

CHAPTER 12: Friction

- Friction: Friction is a resistive force.
- It opposes relative motion when two surfaces come in contact with each other.
- It is dependent on the nature of surface coming in contact.
- Friction acts in the direction opposite to the direction of applied force
- It acts on both the Surfaces.
- Spring balance: a device used for measuring weight of an object.

1. Factors affecting Friction

1. If two uneven or irregular surface come in contact with each other, friction is generated.
2. Smooth looking surfaces can have numberof minute irregularities on them.
3. These irregularities on the surfaces look into one another causing friction.
4. On attemptto move any surface, the force applied tries to overcome interlocking.
5. Rough surfaces have largernumber of irregularities, So the force offriction is greater if a rough surface isinvolved.
6. Polishing a surface makes it smooth thus reducingfriction.
7. If the interacting surfaces are pressed hard, the frictional force increases.
8. Static friction: The force required to overcomefriction at the instant an object startsmoving from rest is a measure of staticfriction.
9. Sliding friction: The forcerequired to keep the object moving withthe same speed is a measure of slidingfriction.

• Why is friction important?

- 1.) If an object started moving, it wouldnever stop if there were no friction.
- 2.) Friction is important as it acts on the tires of the automobiles and the road, and helps in starting, stopping or changing the direction ofmotion.
- 3.) Day to day activities like writing, walking, driving, tying knot etc. all occurs due to friction.
- 4.) On the contrary friction wears out the materials whether like screws, ball bearings or solesof shoes etc. This makes it undesirable some times.
- 5.) Friction can also generates.

➤ **Increasing and ReducingFriction**

1. Interlocking ofirregularities on surface creates bonds which generates friction
2. Friction can be avoided to a great extent by use of lubricants.
3. Due to use of lubricants Movement becomes smooth.

➤ **Rolling and sliding Friction**

- 1.) Rolling friction: The resistance offered to motion, When one body rolls over the surfaceof another bodyis called rolling friction.
- 2.) Rolling causes reduction in friction.

- 3.) It is always easier to roll than to slide a body over another.
- 4.) Sliding Friction has replaced rolling by using ball bearings in most machines.
- 5.) Rolling friction is smaller than sliding Friction.

➤ **Fluid Friction:**

- 6.) Air is very light and thin and exerts frictional force on objects which move through it.
- 7.) Water and other also exert force of friction when objects move through them
- 8.) Gases and liquids are fluids, these fluids can exert force of friction on objects in motion which pass through them.
- 9.) Drag is the frictional force exerted by fluids.
- 10.) The frictional force on an object in a fluid depends on its speed, shape, nature of object, with respect to the fluid.
- 11.) The object has to overcome this exerted by the fluid.
- 12.) This causes loss of energy.
- 13.) This loss can be reduced by giving objects special shape.

