



## Issue 24: Bud's Take on Bearings 101: "It's All Ball Bearings"

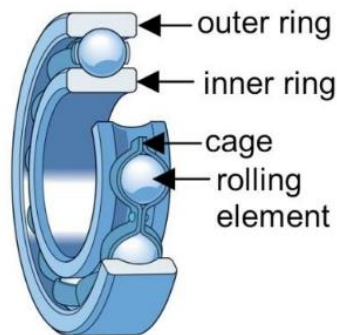
While reviewing my previous articles I realized I jumped right into advanced topics without addressing the basics. In this article I will address some of the most common ball bearings.

To start we need to define a bearing. A bearing is a highly engineered machine component that allows parts to turn or slide. They are found in almost every type of machinery. The two general categories of bearings are sliding surface bearings (plain or journal) and rolling contact bearings. The three major functions of bearings are to carry load, reduce friction and position moving machine parts.

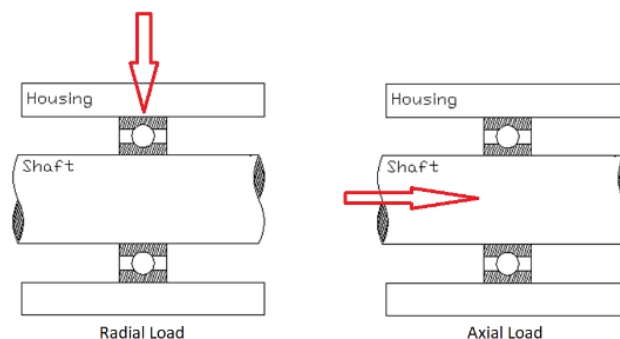
### Components and Loading

This article will focus on the various types of rolling contact bearings that use balls as their rolling elements. To best describe these bearings we need to look at standard bearing components and loading scenarios.

Ball bearings consist of 4 major parts. The inner ring, outer ring, retainer (sometimes call the cage or separator), and the rolling elements. Although the inner and outer rings are commonly referred to as the race or the raceway, the actual race or raceway is the surface where the rolling elements contact the inner and outer rings.



Load is the force or the weight that is placed on a bearing. The type of load placed on a bearing is determined by the direction in which force is applied. This force can be either axial or radial. Most bearings are mounted on a rotating shaft; a shaft rotates around a center line or axis. A radial load will be applied perpendicular to the axis of the shaft. An axial load is applied along the axis of the shaft; these are commonly referred to as thrust loads.



## A review of a few types of ball bearings.

**Deep groove ball bearing (DGBB):** The raceway curvatures are deep in both the inner and outer rings. These bearings are designed for moderately heavy radial load with the ability to carry light axial load. These are often referred to as Conrad type bearings.



**Angular contact ball bearing (ACBB):** One common design of ACBB bearings is they have a higher shoulder on each the inner and outer ring, positioned opposite of each other. This design allows the bearing to handle both radial and axial load. The contact angle can be increased to allow for higher axial loading capabilities. ACBB's are often used in sets to allow for axial load in multiple direction or to increase axial capacity.



**Self-aligning ball bearing:** Also referred to as a spherical race ball bearing because the outer ring raceway is spherical in design. This bearing is designed to carry mainly radial load but similar to the DGBB it can carry light axial load. The outer ring design allows this bearing to handle a small amount of mis-alignment.



**Thrust Ball Bearing:** In this style bearing the rings are often called washers. The two rings are parallel to each other and the rolling elements and retainer are set between the two rings. This style of bearing is designed to carry primarily axial load although they can also support a very small radial load.



## Summary

In this article I discussed 4 types of ball bearings. My objective was not to overwhelm the bearing beginner. As I plunge further into this topic of bearing basics, I will interject many of the topics I have discussed in previous Bud's Take articles.

If you are a bearing beginner I would recommend going to [midpointbearing.com](http://midpointbearing.com) and review my articles on Precision and Clearance, Basic Dynamic Load Rating and Basic Bearing Life Rating.

If you have any questions, comments, ideas for future topics please feel free to contact me directly at [bud@midpointbearing.com](mailto:bud@midpointbearing.com)

