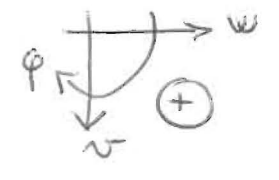


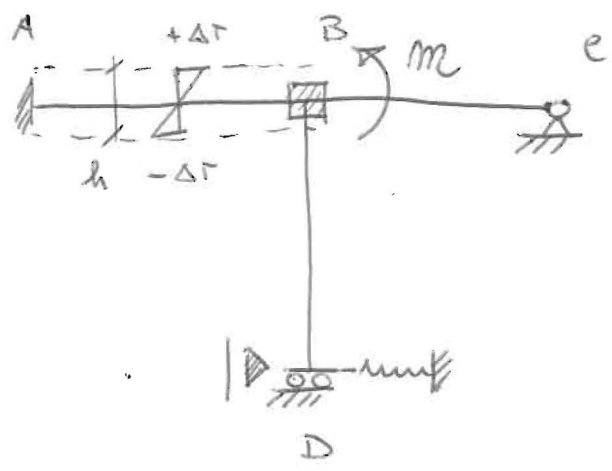
Analisi delle strutture

2 var. ind.

φ_B, w_D



fase I



L'unica asta sollecitata è AB



$M_{AB} = M$

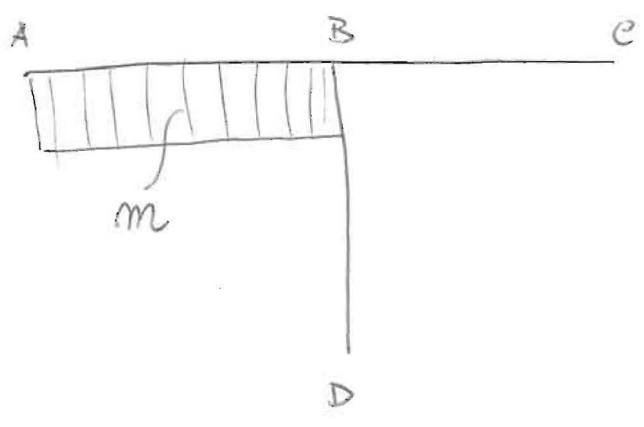
$M_{BA} = -M$

avendo posto $M = ES \alpha \text{ grad } T = ES \alpha \frac{2\Delta T}{h}$

Il momento applicato in B reagisce con una coppia pari a $-M$
 Il cono di momento in D non reagisce.

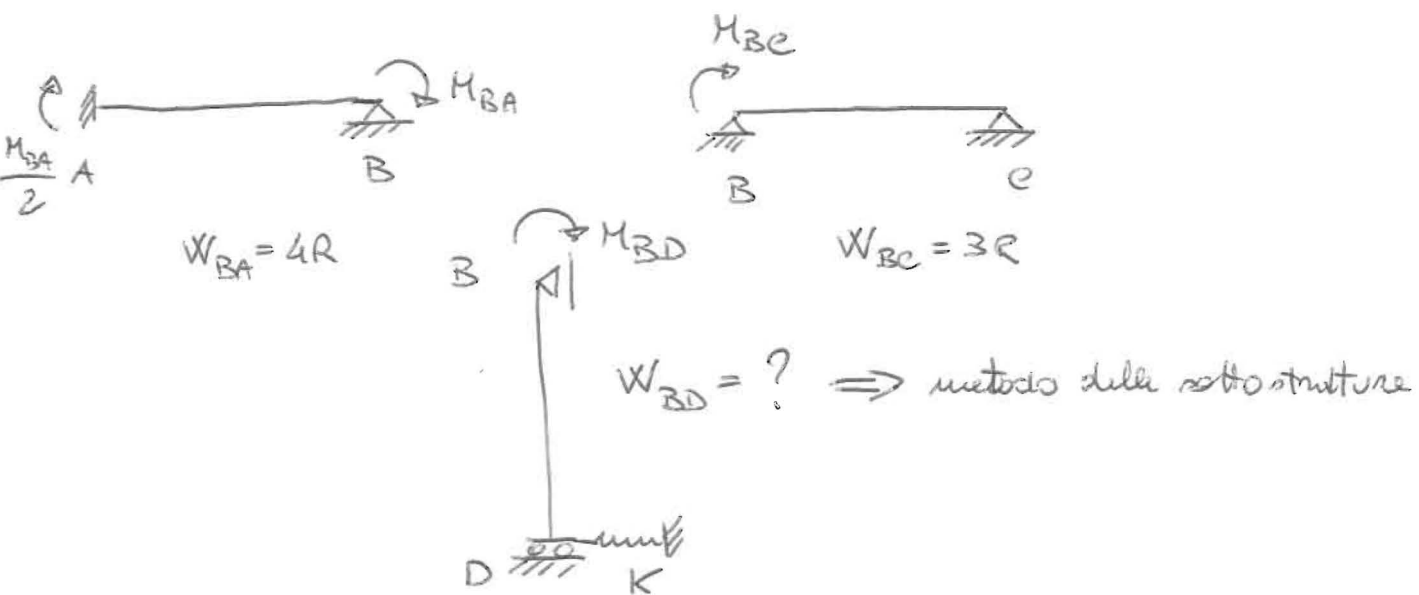
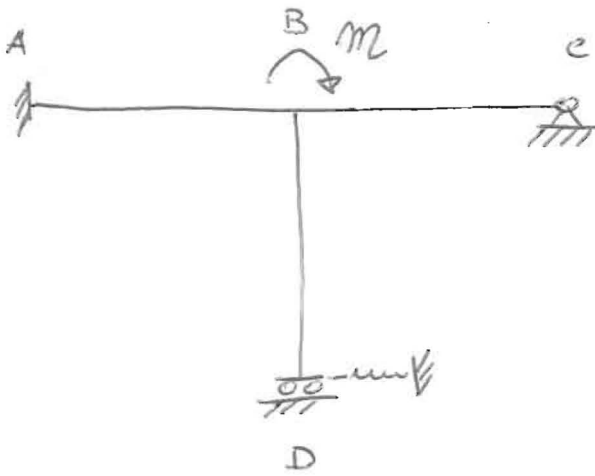
Diagramma dei momenti flettenti in fase I

Deformata qualitativa in fase I

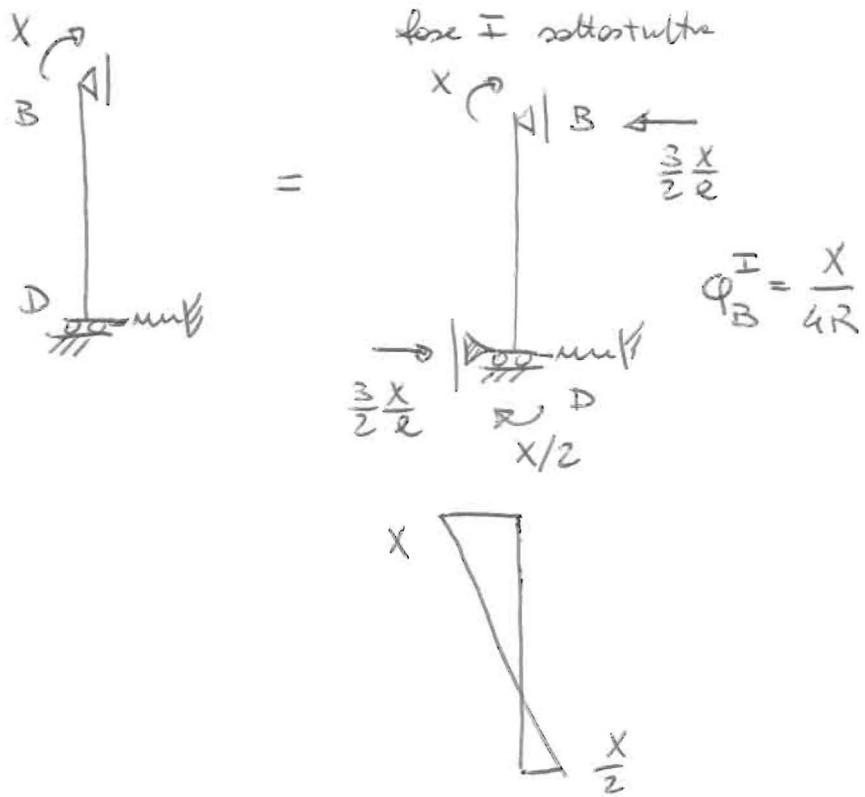


Le curvature elastiche compensano esattamente quelle dovute a grad T: la struttura rimane indeformata

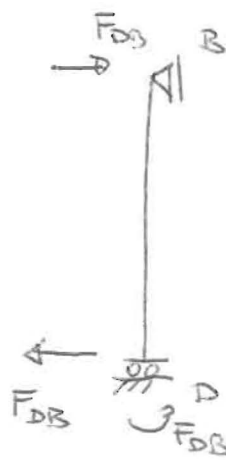
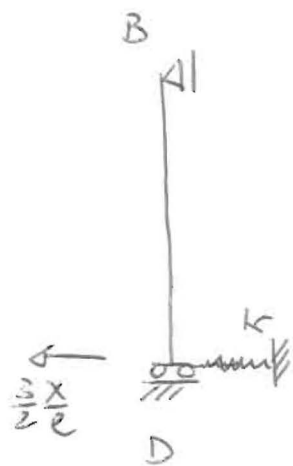
fore II



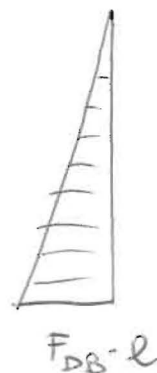
Analisi della sottostuttura soggetta alla coppia esplorativa X



fase II sottostituita



$$U_{DB} = \frac{3R}{e^2}$$



$$F_{molla} \quad U_{molla} = k$$

$$F_{DB} = \frac{U_{DB}}{U_{DB} + U_{molla}} \frac{3X}{2e} = \frac{3X}{2e} \frac{\frac{3R}{e^2}}{\frac{3R}{e^2} + k} = \frac{3X}{2e} \frac{3R}{3R + ke^2}$$

$$F_{molla} = \frac{U_{molla}}{U_{DB} + U_{molla}} \frac{3X}{2e} = \frac{3X}{2e} \frac{ke^2}{3R + ke^2}$$

$$\varphi_B^{II} = \frac{F_{DB}}{2R/e} = \frac{3X}{2e} \frac{3R}{3R + ke^2} \frac{e}{2R} = \frac{9X}{4(3R + ke^2)}$$

rotazione totale sottostituita

$$\varphi_B^{tot} = \varphi_B^I + \varphi_B^{II} = \frac{X}{4R} + \frac{9X}{4(3R + ke^2)} = \frac{X}{4} \frac{12R + ke^2}{R(3R + ke^2)}$$

$$W_{BD} = \frac{X}{\varphi_B^{tot}} = 4R \frac{3R + ke^2}{12R + ke^2}$$

$$\lim_{k \rightarrow 0} W_{BD} = R \quad \left(\text{OK} \begin{array}{c} \curvearrowright \\ | \\ \text{---} \\ | \\ \text{---} \end{array} \right)$$

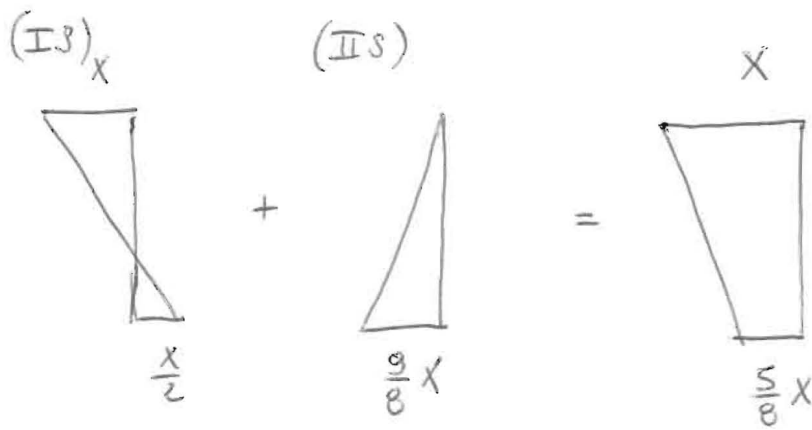
$$\lim_{k \rightarrow \infty} W_{BD} = 4R \quad \left(\text{OK} \begin{array}{c} \curvearrowright \\ | \\ | \\ | \\ | \\ \text{---} \end{array} \right)$$

per svolgere i calcoli manuali supponiamo che $k = R/e^2$

$$\Rightarrow W_{BD} = \frac{16}{13} R$$

$$\Rightarrow F_{DB} = \frac{3X}{2e} \frac{3}{4} = \frac{9X}{8e}$$

Diagramma momenti sottostituite



Torquiamo alle for II

$$W_{TOT} = W_{BA} + W_{BD} + W_{Be} = 4R + \frac{16}{13}R + 3R = \frac{107}{13}R$$

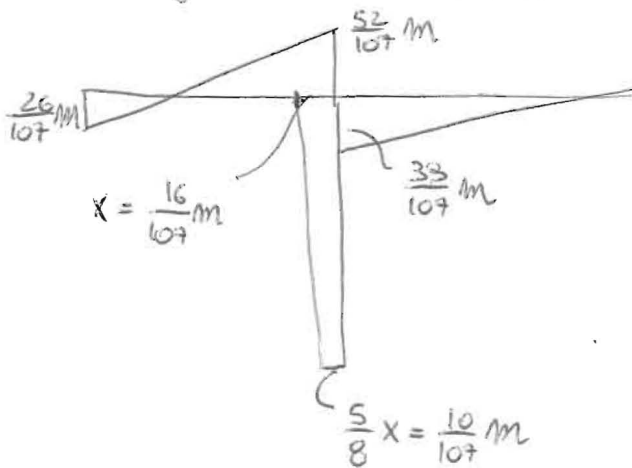
$$M_{BA} = \frac{W_{BA}}{W_{TOT}} M = \frac{52}{107} M$$

$$M_{BD} = \frac{W_{BD}}{W_{TOT}} M = \frac{16}{107} M$$

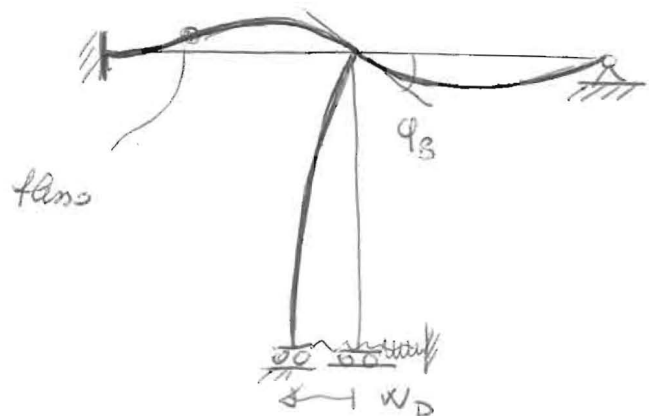
$$M_{Be} = \frac{39}{107} M$$

(è il valore di X sullo studio delle sottostituite)

Diag. Momenti in for II



Def. qualitative for II



$$\varphi_B = \frac{M}{W_{TOT}} = \frac{13}{107} M$$

$$\begin{aligned} |W_D| &= \frac{F_{DB}}{U_{DB}} = \frac{F_{tot}}{U_{tot}} = \frac{F_{uollo}}{U_{uollo}} = \\ &= \frac{3X}{2e} \frac{1}{3R/e^2 + k} = \frac{3 \cdot \frac{16M}{107}}{2e} \frac{e^2}{4R} = \frac{6e}{107R} M \end{aligned}$$

Diag. Mount' finch (I+II)

Det Qualitona
≡ for II

