Course Code: ESC106A
Course Title: Construction Materials and Engineering Mechanics

Lecture No. 45:
Friction

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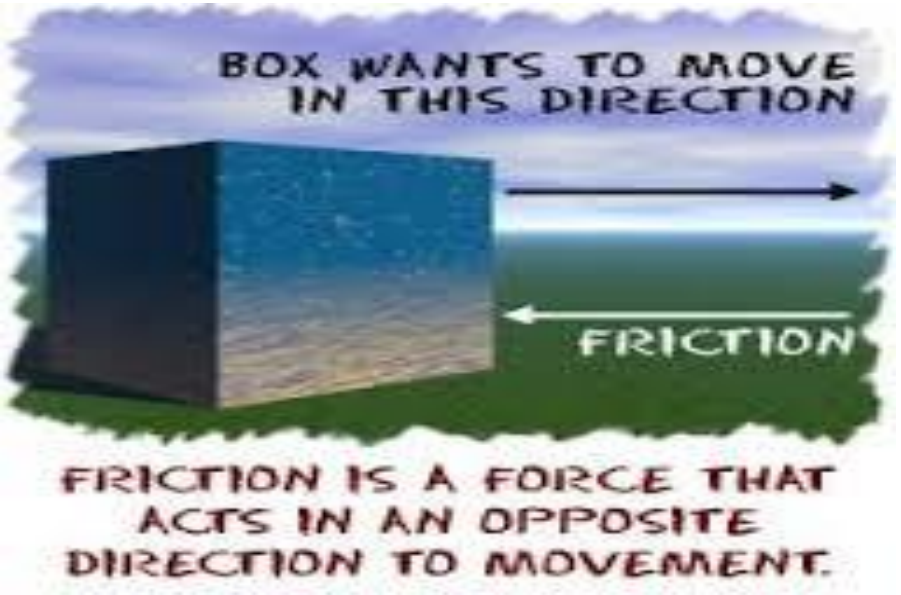
Lecture Intended Learning Outcomes

At the end of this lecture, students will be able to:

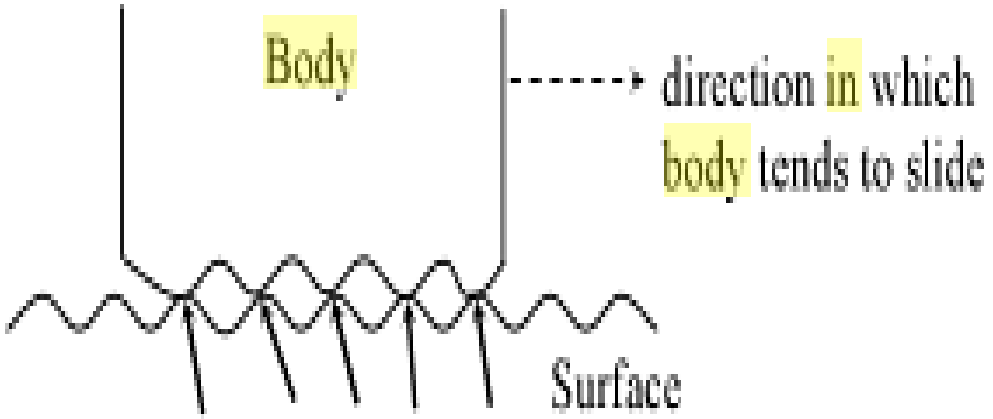
- Describe the concepts of friction

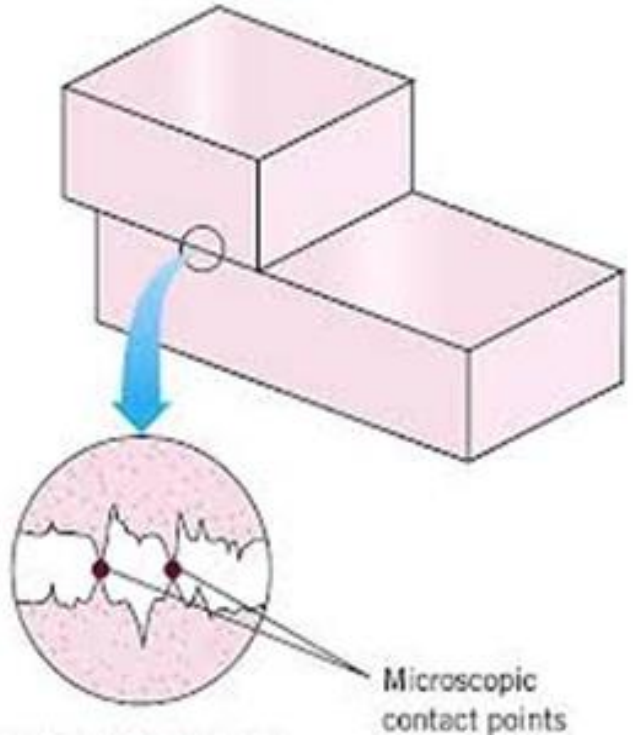
Friction

- Friction is the force resisting the relative motion of solid surfaces, fluid layers and material elements sliding against each other



Reasons behind frictional force





Why friction matters to us?

Advantages

- Friction enables belts to cling to pulleys and nails to hold objects together

- A running car or bicycle uses friction to stop. As the driver steps on brakes, the vehicle slows down to a full stop.
- This is possible because of the friction between the brakes and the wheels.

Disadvantages

- Shoes, Slippers, tires and anything that are used for moving become worn out.
- Friction produces heat that causes objects to wear out
- Some machines perform less efficiency and wear out faster with friction
- Friction also causes sparks, overheating and machine breakdown
- Friction reduces speed

Coefficient of friction

It is the ratio of limiting frictional force and the normal reaction

The Coefficient of friction,

$$\mu = \frac{f}{N} = \tan \phi$$

$$f = \mu N$$

Summary

- Friction is the force resisting the relative motion of solid surfaces, fluid layers and material elements sliding against each other

- The angle made by the resultant ‘R’ with the normal to the surface of contact when the body has impending motion is called the angle of friction