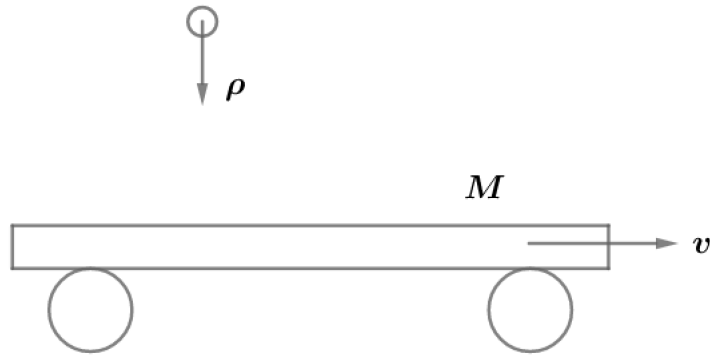# 2017 F=ma Exam: Problem 7

Kevin S. Huang

The kinetic energy of the train and snow is given by

$$K = \frac{1}{2}(M + m_{\text{snow}})v^2$$

The rate dK/dt at which the kinetic energy increases is

$$\frac{dK}{dt} = \frac{1}{2}\frac{dm_{\text{snow}}}{dt}v^2 = \frac{1}{2}\rho v^2$$

using the fact that M and v are constant. Thus, the answer is $\boxed{\text{D}}$.