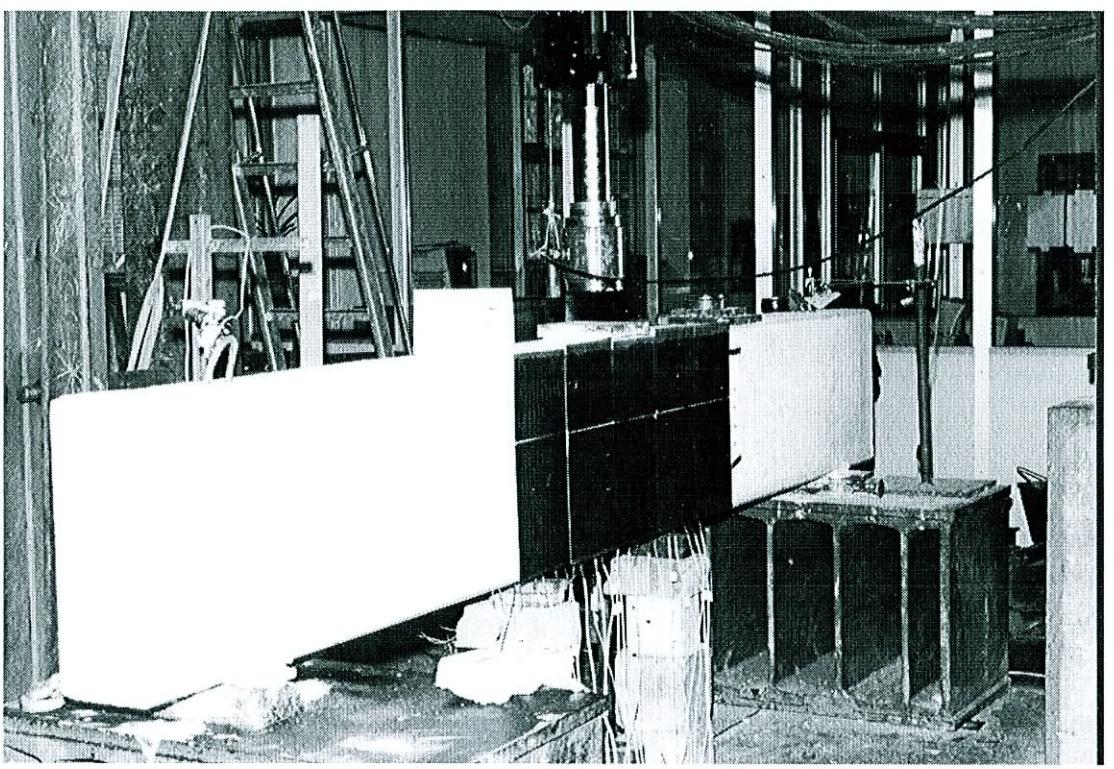
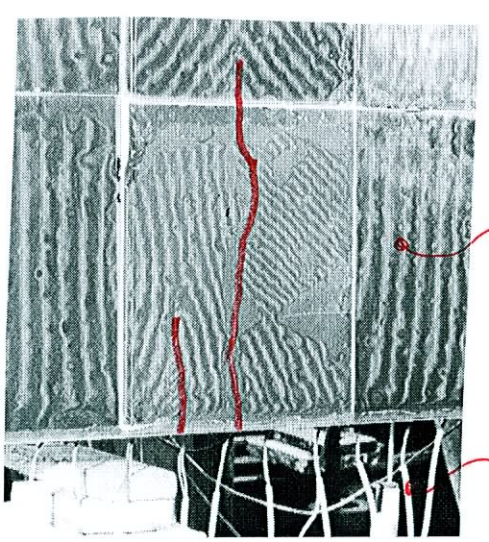
MOMENTO DI FESSURAZIONE

TRAVE INFLESSA DEBOLMENTE ARMATA



(Ferretti et al.)



MOMENTO INIZIO FESSURAZIONE

QUADRO FESSURATIVO

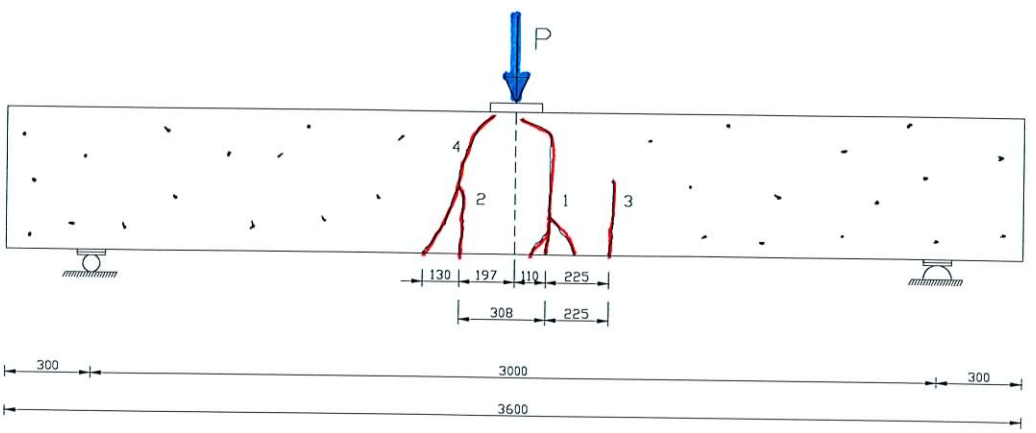
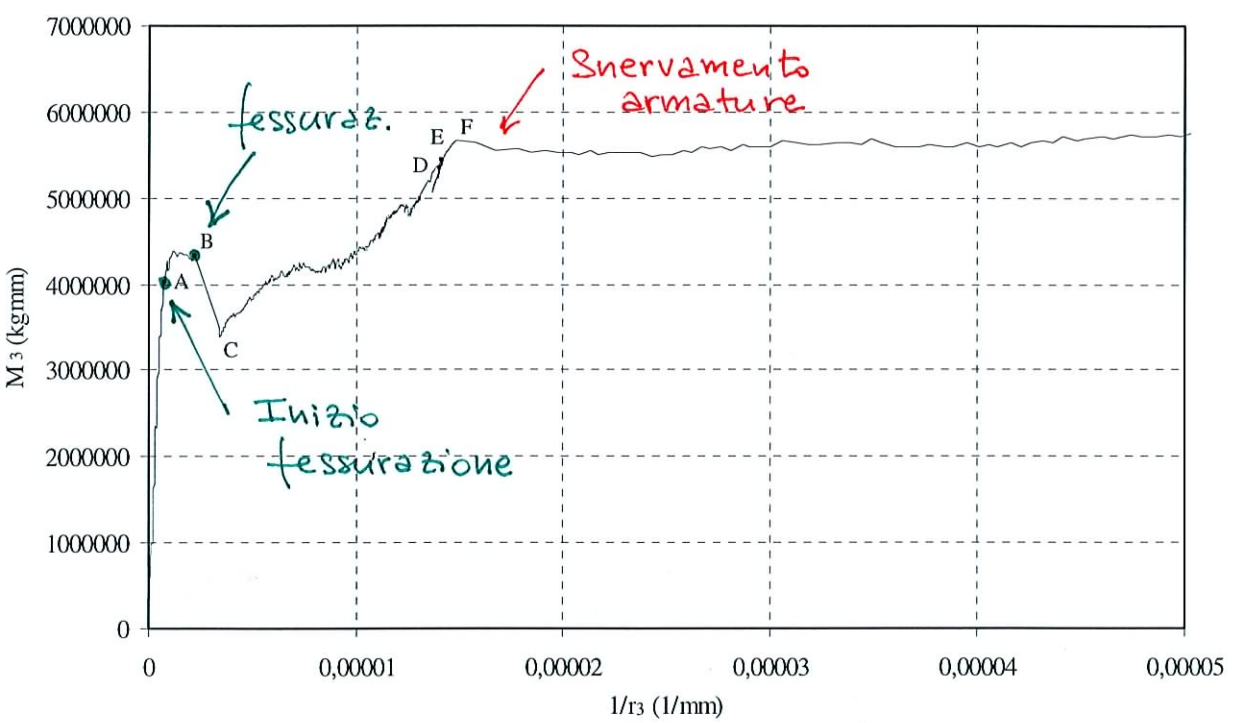
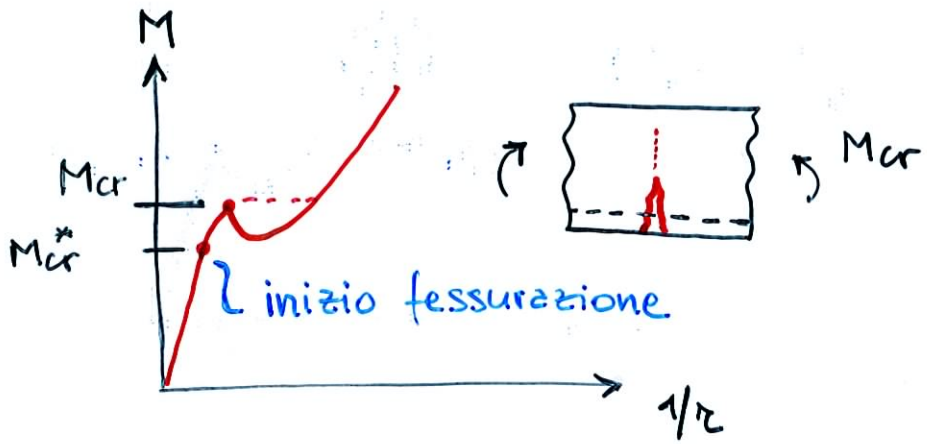
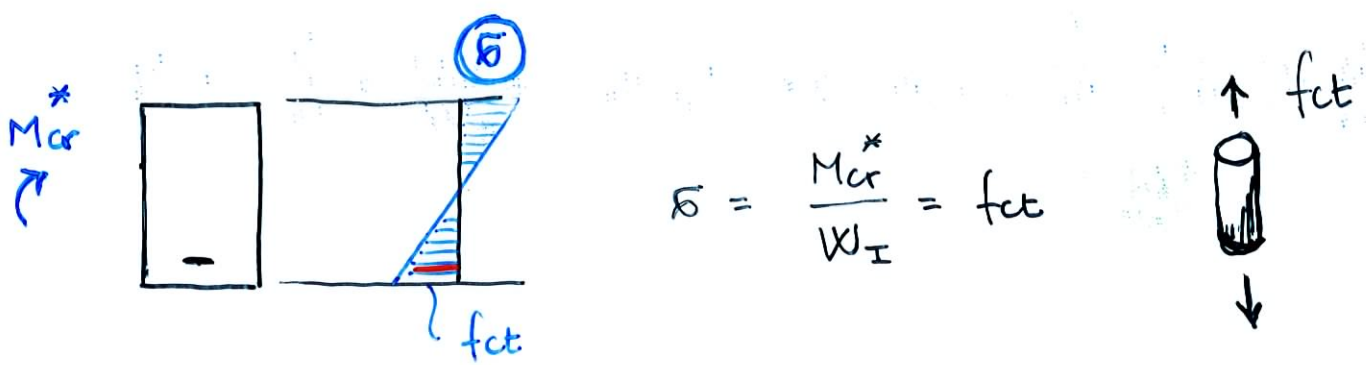


DIAGRAMMA MOMENTO - CURVATURA

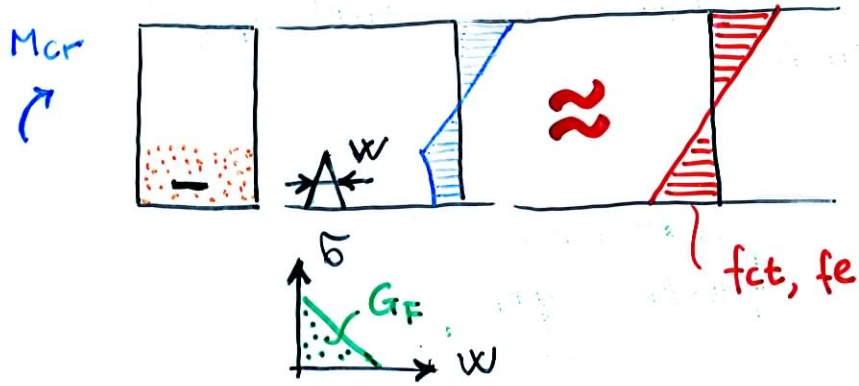


MOMENTO DI FESSURAZIONE M_{cr}





$$\sigma = \frac{M_{cr}^*}{W_I} = f_{ct}$$



$$\sigma = \frac{M_{cr}}{W_I} = f_{ct,fe}$$

$$\boxed{M_{cr} = W_I \, f_{ct,fe}}$$

RESISTENZA TRAZIONE PER FLESSIONE $f_{ct,fe}$

EC2

$$f_{ctm,fe} = \max\left\{\left(1.6 - \frac{h}{1000}\right) f_{ctm},\ f_{ctm}\right\}$$

(f_{ctm}: medio)

h = altezza elemento in mm

NTC

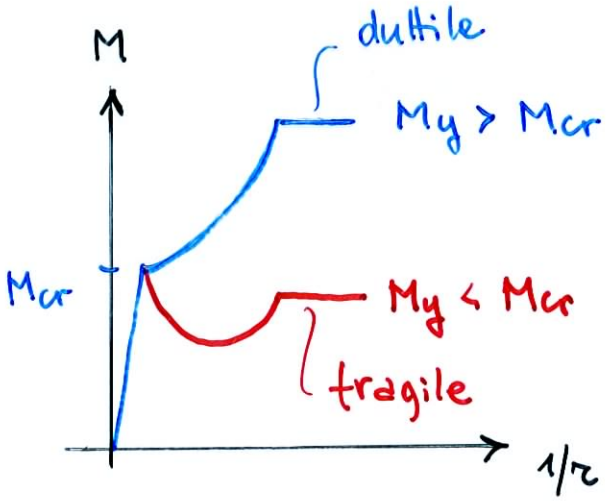
$$f_{ctm,fe} = 1{,}2\ f_{ctm}$$

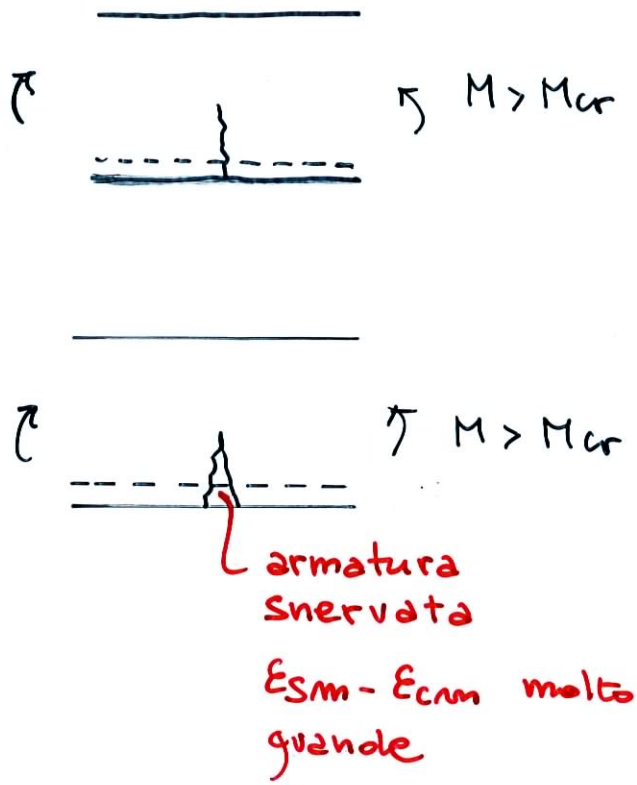
$$f_{ctk,fe} = 0{,}7\ f_{ctm,fe} = 0{,}7 \cdot 1{,}2\ f_{ctm} = 0{,}84 f_{ctm} \approx \frac{f_{ctm}}{1.2}$$

- Ai fini del calcolo w e tension stiffening l'EC2 consiglia utilizzo f_{ctm} ($\approx f_{ctk,fe}$) (↑ caratteristico)

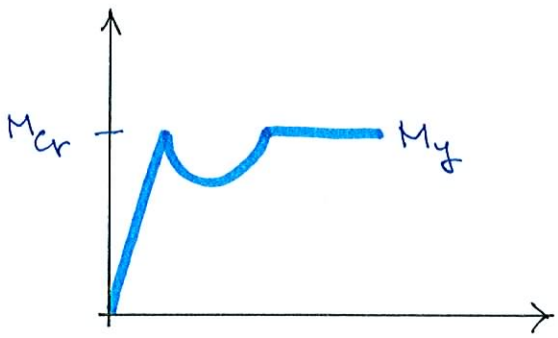
- La circolare consiglia di calcolare M_{cr} con $f_{ctm}/1.2$ (C.4.1.2.2.4.1) prossimo al valore caratteristico x flessione

ARMATURE MINIME : COMPORTAMENTO FRAGILE





ARMATURA MINIMA : As min



$M_{cr} = M_y$

Mcr

$$\sigma = \frac{M_{cr}}{W_I} = f_{ct,fe} \rightsquigarrow M_{cr} = f_{ct,fe} W_I$$

$W_I = \frac{bh^2}{6}$

My

$$M_y = k_h \cdot A_{smin} \cdot \sigma_s$$

braccio di leva

$$M_{cr} = M_y$$

$$A_{smin}\,\sigma_s = f_{ct,fe} \cdot \frac{bh^2}{6} \cdot \frac{1}{k_h h}$$

$$A_{smin} = \frac{1}{k} \frac{bh}{2} \frac{f_{ct,fe}}{\sigma_s}$$

$$A_{smin} = k_c\, K\, A_{ct} \frac{f_{ct,eff}}{\sigma_s} \quad (EC2:2005)$$

ARMATURA MINIMA : EC2 & NTC

EC2

$$A_{s,min} = k_c \, K \, A_{ct} \, f_{ct,eff}$$

A_{ct} = area cls zona tesa incipiente fessurazione

$\sigma_s = f_{yk}$

$f_{ct,eff} = f_{ctm}$

$$K \begin{cases} 1 & h < 300\,mm \\ 0.65 & h \geq 800\,mm \end{cases}$$

$$k_c \begin{cases} 1 & \text{trazione} \\ 0.4 \left[1 - \dfrac{\sigma_c}{k_1 \, (h/h^*) \, f_{ct,eff}} \right] \leq 1 \end{cases}$$

$$\sigma_c = \frac{N_{ED}}{bh} \qquad h^* \begin{cases} h & \leq 1m \\ 1m & \end{cases}$$

$$k_1 \begin{cases} 1.5 & N_{Ed} \text{ compressione} \\ 2/3 \, h^*/h & N_{Ed} \text{ trazione} \end{cases}$$

NTC

$$A_{s,min} = 0,26 \, \frac{f_{ctm}}{f_{yk}} \, b \, d$$

Fornisce valori molto più bassi EC2.