO

contenuto

$N_{Ed} = 310.8$ ~~207.2~~ kN

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

$N_{u,Rd} = 0.9\, A_{n,t} \frac{f_u}{\gamma_{M2}}$ in presenza di fori

acciaio S 275

$f_y = 275$ MPa

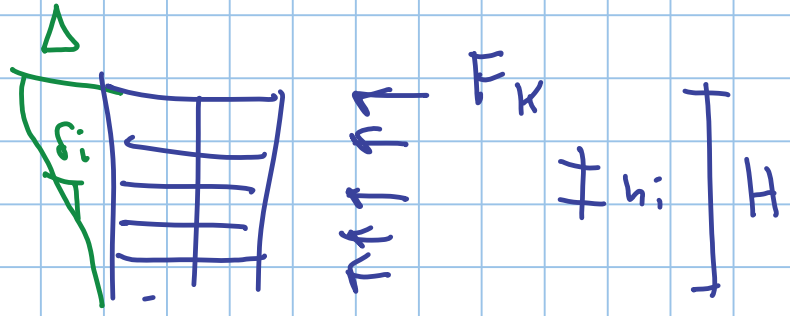
$$A \geq \frac{N_{Ed} \cdot \gamma_{M0}}{f_y} = \frac{310.8 \times 10^3 \cdot 1.05}{275} = 11.87 \times 10^2 \text{ mm}^2$$

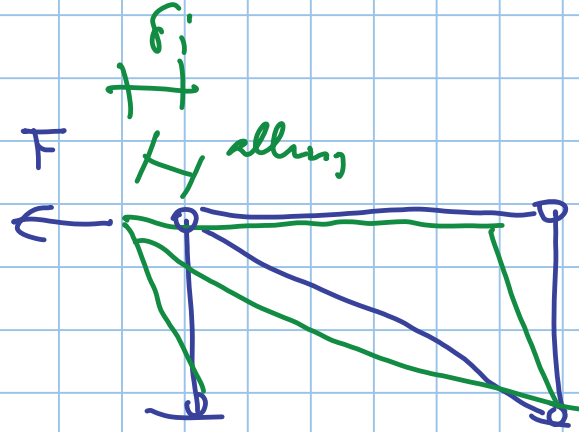
L 80 x 80 x 8 $\quad A = 12.3 \times 10^2$ cm^2

UPE 100 $\quad A = 12.5 \times 10^2$ cm^2

LIMITI DI DEFORMAZIONE SLE

~~Vento~~ i carichi di esercizio.





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

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

$E = 210000$ MPa

Carichi variabili differenti

q_{1k} q_{2k}

$q_{1k} + \psi_0 q_{2k}$ ppr. $\psi_0 q_{1k} + q_{2k}$

COMPRESSIONE

sezioni

↳ non cambia simbologia e trazione

$$N_{Rd} = A \frac{f_y}{\gamma_{M0}}$$

aste

↳ instabilità

$M = N\, v(x)$

$v(x)$

$$-\frac{M(x)}{EI} = v''_{(x)} \qquad M = -EI\, v''$$

$$-EI\, v'' = N\, v \qquad EI\, v'' + N\, v = 0$$

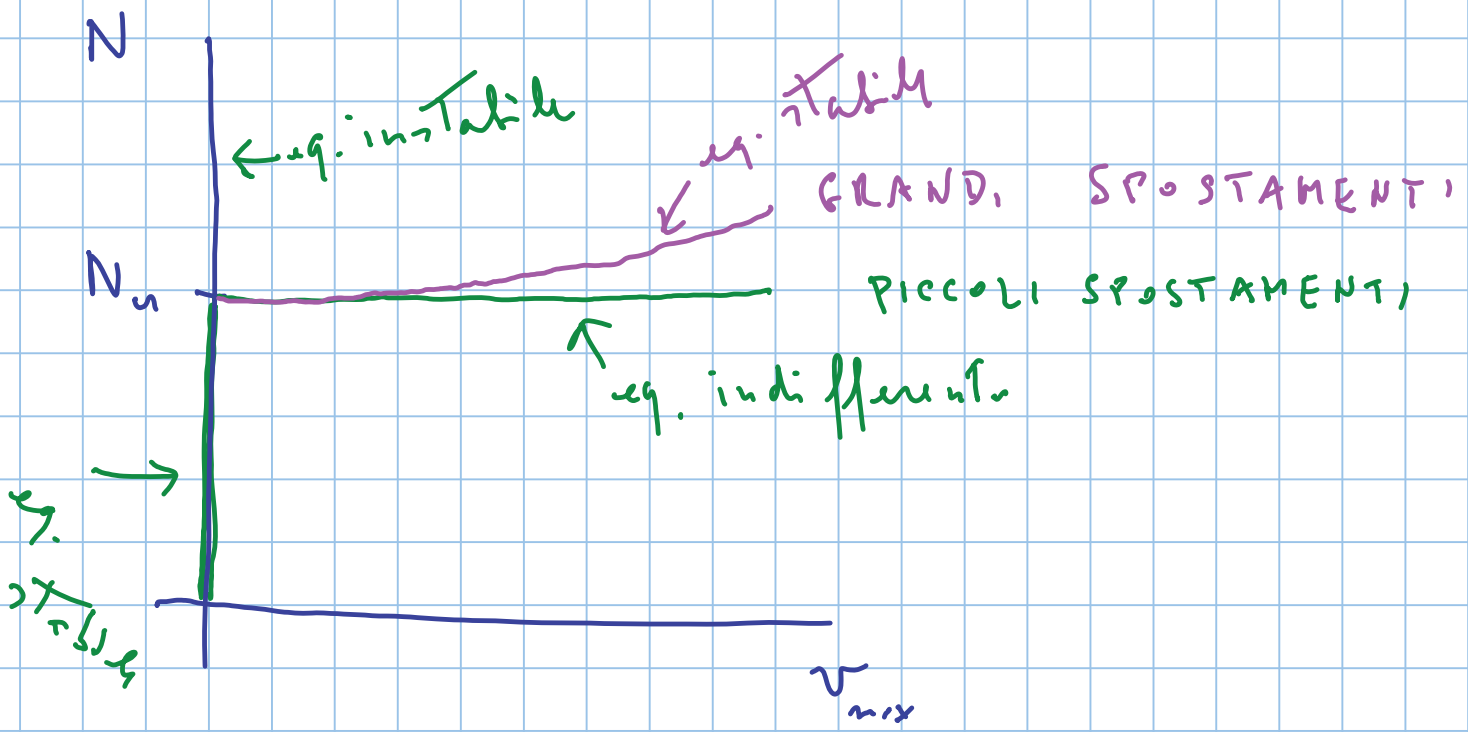
$$v = K \sin \pi \frac{x}{L} \qquad v'' = -K \frac{\pi^2}{L^2} \sin \pi \frac{x}{L}$$

$$EI\left[-K\frac{\pi^2}{L^2}\sin\frac{\pi x}{L}\right]+N\left[K\sin\frac{\pi x}{L}\right]=0$$

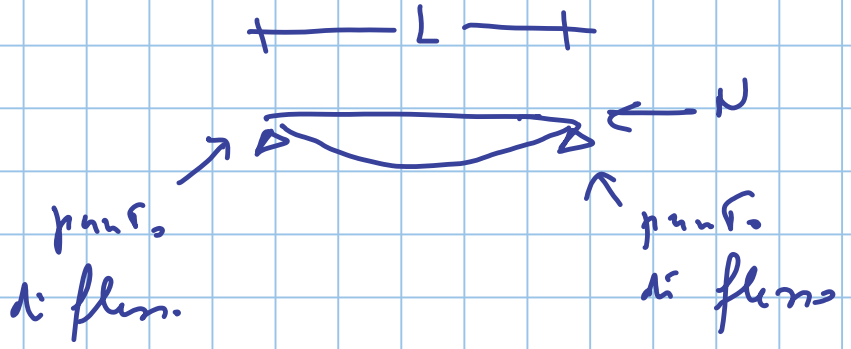
$$-\cancel{K}\frac{\pi^2 EI}{L^2}\cancel{\sin\frac{\pi x}{L}}+\cancel{K}N\cancel{\sin\frac{\pi x}{L}}=0$$

$$-\frac{\pi^2 EI}{L^2}+N=0 \qquad N=\frac{\pi^2 EI}{L^2}=N_{cr}$$

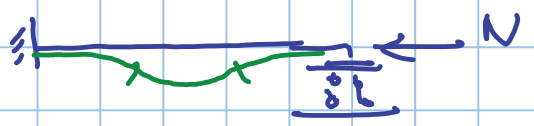
carico critico Euleriano


N
N_u
eq. instabile
eq. instabile
GRANDI SPOSTAMENTI
PICCOLI SPOSTAMENTI
eq. indifferente
eq. stabile
v_{mix}

$$N_{cr} = \frac{\pi^2 E I}{l_0^2}$$



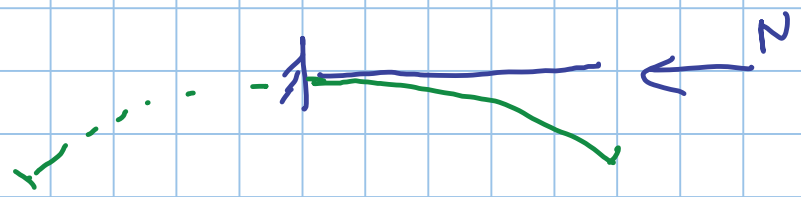
$l_0 = L$



$l_0 = L/2$

$$\sigma_{cr} = \frac{N_{cr}}{A} = \frac{\pi^2 E I}{l_0^2 A}$$

$$\sqrt{\frac{I}{A}} = i \quad \text{raggio d'inerzia}$$



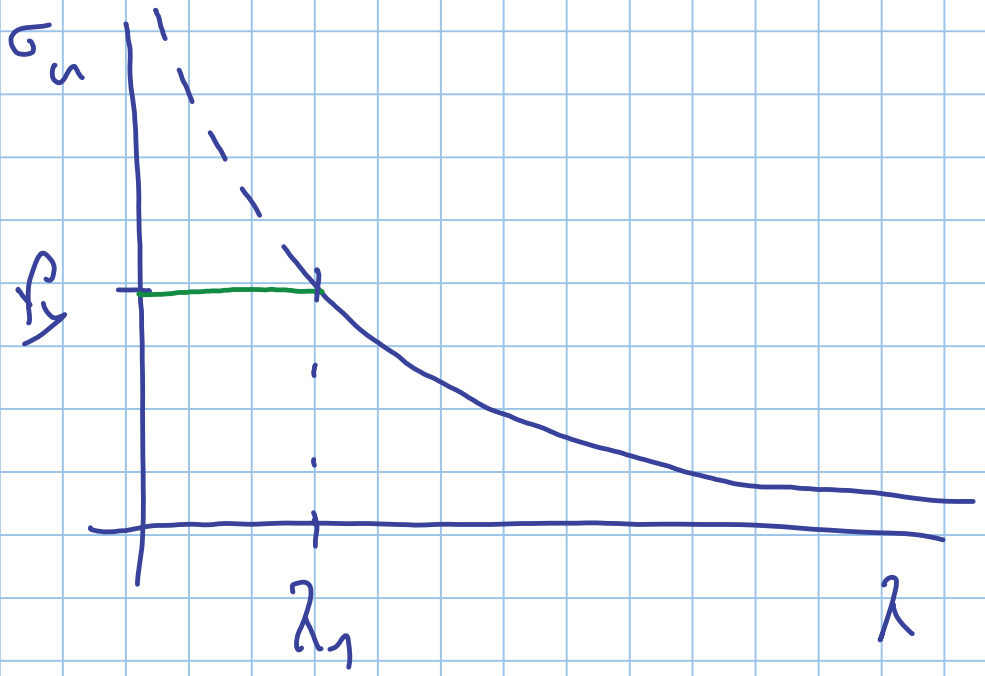
$l_0 = 2l$

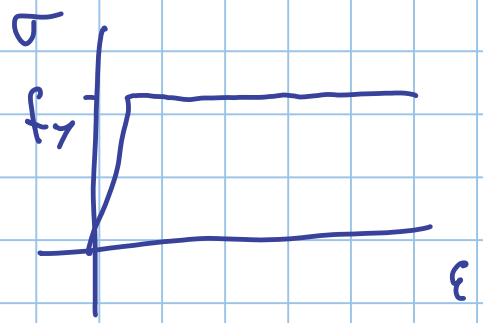
$$\sigma_{cr} = \frac{\pi^2 E i^2}{l_0^2}$$

$$\lambda = \frac{l_0}{i}$$

SNELLEZZA

$$\sigma_{cr} = \frac{\pi^2 E}{\lambda^2}$$





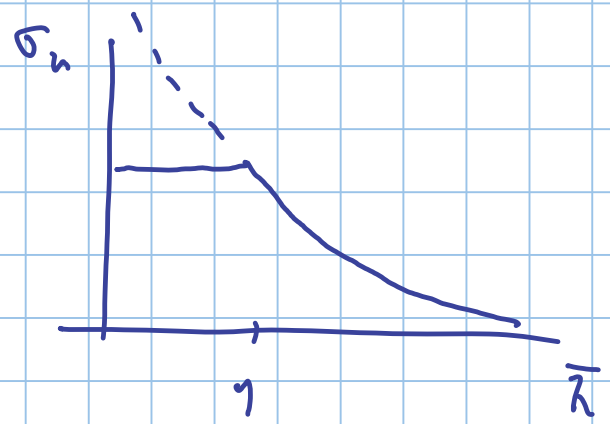
$\lambda < \lambda_1$ tozze

$\lambda > \lambda_1$ snelle

$$\sigma_{cr} = \frac{\pi^2 E}{\lambda^2} \rightarrow f_y = \frac{\pi^2 E}{\lambda_1^2} \rightarrow \lambda_1 = \pi \sqrt{\frac{E}{f_y}}$$

S 235 $\quad f_y = 235\ MPa \quad \lambda_1 = 93.9$

$$\bar{\lambda} = \frac{\lambda}{\lambda_1}$$



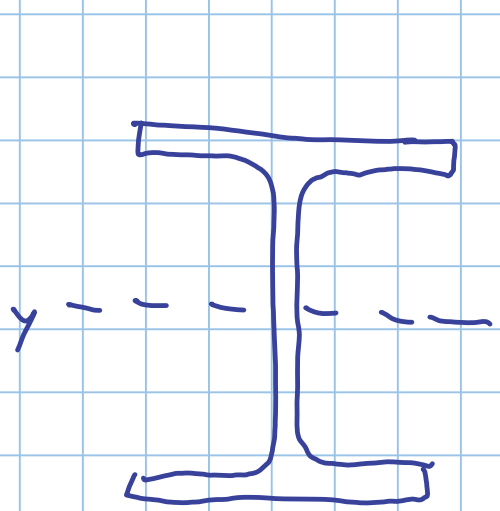
$$\bar{\lambda} = \sqrt{\frac{N_{pm}}{N_{cr}}}$$

$$\lambda = \pi \sqrt{\frac{E}{\sigma_{cr}}}$$

$$\lambda_1 = \pi \sqrt{\frac{E}{f_y}}$$

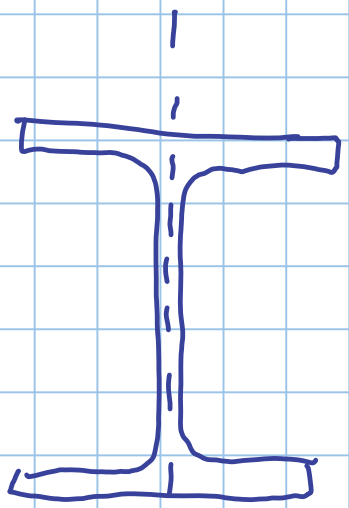
$$\frac{\lambda}{\lambda_1} = \sqrt{\frac{f_y A}{\sigma_{cr} A}} = \sqrt{\frac{N'_{pm}}{N_{pl}}}$$

=



I_y

i_y



I_z

i_z