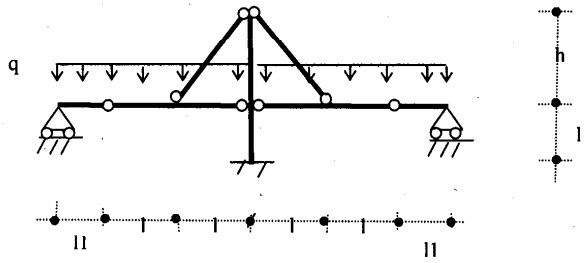
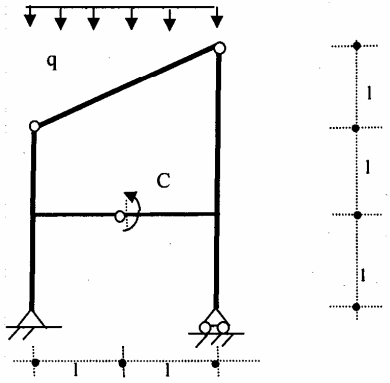
Scienza delle Costruzioni I AA 2009-2010- 24/06/10

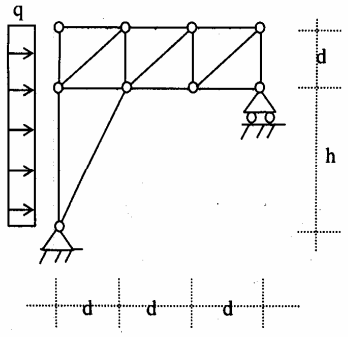
1) Determinare i diagrammi quotati degli sforzi N,T,M per la struttura in figura dove: l=2 m, l1=1m, h=3 m, q=500 kg/m.



2) Determinare i diagrammi quotati degli sforzi N,T,M per la struttura in figura dove: l=3 m, q=80 Kg/m, C=ql^2.

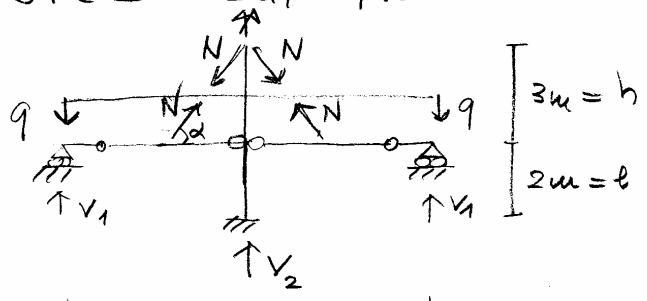


3) Determinare lo stato di sollecitazione primario e secondario della reticolare con d=1m, h=3m, q=100 kg/m.



Sd C I 24/06/10

1)



$q = 500\ kg/m$

$tg\alpha = \frac{3}{2}$

$\sin\alpha = \frac{3/2}{\sqrt{1+9/4}} = 3/\sqrt{13}$

$\cos\alpha = 2/\sqrt{13}$

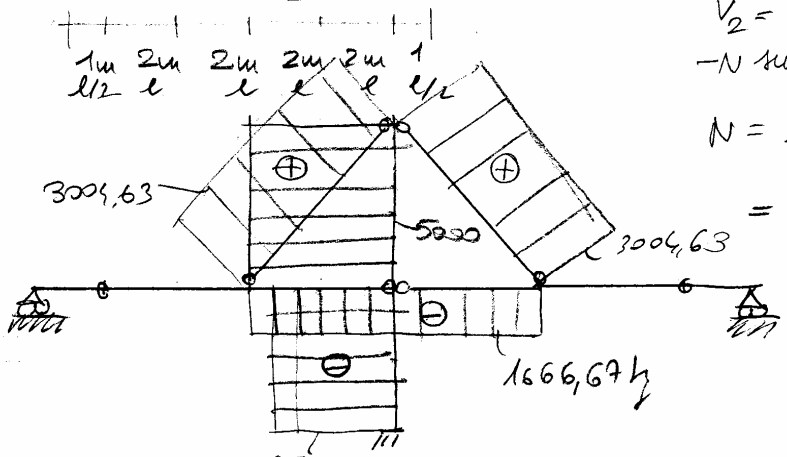
$V_1 = q\frac{\ell}{4} = 250\ kg$

$V_2 = 5q\ell - q\frac{\ell}{2} = \frac{9}{2}q\ell = 4500\ kg$

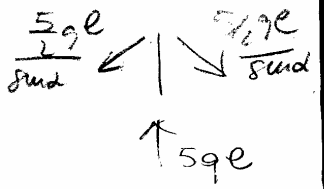
$-N \sin\alpha\, \ell - q\frac{\ell}{4}\frac{5}{2}\ell + \frac{25}{8}q\ell^2 = 0$

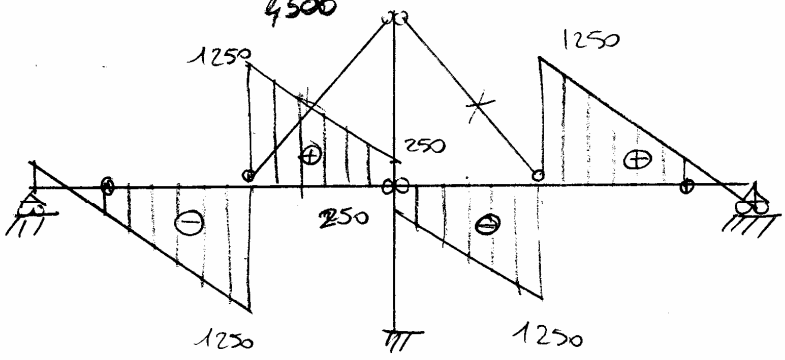
$N = \frac{20}{8}\frac{q\ell}{\sin\alpha} = \frac{5}{2}\frac{q\ell}{\sin\alpha}$

$= 3004{,}63\ kg$

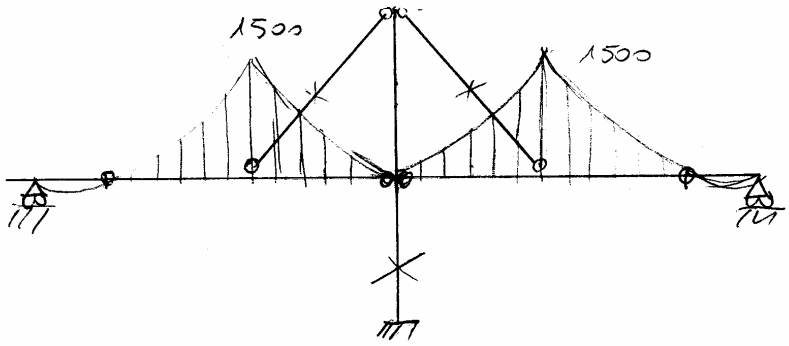


(N)



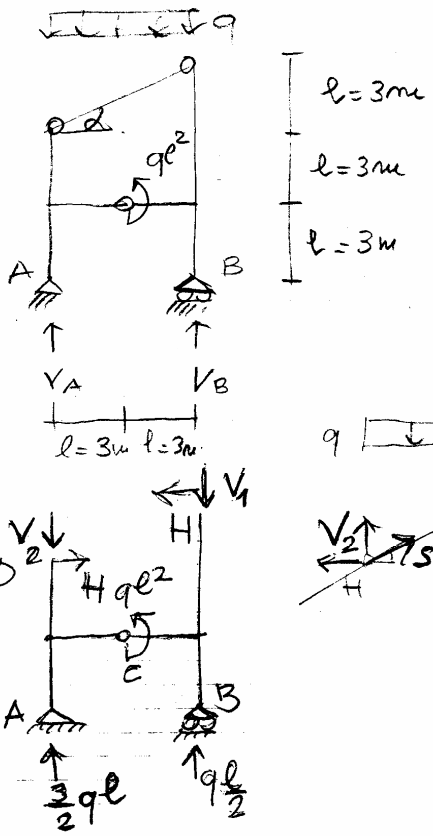


(T)



(M)

2)



$q = 80 kg/m$

$V_A + V_B = 2ql$

$\curvearrowleft \; V_B 2l + ql^2 = 2ql^2$

$V_B = \frac{ql}{2} = 120 kg$

$V_A = \frac{3}{2}ql = 360 kg$

$tg\alpha = 1/2$

$\sin\alpha = \frac{1/2}{\sqrt{1+\frac{1}{4}}} = 1/\sqrt{5}$

$\cos\alpha = 2/\sqrt{5}$

$V_2 l = H l + 2ql^2$

$V_1 = \frac{H}{2} + ql = 200 kg$

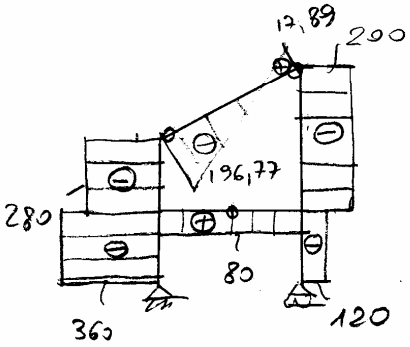
$V_2 = 2ql - V_1 = 280 kg$

c tratto ADC

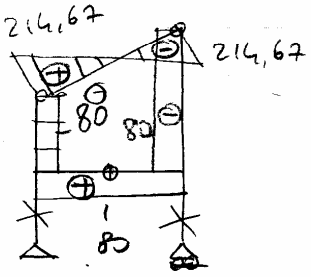
$(2ql - \frac{H}{2} - ql)l = Hl + \frac{3}{2}ql^2$

$ql - \frac{3}{2}ql = \frac{3}{2}H$

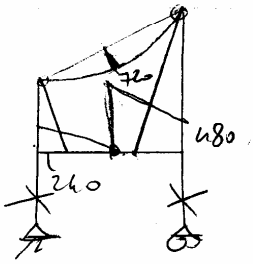
$H = -ql/3 = -80 kg$



(N)



(T)



(M)

$N(S) = H\cos\alpha - V_2\sin\alpha + qS\sin\alpha\sin\alpha$

$T(S) = H\sin\alpha + V_2\cos\alpha - qS\cos^2\alpha$

$M(S) = HS\sin\alpha + V_2 S\cos\alpha - q\frac{S^2}{2}\cos^2\alpha$

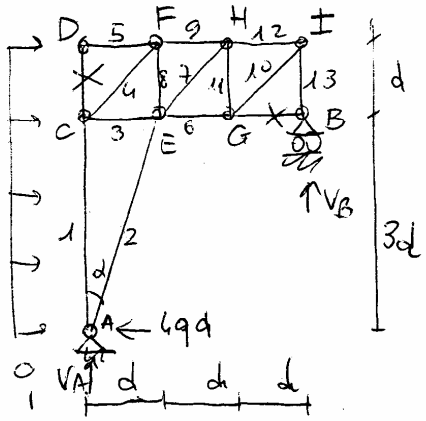
$N(0) = -71,55 - 125,22 = -196,77$

$N(2l/\cos\alpha) = -196,77 + q\,2l\sin\alpha = 17,89$

$T(0) = -35,77 + 250,44 = 214,67$

$T(2l/\cos\alpha) = 214,67 - q2l\cos\alpha = -214,66$

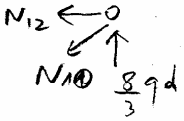
3)



$N_5 = -q\frac{d}{2}$

$N_{13} = -\frac{8}{3}qd$

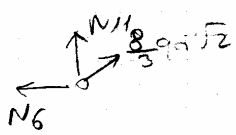
(I)



$N_{12} = -\frac{8}{3}qd$

$N_{10} = \frac{8}{3}qd\sqrt{2}$

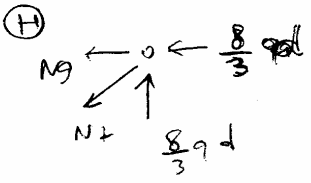
(G)



$N_{11} = -\frac{8}{3}qd$

$N_6 = \frac{8}{3}qd$

(H)

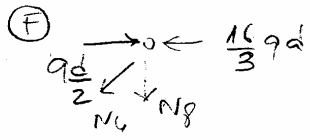


$N_7 = \frac{8}{3}qd\sqrt{2}$

$N_9 = -\frac{8}{3}qd - \frac{8}{3}qd$

$= -\frac{16}{3}qd$

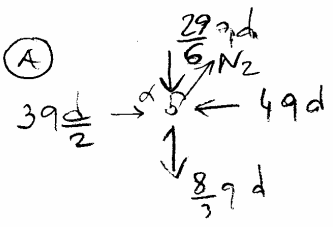
(F)



$N_6 = -\frac{29}{6}qd\sqrt{2}$

$N_8 = \frac{29}{6}qd$

(A)



$N_2 = (-\frac{3}{2}qd + 4qd)\frac{1}{\sin\alpha}$

$= \boxed{\frac{5}{2}q\frac{d}{\sin\alpha}}$

$\frac{15}{2}qd - \frac{29}{6}qd - \frac{8}{3}qd = 0$ ok

$d = 1m$

$q = 100kg/m$

$V_B 3d = 8qd^2 \Rightarrow V_B = \frac{8}{3}qd$

$V_A = -\frac{8}{3}qd$

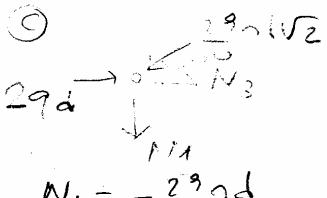
$tg\alpha = 1/3$

$\sin\alpha = \frac{1/3}{\sqrt{1+\frac{1}{9}}} = 1/\sqrt{10}$

$\cos\alpha = 3/\sqrt{10}$

1	−483,33
2	790,56
3	283,33
4	−683,53
5	−50
6	266,66
2	347,12
8	−483,33
9	−533,33
10	377,12
11	−266,66
12	−266,66
13	−266,66

(C)



$N_1 = -\frac{29}{6}qd$

$N_3 = -2qd + \frac{29}{6}qd = \boxed{\frac{17}{6}qd}$