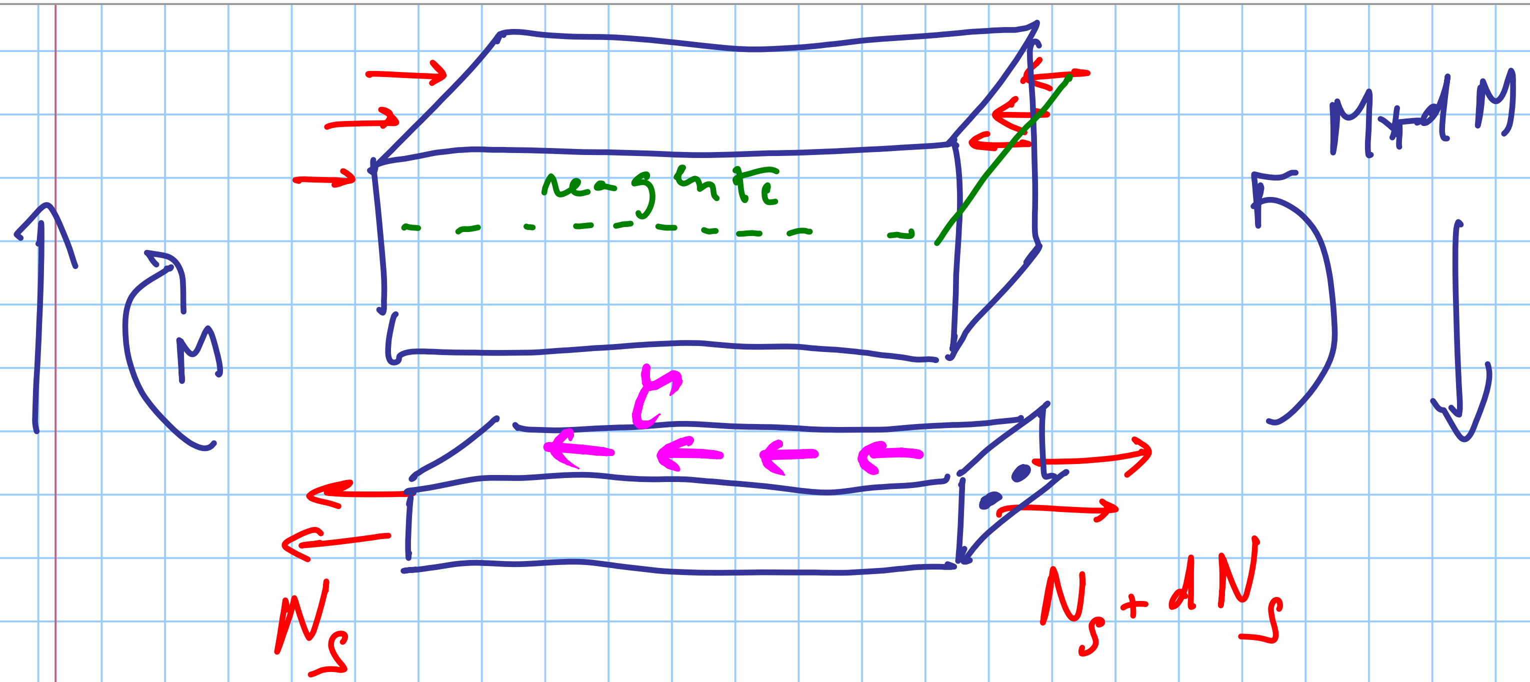
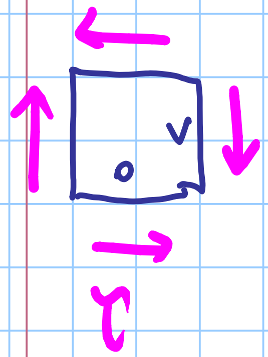
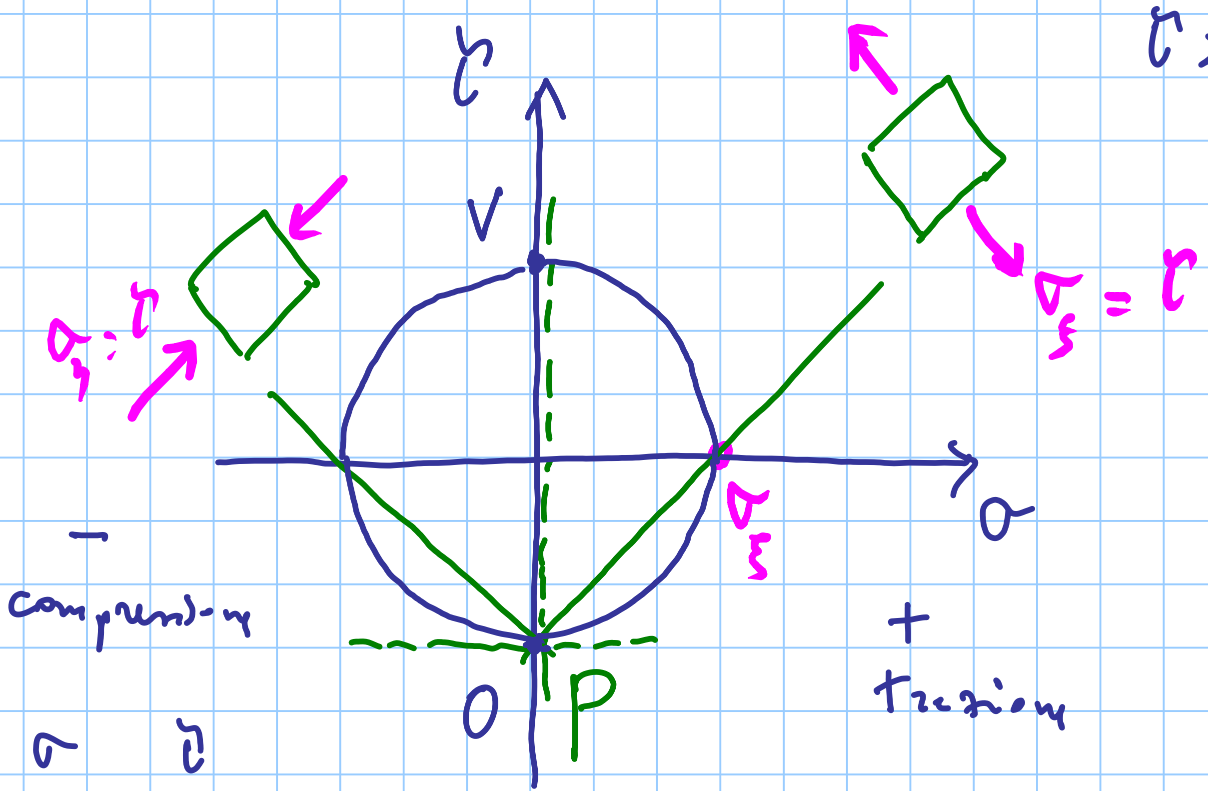
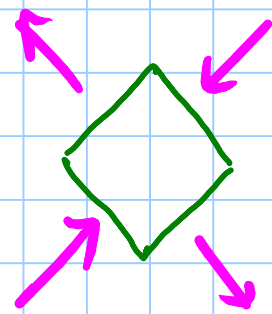
Titolo nota 08/05/2014

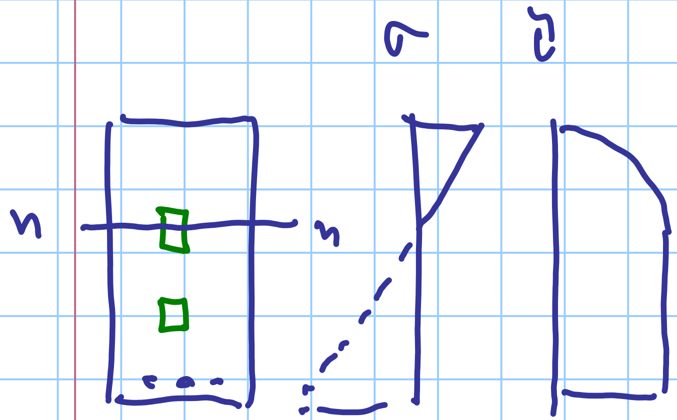


$\tau > 0$ oraria



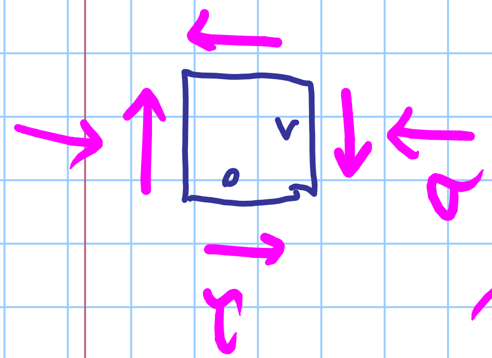


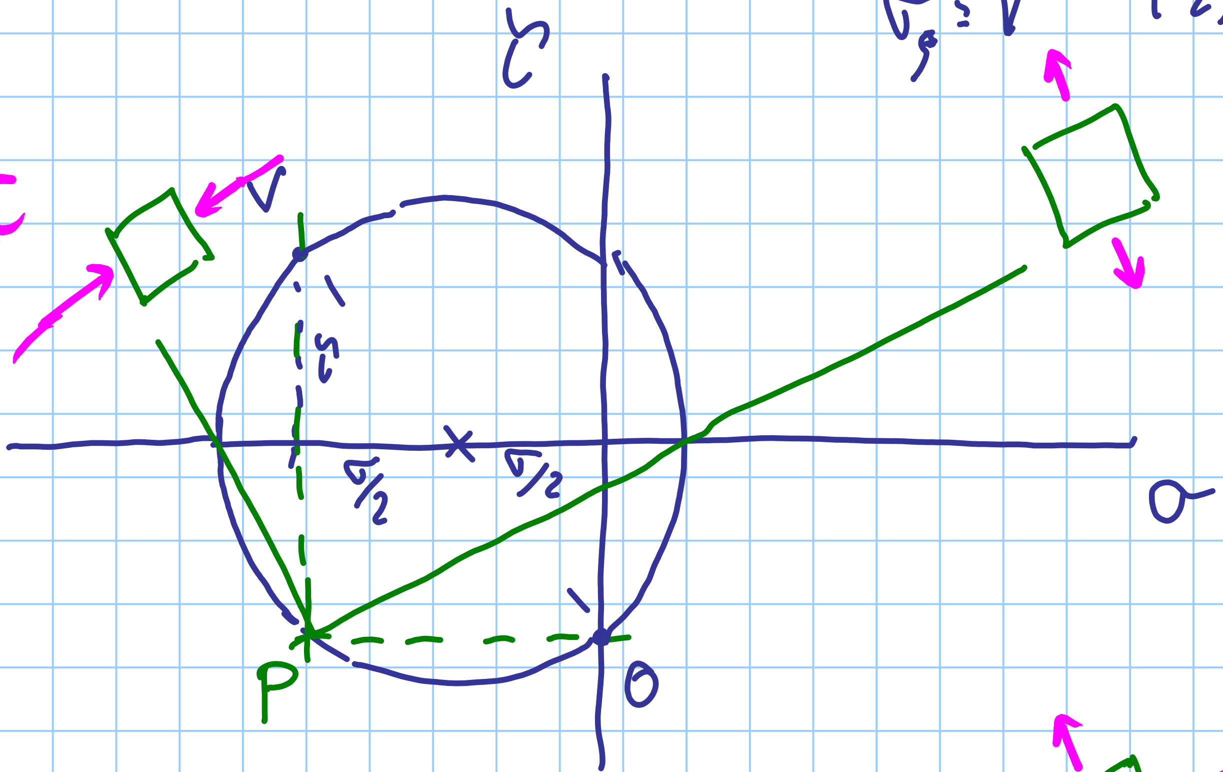


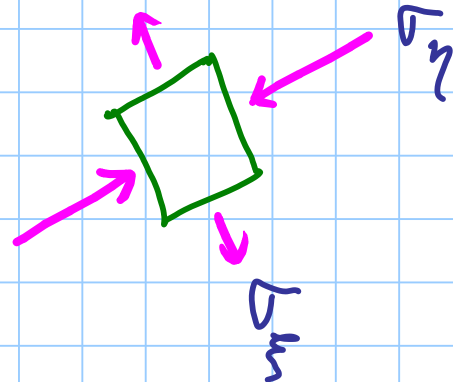


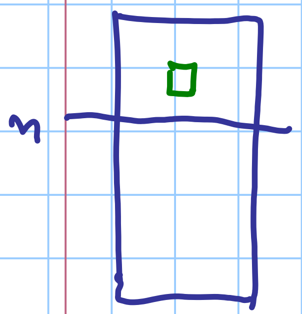
2' mod. comp.

$$\sigma_\xi = \sqrt{\tau^2 + \left(\frac{\sigma}{2}\right)^2} - \frac{\sigma}{2}$$



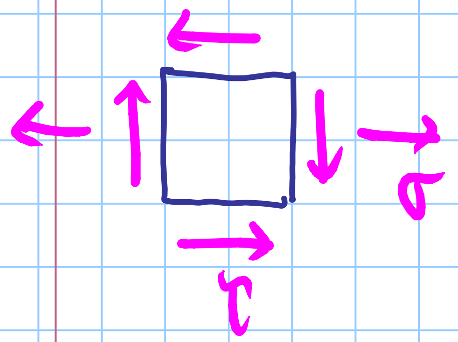


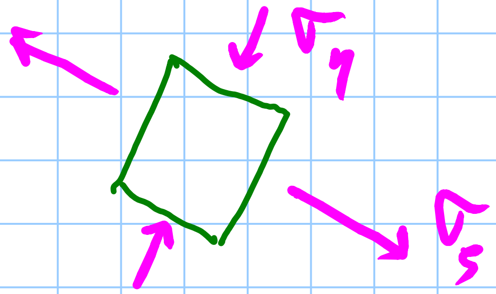




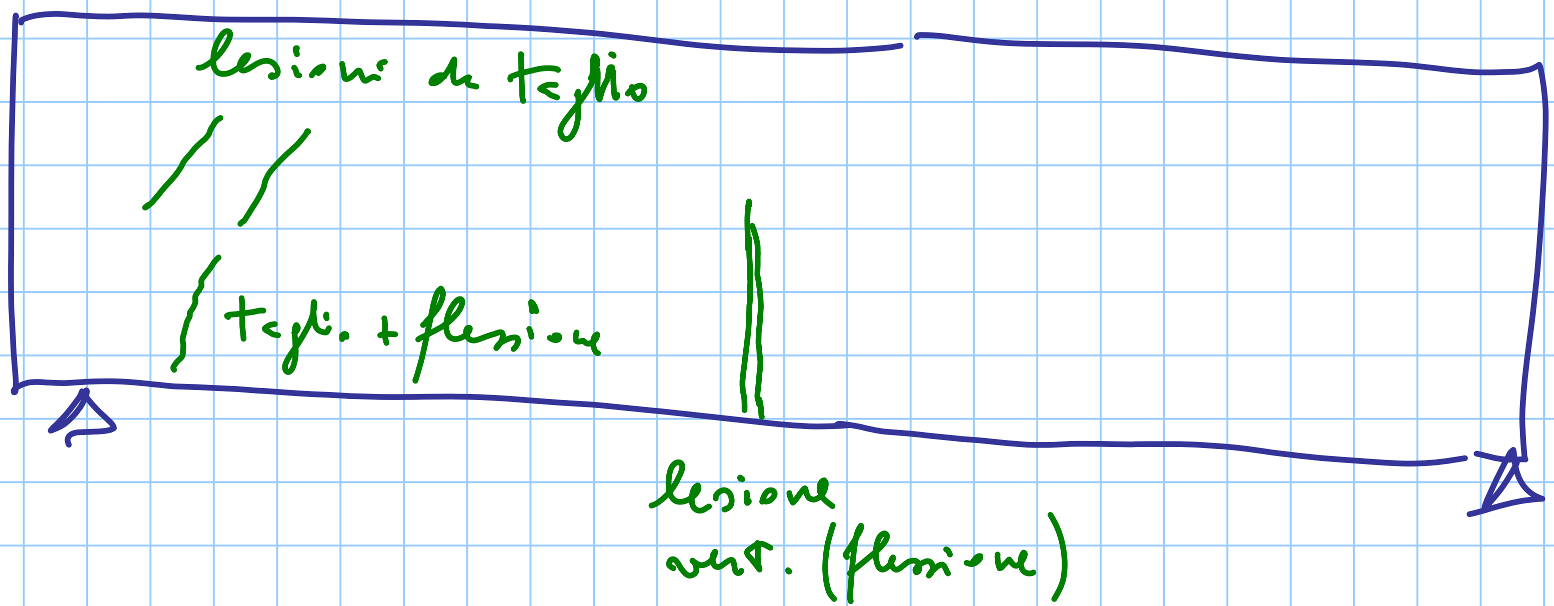
$$r = \sqrt{\tau^2 + \left(\frac{\sigma}{2}\right)^2}$$

$$\sigma_\eta = -\sqrt{\tau^2 + \left(\frac{\sigma}{2}\right)^2} - \frac{\sigma}{2}$$


σ
τ


σ_1
σ_2

1° mod. di comp.


lesioni da taglio
taglio + flessione
lesione vert. (flessione)

possiamo accettare le σ_ξ (tens. princ. trazione)

se piccole

nel passato (T.A.)

$$\tau_{c0} = 0.4 + \frac{R_{ck} - 15}{75}$$

Es. C25/30

$\tau_{c0} = 0.6$ MPa

se $\tau_{max} \leq \tau_{c0}$ non si dispone/calcola armatura a taglio

solaio — trave

$$\tau_{max} = \frac{V}{b\,z}$$

$z = 0.9\,d$ 2° stadio

$$\tau_{max} = \frac{V}{0.9\,b\,d}$$

$$\tau_{max} \leq \tau_{c0} \qquad \frac{V}{0.9\,b\,d} \leq \tau_{c0}$$

$$V \leq 0.9\,b\,d\,\tau_{c0} = V_{c0}$$

la sezione (armata a taglio) può portare taglio?

nel passato (T.A)

$$\tau_{c1} = 1.4 + \frac{R_{ck} - 15}{35}$$

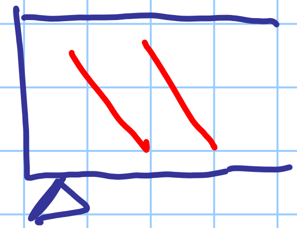
C25/30

$\tau_{c1} = 1.83$ MPa

se $\tau \leq \tau_{c1}$ la sezione va bene

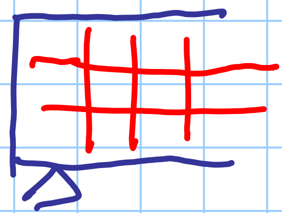
$V \leq 0.9\, b\, d\, \tau_{c1}$ ok

ARMATURA A TAGLIO



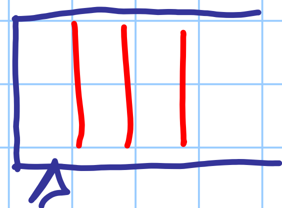
a 45° gradi

(sagomati)



verticale
e orizzontale

(staffe e
ferri di parete)

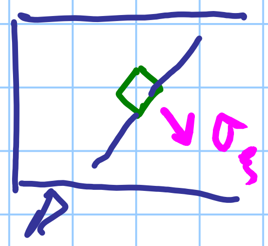


solo verticale

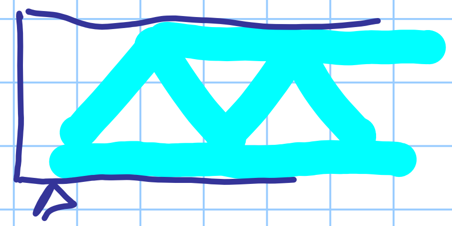
(staffe)

e la trazione
orizzontale ?

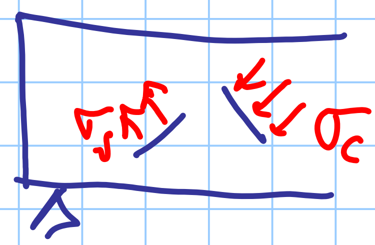
MODELLI PER CALCOLO ARMATURE



dalle tensioni all'armatura

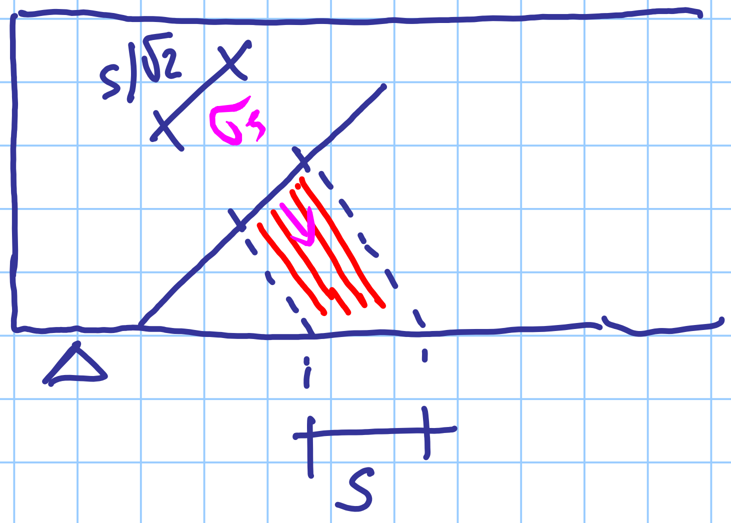


Tralicci di Mörsch



campi di tensione

DALLE TENSIONI



$$\sigma_\xi = \tau = \frac{V}{b\,z}$$

$$N = \int \sigma_\xi \, b \, dl = \sigma_\xi \, b \, \frac{s}{\sqrt{2}} =$$

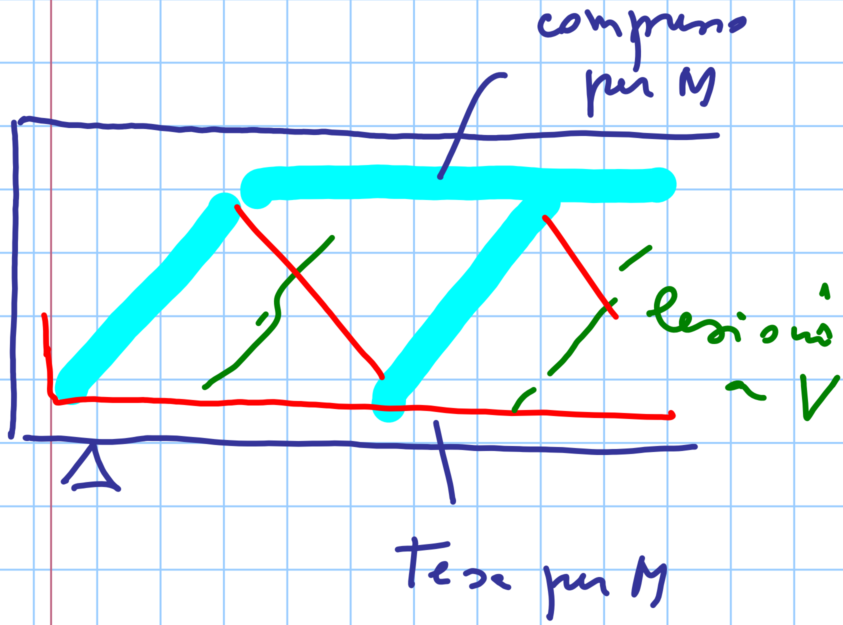
$$= \frac{V\,s}{\sqrt{2}\,z}$$

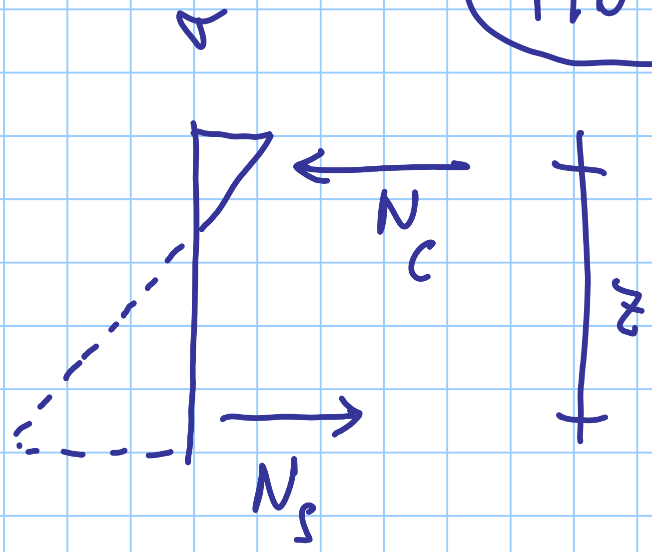
A_{sag}

$$\sigma_s = \frac{N}{A_{sag}} = \frac{V\,s}{\sqrt{2}\,z\,A_{sag}}$$

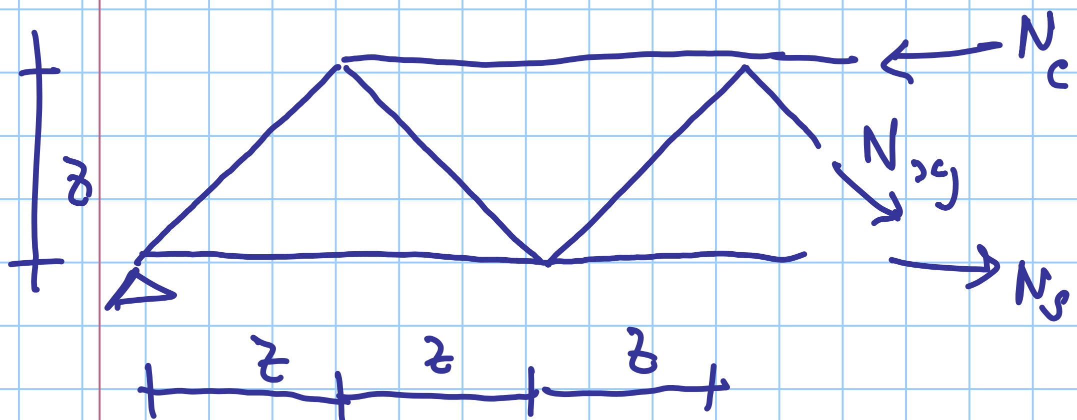
$$A_{sag} = \frac{V\,s}{\sqrt{2}\,z\,\overline{\sigma}_s}$$

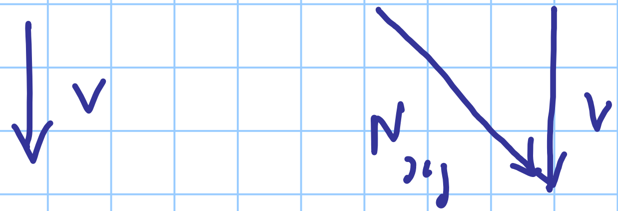
MÖRSCH





per flessione





$$N_{scg} = V\sqrt{2}$$

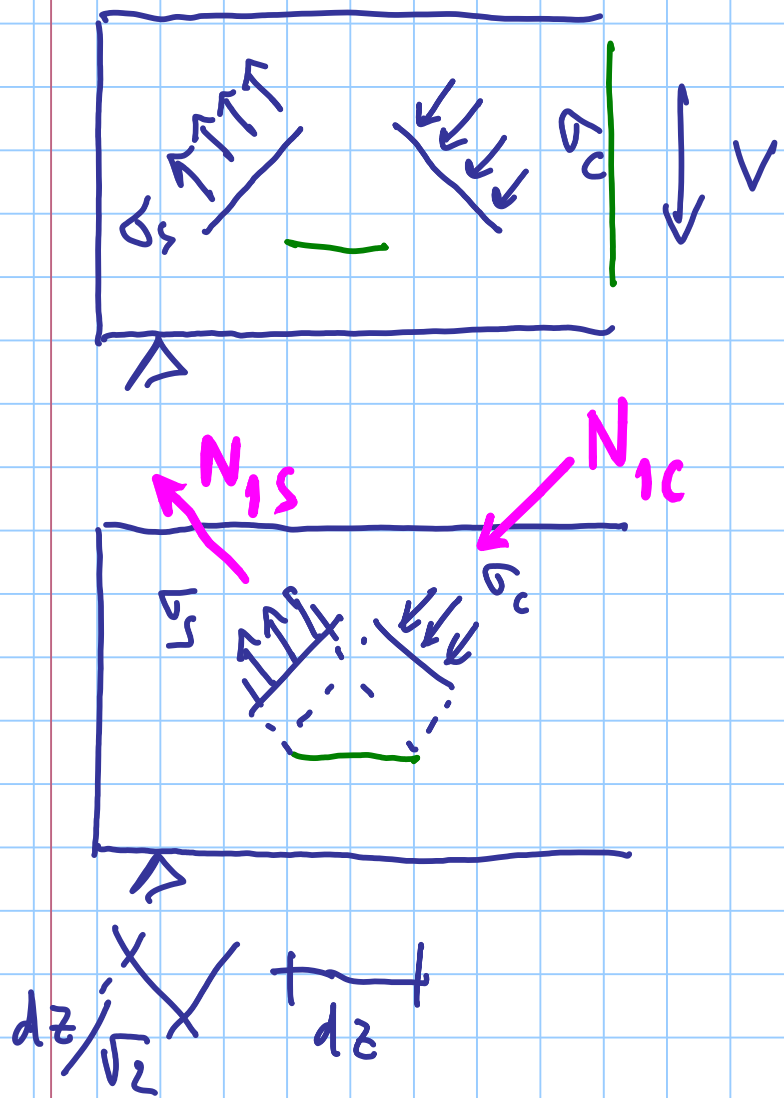
$$\frac{A_{x,y}}{s} \cdot 2z$$

$$\sigma_s = \frac{N_{x,y}}{\frac{A_{x,y}}{s} \cdot 2z} = \frac{V\sqrt{2}}{\frac{A_{x,y}}{s}\, 2z}$$

$$\sigma_s = \frac{V\, s}{A_{x,y}\, \sqrt{2}\, z}$$

$$A_{x,y} = \frac{V\, s}{\sqrt{2}\, z\, \sigma_s}$$

CAMPI DI TENSIONE



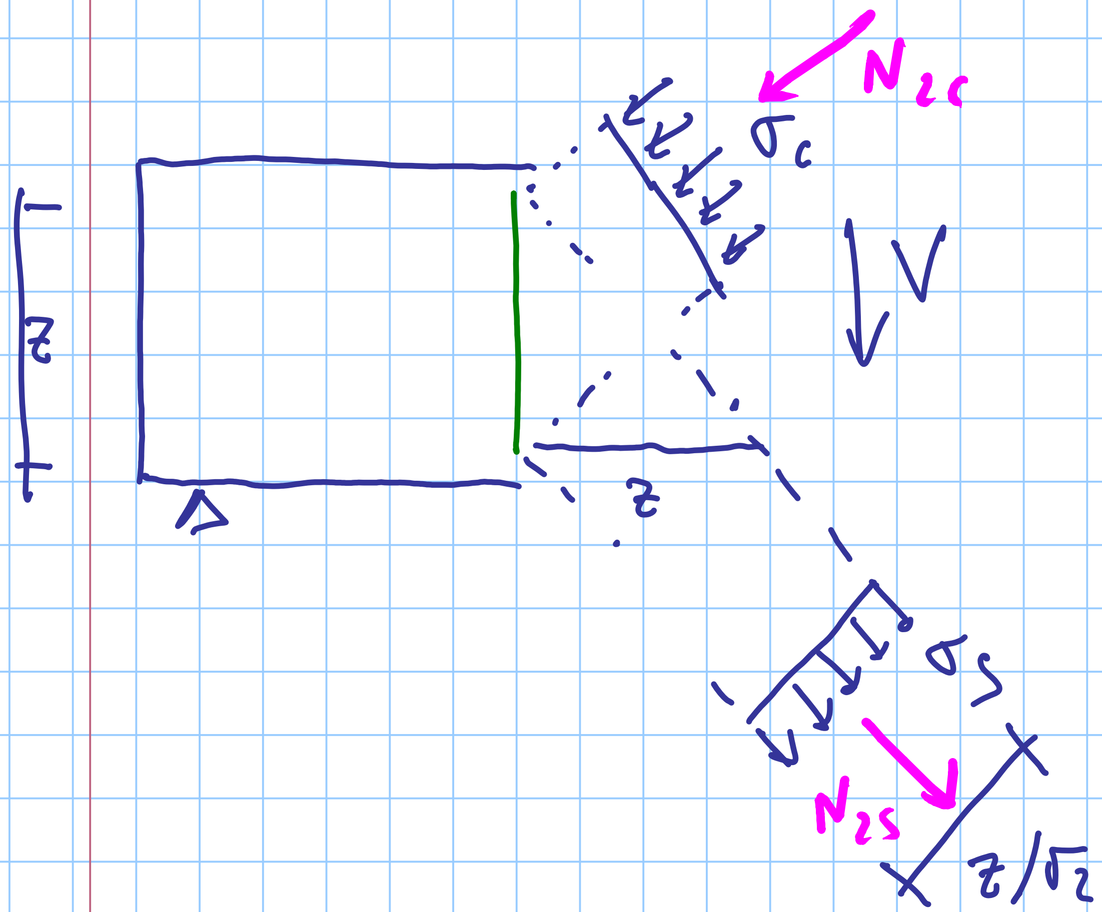
$$N_{1s} = \frac{A_{sag}}{s}\, dz \cdot \sigma_s$$

$$N_{1c} = \frac{dz}{\sqrt{2}}\, b \cdot \sigma_c$$

eq. vert

$$N_{1s}\frac{\sqrt{2}}{2} = N_{1c}\frac{\sqrt{2}}{2}$$

$$\frac{A_{reg}}{s}\,\cancel{dz}\,\sigma_s = \frac{\cancel{dz}}{\sqrt{2}}\,b\,\sigma_c \qquad (1)$$



$$N_{2s} = \frac{A_{reg}}{s}\,z\,\sigma_s$$

$$N_{2c} = \frac{z}{\sqrt{2}}\,b\,\sigma_c$$

$$N_{2s}\frac{\sqrt{2}}{2} + N_{2c}\frac{\sqrt{2}}{2} = V$$

$$\frac{A_{reg}}{s} z \sigma_s \frac{\sqrt{2}}{2} + \frac{z}{\cancel{\sqrt{2}}} b \sigma_c \frac{\cancel{\sqrt{2}}}{2} = V \qquad (2)$$

de (1) $\quad \sigma_c = \frac{A_{reg}}{s} \sigma_s \frac{\sqrt{2}}{b}$

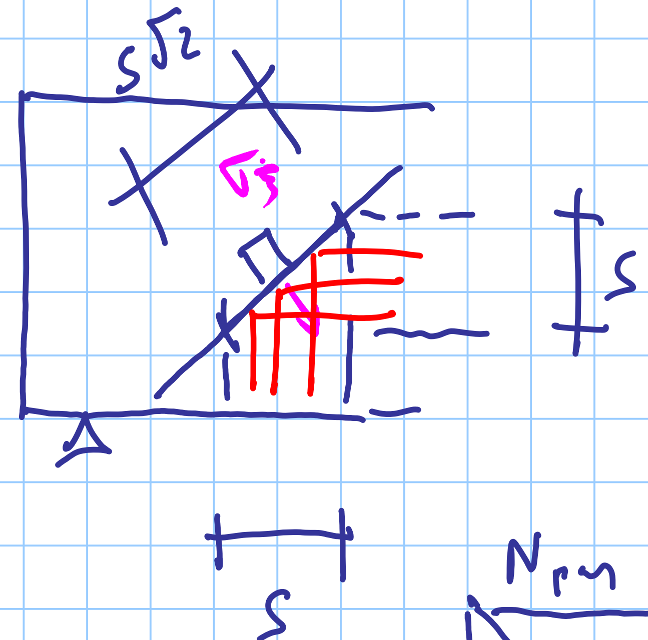
$$\frac{A_{reg}}{s} z \sigma_s \frac{\sqrt{2}}{2} + \frac{z \cancel{b}}{2} \frac{A_{reg}}{s} \sigma_s \frac{\sqrt{2}}{\cancel{b}} = V$$

$$\frac{A_{reg}}{s} z \sigma_s \sqrt{2} = V \qquad \sigma_s = \frac{V s}{A_{reg} \sqrt{2}\, z}$$

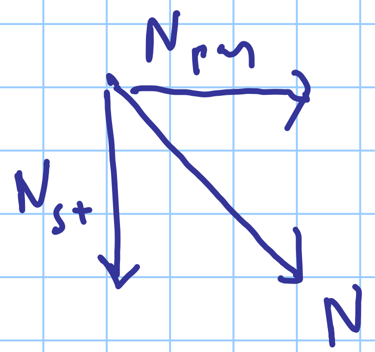
$$A_{reg} = \frac{V s}{\sqrt{2}\, z\, \bar{\sigma}_s}$$

ARMATURA CON STAFFE

(DALLE TENSIONI...)



$$N = \int \sigma_\xi \, b \, dl = \sigma_\xi \, b \, s\sqrt{2} = \frac{V}{\cancel{b} z} \cancel{b} \, s\sqrt{2} = \frac{V s \sqrt{2}}{z}$$



$$N_{st} = N_{par} = \frac{N}{\sqrt{2}} = \frac{V s}{z}$$

staffe $\sigma_s = \dfrac{N_{st}}{A_{st}} = \dfrac{V s}{z A_{st}}$

$$A_{st} = \frac{V s}{z \, \overline{\sigma}_s}$$

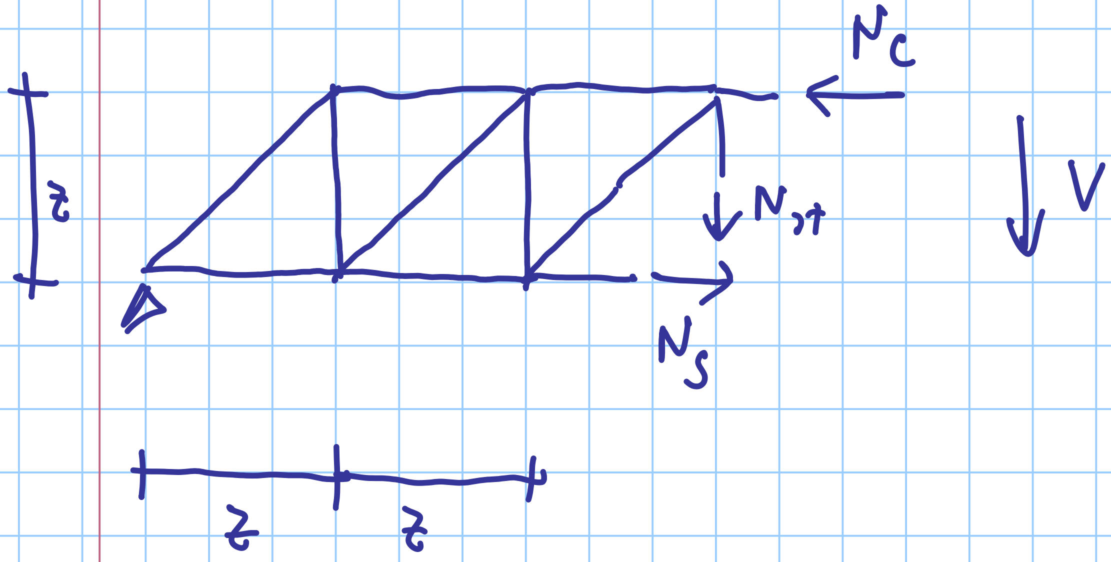
ferri di parete

A_{par} è armatura tipica (per z)

$$\sigma_s = \frac{N_{par}}{A_{par} \frac{s}{z}} = \frac{V \cancel{s}}{\cancel{z} A_{par} \frac{\cancel{s}}{\cancel{z}}} = \frac{V}{A_{par}}$$

$$A_{par} = \frac{V}{\overline{\sigma}_s}$$

MÖRSCH



$$N_{st} = V$$

$$\frac{A_{st}}{s} z$$

$$\sigma_s = \frac{N_{st}}{A_{st} \frac{z}{s}} = \frac{V s}{A_{st} z}$$

$$A_{st} = \frac{V s}{z \bar{\sigma}_s}$$

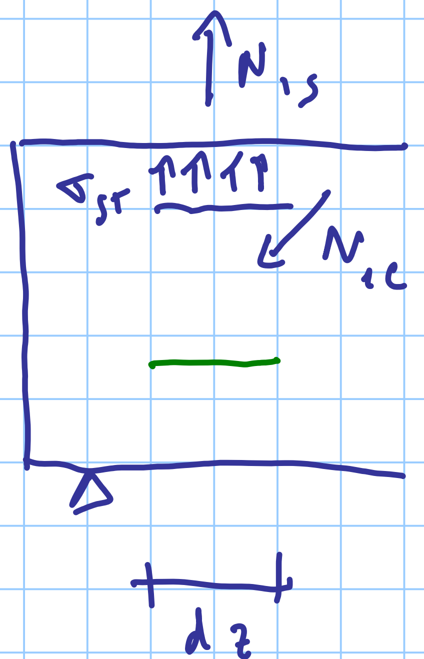
CAMPI TENSIONE

$$N_{1c} = \frac{dz}{\sqrt{2}}\, b\, \sigma_c$$

$$N_{1s} = \frac{A_{st}}{s}\, dz\, \sigma_{st}$$

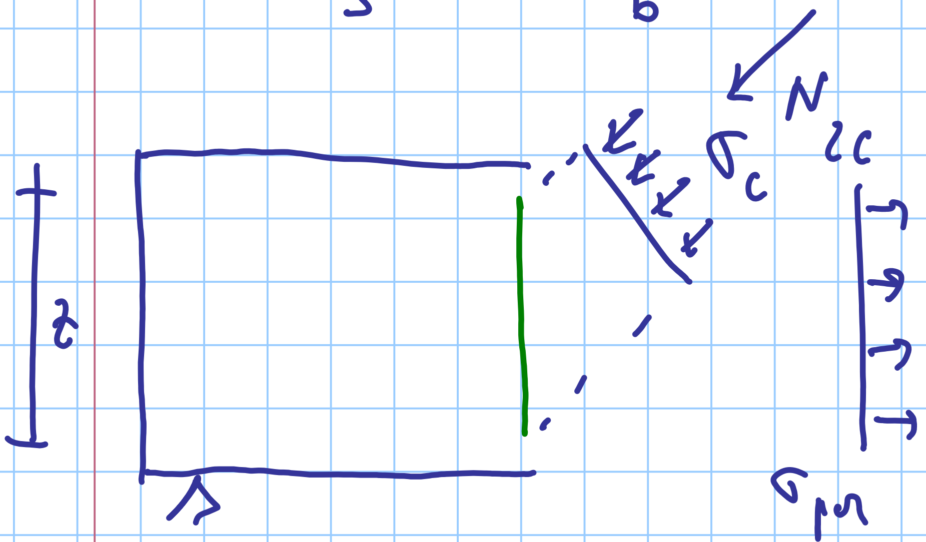
eq. vert.

$$N_{1s} = N_{1c}\,\frac{\sqrt{2}}{2}$$



$$\frac{A_{s,T}}{s}\,\cancel{dz}\,\sigma_{st} = \frac{\cancel{dz}}{\cancel{\sqrt{2}}}\, b\, \sigma_c\, \frac{\cancel{\sqrt{2}}}{2} \qquad (1)$$

$$\sigma_c = \frac{A_{s,t}}{s}\,\sigma_{st}\,\frac{2}{b}$$



$$N_{2c} = \frac{z}{\sqrt{2}}\, b\, \sigma_c$$

$$N_{2c}\,\frac{\sqrt{2}}{2} = V$$

$$\frac{z}{\cancel{\sqrt{2}}}\, b\, \sigma_c\, \frac{\cancel{\sqrt{2}}}{2} = V \qquad (2)$$

$$z \cancel{b} \frac{A_{st}}{s} \sigma_{st} \frac{\cancel{z}}{\cancel{b}} \frac{1}{\cancel{z}} = V$$

$$\sigma_{st} = \frac{V \quad s}{z \; A_{st}} \qquad A_{st} = \frac{V \; s}{z \; \bar{\sigma}_s}$$

eq. Trasl. oriz.

$$\underbrace{N_{2c} \frac{\sqrt{2}}{2}}_{= V} = A_{pm} \; \sigma_{pm}$$

$$\sigma_{pm} = \frac{V}{A_{pm}}$$

$$A_{pm} = \frac{V}{\bar{\sigma}_s}$$