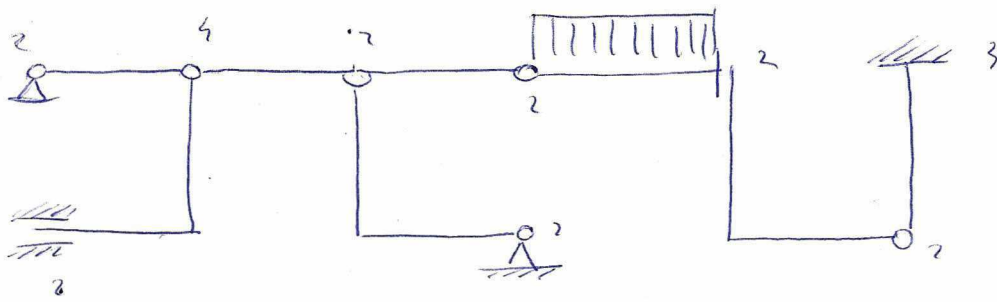


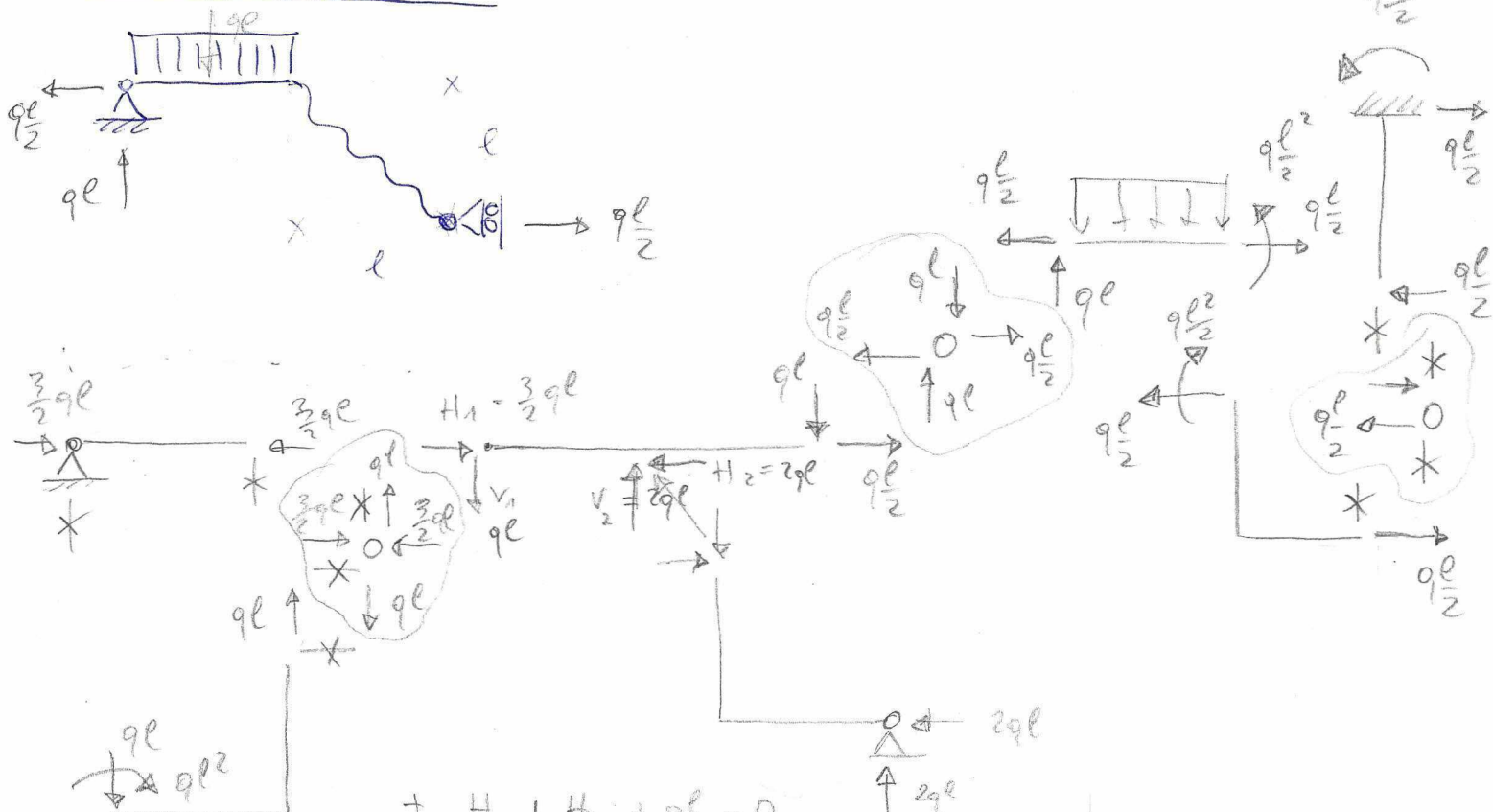
Struttura originale



21 GdV
 21 GdV

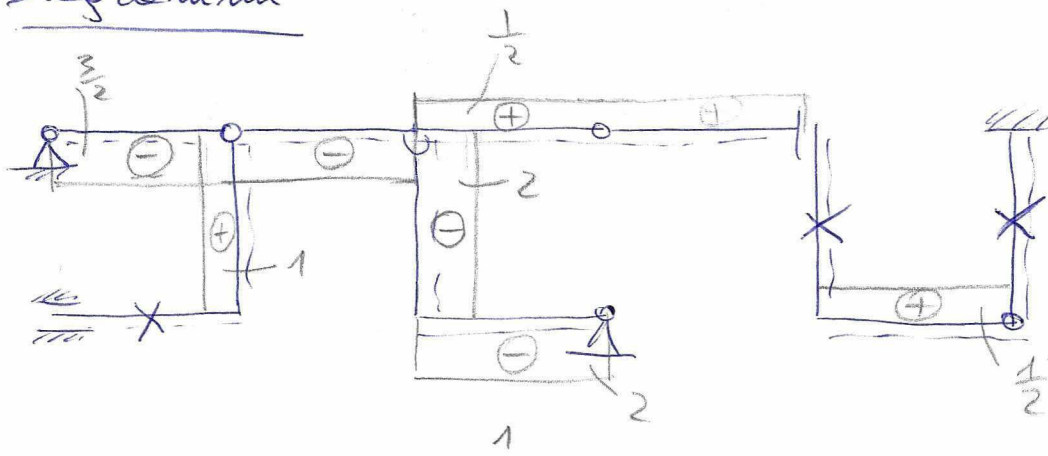
 150

Struttura semplificata

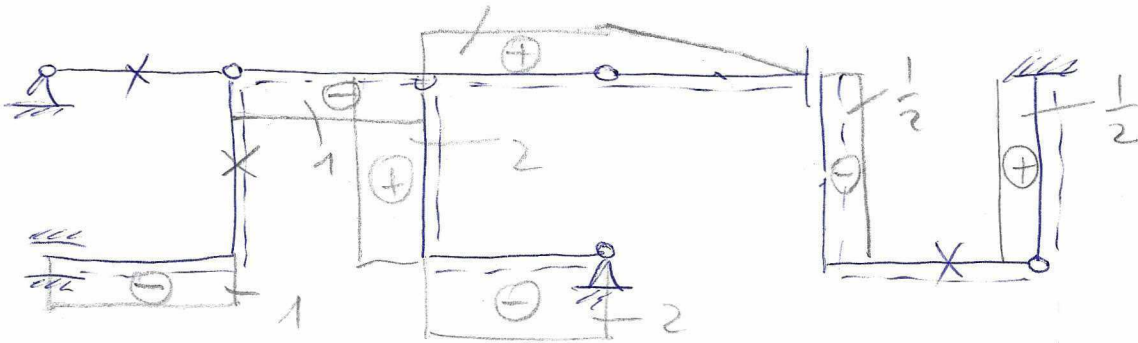


$$\begin{aligned}
 +\rightarrow H_1 + H_2 + q\frac{l}{2} &= 0 \\
 +\uparrow V_1 + V_2 &= ql \quad V_2 = -H_2 \\
 +\curvearrowright -V_2 \cdot l + 2ql^2 &= 0 \Rightarrow V_2 = 2ql = -H_2 \\
 \Rightarrow V_1 &= ql - 2ql = -ql \\
 \Rightarrow H_1 &= -q\frac{l}{2} + 2ql \\
 &= \frac{-1 + 4}{2} = \frac{3}{2}ql
 \end{aligned}$$

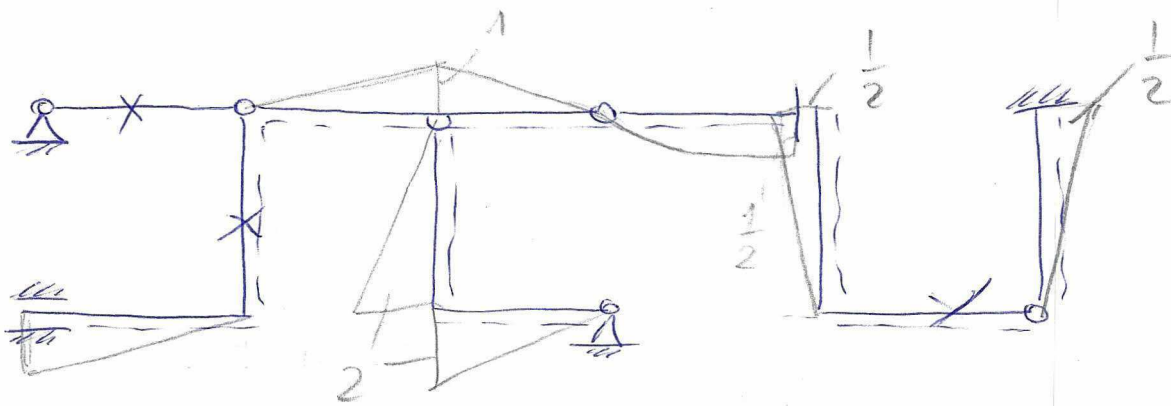
Diagrammi



$(N) \cdot ql$



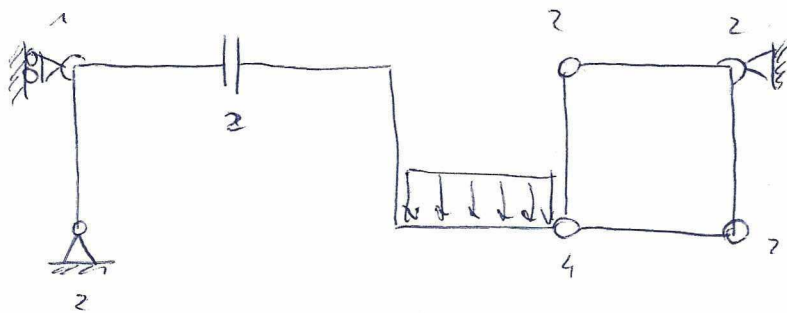
$(T) \cdot ql$



$(M) \cdot ql^2$

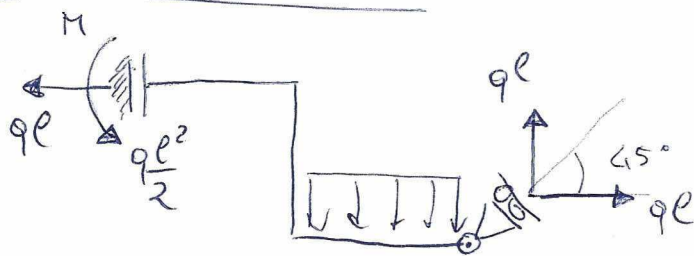
ql
 ql^2
 $\int \dots = ql^2 - ql \cdot z$

struttura originale



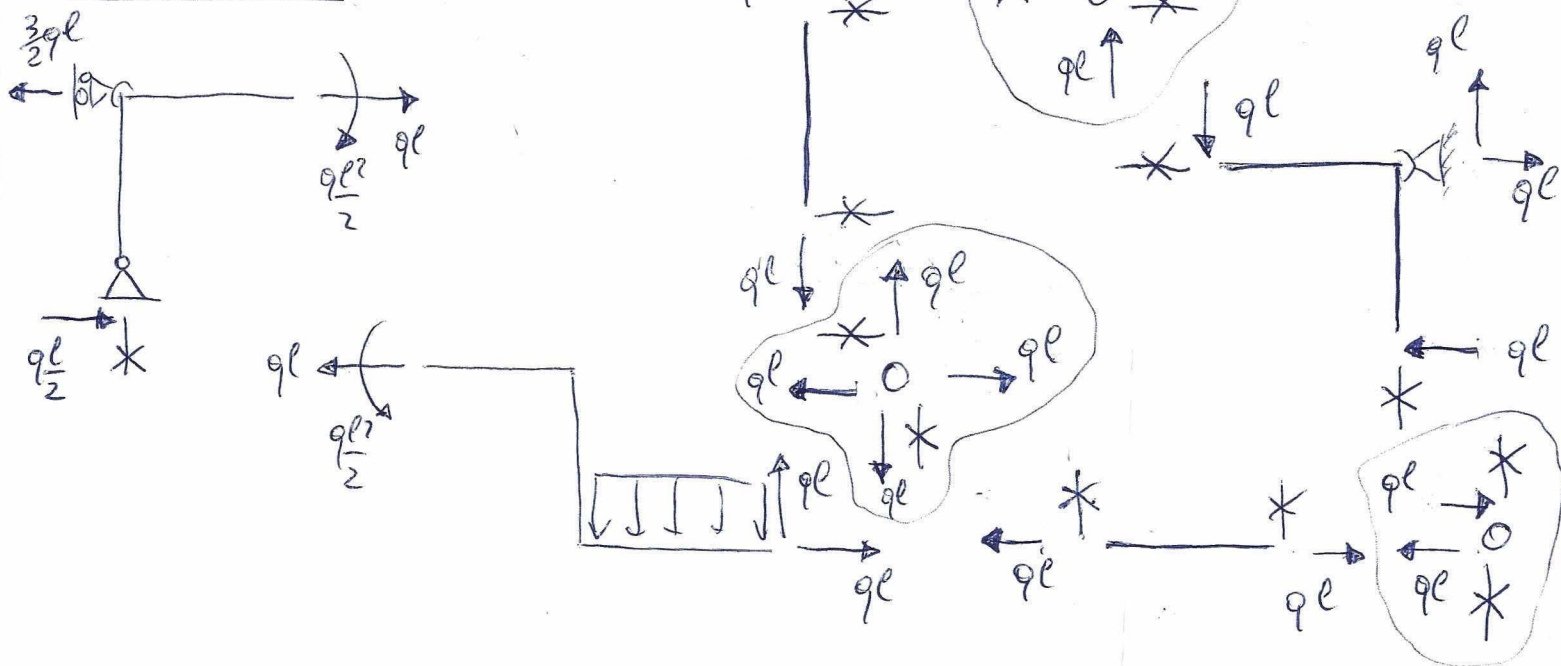
$$\begin{array}{r} 15 \text{ GdV} \\ 15 \text{ GdL} \\ \hline 150 \end{array}$$

struttura semplificata

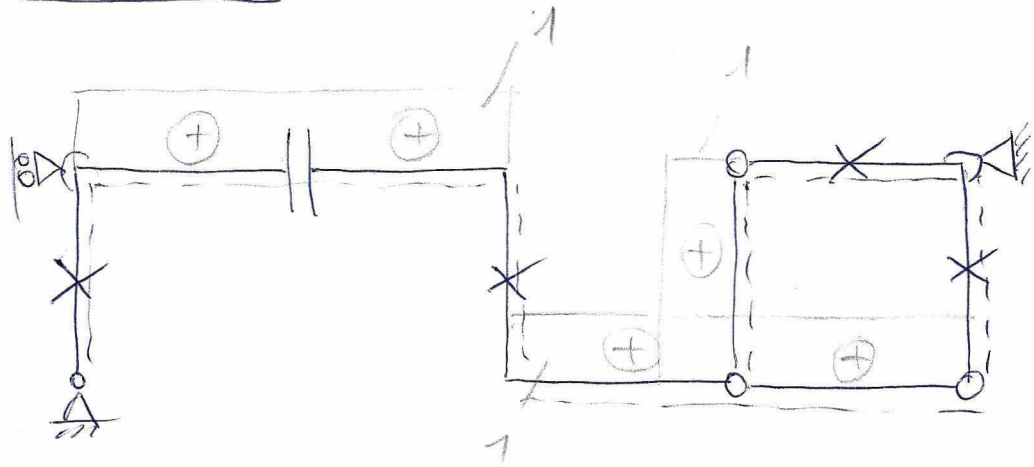


$$\begin{aligned} +) \quad M + \frac{3}{2}ql^2 - 2ql^2 + ql^2 &= 0 \\ M &= -\frac{1}{2}ql^2 \end{aligned}$$

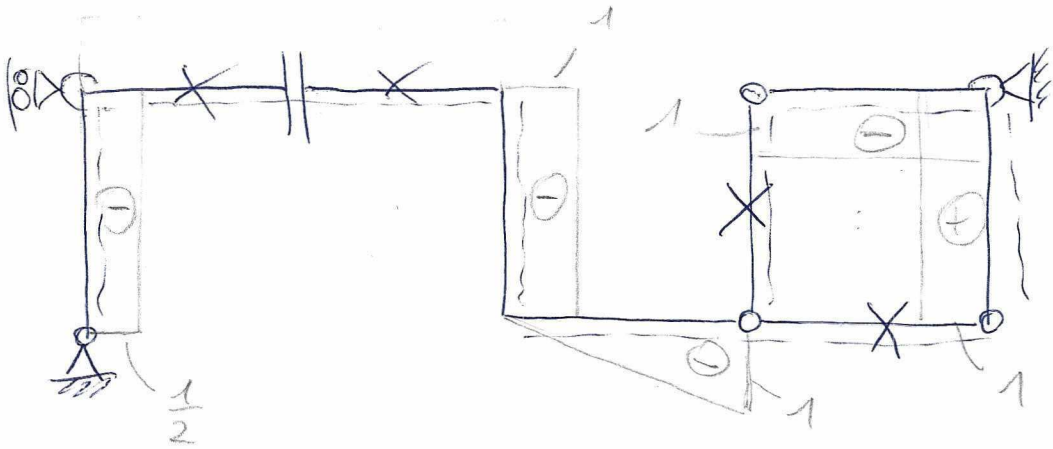
esplosione



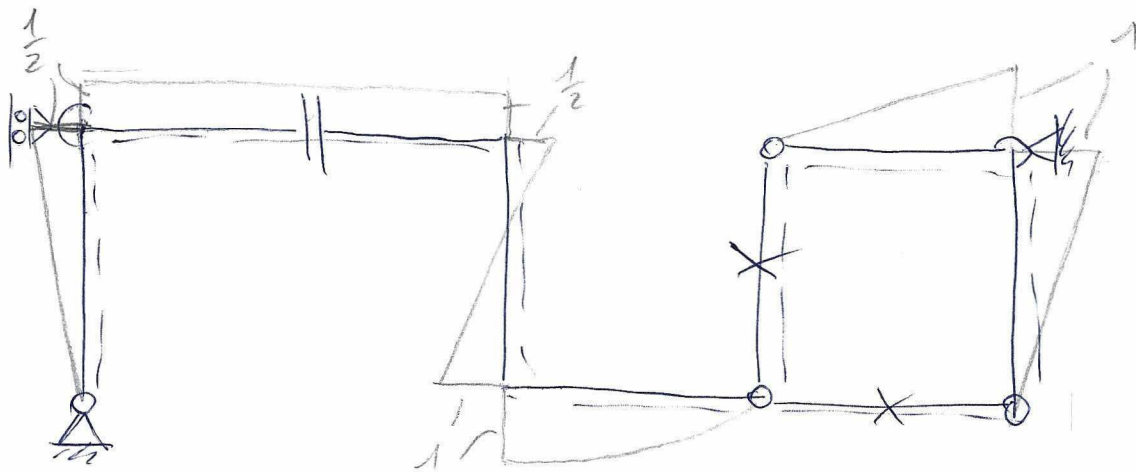
Diagrammi



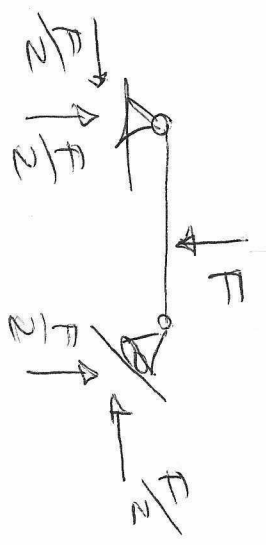
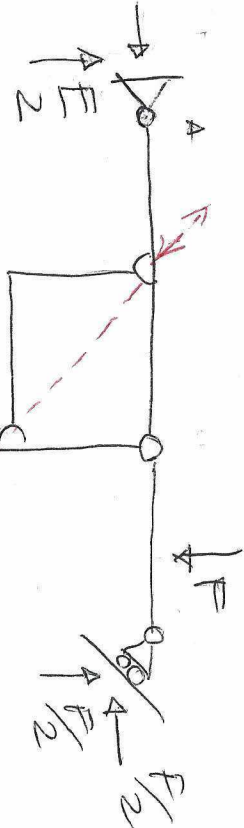
$(N) \cdot ql$



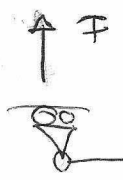
$(T) \cdot ql$



$(n) \cdot ql^2$



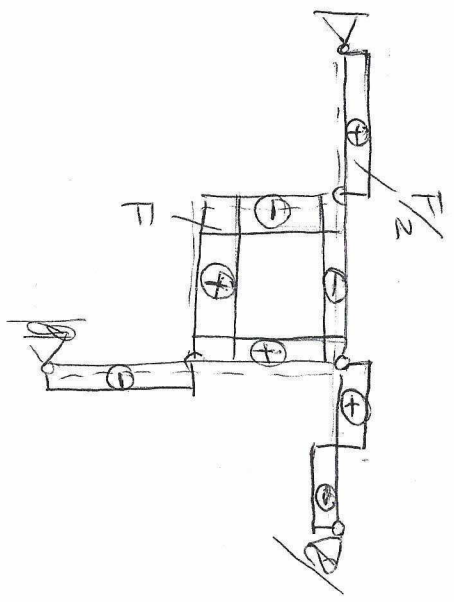
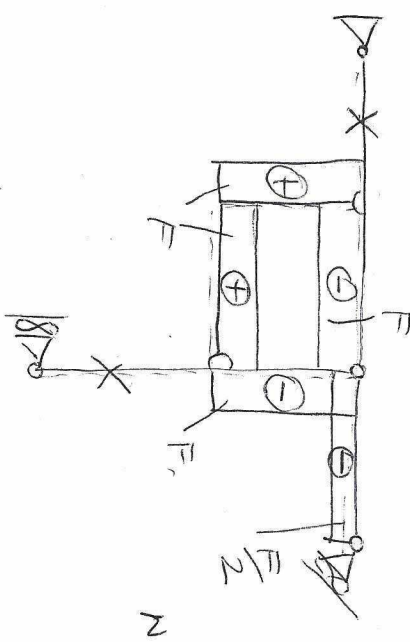
OK



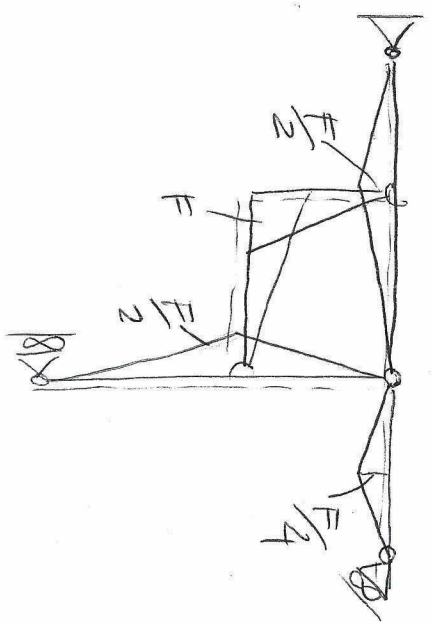
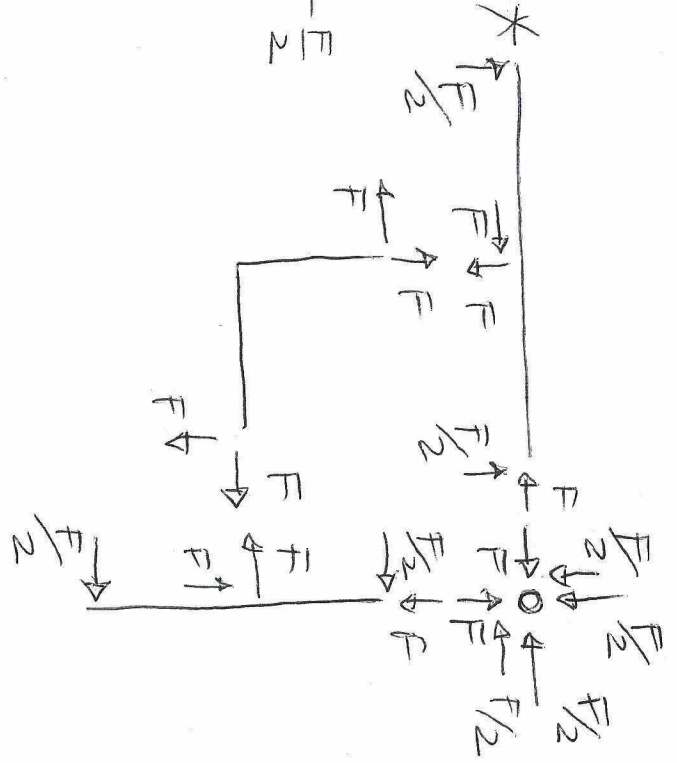
⊙ A
 $\sum M = 0$
 $H \cdot 2l + \frac{5}{2}Fl - \frac{F}{2} \cdot 3l = 0$

$4H + 5F - 3F = 0$

$2/4 H + 2F = 0 \Rightarrow H = -\frac{F}{2}$

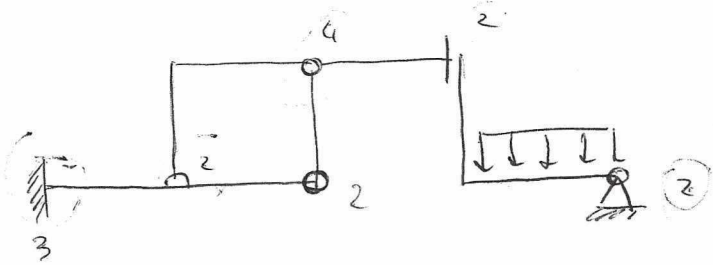


T



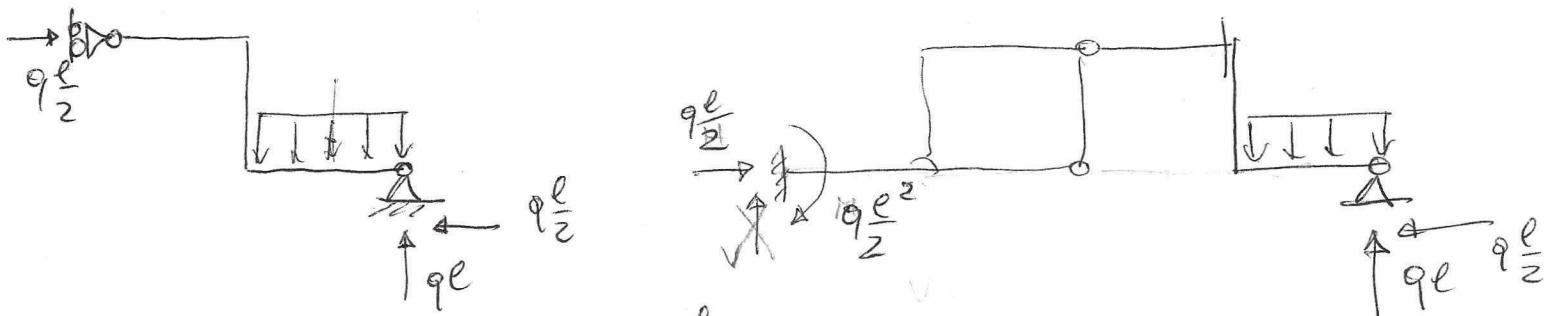
struttura originale

15 GdV
15 GdL

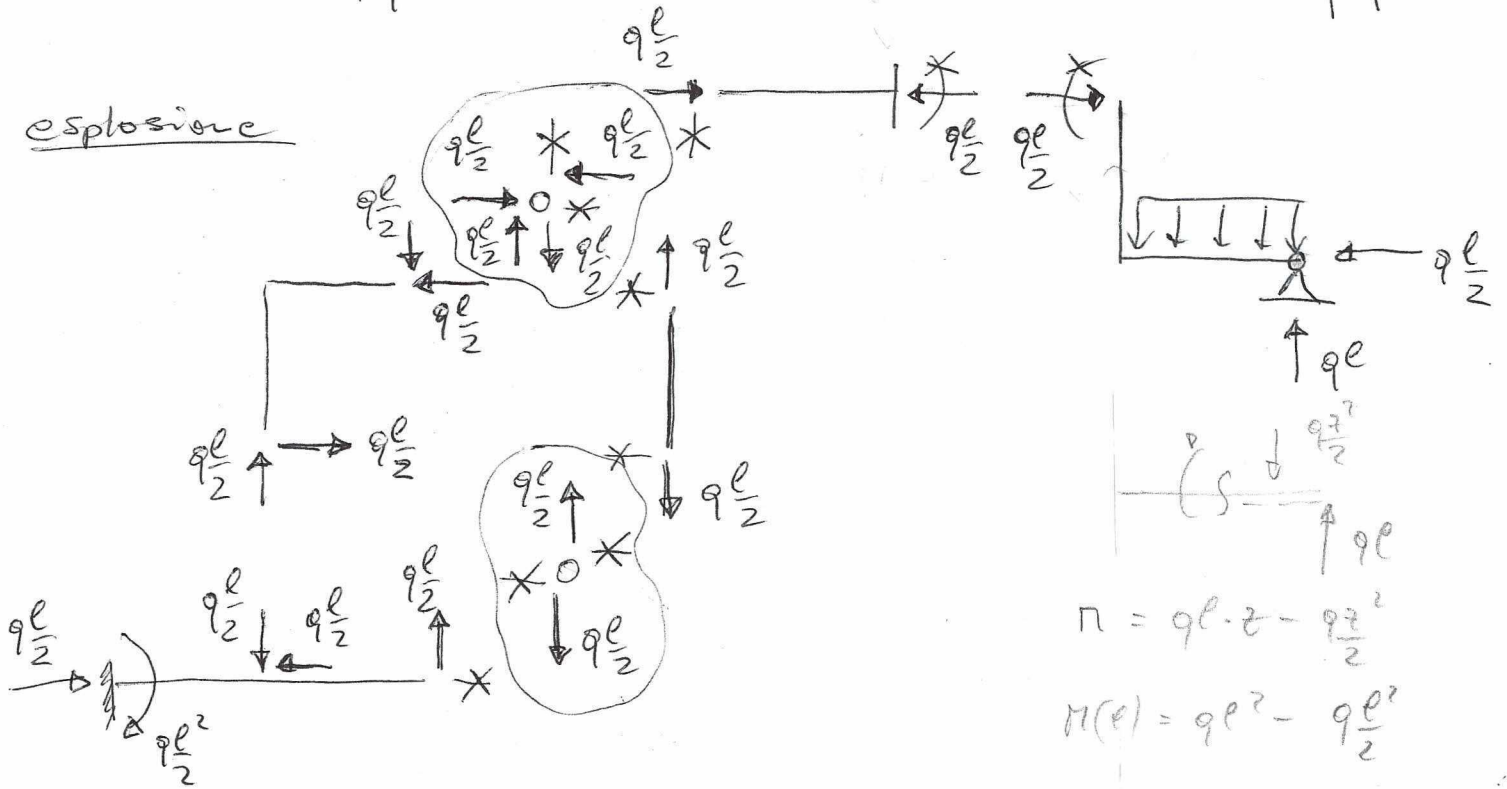


struttura semplificata

reazioni vincolari



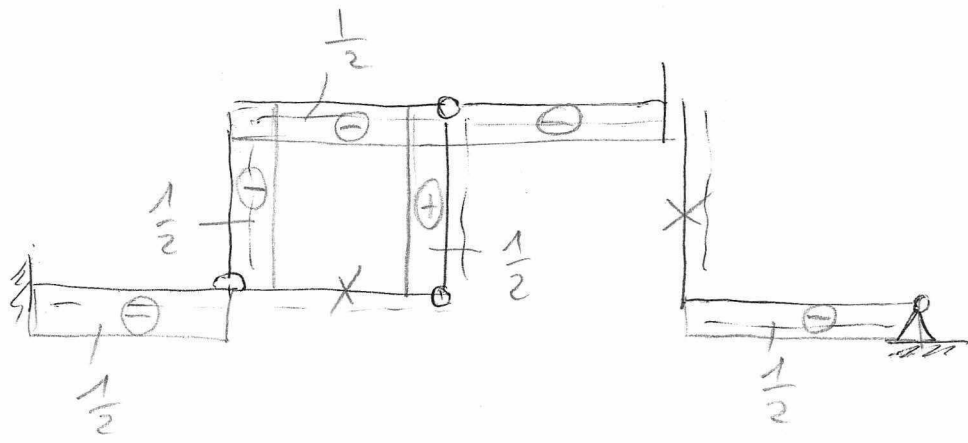
esplosione



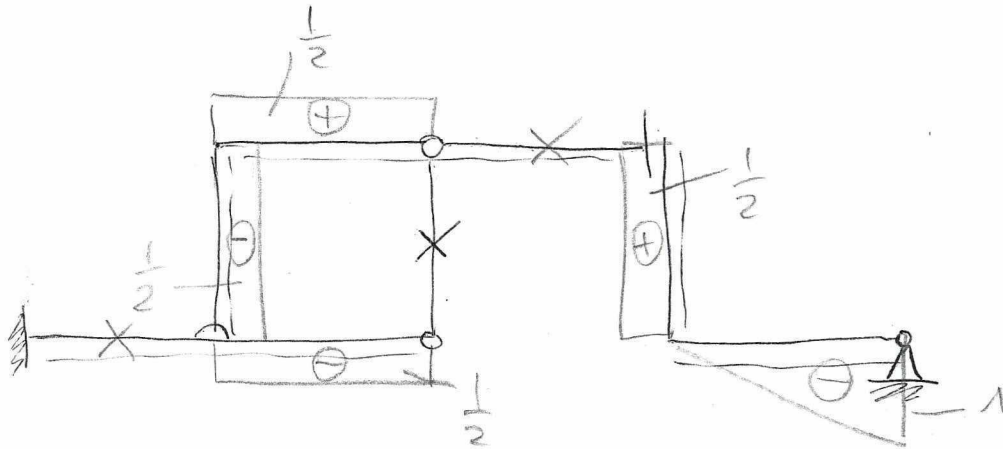
$$n = ql \cdot 2 - \frac{q l^2}{2}$$

$$M(e) = ql^2 - \frac{q l^2}{2}$$

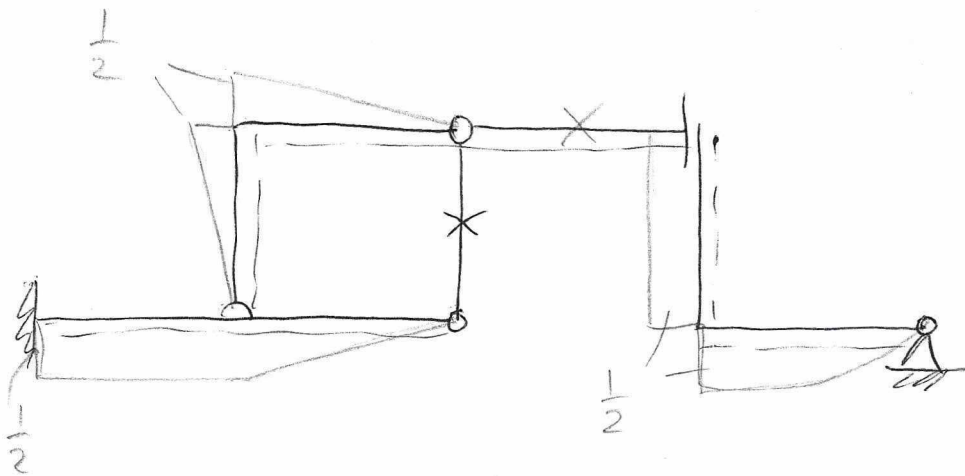
Diagrammi



$(N) \cdot ql$

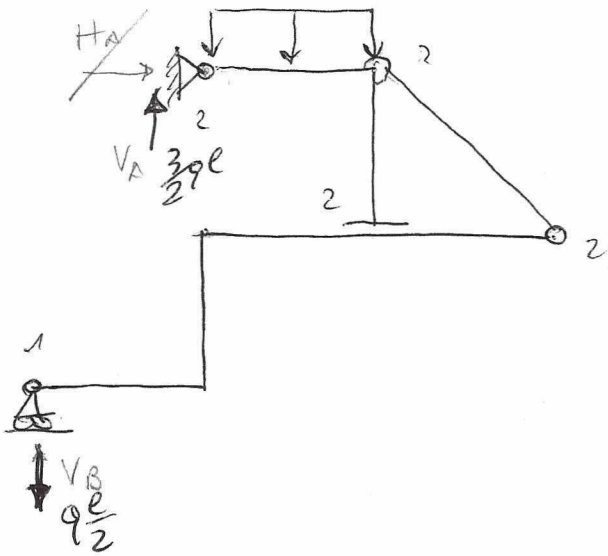


$(T) \cdot ql$



$(M) \cdot ql^2$

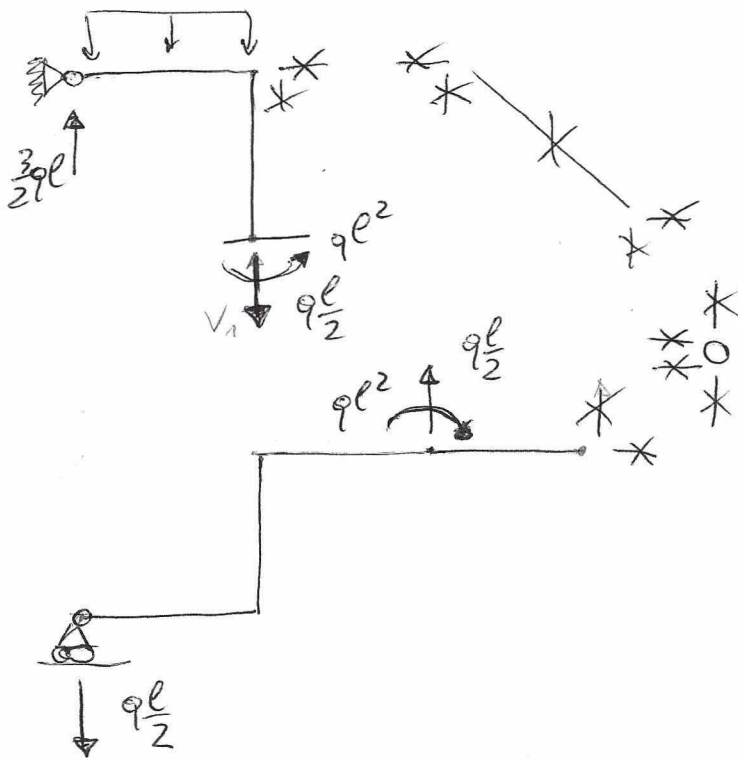
Struttura originale



$\int q dx$
 $\int q dx$
 150

$\rightarrow H_A = 0$
 $\uparrow V_A + V_B = ql$
 $\textcircled{A} \rightarrow q \frac{l^2}{2} + V_B \cdot l = 0 \rightarrow V_B = -\frac{ql}{2}$
 $\Rightarrow V_A = ql + \frac{ql}{2} = \frac{3}{2} ql$

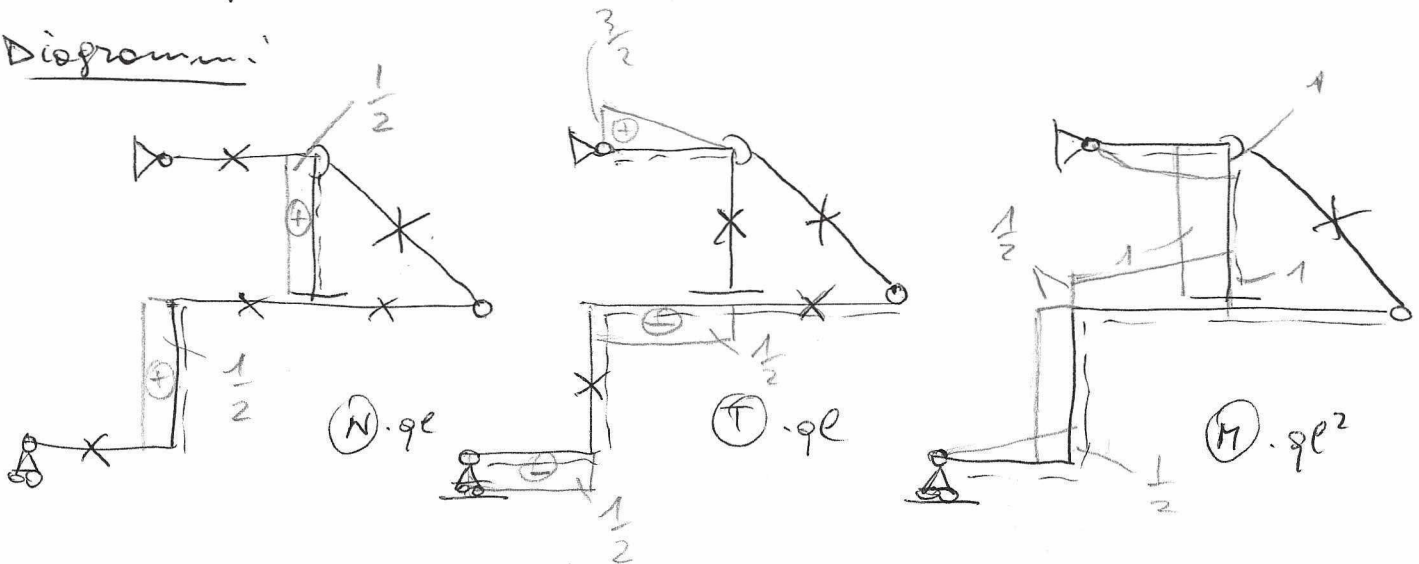
Esplorazione



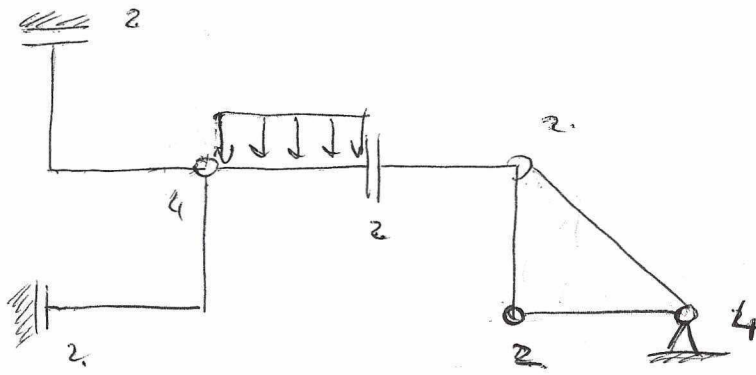
$\rightarrow -ql^2 + \frac{3}{2} ql^2 - \frac{ql^2}{2} = 0$
 ok

$\rightarrow -\frac{ql}{2} \cdot 2l + M_A = 0$
 $M_A = +ql^2$

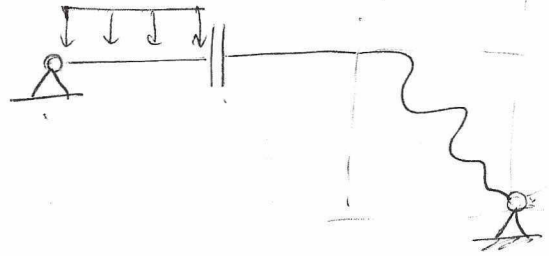
Diagrammi



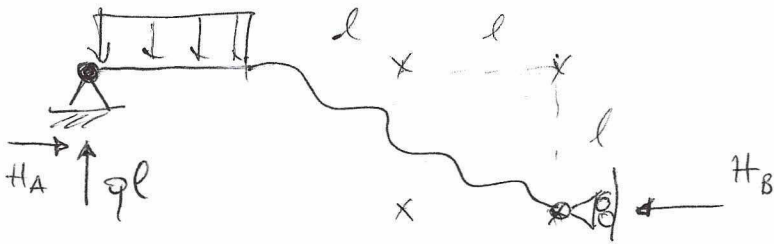
struttura originale



$$\begin{array}{r} 18 \text{ GdV} \\ 18 \text{ GdL} \\ \hline 150 \end{array}$$

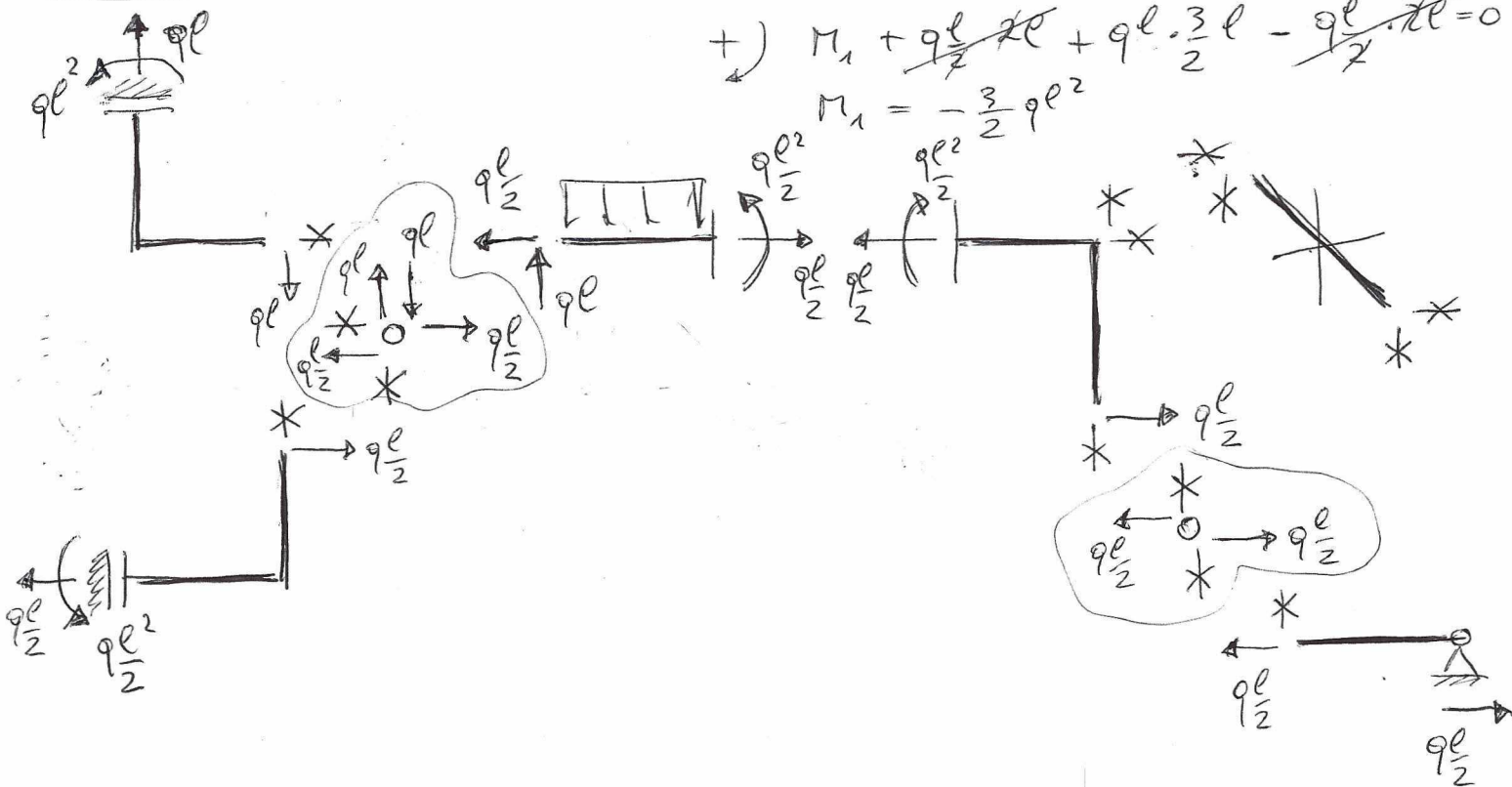


struttura semplificata



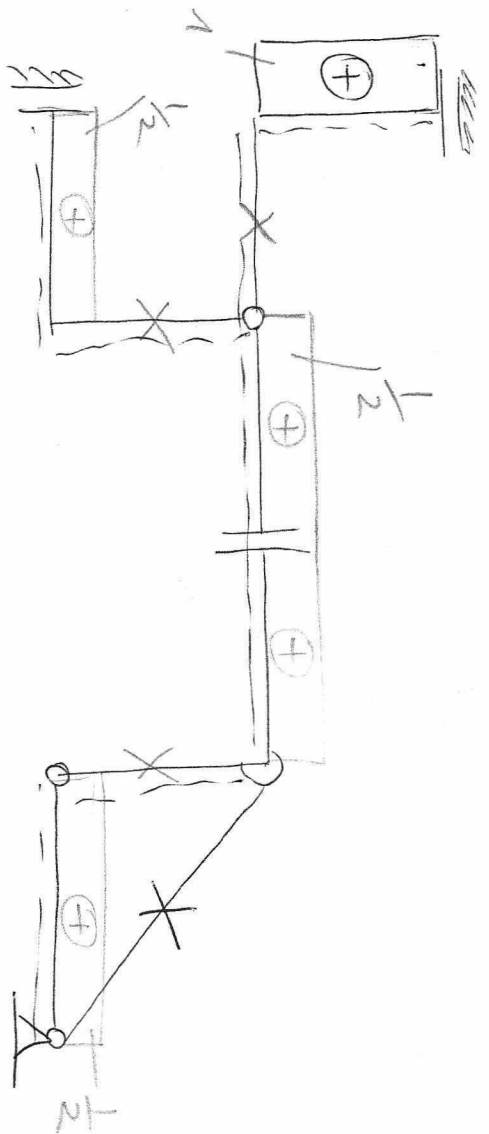
$$\begin{aligned} + \downarrow \quad q \frac{l^2}{2} + H_B \cdot l &= 0 \Rightarrow H_B = -\frac{q l^2}{2} \\ \Rightarrow H_A &= -\frac{q l^2}{2} \end{aligned}$$

Reazioni vincolari

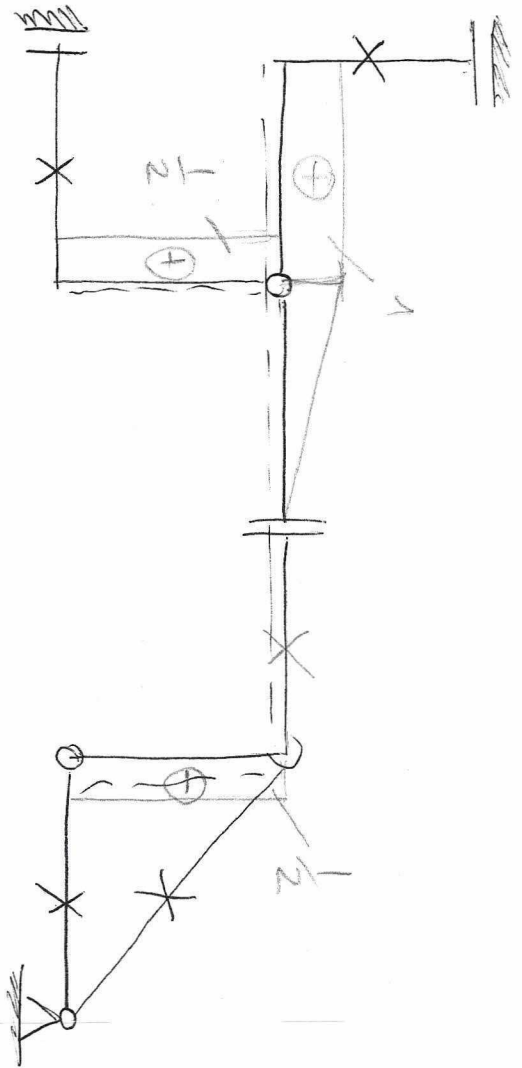


$$\begin{aligned} + \downarrow \quad M_1 + q \frac{l^2}{2} \cdot 2l + q l \cdot \frac{3}{2} l - \frac{q l^2}{2} \cdot 2l &= 0 \\ M_1 &= -\frac{3}{2} q l^2 \end{aligned}$$

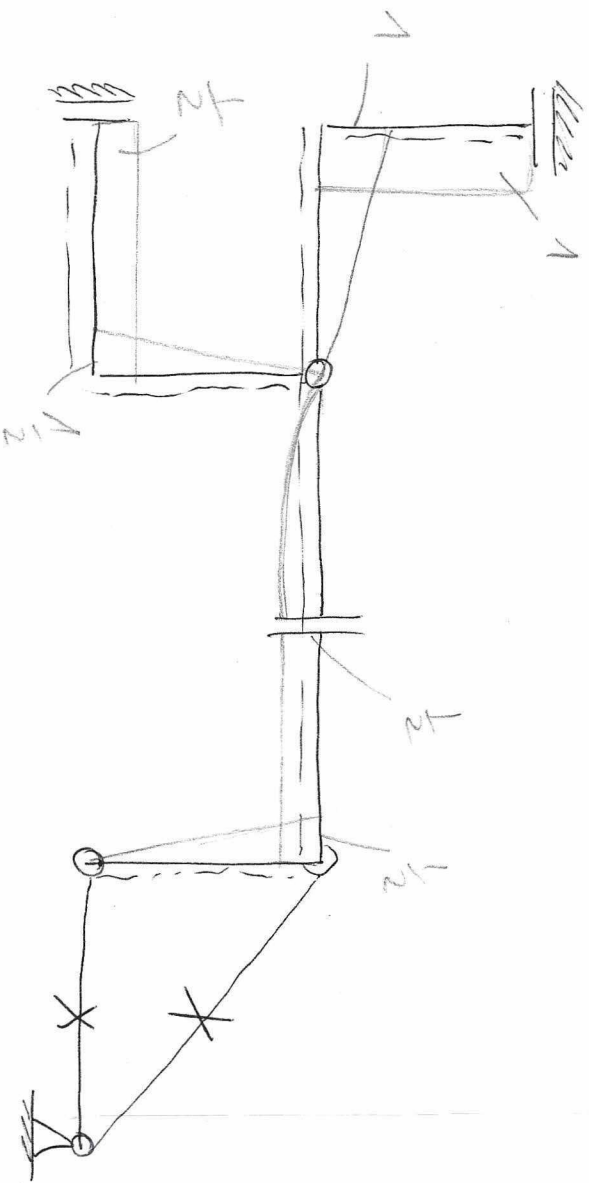
Diagramm:



(N) · ql



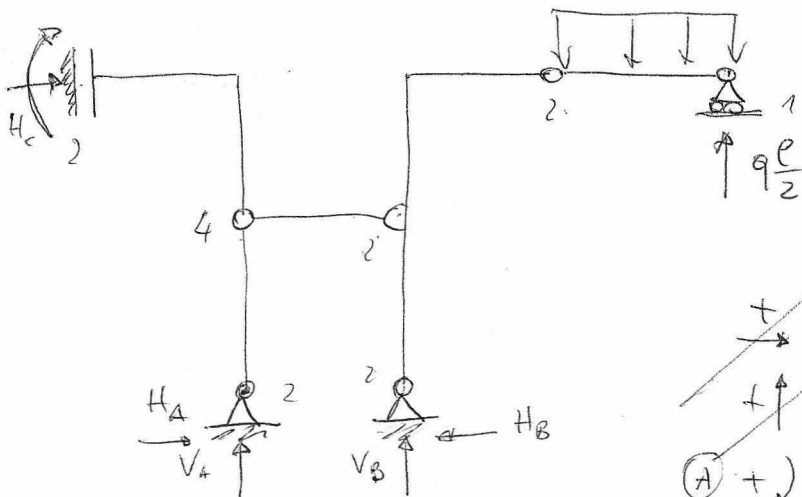
(T) · ql



(M) · ql²

Struttura originale

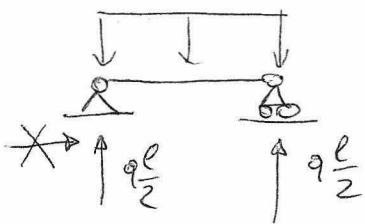
15 GdV
15 GdL
150



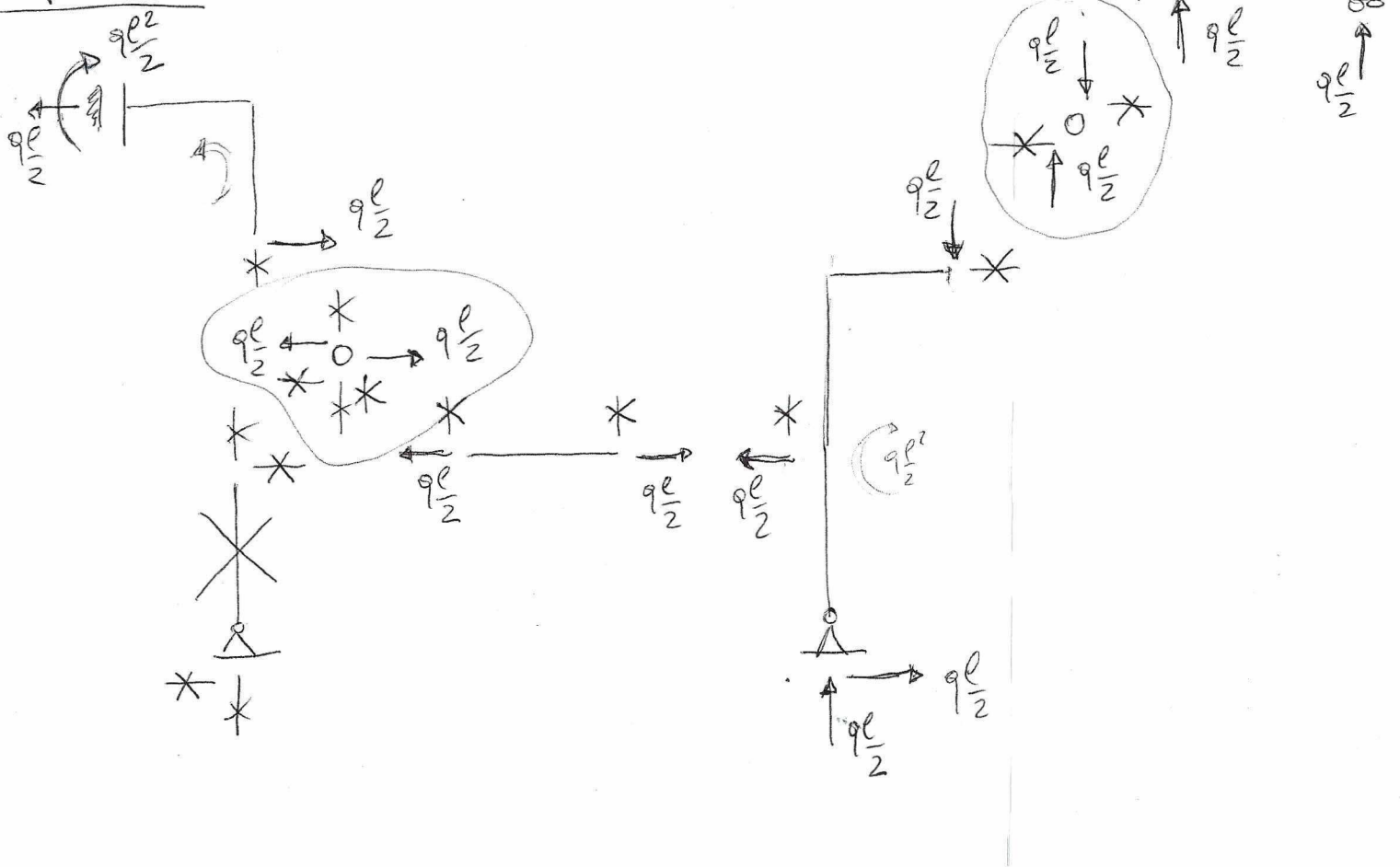
reazioni vincolari

$$\begin{aligned} \rightarrow H_c + H_A &= H_B \\ \uparrow V_A + V_B + q\frac{l}{2} &= ql \\ \textcircled{A} \rightarrow H_c \cdot 2l + M_c &= V_B \cdot l \end{aligned}$$

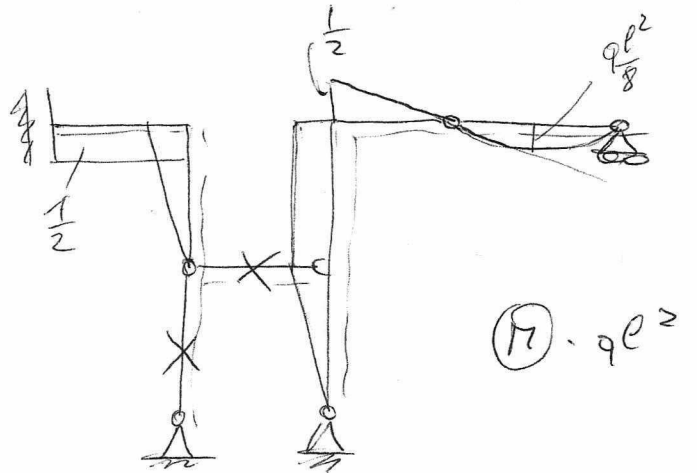
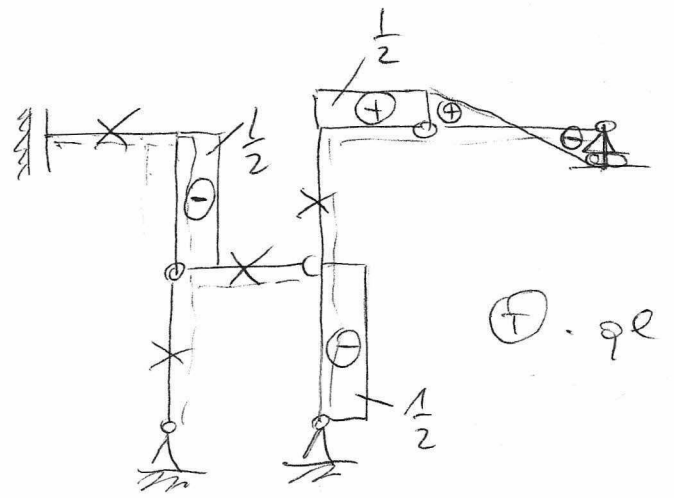
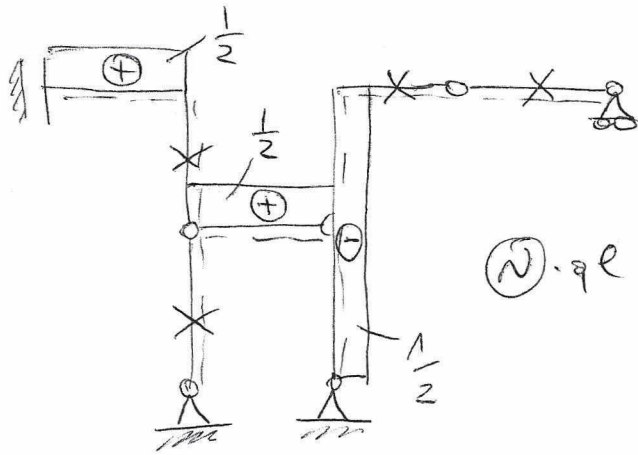
Struttura semplificata



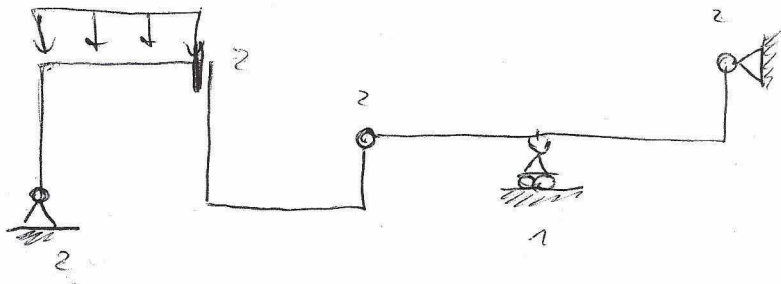
Esplosione



Diagrammi



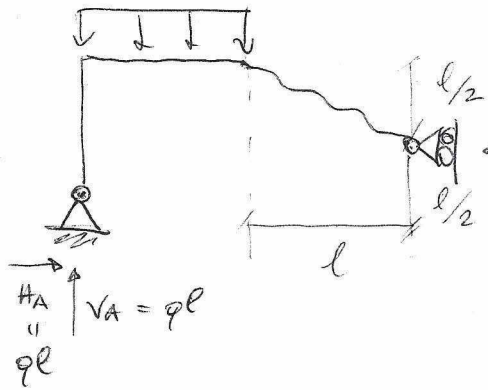
struttura originale



q GdV
 q GdL

 150

struttura semplificata

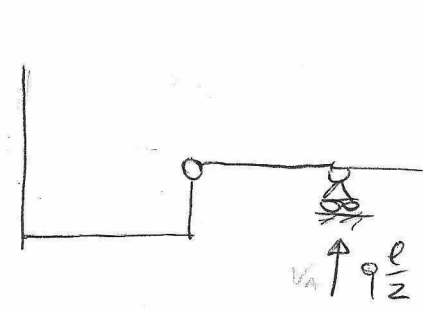
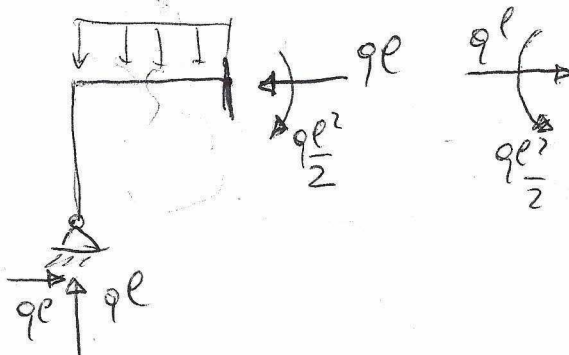


$\rightarrow H_A = H_B$

$\uparrow V_A = ql$

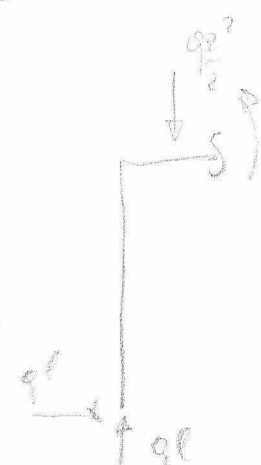
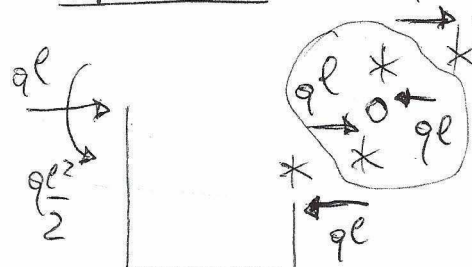
$\textcircled{A} \rightarrow q \frac{l^2}{2} - H_B \cdot \frac{l}{2} = 0 \Rightarrow H_B = ql = H_A$

reazioni vincolari



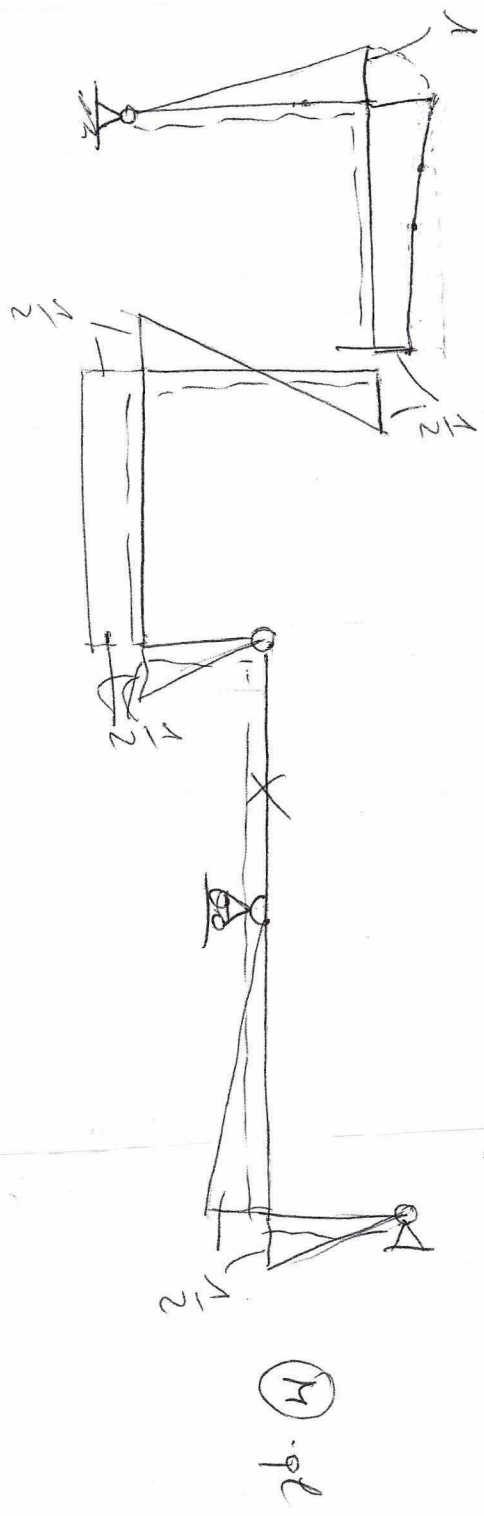
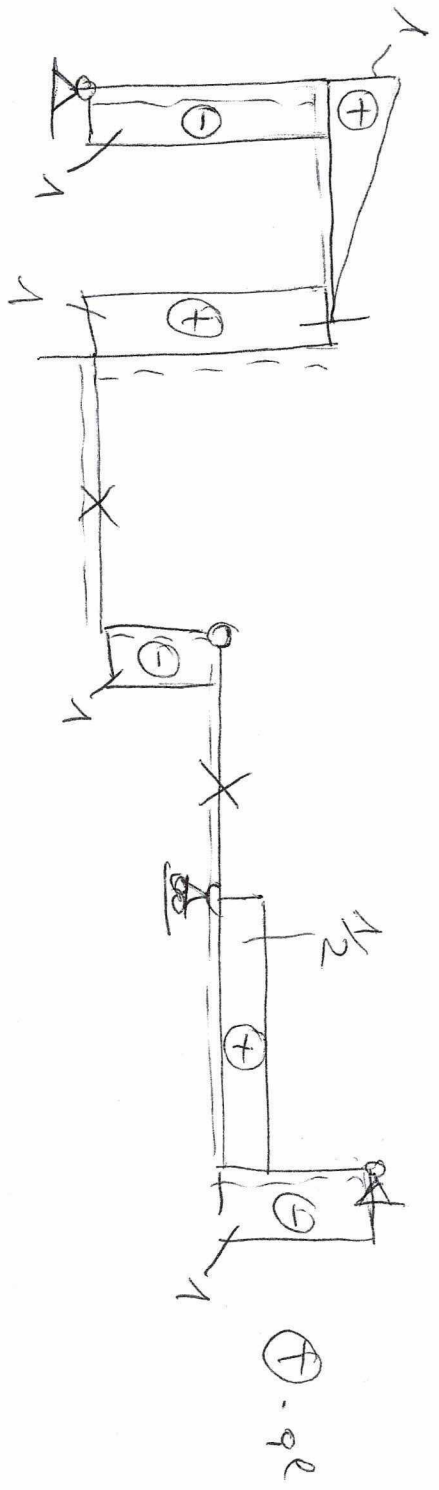
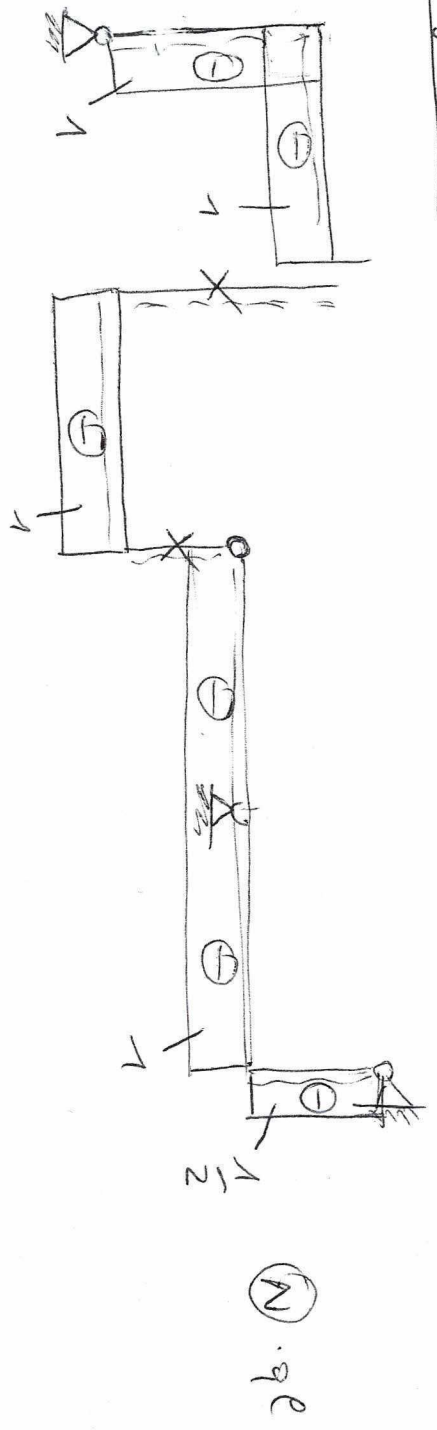
$\rightarrow H_B = ql$
 $\uparrow V_A + V_B = 0$
 $\textcircled{B} \rightarrow V_A \cdot l = ql \frac{l}{2}$
 $V_A = ql/2$
 $\Rightarrow V_B = ql/2$

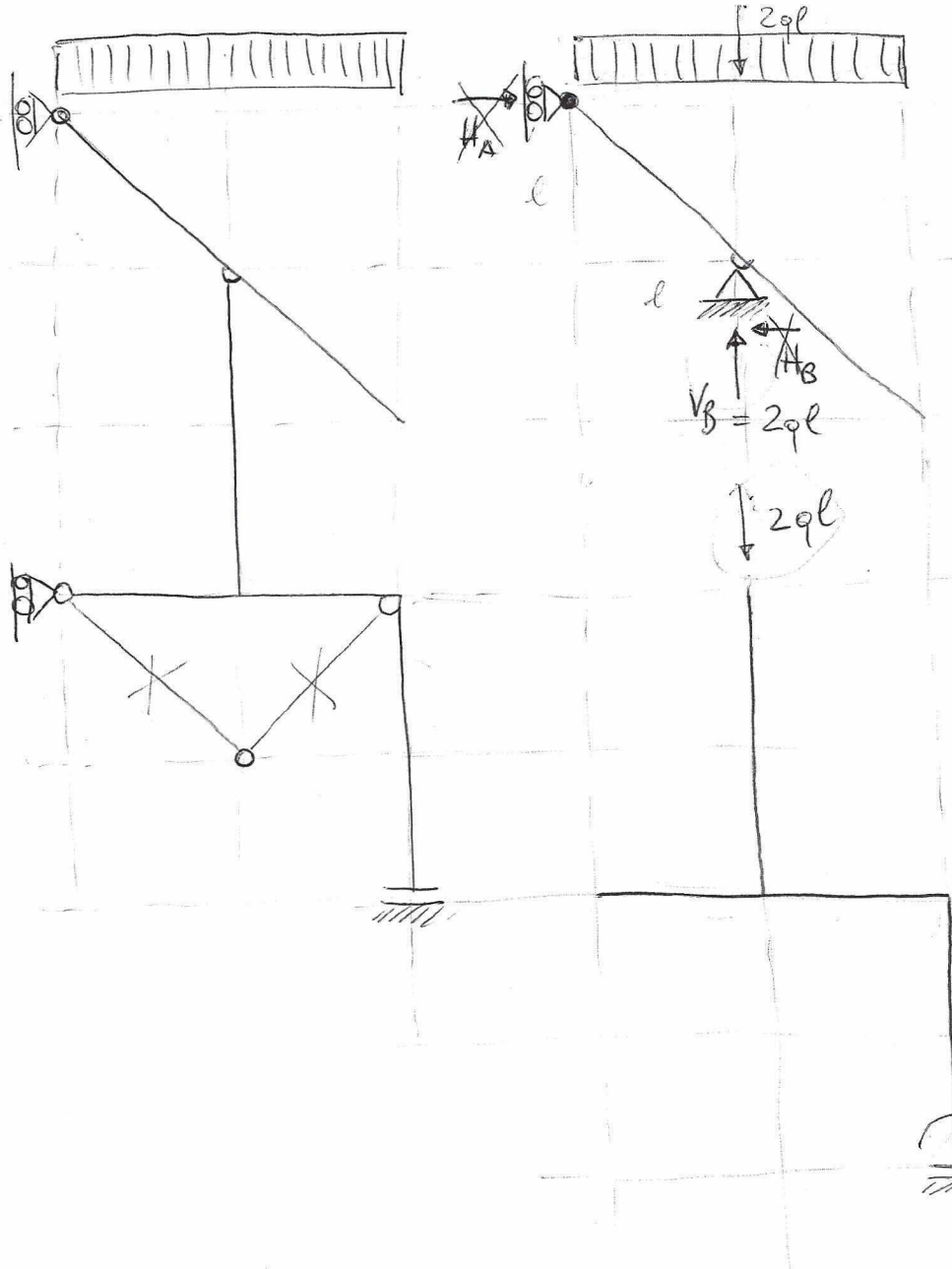
esplosione



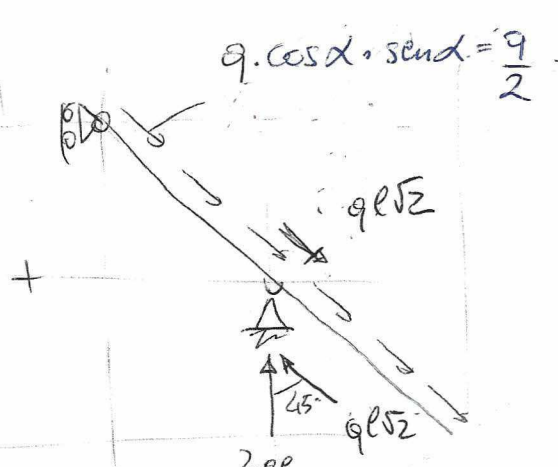
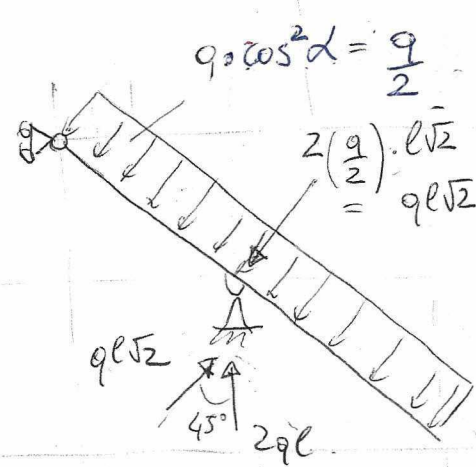
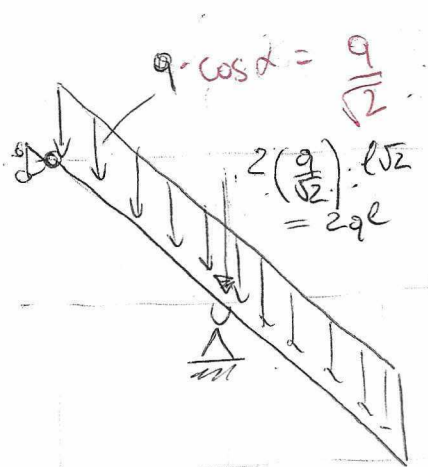
$N = -ql^2 + ql \cdot l - \frac{ql^2}{2}$
 $N(\frac{l}{2}) = -ql^2 + \frac{ql^2}{2} - \frac{ql^2}{8}$

Diagrammi





$$\begin{aligned}
 & \rightarrow H_A = H_B \quad \text{OK} \\
 & \uparrow V_B = 2ql \\
 & \downarrow -V_B \cdot l + H_B \cdot l + 2ql \cdot l = 0 \\
 & -2ql + H_B + 2ql = 0 \\
 & H_B = 0 = H_A
 \end{aligned}$$

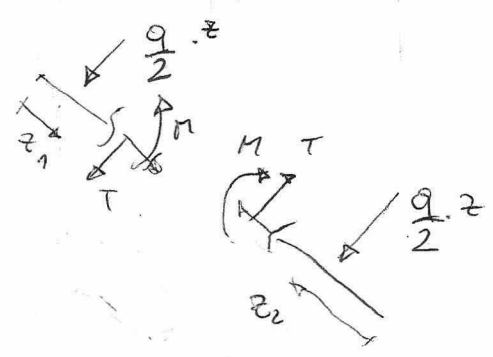


$$0 \leq z_1 \leq l\sqrt{2}$$

$$\begin{aligned}
 T(z) &= -\frac{q}{2} \cdot z \\
 T(l\sqrt{2}) &= -\frac{q}{2} \cdot l\sqrt{2}
 \end{aligned}$$

$$0 \leq z_2 \leq l\sqrt{2}$$

$$\begin{aligned}
 T(z) &= +\frac{q}{2} \cdot z \\
 T(l\sqrt{2}) &= +\frac{q}{2} \cdot l\sqrt{2}
 \end{aligned}$$

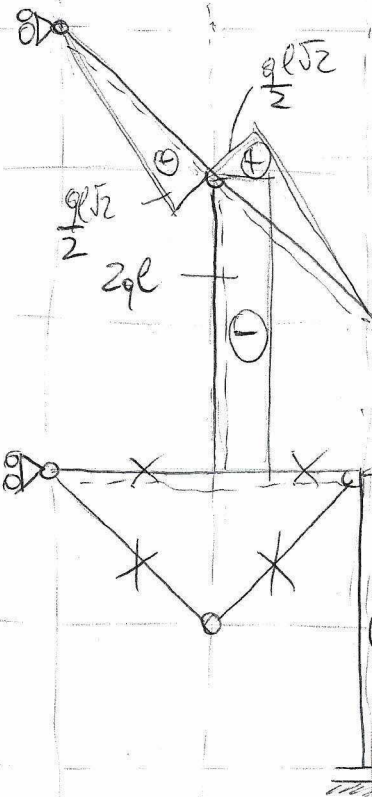


$$0 \leq z_1 \leq l\sqrt{2}$$

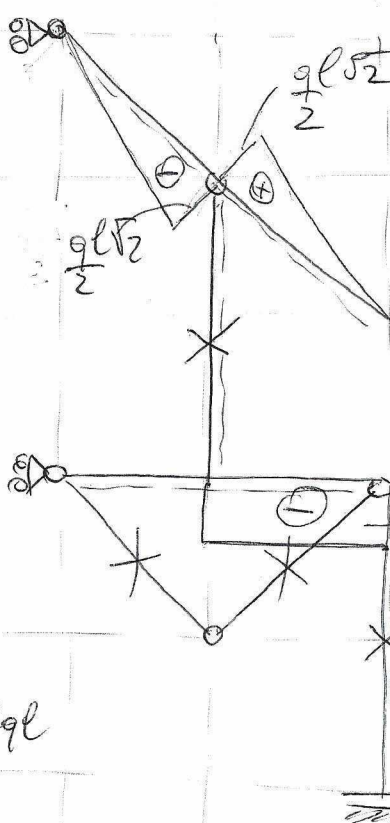
$$\begin{aligned}
 N(z) &= -\frac{q}{2} \cdot z \\
 N(l\sqrt{2}) &= -\frac{q}{2} \cdot l\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 M(z) &= -\frac{q}{2} \cdot \frac{z^2}{2} \\
 M(l\sqrt{2}) &= -\frac{q}{4} \cdot 2l^2 = -\frac{q}{2} l^2
 \end{aligned}$$

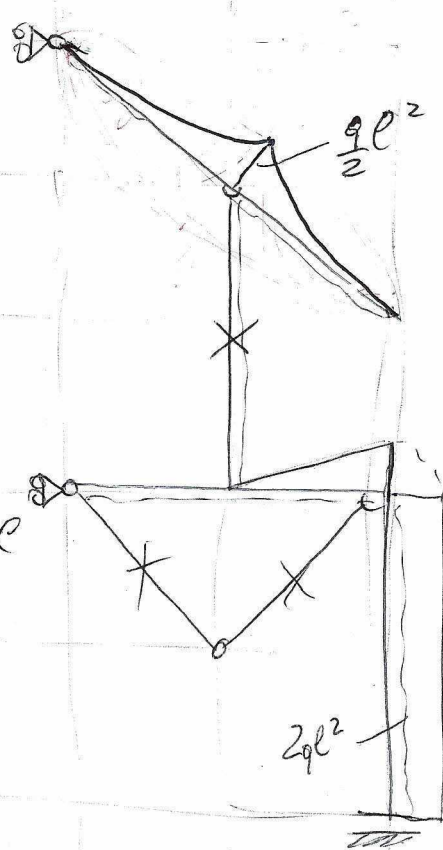
Diagramm



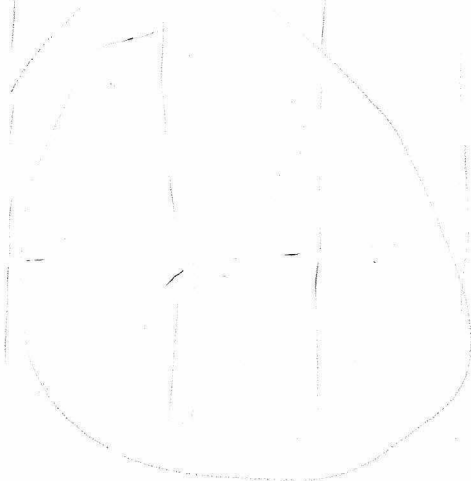
(N)



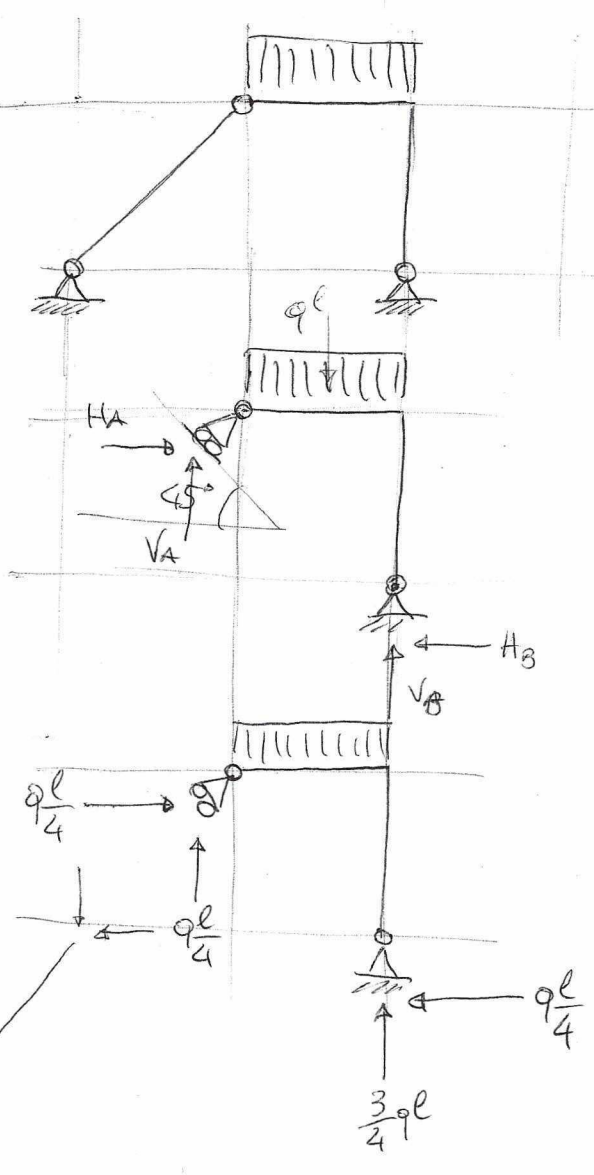
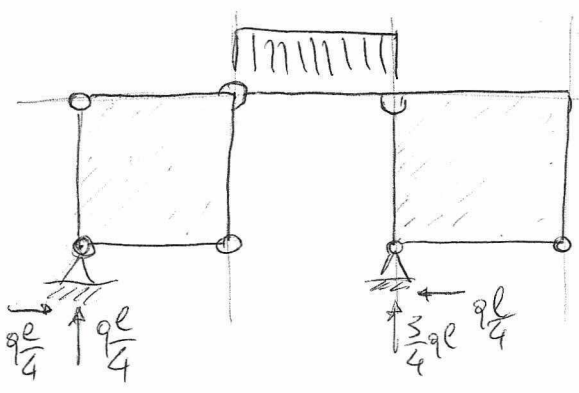
(T)



(M)



OK



$$\rightarrow H_A = H_B = V_A$$

$$\uparrow V_A + V_B = qe$$

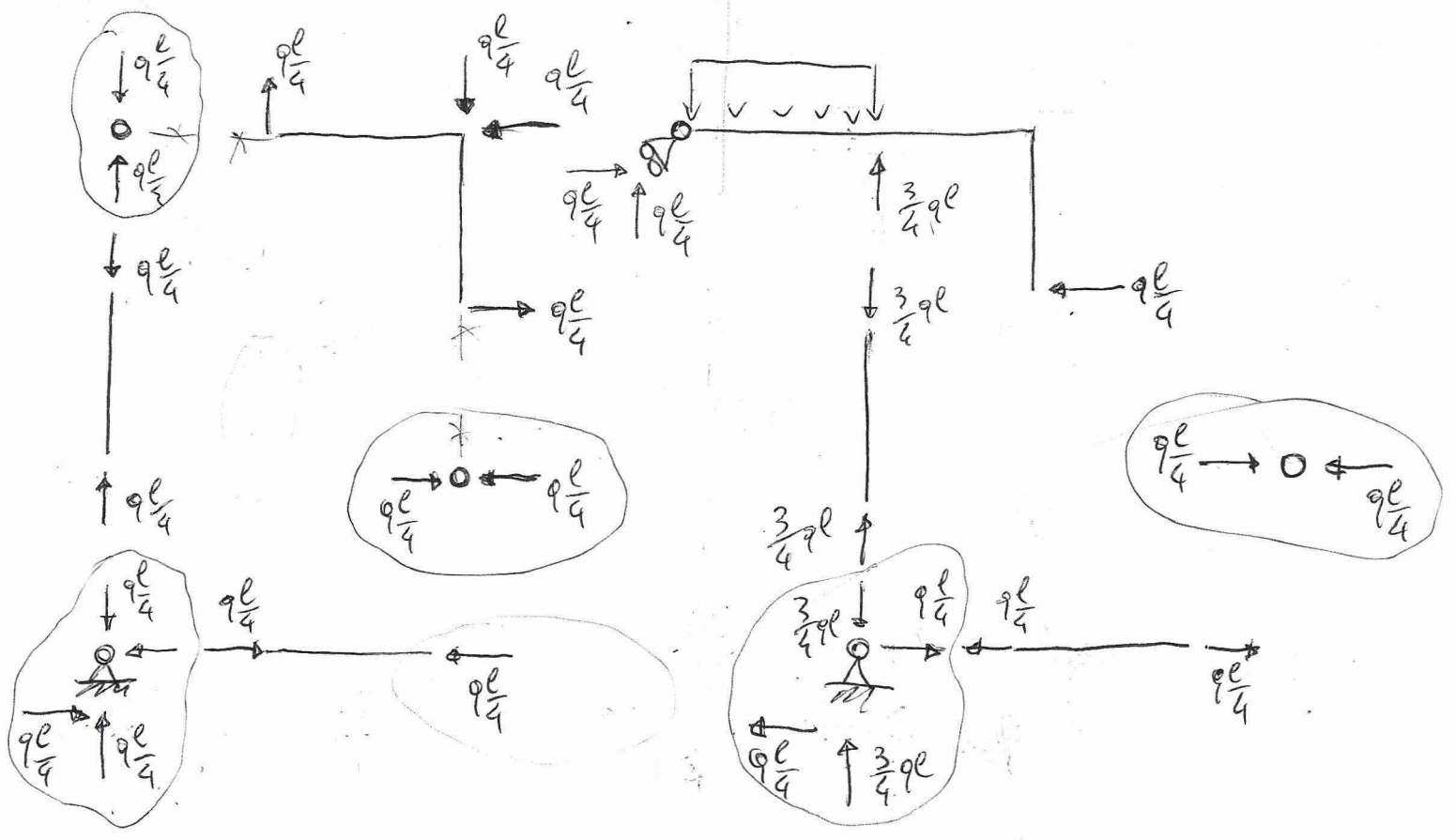
$$\textcircled{B} \rightarrow V_A \cdot l + H_A \cdot l = qe \cdot \frac{l}{2}$$

$$2V_A = \frac{qe}{2}$$

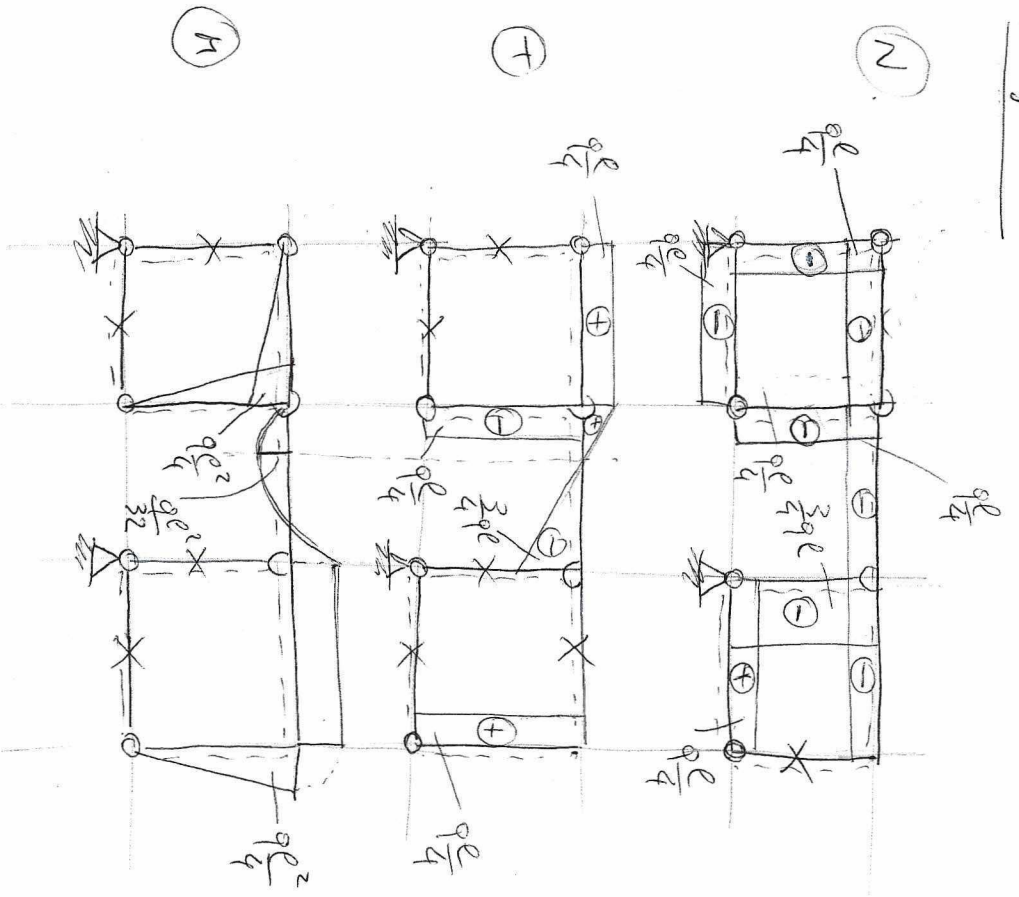
$$V_A = \frac{qe}{4} = H_A = H_B$$

$$V_B = \frac{3}{4} qe$$

Esplorazione



Diagrammi:



$$\begin{array}{c} \uparrow qL \\ \downarrow qz \\ \int T(z) = \frac{qL}{4} - qz \end{array}$$

$$0 = \frac{qL}{4} - qz$$

in $z = \frac{L}{4}$ il taglio si annulla

$$\begin{array}{c} \uparrow qL \\ \downarrow \frac{qz^2}{2} \\ \int M(z) = \frac{qL}{4}z - \frac{qz^3}{6} \end{array}$$

$$M\left(\frac{L}{4}\right) = \frac{qL}{4} \cdot \frac{L}{4} - \frac{qL^3}{16 \cdot 6}$$

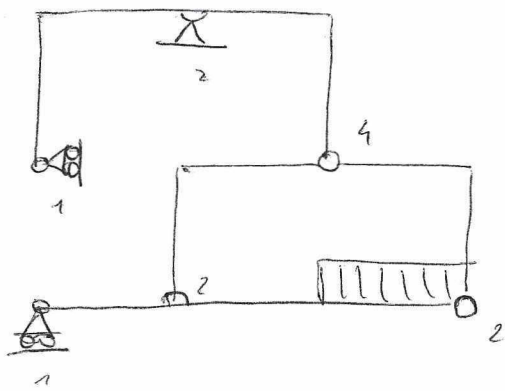
$$= \frac{qL^2}{16} - \frac{qL^3}{96} =$$

$$= \frac{2qL^2 - 1}{32} = \frac{1}{32} qL^2$$

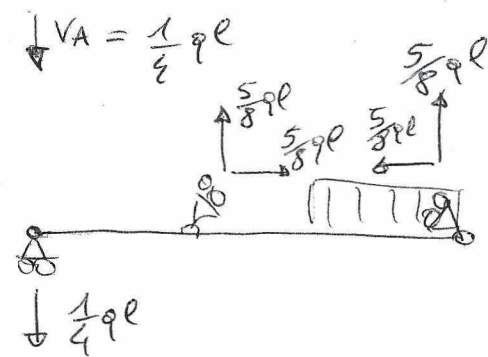
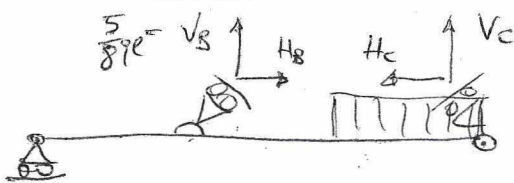
struttura originale

$$\begin{array}{r} 12 \text{ GdV} \\ 12 \text{ GdL} \\ \hline 150 \end{array}$$

OK

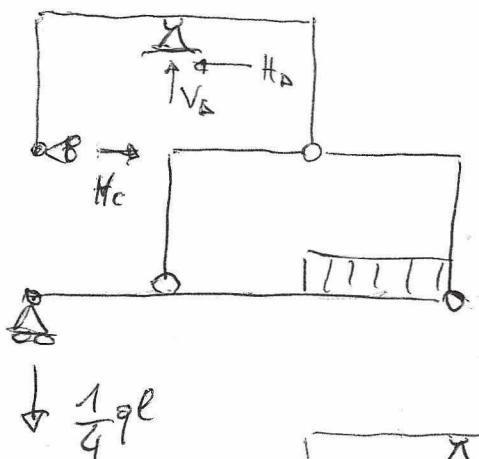


struttura semplificata

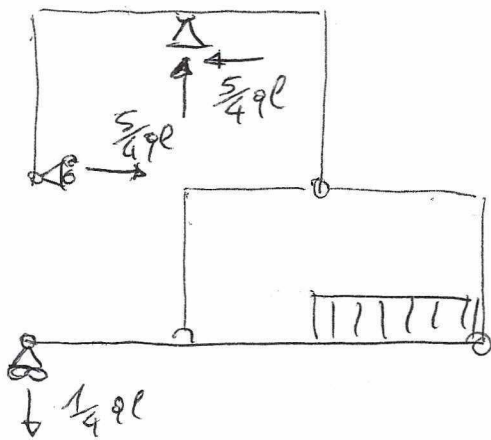


$$\begin{aligned} + \rightarrow H_B = V_B = H_C = V_C \\ + \uparrow V_A + V_B + V_C = ql \\ \textcircled{A} + \rightarrow -V_B \cdot l - V_C \cdot 2l + \frac{5}{2} ql^2 = 0 \\ - \frac{1}{4} V_B + \frac{5}{2} ql = 0 \Rightarrow V_B = + \frac{5}{8} ql \\ \Rightarrow V_A = ql - \frac{5}{4} ql = - \frac{1}{4} ql \end{aligned}$$

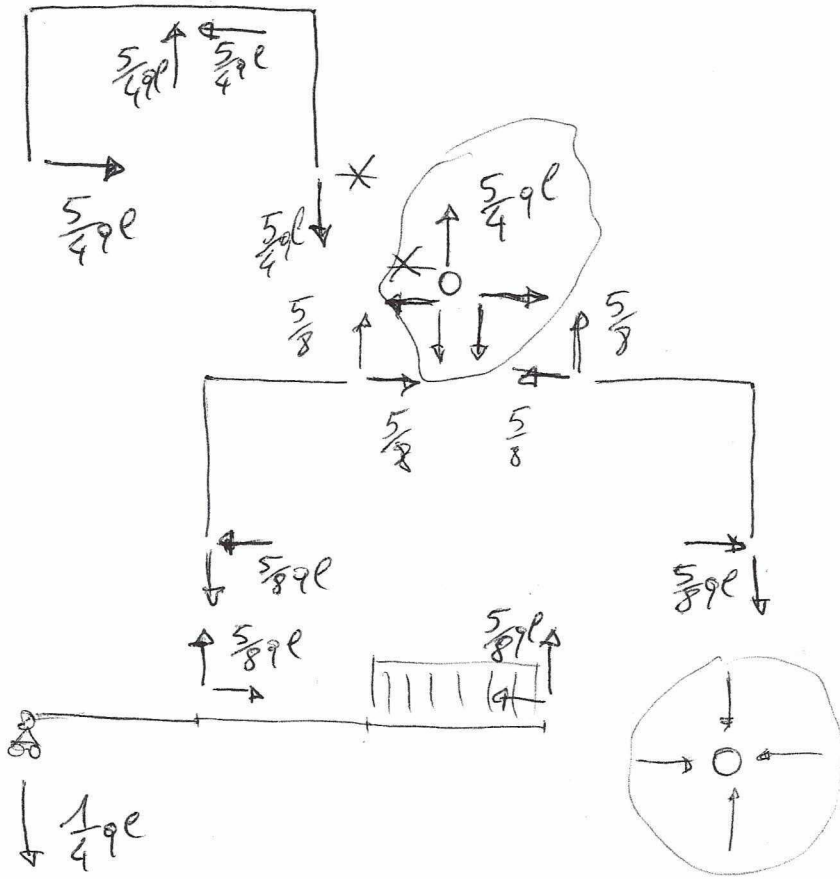
reazioni vincolari



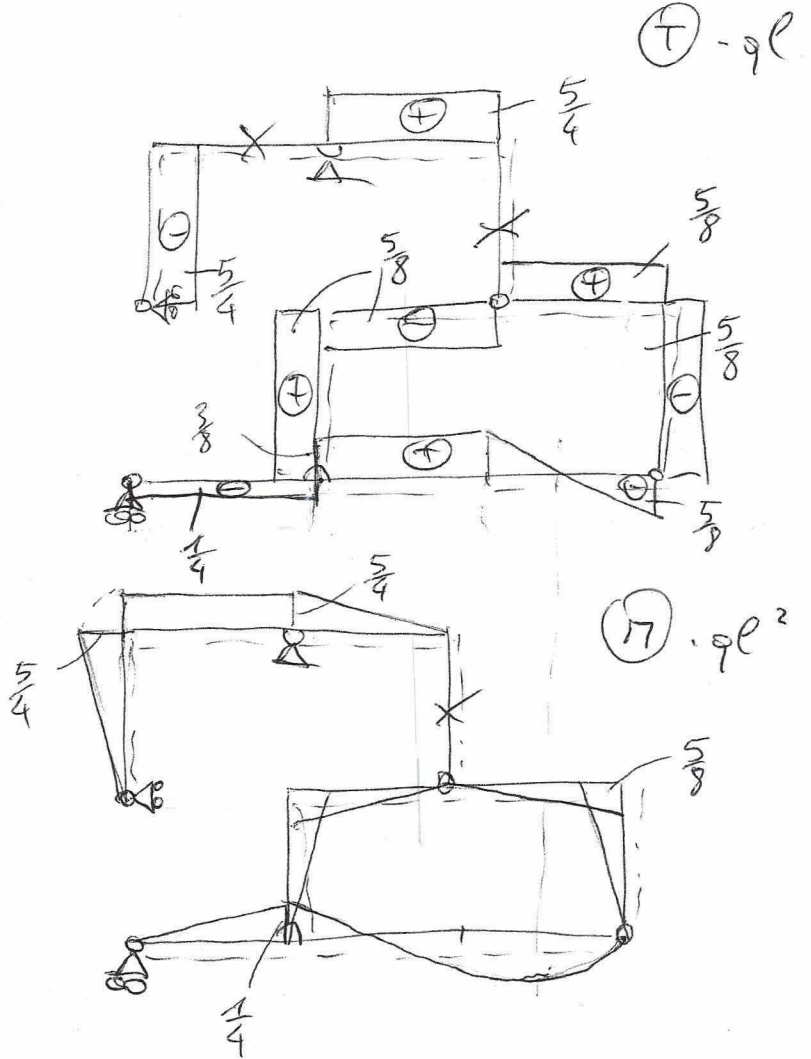
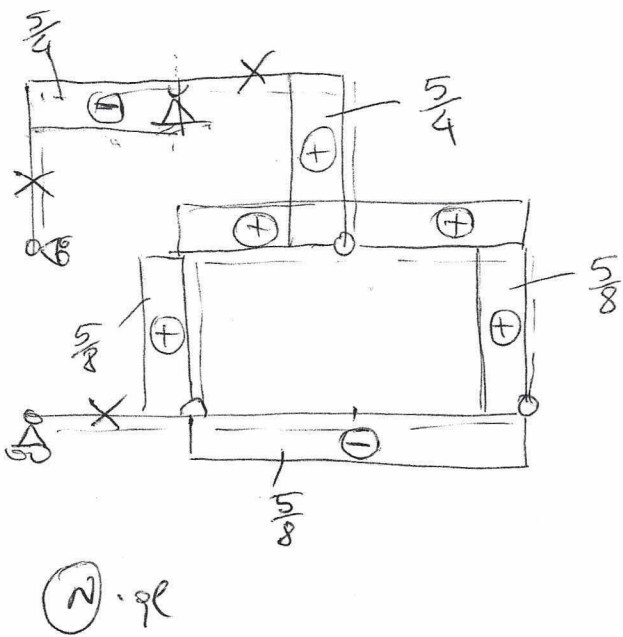
$$\begin{aligned} + \uparrow V_A = ql + \frac{1}{4} ql = \frac{5}{4} ql \\ + \rightarrow H_C = H_D \\ \textcircled{C} + \rightarrow -H_D \cdot l - \frac{5}{4} ql^2 + \frac{5}{2} ql^2 = 0 \\ -H_D + \frac{5}{4} ql = 0 \\ H_D = \frac{5}{4} ql \end{aligned}$$



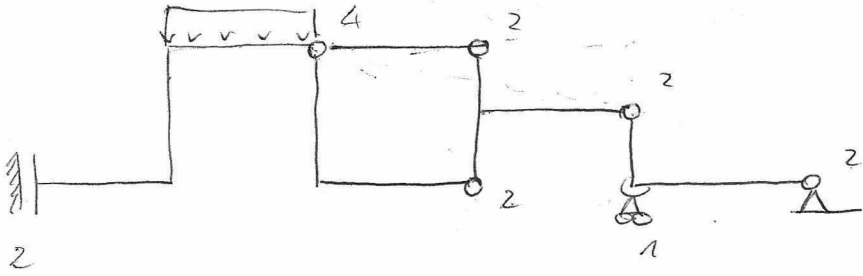
Esplosione



Diagrammi



struttura originale

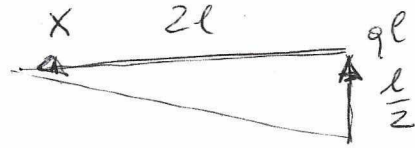
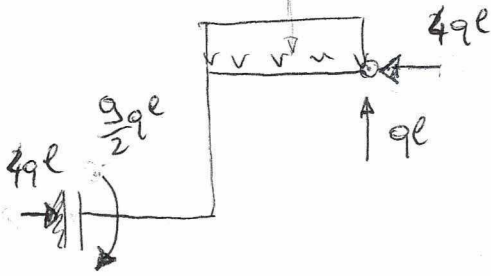


15 GdU

15 GdL

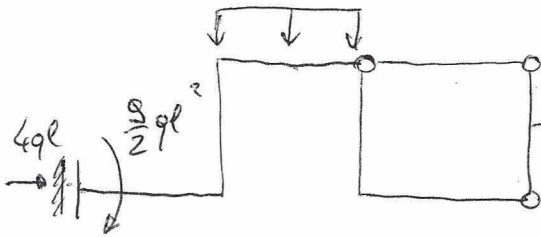
150

struttura semplificata



se $ql : \frac{l}{2} = 2l : x$
 $\Rightarrow x = 4ql$

reazioni vincolari



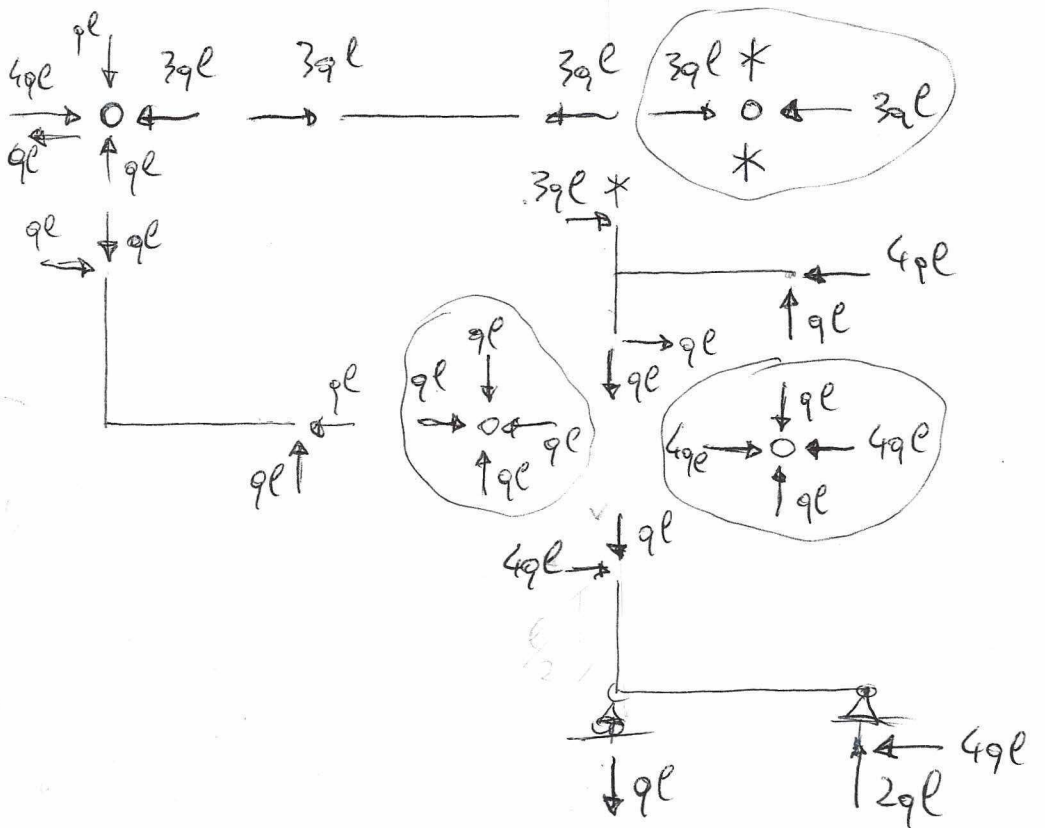
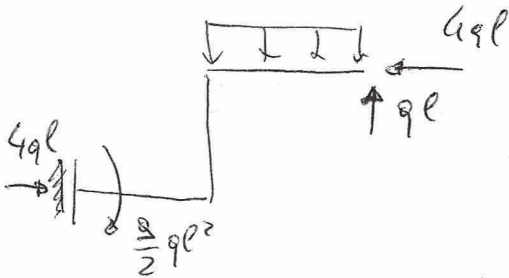
$\rightarrow H_B = 4ql$

$\uparrow V_A + V_B = ql$

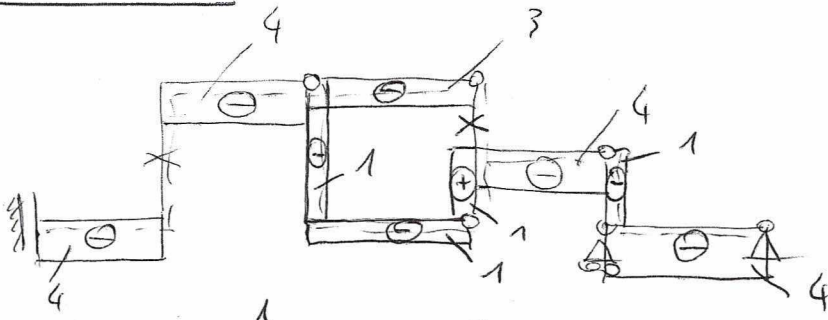
$\circlearrowleft (B) + \rightarrow V_A \cdot l - \frac{7}{2} ql^2 + \frac{8}{2} ql^2 = 0$
 $V_A = -ql$

$\Rightarrow V_B = 2ql$

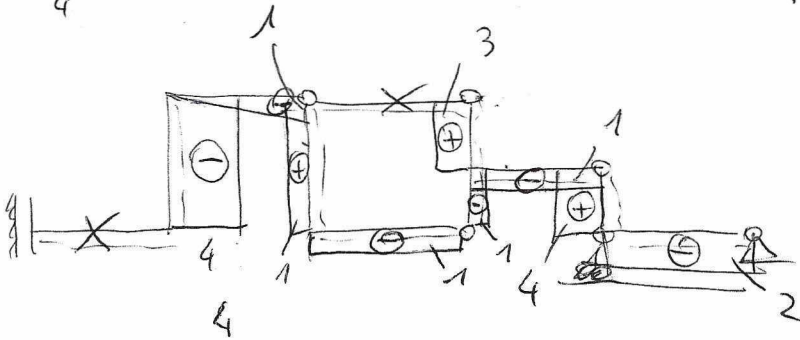
Esplosione



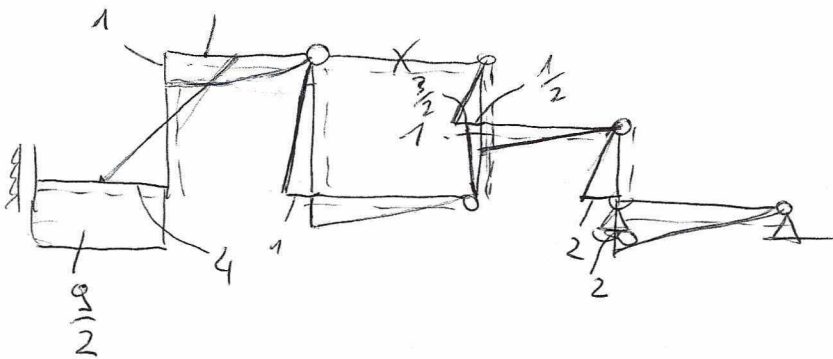
Diagrammi



(N) $\cdot ql$

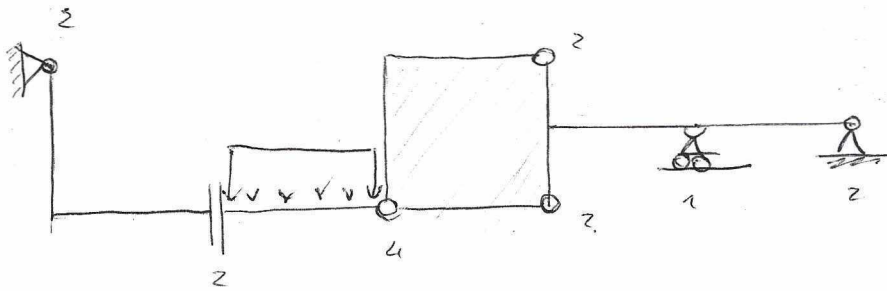


(T) $\cdot ql$



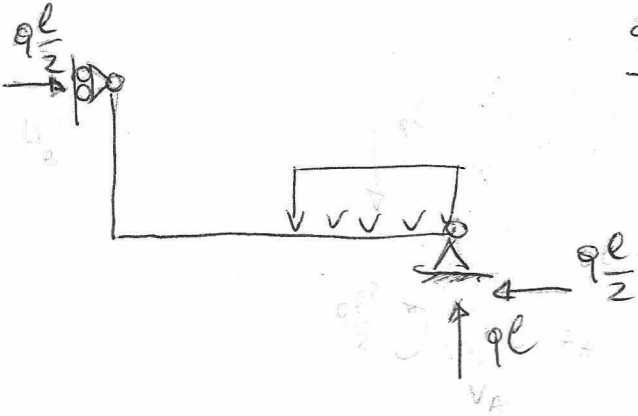
(M) $\cdot ql^2$

struttura originale

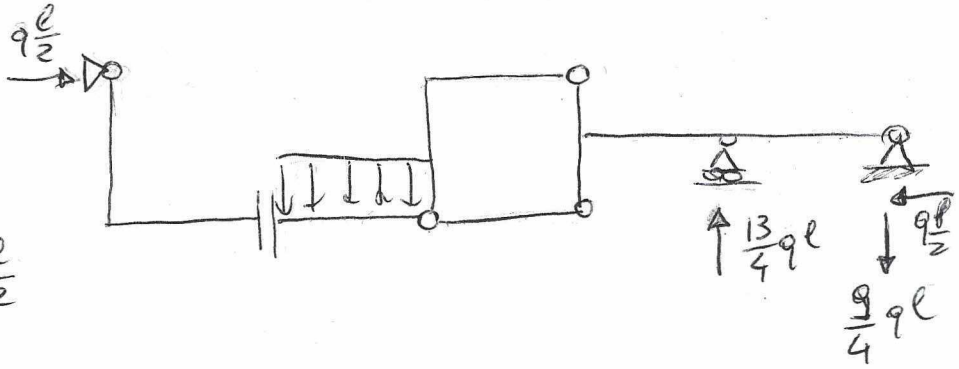


$$\begin{array}{r} 15 \text{ GdV} \\ 15 \text{ GdL} \\ \hline 150 \end{array}$$

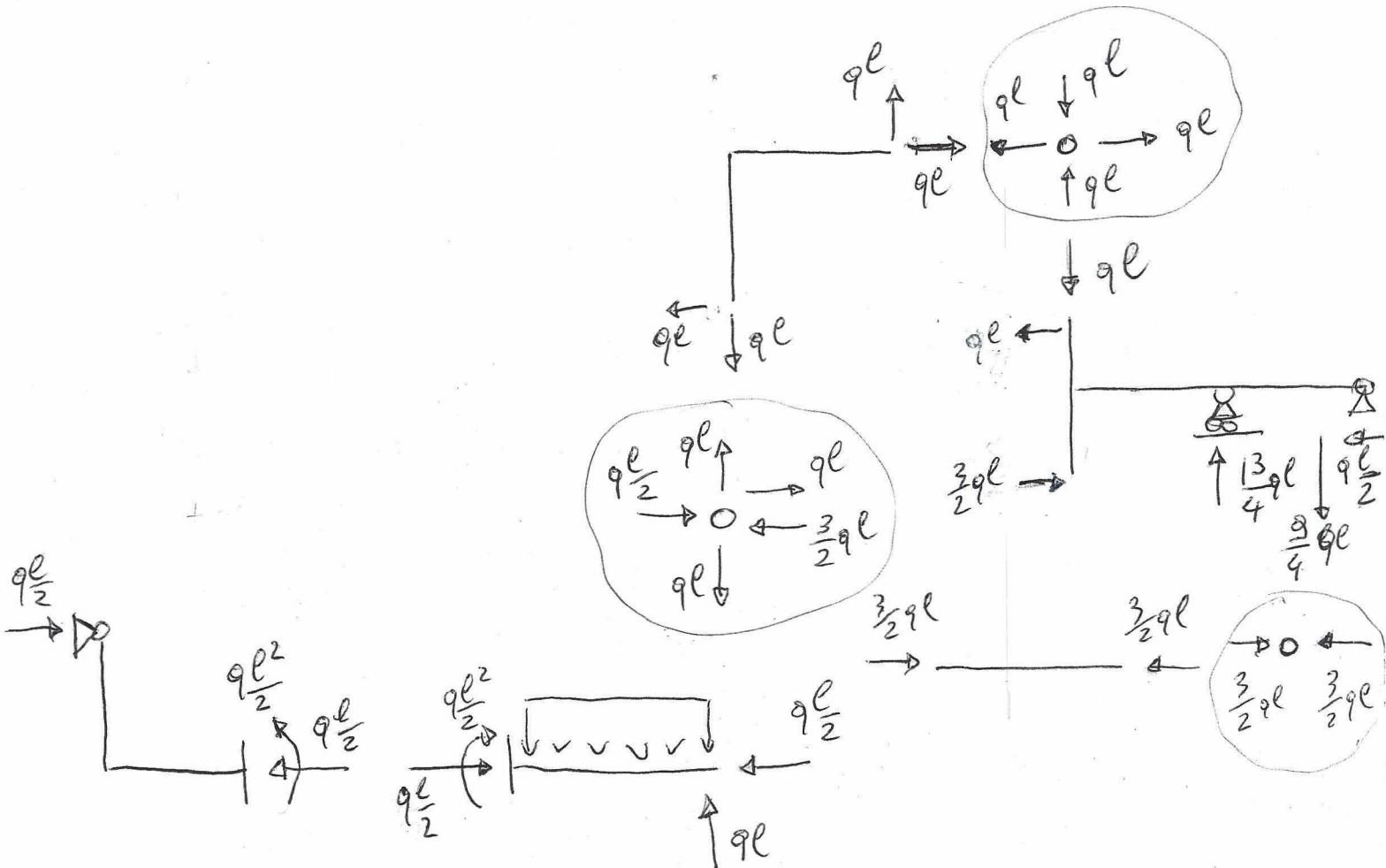
struttura semplificata



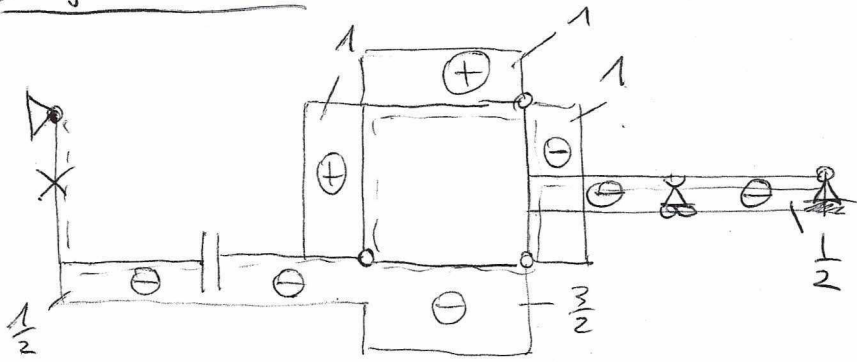
struttura originale con reazioni vincol.



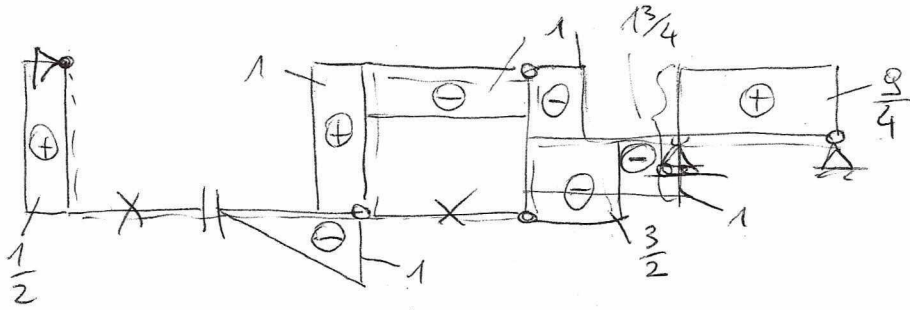
esplosione



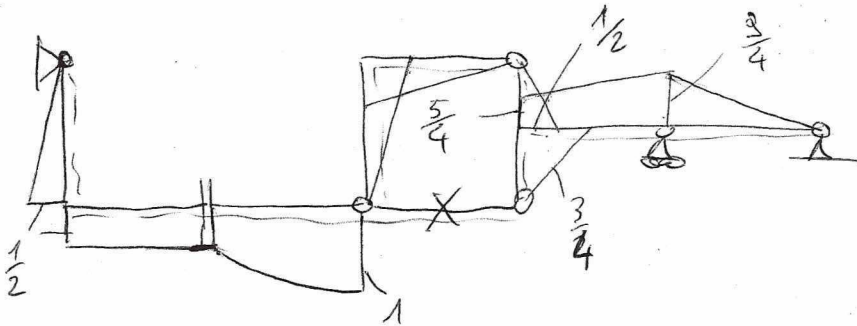
Diagrammi



(2) $\cdot qe$

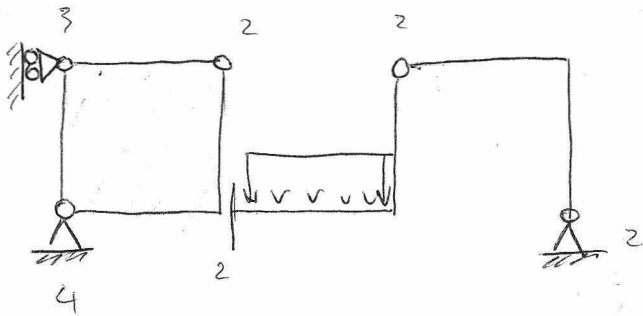


(7) $\cdot qe$



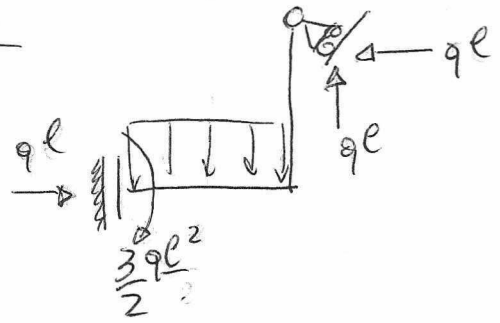
(17) $\cdot qe^2$

struttura originale

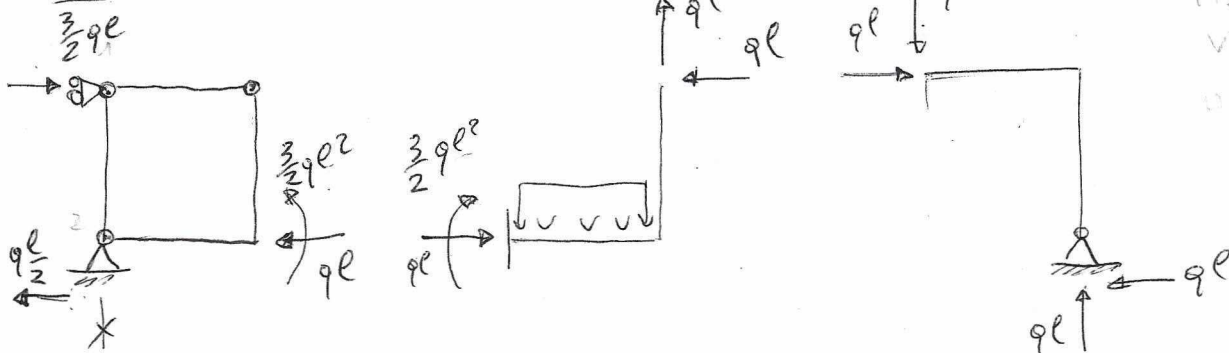


15 GdU
15 GdL
150

struttura semplificata



reazioni vincolari



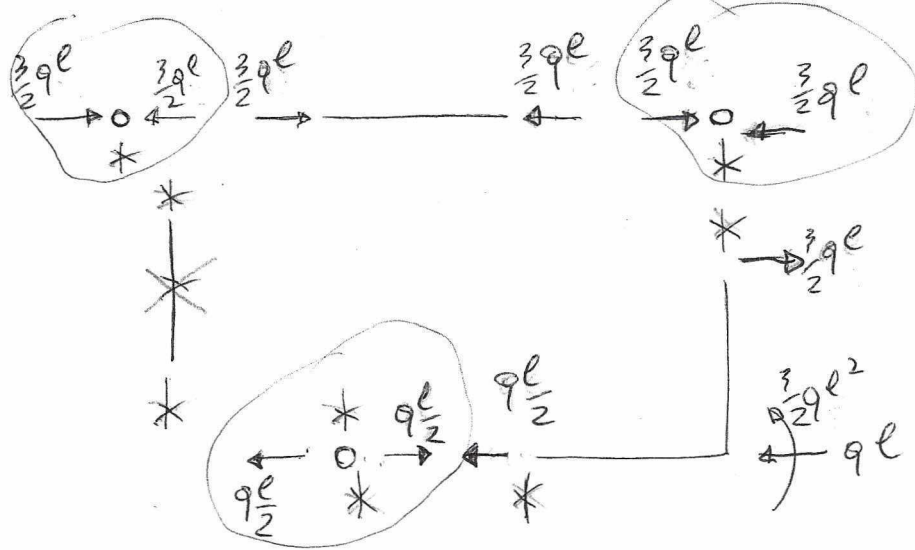
$$H_1 + H_2 = ql$$

$$V_2 = 0$$

$$0 \cdot l - \frac{3ql^2}{2} - 0$$

$$H_1 = +\frac{3ql^2}{2}$$

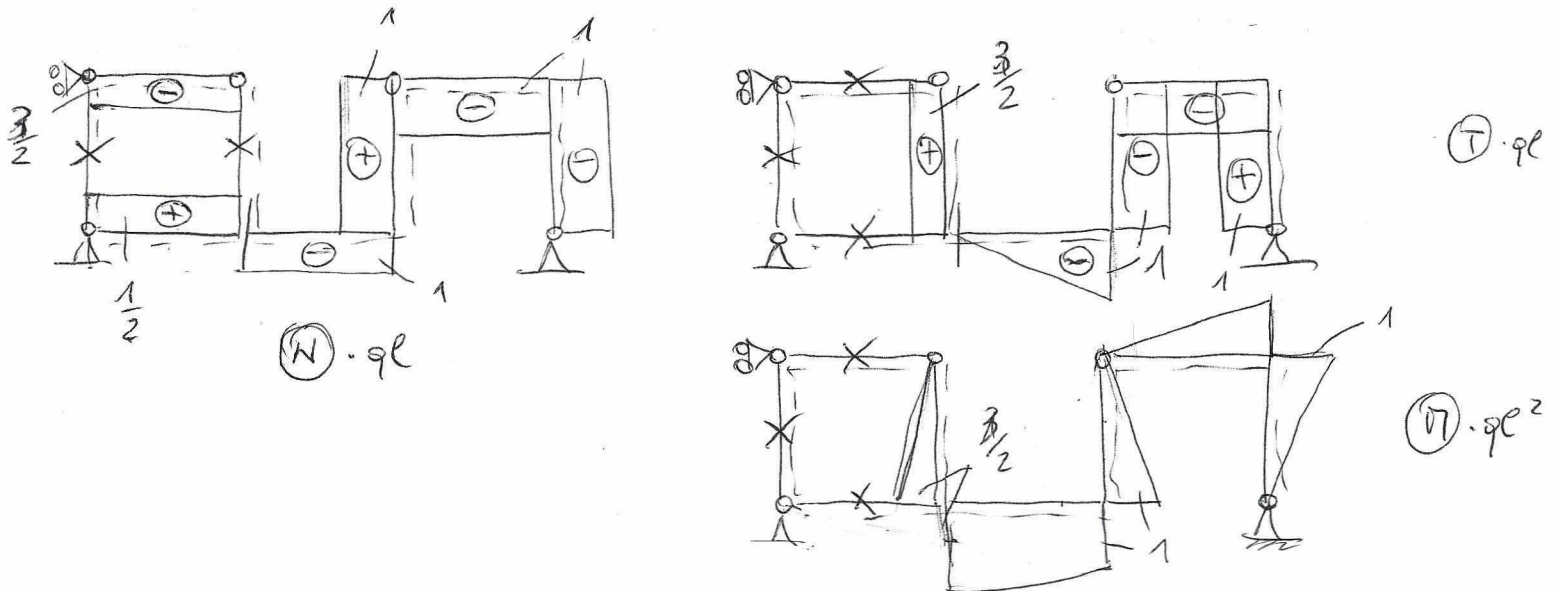
esplosione



$$-\frac{ql^2}{2} + V_1 \cdot l - \frac{ql^2}{2} + ql^2 = 0$$

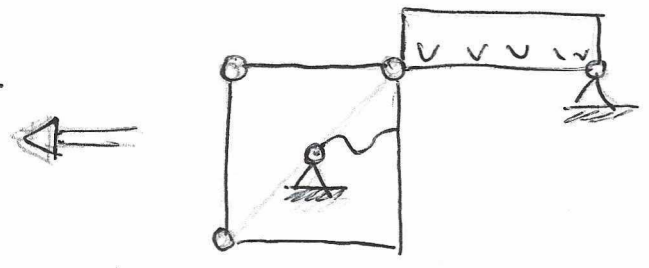
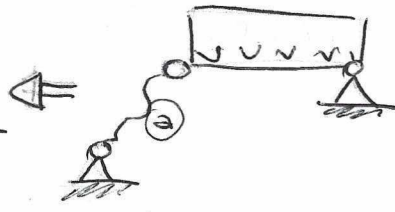
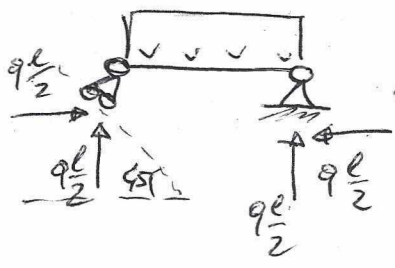
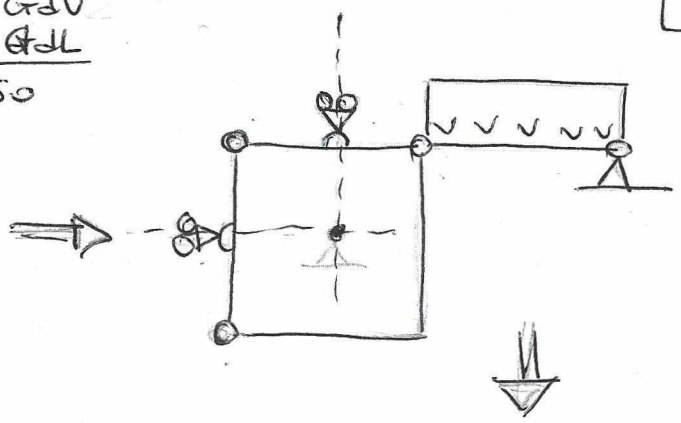
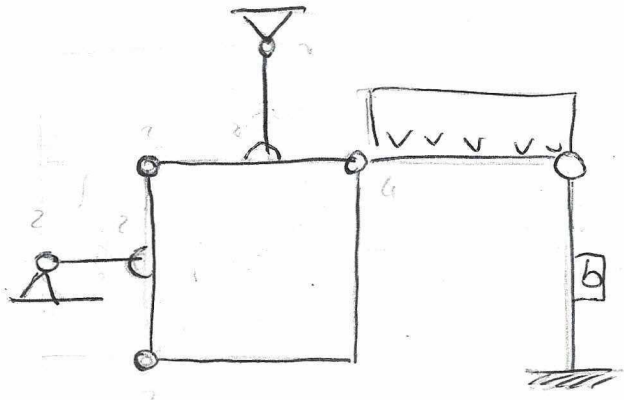
$$V_1 = 0 \quad \text{OK}$$

Diagrammi

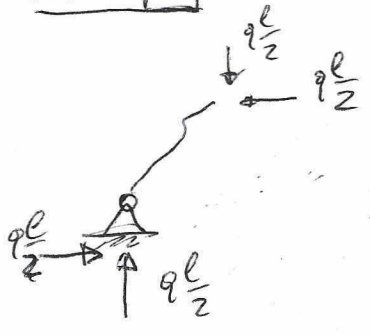


OK

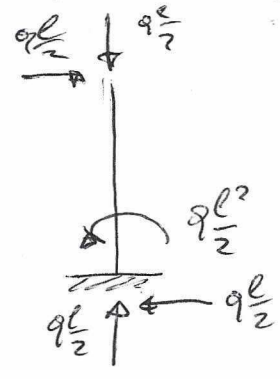
21 GdV
21 GdL
150



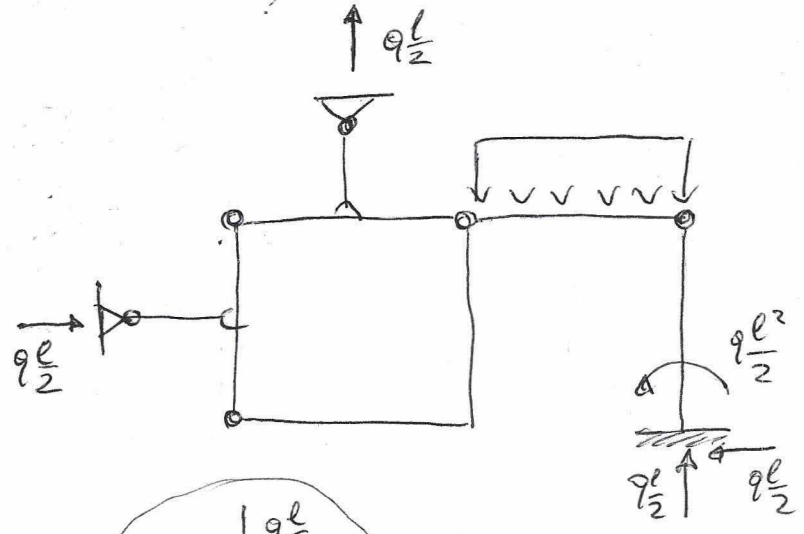
asta a



asta b



struttura completa



esplosione

