Answer on Question #49350, Physics, Mechanics | Kinematics | Dynamics

An explosion takes place at a distance of 3 200 metres away from sound detector that detects only the sound coming from the ground the sound detector detects the sound signals at 0.64 and 0.80 seconds after the explosion. find the depth of the soft ground.

Solution:

The speed of sound through the ground is

$$v = \frac{d_1}{t_1} = \frac{3200}{0.64} = 5000 \; m/s$$

The second reflection from hard ground returns after 0.80 sec.
The one-way time to the hard ground is

$$t_2 = \frac{0.80 - 0.64}{2} = 0.08 \; s$$

Thus, the depth of the soft ground is

$$d = d_1 + d_2 = d_1 + vt_2 = 3200 + 5000 * 0.08 = 3600 \; m$$

Answer: $3600 \; m$