

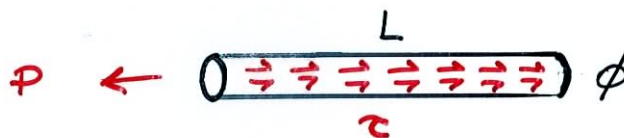
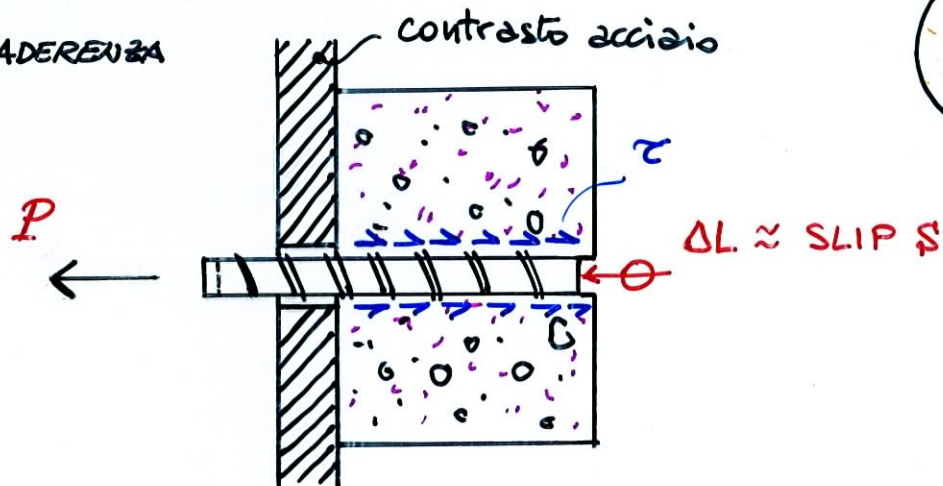
Bond of reinforcement in concrete

Agosto 2000

427 pag.

ADERENZA ACCIAIO - CALCESTRUZZO

PROVA DI ADERENZA



$$\tau = \frac{P}{\pi \phi L}$$

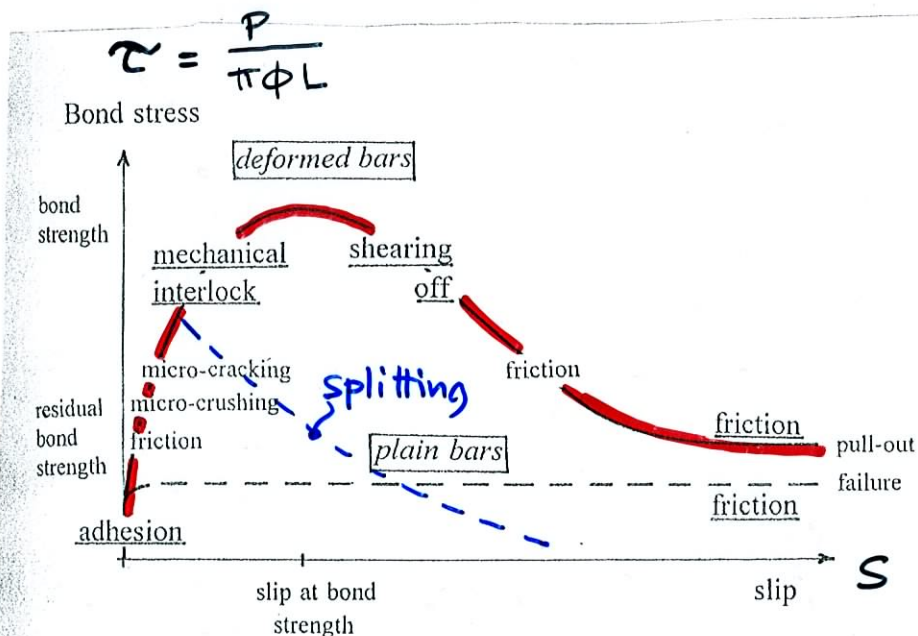
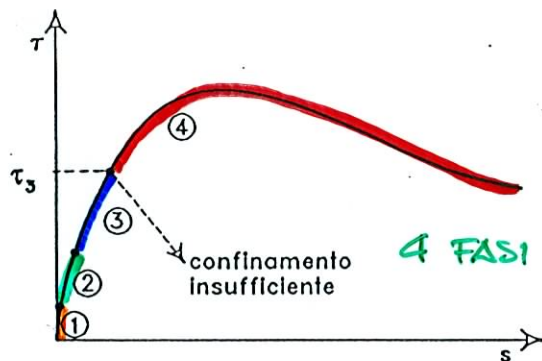


Fig.2.3.1 Phases of bond behaviour - a schematic representation of the bond stress vs. slip relationship (Reinhardt and Balázs, 1995)

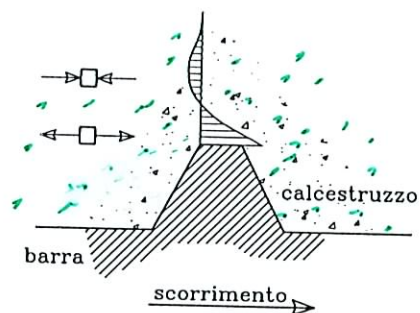
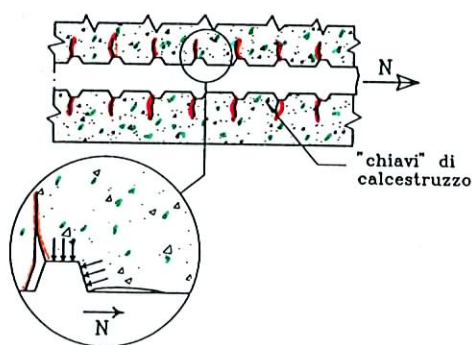
PRINCIPALI MECCANISMI D'ADERENZA ACCIAIO - CALCESTRUZZO



- ADESIONE CHIMICA
- ATRITO BARRA - CLS
- INTERAZIONE MECCANICA TRA LA BARRA ED IL CLS

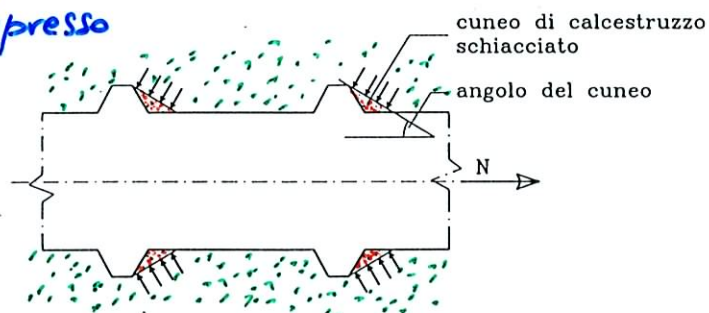
• FASE ① adesione chimica

• FASE ② fessure trasversali



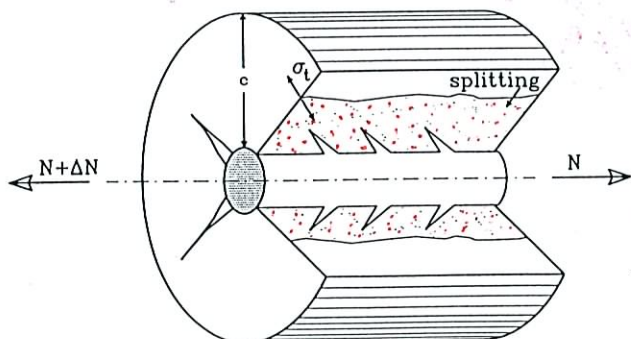
Tensioni longitudinali di trazione nel calcestruzzo all'apice della nervatura.

• FASE ③ schiacciamento del conglomerato compresso

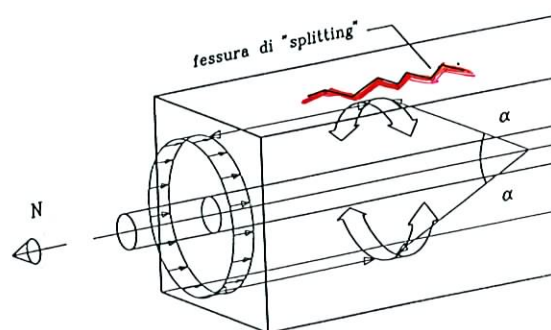


Cunei di calcestruzzo schiacciato a valle delle nervature.

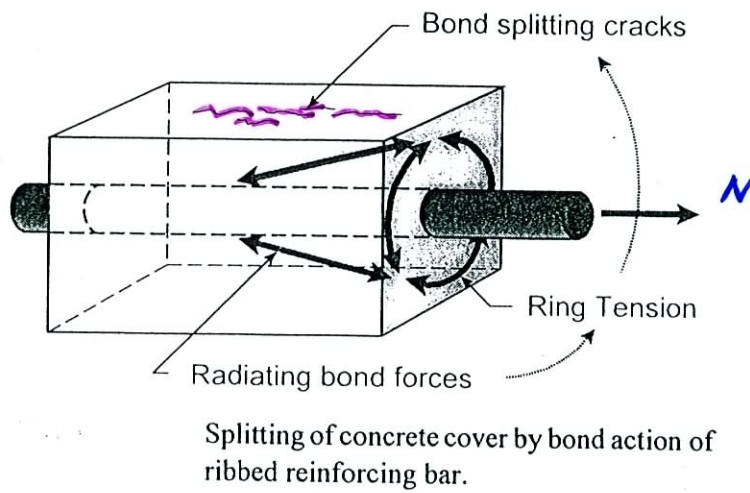
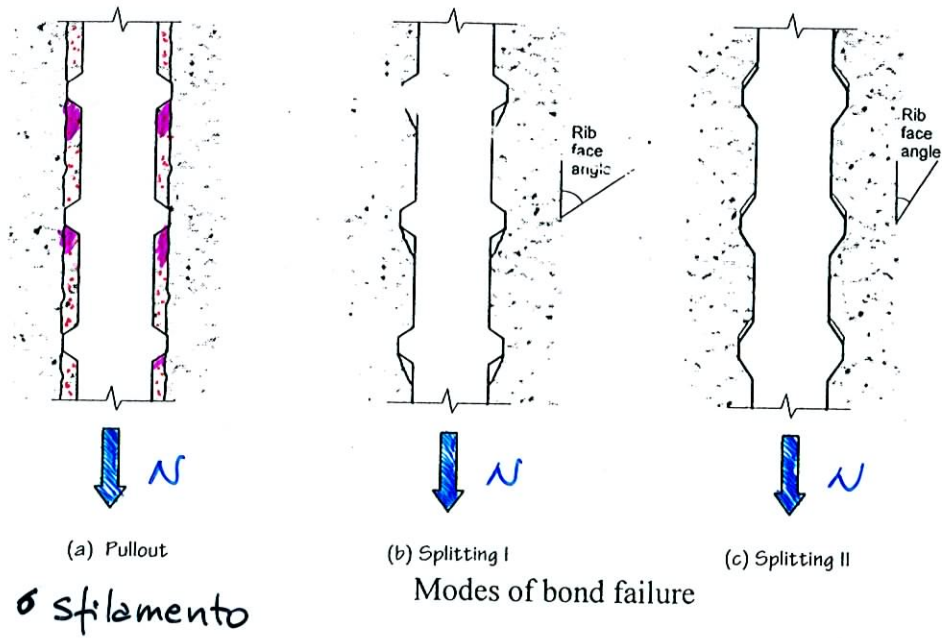
• FASE ④ fessure longitudinali



Fessure trasversali interne e longitudinali di "splitting".

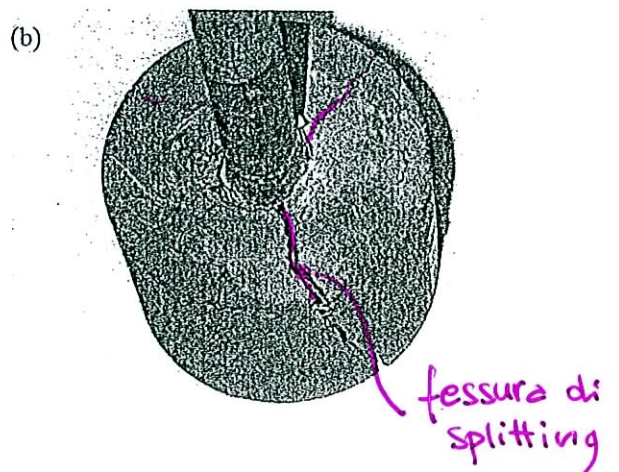
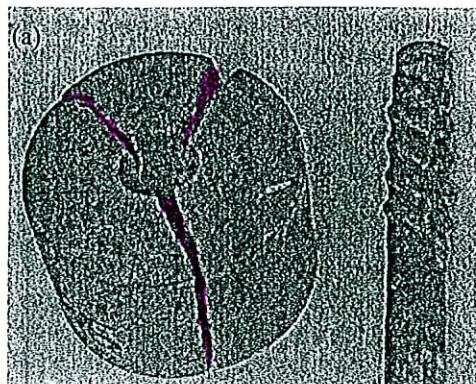


Formazione delle fessure di "splitting"



Controllo N

Controllo
allungamento
circonferenza
provino



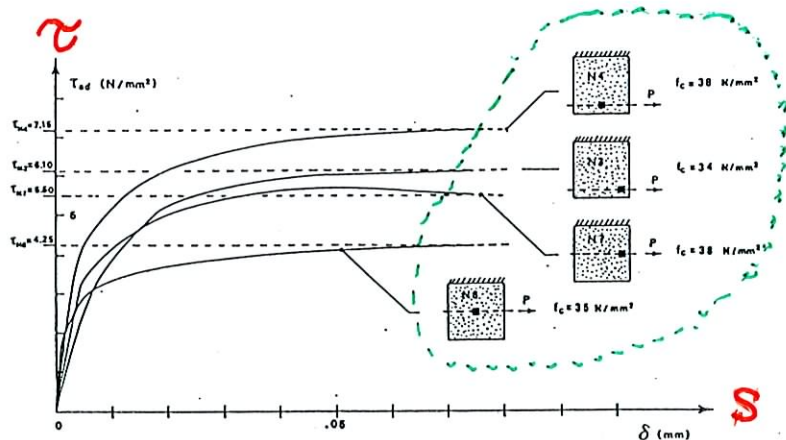
PRINCIPALI FATTORI CHE INFLUENZANO L'ADERENZA

- RESISTENZA A TRAZIONE DEL CONGLOMERATO f_{ct}
- ENERGIA DI FRATTURA DEL CONGLOMERATO G_F
- RESISTENZA A COMPRESSIONE DEL CONGLOMERATO f_c
- GEOMETRIA DELLE NERVATURE \rightarrow
- "CONFIGURATO"

influenzano la formazione di splitting e longitudinali

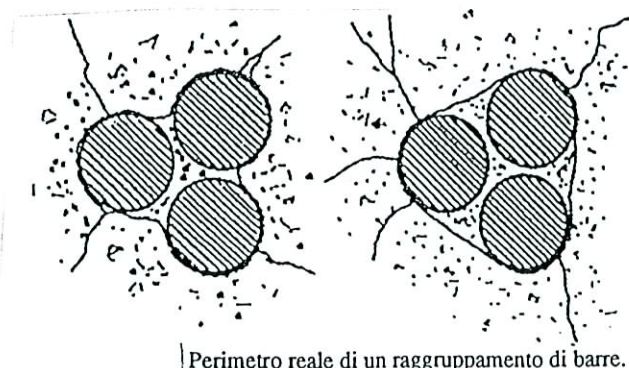
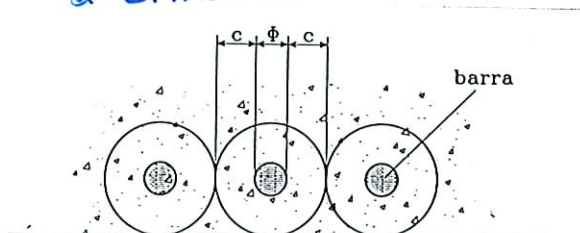
influenza lo sdraiamento dei cunei

barre lisce e nervate hanno un diverso comportamento



Influenza della posizione delle nervature
Giuriani IABSE 1981.

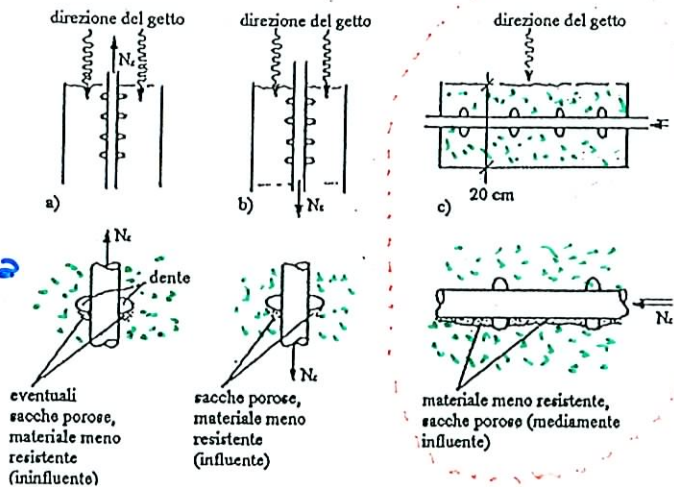
distanza tra le barre d'armatura



Perimetro reale di un raggruppamento di barre.

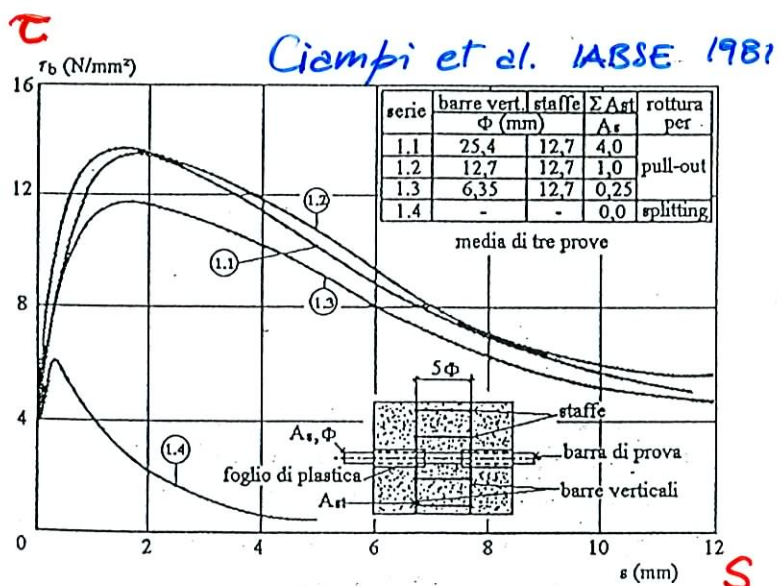
Posizione della barra nel getto

- direzione getto
- zona test o compressa



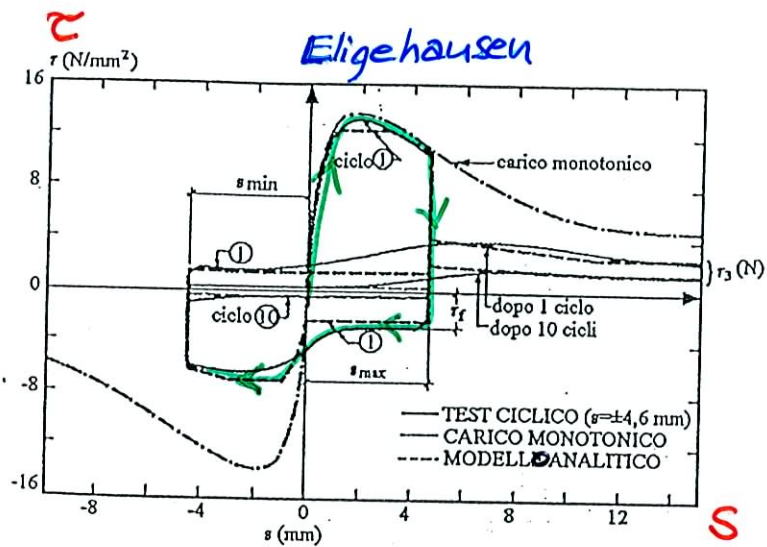
Posizioni della barra durante il getto

Armeture trasversali di confinamento



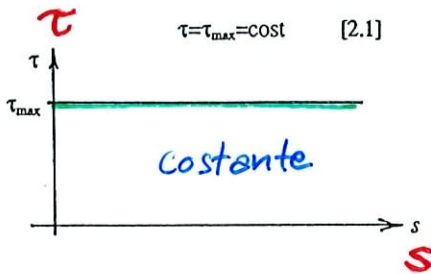
TIPO DI CARICO APPLICATO

- monotono
- ciclico

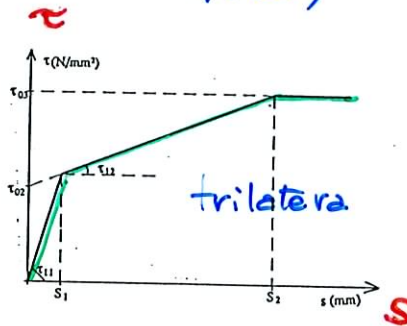


ALCUNE LEGGI DI ADERENZA ACCIAIO - CALCESTRUZZO

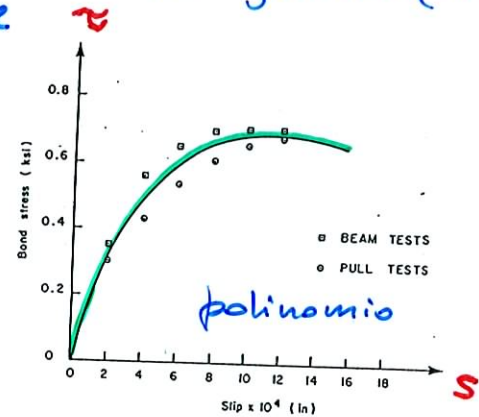
Brice



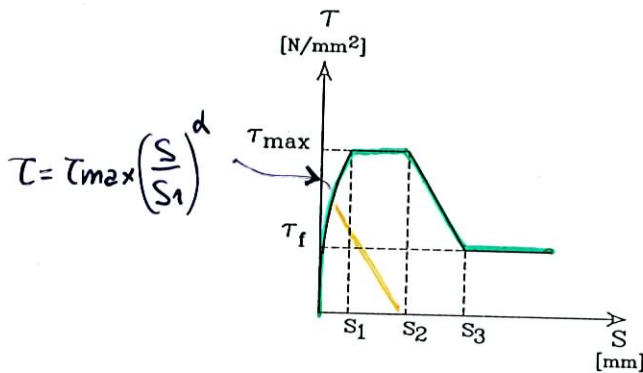
Giuriani Studi e Ricerche (1981)



Mirza e Housheer
ACI Journal (1979)

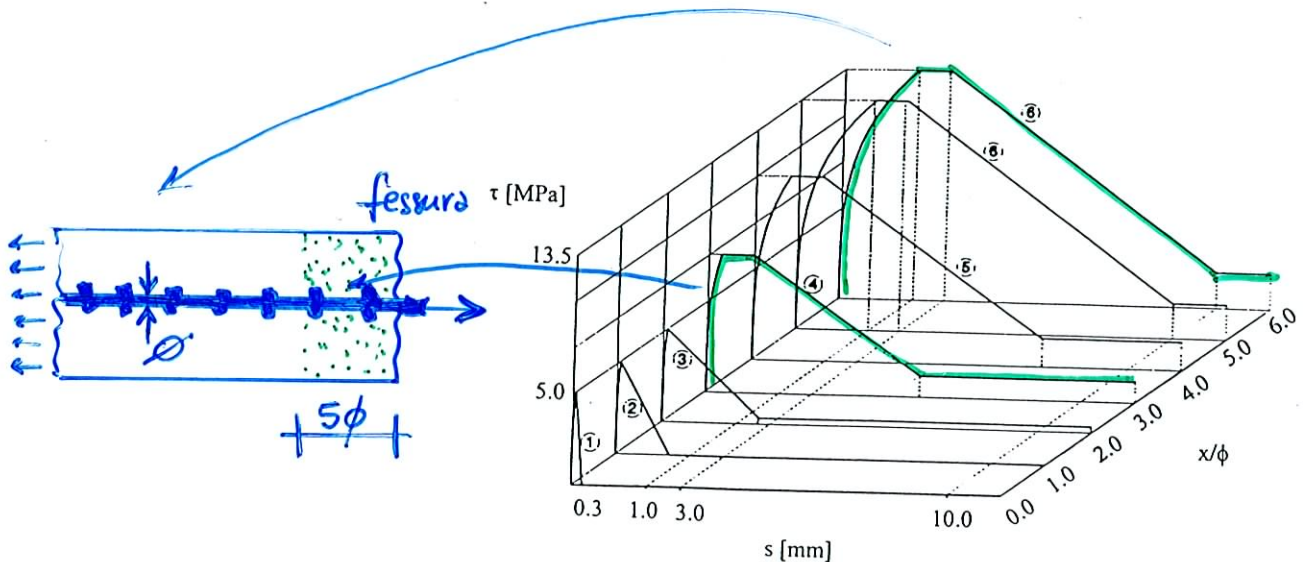


CEB MC 90 (1992)



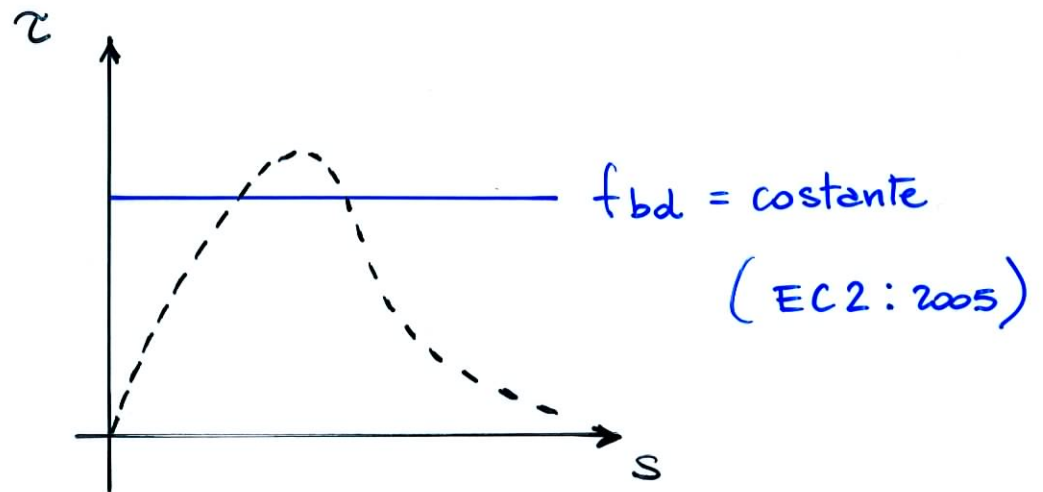
valore	calcestruzzo non confinato		calcestruzzo confinato	
	condizioni di aderenza		condizioni di aderenza	
	buone	tutti gli altri casi	buone	tutti gli altri casi
s_1	0.6 mm	0.6 mm	1.0 mm	1.0 mm
s_2	0.6 mm	0.6 mm	3.0 mm	3.0 mm
s_3	1.0 mm	2.5 mm	dist. tra le nervature	
α	0.4	0.4	0.4	0.4
τ_{\max}	$2.0 \sqrt{f_{ck}}$	$1.0 \sqrt{f_{ck}}$	$2.5 \sqrt{f_{ck}}$	$1.25 \sqrt{f_{ck}}$
τ_f	$0.15 \tau_{\max}$	$0.15 \tau_{\max}$	$0.40 \tau_{\max}$	$0.40 \tau_{\max}$

Eligehausen et al.



Bond stress-slip relationships according to Eligehausen/Popov/Bertero (1983), modified according to Kreller (1989)

LEGGE D'ADERENZA SEMPLIFICATA



con legge $\tau = \text{costante}$ calcoliamo

deformabilità Δl

ampiezza fessura w

lunghezza di ancoraggio l_b