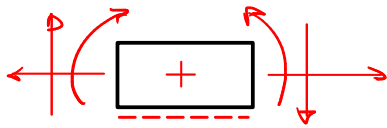
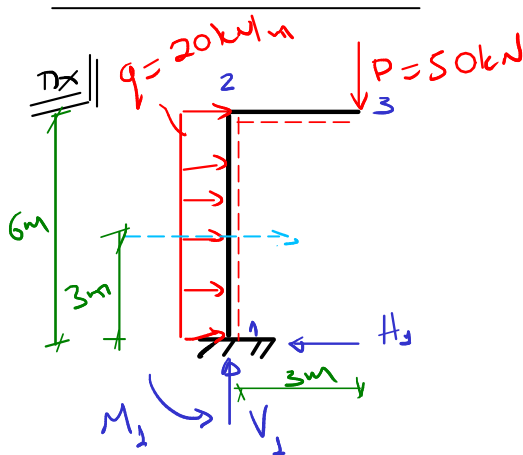


ΓΡΗΓΟΡΑ M-Q-N



Σύμβαση Στατικής

Θετικά πρόσημα εσωτερικών μεγεθών
M-Q-N.



$$\sum M_1 = 0 \Rightarrow M_1 - P \cdot 3 - q \cdot \frac{6^2}{2} = 0 \Rightarrow$$

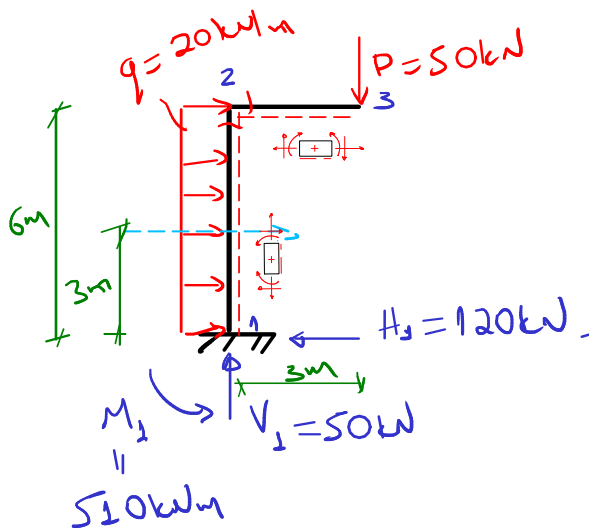
$$M_1 = 50 \cdot 3 + 20 \frac{\text{kN}}{\text{m}} \cdot \frac{6^2}{2} \text{ m}^2$$

$$M_1 = 510 \text{ kNm}$$

$$\sum F_x = 0 \Rightarrow H_1 - q \cdot 6 = 0 \Rightarrow H_1 = q \cdot 6$$

$$\Rightarrow H_1 = 20 \frac{\text{kN}}{\text{m}} \cdot 6 \text{ m} \Rightarrow H_1 = 120 \text{ kN}$$

$$\sum F_y = 0 \Rightarrow V_1 - P = 0 \Rightarrow V_1 = P \Rightarrow V_1 = 50 \text{ kN}$$



ΝΟΤΕ Χαρακτηριστικές Δέσεις

- Αρχική Φόρτιση (εξιδάμεση στήριξη)
- Αρχική Γεωμετρία φορέα
- Αρχική υλική ή διατομή (EI, EA)
- (• Εσωτερική Αρθρωση)
- Άκρα των φορέα

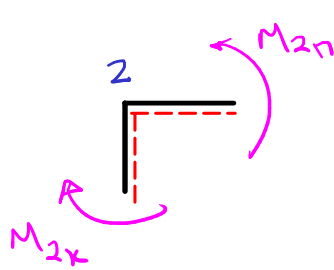
Ποιες [M]

$$M_{2\text{άνω}} = -P \cdot 3 \text{ m} = -50 \text{ kN} \cdot 3 \text{ m} = -150 \text{ kNm} \quad \parallel \parallel \quad M_1 = -510 \text{ kNm}$$

$$M_3 = 0$$

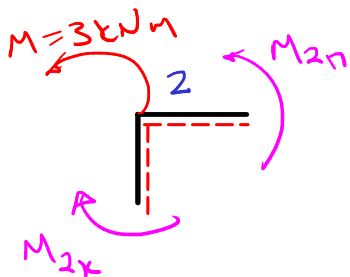
$$M_{2\text{κάτω}} = M_{2\text{άνω}} = -P \cdot 3 = -150 \text{ kNm}$$

NOTE: Ισορροπία κόμβου πλαισίου



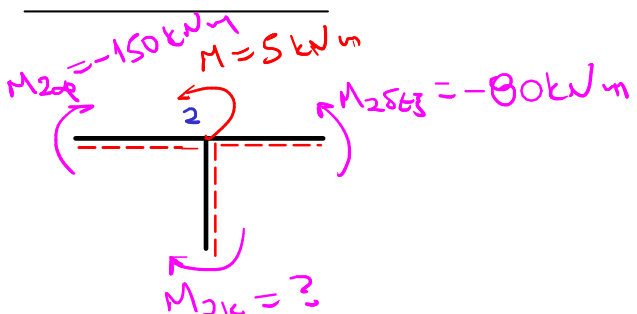
$$\sum \overset{+}{\curvearrowright} M_2 = 0 \Rightarrow M_{2k} - M_{2n} = 0 \Rightarrow M_{2k} = M_{2n}$$

Αν έχω ο x και φορτίκια ερηνή



$$\sum \overset{+}{\curvearrowright} M_2 = 0 \Rightarrow M_{2k} - M - M_{2n} = 0 \Rightarrow$$

$$M_{2k} + M_{2n} = M$$



$$\sum \overset{+}{\curvearrowright} M_2 = 0 \Rightarrow$$

$$M_{2k} + M_{2\alpha\phi} - M - M_{2\delta\epsilon\zeta} = 0$$

$$M_{2k} = M - M_{2\alpha\phi} + M_{2\delta\epsilon\zeta}$$

$$M_{2k} = 5 - (-150) + (-90)$$

$$\Rightarrow M_{2k} = 75 \text{ kNm}$$

ΤΕΜΝΟΥΣΕΣ [Q]

$$Q_1 = +H_1 = 120 \text{ kN}$$

$$Q_{2\delta} = +P = 50 \text{ kN}$$

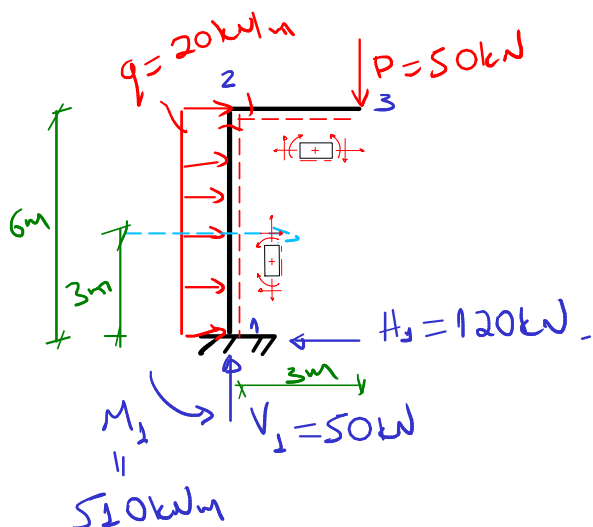
$$Q_{2k} = 0$$

$$Q_3 = +P = 50 \text{ kN}$$

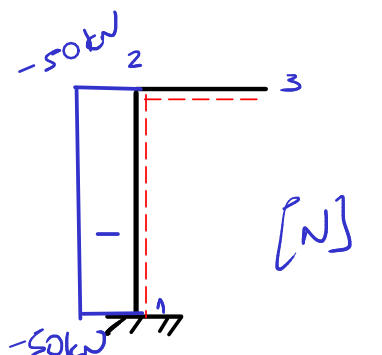
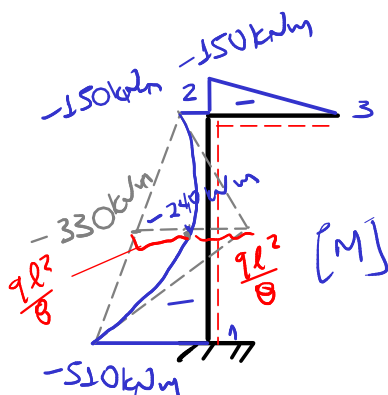
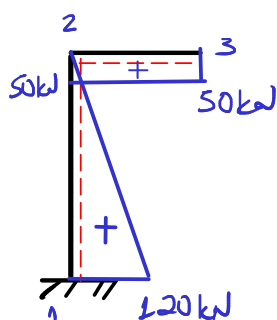
ΑΞΟΝΙΚΕΣ [N]

$$N_1 = -V_1 = -50 \text{ kN} \quad \left| \quad N_{28} = 0 \right.$$

$$N_{2κ} = -V_2 = -50 \text{ kN} \quad \left| \quad N_3 = 0 \right.$$



[Q]



$$\frac{ql^2}{8} = \frac{20 \text{ kN}}{\text{m}} \cdot \frac{6^2 \text{ m}^2}{8} = 90 \text{ kNm} \quad \delta_{11} = -330 + 90 = -240 \text{ kNm}$$

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