



BEARING FAILURES CONTAMINATION & FATIGUE



18%

CONTAMINATION AND SEALS

The ingress of dirt into the lubricant is responsible for 18 % of all bearing failures.

For maintenance teams, the sealing deserves the same attention as the bearing arrangement itself

Seal materials and other considerations.

Seals are produced in many designs and in different materials. Each of these designs and material combinations has specific properties which make it more, or less, suitable for a particular application.

SELECTING THE RIGHT SEAL

- Type of lubrication.
- Sliding velocity at the sealing surface (interface).
- Whether the seal is to be mounted vertically or horizontally.
- Misalignment or deviation from roundness of the shaft.

SEAL ENVIRONMENT

- Chemical or mechanical factors and/or
- Thermal conditions

GREASE RETENTION

Greases have a high “thickness” and are relatively easy to retain in a bearing arrangement. This means that the demands on the seal are moderate.

Radial shaft seals (Fig. 1), V-ring seals (Fig. 2) or felt seals (Fig. 3) are suitable for grease retention.

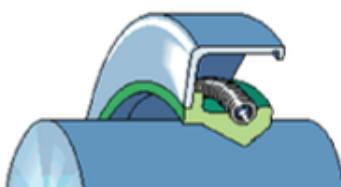


Fig. 1: Radial shaft seal



Fig.2: V-ring



Fig.3: Felt seal



Fig. 4: Speedi-Sleeve (SKF)

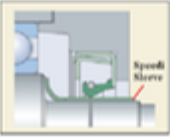


Fig. 5: Speedi-Sleeve In Place

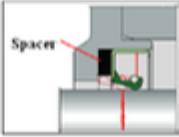


Fig. 6: Spacer to move seal track

- Rework the interface (this entails removing the shaft)
- Use a Speedi-Sleeve (Fig. 4 and 5).
- Mount a spacer ring in the housing bore between the housing shoulder and the seal (Fig. 6).
- Press in the new seal to a different depth into housing.

GREASE RETENTION AND EXTREMELY POLLUTED ENVIRONMENTS

For grease retention and to prevent the ingress of dirt in extremely polluted environments, better sealing arrangements should be considered. Many types of seals are available and again it is advisable to contact a reputable supplier.



G-Seal (SKF)



Labyrinth Seal (SKF)



Taconite Seal (SKF)



LEARNING POINTS

Seals are supposed to:

- Keep Lubricant In
- Keep dirt out of bearings

FATIGUE

As a roller rolls over the raceway it indents the surface, causing a sort of wave in front of the roller. (See Image 1 below.)

After many cycles of waves forming and falling flat again after the roller has passed, the raceway will break up. Like a wire that are bent backwards and forwards continuously will eventually break off. (See Image 2 below.)



Image 1: Fatigue in a bearing.



Image 2: Piece of wire bend backwards and forwards

Fatigue, or spalling, of rolling elements and raceways is the normal mode of bearing failure, but can be accelerated by a number of faults. It can also be slowed down by using better lubricants.



LEARNING POINT

Fatigue is the normal mode of failure in bearings. Nothing much we can do to prevent this, but better lubricants can slow down f