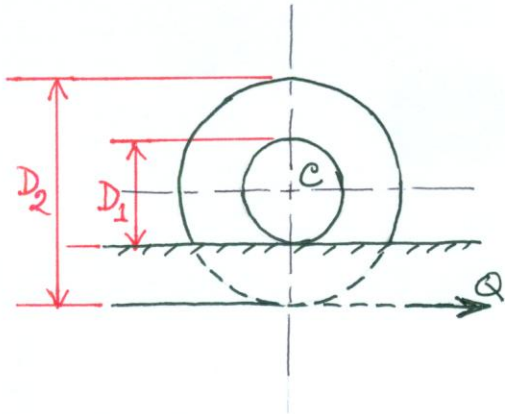


1447/p. 422



Rolling

$$D_1 = 2 \text{ ft}$$

$$D_2 = 4 \text{ ft}$$

$$Q = 160 \text{ lb}$$

$$W = 644 \text{ lb}$$

$$\bar{I} = 12 \text{ slug-ft}^2$$

$$v = ? \text{ when } S = 10 \text{ ft from rest}$$

Solⁿ

$$U_{\text{net}} = Q \cdot S = 160 \times 10 = 1600 \text{ ft-lb}$$

$$\Delta KE = \frac{1}{2} \frac{W}{g} v^2 + \frac{1}{2} \bar{I} \omega^2$$

$$= \frac{1}{2} \times \frac{644}{32.2} v^2 + \frac{1}{2} \times 12 \times \left(\frac{v}{1}\right)^2$$

$$= 10 v^2 + 6 v^2$$

$$= 16 v^2$$

According to principles of work and kinetic energy

$$U_{\text{net}} = \Delta KE$$

$$\Rightarrow 1600 = 16 v^2$$

$$\therefore v = \boxed{10 \text{ fps.}} \text{ Ans}$$