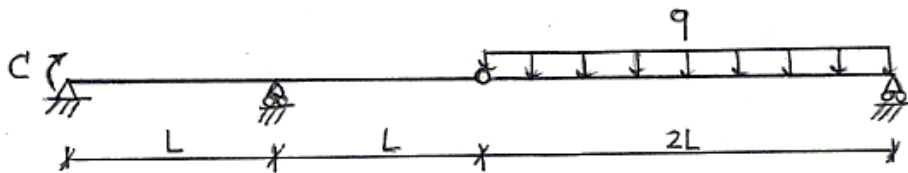


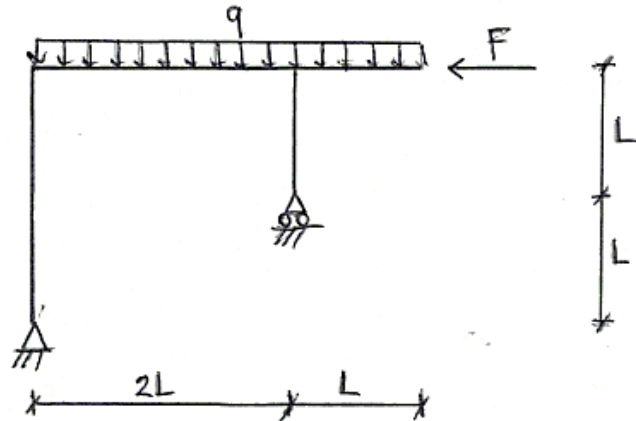


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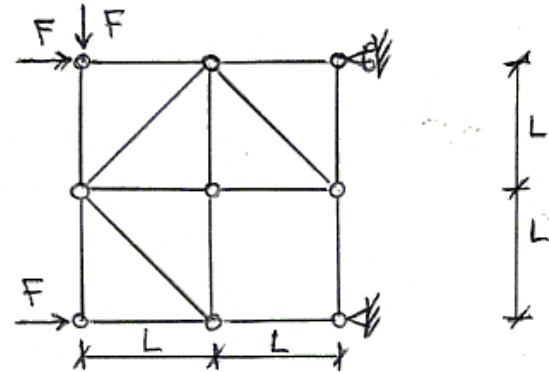
- 1) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=1$ m, $q=20$ kN/m, $C=20$ kNm.



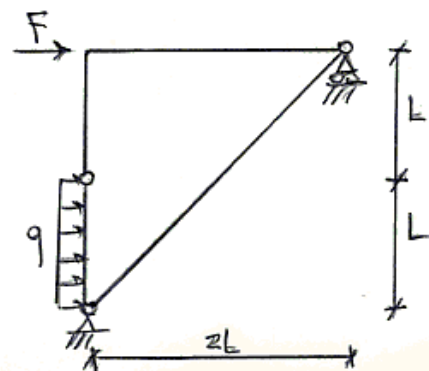
- 2) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=1$ m, $q=20$ kN/m, $F=20$ kN.



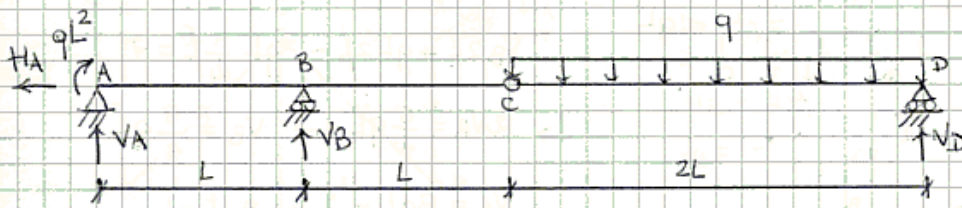
- 3) Calcolare lo stato di sollecitazione per $L=1$ m, $F=20$ kN.



- 4) Disegnare i diagrammi quotati di (N,T,M) per $L=1$ m, $q=20$ kN/m, $F=20$ kN.



A1)

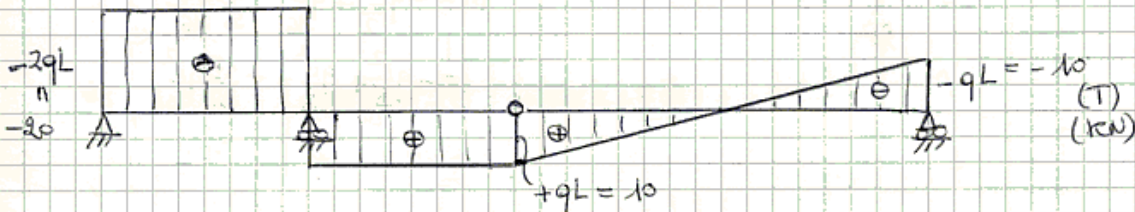
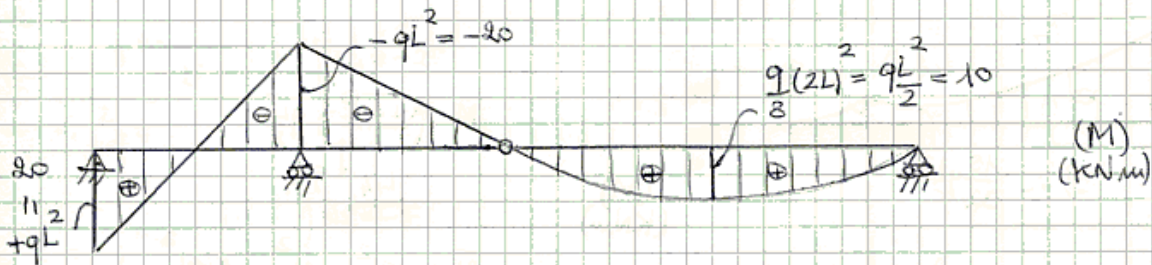
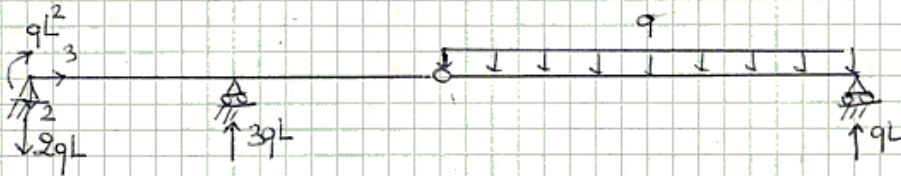


$$\begin{cases} H_A = 0 \\ V_D/L = 2qL \cdot L \\ V_B L + qL \cdot 4L - qL^2 + -2qL \cdot 3L = 0 \end{cases}$$

$$\rightarrow V_B = 3qL$$

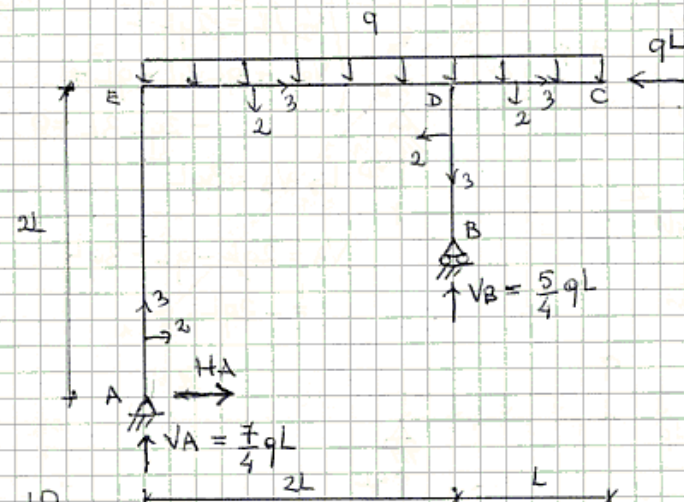
$$V_A = 2qL - qL - 3qL$$

$$= -2qL$$



$$N = 0$$

A2)

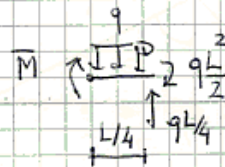
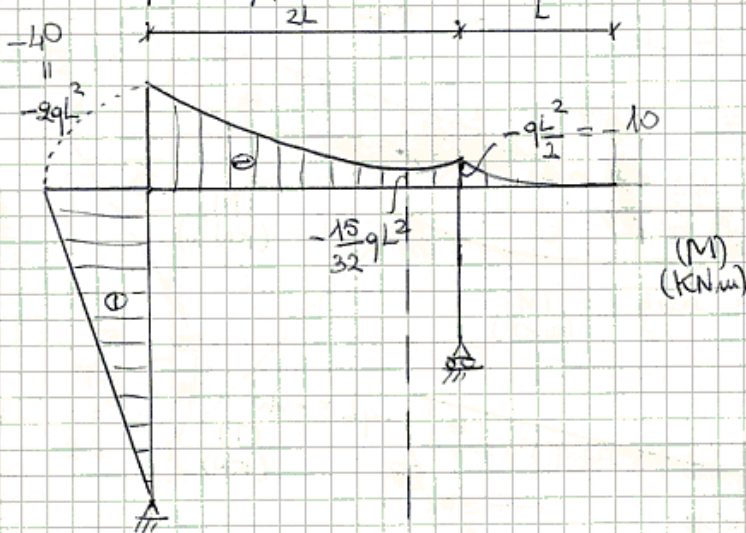


$$H_A = qL$$

$$V_B 2L + qL 2L - 3qL \frac{3}{2}L = 0$$

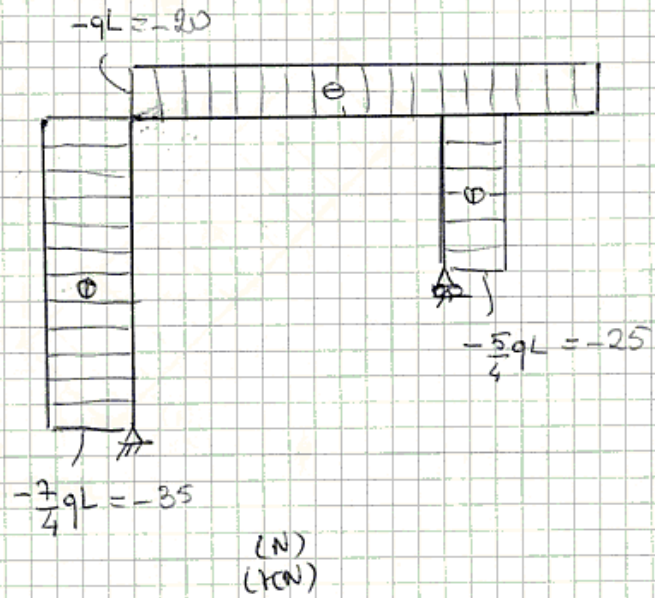
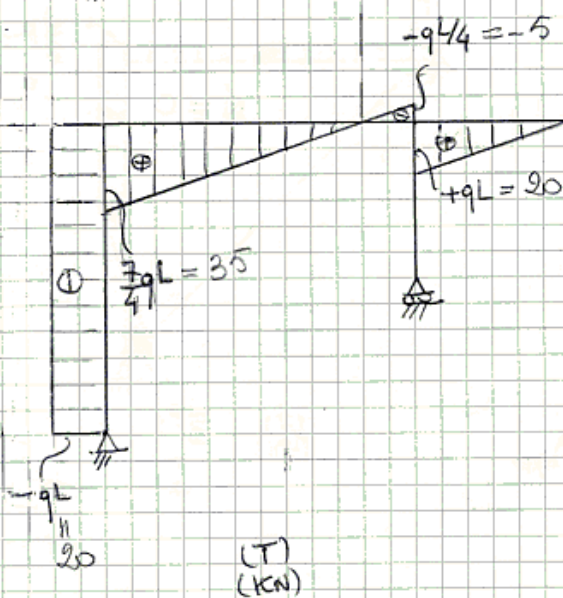
$$\rightarrow 2V_B = \frac{5}{2}qL \rightarrow V_B = \frac{5}{4}qL$$

$$V_A = 3qL - \frac{5}{4}qL = \frac{7}{4}qL$$

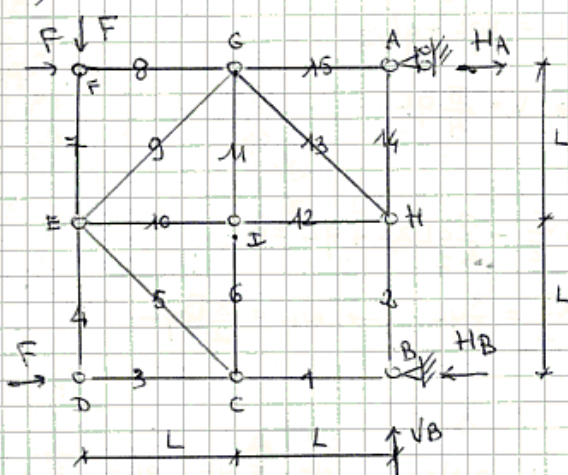


$$\bar{M} = -q \frac{L^2}{2} + qL \frac{L}{16} - \frac{1}{2} qL \frac{L}{16}$$

$$= -\frac{qL^2}{2} + \frac{qL^2}{32} = -\frac{15}{32}qL^2$$



A3)

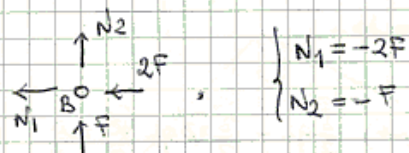


$$H_A 2L = F 2L - F 2L = 0$$

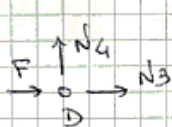
$$\rightarrow H_A = 0$$

$$H_B = 2F$$

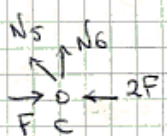
$$V_B = F$$



$$\begin{cases} N_1 = -2F \\ N_2 = -F \end{cases}$$



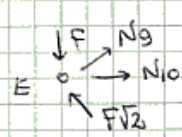
$$\begin{cases} N_3 = -F \\ N_4 = 0 \end{cases}$$



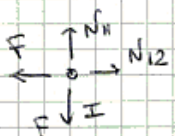
$$\begin{cases} N_5 \frac{\sqrt{2}}{2} = -F \rightarrow N_5 = -F\sqrt{2} \\ N_6 = -N_5 \frac{\sqrt{2}}{2} = F \end{cases}$$



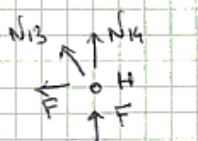
$$\begin{cases} N_7 = -F \\ N_8 = -F \end{cases}$$



$$\begin{cases} N_9 \frac{\sqrt{2}}{2} = F - F \frac{\sqrt{2}}{2} \sqrt{2} = 0 \\ N_{10} = F \frac{\sqrt{2}}{2} \sqrt{2} = F \end{cases}$$



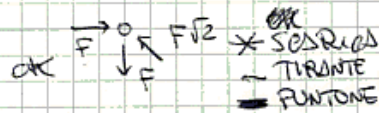
$$\begin{cases} N_{11} = F \\ N_{12} = F \end{cases}$$



$$\begin{cases} N_{13} \frac{\sqrt{2}}{2} = -F \rightarrow N_{13} = -F\sqrt{2} \\ N_{14} = -F + F = 0 \end{cases}$$

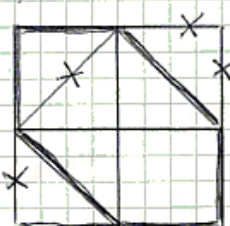
$$N_{15} = 0$$

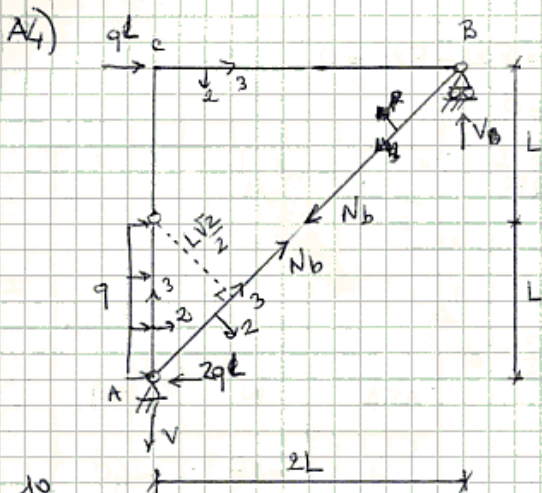
Verifica in G:



* SCARICA
- TIRANTE
- PUNTONE

ASTA	N	(kN)
1	-2F	-40
2	-F	-20
3	-F	-20
4	0	0
5	-F√2	-28,2
6	F	+20
7	-F	-20
8	-F	-20
9	0	0
10	F	20
11	F	20
12	F	20
13	-F√2	-28,2
14	0	0
15	0	0



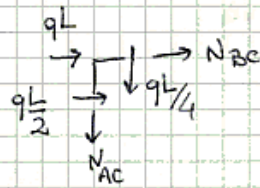
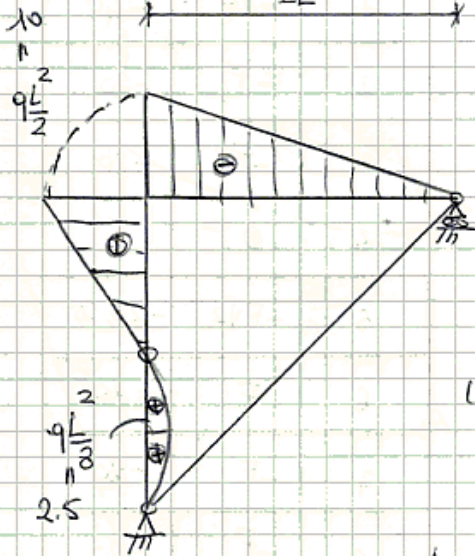


$$V \cdot 2L = 2qL + qL/2$$

$$\rightarrow V = \frac{5}{4}qL$$

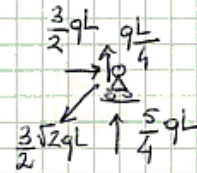
$$N_b \frac{\sqrt{2}}{2} - \frac{5}{4}qL \frac{\sqrt{2}}{2} + qL \frac{\sqrt{2}}{2} = 0$$

$$N_b \frac{\sqrt{2}}{2} = \frac{3}{4}qL \rightarrow N_b = \frac{3}{2}\sqrt{2}qL$$



$$N_{BC} = -qL/2 - qL = -\frac{3}{2}qL$$

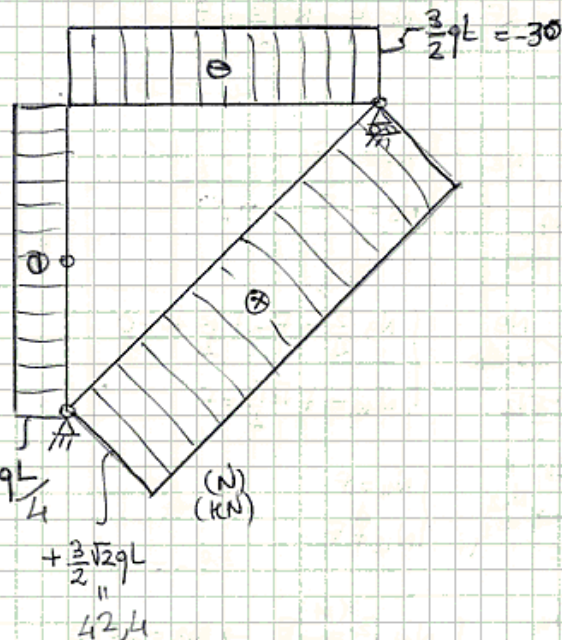
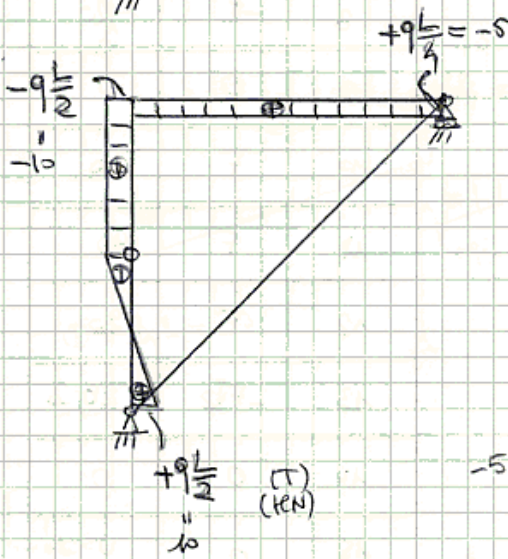
$$N_{AC} = -qL/4$$



$$\rightarrow \frac{3}{2}qL - \frac{3}{2}\sqrt{2}qL \frac{\sqrt{2}}{2} = 0 \text{ or}$$

$$\frac{\sqrt{3}}{2} \frac{3}{2}\sqrt{2}qL - qL/4 - \frac{5}{4}qL = 0 \text{ or}$$

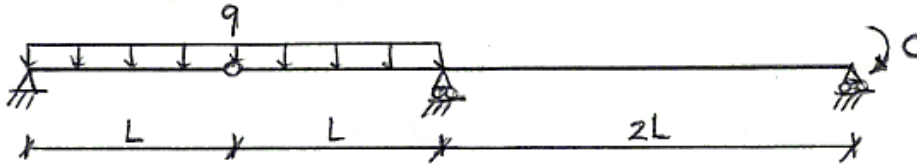
(M)
(kNm)



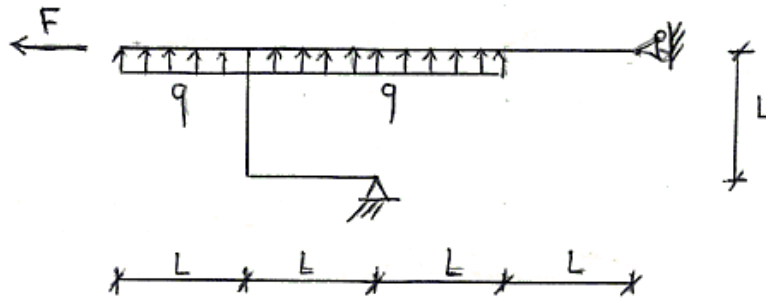
B

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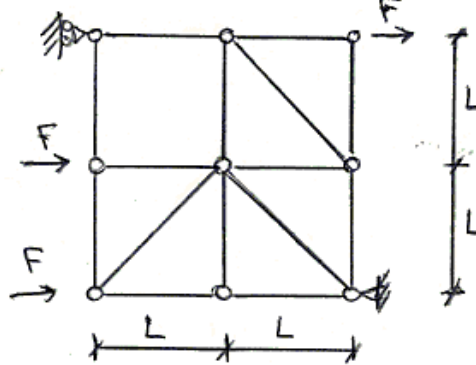
- 1) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=2$ m, $q=5$ kN/m, $C=20$ kNm.



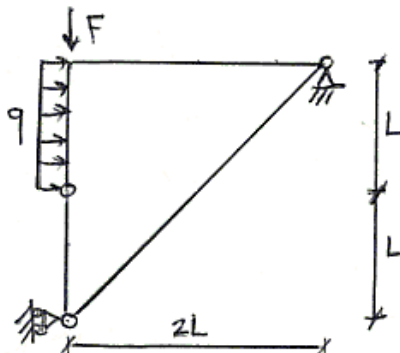
- 2) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=2$ m, $q=5$ kN/m, $F=10$ kN.



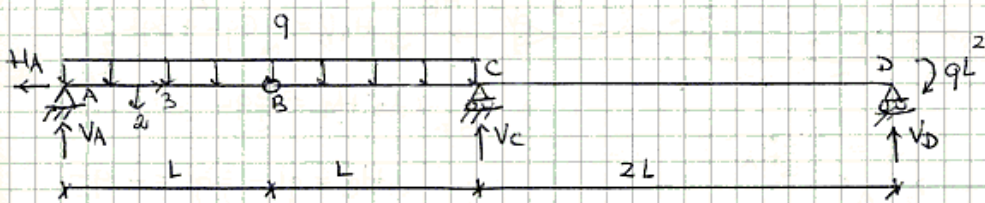
- 3) Calcolare lo stato di sollecitazione per $L=2$ m, $F=10$ kN.



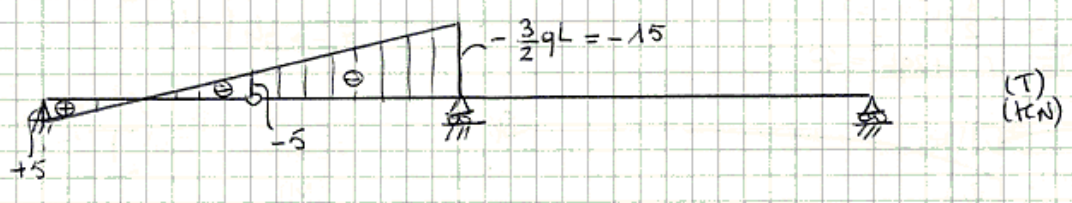
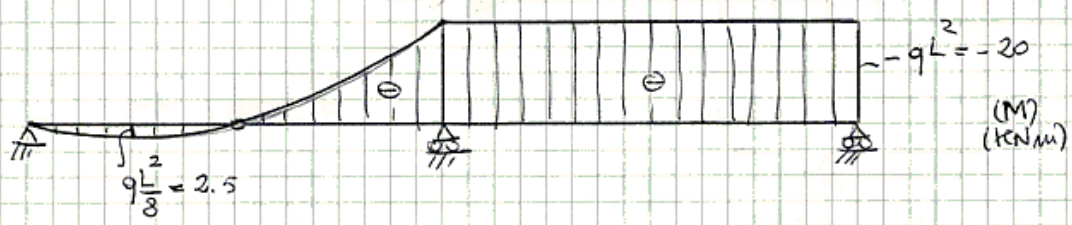
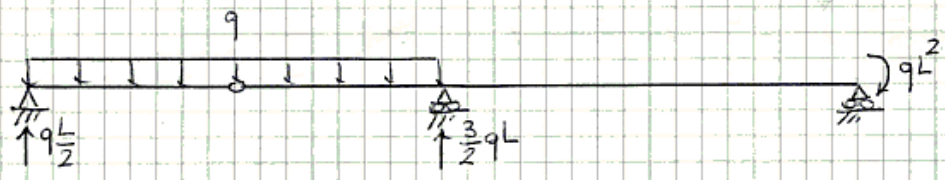
- 4) Disegnare i diagrammi quotati di (N,T,M) per $L=2$ m, $q=5$ kN/m, $F=10$ kN.



B1)



$$\begin{aligned} H_A &= 0 \\ V_A &= q \cdot \frac{L}{2} \\ V_D \cdot 2L &= qL^2 - 2qL^2 + q \cdot \frac{L}{2} \cdot 2L = 0 \\ V_C &= 2qL - q \cdot \frac{L}{2} = \frac{3}{2}qL \end{aligned}$$



$$N = 0$$

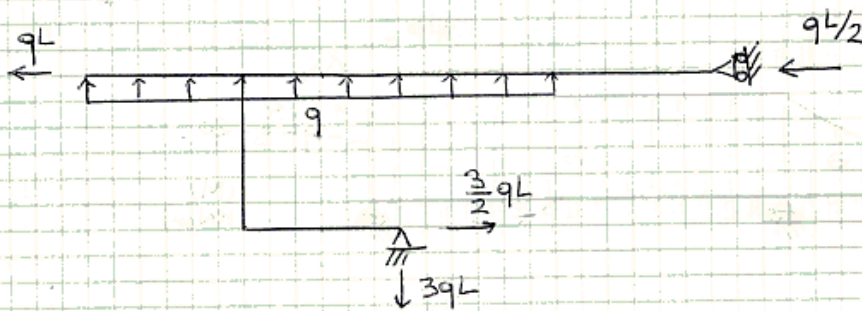
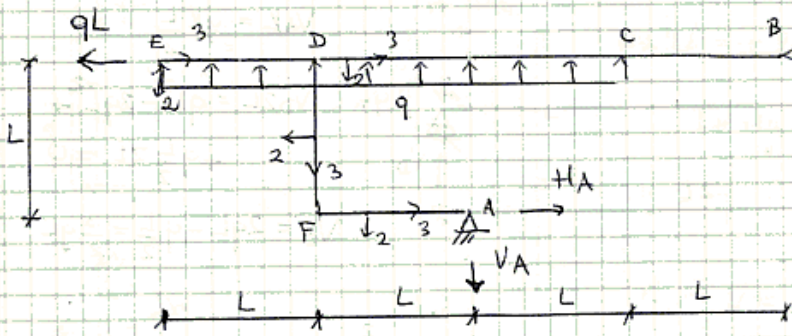
B2)

$$V_A = 3qL$$

$$H_A k = -6qL^2 + 3qL \frac{5L}{2}$$

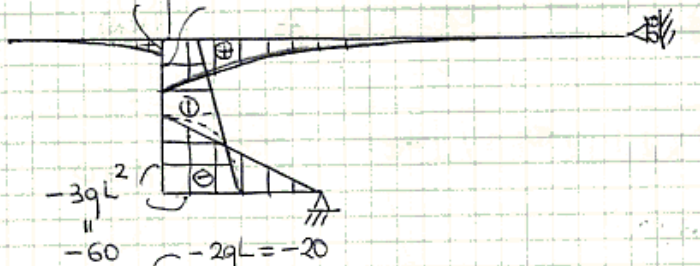
$$\hookrightarrow H_A = \frac{3}{2}qL$$

$$H_B = qL - \frac{3}{2}qL = -\frac{1}{2}qL$$



$$10 = +q \frac{L^2}{2} - \frac{3}{2}qL^2 = -30$$

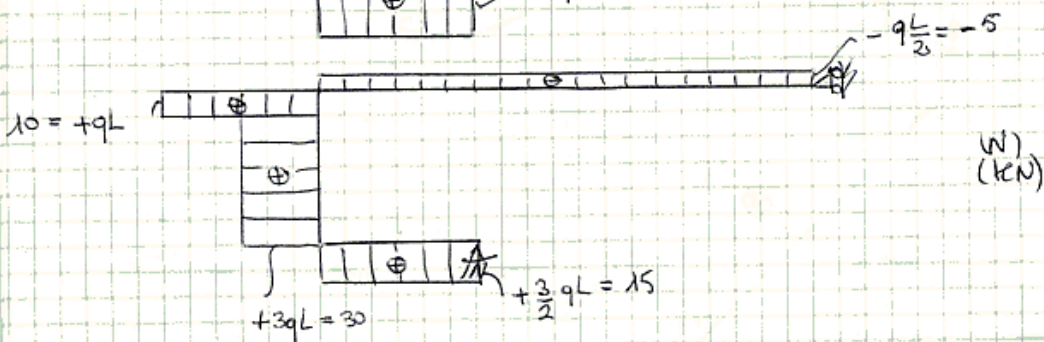
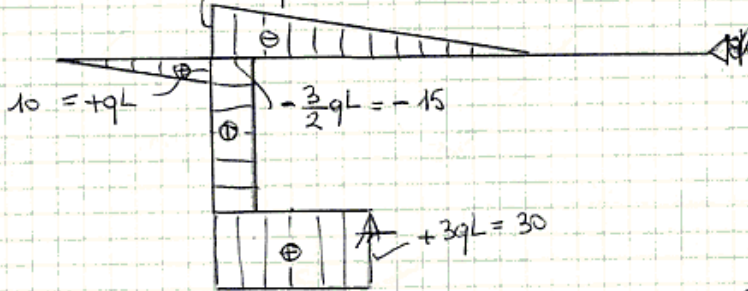
$$+2qL^2 = 40$$

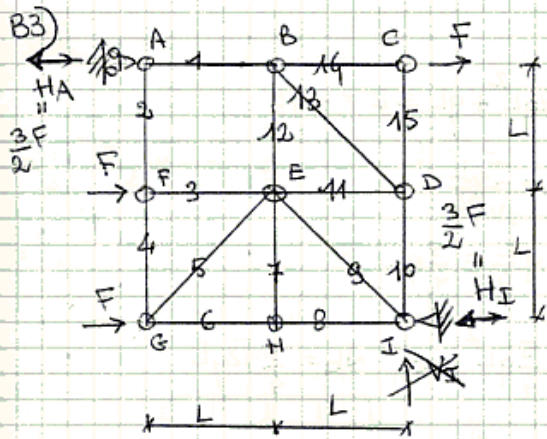


$$q \frac{L^2}{2} \uparrow$$

$$2qL^2 \uparrow$$

$$\frac{3}{2}qL^2 \downarrow$$





$V_I = 0$
 $H_I \cdot 2L = FL + F \cdot 2L$
 $\rightarrow H_I = \frac{3}{2}F$
 $H_A = 3F - \frac{3}{2}F = \frac{3}{2}F$

$\left. \begin{array}{l} N_1 = \frac{3}{2}F \\ N_2 = 0 \end{array} \right\}$

$\left. \begin{array}{l} N_3 = -F \\ N_4 = 0 \end{array} \right\}$

$\left. \begin{array}{l} N_5 = \frac{F\sqrt{2}}{2} = 0 \\ N_6 = -F \end{array} \right\}$

$\left. \begin{array}{l} N_7 = 0 \\ N_8 = -F \end{array} \right\}$

$\left. \begin{array}{l} N_9 \frac{\sqrt{2}}{2} = F - \frac{3}{2}F = -\frac{F}{2} \rightarrow N_9 = -\frac{F\sqrt{2}}{2} \\ N_{10} = -N_9 \frac{\sqrt{2}}{2} = \frac{F}{2} \end{array} \right\}$

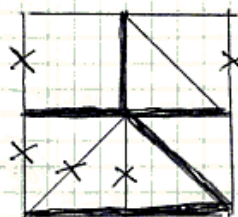
$\left. \begin{array}{l} N_{11} = -F + \frac{F\sqrt{2}}{2} \frac{\sqrt{2}}{2} = -\frac{F}{2} \\ N_{12} = -F \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} = -\frac{F}{2} \end{array} \right\}$

$\left. \begin{array}{l} N_{13} \frac{\sqrt{2}}{2} = \frac{F}{2} \rightarrow N_{13} = \frac{F\sqrt{2}}{2} \\ N_{14} = \frac{3}{2}F - N_{13} \frac{\sqrt{2}}{2} \\ = \frac{3}{2}F - \frac{F}{2} = F \end{array} \right\}$

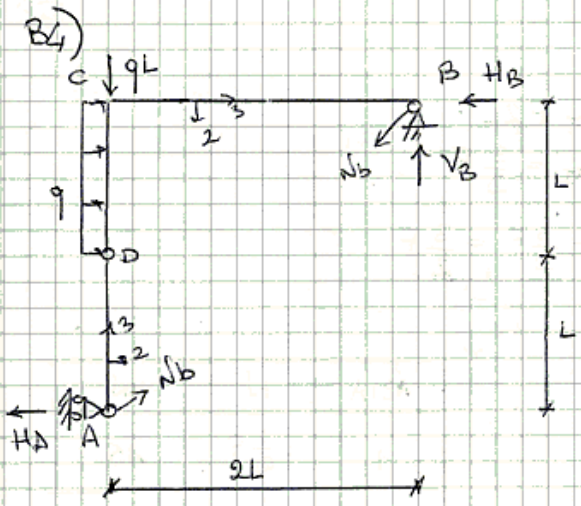
$N_{15} = 0$

$\left. \begin{array}{l} \frac{F\sqrt{2}}{2} \\ \frac{F}{2}, \frac{F}{2} \end{array} \right\}$

ASTA	N	KN
1	$\frac{3}{2}F$	15
2	0	0
3	-F	-10
4	0	0
5	0	0
6	-F	-10
7	0	0
8	-F	-10
9	$-\frac{F\sqrt{2}}{2}$	-7.1
10	$\frac{F}{2}$	5
11	$-\frac{F}{2}$	-5
12	$-\frac{F}{2}$	-5
13	$\frac{F\sqrt{2}}{2}$	7.1
14	F	10
15	0	0



— TIRANTE
 == PUNTONE
 X SCARICA



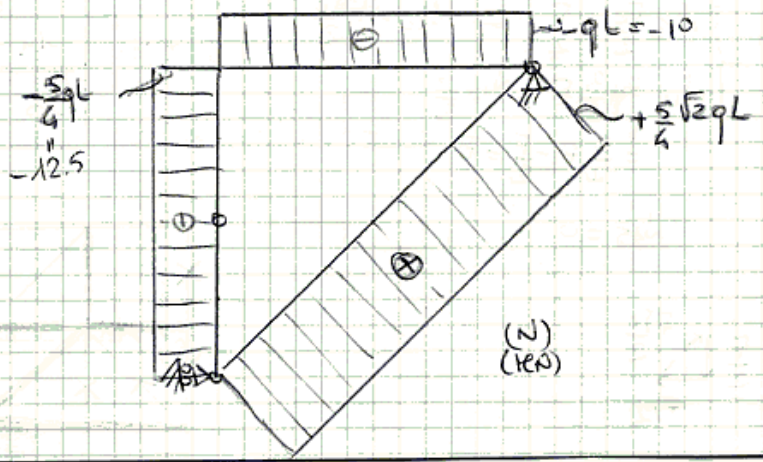
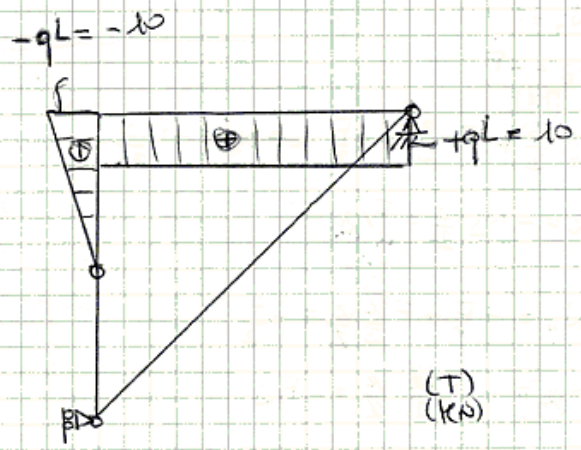
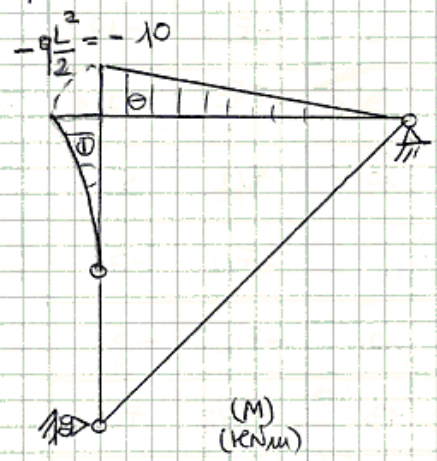
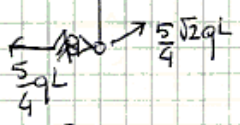
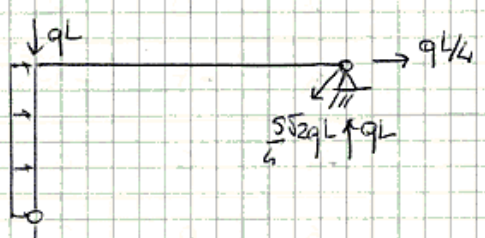
$$V_B = qL$$

$$H_B \cdot 2L = -2qL^2 + qL \cdot \frac{3}{2}L = -\frac{qL^2}{2}$$

$$\rightarrow H_B = -\frac{qL}{4}$$

$$H_A = qL + q \cdot \frac{L}{4} = \frac{5}{4}qL$$

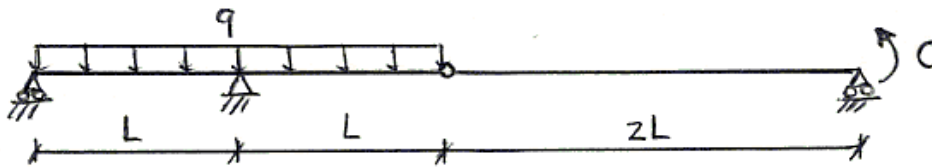
$$N_B \cdot \frac{\sqrt{2}}{2}L = \frac{5}{4}qL^2 \quad \leftarrow \quad N_B = \frac{5}{4}\sqrt{2}qL$$



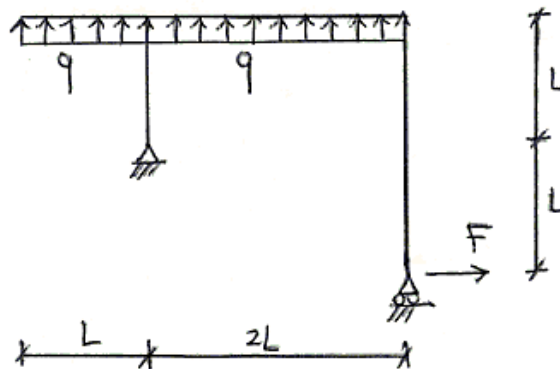
C

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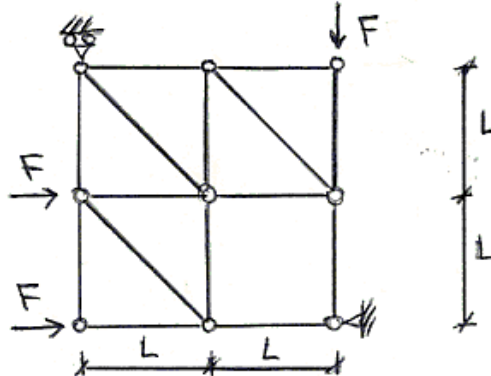
- 1) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=1$ m, $q=20$ kN/m, $C=20$ kNm.



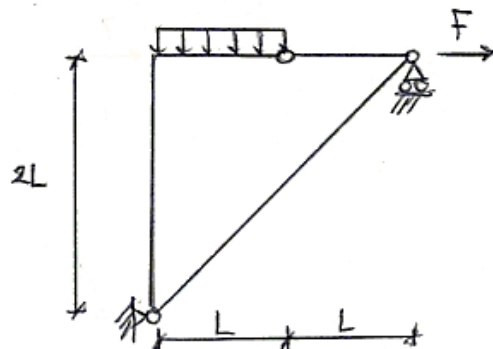
- 2) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=1$ m, $q=20$ kN/m, $F=20$ kN.



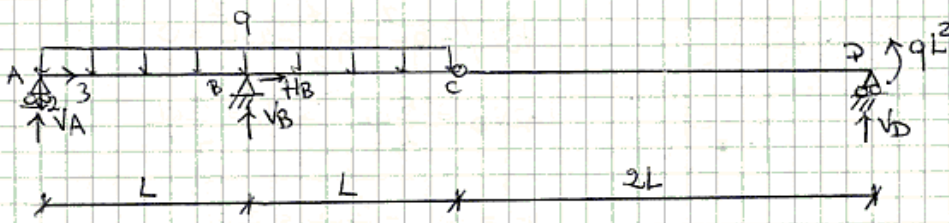
- 3) Calcolare lo stato di sollecitazione per $L=1$ m, $F=20$ kN.



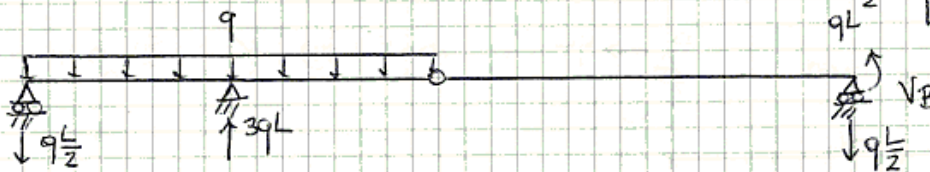
- 4) Disegnare i diagrammi quotati di (N,T,M) per $L=1$ m, $q=20$ kN/m, $F=20$ kN.



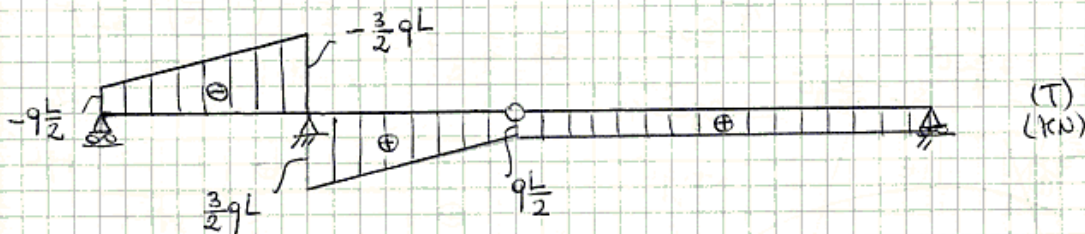
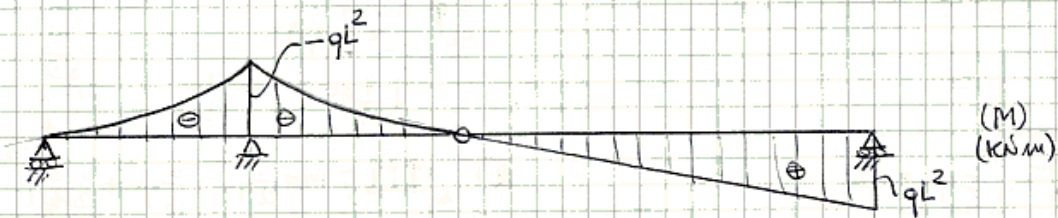
c1)



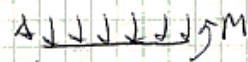
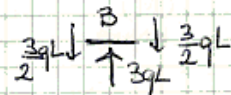
$$\begin{aligned}
 H_B &= 0 \\
 \sum \mathcal{M}_D &= -qL^2 \\
 \sum \mathcal{V}_D &= -q \frac{L}{2} \\
 \sum \mathcal{V}_A &= -q \frac{L}{2} + q \frac{L}{2} - qL^2 \\
 &\quad + q \frac{L}{2} \cdot 3L = 0
 \end{aligned}$$



$$\begin{aligned}
 \sum \mathcal{M}_A &= qL^2 \rightarrow V_A = -q \frac{L}{2} \\
 \sum \mathcal{V}_B &= 2qL + qL = 3qL \\
 \sum \mathcal{V}_D &= q \frac{L}{2}
 \end{aligned}$$

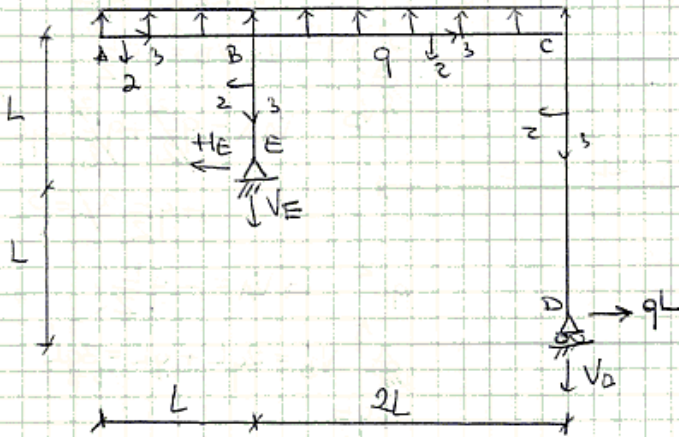


$$N = 0$$



$$\begin{aligned}
 \sum \mathcal{M} &= -q \frac{L}{2} L - qL \frac{L}{2} = -qL^2
 \end{aligned}$$

C2)

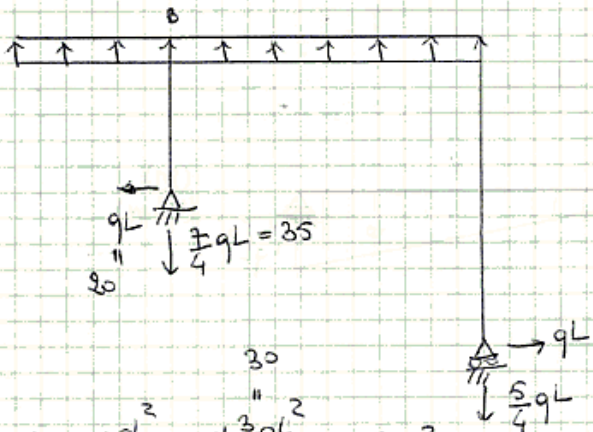


$$H_E = qL$$

$$V_D \cdot L - qL \cdot L + q \frac{L^2}{2} - 2qL \cdot L = 0$$

$$\rightarrow 2V_D = \frac{5}{2}qL \rightarrow V_D = \frac{5}{4}qL$$

$$V_E = 3qL - \frac{5}{4}qL = \frac{7}{4}qL$$



$$qL \cdot \frac{L}{2} \quad \uparrow B \quad \frac{3}{2}qL^2$$

$$qL \cdot L \quad \uparrow E \quad \frac{3}{4}qL^2$$

$$\downarrow \frac{7}{4}qL$$

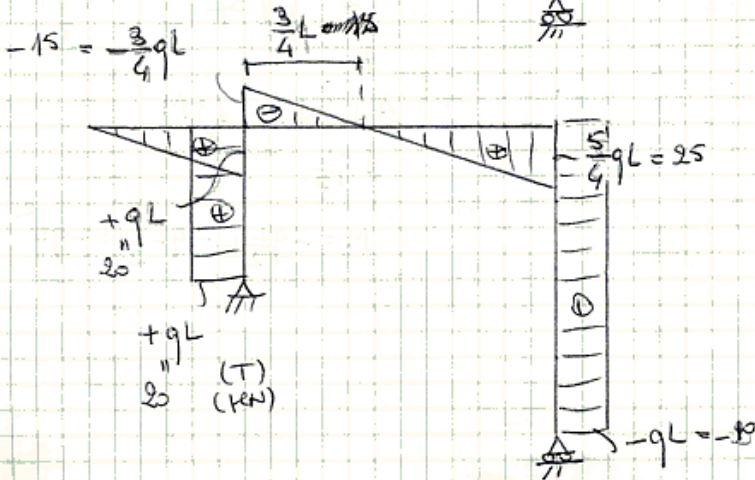
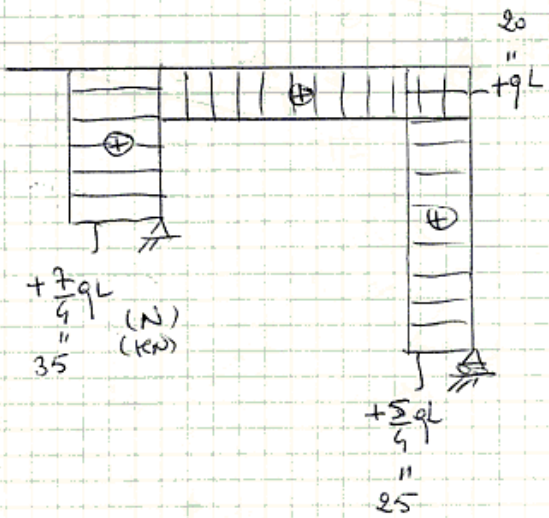
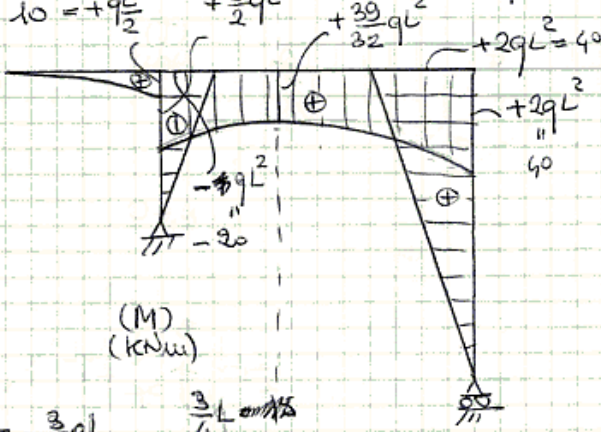
$$\frac{13}{32}$$

$$M = \frac{3}{2}qL^2 - \frac{9}{16}qL^2 + \frac{1}{2} \frac{9}{16}qL^2$$

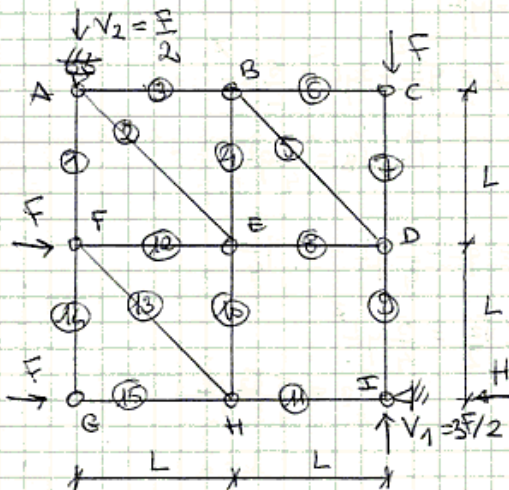
$$= \frac{3}{2}qL^2 - \frac{9}{32}qL^2$$

$$= \frac{3}{2}qL^2 \left(1 - \frac{3}{16}\right) = \frac{39}{32}qL^2$$

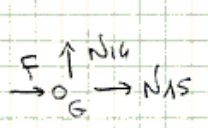
$$\frac{39}{32} < \frac{3}{2} \quad 78 < 96$$



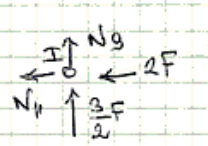
C3)



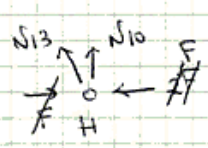
$H = 2F$
 $FL = V_2 2L \rightarrow V_2 = F/2$
 $N_1 = F + V_2 = F/2 + F = \frac{3F}{2}$



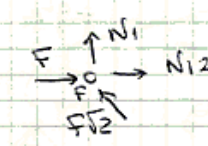
$$\begin{cases} N_{14} = 0 \\ N_{15} = -F \end{cases}$$



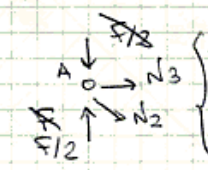
$$\begin{cases} N_{11} = -2F \\ N_9 = -\frac{3F}{2} \end{cases}$$



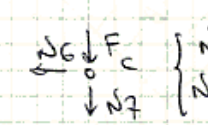
$$\begin{cases} N_{13} \frac{\sqrt{2}}{2} = -F \rightarrow N_{13} = -F\sqrt{2} \\ N_{10} = -N_{13} \frac{\sqrt{2}}{2} = F \end{cases}$$



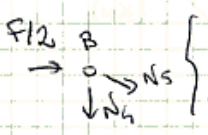
$$\begin{cases} N_{12} + F - F \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} = 0 \rightarrow N_{12} = 0 \\ N_1 = -F \frac{\sqrt{2}}{2} \end{cases}$$



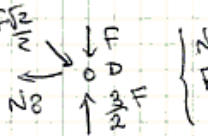
$$\begin{cases} \frac{\sqrt{2}}{2} N_2 = \frac{F}{2} \rightarrow N_2 = F \frac{\sqrt{2}}{2} \\ N_3 = -N_2 \frac{\sqrt{2}}{2} = -\frac{F}{2} \end{cases}$$



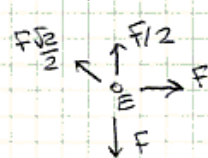
$$\begin{cases} N_6 = 0 \\ N_7 = -F \end{cases}$$



$$\begin{cases} N_5 \frac{\sqrt{2}}{2} = -\frac{F}{2} \rightarrow N_5 = -F \frac{\sqrt{2}}{2} \\ N_4 = -N_5 \frac{\sqrt{2}}{2} = \frac{F}{2} \end{cases}$$

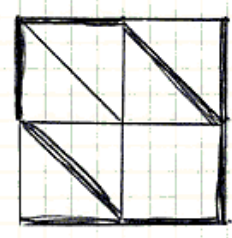


$$\begin{cases} N_8 = F \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} \\ F + F \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} = \frac{3F}{2} \text{ ok} \end{cases}$$



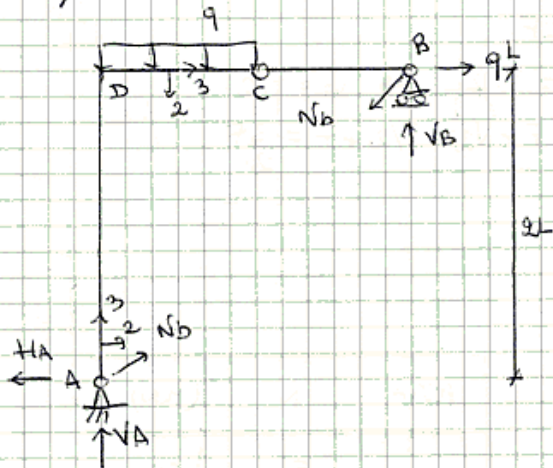
$$\begin{cases} F \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} = F/2 \text{ ok} \\ F \frac{\sqrt{2}}{2} \frac{\sqrt{2}}{2} + \frac{F}{2} = F \text{ ok} \end{cases}$$

ASTA	N	(KN)
1	-F	-20
2	$F \frac{\sqrt{2}}{2}$	14,1
3	-F/2	-10
4	F/2	10
5	$-F \frac{\sqrt{2}}{2}$	-14,1
6	0	0
7	-F	-20
8	F/2	10
9	$-\frac{3F}{2}$	-30
10	F	20
11	-2F	-40
12	0	0
13	$-F \sqrt{2}$	-28,2
14	0	0
15	-F	-20



— TIRANTE
 — PUNTO

C4)



$$H_A = qL$$

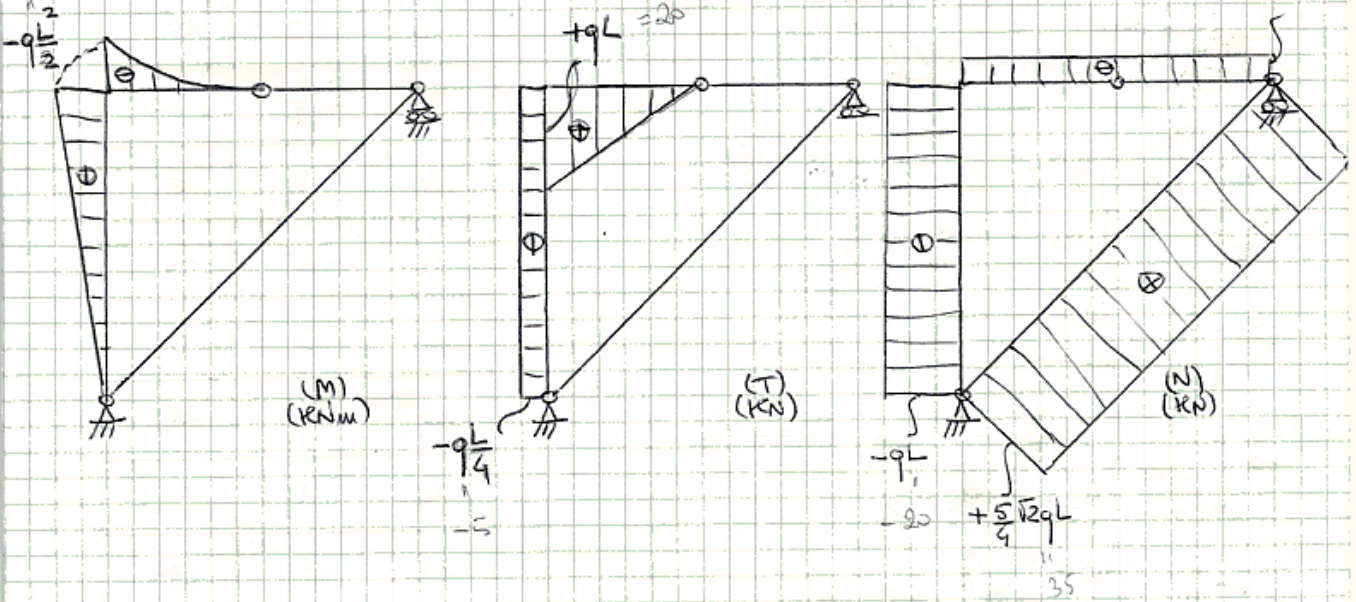
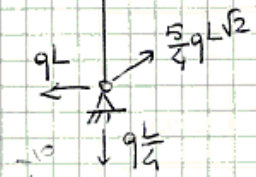
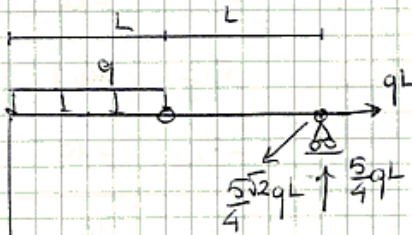
$$V_B \cdot 2L = q \frac{L^2}{2} + 2qL^2 = \frac{5}{2} qL^2$$

$$\rightarrow V_B = \frac{5}{4} qL$$

$$V_A = qL - \frac{5}{4} qL = -\frac{1}{4} qL$$

$$N_B \cdot \frac{\sqrt{2}}{2} = \frac{5}{4} qL^2$$

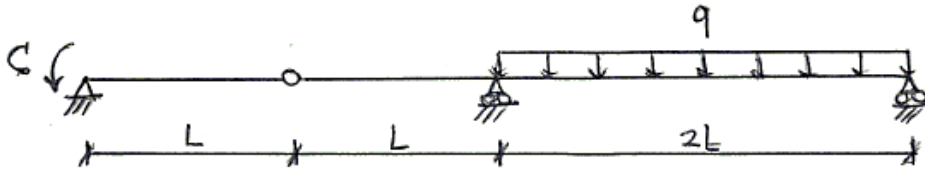
$$\rightarrow N_B = \frac{5\sqrt{2}}{4} qL$$



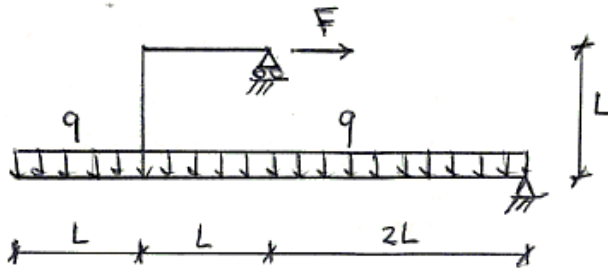
D

CORSO DI LAUREA IN INGEGNERIA MECCANICA
 UNIVERSITÀ DEGLI STUDI DI FERRARA
 PRIMA PROVA SCRITTA IN ITINERE DI STATICA, A. A. 2011/2012
 FERRARA, 11/11/2011

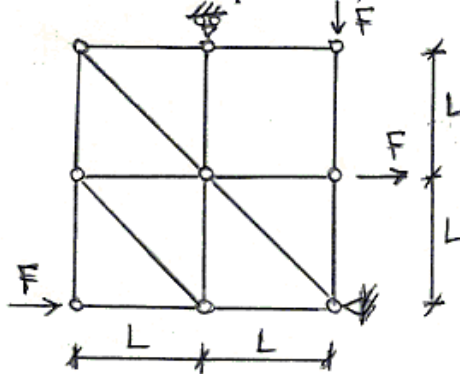
- 1) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=2$ m, $q=15$ kN/m, $C=30$ kNm.



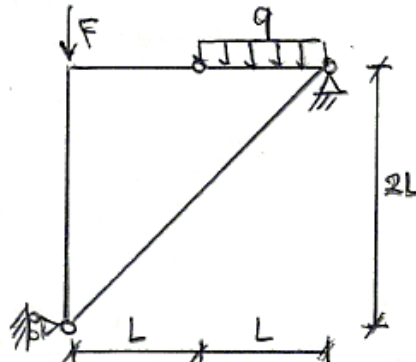
- 2) Disegnare i diagrammi quotati delle azioni interne (N, T, M) per $L=2$ m, $q=15$ kN/m, $F=30$ kN.



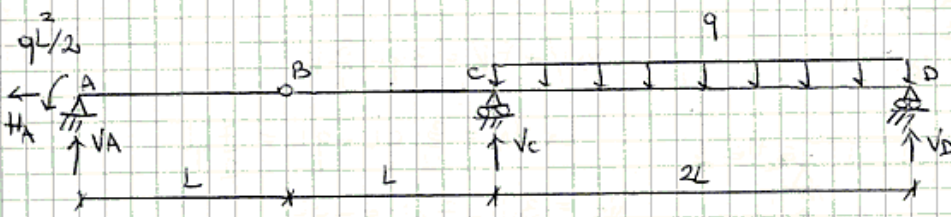
- 3) Calcolare lo stato di sollecitazione per $L=2$ m, $F=30$ kN.



- 4) Disegnare i diagrammi quotati di (N,T,M) per $L=2$ m, $q=15$ kN/m, $F=30$ kN.



D1)



$$H_A = 0$$

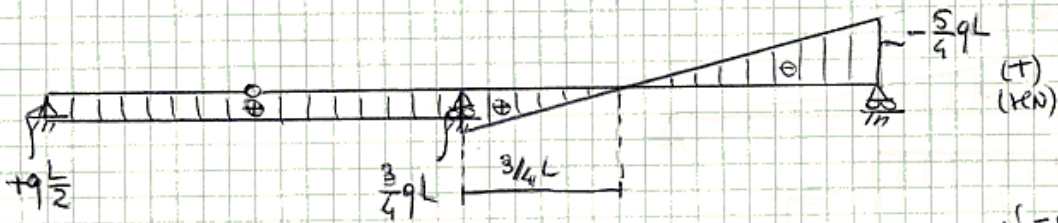
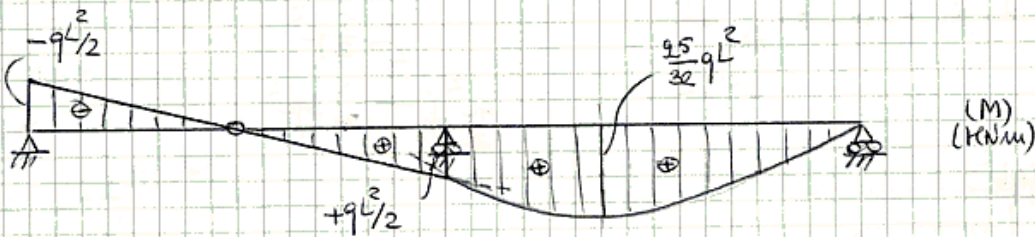
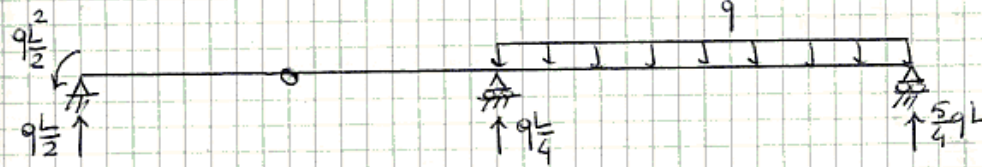
$$V_A = qL/2$$

$$V_D \cdot 2L - 2qL^2 + qL/2 \cdot 2L - qL^2 = 0$$

$$\rightarrow V_D = \frac{5}{4} qL$$

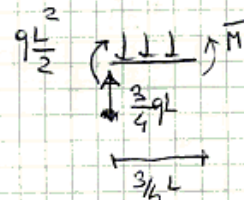
$$V_C = 2qL - qL/2 - \frac{5}{4} qL$$

$$= \frac{(8 - 2 - 5) qL}{4} = \frac{qL}{4}$$



$$N = 0$$

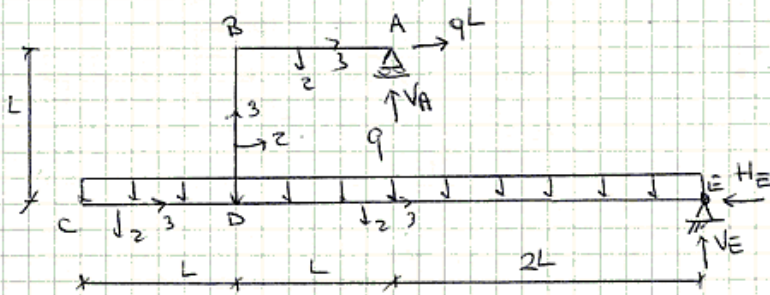
$$qL/2 \uparrow \quad \begin{matrix} C \\ \uparrow qL/4 \\ \downarrow qL/2 + qL/4 = 3qL/4 \end{matrix}$$



$$M = qL/2 \cdot \frac{3}{4} L - \frac{1}{2} \cdot \frac{3}{4} qL \cdot \frac{3}{4} L + \frac{3}{4} qL \cdot \frac{3}{4} L$$

$$= \frac{qL^2}{2} \left(1 + \frac{9}{16} \right) = \frac{25}{32} qL^2$$

D2)

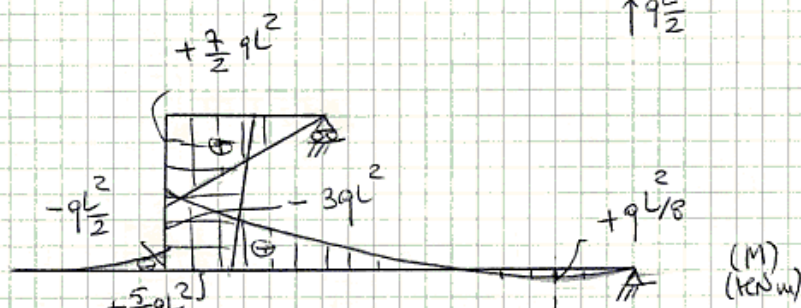
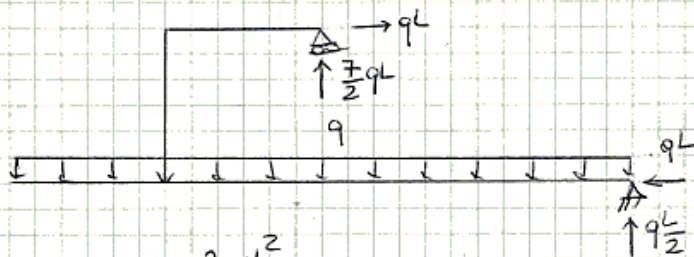


$$H_E = qL$$

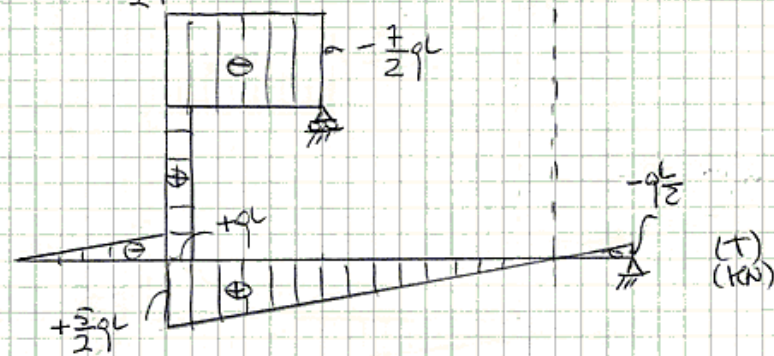
$$V_A \cdot 2L + qL^2 = 4qL \cdot 2L$$

$$\rightarrow V_A = \frac{7}{2}qL$$

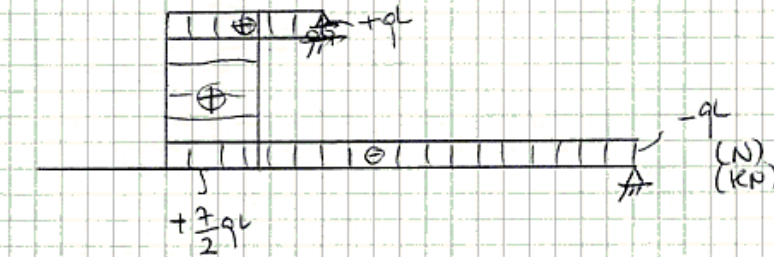
$$V_E = 4qL - \frac{7}{2}qL = \frac{1}{2}qL$$



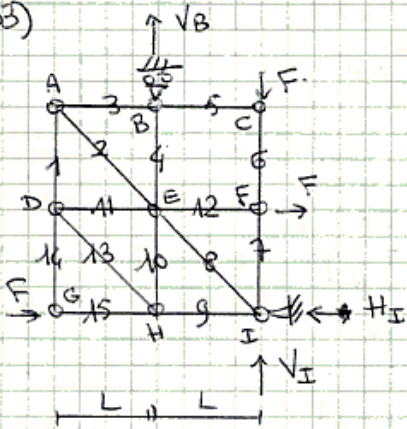
$$\begin{aligned} & \uparrow \frac{7}{2}qL \\ & 5/2 qL^2 \\ & \left[\begin{array}{l} \leftarrow \frac{qL^2}{2} \\ \downarrow 3qL^2 \\ \downarrow \frac{5}{2}qL \end{array} \right. \end{aligned}$$



$$\begin{aligned} & \overline{M} \left[\begin{array}{l} \leftarrow \\ \uparrow \frac{qL}{2} \end{array} \right. \\ & \frac{L}{2} \\ & \overline{M} = qL^2/4 - qL/8 = qL^2/2 \end{aligned}$$



D3)



$$H_I = 2F$$

$$V_I L - \cancel{F}L - 2F \cdot 2L + \cancel{F}L + F \cdot 2L = 0$$

$$\rightarrow V_I = 2F$$

$$V_B = F - 2F = -F$$

$$\begin{matrix} N_{14} \\ \uparrow F \\ \circ G \\ \rightarrow N_{15} \end{matrix} \left\{ \begin{array}{l} N_{14} = 0 \\ N_{15} = -F \end{array} \right.$$

$$\begin{matrix} N_5 \\ \leftarrow \\ \circ C \\ \downarrow N_6 \end{matrix} \left\{ \begin{array}{l} N_5 = 0 \\ N_6 = -F \end{array} \right.$$

$$\begin{matrix} N_3 \\ \leftarrow \\ \circ B \\ \downarrow N_4 \end{matrix} \left\{ \begin{array}{l} N_3 = 0 \\ N_4 = -F \end{array} \right.$$

$$\begin{matrix} A \\ \circ \\ N_1 \downarrow \quad N_2 \searrow \end{matrix} \left\{ \begin{array}{l} N_1 = 0 \\ N_2 = 0 \end{array} \right.$$

$$\begin{matrix} N_{12} \downarrow F \\ \leftarrow \\ \circ E \\ \rightarrow F \\ \downarrow N_7 \end{matrix} \left\{ \begin{array}{l} N_{12} = F \\ N_7 = -F \end{array} \right.$$

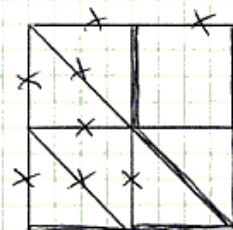
$$\begin{matrix} N_8 \\ \nearrow F \\ \circ F \\ \leftarrow F \\ \uparrow N_9 \end{matrix} \left\{ \begin{array}{l} N_8 \frac{\sqrt{2}}{2} = -F \rightarrow N_8 = -F\sqrt{2} \\ N_9 = -2F - N_8 \frac{\sqrt{2}}{2} = -2F + F = -F \end{array} \right.$$

$$\begin{matrix} N_{11} \downarrow F \\ \leftarrow \\ \circ E \\ \rightarrow F \\ \nearrow F\sqrt{2} \\ \downarrow N_{10} \end{matrix} \left\{ \begin{array}{l} N_{11} = F \frac{\sqrt{2}}{2} - F = 0 \\ N_{10} = F - F \frac{\sqrt{2}}{2} = 0 \end{array} \right.$$

$$\begin{matrix} D \\ \circ \\ N_{14} \downarrow \quad N_{13} \searrow \end{matrix} \left\{ \begin{array}{l} N_{14} = 0 \\ N_{13} = 0 \end{array} \right.$$

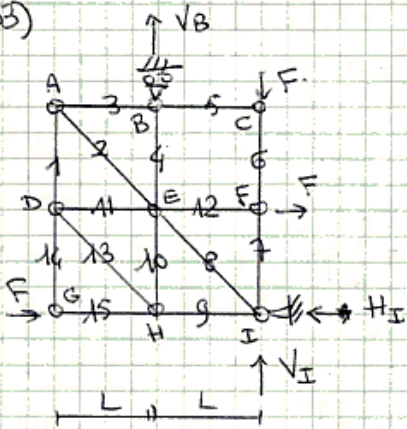
$$\begin{matrix} F \\ \rightarrow \\ \circ H \\ \leftarrow H \end{matrix}$$

ASTA	N	[KN]
1	0	0
2	0	0
3	0	0
4	-F	-30
5	0	0
6	-F	-30
7	-F	-30
8	$-F\sqrt{2}$	-42
9	-F	-30
10	0	0
11	0	0
12	+F	30
13	0	0
14	0	0
15	-F	-30



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D3)



$$H_I = 2F$$

$$V_I L - \cancel{F}L - 2F2L + \cancel{F}L + F2L = 0$$

$$\rightarrow V_I = 2F$$

$$V_B = F - 2F = -F$$

$$\begin{matrix} N_{14} \\ \uparrow F \\ \circ \\ \downarrow N_{15} \end{matrix} \left\{ \begin{array}{l} N_{14} = 0 \\ N_{15} = -F \end{array} \right.$$

$$\begin{matrix} N_5 \\ \leftarrow \\ \circ \\ \downarrow N_6 \end{matrix} \left\{ \begin{array}{l} N_5 = 0 \\ N_6 = -F \end{array} \right.$$

$$\begin{matrix} N_3 \\ \leftarrow \\ \circ \\ \downarrow N_4 \end{matrix} \left\{ \begin{array}{l} N_3 = 0 \\ N_4 = -F \end{array} \right.$$

$$\begin{matrix} A \\ \circ \\ \downarrow N_1 \\ \searrow N_2 \end{matrix} \left\{ \begin{array}{l} N_1 = 0 \\ N_2 = 0 \end{array} \right.$$

$$\begin{matrix} N_{12} \\ \leftarrow \\ \circ \\ \downarrow N_7 \end{matrix} \left\{ \begin{array}{l} N_{12} = F \\ N_7 = -F \end{array} \right.$$

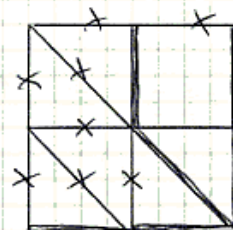
$$\begin{matrix} N_8 \\ \nearrow \\ \circ \\ \leftarrow N_9 \end{matrix} \left\{ \begin{array}{l} N_8 \frac{\sqrt{2}}{2} = -F \rightarrow N_8 = -F\sqrt{2} \\ N_9 = -2F - N_8 \frac{\sqrt{2}}{2} = -2F + F = -F \end{array} \right.$$

$$\begin{matrix} N_{11} \\ \leftarrow \\ \circ \\ \downarrow N_{10} \end{matrix} \left\{ \begin{array}{l} N_{11} = F \frac{\sqrt{2}}{2} - F = 0 \\ N_{10} = F - F \frac{\sqrt{2}}{2} = 0 \end{array} \right.$$

$$\begin{matrix} D \\ \circ \\ \downarrow N_{14} \\ \searrow N_{13} \end{matrix} \left\{ \begin{array}{l} N_{14} = 0 \\ N_{13} = 0 \end{array} \right.$$

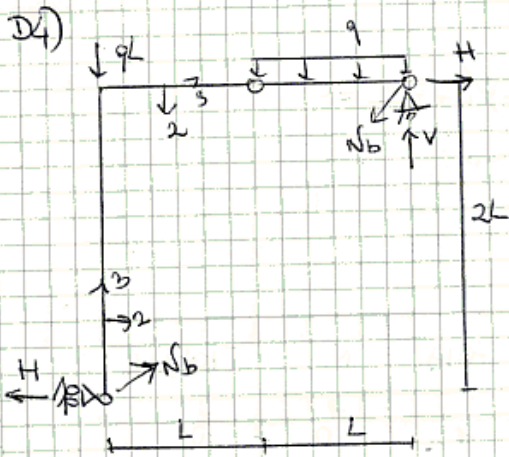
$$\begin{matrix} F \\ \rightarrow \\ \circ \\ \leftarrow H_I \end{matrix}$$

ASTA	N	[KN]
1	0	0
2	0	0
3	0	0
4	-F	-30
5	0	0
6	-F	-30
7	-F	-30
8	$-F\sqrt{2}$	-42
9	-F	-30
10	0	0
11	0	0
12	+F	30
13	0	0
14	0	0
15	-F	-30



- TIRANTE
- PUNTONE

D4)



$$V = 2qL$$

$$H \cdot 2L + \frac{3}{2}qL^2 - 4qL^2 = 0$$

$$\rightarrow H = 5qL/4$$

$$\frac{\sqrt{2}N_b L}{2} = 2qL^2 - qL^2/2 = \frac{3}{2}qL^2$$

$$\rightarrow N_b = \frac{3}{2}qL\sqrt{2}$$

