

# Why do bearing fail

[Bearings](#) are a crucial element of any machine, from simple tools to complex machines such as aircraft and ships. They help to reduce friction between moving parts, thus increasing the efficiency of any machine. However, bearing failure can be extremely costly and time consuming, and the failure of a bearing is not something that you want to happen. Bearings can fail for many reasons, but most often the reason is due to poor lubrication or inadequate maintenance. Let's take a look at some of the common causes of bearing failure and how to avoid them:

## Improper lubrication

When bearings fail, the first thing you should do is check the lubrication. Improper lubrication can be the cause of a bearing failure.

Lubrication is a critical component of any bearing system. Lubricants can be classified as synthetic or natural. Synthetic lubricants are usually made from petroleum products and may include additives to enhance the performance characteristics of the base oil. Natural lubricants include animal and vegetable oils, synthetic esters and silicones, which are derived from plant or animal sources. These lubricants must be compatible with the materials used in the bearing components, shafts and housing bore diameters, speeds and temperatures.

Lubrication failures can occur in both plain bearings and rolling element bearings when they are not properly lubricated. In plain bearings, inadequate lubrication causes premature wear of the rolling elements, which can result in excessive noise (mechanical chattering), vibration and premature failure of the bearing itself. In rolling element bearings that use oil for lubrication, inadequate oil supply or improper viscosity will cause premature wear of the rolling elements due to insufficient lubrication.

## Corrosion

When it comes to bearings, corrosion is the main cause of failure. The most common type of bearing corrosion is caused by water, which can be introduced into the bearings during operation and/or maintenance.

Corrosion is typically the most common cause of bearing failure because water and other contaminants can enter the bearing under many different circumstances:

**During operation:** Water may be introduced into the bearing when it is in operation. This can happen if there are leaks in the seal or if there is some kind of contamination on the shaft or housing such as oil or grease.

**During maintenance:** Water may get into a bearing during routine maintenance, especially if it is not properly cleaned before installation. For example, if you are servicing a pump and do not

clean out all of the old oil before installing new bearings, they will not operate correctly because they will be full of old oil that has been contaminated with water and dirt.

## **Pollution**

The main reason for bearing failure is pollution. Pollution can cause excessive heat, corrosion and wear in bearings.

The most common forms of bearing contamination are:

Dust and dirt - dust particles in the air can get into bearings during operation, causing a build-up of material on the rollers which increases rolling resistance and reduces efficiency. This problem is often found in agriculture and mining where dust has to be tolerated in order to operate machinery efficiently.

Oil contamination - oil from hydraulic systems or lubrication systems can leak into bearings, causing them to fail prematurely. Oil speeds up the process of corrosion as it contains acids that eat away at metal surfaces. The presence of oil also causes increased friction between components which increases wear on seals and moving parts.

Water - water is a common source of contamination in industrial environments where there are no adequate drainage systems or regular maintenance checks have not been carried out by operators. Water corrodes bearing materials and reduces the life span of any parts it comes into contact with.

## **Installation error**

The most common cause of bearing failure is improper installation. The shaft should always be clean and free from burrs and nicks before installing the bearings. If there are any burrs on the shaft, they should be removed with a file or grinder before installing the bearings. Nicks in the shaft can cause excessive wear on one side of the bearing and result in premature failure of the bearing or other components such as seals, which may lead to leakage or contamination.

An improperly sized bearing may also cause premature failure, because it will not fit properly over the shaft. Bearings should always be matched to their proper size when installed on shafts so that they do not become loose or fall off during operation. Using undersized bearings can also result in excessive friction that can lead to overheating and eventual failure of both parts involved in this process.

## **Improper bearing size, resulting in excessive load**

Incorrectly sized bearings can cause premature failure because they are under-sized for the application. An under-sized bearing will carry more load than it was designed for and will wear out quickly. The larger the difference between the bearing's diameter and the shaft diameter,

the more likely it is that a bearing will fail prematurely from carrying excess loads. Bearings should fit snugly against the shaft so there is no play or clearance between the two surfaces. If there is any gap between the shaft and bearing, this will allow dirt and grime to enter into the assembly, which can lead to corrosion if left unchecked.

## **Excessive operating temperature**

The most common cause of bearing failure is excessive operating temperature. Bearings must operate within their designed temperature range to prevent damage and premature failure. If operating temperatures exceed the recommended limits, heat will be generated in the bearing race and rolling elements. This excess heat accelerates wear and causes permanent deformation, which increases the clearance between the rolling elements and raceways.

Bearings fail because they are abused, not lubricated and maintained properly, and not inspected on a regular basis. The more bearings you have in your machine the more easily it will wear them out. Bearings in service that are well-lubricated, adequately inspected and properly maintained will last the life of the machine.