White Paper

Mounting of Bearing
Mounting of Bearings

The mounting of the bearing should be done very carefully, as the improper mounting may affect the performance of bearing and bearing could not achieve its desirable life before failure. Mounting tools should be used for proper mounting of the bearings. The standard bearing handling procedure should be designed by the design engineer and it should be strictly followed for the following conditions,

(1) Cleaning the bearings and bearing related parts.
(2) Checking the bearing as per the required dimensions and finish of bearing components.
(3) Mounting of bearing.
(4) Inspection of bearing after mounting.
(5) Supply of suitable lubricants.

Bearings should be packed in the environment free from dust and other contamination which may damage the bearing. The grease should be filled in the bearing after the proper cleaning of the bearing. When the bearing is used in the high speed applications, then for better performance of the bearing without early failure bearing must be first cleaned with the filtered oil for removal of the anti corrosion oil applied to it while packing.

Factory pre-lubricated bearings must be used without cleaning. Bearing types and the bearing fit decides the method of the mounting of the bearings. The inner rings of the bearing require a tight fit, as mounting of bearing is done on the rotating shafts. The cylindrical bore bearings are mostly press fitted or shrink fitted. In shrink fitting the diameter of the bearing is expanded by heating and then it is fitted on the shaft. In case of tapered bore bearing it is mounted on the tapered shaft or else the taper sleeve is used for mounting it on the cylindrical shaft. When bearings is to be mounted in the housing it is fitted with loose fit, but when there is the interference fit in the outer ring then bearing is fitted with press fit. In the case of the interference fit, bearing is cooled for shrinkage with dry ice and then the proper anti runt treatment is given to the bearing for preventing it from the corrosion.
• **Methods of mounting of Bearings with Cylindrical Bores**

(1) Mounting with press fits

Small size bearings are usually press fitted. For press fit mounting tool is rested on the inner ring as shown in Fig.8.1. Then bearing is pressed slowly on the shaft with a press till the side of the inner ring is rested on the shoulder of the shaft. Care should be taken while placing the mounting tool, mounting tool should be placed on the inner ring. Placing the mounting tool on the outer ring may damage the bearing during mounting. Oil should be applied on the shaft for before mounting for the smooth placement of the bearing. Mounting the bearing with the hammer should be avoided. It can be occasionally done for the small size bearing when press fit in not possible and there is nominal interference. Hammer fitting should be avoided when there is tight interference fits and size of the bearing is medium or large.

In case of deep groove ball bearings where both inner ring and outer ring are not separable, then the mounting tool is to be placed in between the inner ring and outer ring of the bearing and then press fitted using a screw or hydraulic press.

When the inner ring and outer ring of the bearing are separable such as cylindrical roller bearings and tapered roller bearings, then the inner ring of bearing and outer ring of the bearing is mounted separately. The assembly of the inner ring of the bearing and the outer ring of the bearing should be aligned properly to avoid the mounting errors which may lead to bearing failures. Improper or forceful assembly may cause damage to rolling element and the raceways of both inner ring and outer rings.
(2) Mounting with Shrink Fits

Large amount of force is required for press fitting of the large size bearing. To overcome this problem the shrink fitting is used. For shrink fitting the bearings are first heated in oil to expand the components before mounting, so that the less amount of force will be required for mounting of the bearing. The fig 8.3 shows the temperature and thermal expansion of the inner ring. Proper precautions should be taken while shrink fitting of the bearings as follows,

A. The bearings should not be heated above 120°C.
B. While heating the bearing in oil, bearing should not touch the bottom of the tank. It should be placed over the wire net or hang or suspended with the wire.
C. The bearings should be heated to temperature 20 to 30°C than normal temperature for mounting without the interference.
D. The bearing should be pressed properly with the mounting tool and there should not be any gap between the shaft should and the bearing after mounting.
• Mounting of Bearings with Tapered Bores

The tapered bores are mounted with the adapter sleeves or with drawl sleeves on cylindrical or else mounted on tapered shafts directly. The fig 8.4 and fig 8.5 shows mounting of tapered bore bearing with adapter sleeve and withdrawal sleeves. Mounting with the hydraulic pressure is used for the large size spherical roller bearings. In hydraulic mounting holes are drilled in the sleeve and oil is filled under pressure to the bearing seat. An adjusting bolt is used to fit the bearing

While mounting the spherical roller bearing, clearances should be marinated even after the mounting. Fig8.8 shows the clearance measurement method for the spherical roller bearings.

The clearance between both rows of rollers should be measured at once, and the difference between both the values of the clearance should be maintained to minimum.

Fig. 8.3 Mounting with Adapter

Fig.8.4 Mounting with Withdrawal Sleeve

Fig. 8.5 Mounting with Hydraulic Nut
Fig. 8.6 Mounting with Special Sleeve and Hydraulic Pressure

Fig. 8.7 Clearance Measurement of Spherical Roller Bearing