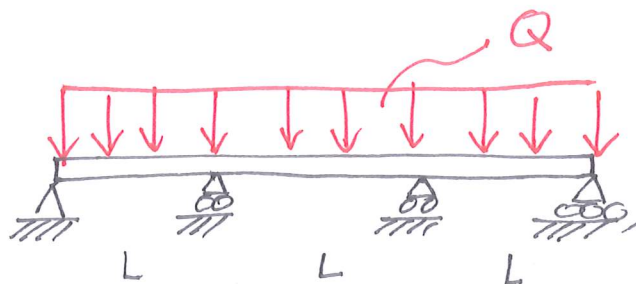


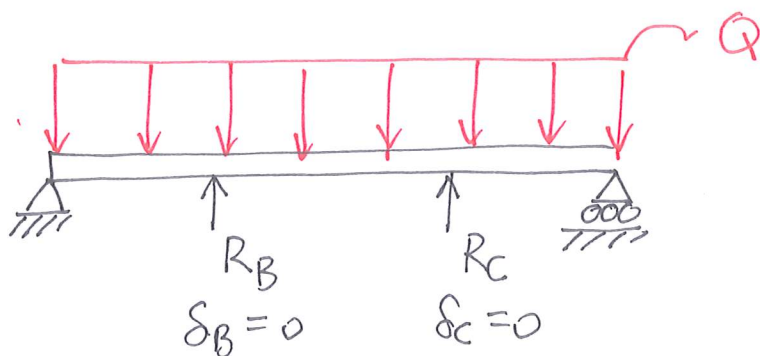
2.4.129

GIVET:

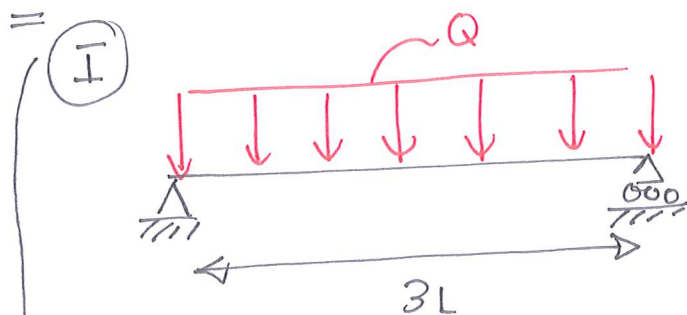


SÖKT: Rita momentdiagram.

LÖSNING:

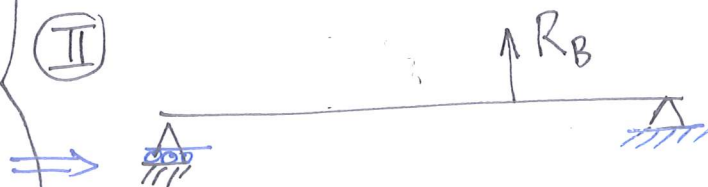


STATISKT
OBESTÄMT.

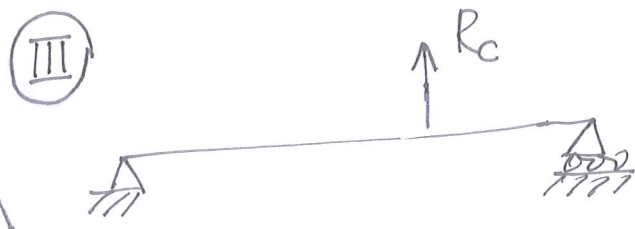


b) $\delta^I(1/3)$ $Q=Q$
 c) $\delta^I(2/3)$ $l=3L$

vänd
pa
balken



b) $\delta^{II}(2/3)$ $P=-R_B$
 $\alpha=2/3$
 c) $\delta^{II}(1/3)$ $\beta=1/3$
 $l=3L$



b) $\delta^{III}(1/3)$ $P=-R_C$
 $\alpha=2/3$
 c) $\delta^{III}(2/3)$ $\beta=1/3$
 $l=3L$

$$\delta_B = 0 = \delta_B^I + \delta_B^{II} + \delta_B^{III}$$

$$\delta_C = 0 = \delta_C^I + \delta_C^{II} + \delta_C^{III}$$

(I) -

$$\delta_B^I = \delta^I(1/3) = \frac{Q(3L)^3}{24EI} \left(\frac{1}{3} - \frac{2}{27} + \frac{1}{81} \right) = \frac{11QL^3}{36EI}$$

$$\delta_C^I = \delta^I(2/3) = \frac{Q(3L)^3}{24EI} \left(\frac{2}{3} - 2 \cdot \frac{8}{27} + \frac{16}{81} \right) = \frac{11QL^3}{36EI}$$

(II) -

$$\delta_B^{II} = \delta^{II}(2/3) = \frac{-R_B(3L)^3}{6EI} \frac{1}{3} \left[\left(1 - \frac{1}{9}\right) \frac{2}{3} - \frac{8}{27} \right] = \frac{-4R_B L^3}{9EI}$$

$$\delta_C^{II} = \delta^{II}(1/3) = \frac{-R_B(3L)^3}{6EI} \frac{1}{3} \left[\left(\frac{8}{9}\right) \frac{1}{3} - \frac{1}{27} \right] = \frac{-7R_B L^3}{18EI}$$

(III)

$$\delta_B^{III} = \delta^{III}(1/3) = \frac{-R_C(3L)^3}{6EI} \left(\frac{1}{3}\right) \left[\left(1 - \frac{1}{9}\right) \frac{1}{3} - \frac{1}{27} \right] = \frac{-7R_C L^3}{18EI}$$

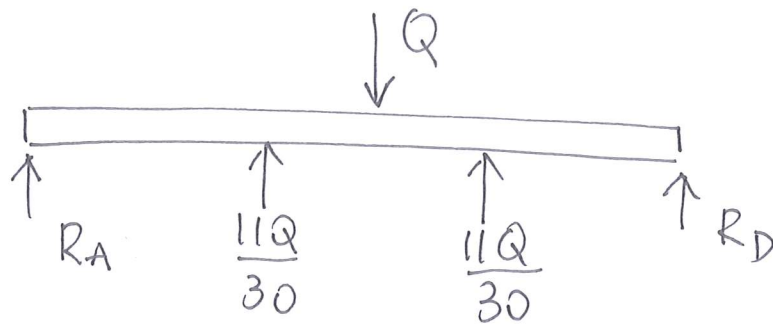
$$\delta_C^{III} = \delta^{III}(2/3) = \frac{-R_C(3L)^3}{6EI} \left(\frac{1}{3}\right) \left[\left(1 - \frac{1}{9}\right) \frac{2}{3} - \frac{8}{27} \right] = \frac{-4R_C L^3}{9EI}$$

$$\delta_B = 0 = \frac{11QL^3}{36EI} - \frac{4R_B L^3}{9EI} - \frac{7R_C L^3}{18EI}$$

$$\delta_C = 0 = \frac{11QL^3}{36EI} - \frac{7R_B L^3}{18EI} - \frac{4R_C L^3}{9EI}$$

$$\left. \begin{array}{l} \delta_B = 0 \\ \delta_C = 0 \end{array} \right\} \begin{array}{l} R_B = R_C \\ \text{sym.} \end{array}$$

$$\underline{R_B = R_C = \frac{11Q}{30}}$$



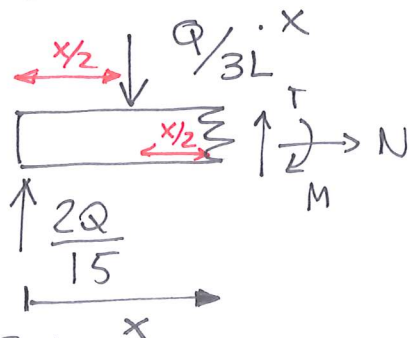
p.g.a sym. $R_A = R_D$

$$\sum A: \frac{33QL}{30} - \frac{3LQ}{2} + 3LR_D = 0$$

$$\underline{R_D = +\frac{2Q}{15} = R_A}$$

2.- Moment diagram.

Del 1:
 $0 \leq x \leq L$.



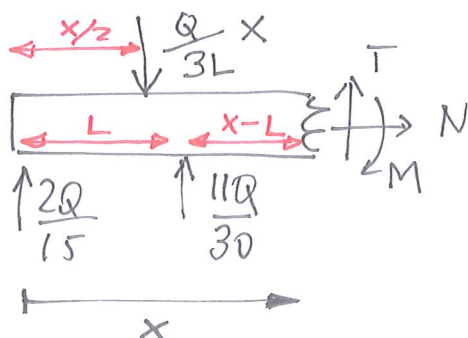
$$M = \frac{Q}{6L} x^2 - \frac{2Q}{15} x = Q \left(\frac{x}{6L} - \frac{2}{15} \right)$$

$$M(0) = 0$$

$$M(L) = \frac{QL}{30}$$

Del 2: x

$L \leq x \leq 2L$



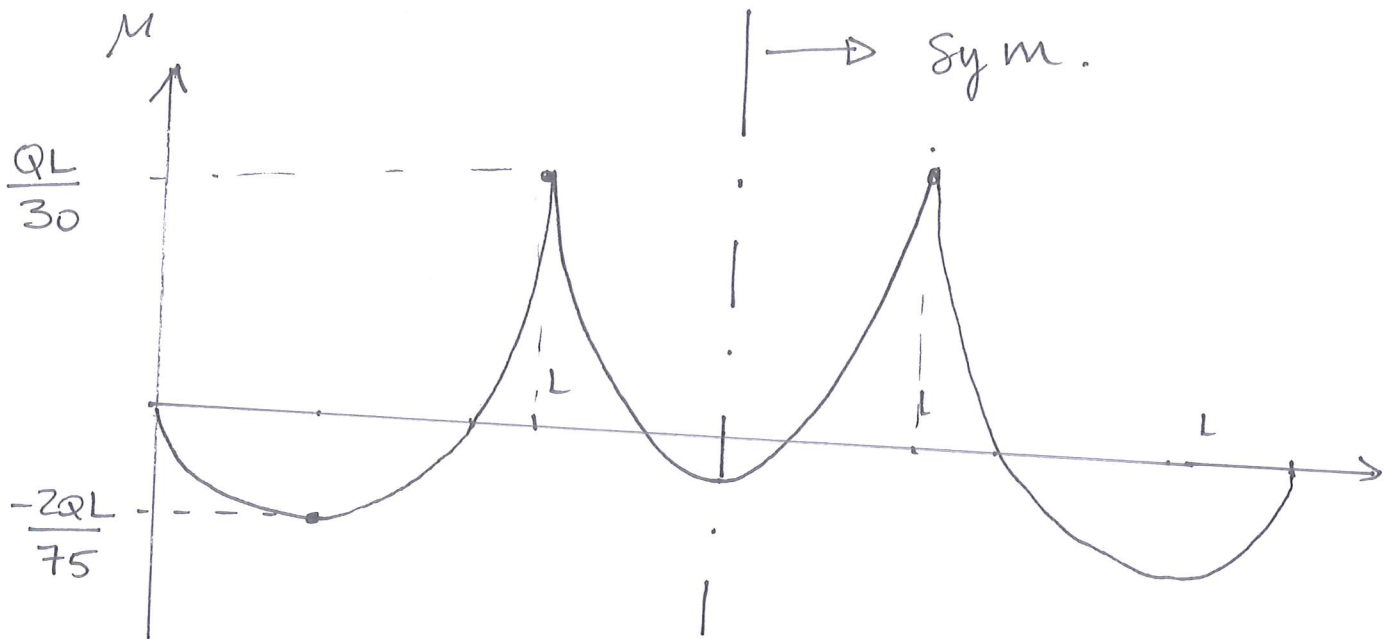
$$M = -\frac{11Q}{30} (x-L) - \frac{2Q}{15} x + \frac{Q}{6L} x^2$$

$$M(L) = \frac{QL}{30}$$

$$M(2L) = \frac{QL}{30}$$

Del 3:

sym.



Del 1 :

$$\frac{dM}{dx} = 0 \rightarrow x = \frac{2L}{5} \rightarrow M = -\frac{2QL}{75}$$

Del 2 :

$$\frac{dM}{dx} = 0 \rightarrow x = \frac{3L}{2} \rightarrow M = -\frac{QL}{120}$$