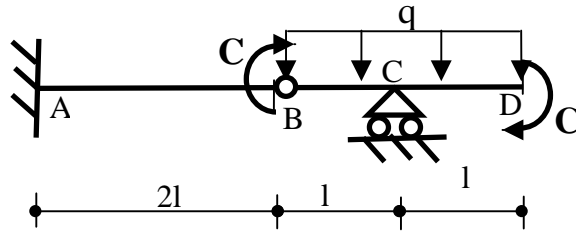
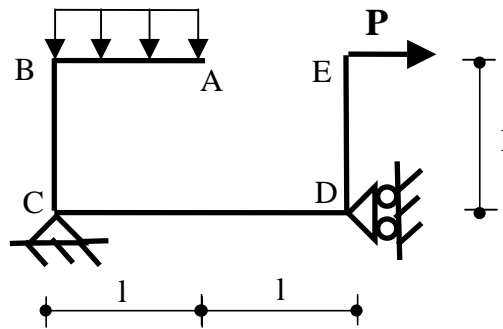


FERRARA, 3/11/2008

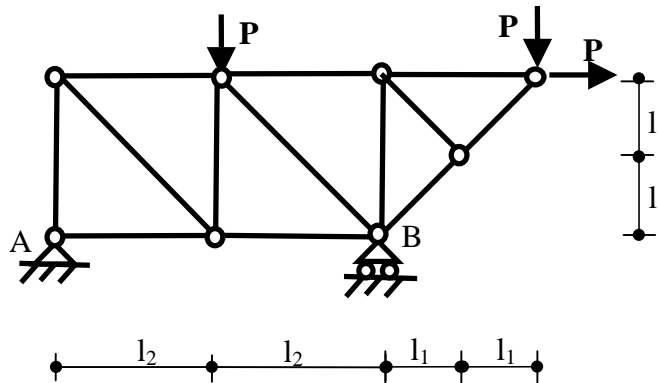
- 1) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $l=1.5$ m, $q=2000$ kg/m, $C=1.5$ tm.



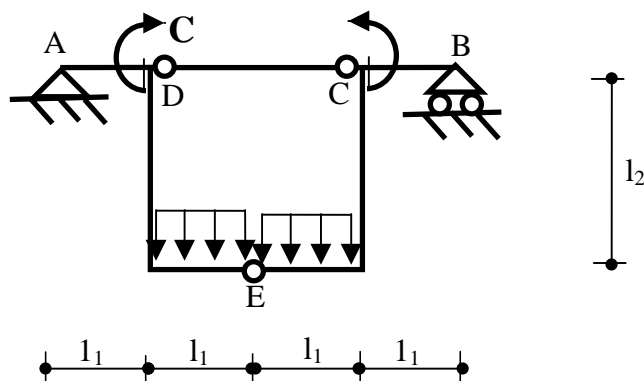
- 2) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $l=1.5$ m, $q=2000$ kg/m, $P=1.5$ t.

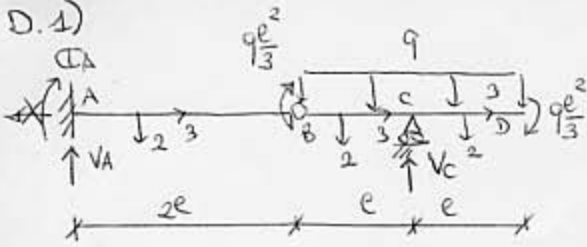


- 3) Calcolare lo stato di sollecitazione per $l_1=0.75$ m, $l_2=1.5$ m, $P=1.5$ t.



- 4) Disegnare i diagrammi quotati di (N,T,M) per $l_1=0.75$ m, $l_2=1.5$ m, $C=1.5$ tm, $q=2000$ kg/m.



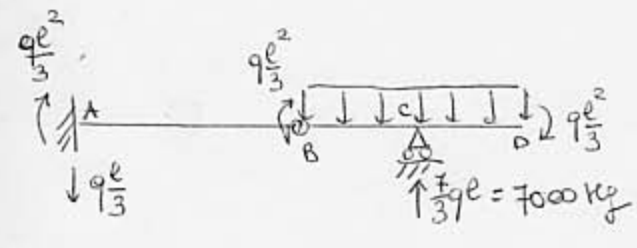


(B) BCD $V_c l = 2qe^2 + qe^2 = \frac{7}{3}qe^2$ $q = 2t/m$
 $l = 1.5m$

$\rightarrow V_c = \frac{7}{3}qe$

(↑) $V_A = 2qe - \frac{7}{3}qe = -\frac{1}{3}qe$

(B) AB $\Sigma A = -\frac{qe^2}{3} + V_A 2e$
 $= -\frac{qe^2}{3} + 2qe^2 = \frac{5}{3}qe^2$



Equilibrio in A: $\frac{qe^2}{3}$ (up), $\frac{qe^2}{3}$ (down), $\frac{qe^2}{3}$ (down)

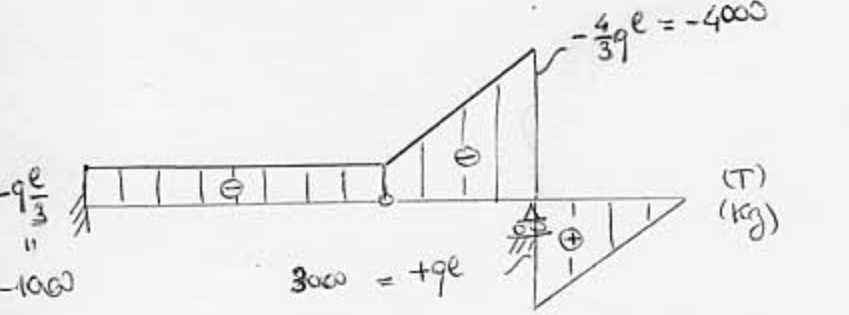
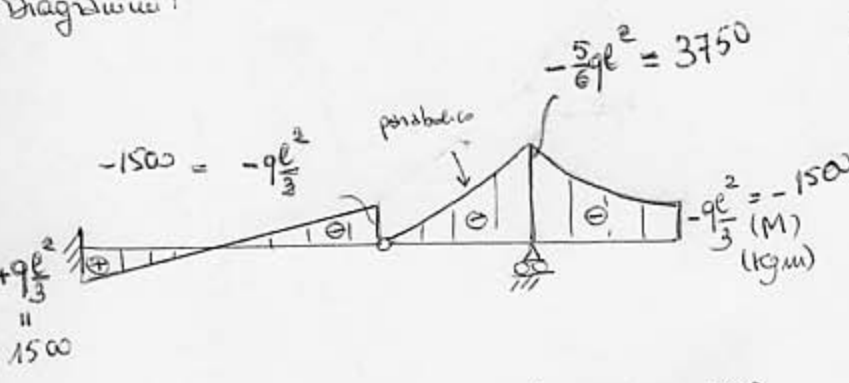
Equilibrio di AB: $\frac{qe^2}{3}$ (up), $\frac{qe^2}{3}$ (down), $\frac{qe^2}{3}$ (down), $\frac{qe^2}{3}$ (up)

Equilibrio di B: $\frac{qe^2}{3}$ (down), $\frac{qe^2}{3}$ (up), $\frac{qe^2}{3}$ (down), $\frac{qe^2}{3}$ (up)

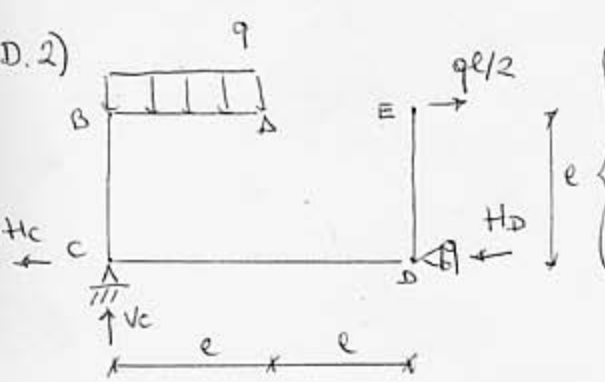
Equilibrio di BC: $\frac{qe^2}{3}$ (down), $\frac{4qe^2}{3}$ (up)

Equilibrio in C: $\frac{4qe^2}{3}$ (down), $\frac{7qe^2}{3}$ (up)

Diagrammi:

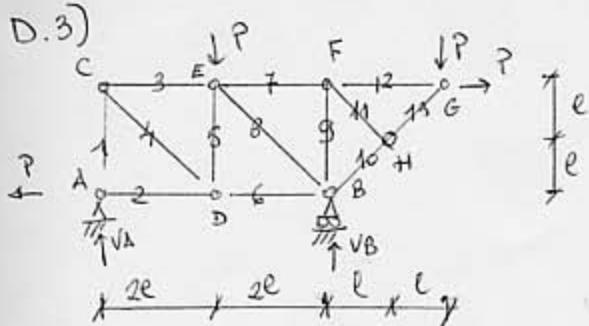


$N = 0$



$V_c = qe$
 $H_c + H_D = \frac{qe}{2}$
 (C) $\frac{qe^2}{2} + \frac{qe^2}{2} = 0$

Struttura labile: è impossibile soddisfare l'eq. me dell'equilibrio alle rotazioni attorno al punto C.



$$(A) \quad V_B 4e = 2Pe + P6e + P2e = 10Pe$$

$$\rightarrow V_B = \frac{5}{2}P$$

$$(T) \quad V_A = 2P - \frac{5}{2}P = -\frac{P}{2}$$

Equilibrio ai nodi:

$$\begin{matrix} \uparrow N_1 \\ \leftarrow P \\ \downarrow \frac{P}{2} \\ \rightarrow N_2 \end{matrix} \quad \left\{ \begin{array}{l} N_1 = \frac{P}{2} \\ N_2 = P \end{array} \right.$$

$$\begin{matrix} \rightarrow N_3 \\ \downarrow \frac{P}{2} \\ \searrow N_4 \end{matrix} \quad \left\{ \begin{array}{l} -N_4 \frac{\sqrt{2}}{2} = \frac{P}{2} \rightarrow N_4 = -\frac{P\sqrt{2}}{2} \\ N_3 = -N_4 \frac{\sqrt{2}}{2} = +\frac{P}{2} \end{array} \right.$$

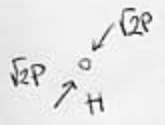
$$\begin{matrix} \uparrow N_5 \\ \leftarrow \frac{P\sqrt{2}}{2} \\ \rightarrow N_6 \\ \downarrow P \end{matrix} \quad \left\{ \begin{array}{l} N_5 = \frac{P\sqrt{2}}{2} \frac{\sqrt{2}}{2} \\ N_6 = P - \frac{P\sqrt{2}}{2} \frac{\sqrt{2}}{2} = \frac{P}{2} \end{array} \right.$$

$$\begin{matrix} \downarrow P \\ \leftarrow \frac{P}{2} \\ \rightarrow N_7 \\ \downarrow N_8 \\ \uparrow \frac{P}{2} \end{matrix} \quad \left\{ \begin{array}{l} -N_8 \frac{\sqrt{2}}{2} = \frac{3}{2}P \rightarrow N_8 = -\frac{3}{2}P\sqrt{2} \\ N_7 = \frac{P}{2} - N_8 \frac{\sqrt{2}}{2} = \frac{P}{2} + \frac{3}{2}P = 2P \end{array} \right.$$

$$\begin{matrix} \uparrow N_9 \\ \rightarrow N_{10} \\ \leftarrow \frac{3P\sqrt{2}}{2} \\ \downarrow \frac{P}{2} \\ \uparrow \frac{3P}{2} \end{matrix} \quad \left\{ \begin{array}{l} \frac{\sqrt{2}}{2} N_{10} = \frac{P}{2} - \frac{3}{2}P \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} = -P \rightarrow N_{10} = -P\sqrt{2} \\ N_9 = -\frac{5}{2}P + \frac{3}{2}P\sqrt{2} \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} N_{10} = -\frac{5}{2} + \frac{3}{2} + P = 0 \end{array} \right.$$

$$\begin{matrix} \rightarrow N_{12} \\ \leftarrow 2P \\ \downarrow N_{11} \end{matrix} \quad \left\{ \begin{array}{l} \frac{\sqrt{2}}{2} N_{11} = 0 \\ N_{12} = 2P \end{array} \right.$$

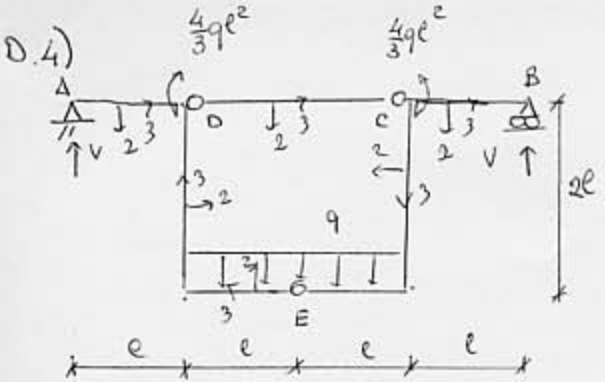
$$\begin{matrix} \downarrow P \\ \leftarrow P \\ \rightarrow P \\ \downarrow N_{13} \end{matrix} \quad \left\{ \begin{array}{l} N_{13} \frac{\sqrt{2}}{2} = -P \rightarrow N_{13} = -P\sqrt{2} \\ 2P = P - N_{13} \frac{\sqrt{2}}{2} = P + P \quad \checkmark \end{array} \right.$$



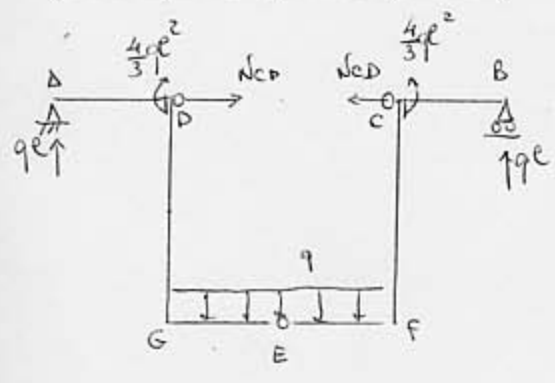
Asq	N	kg
1	P/2	750
2	P	1500
3	P/2	750
4	-P/2	1061
5	P/2	750
6	P/2	750
7	2P	3000
8	-3/2 P sqrt(2)	-3182
9	0	0
10	-P sqrt(2)	-2121
11	0	0
12	2P	3000
13	-P sqrt(2)	-2121



- TIRANTE
- PUNTO



$q = 2 \text{ t/m}$
 $l = 0.75 \text{ m}$
 $\sum V = \sum qe$



(E↑) BC FE

$$N_{CD} 2e = -\frac{4}{3} qe^2 + qe 2e + q \frac{e^2}{2}$$

$$= qe^2 \left[-\frac{4}{3} - 2 + \frac{1}{2} \right] = qe^2 \frac{-8-12+3}{6}$$

$$= -\frac{17}{6} qe^2$$

$\hookrightarrow N_{CD} = -\frac{17}{12} qe = -2125 \text{ kg}$

Diagrammi:

