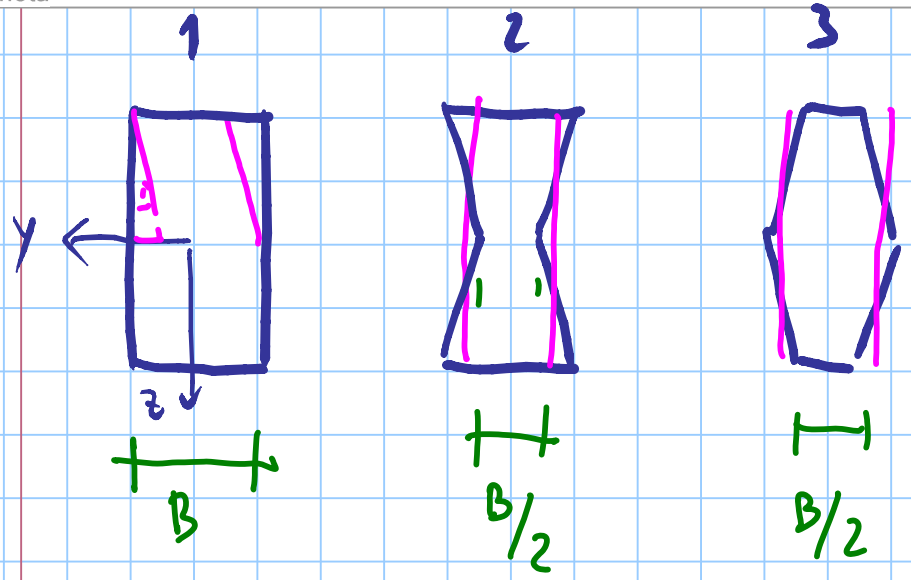
Titolo nota 20/11/2013



$A = 1800\ cm^2$

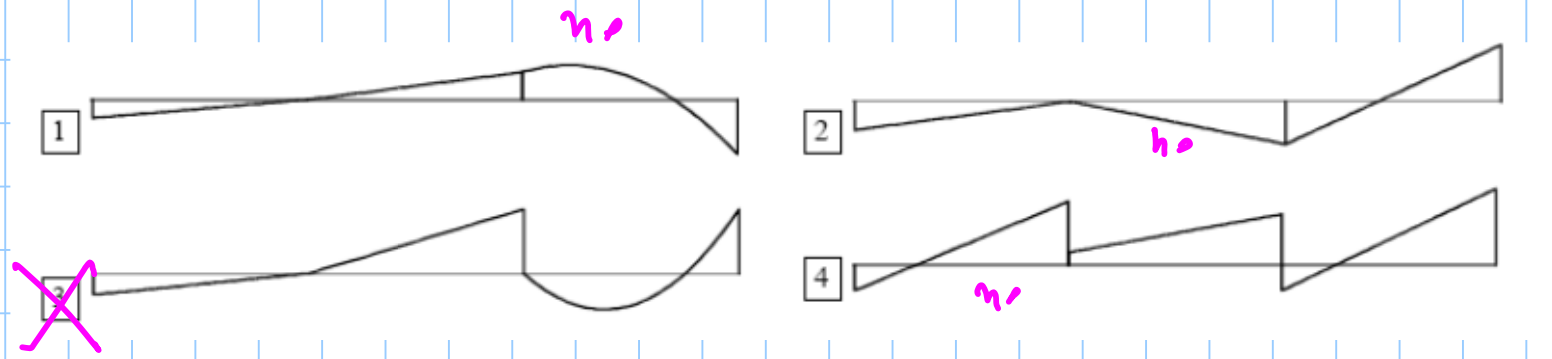
$I_y = 540000\ cm^4$

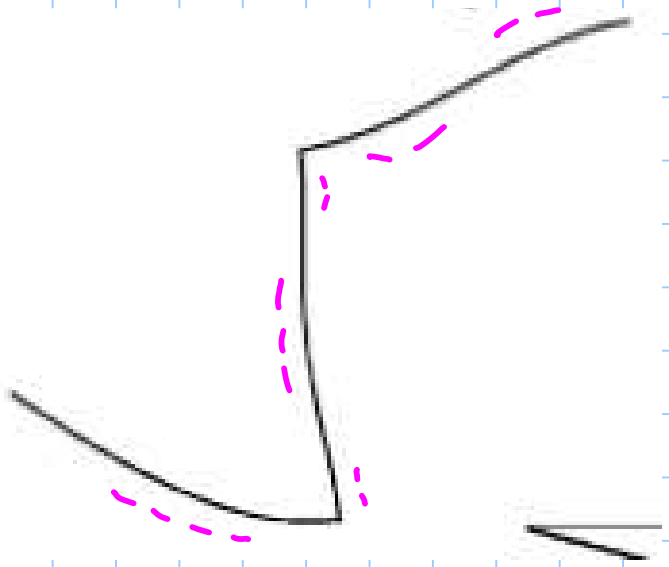
607 500 no

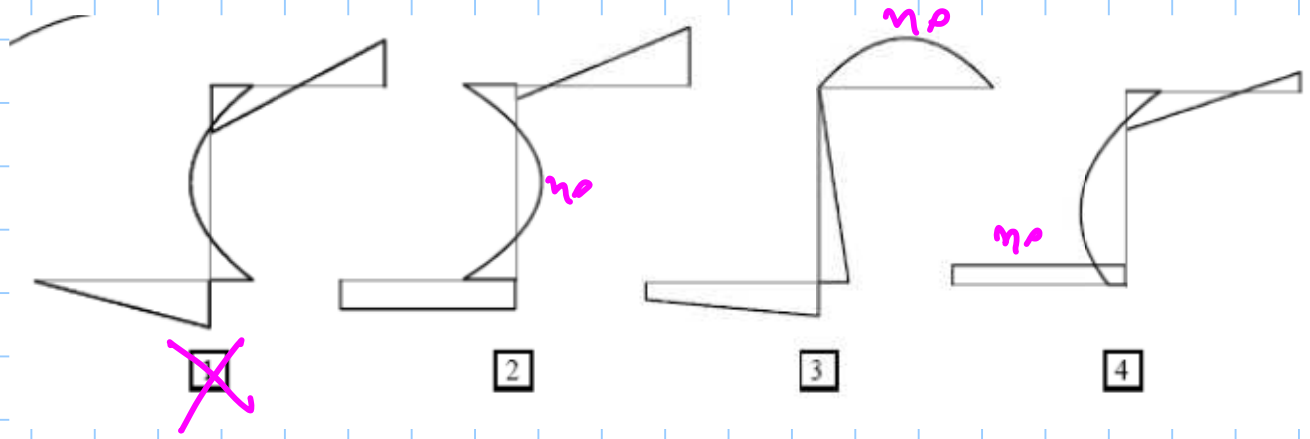
472 500 → 2

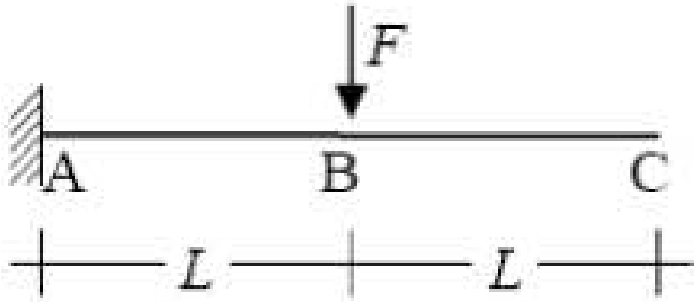
337 500 → 3

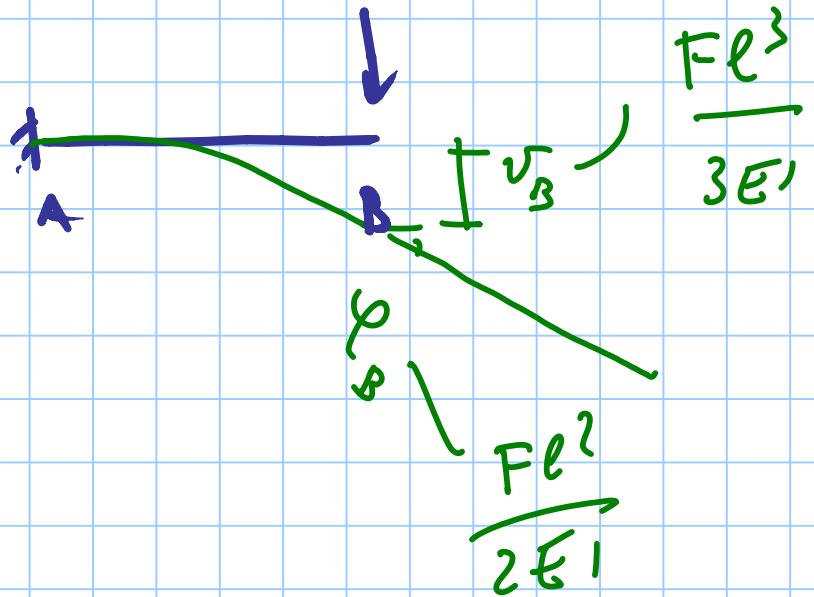
270 000 no


1
2
3
4



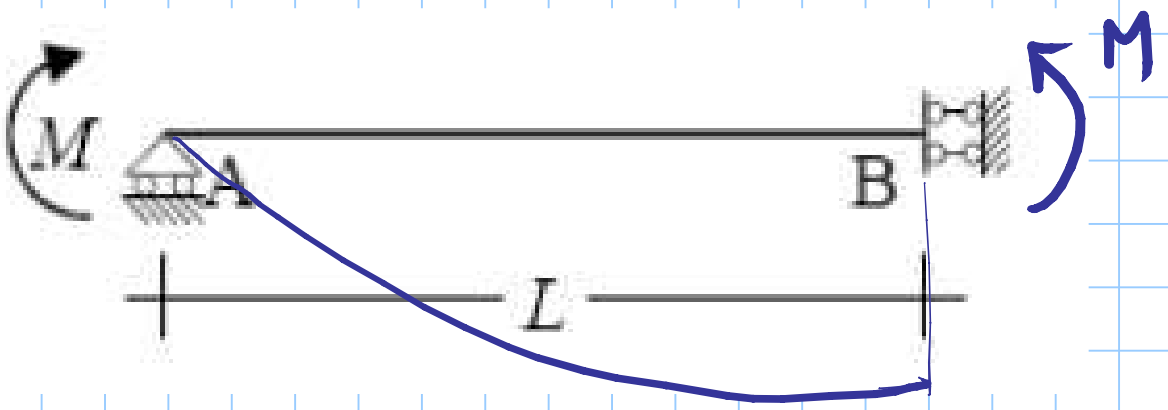

no
no
no
1
2
3
4





$$\left(\frac{1}{3}+\frac{1}{2}\right)\frac{Fl^3}{EI}$$

$$\frac{5}{6}$$



$M \cdot h_2$

$+ l_{/2} +$

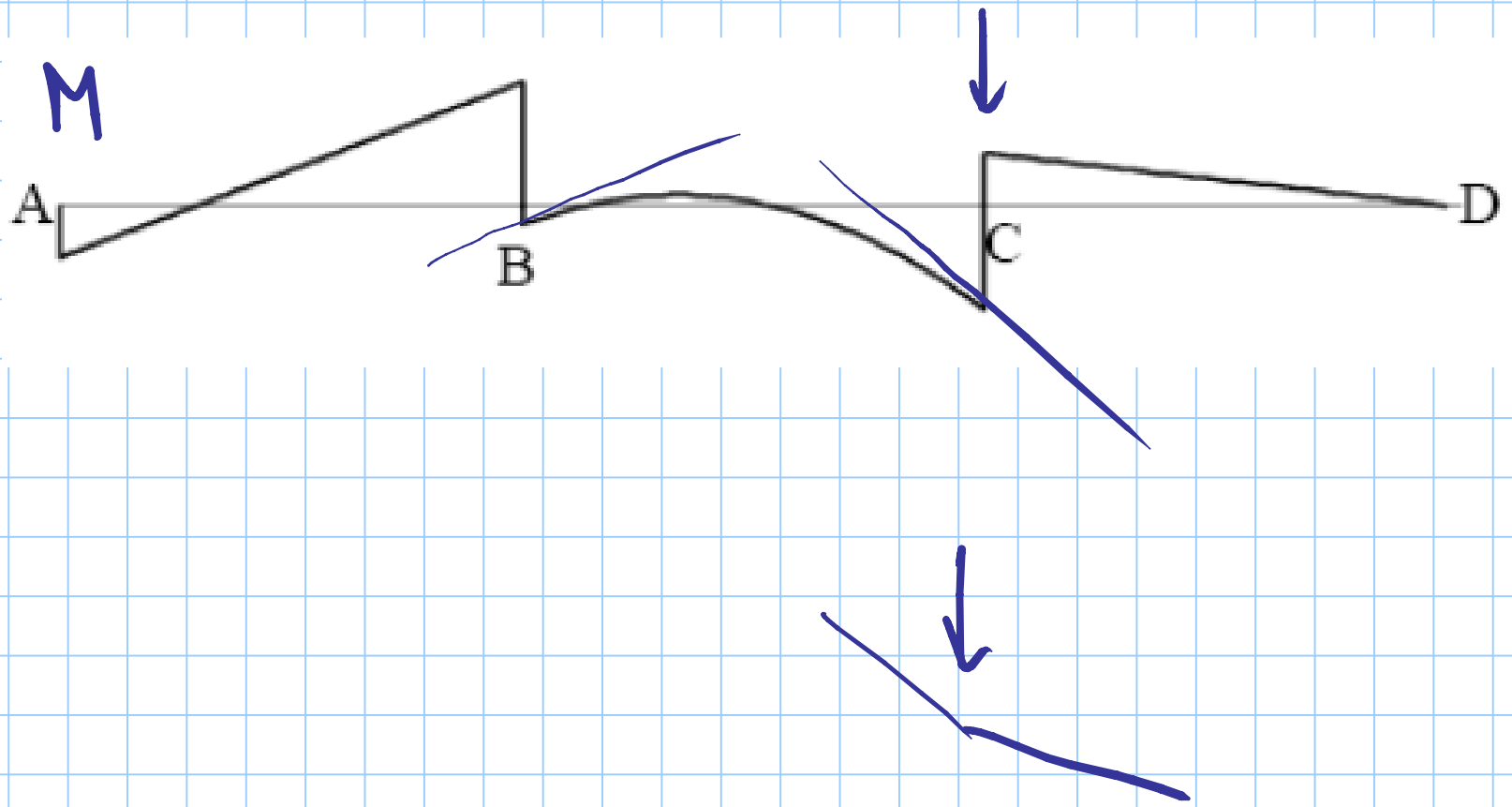
M/EI

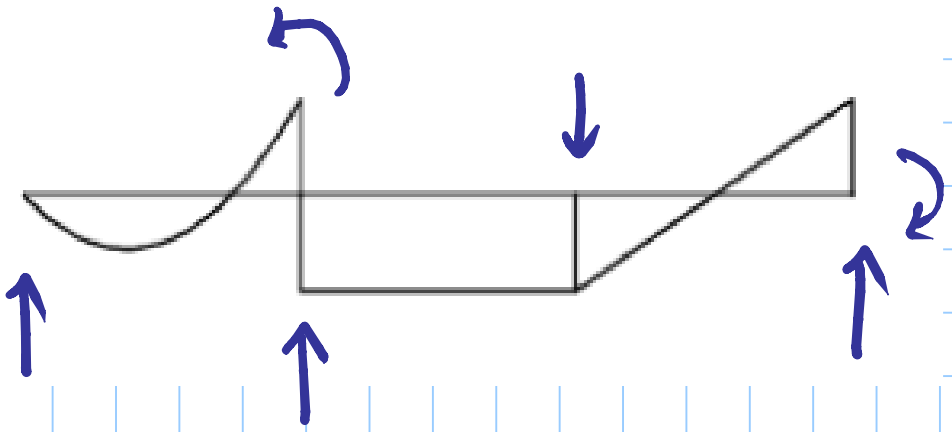
Δ

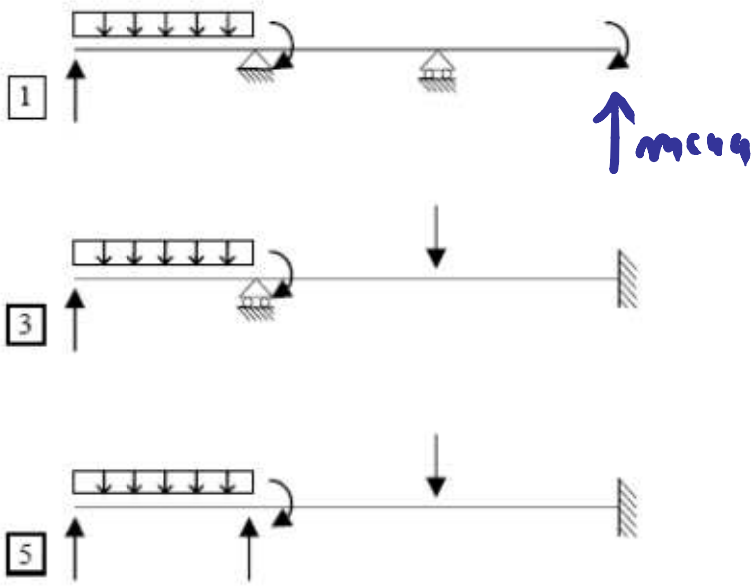
$\frac{Ml}{EI}$

$\frac{Ml}{EI} \cdot \frac{l}{2}$

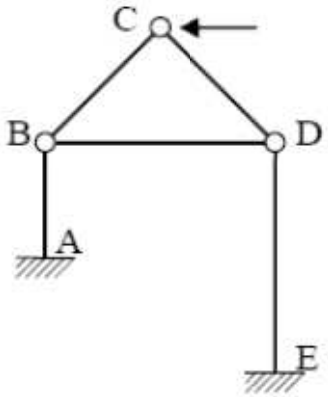
$\frac{Ml}{EI}$


M
A
B
C
D

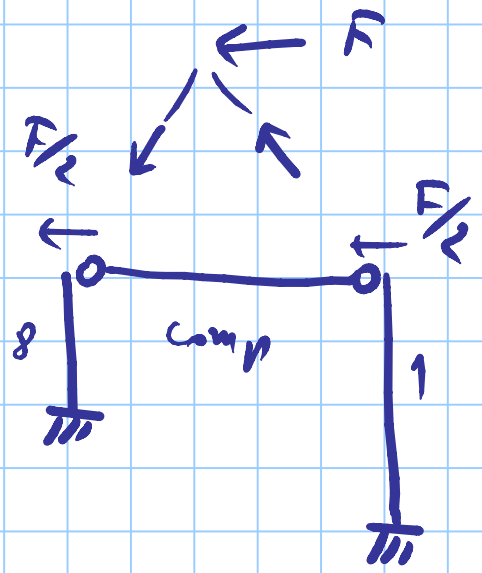


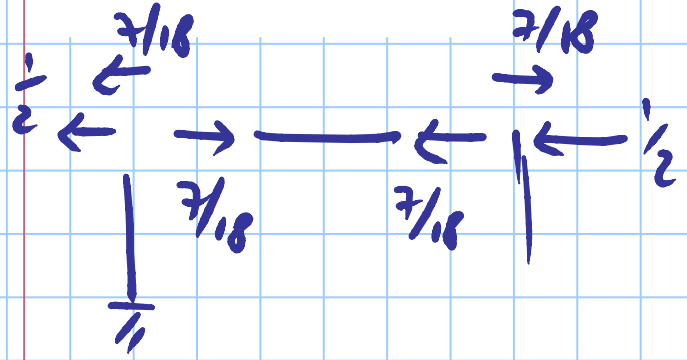


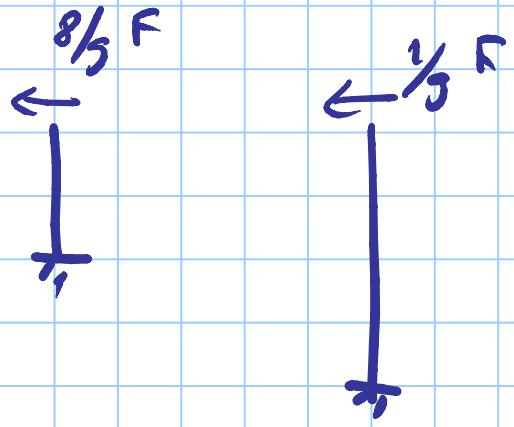
6 Sono tutti compatibili col diagramma

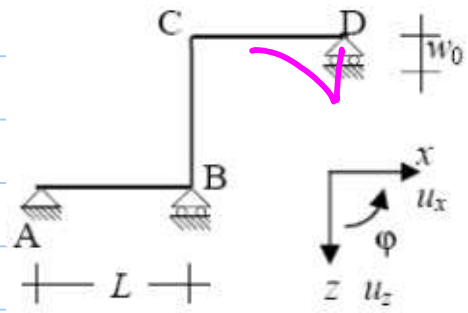

C
B
D
A
E

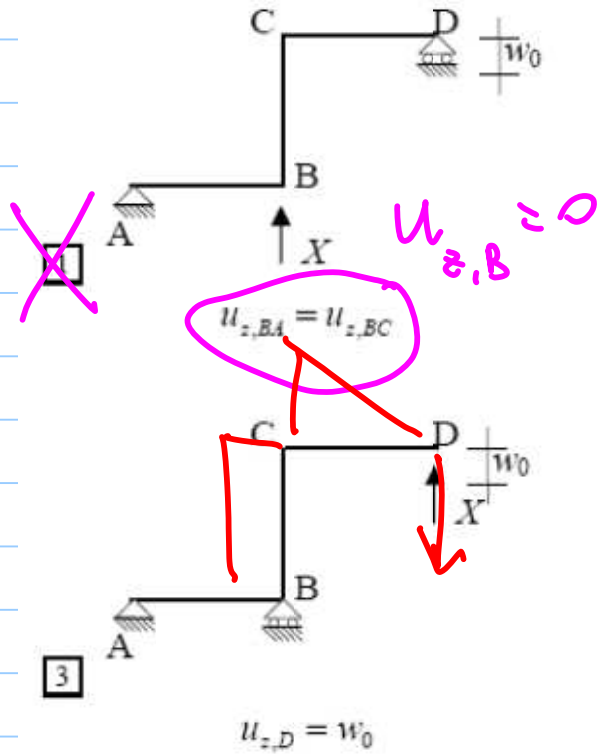
=

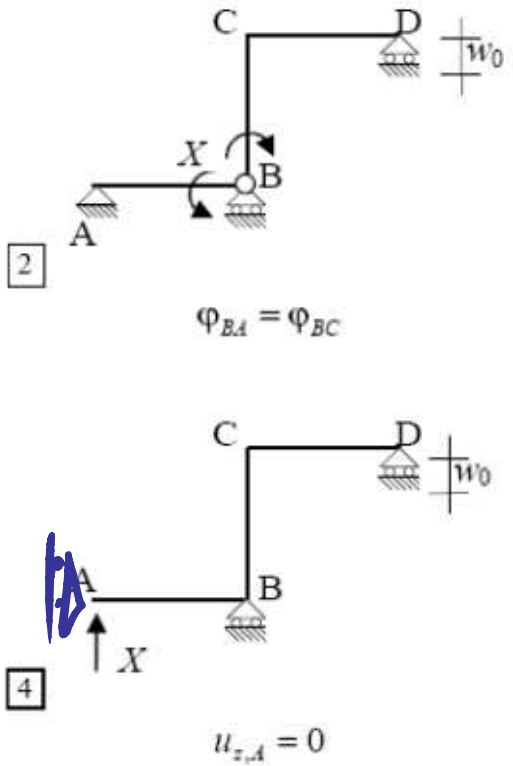

F
F/2
F/2
8
comp
1


7/16
7/16
1/2
7/16
7/16
1/2


8/5 F
1/5 F


C
D
w_0
B
A
L
x
u_x
φ
z
u_z


C
D
w_0
B
A
X
1
$u_{z,BA} = u_{z,BC}$
$u_{z,B} = 0$
C
D
w_0
X
B
A
3
$u_{z,D} = w_0$


C
D
w_0
X
B
A
2
$\varphi_{BA} = \varphi_{BC}$
C
D
w_0
A
B
X
4
$u_{z,A} = 0$

INSTABILITA'

$$N_{b.Rd} = \chi A \frac{f_y}{\gamma_{M1}}$$

$$\chi = \frac{\sigma_{cr}}{f_y} \qquad \frac{N_{u.q}}{N_y}$$

nel met. d. delle T.A.

$$\omega = \frac{1}{\chi} = \frac{f_y}{\sigma_q} = \frac{\sigma_s \cdot s}{\sigma_q}$$

SLU $N_{Ed} \leq N_{b.Rd} = \chi A \frac{f_y}{\gamma_{M1}}$

T.A. $\sigma = \frac{N}{A} \leq \frac{\sigma_{cr}}{S} \frac{f_y}{f_y} = \sigma$

$\frac{f_y}{\sigma_{cr}} \frac{N}{A} \leq \sigma$

ω

$\omega \frac{N}{A} \leq \sigma$

VERIFICA curva C $\alpha = 0.49$

HEB 240 $\bar{\lambda} = 1.52$

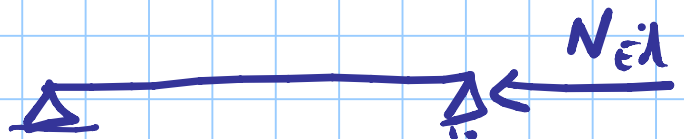
$$\phi = \frac{1}{2}\left[1 + \alpha(\bar{\lambda} - 0.2) + \bar{\lambda}^2\right]$$

$$\phi = \frac{1}{2}\left[1 + 0.49(1.52 - 0.2) + 1.52^2\right] = 1.979$$

$$\chi = \frac{1}{\phi + \sqrt{\phi^2 - \bar{\lambda}^2}} = \frac{1}{1.979 + \sqrt{1.979^2 - 1.52^2}} = 0.308$$

$$N_{b,Rd} = 0.308 \times 106 \times 10^2 \times \frac{275}{1.05} \times 10^{-3} = 855\ kN$$

PROGETTO



S 275

← 2500 mm →

1) ipotizzo χ prov. $\chi = 0.25$

2) $N_{Ed} \leq N_{b,Rd} = \chi A \frac{f_y}{\gamma_{M1}}$ $\qquad A \geq \frac{N_{Ed}\,\gamma_{M1}}{\chi f_y}$

$$A \geq \frac{100 \times 10^3 \times 1.05}{0.25 \times 275} = 15.27 \times 10^2 \text{ mm}^2$$

potrei usare HE 100A

$A = 21.2 \times 10^2 \text{ mm}^2$

$i_{min} = 25.1 \text{ mm}$

3) calcolo $N_{b,Rd}$

$$\lambda = \frac{l_0}{i_{min}} = \frac{2500}{25.1} = 99.6$$

$$\bar{\lambda} = \frac{99.6}{86.8} = 1.147 \qquad \text{curva c}$$

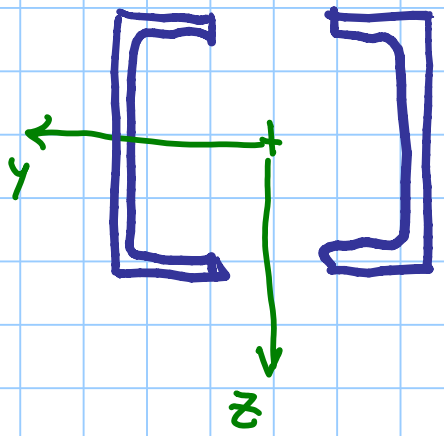
Trovo $\chi = 0.46$

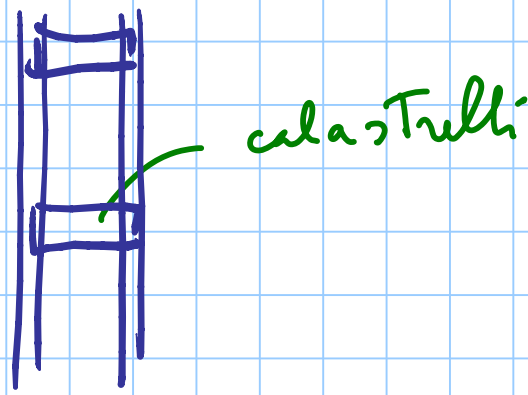
$$N_{b,Rd} = 0.46 \times 21.2 \times 10^2 \times \frac{275}{1.05} \times 10^{-3} = 255 \text{ kN}$$

$$N_{Ed} < N_{b,Rd} \qquad \text{OK}$$

ALTRA POSSIBILITÀ

Tens. schem. e carichi

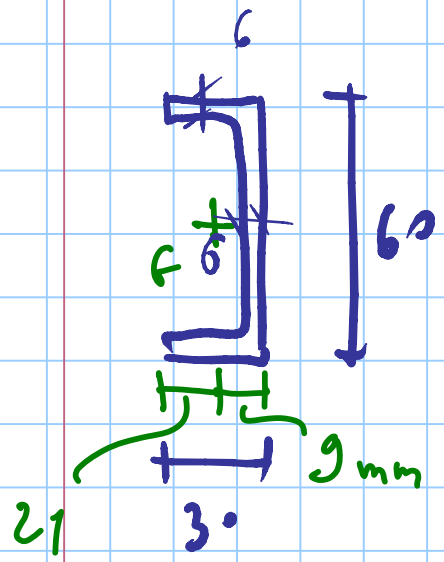




1) prov. $\chi = 0.35$

2) $A \geq \dfrac{100 \times 10^3 \times 1.05}{0.35 \times 275} = 10.91 \times 10^2 \ mm^2$

prova U 60×30

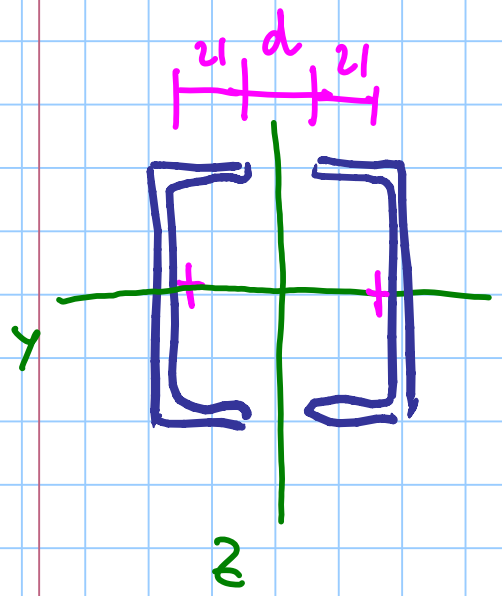


$A = 6.46 \times 10^2 \ mm^2$

$i_y = 22.1 \ mm$

$I_z =$

$i_z = 8.4 \ mm$



$A = 2 \times 6.46 \times 10^2 = 12.92 \times 10^2 \ mm^2$

$i_y = 22.1 \ mm$ come per 1 profilo

coppia

$$i_z = \sqrt{\frac{\Sigma}{A}} = \sqrt{\frac{2 \times \left[A_1 \cdot i_{z,1}^2 + A_1 \left(21 + \frac{d}{2} \right)^2 \right]}{2 \times A_1}} =$$

$$= \sqrt{i_{z,1}^2 + \left(21 + \frac{d}{2} \right)^2}$$

poiché $i_z = i_y \, (22.1 \text{ mm})$

$$22.1 = \sqrt{8.4^2 + \left(21 + \frac{d}{2} \right)^2}$$

$$22.1^2 = 8.4^2 + \left(21 + \frac{d}{2} \right)^2$$

$$488.41 - 70.56 = \left(21 + \frac{d}{2}\right)^2$$

417.85

$$21 + \frac{d}{2} = \sqrt{417.85} = 20.44$$

$$\frac{d}{2} = 20.44 - 21 < 0$$

$i_z > i_y$ sempre

curva c per Tab:]

$$i_{min} = 22.1 \text{ mm}$$

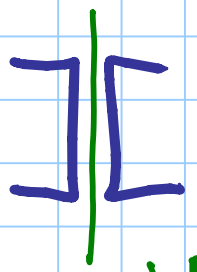
$$\lambda = \frac{2500}{22.1} = 113.1$$

$$\bar{\lambda} = \frac{113.1}{86.8} = 1.30$$

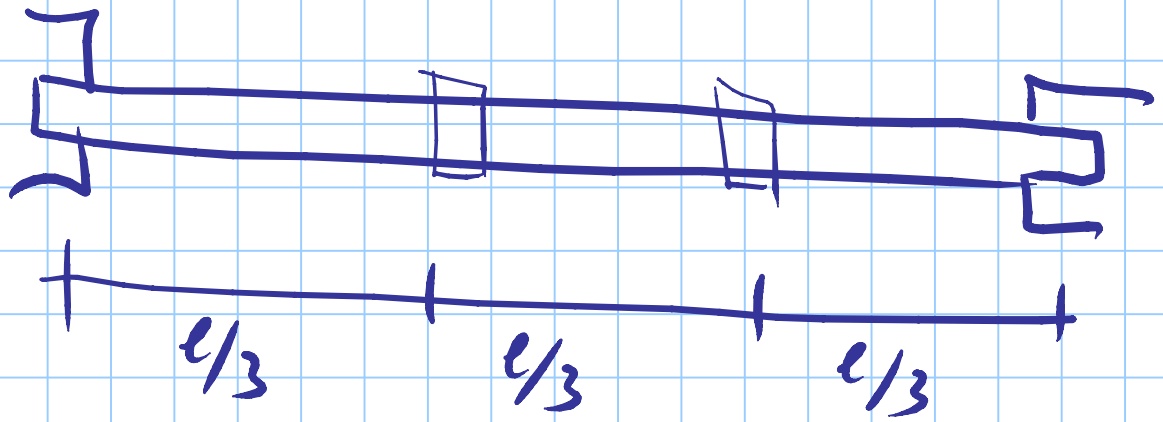
$$\chi = 0.38$$

$$N_{b,Rd} = 0.38 \times 12.92 \times 10^2 \times \frac{275}{1.05} \times 10^{-3} = 128.6 \text{ kN}$$

nel capannone



asse composto



la coppia ha $l_0 = l \Rightarrow \lambda_{coppia}$

il singolo profilo ha $l_0 = \frac{l}{3} \Rightarrow \lambda_{1\,prof.}$

coppia con $\lambda_{eq} = \sqrt{\lambda_{coppia}^2 + \lambda_{1\,prof.}^2}$