

Chapter 4 Problem 27 [†]

Given

$$W = 10 \text{ tons}$$

Solution

Find the maximum mass a bridge can carry.

First convert the weight from tons to newtons.

$$10 \text{ tons} \left(\frac{2000 \text{ lb}}{1 \text{ ton}} \right) \left(\frac{4.448 \text{ N}}{1 \text{ lb}} \right) = 88,960 \text{ N}$$

From the definition of weight we get a mass of

$$W = mg$$

$$m = \frac{W}{g} = \frac{88,900 \text{ N}}{9.80 \text{ m/s}^2} = 9080 \text{ kg}$$

[†]Problem from Essential University Physics, Wolfson