

Example - (explosion)

Determine the recoil velocity of a boat ($m = 1500\text{kg}$) if a large gun shoots a shell ($m = 10\text{kg}$) directly left at 75m/s .

$$p_{\text{Initial}} = 0$$

$$p_{\text{Final}} = 0$$

$$0 = m_b v_b + m_s v_s$$

$$v_b = \frac{-m_s v_s}{m_b} = \frac{-(-75\text{m/s})(10\text{kg})}{1500\text{kg}} = \boxed{0.50 \frac{\text{m}}{\text{s}}}$$