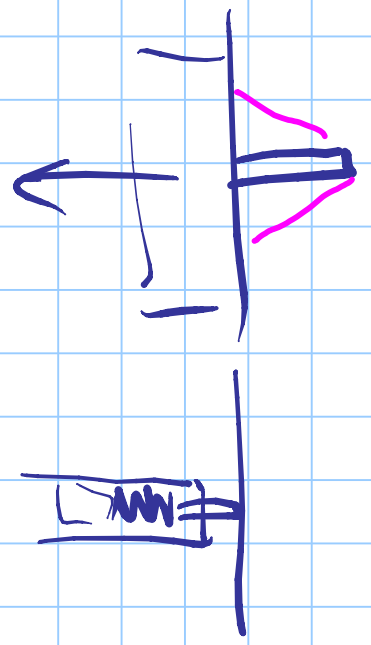
RESISTENZA – EDIFICI ESISTENTI

Titolo nota 12/03/2014

- prove distruttive — CAROTE
- prove semi-distruttive — PULL-OUT
- prove non distruttive — ⋮

SONREB { SCLEROMETRO, ULTRASUONI }



dispersione dei valori

$$f_{cm} = f_{ck} + 8\ MPa$$

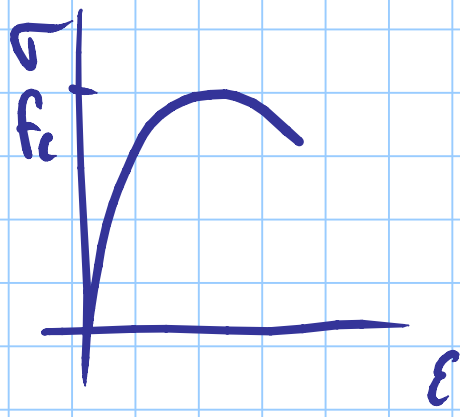
Es. $f_{ck} = 25\ MPa$

$f_{cm} = 33\ MPa$

per verifiche allo SLU

$$f_{cd} = \alpha_{cc} \frac{f_{ck}}{\gamma_c}$$

$\alpha_{cc} = 0.85$ $\quad \gamma_c = 1.5$



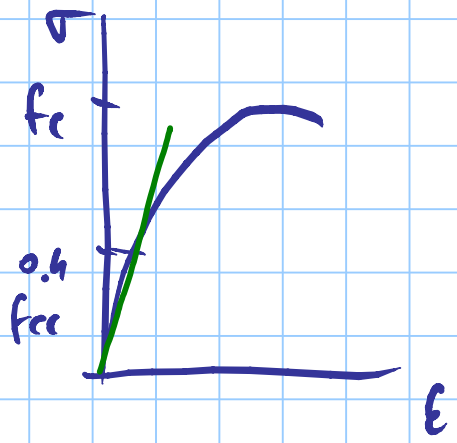
C25/30 $\quad f_{ck} = 25\ MPa$

$$f_{cd} = 0.85 \frac{25}{1.5} = 14.17\ MPa$$

MODULO ELASTICO E_c

prove con tensioni fino a circa $0.4\, f_c$

modulo secante $0 \div 0.4\, f_c$



$$\left[E_c \text{ tang all'orig} \cong 1.1 \; E_c \text{ secante a } 0.4 f_c \right]$$

- prove per la determinazione di E_c

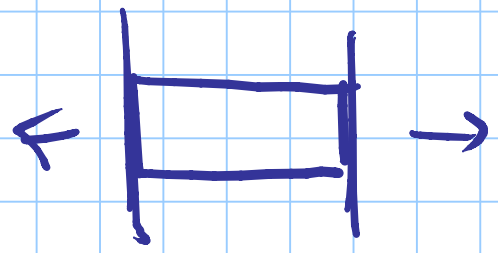
- indicazioni di normativa

$$E_c = 22000 \left(\frac{f_{cm}}{10} \right)^{0.3}$$

C25/30 $\quad E_c = 22000 \left(\frac{33}{10} \right)^{0.3} \simeq 31500 \text{ MPa}$

$f_{cm} = 33 \text{ MPa}$

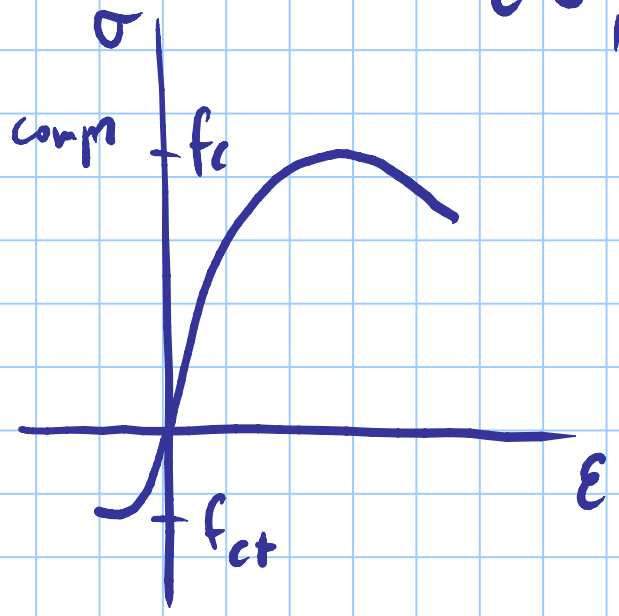
RESISTENZA A TRAZIONE



prove a trazione dirette

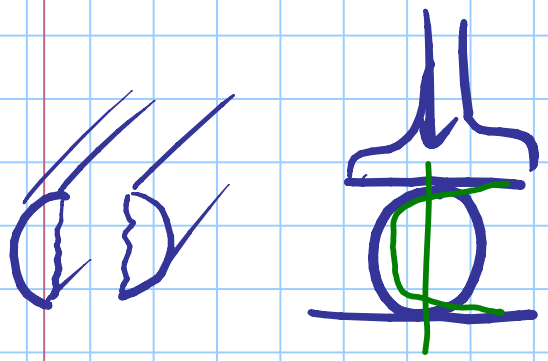
$f_{ct,ax}$

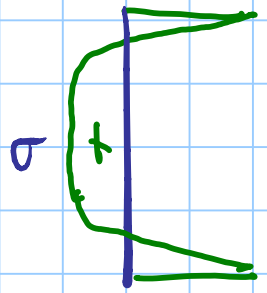
picco incl.



prova a trazione indiretta (brasiliana)

SPLITTING TEST





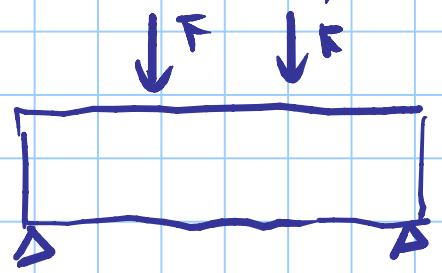
$$\sigma = \frac{F}{\pi r l}$$

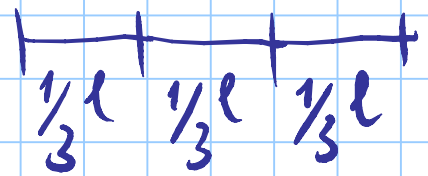
raggio · lunghezza

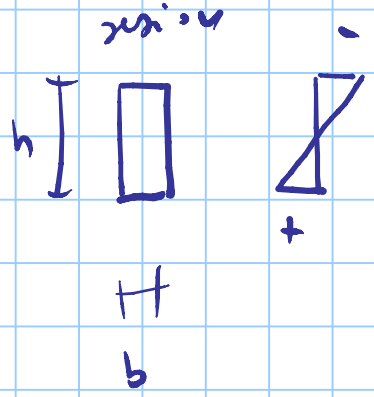
$$f_{ct,sp} = \frac{F_{max}}{\pi r l}$$

$$f_{cT} = 0.9\, f_{ct,sp}$$

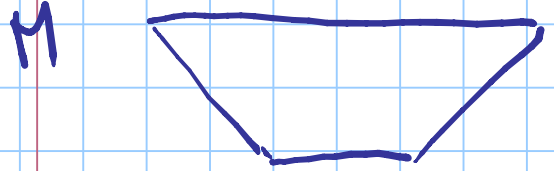
prove a flessione







$$\sigma_{max} = \frac{M}{W} = \frac{6M}{bh^2}$$

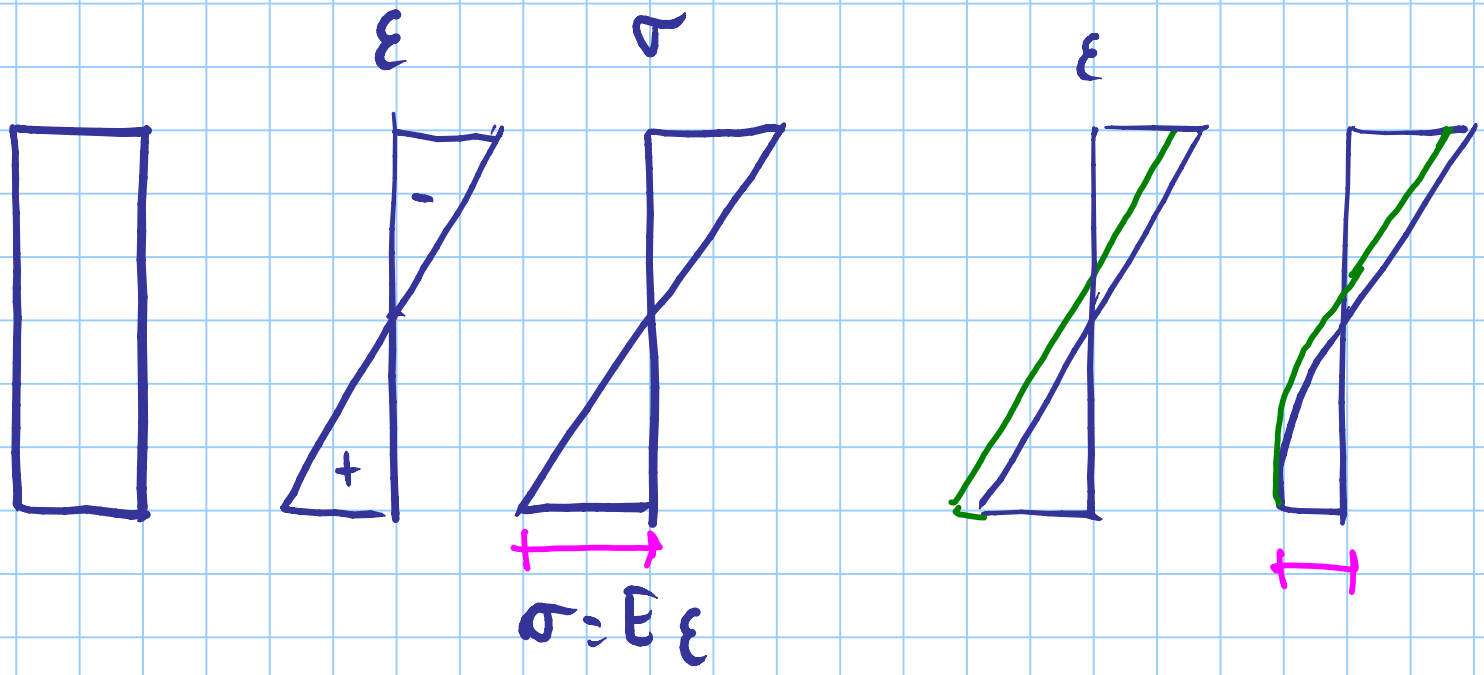


$$M_{max} = \frac{Fl}{3}$$

$$f_{ct,fl} = \frac{6 M_{max}}{bh^2} = \frac{2 F_{max} l}{bh^2}$$

$f_{ct,fl}$ calcolata con mod. lineare $\ll f_{ct,ax}$

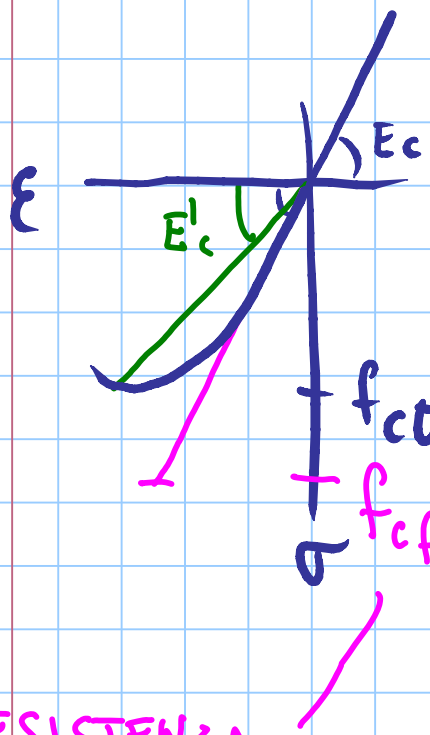
Confronto tra modello lineare e realtà



MODELLO LINEARE

REALTÀ

COME MODELLARE IL CALCESTRUZZO TESO ?



RESISTENZA A TRAZIONE PER FLESSIONE

modello del passato

- lineare
- $E_c' < E_c$
- rottura a f_{ct}

$$f_{cf} \simeq 1{,}2\, f_{ct}$$

oggi

- lineare
- E_c come a compressione
- rottura (convenzionale) a f_{cf}

normativa

C 25/30

$$f_{ctm} = 0.30 \sqrt[3]{f_{ck}^2}$$

$$0.30 \sqrt[3]{25^2} = 2.56 \text{ MPa}$$

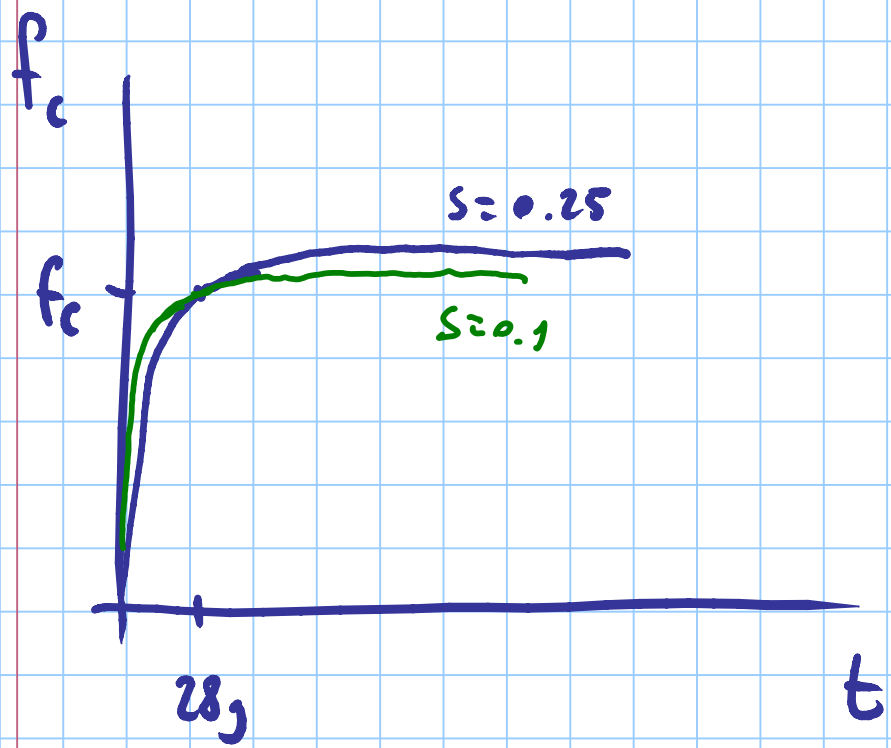
$$f_{ctk} = 0.7 \, f_{ctm}$$

$$1.80 \text{ MPa}$$

$$f_{cfk} = 1.2 \, f_{ctk}$$

$$2.16 \text{ MPa}$$

INFLUENZA DEL TEMPO — RESISTENZA



$$f_{c,t} = e^{s\left(1-\sqrt{28/t}\right)} f_{c,28}$$

cls normale $s = 0.25$

$$e^{0.25} = 1.28$$

con $s = 0.1$

INFLUENZA DEL TEMPO

- RITIRO
- DEFORMAZIONI VISCOSE

RITIRO equivale a $\Delta T < 0$