

$$a_1 = 1,4 \text{ м}$$

$$a_2 = 1,2 \text{ м}$$

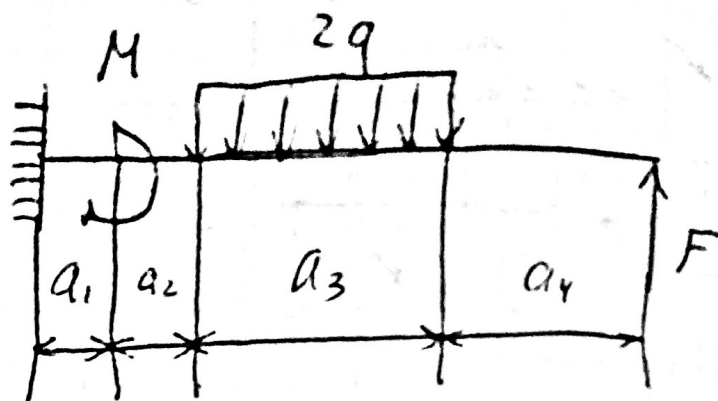
$$a_3 = 0,5 \text{ м}$$

$$a_4 = 2,3 \text{ м}$$

$$q = 20 \text{ кН/м}$$

$$F = 20 \text{ кН}$$

$$M = 35 \text{ кНм}$$



Построение эпюр ВСР

$$0 < z_1 < a_4$$

$$Q_y' = -F = -20 \text{ кН}$$

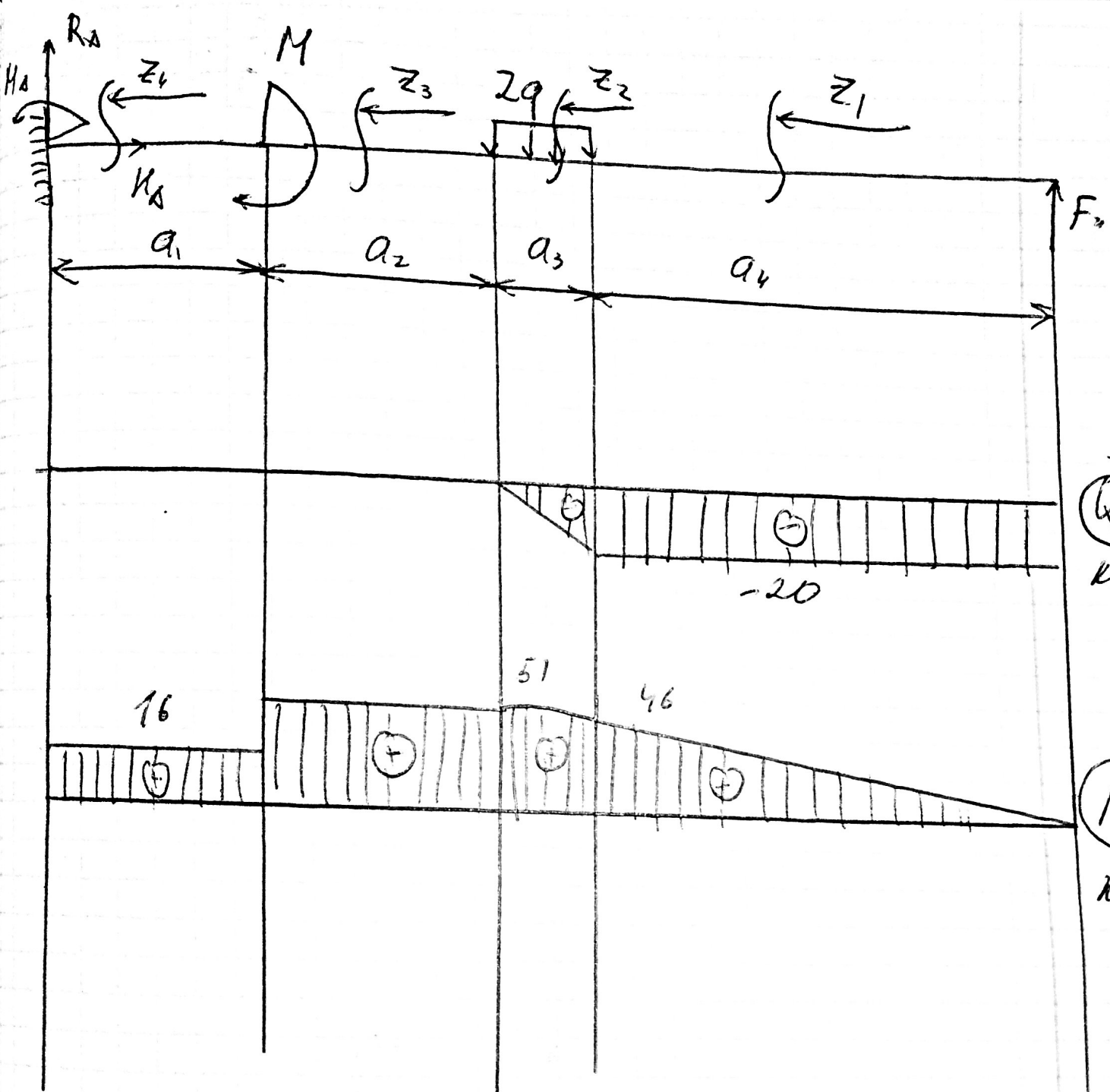
$$M_x' = F z_1 \Big|_{0 \rightarrow 0}^{a_4} \rightarrow F a_4 = 20 \cdot 2,3 = 46 \text{ кНм}$$

$$a_4 < z_2 < (a_3 + a_4)$$

$$Q_y'' = -F + 2q(z_2 - a_4) \Big|_{a_4 \rightarrow -F = -20 \text{ кН}}^{a_3 + a_4 \rightarrow -F + 2q a_3 = -20 + 2 \cdot 20 \cdot 0,5 = 0 \text{ кН}}$$

$$M_x'' = +F z_2 - 2q \frac{(z_2 - a_4)^2}{2} \Big|_{a_4 \rightarrow +F a_4 = 46 \text{ кНм}}^{a_3 + a_4}$$

$$M_x''(a_3 + a_4) = F(a_3 + a_4) - q a_3^2 = 20(0,5 + 2,3) - 20 \cdot 0,5^2 = 51 \text{ кНм}$$



Q_y , kN

M_x , kNm

$$\underline{(a_3 + a_4) < z_3 < (a_2 + a_3 + a_4)}$$

$$Q_y^{III} = -F + 2qa_3 = 0 \text{ kN}$$

$$M_x^{III} = Fz_3 - 2qa_3 \left(z_3 - a_4 - \frac{a_3}{2} \right) \begin{array}{l} a_3 + a_4 + a_2 \\ a_3 + a_4 \end{array}$$

$$M_x^{III}(a_3 + a_4) = F(a_3 + a_4) - 2qa_3 \left(\frac{a_3}{2} \right) =$$

$$= 20(0,5 + 2,3) - 2 \cdot 20 \cdot 0,5 \frac{0,5}{2} = 51 \text{ kNm}$$

$$M_x^{III}(a_3 + a_4 + a_2) = F(a_3 + a_4) - 2qa_3 \left(\frac{a_3}{2} + a_2 \right) =$$

$$= 20(0,5 + 2,3) - 2 \cdot 20 \cdot 0,5 \left(\frac{0,5}{2} + 1,2 \right) =$$

$$= 27 \text{ kNm}$$

$$\underline{(a_2 + a_3 + a_4) < z_4 < (a_2 + a_3 + a_4 + a_1)}$$

$$Q_y^{IV} = -F + 2qa_3 = 0 \text{ kN}$$

$$M_x^{IV} = Fz_4 - 2qa_3 \left(z_4 - a_4 - \frac{a_3}{2} \right) - M \begin{array}{l} a_2 + a_3 + a_4 + a_1 \\ a_2 + a_3 + a_4 \end{array}$$

$$M_x^{IV}(a_2 + a_3 + a_4) = F(a_2 + a_3 + a_4) - 2qa_3 \left(a_2 + \frac{a_3}{2} \right) -$$

$$M = 20(1,2 + 0,5 + 2,3) - 2 \cdot 20 \cdot 0,5 \left(1,2 + \frac{0,5}{2} \right) = 35 =$$

= 60 kWh

$$\begin{aligned} M_{\text{X}}^{\text{IV}}(a_2 + a_3 + a_4 + a_1) &= F(a_2 + a_3 + a_4 + a_1) - \\ &- 2qa_3 \left(a_2 + \frac{a_3}{2} + a_1 \right) - M = 20(1,2 + 0,5 + \\ &+ 2,3 + 1,4) - 2 \cdot 20 \cdot 0,5 \left(1,2 + \frac{0,5}{2} + 1,4 \right) - \\ &- 35 = 60 \text{ kWh} \end{aligned}$$