

A helicopter ( $m = 3250 \text{ kg}$ ) is cruising at a speed of  $56.9 \text{ m/s}$  at an altitude of  $185 \text{ m}$ . What is the total mechanical energy of the helicopter?

**Solution:**

Total mechanical energy of the helicopter is the sum of kinetic and potential energy:

$$W = W_k + W_p = \frac{mV^2}{2} + mgh = \frac{3250\text{kg} \cdot \left(56.9 \frac{\text{m}}{\text{s}}\right)^2}{2} + 3250\text{kg} \cdot 9.8 \frac{\text{m}}{\text{s}^2} \cdot 185\text{m}$$
$$= 11.2 \times 10^6 \text{ J}$$

**Answer:** Total mechanical energy of the helicopter is  $11.2 \text{ MJ}$ .