

P6.2-5) A RWD 2011 Corvette Coupe's technical specifications are listed below. If the car, starting from rest, has a maximum acceleration before slip of 10 ft/s^2 on a 15% grade, determine the total rolling resistance. Estimate the friction characteristics as that between rubber and dry asphalt ($\mu_s = 0.9$) and assume that drag is negligible. Use a rigid-body model to solve this problem.

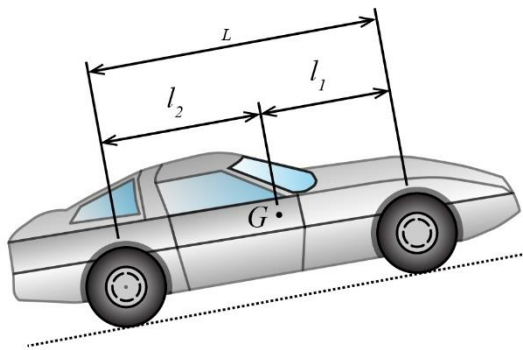
- Curb weight: $W = 3175 \text{ lb}$
- Wheel base: $L = 105.7 \text{ in}$ (Distance between the axles.)
- CG height: $h = 19.8 \text{ in}$
- Rear wheel drive
- Weight distribution: 51/49 f/r (%)

Given:

Find:

Solution:

Draw a free-body diagram of the car.



Use the car's equation of motion to determine the rolling resistance.

Calculate the position of the mass center.

$l_1 =$ _____

Calculate the angle of the road.

$\theta =$ _____

$R =$ _____