



AKADEMIA EDUKACYJNO - INŻYNIERSKA

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MATURA STUDIA PRAKTYKA STAŻ PRACA BIZNES PRZEMYSŁ STEAM

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MECHANIKA I

"REAKCJE PODPOROWE USTROJÓW NOŚNYCH STATYCZNIE WYZNACZALNYCH"

PROJEKT

Oblicz:

– reakcje podporowe

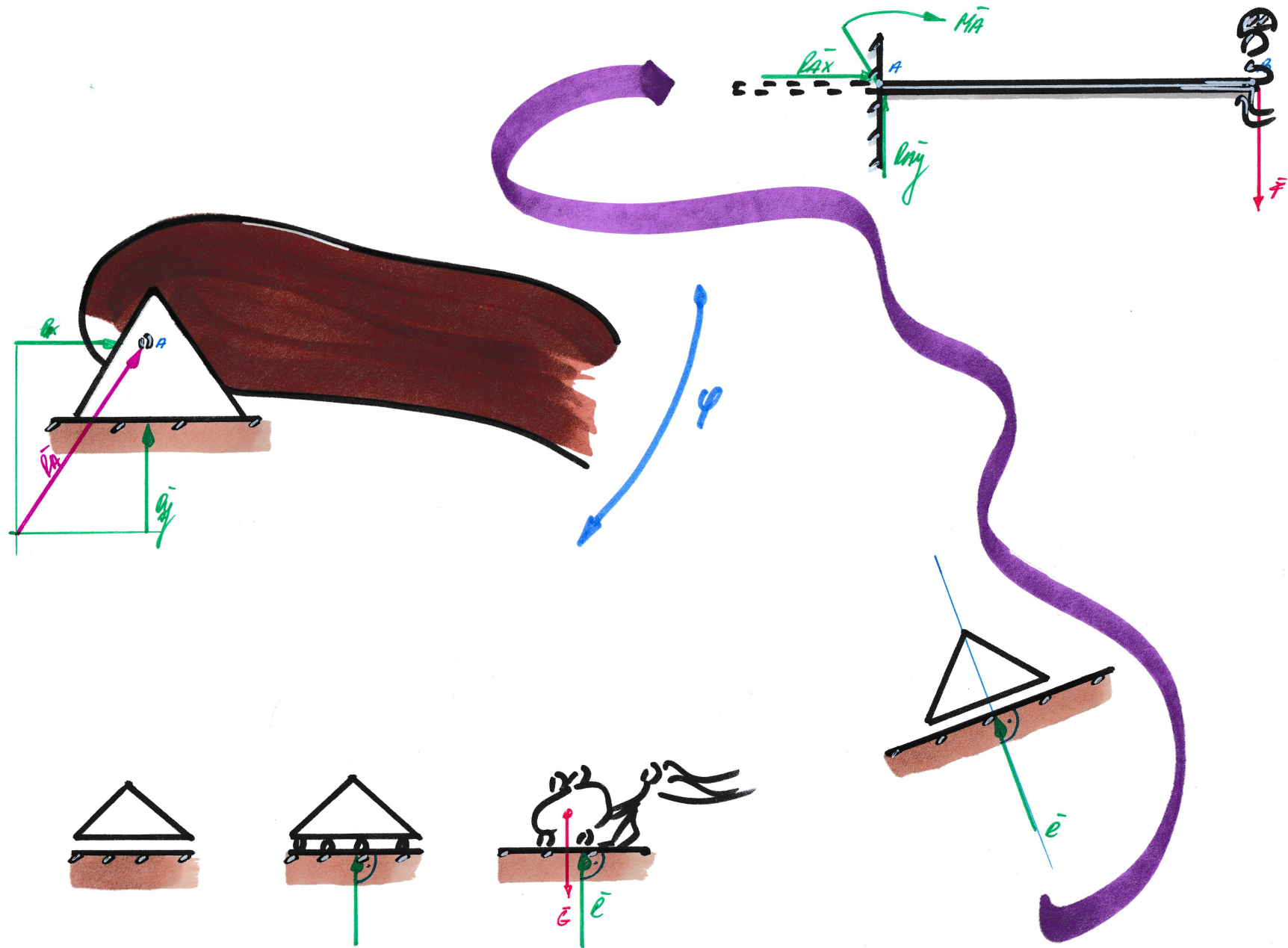
ustroju nośnego belkowego i ramowego.

DANE:

$$F_1, F_2, M_l, q = OK$$

SZUKAM:

$$R, M_R = ?$$



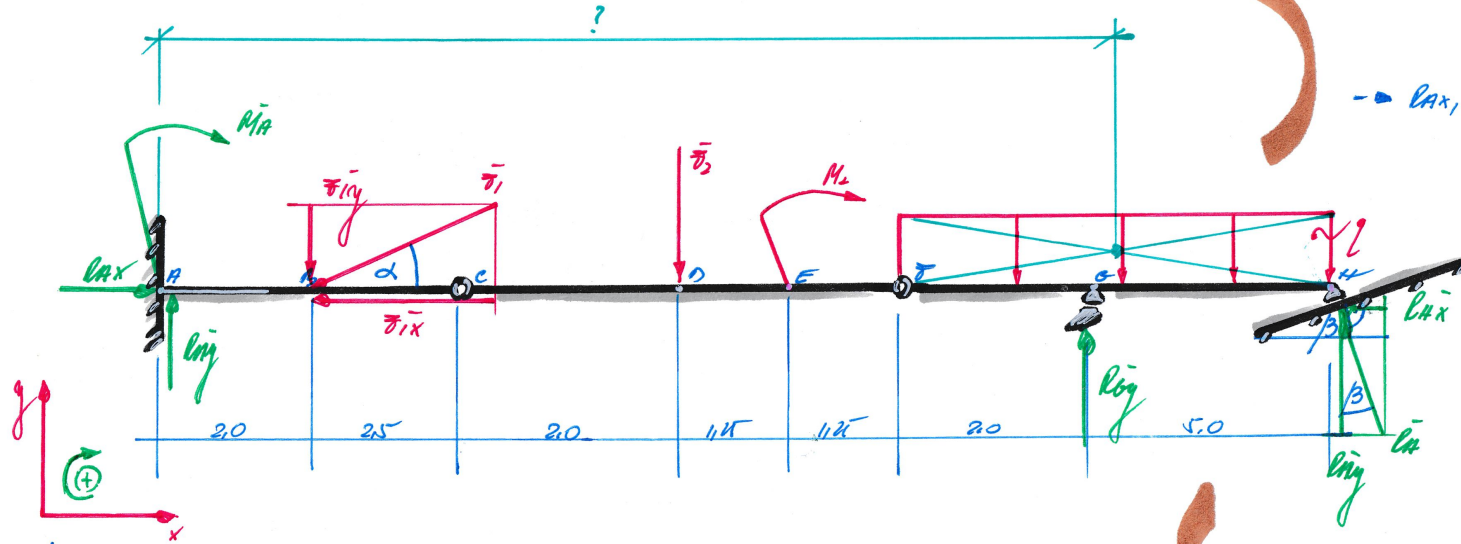
$$\bar{T}_1, \bar{T}_2, M_L, q = \checkmark$$

$$E = ?$$

$$\begin{aligned} \text{III) } \sum M_{iC}^{(A)} &= 0 \Rightarrow +M_A + R_{Ay} \cdot |AC| - \bar{T}_{1y} \cdot |BC| = 0 \\ \text{II) } \sum M_{iC}^{(A)} &= 0 \Rightarrow +M_A + R_{Ay} \cdot |AC| - \bar{T}_{1y} \cdot |AC| - \bar{T}_2 \cdot |AD| + M_L = 0 \end{aligned}$$

2?

$$\rightarrow R_{Ax}, R_{Ay}, M_A, R_{Dy}, R_H = \checkmark$$



1) RUMPE.

$$\begin{aligned} \text{I) } \sum \bar{T}_{ix} &= 0 \\ \text{II) } \sum \bar{T}_{iy} &= 0 \Rightarrow +R_{Ax} - \bar{T}_{1x} - R_{Ax} = 0 \\ \text{III) } \sum M_{iA} &= 0 \Rightarrow +M_A + \bar{T}_{1y} \cdot |AB| + \bar{T}_2 \cdot |AD| + M_L - R_{Ay} \cdot |AC| + \frac{q \cdot |AH|}{2} \cdot \left(|AB| - \frac{1}{2} |AH| \right) = 0 \end{aligned}$$

8?

$$\text{II) } \frac{\bar{T}_{1x}}{\bar{T}} = \cos \alpha \Rightarrow \bar{T}_{1x} = \bar{T} \cos \alpha$$

$$\text{I) } \frac{\bar{T}_{1y}}{\bar{T}} = \sin \alpha \Rightarrow \bar{T}_{1y} = \bar{T} \sin \alpha$$

$$\text{II) } \frac{R_{Ax}}{R_H} = \sin \beta \Rightarrow R_{Ax} = R_H \sin \beta$$

$$\text{III) } \frac{R_{Ay}}{R_H} = \cos \beta \Rightarrow R_{Ay} = R_H \cos \beta$$

$$\bar{F}_1 = 2ql, M_1 = 4ql^2, q, l = \checkmark$$

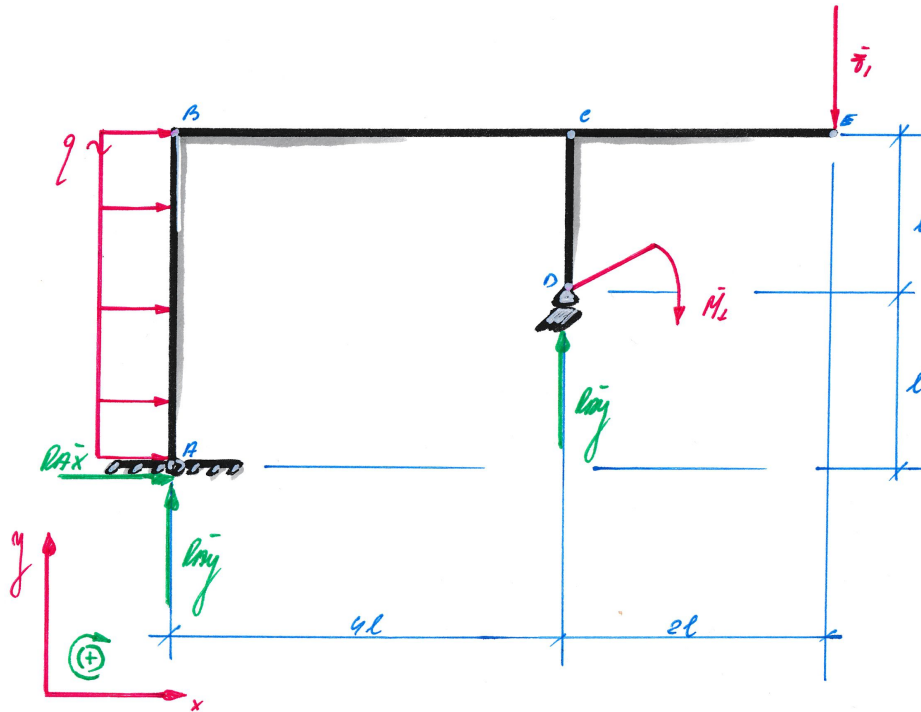
$$l = ?$$

$$R_{Ax} = -q \cdot 1AB / = -2ql$$

$$\begin{aligned} R_{Ay} &= \frac{\frac{1}{2} q \cdot 1AB^2 + M_1 + 6ql}{4l} = \\ &= \frac{\frac{1}{2} q \cdot (2l)^2 + 4ql^2 + 6 \cdot 2ql^2}{4l} = \\ &= \frac{2ql^2 + 4ql^2 + 12ql^2}{4l} = \frac{18ql^2}{4l} = 4.5ql \end{aligned}$$

$$R_{Ay} = -R_{Ay} + \bar{F}_1 = -4.5ql + 2ql = -2.5ql$$

$$\begin{cases} R_{Ax} = -2ql \\ R_{Ay} = -2.5ql \\ R_{By} = 4.5ql \end{cases}$$



1) REACT.

$$\begin{aligned} \sum \bar{F}_{ix} &= 0 \\ \sum \bar{F}_{iy} &= 0 \\ \sum M_{iA} &= 0 \end{aligned}$$

$$\begin{aligned} \Rightarrow \sum R_{Ax} + q \cdot 1AB &= 0 \\ \sum R_{Ay} + R_{By} - \bar{F}_1 &= 0 \\ \sum q \cdot 1AB \cdot \frac{1}{2} 1AB - R_{Ay} \cdot 4l + M_1 + \bar{F}_1 \cdot 2l &= 0 \end{aligned}$$

