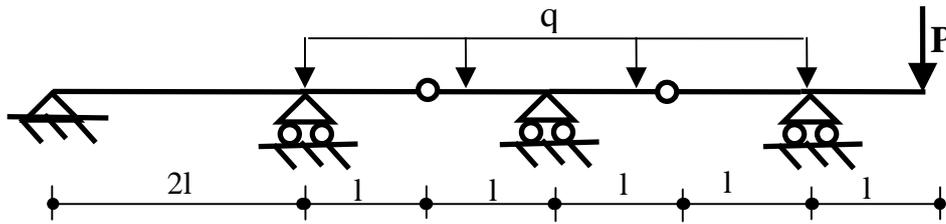
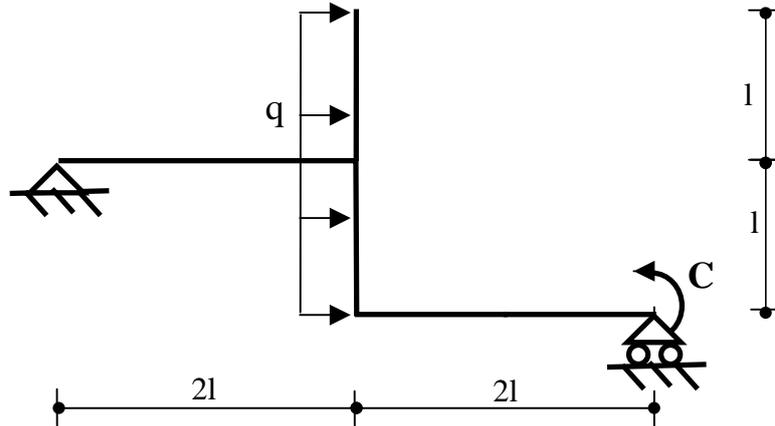


FERRARA, 27/10/2009

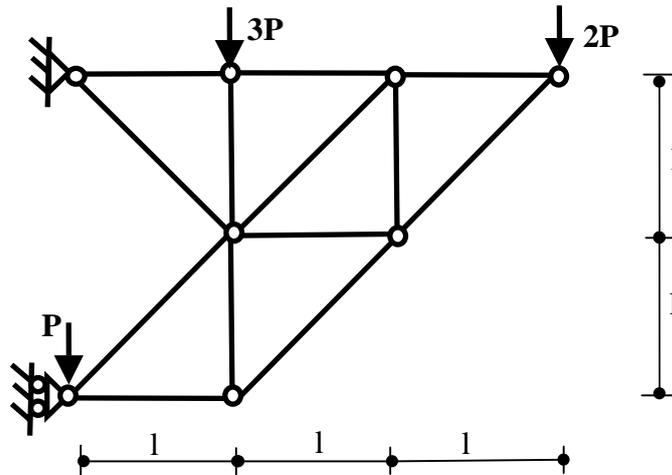
- 1) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $l=1\text{ m}$, $q=20\text{ kN/m}$, $P=10\text{ kN}$.



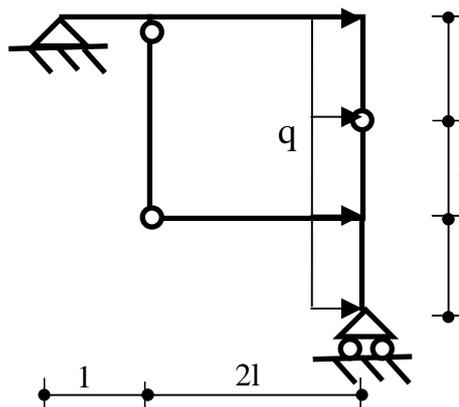
- 2) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $l=1\text{ m}$, $q=20\text{ kN/m}$, $C=15\text{ kN m}$.

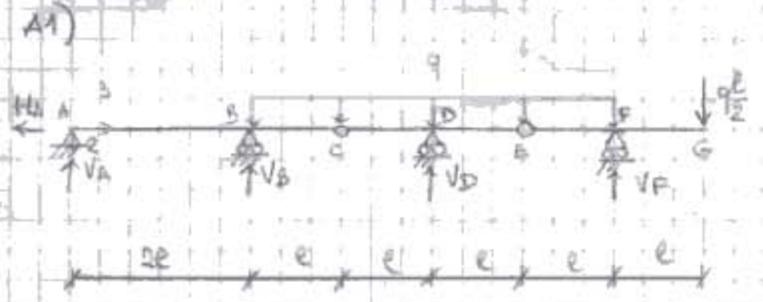


- 3) Calcolare lo stato di sollecitazione per $l=1\text{ m}$, $P=10\text{ kN}$.



- 4) Disegnare i diagrammi quotati di (N,T,M) per $l=1\text{ m}$, $q=20\text{ kN/m}$.

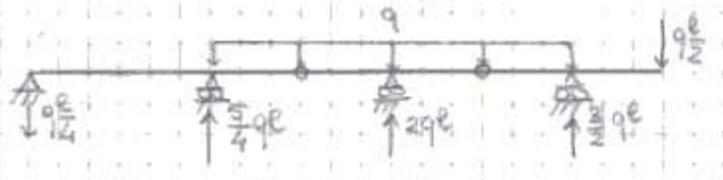




(←) $H_A = 0$

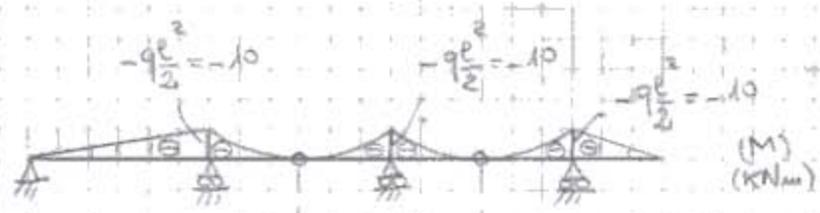
(E↑) $V_F = q \frac{e}{2} \cdot 2e + q \frac{e}{2} = \frac{3}{2} qe \rightarrow V_F = \frac{3}{2} qe$

(C↑) $V_D = q \frac{e}{2} \cdot 4e + 3qe \frac{e}{2} - \frac{3}{2} qe \frac{e}{2}$
 $\rightarrow V_D = 2qe$

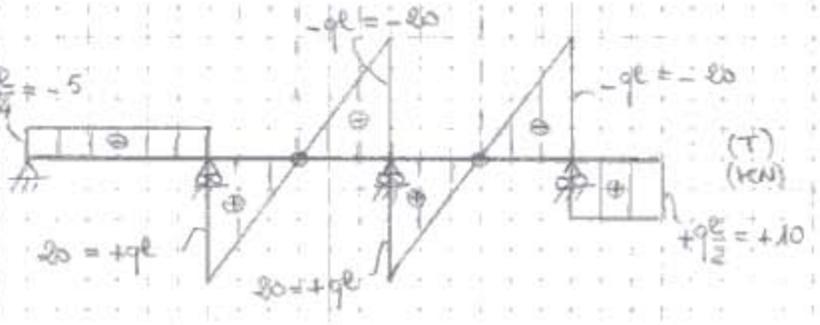
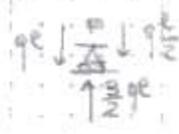
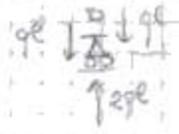
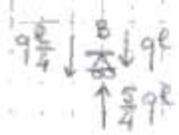


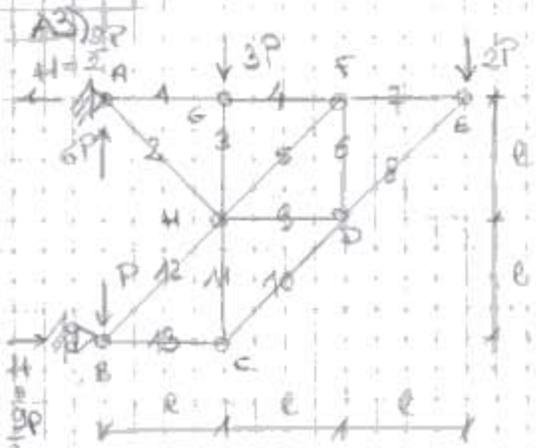
(B) $V_A \cdot 2e = 2qe \cdot 2e + \frac{3}{2} qe \cdot 4e - q \frac{e}{2} \cdot 5e - 4qe \cdot 2e$
 $= qe^2 (4 + 6 - \frac{5}{2} - 8) = -\frac{qe^2}{2}$
 $\rightarrow V_A = -\frac{qe}{4}$

(↑) $V_B = 4qe + q \frac{e}{2} + q \frac{e}{4} - 2qe - \frac{3}{2} qe = \frac{5}{2} qe$



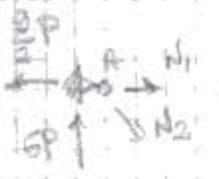
Equilibrium on node



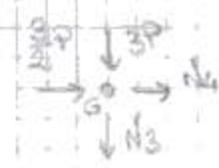


$$(A) \quad H = 3P + 2P = 5P$$

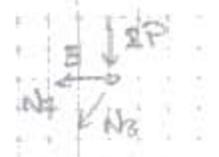
$$\hookrightarrow H = \frac{9}{2}P$$



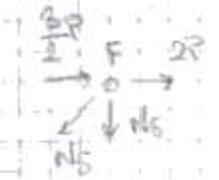
$$\left. \begin{aligned} N_1 \frac{\sqrt{2}}{2} &= 6P & N_2 &= 6P\sqrt{2} \\ H_1 &= \frac{9}{2}P - N_1 \frac{\sqrt{2}}{2} & &= \frac{9}{2}P - 6P = -\frac{3}{2}P \end{aligned} \right\}$$



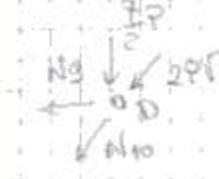
$$\left. \begin{aligned} N_3 &= -\frac{6}{2}P \\ N_4 &= -3P \end{aligned} \right\}$$



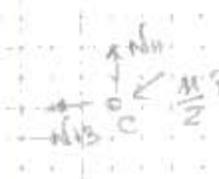
$$\left. \begin{aligned} N_5 \frac{\sqrt{2}}{2} &= -2P & N_6 &= -2P\sqrt{2} \\ N_7 &= -N_5 \frac{\sqrt{2}}{2} & &= 2P \end{aligned} \right\}$$



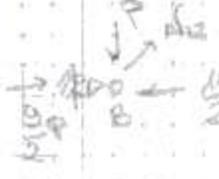
$$\left. \begin{aligned} N_8 \frac{\sqrt{2}}{2} &= \frac{1}{2}P & N_9 &= \frac{1}{2}P\sqrt{2} \\ N_{10} &= -N_8 \frac{\sqrt{2}}{2} & &= -\frac{1}{2}P \end{aligned} \right\}$$



$$\left. \begin{aligned} N_{11} \frac{\sqrt{2}}{2} &= -\frac{1}{2}P - 2P \frac{\sqrt{2}}{2} & N_{12} &= -\frac{1}{2}P\sqrt{2} \\ N_{13} &= -2P\sqrt{2} - N_{11} \frac{\sqrt{2}}{2} & &= -2P + \frac{1}{2}P = -\frac{3}{2}P \end{aligned} \right\}$$

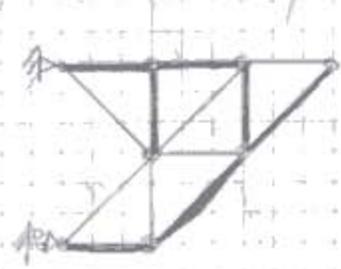


$$\left. \begin{aligned} N_{14} &= \frac{1}{2}P \frac{\sqrt{2}}{2} \\ N_{15} &= -\frac{1}{2}P \frac{\sqrt{2}}{2} \end{aligned} \right\}$$



$$\left. \begin{aligned} N_{16} \frac{\sqrt{2}}{2} &= P & \rightarrow N_{17} &= P\sqrt{2} \\ \frac{9}{2}P + P \frac{\sqrt{2}}{2} &= \frac{11}{2}P & & \end{aligned} \right\}$$

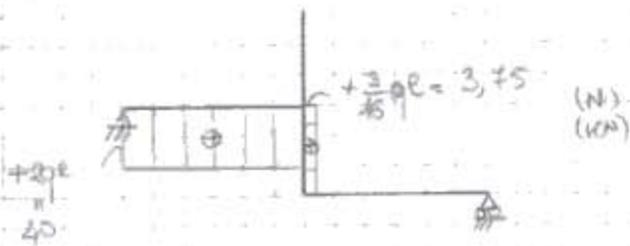
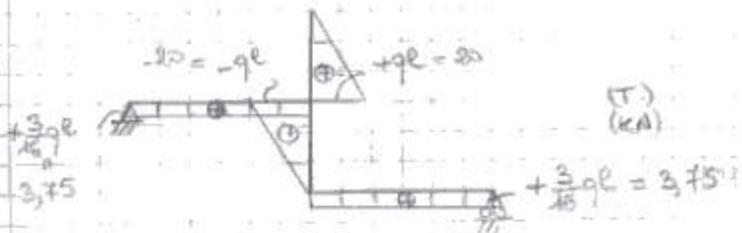
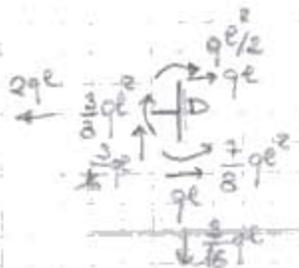
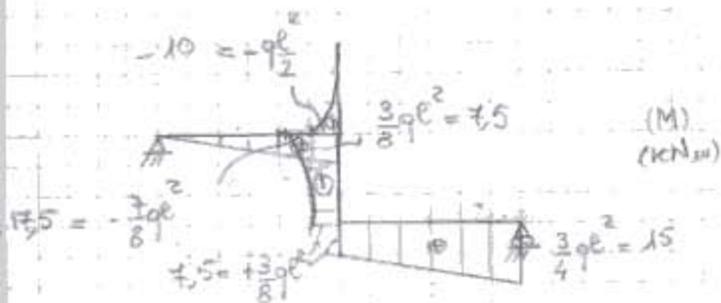
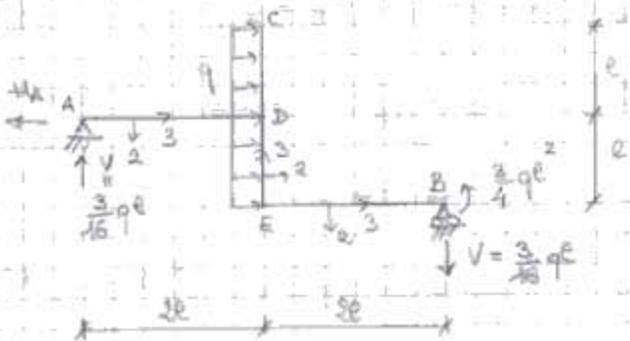
ASTA	N	RN
1	$-\frac{3}{2}P$	-15
2	$6P\sqrt{2}$	84,6
3	$-3P$	-30
4	$-\frac{3}{2}P$	-15
5	$\frac{1}{2}P\sqrt{2}$	49
6	$-\frac{1}{2}P$	-35
7	$2P$	20
8	$-2P\sqrt{2}$	-28
9	$\frac{1}{2}P$	35
10	$-\frac{1}{2}P\sqrt{2}$	-77,5
11	$\frac{11}{2}P$	55
12	$P\sqrt{2}$	14
13	$-\frac{11}{2}P$	-55



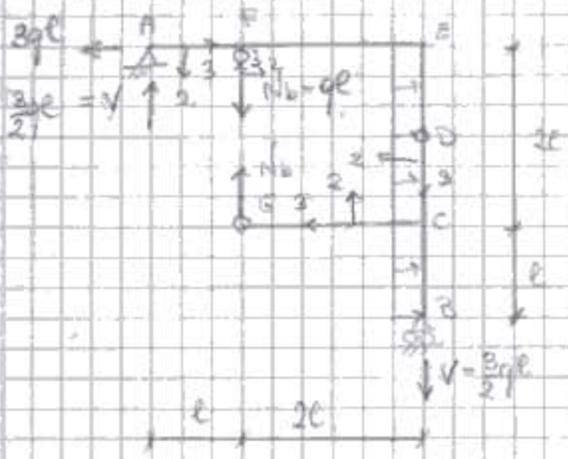
A2)

(←) $H_A = 2qe$

(A1) $V_{qe} = \frac{3}{4}qe^2 \rightarrow V = \frac{3}{16}ql$



A4)



(A) $V_{qe} = 3qe \frac{l}{2}$

(D) $N_{qe} = 3qe^2$

