

### Answer on Question #72808-Physics-Other

A 5 ton truck with a 2 ton load on the tray collides into the side of a 2 ton car and pushes it 20 meters before coming to a stop. Dry roads, fine day. How fast could the truck have been travelling?

#### Solution

From the conservation of momentum:

$$MV = (M + m)v$$

$$v = \frac{M}{(M + m)}V$$

Assume that coefficient of kinetic friction between tire and the concrete is

$$\mu_k = 0.8$$

Stopping distance is

$$d = \frac{v^2}{2\mu g}$$

$$v = \sqrt{2\mu g d}$$

The initial speed of the truck is

$$V = \left(1 + \frac{m}{M}\right)\sqrt{2\mu g d} = \left(1 + \frac{2}{5 + 2}\right)\sqrt{2(0.8)(9.8)(20)} = 23 \frac{m}{s}$$

**Answer:  $23 \frac{m}{s}$ .**

Answer provided by <https://www.AssignmentExpert.com>