64. With $M = 1000$ kg and $m = 82$ kg, we adapt Eq. 16-12 to this situation by writing

$$\omega = \sqrt{\frac{k}{M + 4m}} \quad \text{where} \quad \omega = \frac{2\pi}{T} \ .$$

If $d = 4.0$ m is the distance traveled (at constant car speed v) between impulses, then we may write $T = v/d$, in which case the above equation may be solved for the spring constant:

$$\frac{2\pi v}{d} = \sqrt{\frac{k}{M + 4m}} \quad \Longrightarrow \quad k = (M + 4m)\left(\frac{2\pi v}{d}\right)^2 \ .$$

Before the people got out, the equilibrium compression is $x_i = (M + 4m)g/k$, and afterward it is $x_f = Mg/k$. Therefore, with $v = 16000/3600 = 4.44$ m/s, we find the rise of the car body on its suspension is

$$x_i - x_f = \frac{4mg}{k} = \frac{4mg}{M + 4m}\left(\frac{d}{2\pi v}\right)^2 = 0.050 \text{ m} \ .$$