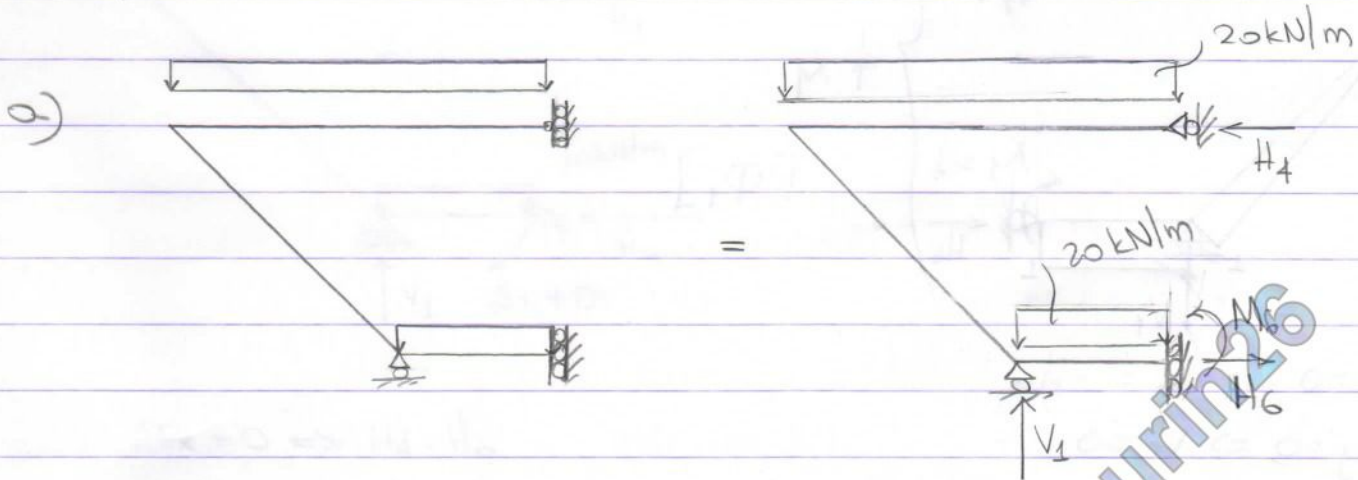


2010-11 Κανονική

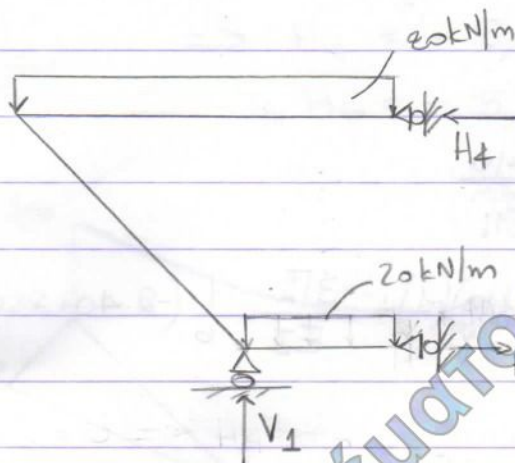
Θέμα 1



Άγνωστοι: 4

Εξισώσεις ισορροπίας: 3

$a = 1$

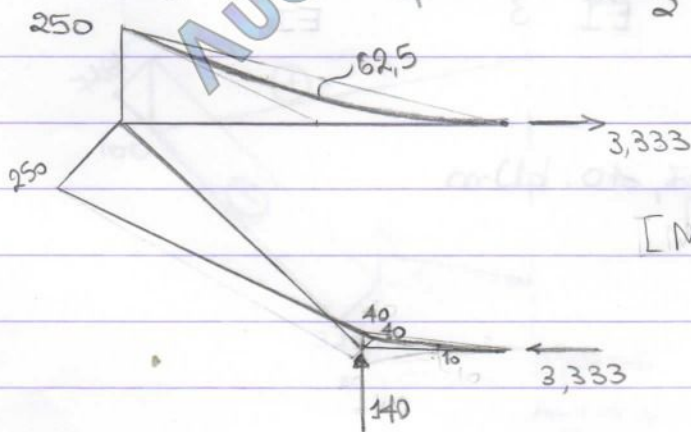


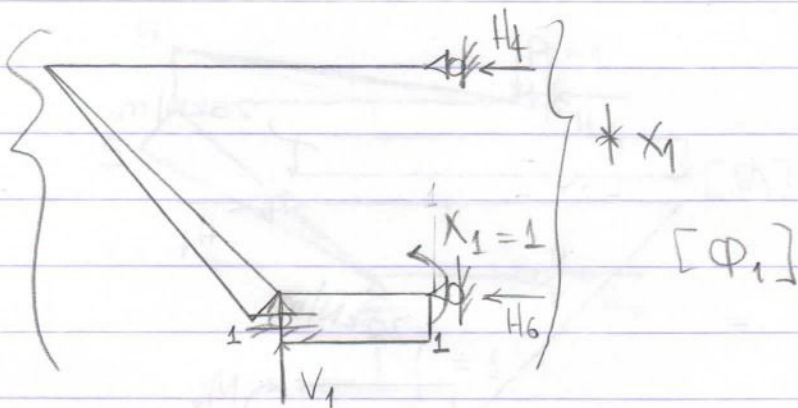
$$\sum F_x = 0 \Rightarrow H_4 = H_6$$

$$\sum F_y = 0 \Rightarrow V_1 = 20 \cdot 2 + 20 \cdot 5 = 140 \text{ kN}$$

$$\sum M_6 = 0 \Rightarrow H_4 \cdot 3 + 20 \cdot 5 \cdot \frac{5}{2} + 20 \cdot 2 \cdot 1 - 140 \cdot 2 = 0 \Rightarrow H_4 = -3,333 \text{ kN}$$

$$H_6 = -3,333 \text{ kN}$$





$$\sum F_x = 0 \Rightarrow H_4 = -H_6$$

$$\sum F_y = 0 \Rightarrow V_1 = 0$$

$$\sum M_6 = 0 \Rightarrow H_4 \cdot 3 + 1 = 0 \Rightarrow H_4 = -0,333 \text{ kN}$$

$$H_6 = 0,333 \text{ kN}$$

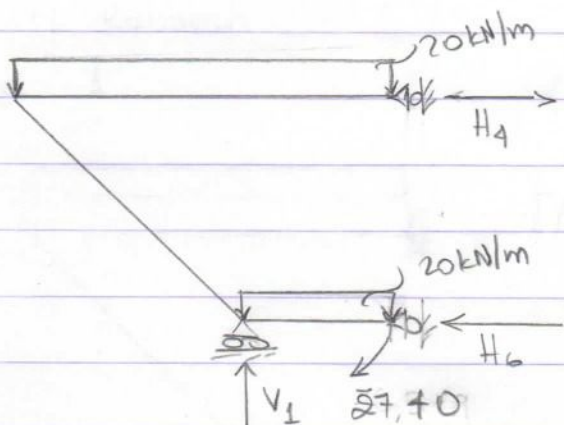
$$\Delta_1 = \Delta_{10} + F_{11} X_1 \Rightarrow X_1 = -\frac{\Delta_{10}}{F_{11}}$$

$$\frac{1}{2} \Delta_{10} = \int \frac{M_1 M_0}{EI} dx = \frac{2}{EI} \cdot \frac{1}{6} (40 + 10)(-1) + \frac{3\sqrt{2}}{EI} \cdot \frac{1}{6} (-2 \cdot 40 + 250) =$$

$$= \frac{93,541}{EI}$$

$$\frac{1}{2} F_{11} = \int \frac{M_1^2}{EI} dx = \frac{2}{EI} \cdot 1^2 + \frac{3\sqrt{2}}{EI} \cdot \frac{1}{3} \cdot 1^2 = \frac{3,414}{EI}$$

$$X_1 = -\frac{93,541}{3,414} \Rightarrow X_1 = -27,40 \text{ kN.m}$$



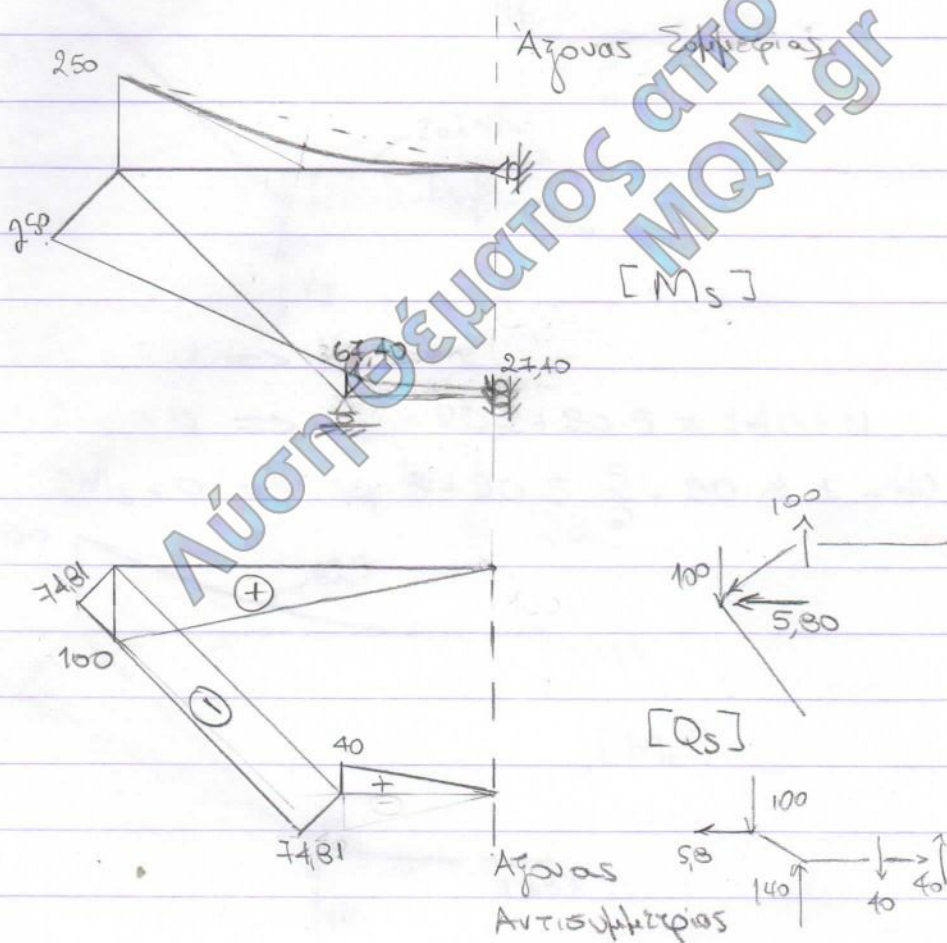
$$\sum F_x = 0 \Rightarrow H_4 = H_6$$

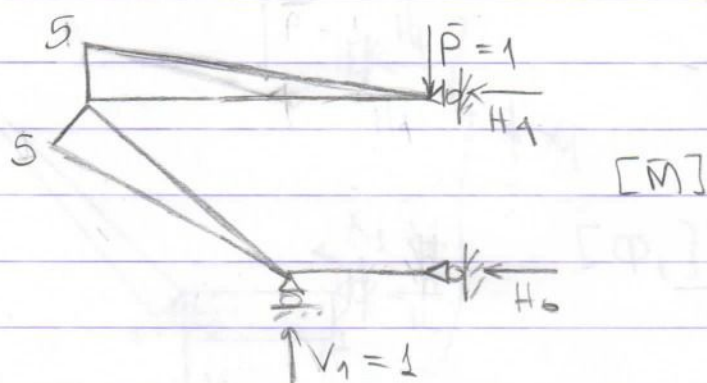
$$\sum F_y = 0 \Rightarrow V_1 = 140 \text{ kN}$$

$$\sum M_6 = 0 \Rightarrow 20 \cdot 5 \cdot \frac{5}{2} - H_4 \cdot 3 + 20 \cdot 2 \cdot 1 - 140 \cdot 2 - 27.40 = 0 \Rightarrow$$

$$\Rightarrow H_4 = -5.80 \text{ kN}$$

$$H_6 = -5.80 \text{ kN}$$





$$1. w_4 = \int \frac{\bar{M} M_s}{EI} dx = -\frac{5}{EI} \cdot \frac{1}{6} 5 (2 \cdot 625 + 250) + \frac{3\sqrt{2}}{EI} \cdot \frac{1}{6} \cdot 5 (-67,40 + 2 \cdot 250)$$

$$= 0,0515 \text{ m} = 5,15 \text{ cm} \text{ προς τα κάτω}$$

Λύση Θέματος από ingenieurin26
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