2.2.2 Lubricants:

Definition: Any substance introduced between the two moving and sliding surfaces with a view to reduce frictional resistance to know as lubricant.

Lubrication Mechanisms:

Three mechanisms have been proposed to explain the action of lubricants they are

a) Thin film (or) Boundary Lubrication:

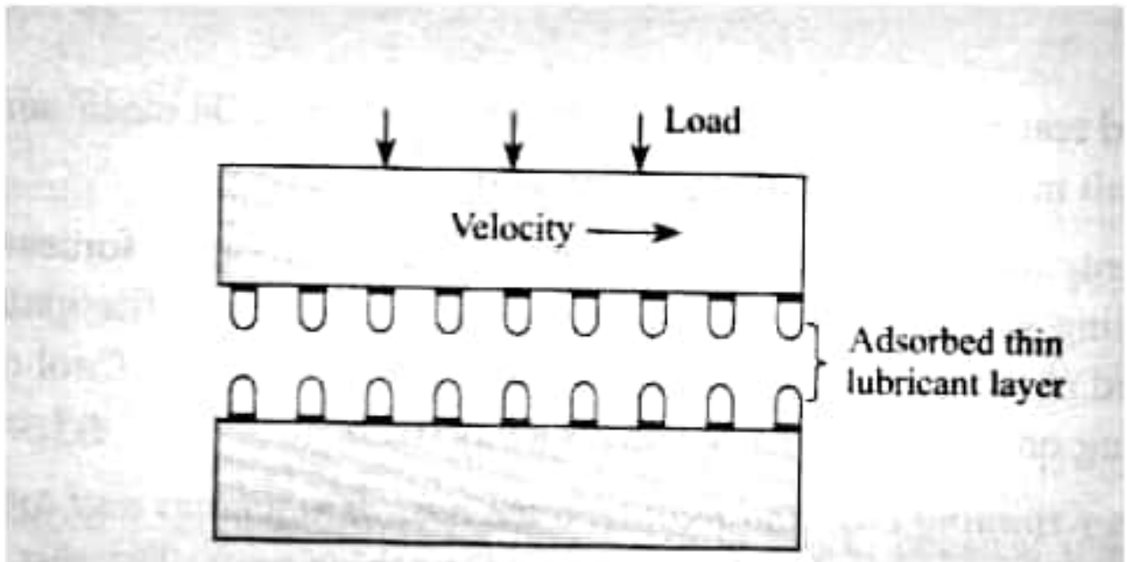

Fig 2.7Boundary film lumbrication

In this type of lubrication a thin film of lubricant is absorbed on the surface and held by vandarwaals forces. When the lubricant is not viscous enough to generate a film of sufficient thickness for the separation of surfaces under heavy loads, friction is reduced by thin film lubrication. Thin film lubrication is applied when the speed is very low, the loading heavy, the oil has low viscosity.

Some peaks may have higher thickness than the film of lubricant which results in wearing and tearing. Hence the chemical or physical forces on some metal surfaces would avoid the direct contact of metals and absorb a thin layer of lubricating oil. The co-efficient of friction is reduced due to oiling.

b) Fluid Film (or) Hydrodynamic Lubrication:

This type of lubrication is also known as thick film lubrication. It is carried out with the help of liquid lubricants. In fluid film lubrication the two sliding surfaces are separated by a thick film of about 1000A° which is applied to prevent direct surface to surface contact. Wearing and tearing of metals is minimized.

In a ball bearing the irregularities of the shaft and bearing surfaces are covered by a thick film of lubricants and don't not allow. The content of metallic surfaces with each other as shown in the figure. The resistance to moment is only due to resistance of the lubricant. Fluid film lubrication is useful in delicate and light machines like watches, clocks, guns, scientific equipments.

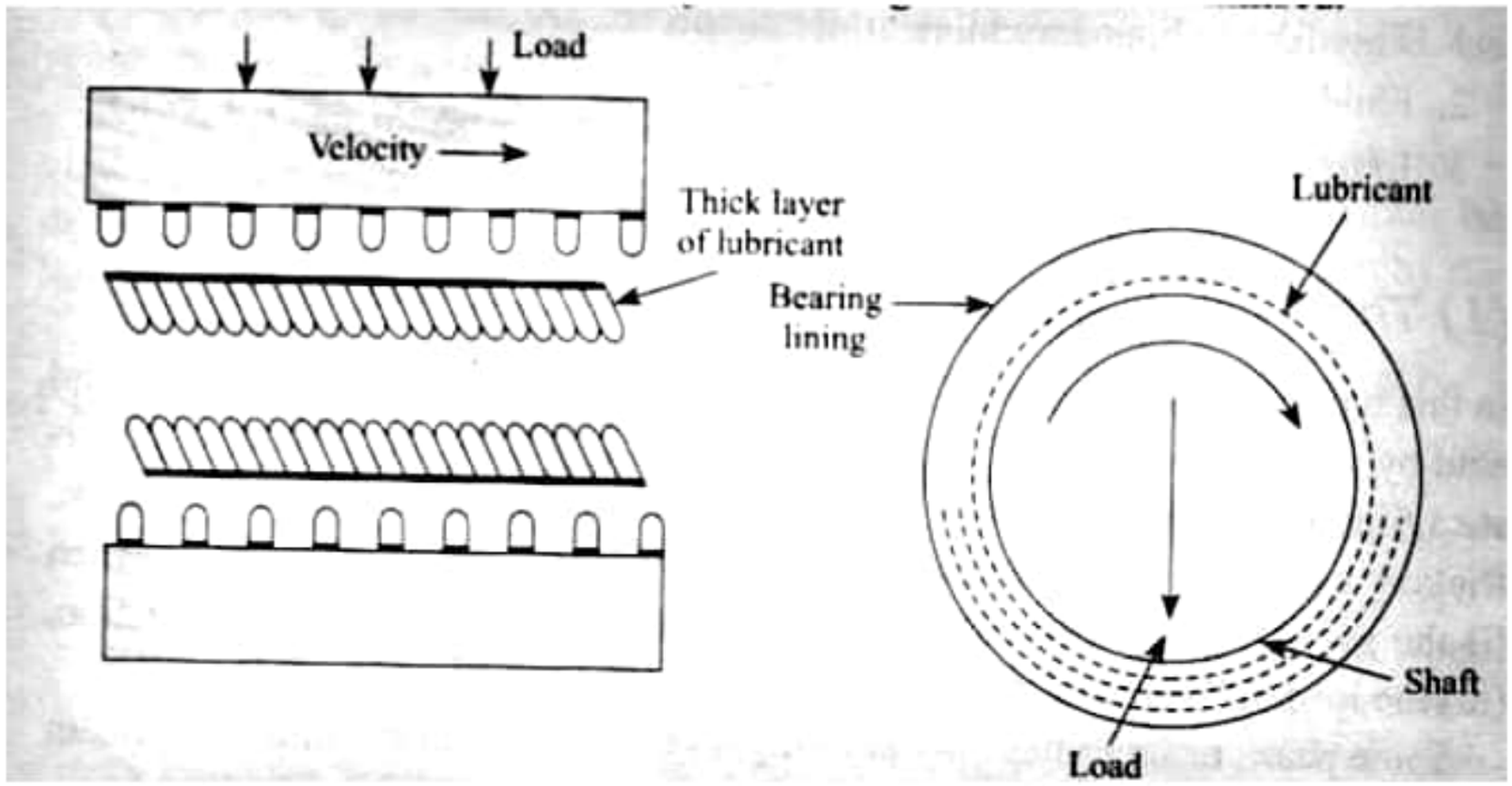

Fig 2.8 Fluid film lubrication

Extreme Pressure Lubrication:

It involves chemical action on the part of lubricant. Under heavy load and high speed conditions, high local temperature is generated. The liquid film may not stick, it may decompose and vaporizes. Hence special additives called extreme pressure additive are blended with lubricating oil to form more durable film to with stand high temperature and pressure. Chlorinated esters, sulpharised oils and tricrysyl phosphates are used as extreme pressure additives. These additives combined with the metallic surfaces with high temperature to form metallic chlorides.