

This 1932 commercial for Oldsmobile has a young man and woman riding in a car while “In My Merry Oldsmobile” plays in the background. The video, while somewhat amusing, is quite simple, but it provides a good segue into rotational motion and its relationship with linear motion.

What is the rotational speed of the wheels?

First, we must make a couple of assumptions:

- The speed of the car is probably about 20 mph or 10 m/s.
- The radius of the wheel is about 0.5 m.

The rotational and linear velocities are directly proportional as such:

$$v = \omega r$$

So, the angular velocity is

$$\omega = \frac{v}{r} = 20 \frac{\text{rad}}{\text{s}}$$

To convert this to revolutions/second, do the following:

$$\omega = 20 \frac{\text{rad}}{\text{s}} \left(\frac{1 \text{ rev}}{2\pi \text{ rad}} \right) = 3.1 \frac{\text{rev}}{\text{s}}$$