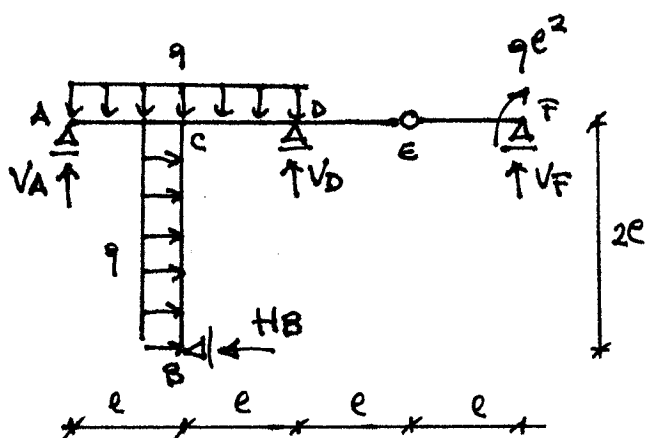


Risoluzione Esercizio 1

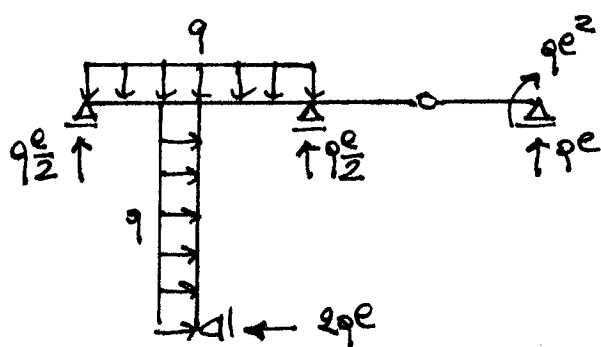
$$H_B = 2qe$$

$$\sum \rightarrow V_F \cdot e - qe^2 = 0 \rightarrow \boxed{V_F = qe}$$

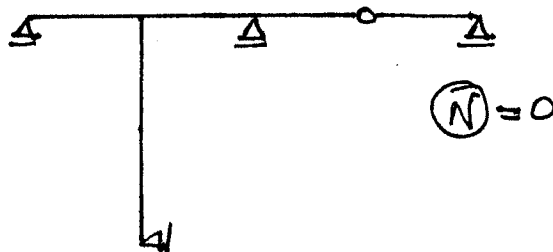
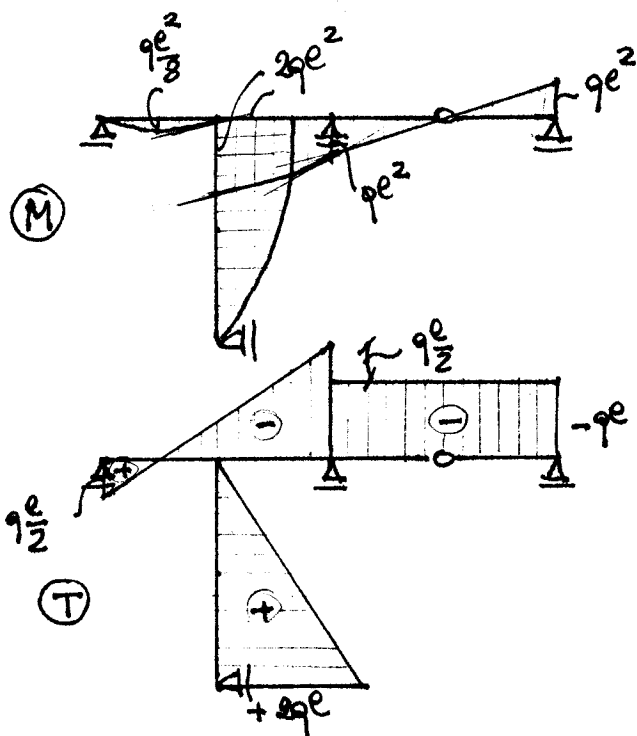
$$\sum \uparrow qe \cdot e - qe^2 + V_D \cdot 2e - 2qe^2 + 2qe^2 - 2qe \cdot 2e = 0$$

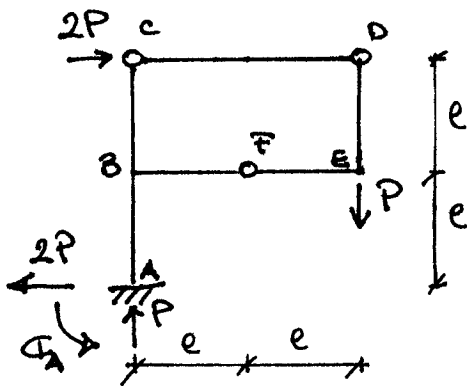
$$\rightarrow \boxed{V_D = qe/2}$$

$$V_A = 2qe - V_D - V_F = qe/2$$

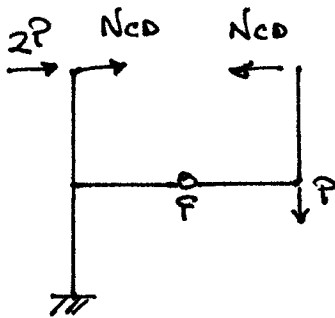


Diagrammi quotati:



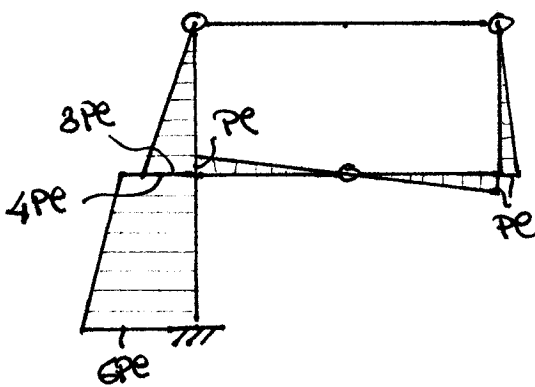
Risoluzione Esercizio 2

$$A) \quad \mathcal{M}_A = 2P \cdot 2e + P \cdot 2e = 6Pe$$

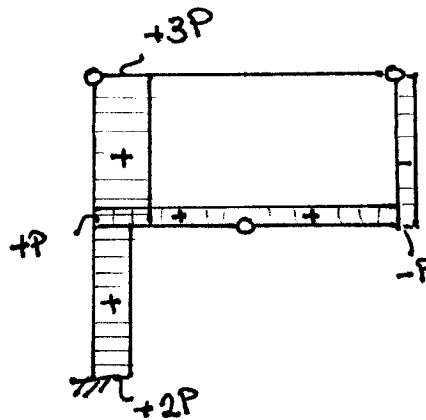


$$F) \quad N_{CD} \cdot e - Pe = 0 \rightarrow N_{CD} = P$$

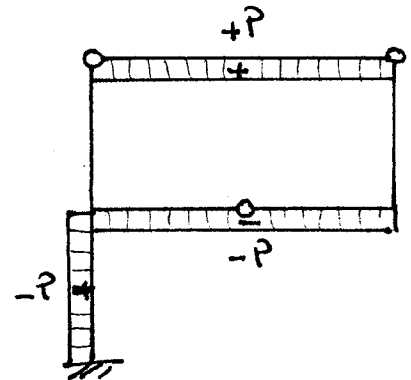
Diagrammi quotati:



(M)



(T)

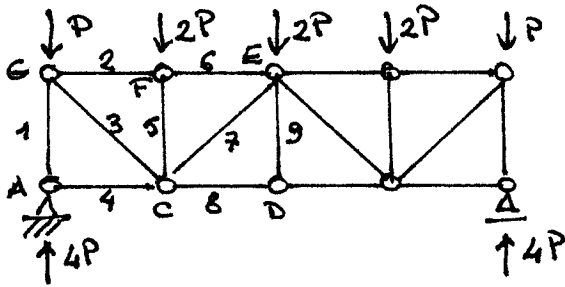


(N)

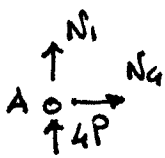
Risoluzione Esercizio 3

"Primario":

$$P = 9 \frac{e}{2} = 1000 \text{ kg}$$

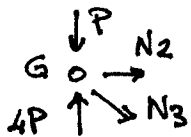


Equilibrio ai nodi:



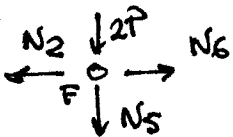
$$N_1 = 4P$$

$$N_4 = 0$$



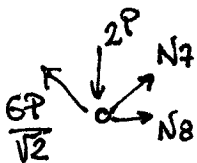
$$N_3 \frac{\sqrt{2}}{2} = 3P \rightarrow N_3 = \frac{6P}{\sqrt{2}}$$

$$N_2 = -N_3 \frac{\sqrt{2}}{2} = -3P$$



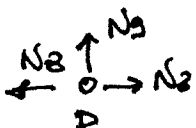
$$N_6 = N_2$$

$$N_5 = -2P$$



$$N_7 \frac{\sqrt{2}}{2} = 2P - \frac{6P}{\sqrt{2}} \frac{\sqrt{2}}{2} = -P$$

$$N_8 = \frac{6P\sqrt{2}}{\sqrt{2} \cdot 2} + \frac{\sqrt{2}P\sqrt{2}}{2} = 4P$$



$$N_9 = 0$$

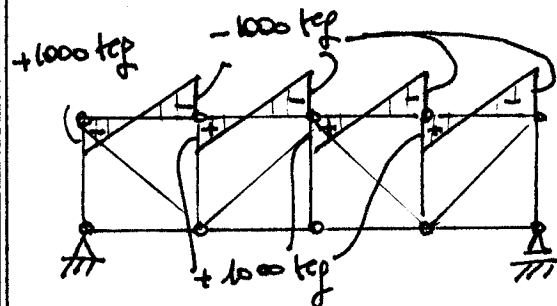
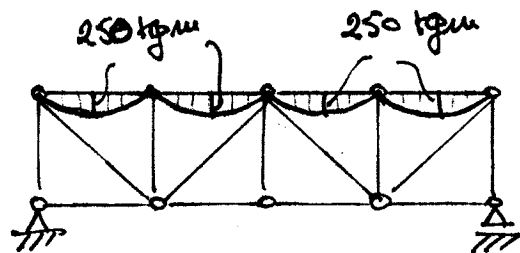
ASTA	N	kg
1	-4P	-4000
2	-3P	-3000
3	$6P/\sqrt{2}$	+4242
4	0	0
5	-2P	-2000
6	-3P	-3000
7	$-\sqrt{2}P$	-1414
8	4P	+4000
9	0	0

compressione
compressione
trazione

compressione
compressione
compressione
trazione

(Aste dritte: per simmetria)

"Secondario"



(M)

(T)

$$\underline{T} = \begin{bmatrix} 10x_1^2 & -20x_1x_2 & 0 \\ -20x_1x_2 & 10x_2^2 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$d\omega \underline{T} = \begin{bmatrix} 20x_1 - 20x_1 \\ -20x_2 + 20x_2 \\ 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \quad (\text{parte di volume nulla})$$

Tensioni superficiali:

• lato di normale $\underline{m} = (1, 0, 0)$: $\underline{T}_{\underline{m}} = \begin{bmatrix} 10x_1^2 \\ -20x_1x_2 \\ 0 \end{bmatrix} \Big|_{x_1=d} = \begin{bmatrix} 10d^2 \\ -20dx_2 \\ 0 \end{bmatrix} = \begin{bmatrix} 1000 \\ -2000x_2 \\ 0 \end{bmatrix}$

• " " $\underline{m} = (-1, 0, 0)$: $\underline{T}_{\underline{m}} = \begin{bmatrix} -10x_1^2 \\ +20x_1x_2 \\ 0 \end{bmatrix} \Big|_{x_1=0} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$

• " " $\underline{m} = (0, 1, 0)$: $\underline{T}_{\underline{m}} = \begin{bmatrix} -20x_1x_2 \\ 10x_2^2 \\ 0 \end{bmatrix} \Big|_{x_2=d} = \begin{bmatrix} -2000x_1 \\ 1000 \\ 0 \end{bmatrix}$

• " " $\underline{m} = (0, -1, 0)$: $\underline{T}_{\underline{m}} = \begin{bmatrix} 20x_1x_2 \\ -10x_2^2 \\ 0 \end{bmatrix} \Big|_{x_2=0} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$

• " " $\underline{m} = (0, 0, \pm 1)$: $\underline{T}_{\underline{m}} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$

Tensioni e loro direzioni principali in $P = (d, d, 0)$:

$$\underline{T} = \begin{bmatrix} 1000 & -2000 & 0 \\ -2000 & 1000 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$C = (1000; 0)$$

$$\alpha = 45^\circ$$

$$R = \sqrt{0 + 8000^2} = 2000 \quad 2$$

$$\left. \begin{matrix} \sigma_1 \\ \sigma_2 \end{matrix} \right\} = 1000 \mp 2000 = \begin{cases} -1000 \text{ kg/cm}^2 \\ +3000 \text{ kg/cm}^2 \end{cases}$$

