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Lesson 13.

Shaft bearing: Journal bearings, Pivot bearings, Collar bearings

Introduction

Bearing provide supports/stability for rotating members/shaft as well as permit free and smooth motion. Bearing are classified according to the direction of pressure with respect to the axis of the shaft. Journal bearings, Pivot bearings and Collar bearings are sliding contact type bearing in which the rotating shaft has sliding contact with the bearing and the friction between two is relatively high.

Journal Bearings: The load on the bearing is perpendicular to the axis of the shaft. Solid, bushed and pedestal are the types of journal bearing. In solid and bushed bearings, the shaft can be inserted endwise only. Hence, they are generally placed only at or near the ends of the shaft.

Solid bearing

- This simplest form of journal bearing is made of cast-iron and consist a cylindrical block with a rectangular base [fig.13.1.1].
- A hole is bored in the cylindrical part of the bearing of the size equal to the diameter of the shaft.
- Rectangular base-plate has two holes drilled in it for bolting down the bearing in its position.
- An oil-hole to lubricate the bearing is drilled at the top. Friction between the bearing and the shaft is thus reduced.
- There is no any provision for adjustment for wear. Therefore, it is mostly used for shafts which rotate at comparatively slow speeds, carry light loads and the wear is immaterial.

Bushed bearing

- Bushed bearing is a somewhat modified version of solid bearing, consisting mainly two parts, the body and the bush [fig.13.1.2].
- It is lined with a hollow bush of gun-metal or brass. The bush is pressed inside the bore in the bearing and is checked from sliding or rotating by means of a dowel-pin or grub-screw inserted half inside the block and half in the bush.
- For lubrication of the bearing, a oil hole is provided at the top of the body

When the bush wear out it is easily removed and replaced by a new one.

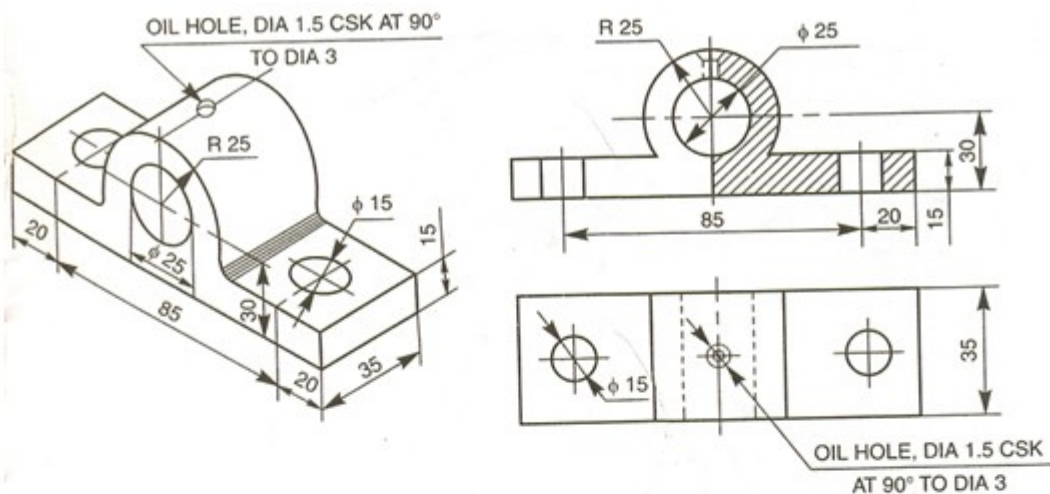


Fig.13.1.1 Solid journal bearing

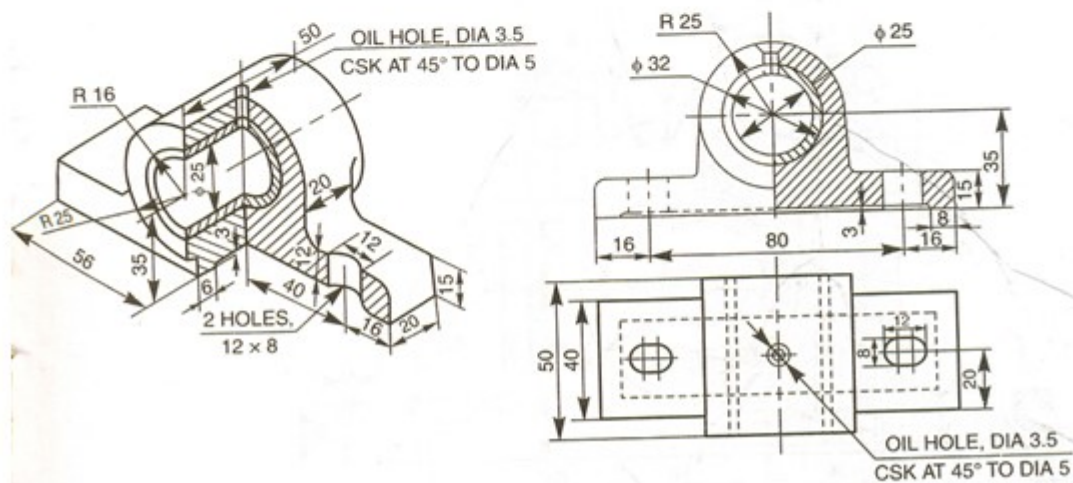


Fig.13.1.2 Bushed bearing

Pedestal bearing (plummer block)

- A pedestal bearing consists of cast-iron pedestal or block, gun-metal brasses made in two halves, a cast-iron cap and two mild-steel bolts [fig. 13.1.3].
- It is made in two halves for placing and removal of the shaft in and from the bearings ,for adjustment of wear in the brasses and for renewal of brasses.
- The cap while resting on the upper step fits inside the block at its sides but does not sit on it.
- The rotary motion motion of the bush is checked by snug provided at the bottom of the lower brass.
- Two square-headed bolts are used to fasten the cap and the block together. The square heads fit in square recesses at the bottom of the pedestal and prevent rotation of the bolts.

Pivot Bearing: The pressure is parallel to the axis of the shaft and the end of the shaft rests on the bearing surface

Foot-step bearing

- Lower end of the vertical shaft is supported by foot step bearing i.e. the shaft is terminated at the bearing [fig. 13.1.4].
- A cast-iron block (with a sole), into which a gun-metal bush having a collar at the top is fitted. The bottom end of the shaft rests on a concave steel disc.
- A pin is inserted through the body and away from the centre to prevent the disc from rotating. The snug is provided at its neck just below the collar to prevent the bush from rotating.
- The collar of the bush is made hollow to serve as an oil cup for lubrication.

Collar bearing : The pressure is parallel to the axis of the shaft which is passed and extended through the bearing

In a collar bearing, the shaft continues through and beyond the bearing.

The shaft may be vertical or horizontal with single collar or multi collars. The collars are either integral parts of the shaft or rigidly fastened to it.

Such a bearing is used when it is not practicable to use the foot step bearing.

The collar rotates against the stationary split bearing surfaces.

