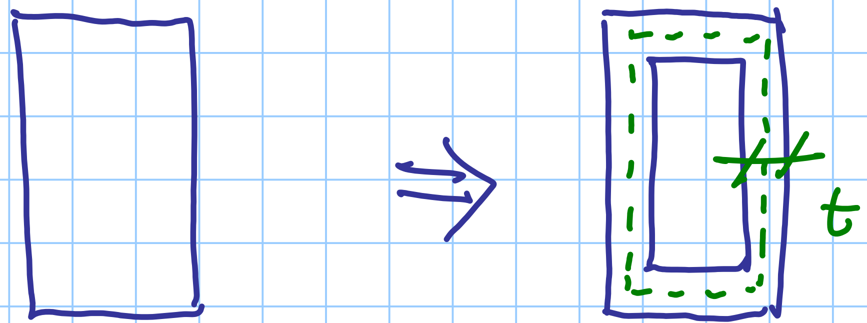


$$\tau_{max} = \psi \frac{T}{a b^2}$$

$$\tau = \frac{T}{2 A_\kappa t}$$

Bredt

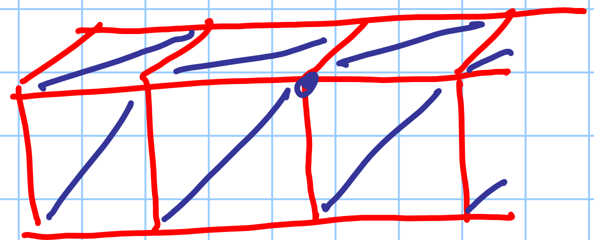
A_κ = area racchiusa dalla linea media

u_κ = perimetro

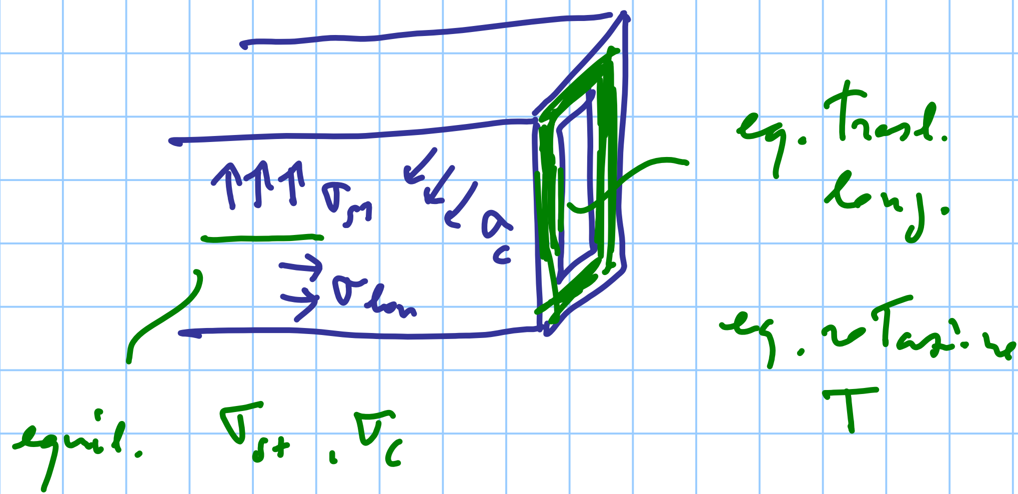
MODELLI

1) dalla tensione principale di trazione → A_s

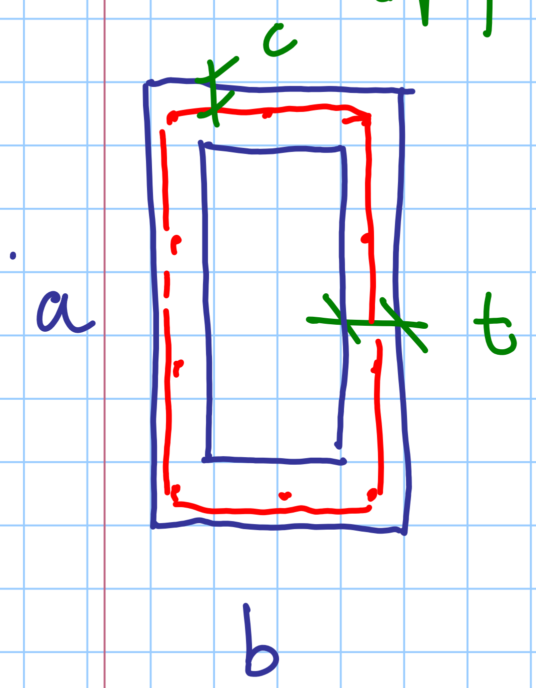
2) Traliccio di Raüsch



3) Campi di tensione



copriferro di calcolo



A = area = $a \times b$

u = perimetro = $2(a+b)$

$$t = \frac{A}{u} \geq 2c$$

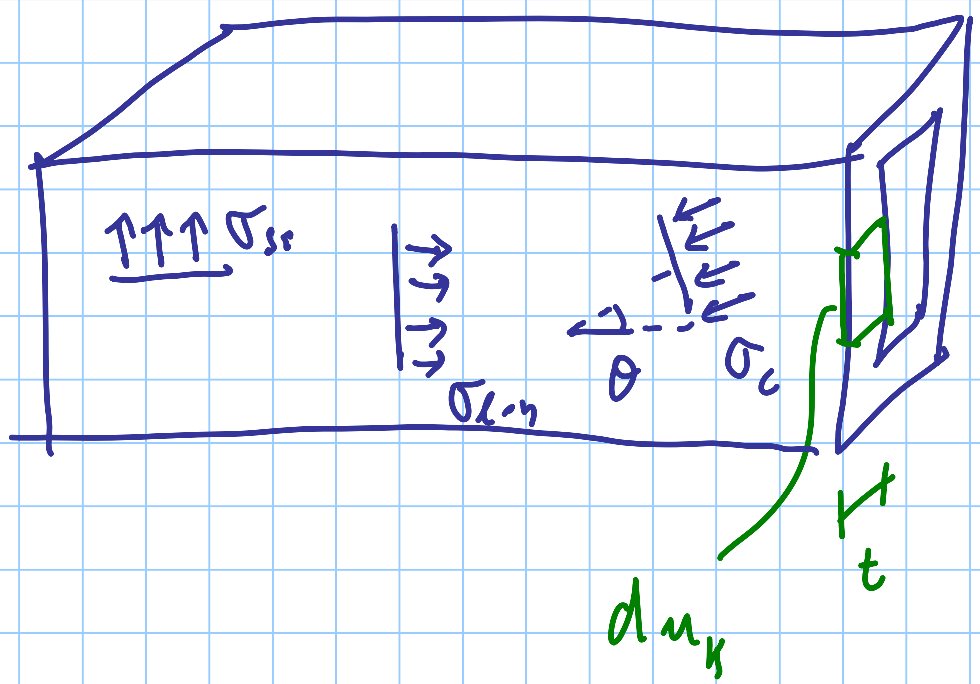
Esempio

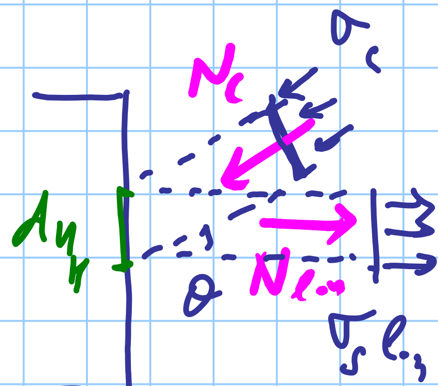
sezione 30×50

$c = 4$ cm

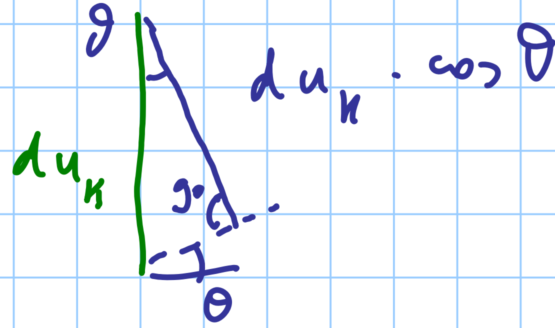
$$t = \frac{30 \times 50}{2(30+50)} = \frac{1500}{160} = 9.38 \text{ cm}$$

3) CAMPI DI TENSIONE



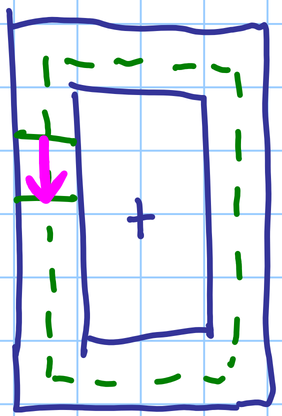


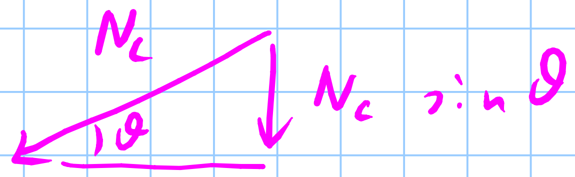
$$N_c = du_K \cos\theta \cdot t \cdot \sigma_c$$



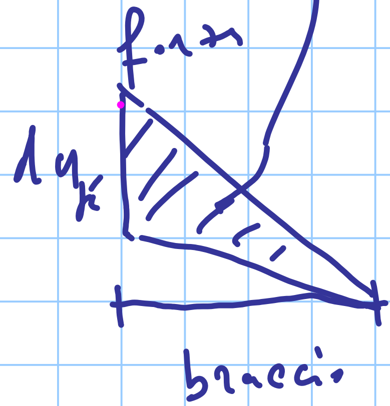
$$N_{l,on} = A_{l,on} \frac{du_K}{u_K} \cdot \sigma_{s,l,on}$$

equilibrio rotazione intorno asse





$$du_k \cdot \text{braccio} = 2\, dA_k \quad \Leftarrow \quad dA_k = \frac{du_k \cdot \text{braccio}}{2}$$



$$N_c \sin\theta = du_k \cos\theta \; t \; \sigma_c \sin\theta$$

$$T = \int \text{forza} \cdot \text{braccio} =$$

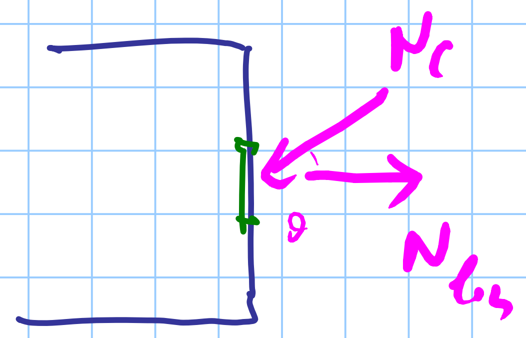
$$= \int 2\, dA_k \; t \sin\theta \cos\theta \; \sigma_c$$

$$T = \left(\int dA_k\right) \cdot 2\, t \sin\vartheta \cos\vartheta\, \sigma_c = 2\, A_k\, t \sin\vartheta \cos\vartheta\, \sigma_c$$

$$\sin\vartheta \cos\vartheta = \frac{\cot\vartheta}{1+\cot^2\vartheta} \qquad \sigma_c \leq \nu_1 f_{cd}$$

$$T_{Rd,max} = 2\, A_k\, t\, \nu_1 f_{cd} \frac{\cot\vartheta}{1+\cot^2\vartheta}$$

equilibrio traslazione longitudinale



$$N_c \cos\vartheta = N_{lon}$$

$$N_c = du_k \cos\vartheta \cdot t \cdot \sigma_c$$

$$N_{lon} = A_{lon} \frac{du_k}{u_k} \cdot \sigma_{s,lon}$$

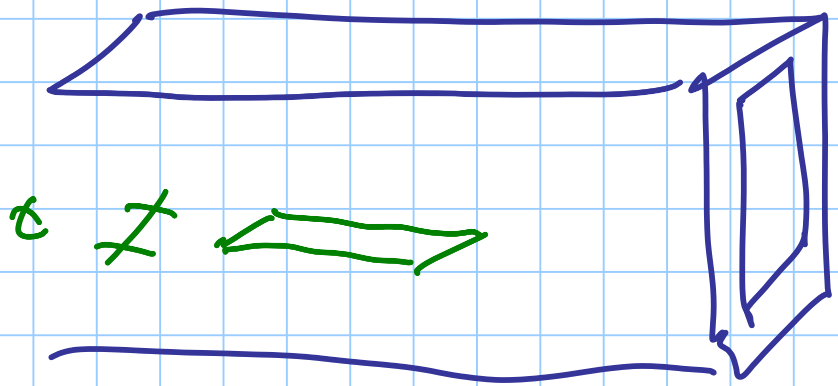
$$\cancel{du_k} \cos^2\vartheta \; t \; \sigma_c = A_{lon} \frac{\cancel{du_k}}{u_k} \sigma_{lon}$$

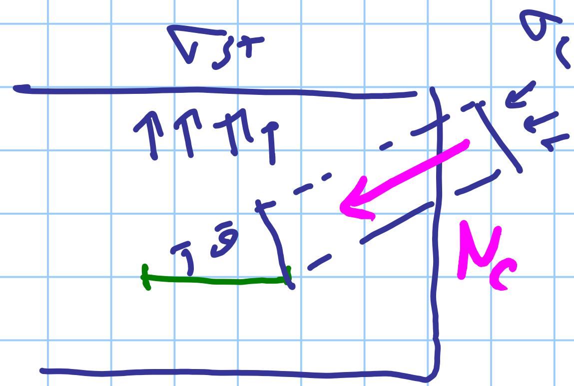
$$\sigma_c = \frac{T}{2 A_k t \sin\vartheta \cos\vartheta}$$

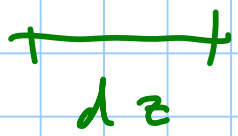
$$\cos^{\cancel{2}}\theta\,\cancel{t}\,\frac{T}{2\,A_k\,\cancel{t}\,\sin\theta\,\cancel{\cos\theta}} = \frac{A_{ln}}{u_k}\,\sigma_{ln}$$

$$T = \frac{2\,A_k\,A_{ln}}{\cot\theta\;u_k}\,\sigma_{ln} \qquad\qquad \sigma_{ln} \le f_{yd}$$

$$T_{Rd,s\,ln} = 2\,A_k\,\frac{A_{ln}}{u_k}\,f_{yd}\,\frac{1}{\cot\theta}$$







$$N_c = dz \sin\vartheta \cdot t \cdot \sigma_c$$

$$N_{st} = \frac{A_{ST}}{s} dz \cdot \sigma_s$$

$$\cancel{\lambda z} \sin^2\vartheta \; t \; \sigma_c = \frac{A_{st}}{s} \cancel{\lambda z} \; \sigma_s$$

$$\sigma_c = \frac{T}{2 A_k \, t \, \sin\vartheta \cos\vartheta}$$

$$\sin^{\cancel{2}}\vartheta \; \cancel{t} \; \frac{T}{2 A_k \cancel{t} \cancel{\sin\vartheta} \cos\vartheta} = \frac{A_{st}}{s} \sigma_s$$

$$\frac{T}{2 A_k \cot\vartheta} = \frac{A_{st}}{s} \sigma_s \qquad \sigma_s \le f_{yd}$$

$$T_{Rd,st} = 2 A_k \frac{A_{st}}{s} f_{yd} \cot\vartheta$$

RIEPILOGO

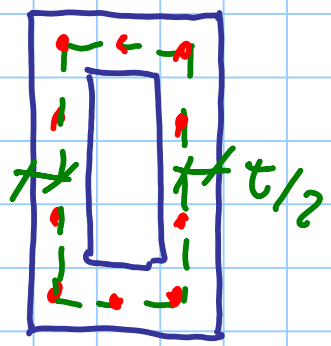
$$T_{Rd,max} = 2 A_k t \nu_1 f_{cd} \frac{\cot\vartheta}{1+\cot^2\vartheta}$$

$$T_{Rd,sl} = 2 A_k \frac{A_{sl}}{u_k} f_{yd} \frac{1}{\cot\vartheta}$$

$$T_{Rd,st} = 2 A_k \frac{A_{st}}{s} f_{yd} \cot\vartheta$$

sezione 30 x 50 $\qquad t = 9.38\ cm$

$a = 50$



$b = 30$

$a_k = a - t = 40{,}62\ cm$

$b_k = b - t = 20{,}62\ cm$

$u_k = 122.48\ cm$

$A_k = 837{,}6\ cm^2$

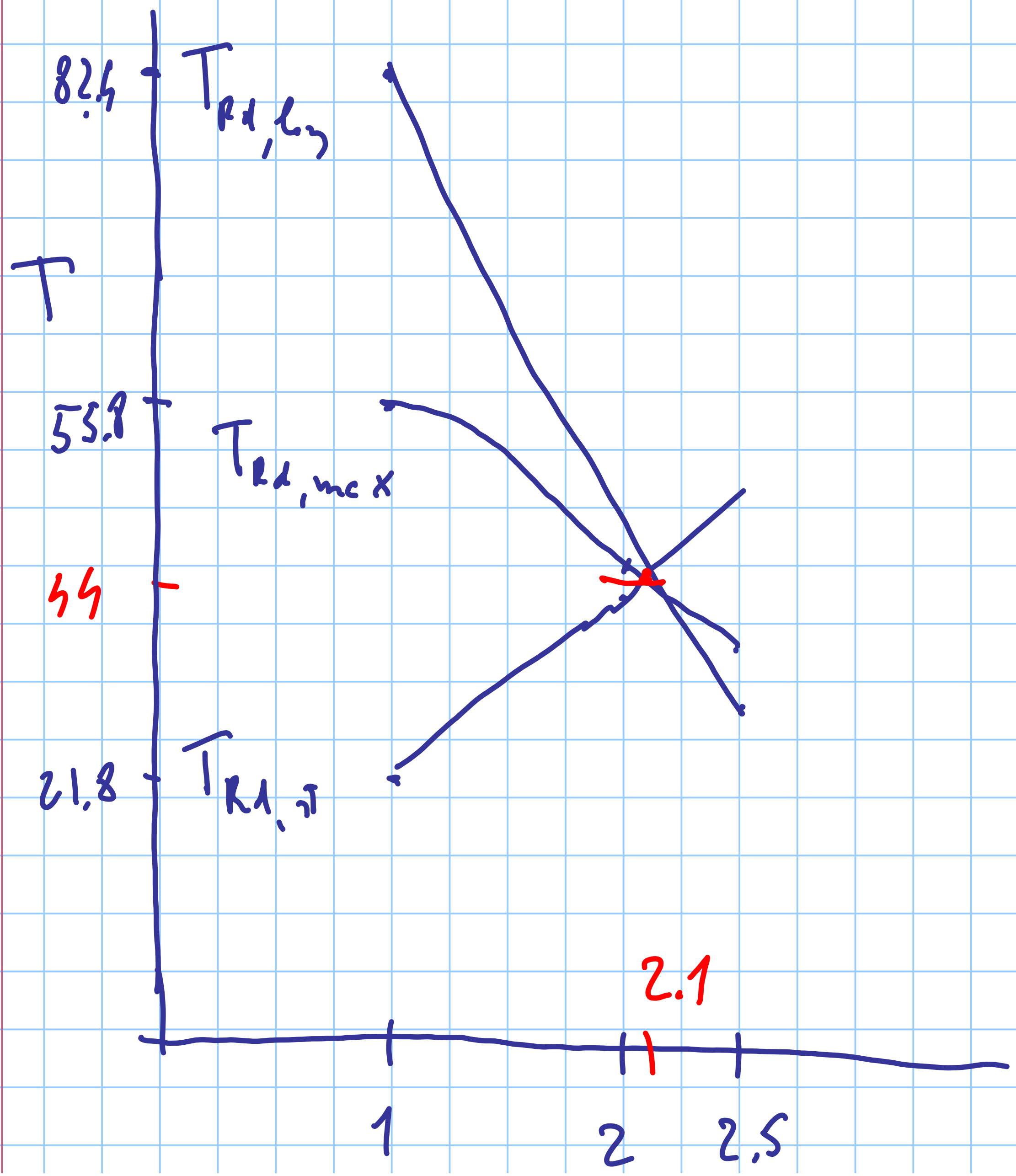
$A_{lon} = 10\ \phi 14 = 15.4\ cm^2$

staffe $\quad \phi 8/15 = 3.33\ cm^2/m$

$$T_{Rd,max} = 2 \underset{837.6}{A_k} \underset{9.38}{t} \overset{0.5}{\nu_1} \overset{14.2}{f_{cd}} \frac{\cot\theta}{1+\cot^2\theta} \times 10^{-3} = 111.6 \frac{\cot\theta}{1+\cot^2\theta} \; kN_m$$

$$T_{Rd,sl} = 2 \underset{837.6}{A_k} \frac{\overset{15.4}{A_{sl}}}{\underset{122.48}{u_k}} \underset{391.3}{f_{yd}} \frac{1}{\cot\theta} \times 10^{-3} = \frac{82.4}{\cot\theta} \; kN_m$$

$$T_{Rd,st} = 2 A_k \frac{\overset{3.33}{A_{st}}}{\underset{100}{s}} f_{yd} \cot\theta = 21.8 \cot\theta \; kN_m$$



T
82.4
$T_{Rd,b,z}$
55.8
$T_{Rd,max}$
44
21.8
$T_{Rd,T}$
2.1
1
2
2,5