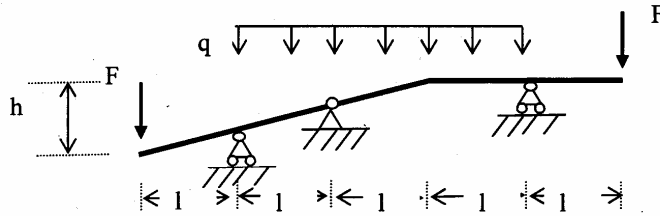
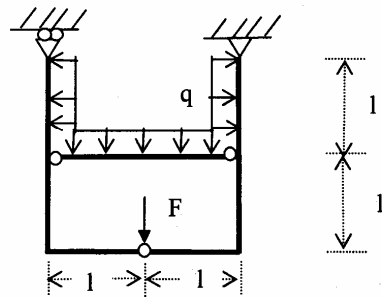


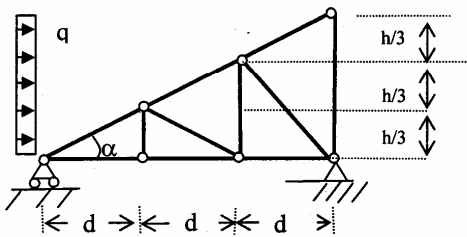
1) Risolvere e disegnare i diagrammi quotati di N, T, M per $l=4$ m, altezza del pilastro $h=3$ m, $q=1000$ kg/m, $F=ql$.



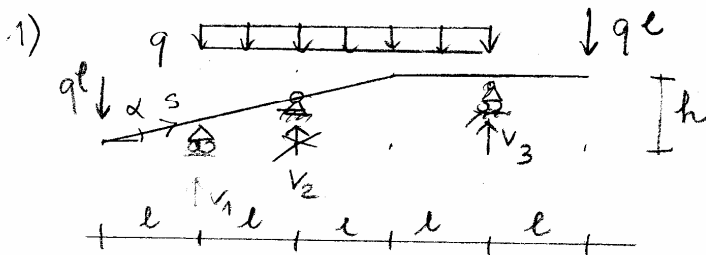
2) Risolvere e disegnare i diagrammi quotati di N, T, M con $l=4$ m, $q=100$ kg/m, $F=2ql$.



3) Determinare lo stato di sollecitazione primario e secondario per $d=2$ m, $h=3$ m, $q=200$ kg/m



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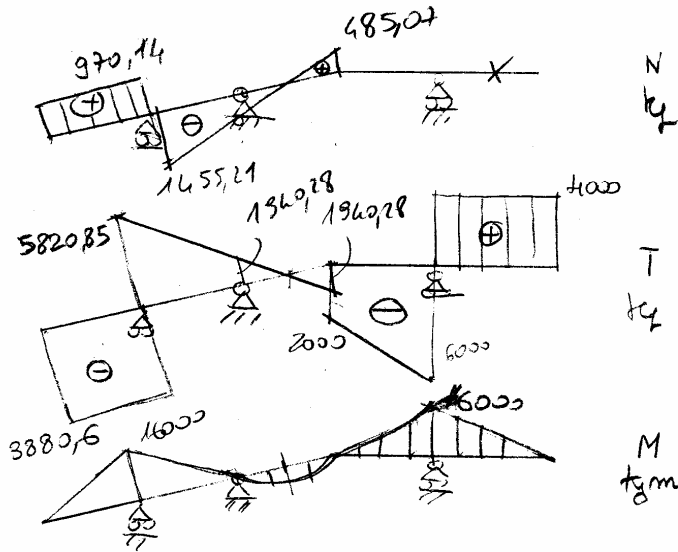
$$h = 3\text{ m}, l = 4\text{ m};$$

$$q = 1000\text{ kg/m}$$

$$\tan \alpha = 1/4$$

$$\sin \alpha = \frac{1/4}{\sqrt{1 + 1/16}} = 1/\sqrt{17}$$

$$\cos \alpha = 4/\sqrt{17}$$



$$-V_1 l + q l^2 + 2q l^2 = 0$$

$$V_1 = \frac{5}{2} q l = 10000\text{ kg}$$

$$V_3 2l = 2q l^2 + 3q l^2$$

$$V_3 = \frac{5}{2} q l = 10000\text{ kg}$$

$$V_2 = 5q l - 5q l = 0$$

$$s \in (0, \frac{l}{\cos \alpha})$$

$$N(s) = +q l \sin \alpha = 970,14$$

$$T(s) = -q l \cos \alpha = -3880,6\text{ kg}$$

$$M(s) = -q l s \cos \alpha$$

$$s \in (\frac{l}{\cos \alpha}, \frac{3l}{\cos \alpha})$$

$$N(s) = q l \sin \alpha - \frac{5}{2} q l \sin \alpha$$

$$+ q (s - \frac{l}{\cos \alpha}) \cos \alpha \sin \alpha$$

$$T(s) = -q l \cos \alpha + 5q l \cos \alpha$$

$$- q (s - \frac{l}{\cos \alpha})^2 \cos^2 \alpha$$

$$M(s) = -q l s \cos \alpha -$$

$$- q \frac{(s - \frac{l}{\cos \alpha})^2 \cos^2 \alpha}{2} + \frac{5q l (s - \frac{l}{\cos \alpha}) \cos \alpha}{2}$$

$$T(\frac{3l}{\cos \alpha}) = \frac{3}{2} q l \cos \alpha - \frac{2q l \cos^2 \alpha}{\cos \alpha}$$

$$\cos \alpha = -\frac{q l \cos \alpha}{2} = -1940,28\text{ kg}$$

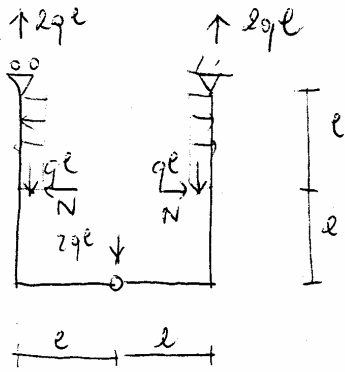
$$N(\frac{3l}{\cos \alpha}) = -\frac{3}{2} q l \sin \alpha + 2q l \sin \alpha$$

$$= +\frac{q l \sin \alpha}{2} = 485,07$$

$$T(\frac{l}{\cos \alpha}) = \frac{3}{2} q l \cos \alpha = 5820,85\text{ kg}$$

$$N(\frac{l}{\cos \alpha}) = -\frac{3}{2} q l \sin \alpha = -1455,21\text{ kg}$$

2)

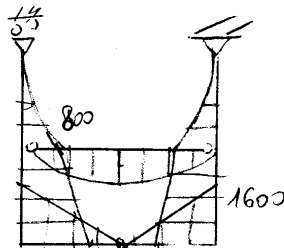
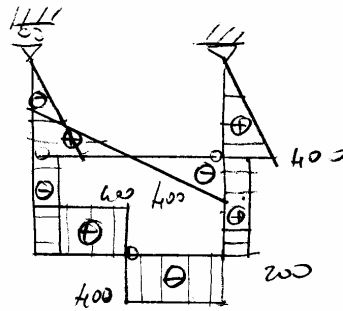
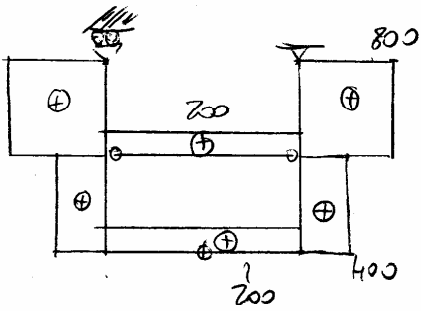


$$l = 4 \text{ m}; q = 100 \text{ kg/m}$$

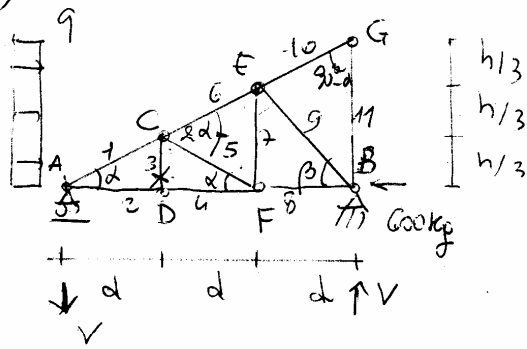
$$F = 2qe$$

$$Ne + qe^2 + qe^2 \frac{3}{2} = 2qe^2$$

$$N = -\frac{qe}{2} = -200 \text{ kg}$$



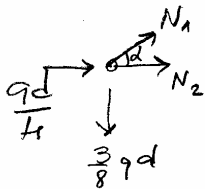
3)



$$V_{3d} = q \cdot h \cdot \frac{h}{2}$$

$$V = \frac{1}{2} q \cdot \frac{h^2}{2} = 150 \text{ kg} = \frac{3}{8} qd$$

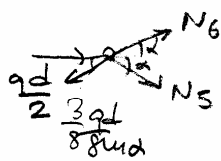
(A)



$$N_1 = \frac{3}{8} qd = 335,41 \text{ kg}$$

$$N_2 = -\frac{qd}{4} - N_1 \cos \alpha = -\frac{qd}{4} - \frac{3}{8} qd \cdot \frac{2}{\sqrt{5}} = -qd = -400 \text{ kg}$$

(C)



$$\rightarrow (N_6 + N_5) \cos \alpha = -\frac{qd}{2} + \frac{3}{8} qd$$

$$\uparrow (N_6 - N_5) \sin \alpha = +\frac{3}{8} qd$$

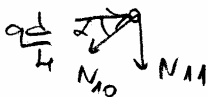
$$\begin{cases} N_6 + N_5 = \frac{qd}{4 \cos \alpha} \\ N_6 - N_5 = \frac{3}{8} \frac{qd}{\sin \alpha} \end{cases}$$

$$2N_6 = \frac{qd}{4 \cos \alpha} + \frac{3}{8} \frac{qd}{\sin \alpha}$$

$$N_6 = \frac{qd}{2 \cdot 4} \left(\frac{1}{\cos \alpha} + \frac{3}{2 \sin \alpha} \right) = \frac{qd}{8} \left(\frac{\sqrt{5}}{2} + \frac{3\sqrt{5}}{2} \right) = \frac{qd\sqrt{5}}{4} = 223,6 \text{ kg}$$

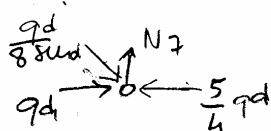
$$N_5 = \frac{qd\sqrt{5}}{4 \cdot 2} - \frac{qd\sqrt{5}}{8} = -\frac{qd\sqrt{5}}{8} = -111,8 \text{ kg}$$

(G)



$$N_{10} = \frac{qd}{4 \cos \alpha} = 111,8 \text{ kg}$$

$$N_{11} = -\frac{qd}{4} \cdot \frac{1}{2} = -\frac{qd}{8} = -50 \text{ kg}$$



$$N_7 = +\frac{qd}{8} = 50$$

$$\alpha = 2 \text{ m}; h = 3 \text{ m}; h = \frac{3}{2} d$$

$$q = 200 \text{ kg/m}$$

$$\tan \alpha = 1/2$$

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

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

$$\tan \beta = 1; \beta = 45^\circ$$

$$\tan 2\alpha = \frac{\sin 2\alpha}{\cos 2\alpha} = \frac{2 \sin \alpha \cos \alpha}{\cos^2 \alpha - \sin^2 \alpha}$$

$$= \frac{4/5}{3/5} = 4/3$$

$$\frac{1}{335,41}$$

$$\frac{2}{-400}$$

$$\frac{3}{-111,8}$$

$$\frac{4}{-400}$$

$$\frac{5}{-111,8}$$

$$\frac{6}{223,6}$$

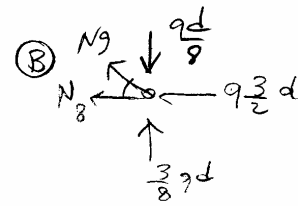
$$\frac{7}{+50}$$

$$\frac{8}{-500}$$

$$\frac{9}{-111,82}$$

$$\frac{10}{111,8}$$

$$\frac{11}{-50}$$



$$N_9 = -\frac{qd}{4} \sqrt{2}$$

$$N_8 = \frac{qd}{4} - \frac{3qd}{2} = -\frac{5qd}{4}$$