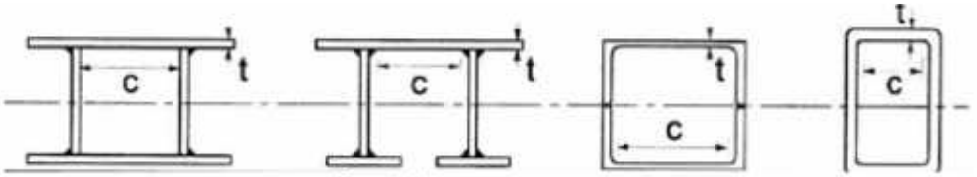
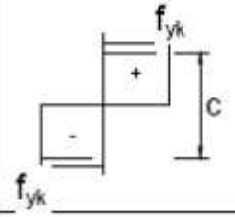
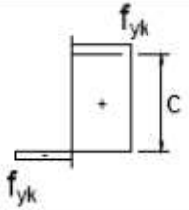
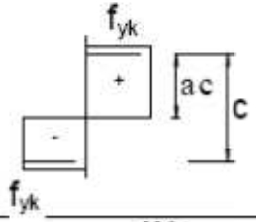
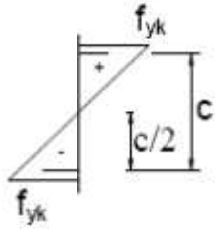
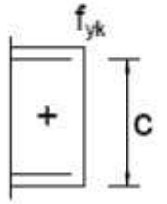
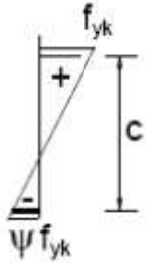
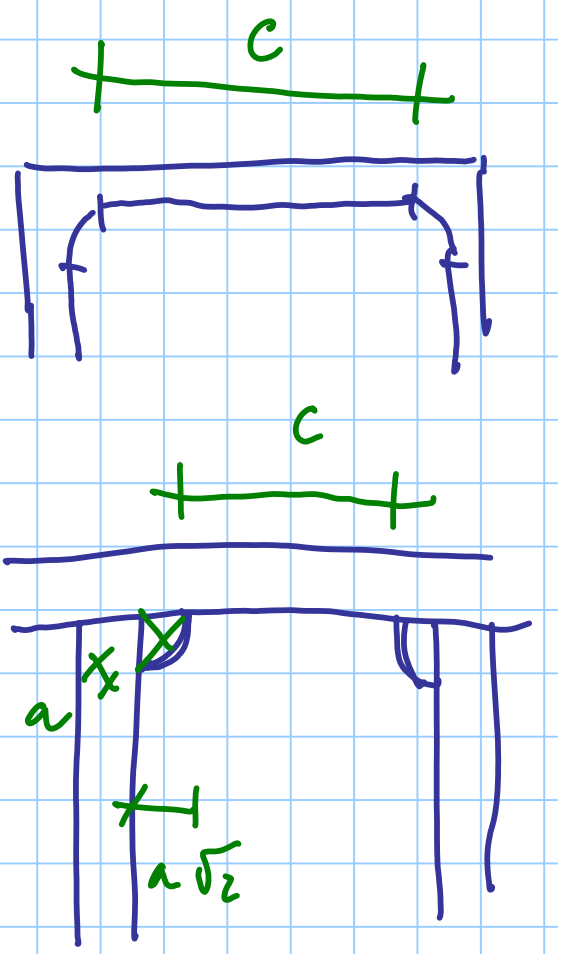


Inflessione intorno all'asse

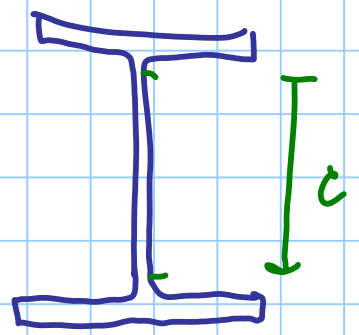
Parti interne compresse

Classe	Parte soggetta a flessione	Parte soggetta a compressione	Parte soggetta a flessione e a compressione
Distribuzione delle tensioni nelle parti (compressione positiva)			
1	$c/t \le 72\varepsilon$	$c/t \le 33\varepsilon$ 33 ε	quando $\alpha > 0{,}5 : c/t \le \frac{396\varepsilon}{13\alpha - 1}$ quando $\alpha \le 0{,}5 : c/t \le \frac{36\varepsilon}{\alpha}$
2	$c/t \le 83\varepsilon$	$c/t \le 38\varepsilon$ 38 ε	quando $\alpha > 0{,}5 : c/t \le \frac{456\varepsilon}{13\alpha - 1}$ quando $\alpha \le 0{,}5 : c/t \le \frac{41{,}5\varepsilon}{\alpha}$
Distribuzione delle tensioni nelle parti (compressione positiva)			
3	$c/t \le 124\varepsilon$	$c/t \le 42\varepsilon$ 42 ε	quando $\psi > -1 : c/t \le \frac{42\varepsilon}{0{,}67 + 0{,}33\psi}$ quando $\psi \le -1^{*} : c/t \le 62\varepsilon(1-\psi)\sqrt{(-\psi)}$

$\varepsilon = \sqrt{235/f_{yk}}$	f_{yk}	235	275	355	420	460
	ε	1,00	0,92	0,81	0,75	0,71



Esempio HE 120 A compresso



$b = 120$ mm

$h = 114$ mm

$t_f = 8$ mm

$t_w = 5$ mm

$r = 12$ mm

$$c = h - 2t_f - 2r = 74 \text{ mm}$$

$$\frac{c}{t} = \frac{74}{5} = 14{,}8$$

$$\frac{c}{t} < 33\,\varepsilon$$

CLASSE 1

profilo HE 300 A compress.

$b = 300$ mm

$h = 290$ mm

$t_f = 14$ mm

$t_w = 8.5$ mm

$r = 27$ mm

$c = 208$ mm

$\frac{c}{t} = \frac{208}{8.5} = 24.5$

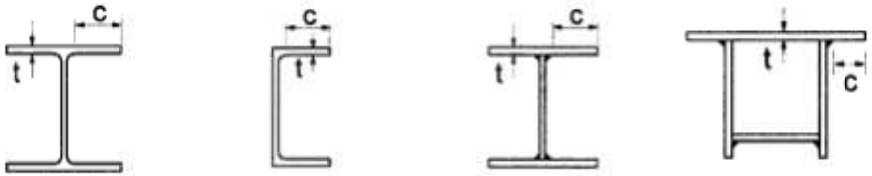
CLASSE 1

S235 S275 S355

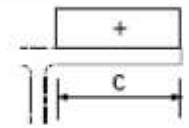
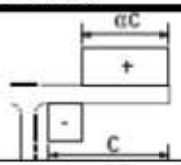
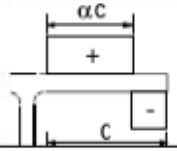
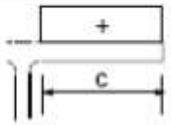
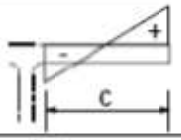
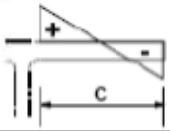
$\varepsilon = 1$ $\varepsilon = 0.91$ $\varepsilon = 0.82$

$\rightarrow 33\varepsilon = 27.1$

Piattabande esterne

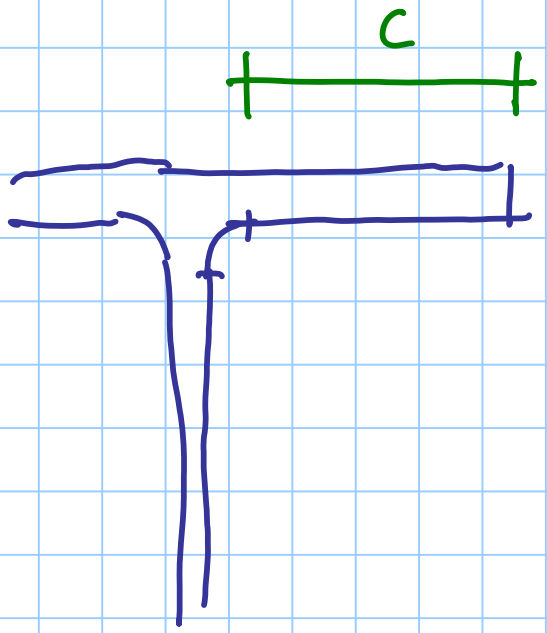


Profilati laminati a caldo — Sezioni saldate

Classe	Piattabande esterne soggette a compressione	Piattabande esterne soggette a flessione e a compressione	
		Con estremità in compressione	Con estremità in trazione
Distribuzione delle tensioni nelle parti (compressione positiva)			
1	$c/t \le 9\varepsilon$ 9 ε	$c/t \le \frac{9\varepsilon}{\alpha}$	$c/t \le \frac{9\varepsilon}{\alpha\sqrt{\alpha}}$
2	$c/t \le 10\varepsilon$ 10 ε	$c/t \le \frac{10\varepsilon}{\alpha}$	$c/t \le \frac{9\varepsilon}{\alpha\sqrt{\alpha}}$
Distribuzione delle tensioni nelle parti (compressione positiva)			
3	$c/t \le 14\varepsilon$ 14 ε	$c/t \le 21\varepsilon\sqrt{k_\sigma}$ Per k_σ vedere EN 1993-1-5	

$\varepsilon = \sqrt{235/f_{yk}}$

f_{yk}	235	275	355	420	460
ε	1,00	0,92	0,81	0,75	0,71



esempio HE 300 A compressa / inflessa

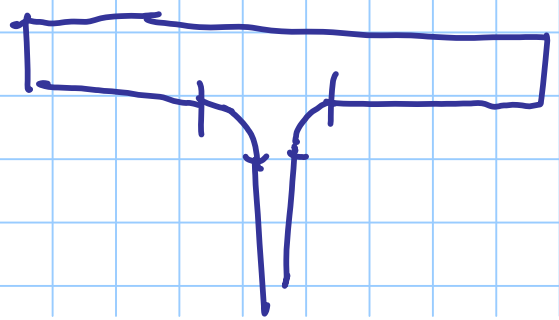
$b = 300$ mm

$h = 290$ mm

$t_f = 14$ mm

$t_w = 8.5$ mm

$r = 27$ mm



ALA

$$c = \frac{1}{2}(b - 2r - t_w) =$$

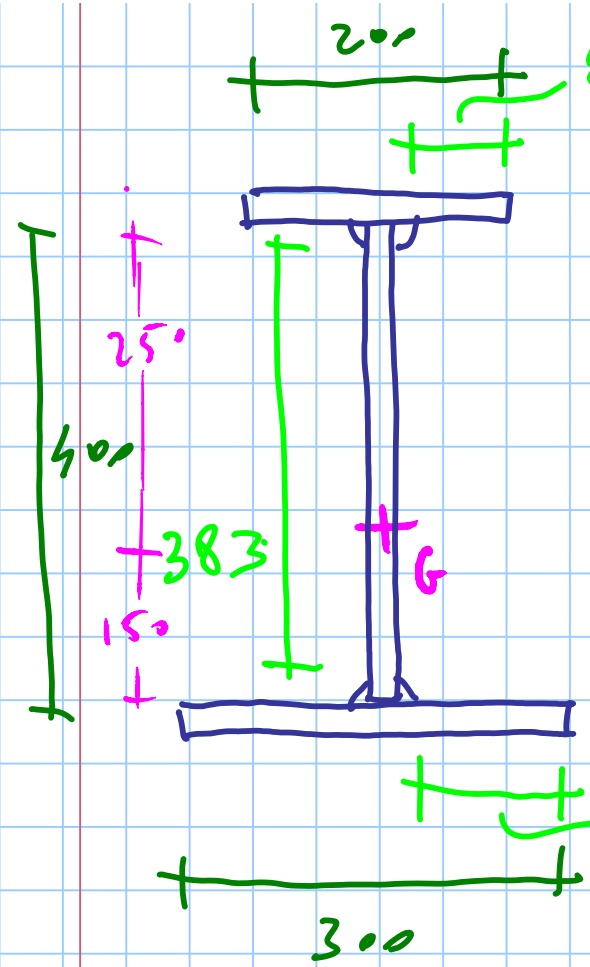
$$= \frac{237.5}{2} = 118.8$$

$$\frac{c}{t} = \frac{118.8}{14} = 8.49$$

LIMITI per d_c

classe	S 235	S 275	S 355
1	9	8.19	7.38
2	10	9,1	8.2
3	14	12.74	11,48
4			

HE 300 A d_c 1 d_c 2 d_c 3



$t = 8$ mm

$a = 6$ mm

$a\sqrt{2} = 8{,}5$ mm

S 235

N

ala sup $\frac{c}{t} = 10.9\,\varepsilon$

ala inf $\frac{c}{t} = 17.1\,\varepsilon > 1\varepsilon$

anima $\frac{c}{t} = 47.9\,\varepsilon > 42\varepsilon$

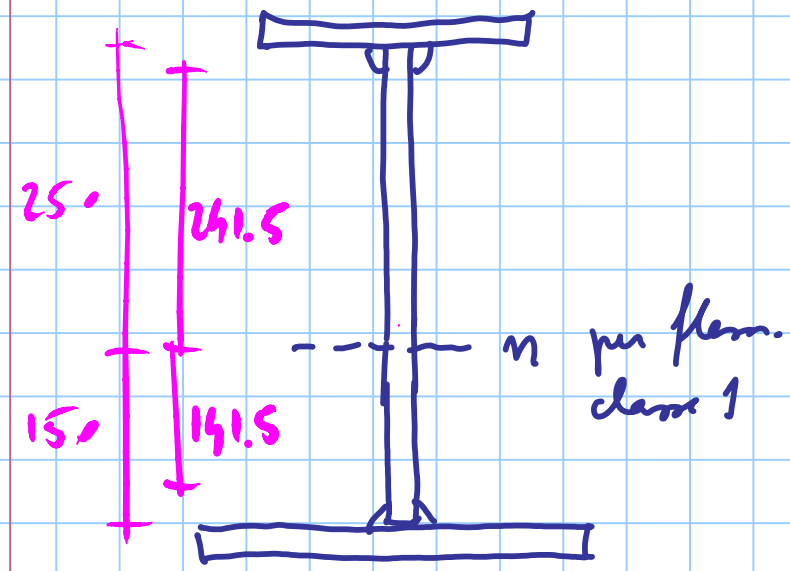
CLASSE 4

M_y positivo

ala sup. $10.9\,\varepsilon$ $10 \div 14\,\varepsilon$ cl. 3

anima classe 4

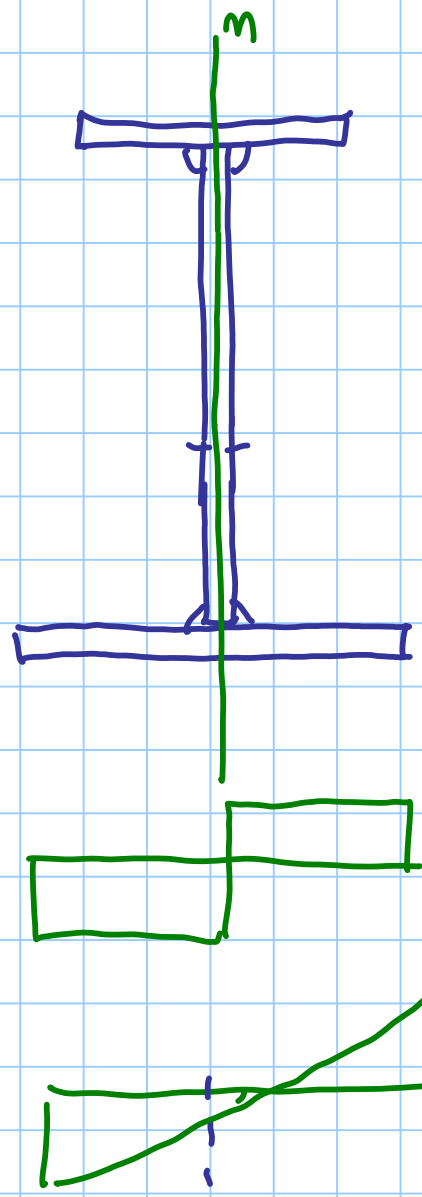
ala inf Trazione



$$\alpha = \frac{241.5}{383} = 0.63$$

$$\frac{396\varepsilon}{13\alpha - 1} = 55.1\,\varepsilon$$

anima classe 1 $47.3 < 55.1$



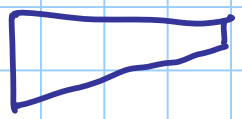
momento M_z

classe 1, 2 metà ala unif. compress.

lim: 9
10
14

classe 1,2

classe 3

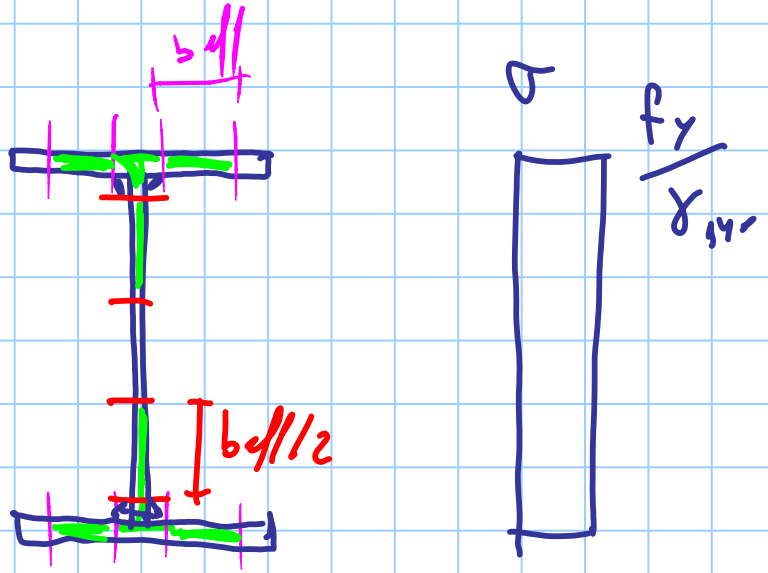


classe 3

vedere 2° colonna della Tabella (che rinvia a EC3 parte 1.5)

cosa fare se la sezione è di classe 4

SFORZO NORMALE



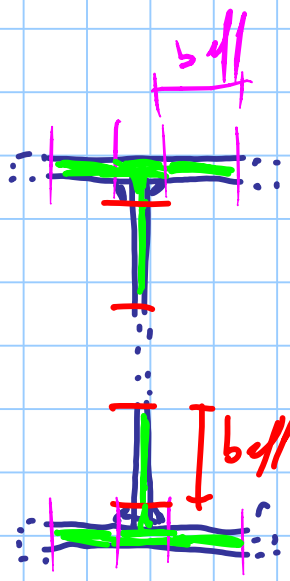
$$\bar{\lambda}_p = \frac{c/t}{28.4\,\varepsilon\sqrt{k}}$$

per ogni elemento

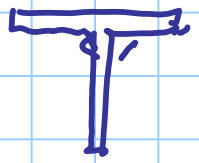
$$\frac{c}{t} \rightarrow \bar{\lambda}_p$$

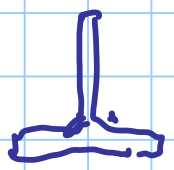
se $\bar{\lambda}_p < 0.673$ $\quad b_{eff} = b$

altrimenti calcolo $b_{eff} < b$



sezione efficace





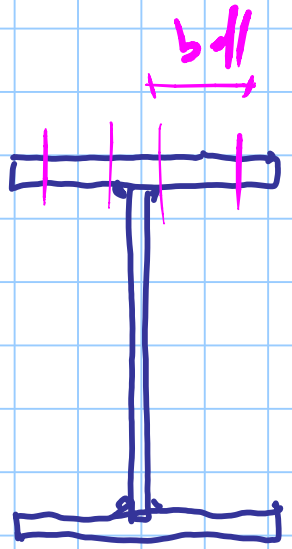
calcolo A_{eff}

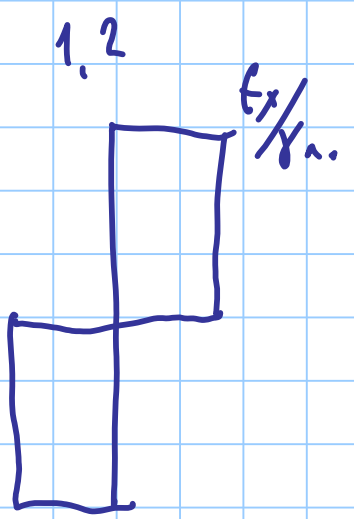
$$N_{Rd} = A_{eff} \frac{f_y}{\gamma_{M0}}$$

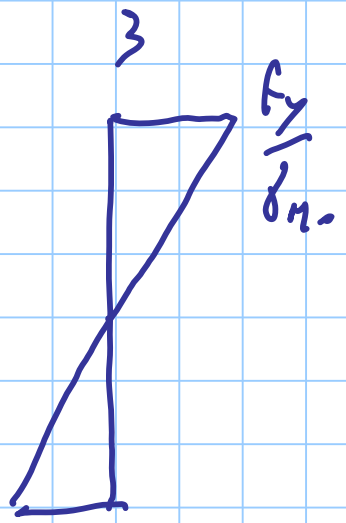
per verifiche a instabilità

i_y i_z sono calcolati con la sezione efficace

FLESSIONE M_y





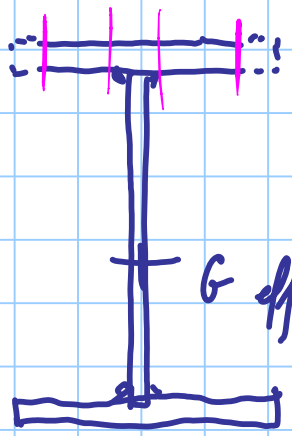


ALA compressa

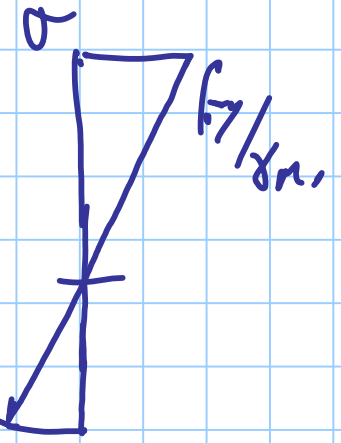
con $\sigma = cost$

$= f_y/\gamma_{M0}$

$\frac{c}{\varepsilon} \rightarrow \bar{\lambda}_p \rightarrow b_{eff}$



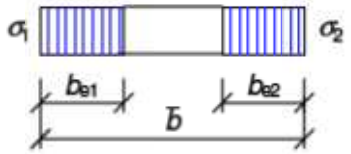
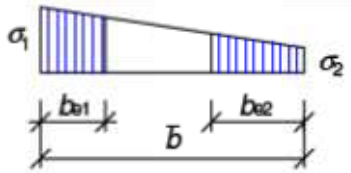
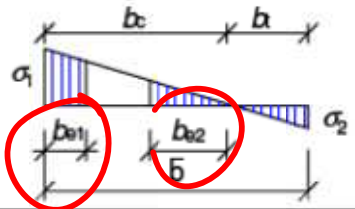
sezione efficace non più simmetrica



$M_{Rd} = W_{el,eff} \frac{f_y}{\gamma_{M0}}$

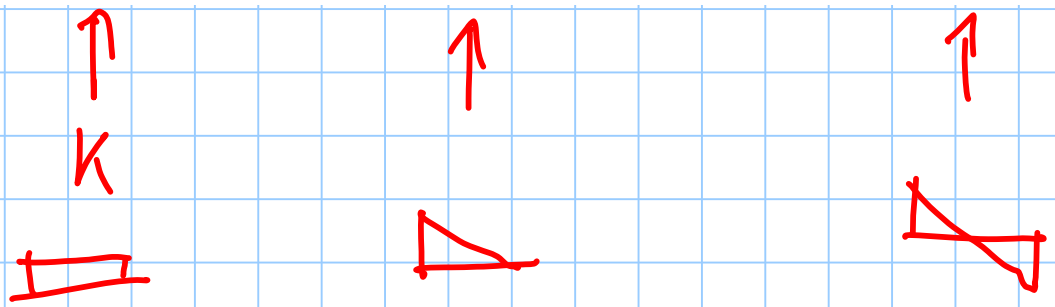
EC3 parte 1.5

Table 4.1: Internal compression elements

Stress distribution (compression positive)	Effective[p] width b_{eff}
	$\psi = 1$: $b_{eff} = \rho\ \bar{b}$ $b_{e1} = 0{,}5\ b_{eff}$ $b_{e2} = 0{,}5\ b_{eff}$
	$1 > \psi \geq 0$: $b_{eff} = \rho\ \bar{b}$ $b_{e1} = \frac{2}{5-\psi} b_{eff}$ $b_{e2} = b_{eff} - b_{e1}$
	$\psi < 0$: $b_{eff} = \rho\ b_c = \rho\ \bar{b} / (1-\psi)$ $b_{e1} = 0{,}4\ b_{eff}$ $b_{e2} = 0{,}6\ b_{eff}$

$\psi = \sigma_2/\sigma_1$	1	$1 > \psi > 0$	0	$0 > \psi > -1$	-1	$-1 > \psi > -3$
Buckling factor k_σ	4,0	$8{,}2 / (1{,}05 + \psi)$	7,81	$7{,}81 - 6{,}29\psi + 9{,}78\psi^2$	23,9	$5{,}98\ (1 - \psi)^2$

b eff,1 ≠ b eff,2



PROGETTO

Trave3-1.txt - Blocco note

File Modifica Formato Visualizza ?

```
Telgen 5.1
Trave reticolare 3
18,33,0,1,4
0,0,111,    2,0,001,    4,0,001,    6,0,001,    8,0,001,    10,0,001,    12,0,001,    14,
0,1.6,001,  2,1.9,001,  4,2.2,001,  6,2.5,001,  8,2.8,001,  10,2.5,001,  12,2.2,001,  14,
SISINT
206000,0.3
G,.001,.001,0,"corrinf",1, G,.001,.001,0,"corrsup",1, G,.001,.001,0,"diag",1, G,.00
P,1,2,1,    P,2,3,1,    P,3,4,1,    P,4,5,1,    P,5,6,1,    P,6,7,1,    P,7,8,1,    P,8,9,
P,10,11,2,  P,11,12,2,  P,12,13,2,  P,13,14,2,  P,14,15,2,  P,15,16,2,  P,16,17,2,  P,17,1
P,10,2,3,   P,11,3,3,   P,12,4,3,   P,13,5,3,   P,15,5,3,   P,16,6,3,   P,17,7,3,   P,18,8
P,1,10,4,   P,2,11,4,   P,3,12,4,   P,4,13,4,   P,5,14,4,   P,6,15,4,   P,7,16,4,   P,8,17
9,0
10,0,-0.5,0, 11,0,-1,0,   12,0,-1,0,   13,0,-1,0,   14,0,-1,0,   15,0,-1,0,   16,0,
9,0
10,0,-0.5,0, 11,0,-1,0,   12,0,-1,0,   13,0,-1,0,   14,0,-0.5,0, 15,0,0,0,    16,0,
```

Annotations: prog. – intestaz. – indicaz. gen. – nodi – materiali – sezioni – aste – 1° – 2° – cond. caric

G, 0.001, 0.001, 0, "corrinf", 1

(area, area anim., I, ← mat)

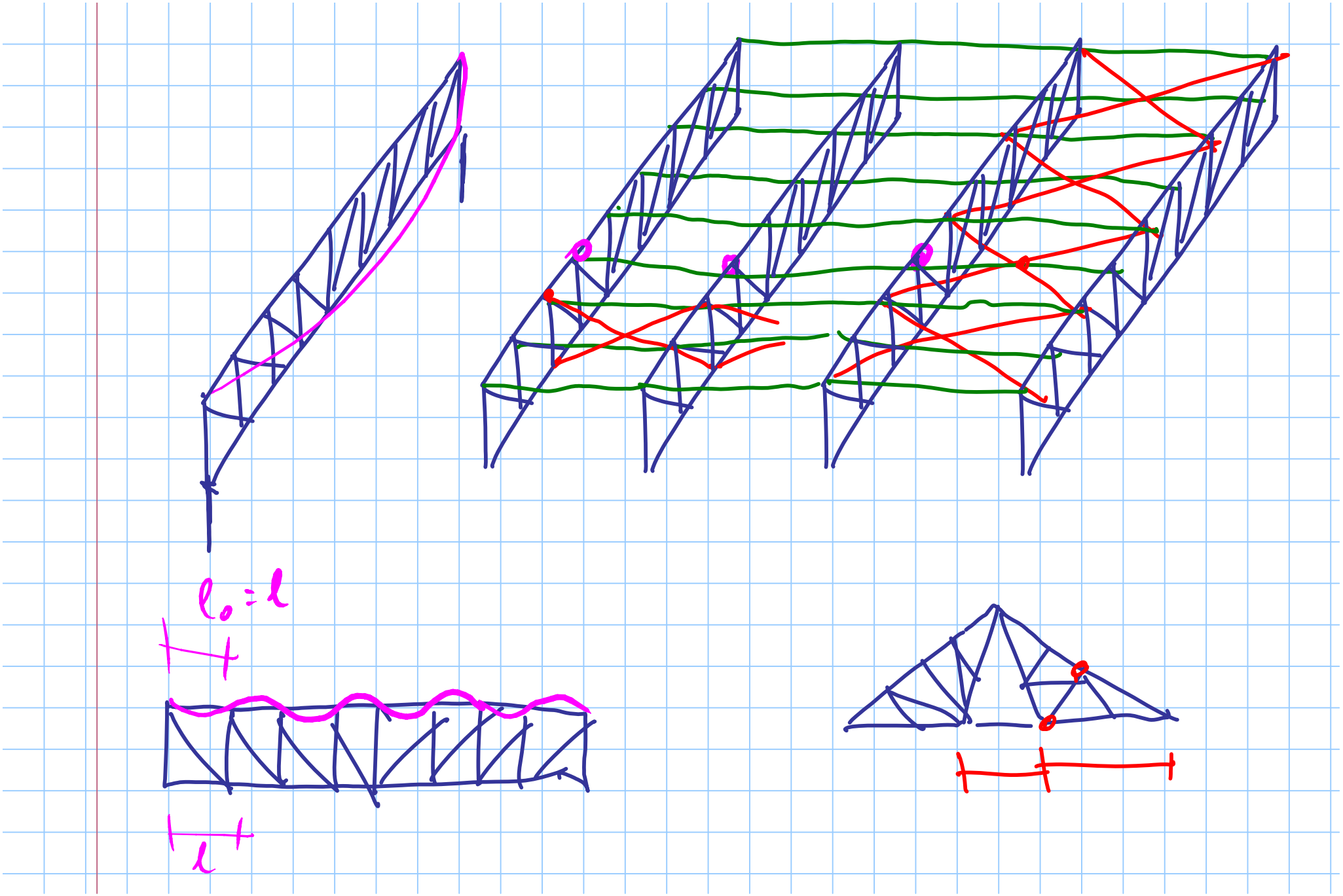
Dati iniziali

ASTE TESE

$N_{Ed} \rightarrow A \geq \frac{N_{Ed}\,\gamma_{M0}}{f_y}$

ASTE COMPRESSE

quale l_0 ?


$l_0 = l$
l

dimensionn. a compressione

$$N_{Ed} \qquad N_{b,Rd} = \chi A \frac{f_y}{\gamma_{m0}}$$

$$A \geq \frac{N_{Ed}\, \gamma_{m0}}{\chi f_y}$$

ATTENZIONE a vento ↑ ↑ ↑ ↑