

F6 - Mechanická práce, výkon, energie

Zákon zachování mechanických veličin

- ZZME
- ZZH

$$W = F * s \text{ [J]}$$

$$W = F * s * \cos \alpha$$

$$P = \frac{W}{t} \text{ [W]}$$

$$E_k = \frac{1}{2}mv^2$$

$$E_p = m * g * h$$

E_d - deformační

ZZME

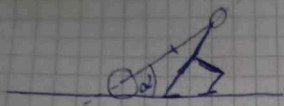
$$E_{m_c} = konst.$$

Platí to v izolované soustavě těles

ZZH

$$\vec{p}_c = konst.$$

$$\vec{p} = m * \vec{v}$$

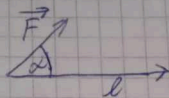


D: $\alpha = 30^\circ$

$F = 300 \text{ N}$

$l = 100 \text{ m}$

U: $W = ?$



$W = F \cdot l \cdot \cos \alpha$

$W = 300 \cdot 100 \cdot \frac{\sqrt{3}}{2} \text{ J} \approx 25981 \text{ J} \approx 26 \text{ kJ}$

$d = 16 \text{ cm}$ $d_{\text{max}} = ?$

$v_2 = 0,6 v_1$

$E_1 = \frac{1}{2} m v_1^2$

$E_2 = \frac{1}{2} m v_2^2$

1. choice $E_1 - E_2 = W = F \cdot d$

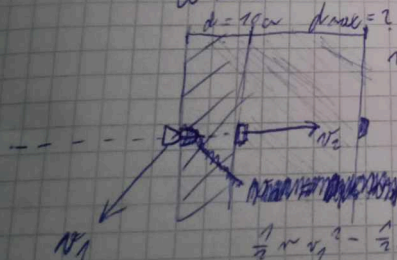
2. choice $E_1 - 0 = W = F \cdot d_{\text{max}}$

$\frac{1}{2} m v_1^2 - \frac{1}{2} m v_2^2 = F \cdot d$

$\frac{1}{2} m (v_1^2 - v_2^2) = F \cdot d$

$\frac{1}{2} m v_1^2 - 0 = F \cdot d_{\text{max}}$

$\frac{1}{2} m v_1^2 = F \cdot d_{\text{max}}$



$\frac{v_1^2 - v_2^2}{v_1^2} = \frac{d}{d_{\text{max}}}$

$d_{\text{max}} = \frac{d \cdot v_1^2}{v_1^2 - v_2^2} \cdot \frac{\frac{1}{v_1^2}}{\frac{1}{v_1^2}} = \frac{d}{\frac{v_1^2 - v_2^2}{v_1^2}} = \frac{d}{1 - \frac{v_2^2}{v_1^2}} = \frac{d}{1 - 0,6^2} =$
 $= \frac{0,1}{1 - 0,36} \approx 0,156 \text{ m} \approx 16 \text{ cm}$

D: $m = 150 \text{ kg}$