

Mechanical Equipment - Course 430.1

BEARINGS - UNIT 1

OBJECTIVES

From memory, the student will be able to:

1. Name the four roles of bearings.
 2. Delineate the major types of bearings in a branch tree format as outlined in the text.
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ROLES OF BEARINGS

By definition, bearings are parts of a machine in or on which another part revolves or slides. To rephrase the above, a bearing is simply a supporting part. This is the primary function of a bearing - to support. As we will see in later lessons, bearings are also typed according to the way they support the moving part.

So far, we have discussed the most obvious function of a bearing but this is not the only function. Without bearings, in particular, without well lubricated bearings in a machine, a significant amount of contact would take place. Understandably the machine would not be very efficient. A well lubricated bearing would reduce the amount of contact thereby reducing the amount of friction. As a result, the amount of wear would also be decreased.

Lastly, the design of a bearing generally incorporates a replaceable wear surface which is more economical to replace than a shaft. A shaft that is damaged would need to undergo remachining and heat treatments in order to regain its' original condition. This is a rather lengthy and costly exercise compared to replacing parts of a bearing.

EXERCISE

List the four roles of bearings below.

1.

2.

3.

4.

Solution is on next page.

SOLUTION

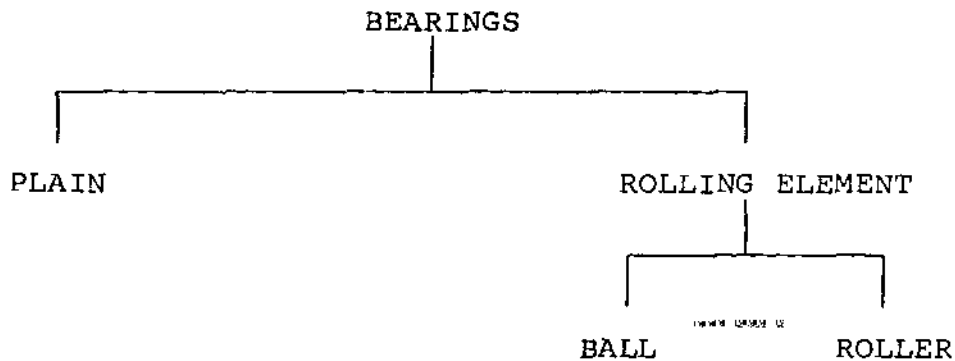
The four roles of bearings are to:

1. support moving parts,
2. reduce friction in the machine,
3. reduce wear in the machine,
4. provide a replaceable surface which is more economical to replace than a shaft.

TYPES OF BEARINGS

Bearings either belong to the plain or rolling element types. More will be said about each bearing type later. For now, plain bearings are bearings in which the primary motion is sliding. Rolling element bearings, on the other hand, are bearings which have relative motion between two loaded parts accommodated by rotation of balls or rollers.

The bearing tree, so far, looks like this:

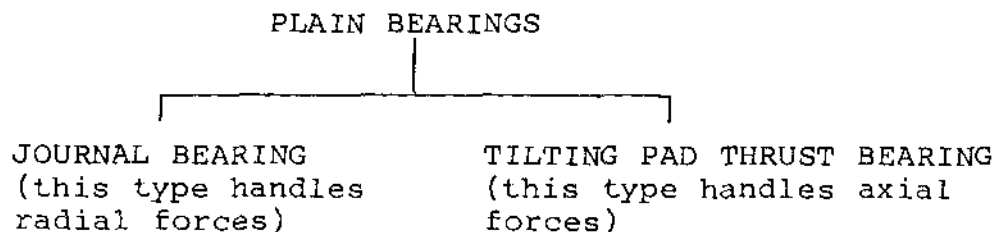


From the discussion on roles of bearings we mentioned that the primary role of a bearing is to support moving parts. Support means the bearing must be able to handle the different forces which act in the shaft.

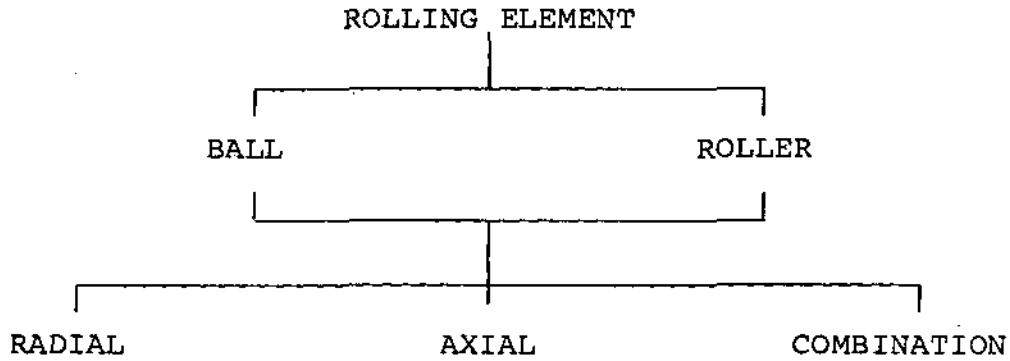
If we analyse the types of forces which can be transmitted in a shaft, there are two main types:

1. radial forces - forces which act at 90° to the shaft.
2. axial forces - forces which act parallel to the shaft.

To cope with each force, the plain bearing type must use a different design. We can therefore breakdown the plain bearing group into the following:



Rolling element bearings can also be typed according to the type of force handled. Unlike the plain bearing design, some rolling element types can handle a combination of radial and axial loads. Simply, the tree formation of rolling element bearings look like this:



EXERCISE

From memory, draw a branch tree of the major types of bearings.

For the solution, turn to the next page.

SOLUTION

