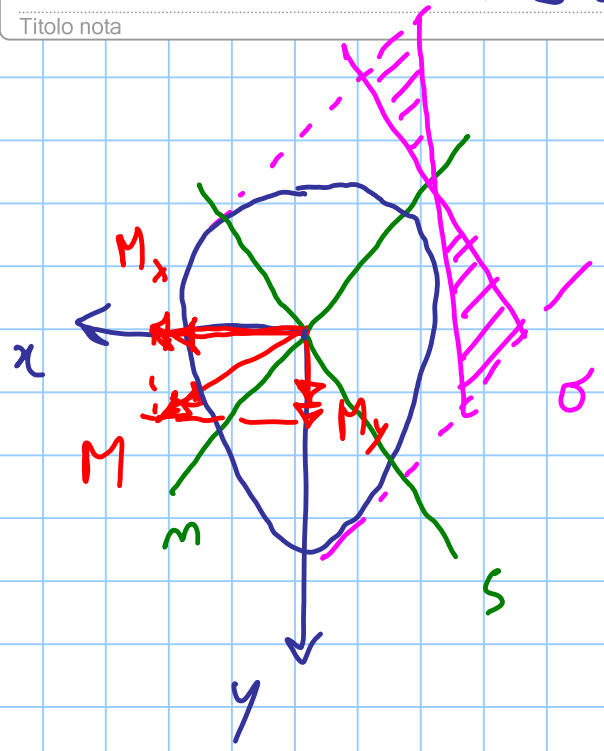
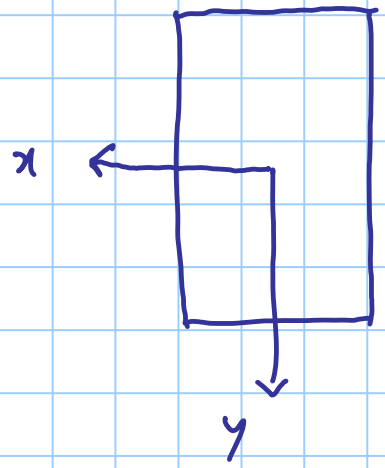
FLESSIONE SEMPLICE

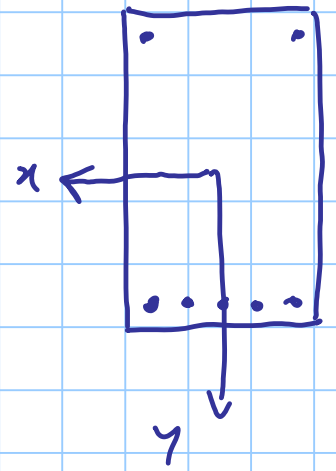
Titolo nota 08/11/2016



omogenea

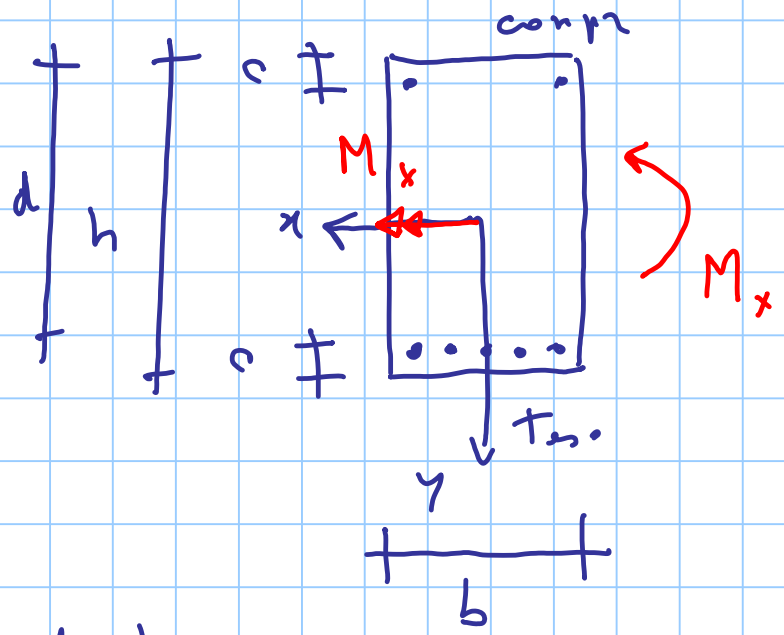


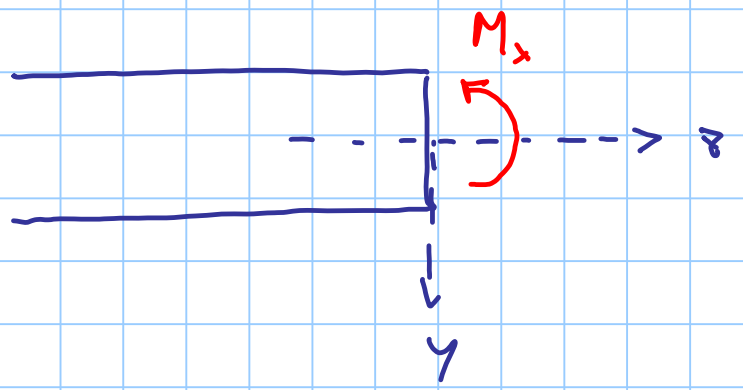
C.A.



I modelli di comportamento

C.A.





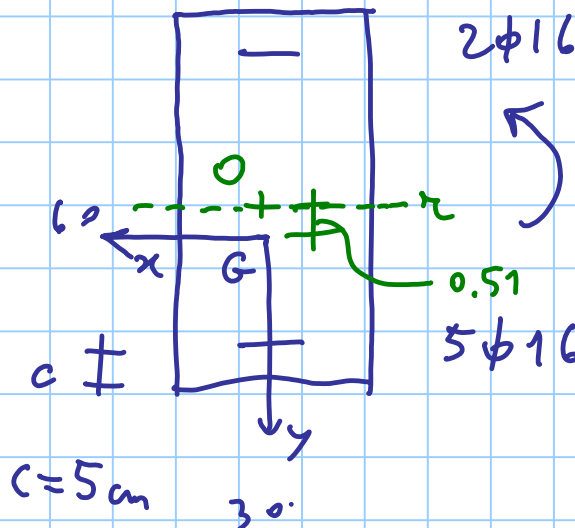
$d = h - c$

distanza tra bordo compresso e armature tese

"altezza utile"

$1\phi 16 \quad A_s = 2.01 \text{ cm}^2$

$n = 6.35$



$A'_s = 4.02 \text{ cm}^2$

$M = 300 \text{ KN}_m$

$A_s = 10.05 \text{ cm}^2$

$$A = bh + n\left(A_s + A'_s\right)$$

$$= 1889 \text{ cm}^2$$

$$S_{xx} = nA_s\left(\frac{h}{2} - c\right) - nA'_s\left(\frac{h}{2} - c\right)$$

$$= n\left(A_s - A'_s\right)\left(\frac{h}{2} - c\right)$$

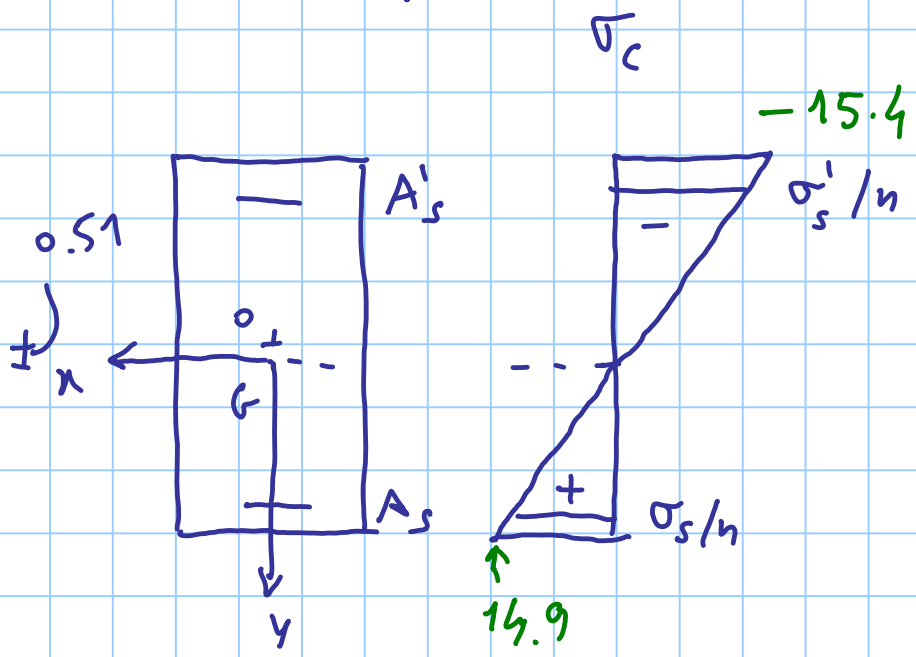
$$= 957.3 \text{ cm}^3$$

$$\sigma = \frac{M}{I} y$$

$$\frac{S_{xx}}{A} = d_{x-G} = 0.51 \text{ cm}$$

calcul un axe x horizontale

calcul S_{xx}



$$\sigma^{inf} = \frac{M}{I} y = \frac{300 \times 10^6}{595\,355 \times 10^4} \times 29.49 \times 10^1$$

$$= 14.9 \text{ MPa}$$

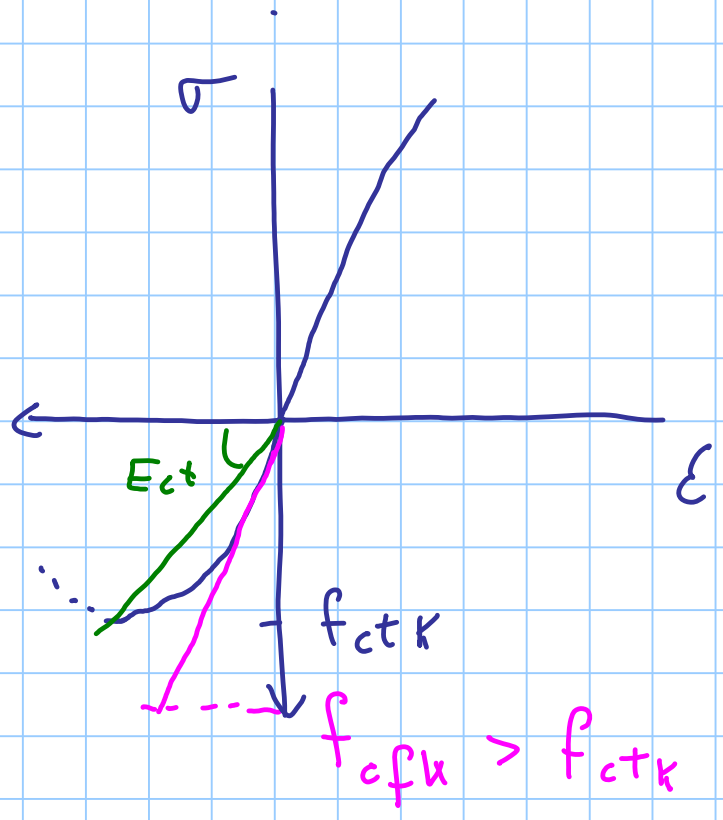
$$\sigma_s' = -81.6 \text{ MPa}$$

$$\sigma_s = 78.4 \text{ MPa}$$

$$I = \frac{bh^3}{12} + bh\, d_{oG}^2 + n A_s \left(\frac{h}{2} - c - d_{oG}\right)^2 + n A_s' \left(\frac{h}{2} - c + d_{oG}\right)^2$$

$$= 540\,000 + 468 + 38\,275 + 16\,612 = 595\,355 \text{ cm}^4$$

$$f_{ctk} = 1.80 \text{ MPa}$$



nel passato oggi

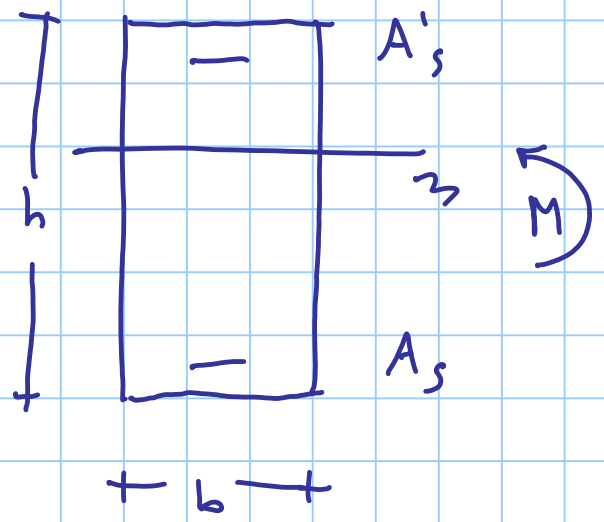
C25/30

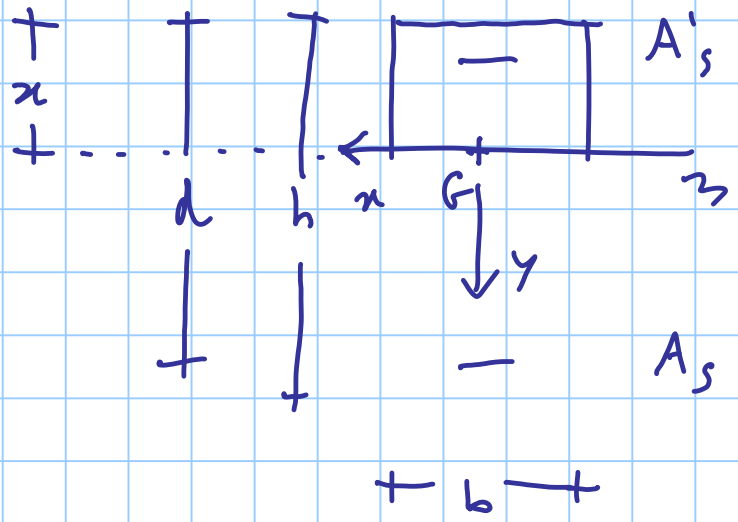
$f_{cfk} = 1.2\ f_{ctk} = 2.16$ MPa

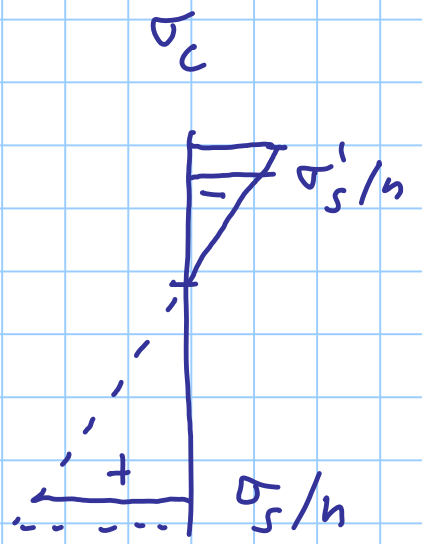
momento di fessurazione

$M_2 = 43.5$ kNm

$$300 \times \frac{2.16}{14.9}$$







$$S_n = 0$$

$$-\frac{b x^2}{2} + n A_s (d - x) - n A'_s (x - c) = 0$$

$$x^2 - \frac{2 n A_s}{b} (d - x) + \frac{2 n A'_s}{b} (x - c) = 0$$

$$x^2 + \frac{2nA_s}{b}x + \frac{2nA'_s}{b}x - \frac{2nA_s}{b}d - \frac{2nA'_s}{b}c = 0$$

$$x^2 + \frac{2n(A_s+A'_s)}{b}x - \frac{2n(A_s d + A'_s c)}{b} = 0$$

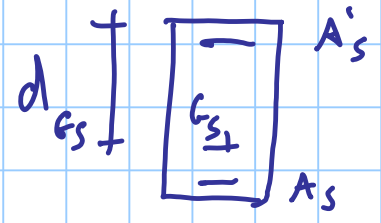
$$x = -\frac{n(A_s+A'_s)}{b} + \sqrt{\frac{n^2(A_s+A'_s)^2}{b^2} + \frac{2n(A_s d + A'_s c)}{b} \cdot \frac{nb(A_s+A'_s)^2}{nb(A_s+A'_s)^2}}$$

$$x = \frac{n(A_s+A'_s)}{b}\left[-1 + \sqrt{1 + \frac{2b(A_s d + A'_s c)}{n(A_s+A'_s)^2}}\right]$$

$$n \frac{A_s + A'_s}{b\,d} = \psi$$

$$\frac{n\,(A_s + A'_s)}{b} = \psi\,d$$

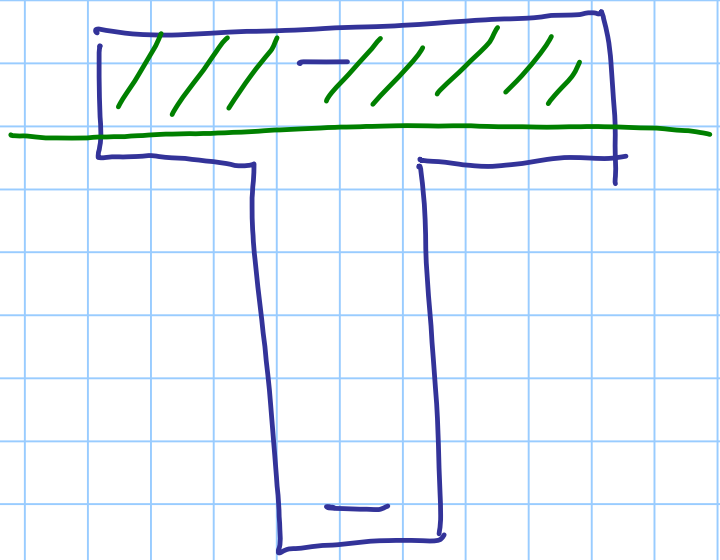
$$\frac{A_s\,d + A'_s\,c}{A_s + A'_s} = d_{GS}$$



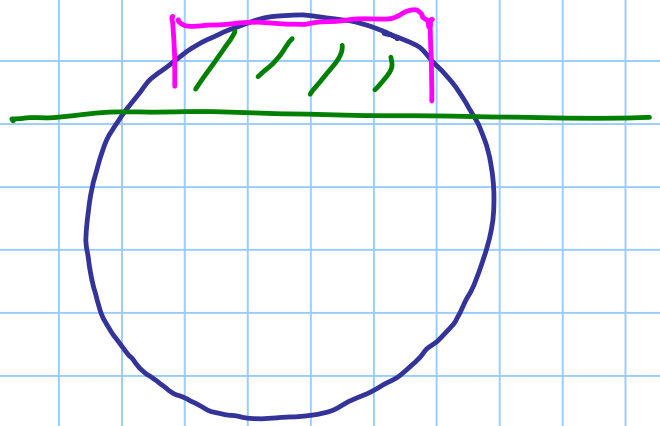
$$x = \psi\,d \left[-1 + \sqrt{1 + \frac{2\,d_{GS}}{\psi\,d}} \right]$$

$$S_n = -\frac{b x^2}{2} + n A_s (d - x) - n A_s' (x - c)$$

$$I_n = \frac{b x^3}{3} + n A_s (d - x)^2 + n A_s' (x - c)^2$$



equivale a sezione rettangolare



non è equivalente a rettang. lungo, ma ...