

F) POTENTIAL ENERGY + KINETIC ENERGY + THERMIC ENERGY

$$E_{PA} = E_{PF} + E_{CF} + Q_{AF}$$

$$\delta m h_A = \delta m h_A + \frac{1}{2} m v_F^2 + F_{ATT} \cdot AF$$

$$2 \delta m h_A = 2 \delta m h_A + m v_F^2 + 2 F_{ATT} \cdot AF$$

$$v_F = \sqrt{\frac{2 \delta m h_A - 2 \delta m h_A - 2 F_{ATT} \cdot AF}{m}} = \sqrt{\frac{(2 \cdot 9,8 \frac{J}{kg} \cdot 2400 kg \cdot 50 m) - (2 \cdot 9,8 \frac{J}{kg} \cdot 2400 kg \cdot 3 m) - (770,1 N \cdot 2 \cdot 182 m)}{2400 kg}}$$

$$v_F = 28,4 \text{ m/s} = (28,4 \cdot 3,6) \text{ km/h} = 102,24 \text{ km/h}$$

$$E_{CF} = \frac{1}{2} m v_F^2 = \frac{1}{2} \cdot 2400 \text{ kg} \cdot 806,56 \text{ m}^2/\text{s}^2 = 967.872 \text{ J}$$

$$E_{PF} = \delta m h_A = 9,8 \frac{J}{kg} \cdot 2400 \text{ kg} \cdot 3 \text{ m} = 70.560 \text{ J}$$

$$Q_{AF} = F_{ATT} \cdot AF = 770,1 \text{ N} \cdot 182 \text{ m} = 140.158 \text{ J}$$