20-P-MOM-DY-2

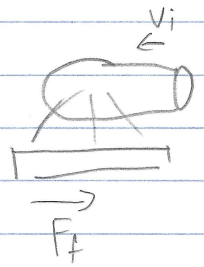
$m_c = 900\,kg$

$m_b = 15\,kg \quad v_b = 20\,m/s$

$m_t = 60\,kg \quad \mu = 0.3$

$$m_c v_c = m_b v_b \qquad v_c = \frac{m_b v_b}{m_c} = 0.33\,m/s$$

$$m_b v_b = (m_b + m_t) v_t \qquad v_t = \frac{m_b v_b}{(m_b + m_t)} = 4\,m/s$$



$$F_f = \mu N = \mu mg \qquad F_f = ma_x$$

$$\mu mg = ma_x \qquad a_x = \mu g$$

same for target

$$v_f^2 = v_i^2 + 2ad$$

Cannon: $d = \frac{-v_i^2}{2a} = \frac{-v_c^2}{2a} = 0.0185\,m$

Target: $d = \frac{-v_i^2}{2a} = \frac{-v_t^2}{2a} = 2.718\,m$