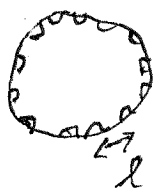


Chapter 15Problem 26

$$l = 2.00 \text{ cm}$$

$$v = 30.0 \text{ m/s}$$

Find the frequency of vibrations as crevices hit the pavement.

The time period between crevices hitting the pavement can be determined by

The definition of velocity

$$v = \frac{\Delta x}{\Delta t}$$

where $\Delta x = 2.00 \text{ cm} = 0.020 \text{ m}$
and $v = 30.0 \text{ m/s}$

with algebra

$$T = \Delta t = \frac{\Delta x}{v} = \frac{0.020 \text{ m}}{30.0 \text{ m/s}} = 6.67 \times 10^{-4} \text{ s}$$

frequency is the reciprocal of the time period

$$f = \frac{1}{T} = \frac{1}{6.67 \times 10^{-4} \text{ s}} = \boxed{1,500 \text{ Hz}}$$

This is the hum you hear as you drive down the road. The frequency increases with an increase of speed.