

Problem



- An alert driver (with a reaction of 0.5 sec) is driving downhill on a 4% grade at 35 mph on a dry pavement when suddenly a person steps from behind a parked car in the path of the driver, at a distance of 125 ft.
 - Can the driver stop in time with emergency brake assuming a deceleration rate of 14.8 ft/sce²
 - Can the driver stop in time on the rainy day with comfortable braking assuming a deceleration rate of 11.2 ft/sce²

Problem:

Data:

$$t_r = 0.5 \text{ s}$$

$$G = -0.04$$

$$V = 35 \text{ mph} = 15.64 \text{ m/s}$$

$$\text{Given SSD} = 125 \text{ ft} = 38.1 \text{ m}$$

a) Dry pavement. Can stop? $a = 14.8 \text{ ft/s}^2 = 4.51 \text{ m/s}^2$

b) Wet " can stop? $a = 11.2 \text{ ft/s}^2 = 3.41 \text{ m/s}^2$

Solution

$$\text{SSD} = \frac{V^2}{2a \pm G} + Vt_r$$

$$\begin{aligned} \text{a) } \text{SSD} &= \frac{15.64^2}{2(4.51) - 0.04} + 15.64(0.5) \\ &= 35.06 \text{ m} \end{aligned}$$

Yes he can stop

$$\begin{aligned} \text{b) } &= \frac{15.64^2}{2(3.41) - 0.04} + 15.64(0.5) \\ &= 43.8 \text{ m} \end{aligned}$$

No he cannot stop