

# **BEARING AND TYPES OF BEARING**

In this article, you will learn about bearing and types of bearing.

Generally, all types of machinery are provided with supports for rotating shafts, the supporting device known as a bearing.

According to Wikipedia a bearing is a machine element that constrains relative motion to only the desired motion and reduces friction between moving parts.



**BEARING**

Bearing employs to support, guide and restrain moving the element. This is a stationary member and it carries the load.

The part of the shaft supports by the bearing is known as the journal which is a moving member. Bearings are classified according to the type of operation they do.

The motions allowed, or to the directions of the loads or forces applied to the parts.

**The common applications of bearings are:**

- Shafting in workshops,
- Spindles of a machine tool such as a lathe, drilling, milling machine, etc.
- The crankshaft of engines, and axles of automobiles, etc.

## **Classification of Bearing**

There are three main kinds of bearing, according to the direction of load, viz.,

1. Journal or radial bearing,
2. Footstep bearing,

3. Thrust or collar bearing.

**A journal or radial bearing** afford support to the shaft at a right angle to the shaft axis.

**A footstep or pivot bearing** support shaft parallel to the shaft axis and the end of the shaft rests on the bearing surfaces.

**A thrust or collar bearing** provides support to shaft subjected to end or axial thrust.

The surfaces of the bearing are generally flat or cylindrical. And they may consist of nonferrous metal surfaces known as bushes or hardened steel races supported by steel balls or rollers in the above case, the bearing known as bush bearings and in the latter known as a ball or roller bearings.

## Types of bearings are:

1. Bush Bearing
2. Plummer Block
3. Thrust Bearing
  - a. Foot Step Bearing
4. Rolling contact or Anti-friction Bearing
  - a. Ball and Roller Bearings

## Bush bearings

The simplest type of bush bearing shown in Fig. it consists of a cast iron bearing block and a brass or gun metal bush.

In this types of bearing, The base plate of the bearing block provides with holes for bolting down the bearing in position.

At the top of the bearing, there is a counter boring oil hole that passes through the block and bush in facilitating lubrication of the shaft and the bush.



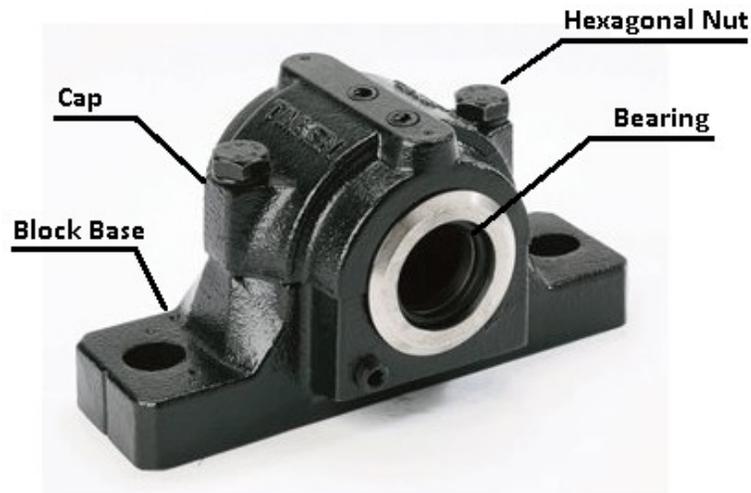
**BUSH BEARING**

It is using for the shaft which carry light loads and which rotate at slow speeds. In this type of solid bearing, the shaft may introduce and removed wise.

## Plummer block

When a long shaft requires to support at intermediate point a pedestal bearing or more Plummer block is put to use.

It consists of a cast iron pedestal or blocks with a sole, tow split gum metal or bushes, a cast iron cap and tow square headed bolts for fastening the cap and the block together.



## PLUMMER BLOCK

A projecting snug in the bottom bush, fitting in the corresponding hole in the body or block, prevent their rotation.

The bush is preventing from moving along the length of the shaft by two collars at the sides. It is made of two halves to help.

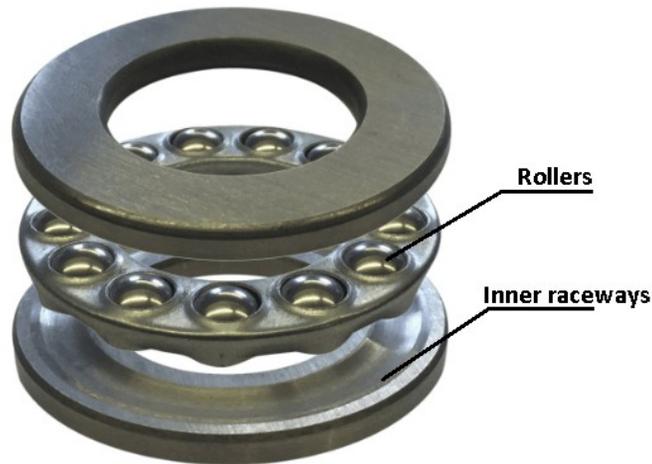
- Placing and removal of the shaft in and from the bearing
- Change for wear in the bushes, and
- Renewal of the bushes.

In bush bearing, there is a rubbing action between the outer surface of the shaft and the inner surface of the bearing. And the resulting friction minimizes by the presence of a film of lubrication oil.

For line shafting, ring oiling may consider the safest and most efficient type under the ordinary condition of service.

## Thrust Bearings

In thrust bearing, the bearing pressure will be axial. The axis of the shaft may vertical or horizontal.



## THRUST BEARING

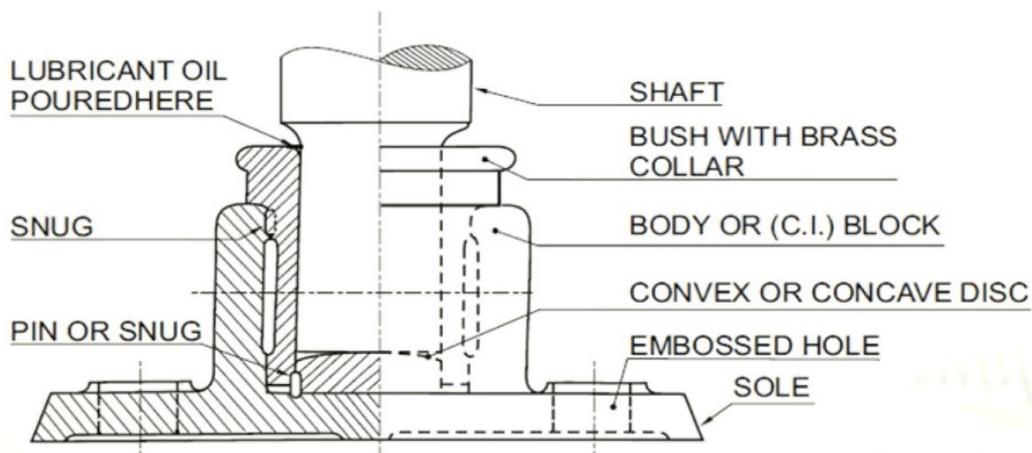
If the axis of the shaft is vertical, the thrust bearing known as footstep bearing, if the axis of the shaft is horizontal, the thrust bearing known as collar bearing.

### Foot Step bearing

The figure shows a simple type of the footstep bearing. It is suitable for supporting a vertical shaft.

It consists of a cast-iron block and a gunmetal bush. The lower end of the shaft rests on a steel disc having a concave seating.

In this types of bearing, The disc is preventing from rotating along and with the shaft by a pin inserts partly into the block and partly into the disc.



**DETAILS OF A FOOTSTEP BEARING**

The bush is preventing from rotating along with the shaft by the snug provides at its neck below the collar.

The main disadvantages of this type of bearing are that it is difficult to achieve effective lubrication. This type of bearing is generally using for slow speed shafts carrying light loads.

Generally, the vertical shaft is uncommon in the ordinary transmission of power. But they often occur on machine practice in machine tool turntables, textile machinery, etc.

## Rolling Contact or Anti-friction bearings

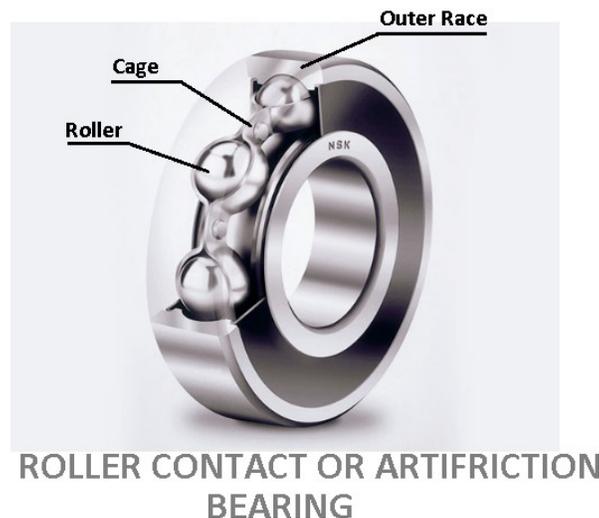
It is a well-known fact that a smooth rounder surface will roll over a similar surface more than when it is sliding.

This phenomenon employs hard chrome steel balls or rollers to run in special design cages to provide bearings with low friction loss.

In these types of bearing, the motion between the shaft and the bearing surface is of pure rolling. Since the rolling friction is much less than the sliding friction, this type bearing known as an anti-friction bearing.

The two type of antifriction bearing is,

1. Ball Bearing
2. Rolling Bearing.



The outstanding feature of the antifriction bearings is their low starting frictions, which will practical the same while running also. This renders their application particularly suitable for machinery which has to frequent start, stop and restart.

## Ball and Rolling Bearings

The figure shows the simplest type of ball and rolling bearing. It consists of a hard steel ball and rolling, the position between two suitable grooves, hard steel rings, known as races.

In these types of bearing, the ball and rolling are retaining in positions by separators. This known as cages usually made of brass.

The inner race should be of 'drive fit' on the shaft so as to rotate with it. The outer race fits into the housing and does not rotate.



## BALL BEARING

A ball and rolling being free to rotate, the action in them is not that of rubbing but of rolling between the balls and rolling and their races.

Since the rolling friction is much less than the sliding friction, ball and rolling bearing are known as an antifriction bearing.

Rolling bearings maintain accurate alignment of every part over a long period of time and can carry the heavy momentary load. This renders them suitable for machinery which requires to frequent start and stops.

Rolling make the line a contact with their races, while balls make point contact. Rolling, thus, has a higher load carrying capacity.

At the point (or line) of contact between a ball (and rolling) and its races, the intensity of pressure is as great that film lubrication as usually understood is impossible.

Lubrication is necessary to protect the polished surface from rust and to help in the exclusion of foreign matter. Pure mineral grease is so generally used.

### **Advantages of Rolling Contact bearing**

- Starting and running friction is negligible.
- Can be used for radial and thrust load.
- Requires minimum lubrication.
- Suitable for high speeds.
- Serves for a long life.

### **Disadvantages of Rolling Contact bearings**

- High initial cost.
- More liable to shock loads.
- Requires a very high precision machining of the bearing housing.
- Not suitable for heavy loads.

- Worn out parts cannot be repaired, the only entire bearing unit is to be replaced.

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