

Sliding Contact Bearings

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26.1 Introduction

A bearing is a machine element which support another moving machine element (known as journal). It permits a relative motion between the contact surfaces of the members, while carrying the load. A little consideration will show that due to the relative motion between the contact surfaces, a certain amount of power is wasted in overcoming frictional resistance and if the rubbing surfaces are in direct contact, there will be rapid wear. In order to reduce frictional resistance and wear and in some cases to carry away the heat generated, a layer of fluid (known as lubricant) may be provided. The lubricant used to separate the journal and bearing is usually a mineral oil refined from petroleum, but vegetable oils, silicon oils, greases etc., may be used.

26.2 Classification of Bearings

Though the bearings may be classified in many ways, yet the following are important from the subject point of view:



Roller Bearing

1. Depending upon the direction of load to be supported. The bearings under this group are classified as:

(a) Radial bearings, and (b) Thrust bearings.

In *radial bearings*, the load acts perpendicular to the direction of motion of the moving element as shown in Fig. 26.1 (a) and (b).

In *thrust bearings*, the load acts along the axis of rotation as shown in Fig. 26.1 (c).

Note : These bearings may move in either of the directions as shown in Fig. 26.1.

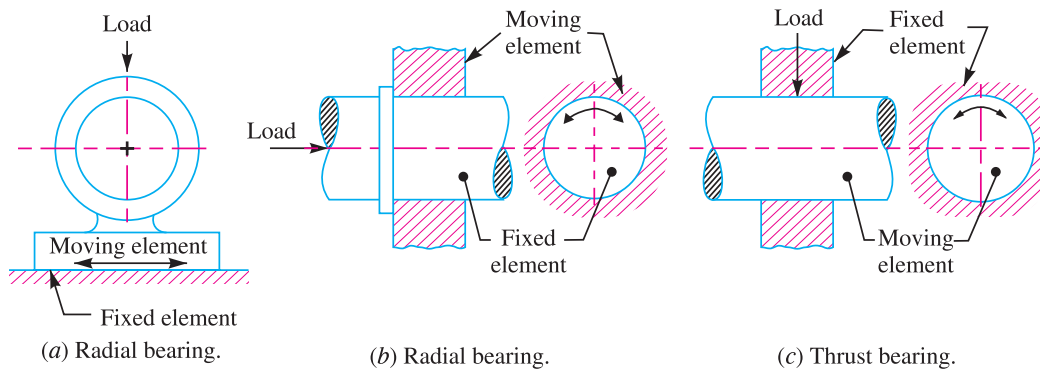


Fig. 26.1. Radial and thrust bearings.

2. Depending upon the nature of contact. The bearings under this group are classified as :

(a) Sliding contact bearings, and (b) Rolling contact bearings.

In *sliding contact bearings*, as shown in Fig. 26.2 (a), the sliding takes place along the surfaces of contact between the moving element and the fixed element. The sliding contact bearings are also known as *plain bearings*.

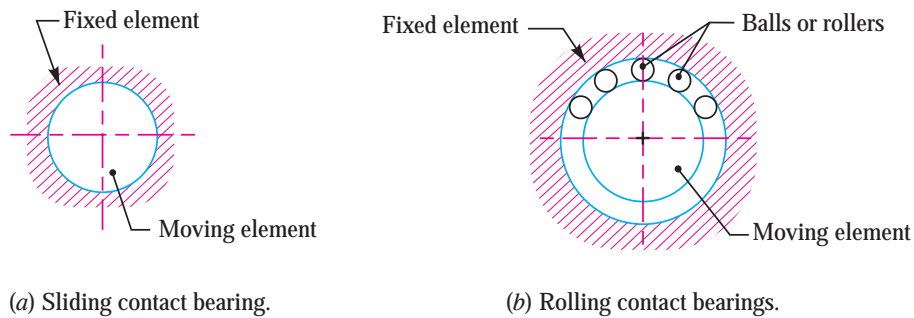


Fig. 26.2. Sliding and rolling contact bearings.

In *rolling contact bearings*, as shown in Fig. 26.2 (b), the steel balls or rollers, are interposed between the moving and fixed elements. The balls offer rolling friction at two points for each ball or roller.

26.3 Types of Sliding Contact Bearings

The sliding contact bearings in which the sliding action is guided in a straight line and carrying radial loads, as shown in Fig. 26.1 (a), may be called *slipper* or *guide bearings*. Such type of bearings are usually found in cross-head of steam engines.

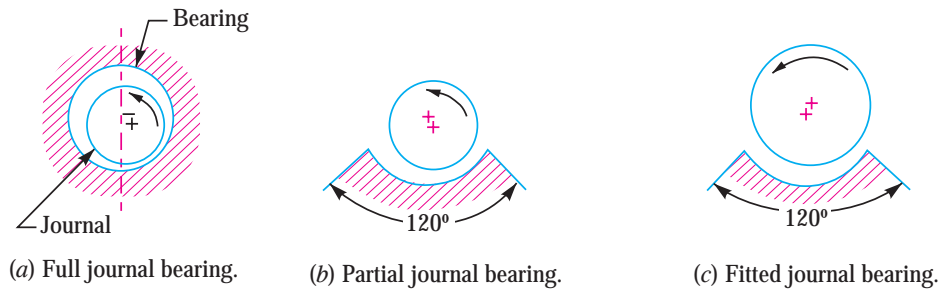


Fig. 26.3. Journal or sleeve bearings.

The sliding contact bearings in which the sliding action is along the circumference of a circle or an arc of a circle and carrying radial loads are known as *journal* or *sleeve bearings*. When the angle of contact of the bearing with the journal is 360° as shown in Fig. 26.3 (a), then the bearing is called a *full journal bearing*. This type of bearing is commonly used in industrial machinery to accommodate bearing loads in any radial direction.

When the angle of contact of the bearing with the journal is 120° , as shown in Fig. 26.3 (b), then the bearing is said to be *partial journal bearing*. This type of bearing has less friction than full journal bearing, but it can be used only where the load is always in one direction. The most common application of the partial journal bearings is found in rail road car axles. The full and partial journal bearings may be called as *clearance bearings* because the diameter of the journal is less than that of bearing.



Sliding contact bearings are used in steam engines