

## Answer on Question#54991 – Physics – Mechanics | Kinematics | Dynamics

$$v \approx 44.16 \left( \frac{m}{s} \right) \approx 98.78 \left( \frac{mi}{h} \right)$$

### Question

The greatest height reported for a jump into an airbag is 99.4 m by stuntman Dan Koto. In 1948 he jumped from rest from the top of the Vegas World Hotel and Casino. He struck the airbag at a speed of 39 m/s (88 mi/h). To assess the effects of air resistance, determine how fast he would have been traveling on impact had air resistance been absent.

### Solution

If case of no effect of air resistance (no dissipation), conservation law holds for this system:

$$mgh = \frac{mv^2}{2},$$

where  $m$  – mass of the Dan Koto,  $h$  – height of the Vegas World Hotel and Casino,  $v$  – speed of the Dan Koto near the airbag,  $g$  – gravitational acceleration.

Factor out  $v$ :

$$v = \sqrt{2gh}$$

Assume that  $g \approx 9.81 \left( \frac{m}{s^2} \right)$

Plug in numbers:

$$v = \sqrt{2 * 9.81 * 99.4} \approx 44.16 \left( \frac{m}{s} \right) \approx 98.78 \left( \frac{mi}{h} \right)$$