

## Comparisons between Various Failures and Remedies Identification of Pre-Mature Failure

In general, if rolling bearings are used correctly they will survive to their predicted fatigue life. However, they often fail prematurely due to avoidable mistakes. Failure of the rolling bearing can occur for a variety of reasons. Accurate determination of the cause of a bearing failure is must to make suitable recommendations for eliminating the cause.

The major factors that singly or in combination may lead to premature failure during service include incorrect mounting, excessive loading, inadequate & insufficient lubrication, impact loading, vibrations, contamination, entry of harmful liquids.

It is difficult to determine the root cause of some of the premature failures. If all the conditions at the time of failure, and prior to the time of failure are known, including the application, operating conditions and environment, then by studying the nature of failure and its probable causes, the possibility of similar future failures can be reduced.

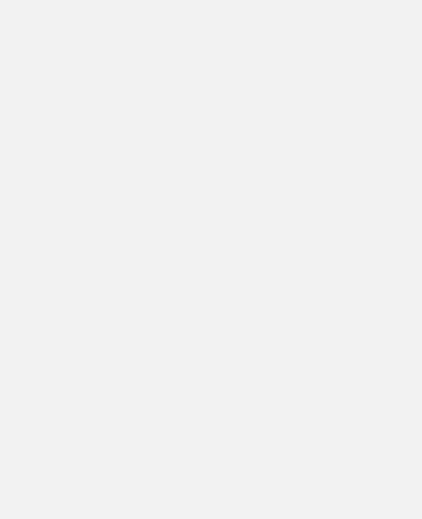
Two or more failure pattern can occur simultaneously and can thus be in competition with one another to reduce the bearing life. Also, a pattern of failure that is active for one period in the life of a bearing can lead to or can even be followed by another failure mechanism, which then cause premature failure.

Thus, in some instances, a single failure pattern will be visible and in other indications of several failure pattern will be evident, making exact determination of root cause difficult. So, when more than one bearing failure pattern has been occurred, proper analysis depends on careful examination of failed components. In contrast to fatigue life, this premature failure could be caused by:

1. INCORRECT FIT
2. IMPROPER MOUNTING
3. IMPROPER HANDLING
4. POOR LUBRICATION
5. CONTAMINATION

6. EXCESSIVE HEATING

7. EXCESSIVE LOAD

Condition as Observed	Look Like	Probable Cause	Corrective Activity
<p>Rust Surface becomes partially or fully rusted Sometimes rusted at spacing equal to distances between rolling element</p>		<p>Improper storage Improper packaging Insufficient rust preventative Invasion of moisture, acid etc. Handling with bare hands</p>	<p>Take measure to prevent rusting while in Storage Improve sealing Performance Improve method of assembly and handling</p>
<p>Fretting Fretting Surfaces wear producing Red coloured Particles that form hollows.</p>		<p>Insufficient interference Insufficient lubrication Fluctuating load Vibration during transport or when not operating Conditions</p>	<p>Improve fit Check surface roughness of Journal and housing Check consistency of grease. Do not use worn out or Damaged housings</p>
<p>Flaking Flakes form on the surfaces of the raceway and roller elements. When the flakes falloff the surface  Becomes rough and un even.</p>		<p>Excessive loads, fatigue life, improper handling Improper mounting Insufficient precision of journal or housing Insufficient clearance Contamination Rusting Passing of electric current through bearing Softening due to abnormal</p>	<p>Find the cause of heavy load Check internal clearance regularly Improve precision of journal and housing Improve operating conditions Improve method of assembly and handling Check grease and greasing method</p>

		<p>temperature rise</p>	
<p>Seizure Bearing heats up, becomes discolored and eventually seizes up.</p>		<p>Insufficient clearance (including clearances made smaller by local deformation)          Insufficient Grease          Bad quality of grease          Excessive load Roller Skewing Softening due to abnormal temperature rise</p>	<p>Check grease type and quantity Check internal clearance regularly Improve method of assembly and handling</p>
<p>Cracking Split and cracks in bearing rings and rollers</p>		<p>Rapid heating during mounting Excessive shock load Improper handling, use of steel hammer and impact of large foreign particles Surface deformation due to improper lubrication Excessive interference Large flaking Overheating by creeping</p>	<p>Avoid rapid heating of bearing during mounting Reconsider operating condition Improve method of assembly and handling Prevention of creep Do not use excessively worn-out or deformed housing</p>

<p>Cage damage Breaking or wear of cage.</p>		<p>Excessive moment load High-speed rotation or excessive fluctuation of speed Trapping of foreign objects Excessive vibration Improper mounting (misalignment)</p>	<p>Investigate rigidity of system Reconsider operating conditions Improve method of assembly and handling</p>
<p>Rolling Path Skewing Roller contact path in raceway surface strays or skews</p>		<p>Deformation or tilt of bearing due to insufficient precision of journal or housing Improper mounting Insufficient rigidity of journal and housing</p>	<p>Re-check internal clearance Re-check precision of journal and housing Investigate rigidity of system</p>
<p>Smearing and scuffing  Surface becomes rough with small deposits.  "Scuffing" generally refers to roughness of the bearing ring ribs and roller end faces.</p>		<p>Improper lubrication  Invasion of foreign matter Roller skew due to excessive misalignment  Excessive surface roughness Excessive sliding of rolling elements</p>	<p>Check the quality / quantity of grease Improve sealing performance Check operating conditions Improve method of assembly and handling</p>
<p>Indentations  Hollows in raceway surface produced by solid foreign objects trapped or impacts (False) brinelling)</p>		<p>Ingress of solid foreign objects  Trapping of flaked particles Impacts due to careless handling</p>	<p>Improve sealing performance  Improvement in handling and mounting practices Check involved bearing for flaking if dents produced by metal practices Always</p>

			use clean grease
<p>Electrolytic corrosion</p> <p>Pits form on raceway and develop into ripples. Further development leads to corrugated surface</p>		Electric current flowing through raceway	Create a bypass for current Insulate the bearing
<p>Discoloration Change of raceways / roller colour</p>		<p>Temper color by overheating</p> <p>Deposition of deteriorated grease on surface Improper lubrication</p>	Use good quality of grease Replacement of grease after recommended interval
<p>Peeling</p> <p>Peeling is a cluster of very small spalls. Peeling can also include very small cracks which develop into spalls.</p>		Ingress of foreign matter Improper lubrication	Control of surface roughness and dust Improve sealing performance Use only clean grease