Answer on Question #41462, Physics, Mechanics

Which of the following is INCORRECT?

a. The coefficient of static friction depends on the nature of the surfaces in contact

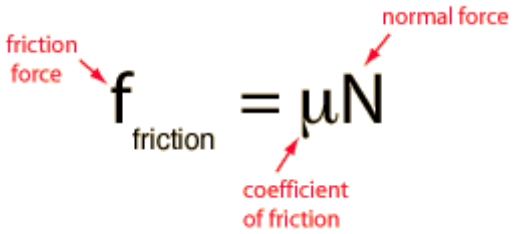
b. static friction is larger than kinetic friction for any given surfaces in contact

c. The coefficient of friction is independent of the relative velocity of the surfaces in contact

d. The coefficient of friction is dependent on the area of the surfaces in contact.

Solution:

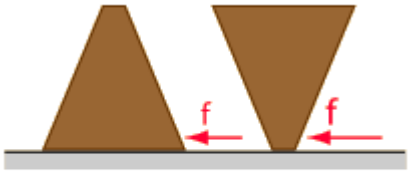
In the standard model for friction between surfaces, there are certain inherent assumptions:



1. The frictional force is independent of area of contact
2. The frictional force is independent of the velocity of motion
3. The frictional force is proportional to the normal force.

Part of the standard model of surface friction is the assumption that the frictional resistance force between two surfaces is independent of the area of contact.

The assumption is a fairly good one in this case of different orientations of a box or crate made of uniform material.



This approaches an obvious failure of this assumption, when one area becomes so small that it digs into the surface.

While exceptions exist, the assumption has enough validity to be useful in many circumstances. For example, it implies that wide tires will not in general give better traction than narrow tires, and will not change the normal braking distance for a car. Better traction can be obtained with wide tires, or tires with lower pressure, if the pressure changes the coefficient of friction, as on a surface of snow.

Answer. INCORECT is d. The coefficient of friction is dependent on the area of the surfaces in contact.