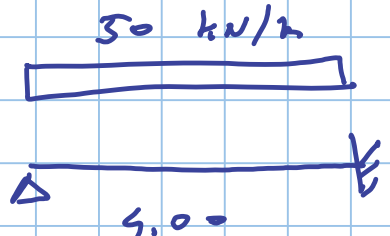
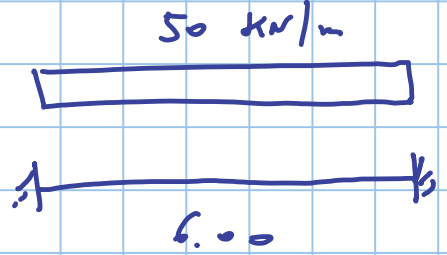
Titolo nota 17/01/2018

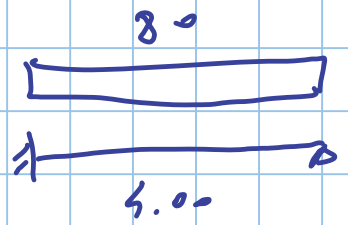
1 50 50 80 kN/m

sezioni uguali

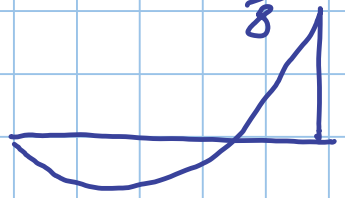
2 4.00 6.00 4.00

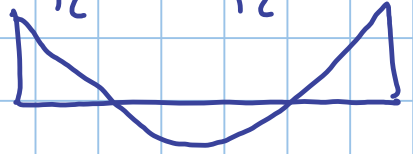


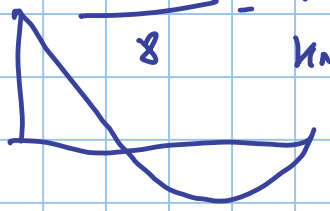




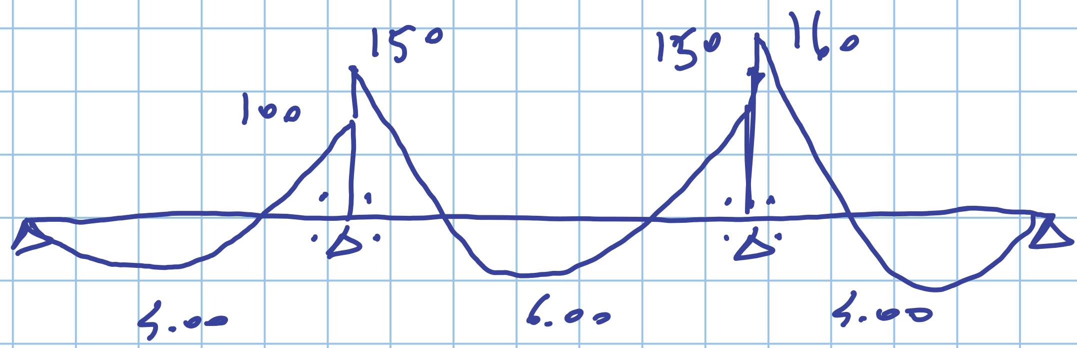
$\frac{ql^2}{8} = \frac{50 \times 4.00^2}{8} = 100$ kNm $\frac{ql^2}{12} = \frac{50 \times 6.00^2}{12} = 150$ kNm $\frac{80 \times 4^2}{8} = 160$ kNm

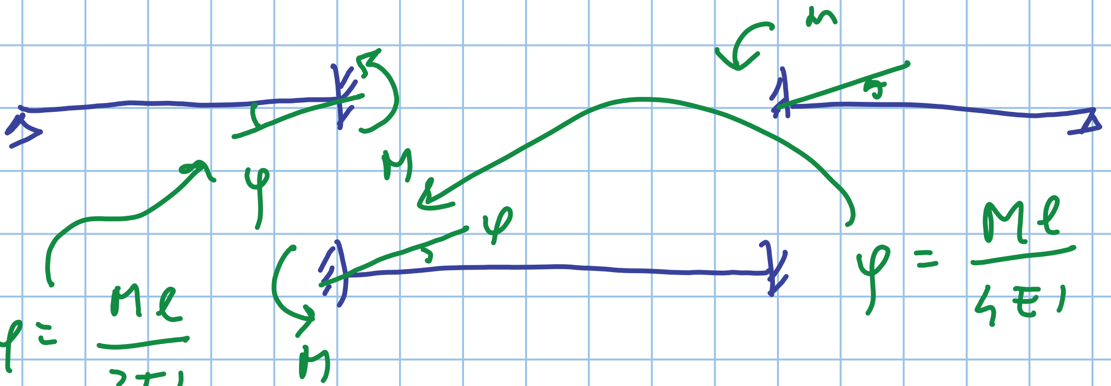






EI uguale per tutte le campate





$$\varphi = \frac{M\ell}{3EI}$$

$$\varphi = \frac{M\ell}{4EI}$$

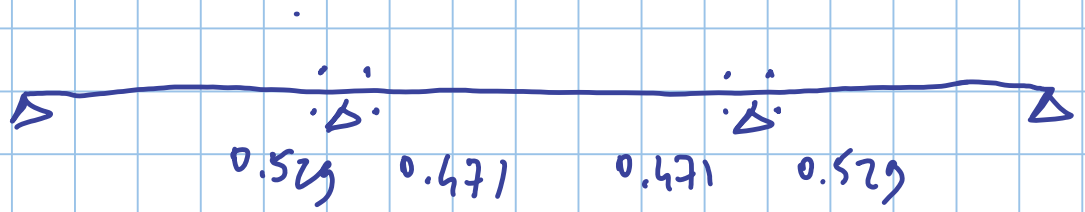
$$M = \underbrace{\frac{3EI}{\ell}}_{\rho}\varphi \qquad \rho = \frac{3EI}{4.00} = 0.75\,EI$$

$$M = \frac{4EI}{\ell}\varphi$$

$$\rho = \frac{4EI}{6.00} = 0.667\,EI$$

$$M = \frac{3EI}{\ell}\varphi$$

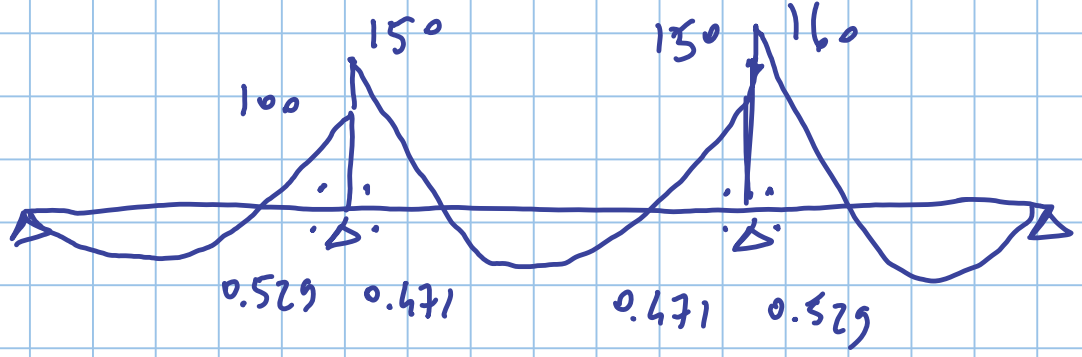
$$\rho = \frac{3EI}{4.00} = 0.75\,EI$$

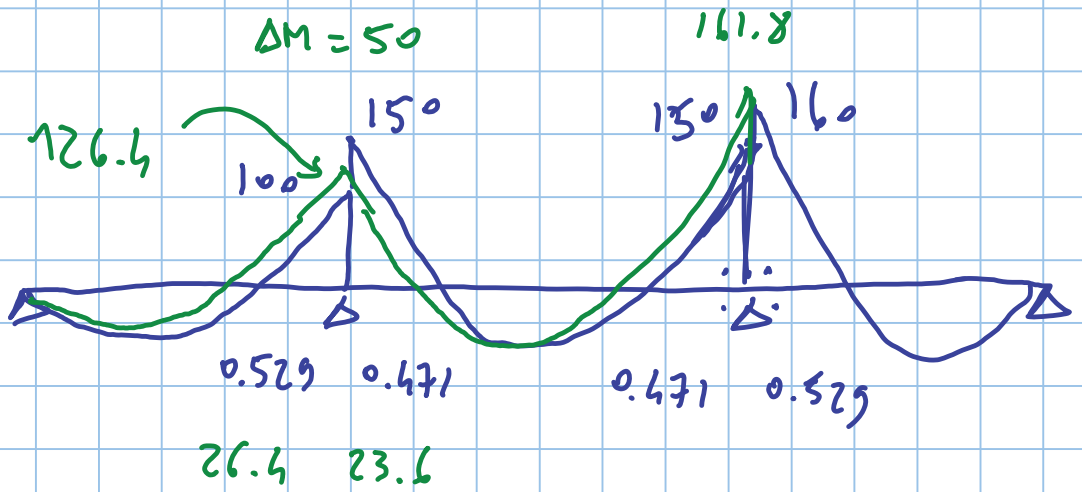


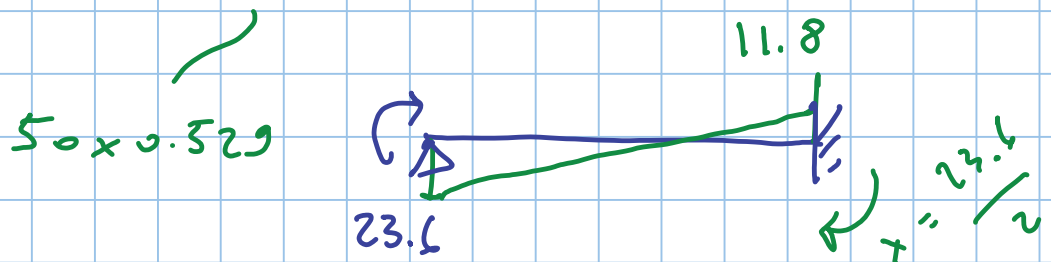
0.75 E1 0.67 E1

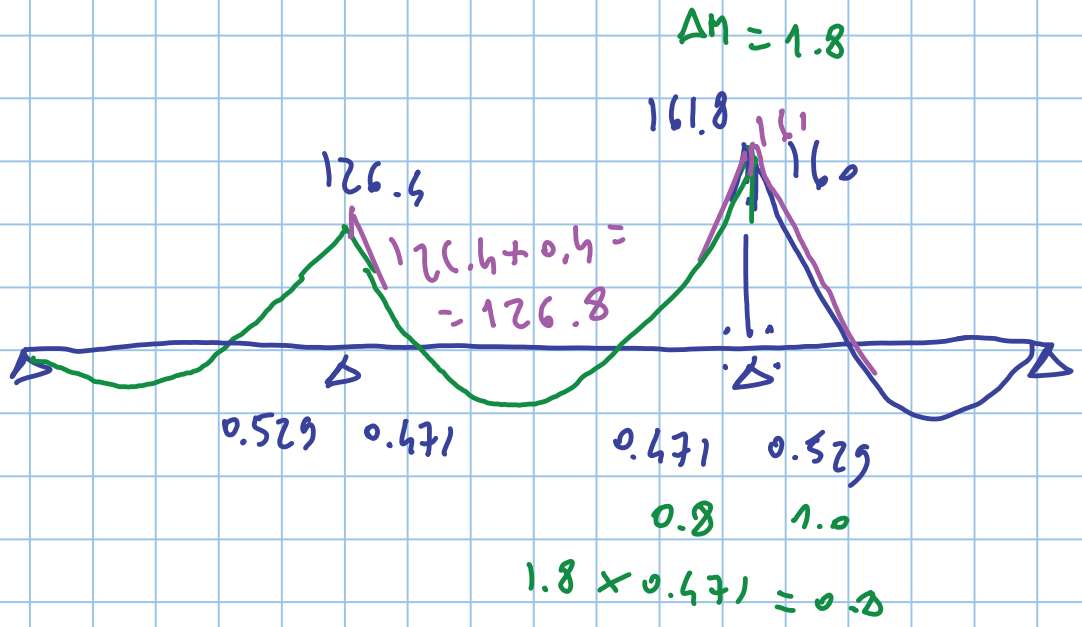
$0.75 + 0.67 = 1.417$

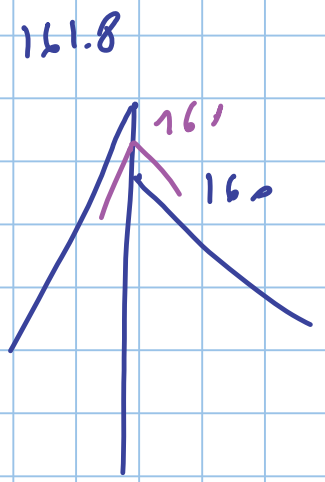
$\frac{0.75}{1.417} = 0.529 \quad 0.471$

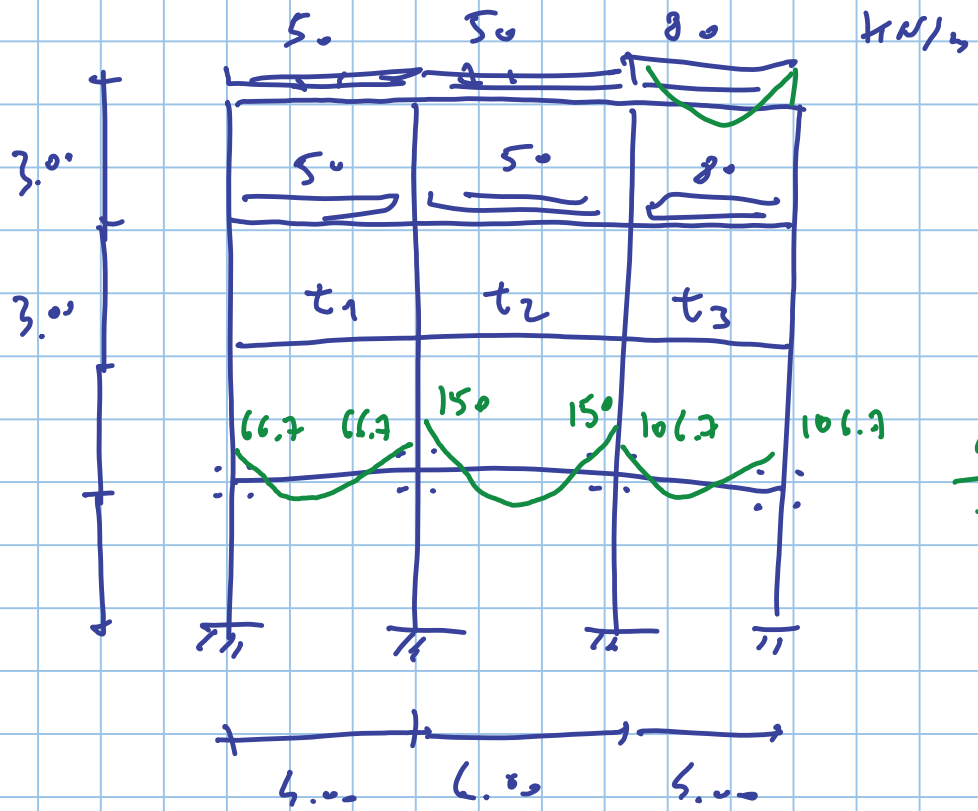

150
100
150
160
0.529
0.471
0.471
0.529


ΔM = 50
161.8
126.4
150
100
150
160
0.529
0.471
0.471
0.529
26.4
23.6


50 x 0.529
11.8
23.6
x = 24.4/2


Δm = 1.8
161.8
161
160
126.4
126.4+0.4=
=126.8
0.529
0.471
0.471
0.529
0.8
1.0
1.8 × 0.471 = 0.8


161.8
161
160



$\frac{q l^2}{12}$ sempre

$$\rho_p = \frac{4 E I_p}{l} = \frac{4 E \, 0.3 \, I_t}{3.00} = 0.4 \, E I_t$$

Spostamenti: orizzontali nulli

travi 30×60 $\quad I = 540\,000 \text{ cm}^4$

pilastri 30×40 $\quad I = 160\,000 \text{ cm}^4$

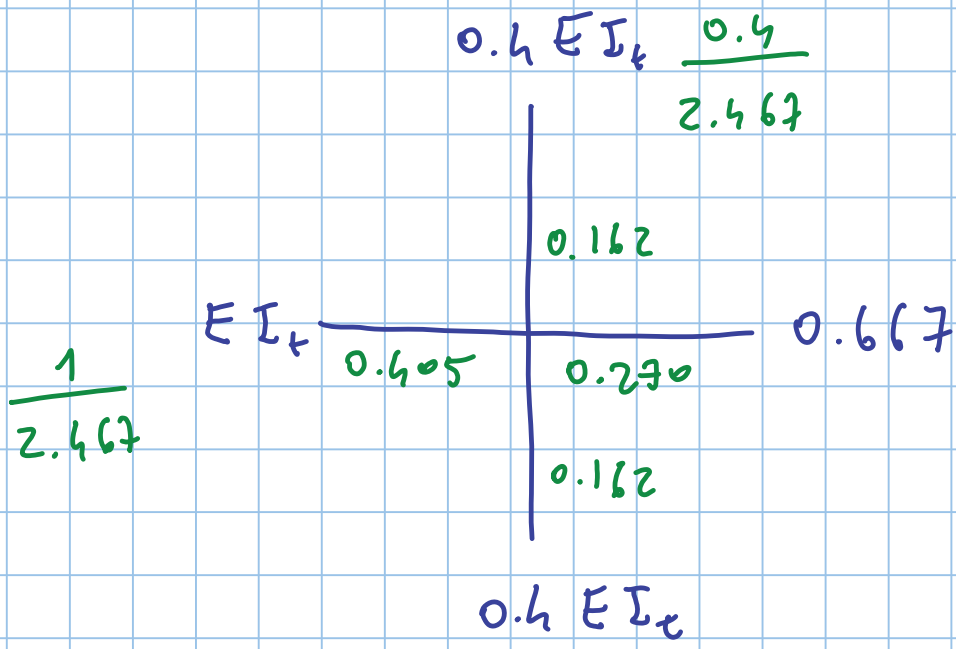
$$\frac{540}{160} = 3.375 \qquad I_t = 3.375 \, I_p$$

$$I_p = 1/3.375 = 0.296 \, I_t \simeq 0.3 \, I_t$$

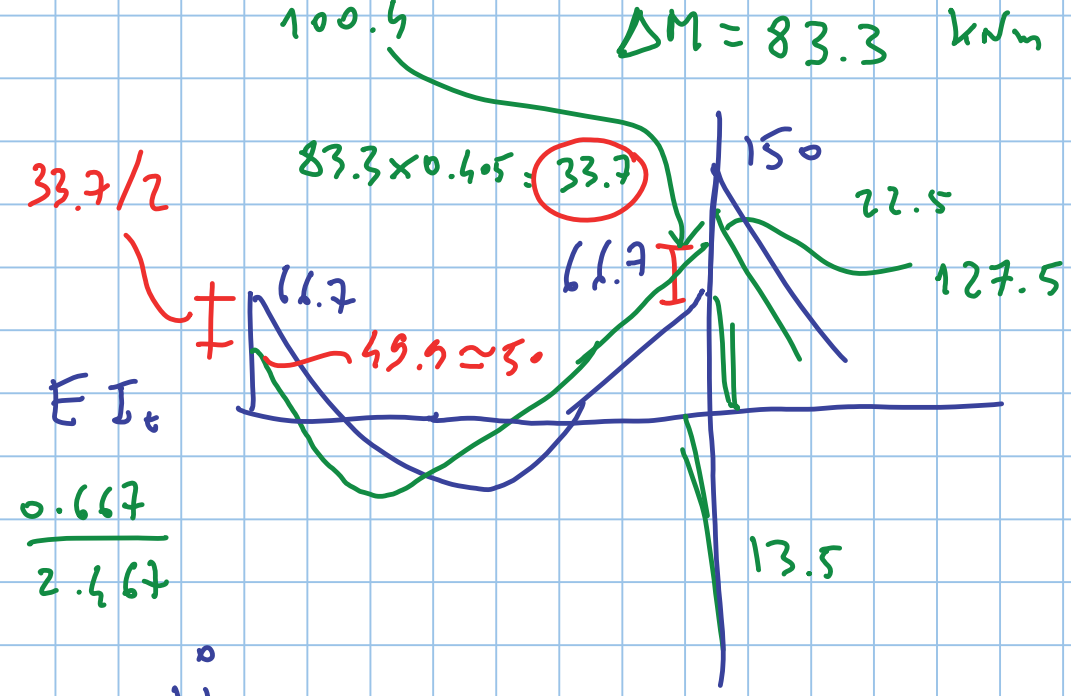
$$\rho_{t1} = \frac{4 E I}{l} = \frac{4 E I_t}{4.00} = E I_t$$

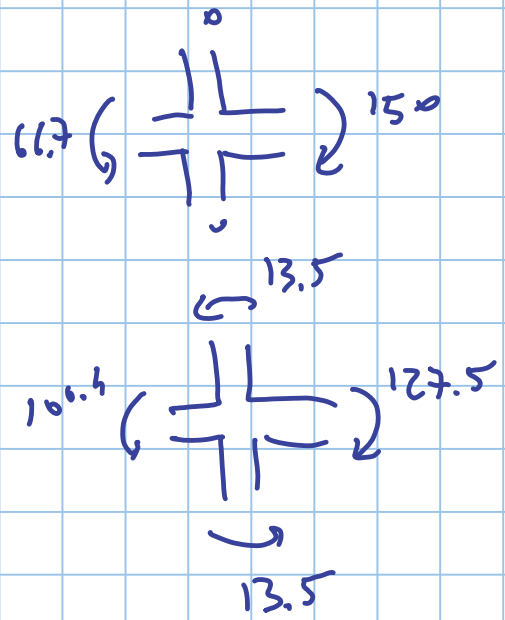
$$\rho_{t2} = \frac{4 E I_t}{6.00} = 0.667 \, E I_t$$

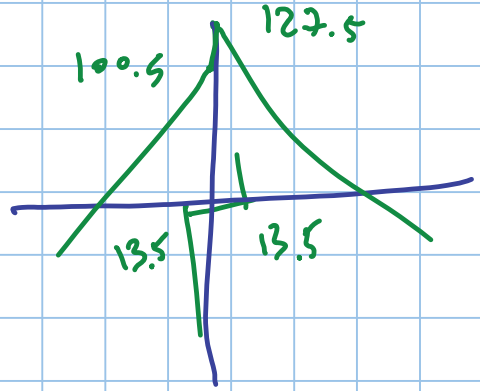
$$\rho_{t3} = \rho_{t1}$$

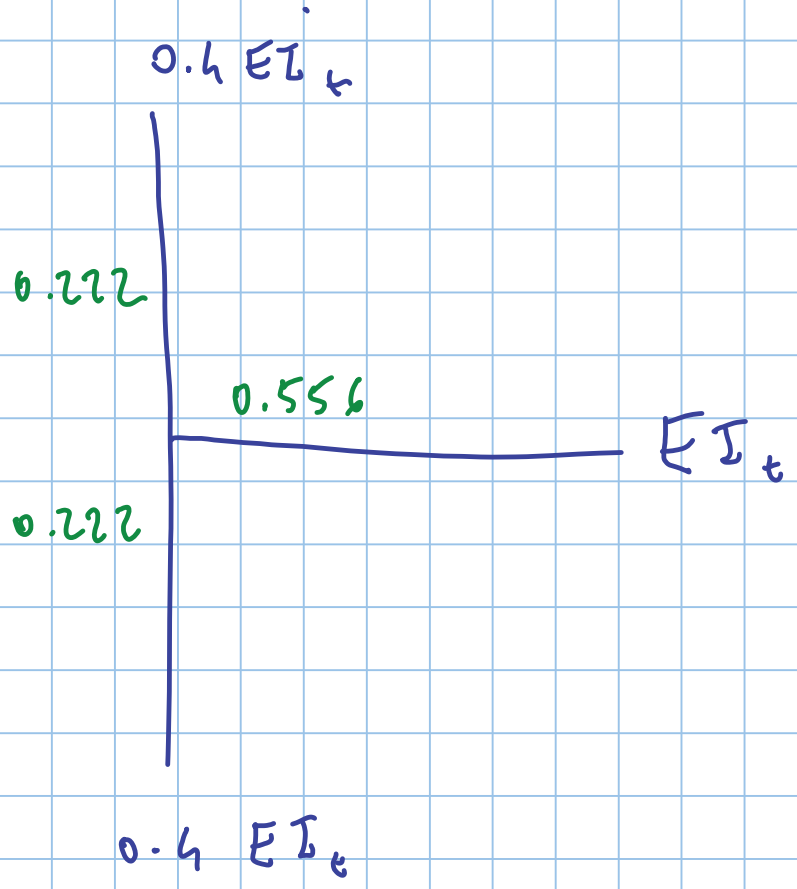


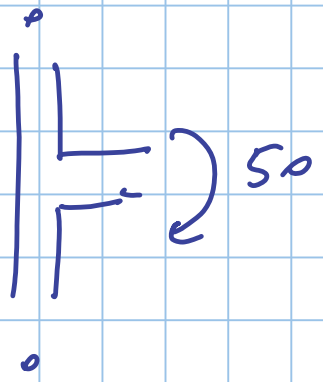
$$\Sigma \rho = \frac{(1 + 0.667 + 0.4 + 0.5)}{2.467} E I_t$$



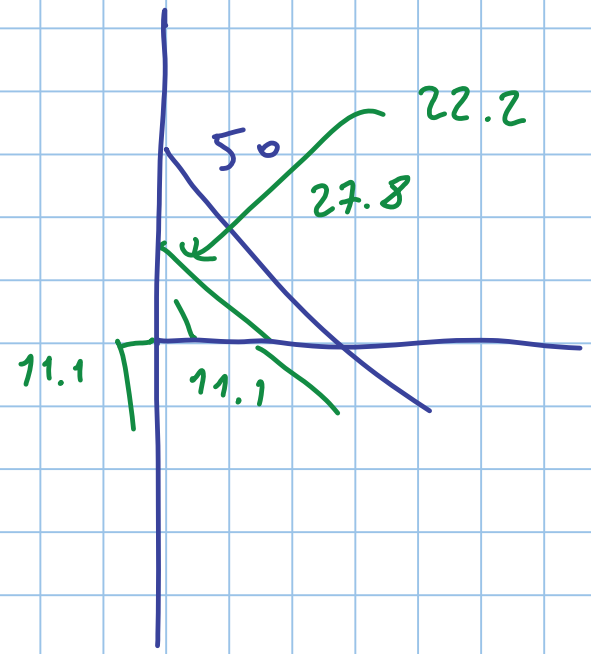


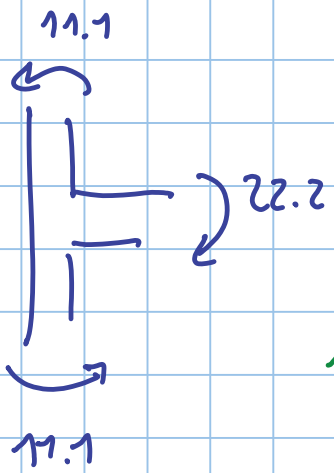


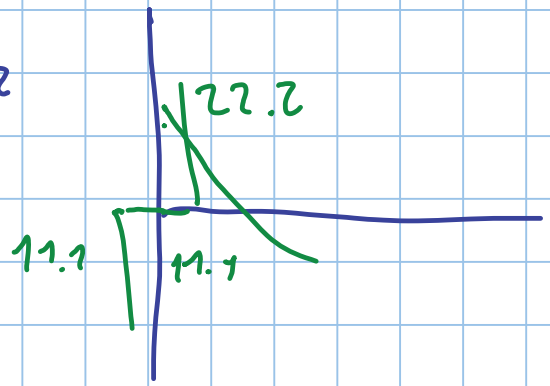

0.4 EI_t
0.222
0.556
EI_t
0.222
0.4 EI_t

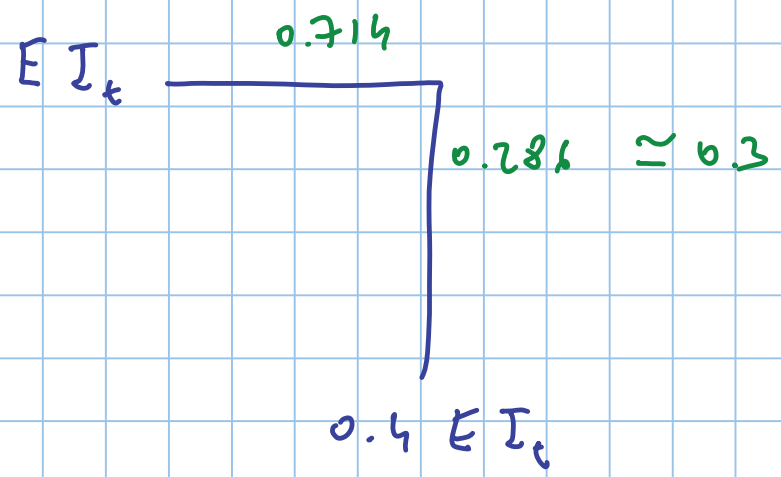

50

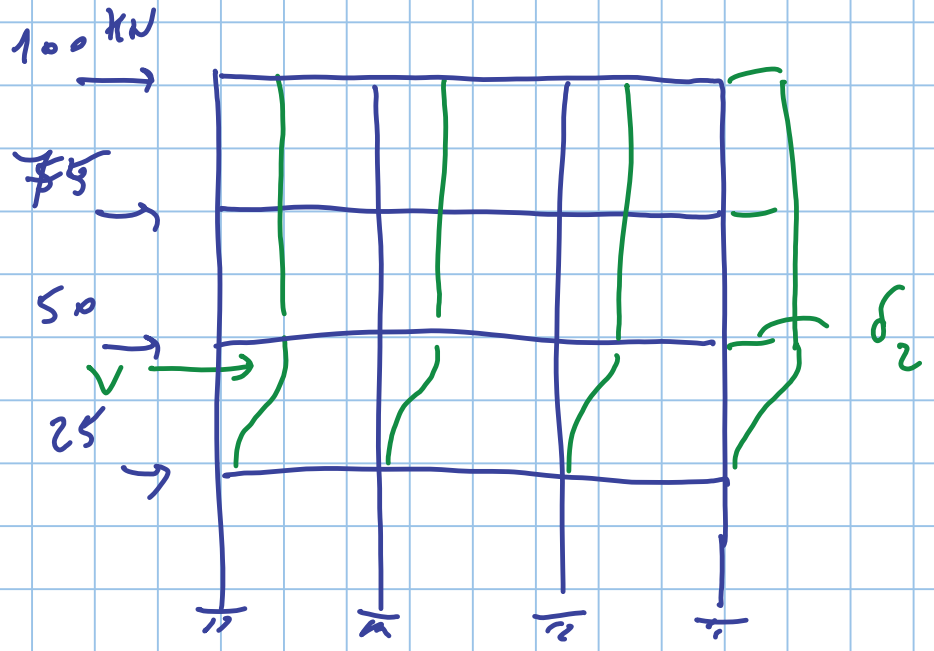
ΔM = 50 kNm


22.2
50
27.8
11.1
11.1


11.1
22.2
11.1


22.2
11.1
11.1


EI_t
0.714
0.286 ≃ 0.3
$0.4\ EI_t$



$$K = \frac{V}{\delta_2}$$ rigidezza di piano

travi 30×60

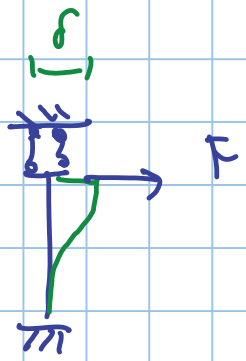
pilastri 30×40

NOTA: non buona per progetto sismico.

travi rigide dei pilastri

al limite travi: molto + rigide

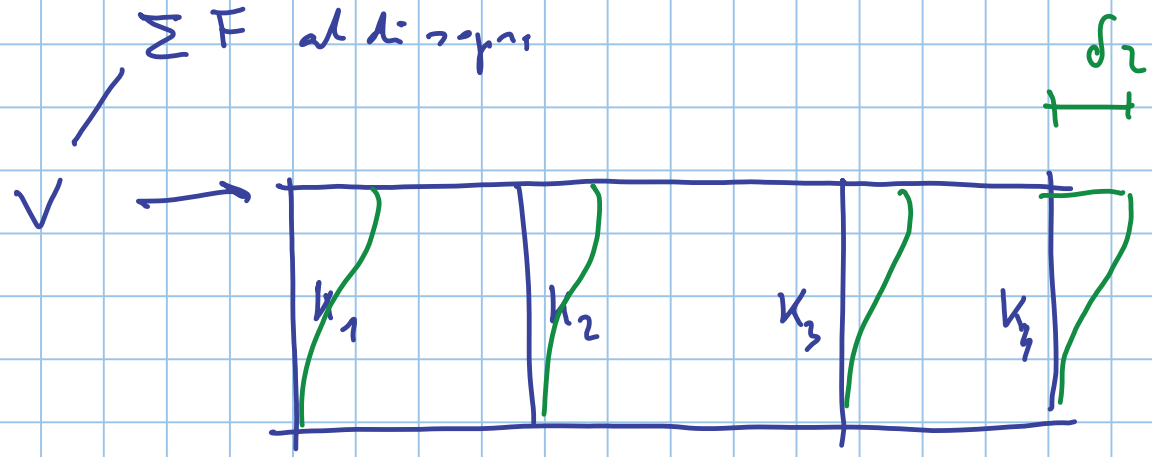
∞ + rigide SHEAR TYPE



$$\delta = \frac{F \ell^3}{12 E I} \qquad K = \frac{F}{\delta} = \frac{12 E I}{\ell^3}$$

$$F = \frac{12 E I}{\ell^3}\,\delta$$

$\frac{12 E I}{\ell^3}$ — rigidezza



piano generale

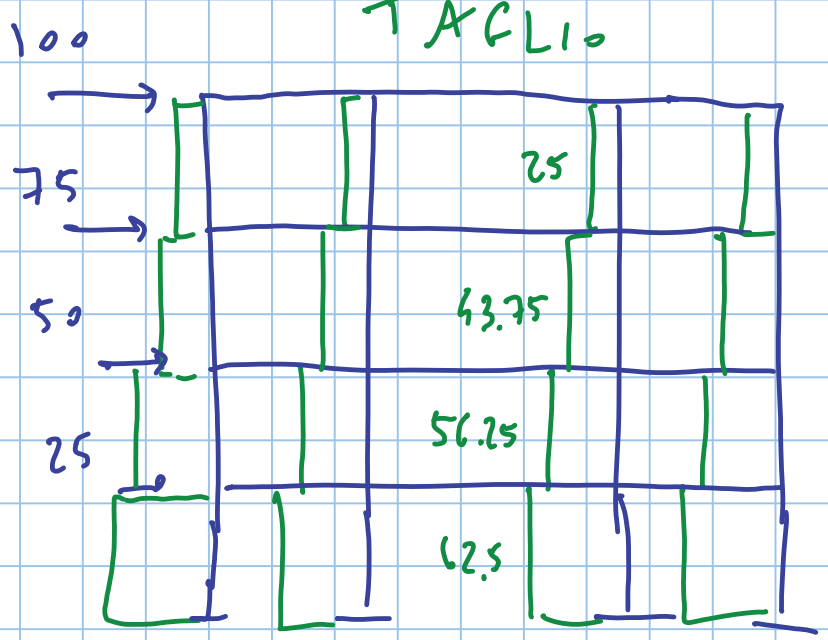
$$K_{TOT} = K_1 + K_2 + K_3 + K_4$$

$$\delta_2 = \frac{V}{K_{TOT}}$$

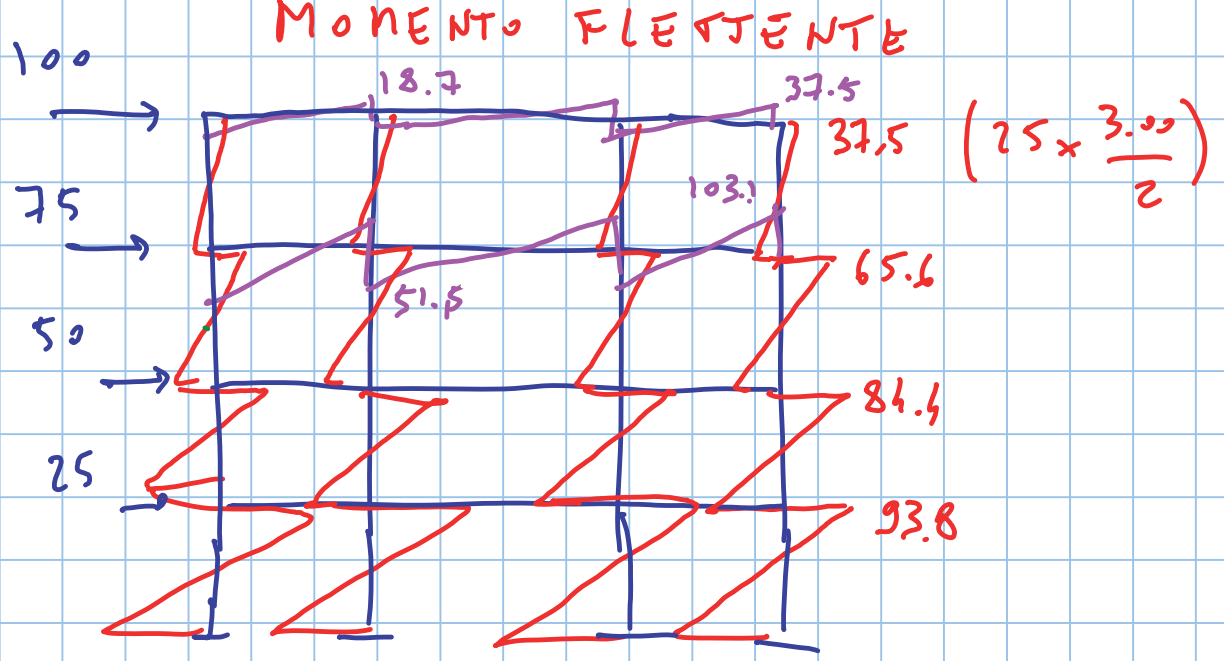
$$V_i = \delta_2 \cdot K_i$$

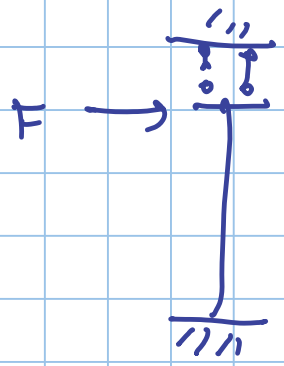
singola rigidezza

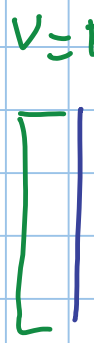
$$V_i = V \frac{K_i}{\Sigma K_i}$$

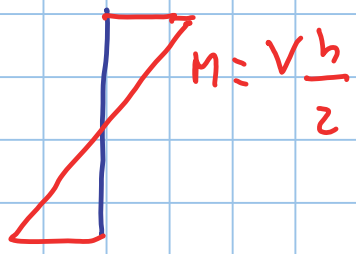


comportamento SHEAR TYPE



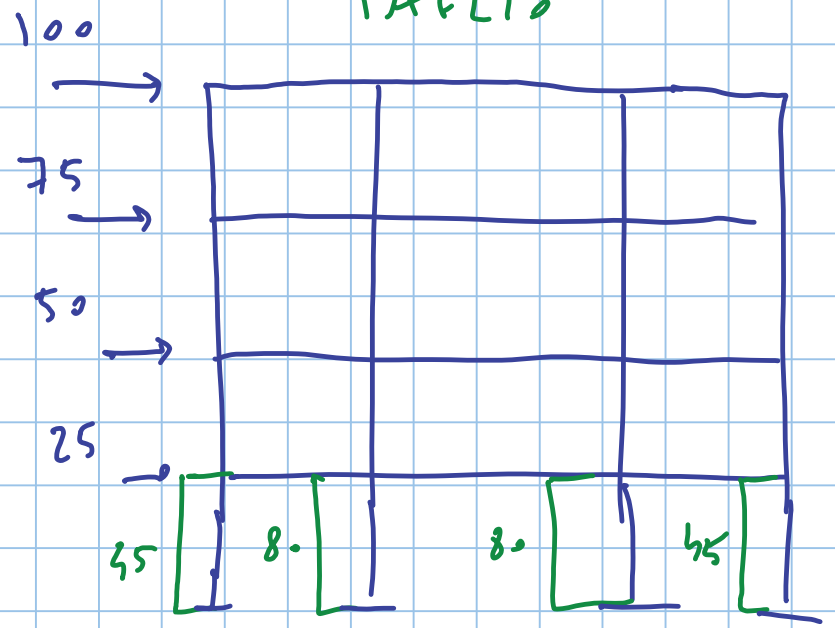






GRINTEK

TAGLIO



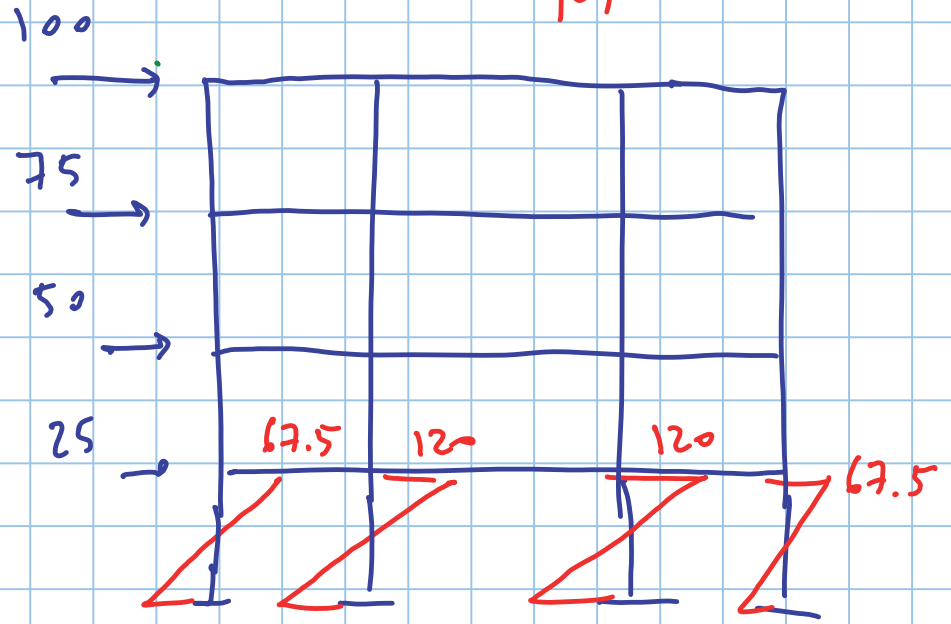
$\frac{K}{\sum K} = \frac{9}{50} =$ 0.18 0.32 0.32 0.18

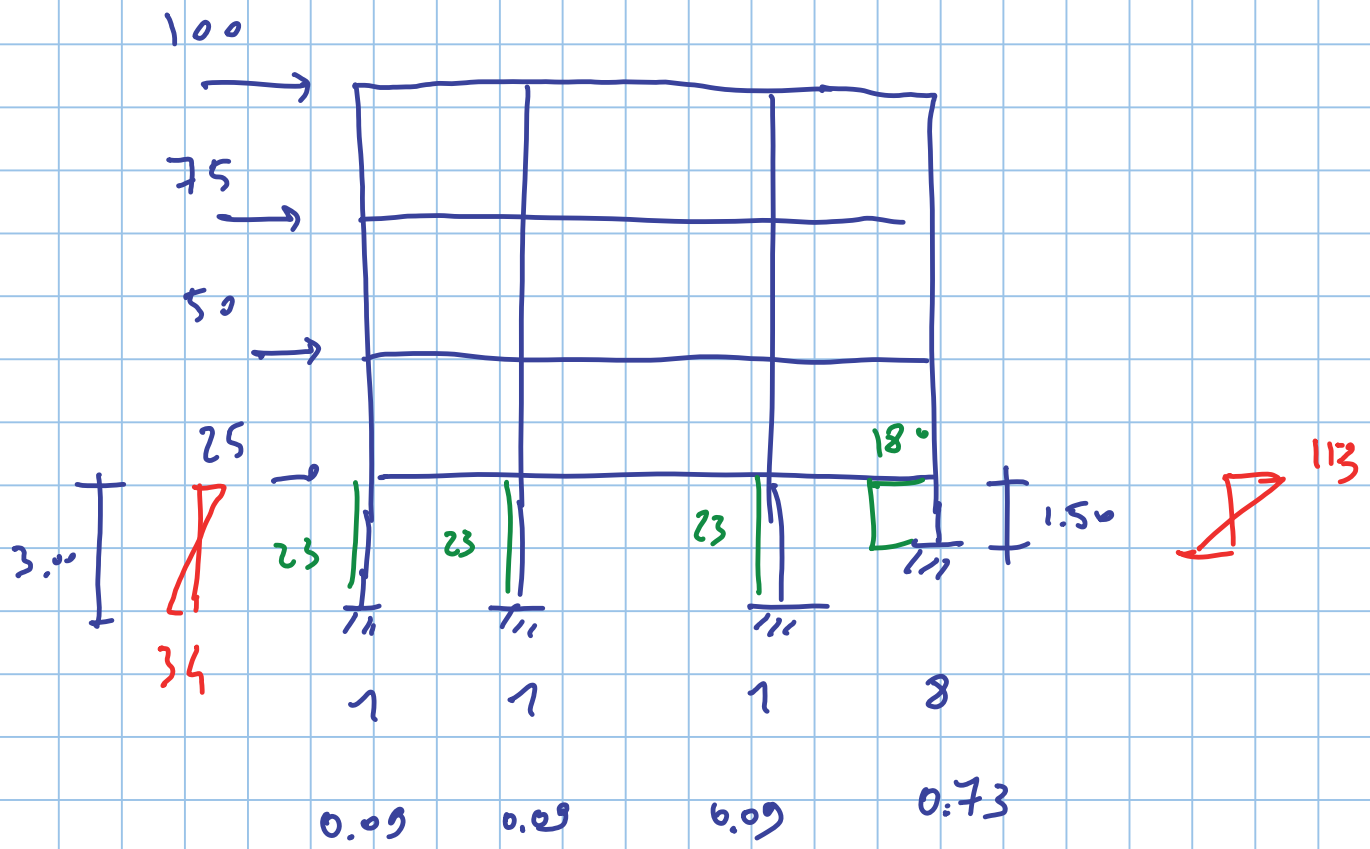
40×30 30×40

I = 90000 I = 160000

$K = \frac{12EI}{l^3} = 2.9 \quad 2.16$

M





$$K = 12 \frac{EI}{l^3}$$