LOAD BEARING ROLLER ASSEMBLIES

PCI®

Solutions Through Innovation

∞ INFINITY ROLLER™ TECHNOLOGY

989.358.6148
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Why Bearings Fail

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Bearing Fatigue

Bearing Fatigue is the formation and propagation of cracks (weakening of a material) due to a repetitive or cyclic load of an intensity considerably below the normal strength. Fatigue fractures are progressive, beginning as minute cracks that grow under the action of the fluctuating stress. Although these cracks or fractures may take some time to propagate, depending on intensity and frequency of stress cycles, they can and do occur in normal service, without excessive overloads, and under normal operating conditions. Nevertheless, fatigue fractures are serious because they are insidious; that is, they are frequently "sneaky" and can occur with very little, if any warning before failure if the crack is not noticed. Obviously, if service is abnormal as a result of excessive overloading, corrosive environments, or other conditions, the possibility of fatigue fracture is increased.

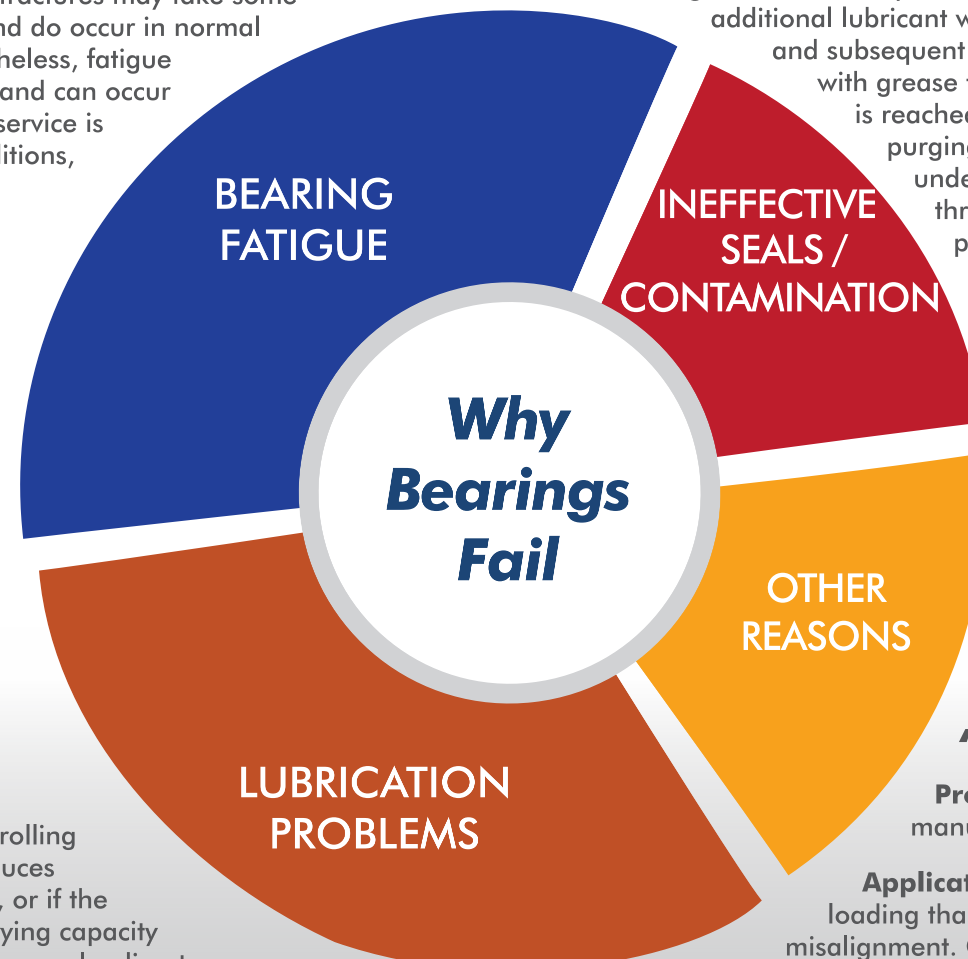
Bearing Fatigue - spalling prior to failure

Ineffective Seals / Contamination

A bearing seal has two main functions, to retain lubricant and exclude contaminants. Seals must be properly orientated or have design features that allow for relubrication of the bearing. Additional lubricant installed in a bearing will need to displace old lubricant. If a bearing is overfilled or has more grease than is necessary, the additional lubricant will be pushed out in a similar manner as purging old lubricant during relubrication and subsequent operation. Full compliment needle and cylindrical roller bearings are generally filled with grease to 75-100 percent capacity. Upon use, grease may purge until the appropriate level is reached. The appropriate level is dependent on the rotating speed. Upon relubrication, the purging will happen again as it is impractical to lubricate to exactly the right amount. Even under the best operating conditions, bearing seals can leak. Typically seal leaks are traced to three basic causes, condition and size of the shaft and housing bore, contamination, and poor installation practices.

Single lip seals designs perform only one of these tasks well. If the lip is facing inside the bearing it retains lubricant better than excluding contaminates. The same seal installed with the lip facing outside the bearing excludes contaminates better than retaining lubricants.

Multiple lip seals increase effectiveness of retaining lubricant or excluding contaminates by several methods; some have opposing lips, some have designs where additional grease reservoirs impede the ingress of contaminates and provide a reservoir of grease to lubricate seal lips. Multiple lips tend to have higher levels of drag and therefore higher temperatures. Multiple lips seals tend to be used in slower rotating or primarily static applications.

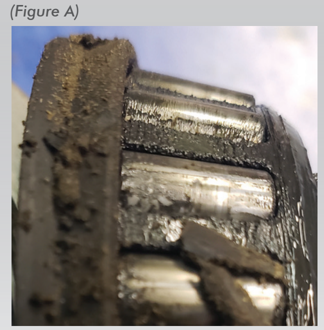


Lubricant – [wrong lubricant, wrong quantity, wrong interval]

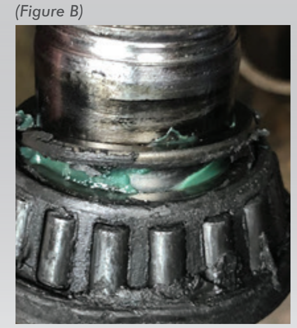
Rolling element bearings depend on the continuous presence of a very thin film of lubricant between rolling elements and raceways, and between the cage, rings and rolling elements to reduce friction between surfaces in mutual contact, which ultimately reduces the heat generated when the surfaces move. If a bearing has insufficient lubrication, or if the lubricant has lost its lubricating properties, the required film with sufficient load-carrying capacity cannot form. The result is metal-to-metal contact between rolling elements and raceways, leading to adhesive wear and/or results in overheating and subsequent catastrophic failure. There are numerous causes for lubricant failure, including;

- **Contamination with foreign matter** *(Figure A)*
- **Incompatible (mixing) lubricants** *(Figure B)*
- Insufficient lubricant quantity or viscosity
- Over-lubricating
- Excessive temperatures
- Incorrect grease base for a particular application
- Deterioration due to prolonged service without replenishment
- Use of grease when conditions dictate the use of static or circulating oil

(Figure A)



(Figure B)

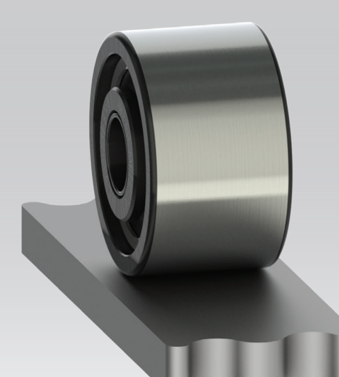


"Other" Reasons - Production and Application

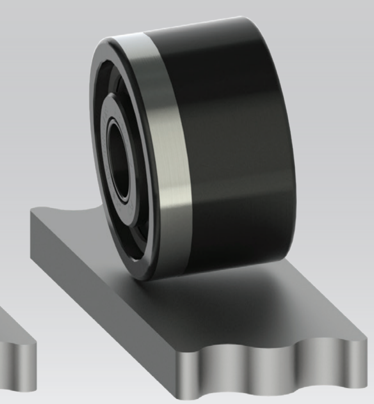
Production: Poor Quality components, improper storage, handling and care during manufacture or production of the roller assembly.

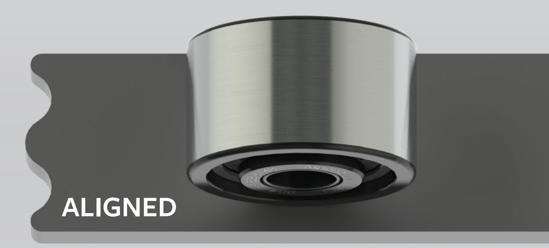
Application: improper mounting, wrong or inadequate selection/fit, and heavier/different loading than anticipated. One of the most common is combination load produced from application misalignment. Combination load is comprised of both radial and thrust loads and is a large contributor to premature failure.

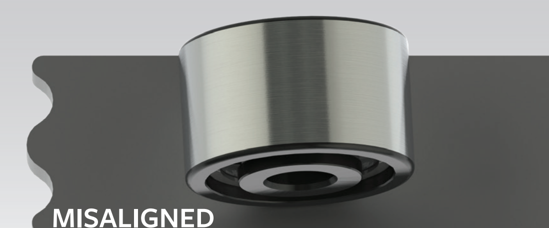
ALIGNED



MISALIGNED







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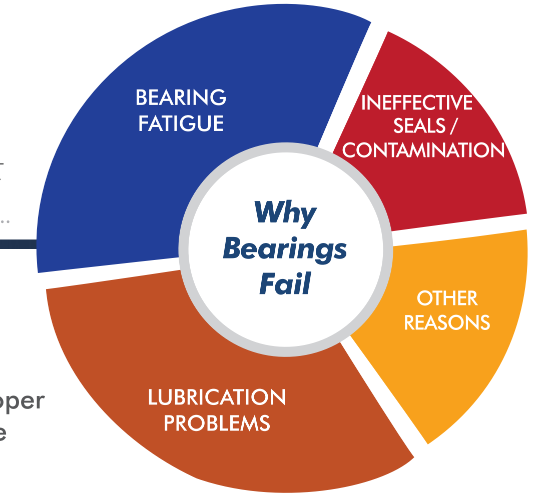
Minimizes Bearing Failure and Maximizes Life

Longest life in the Industry that Last and Last and Last and Last and Last and Last...



Bearing Fatigue Minimized

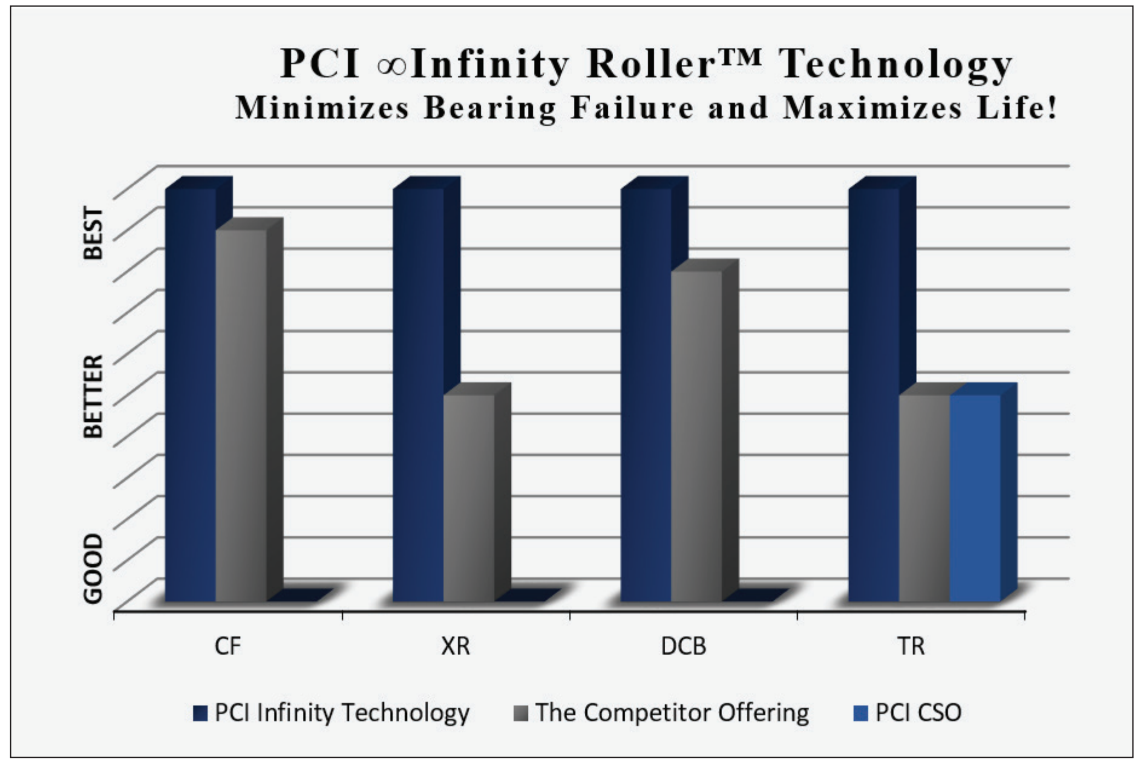
PCI Infinity Roller™ Technology offerings feature bearings with optimized bearing component geometry for enhanced load capabilities and extended service life. PCI's unparalleled combination of the right quantity and quality of superior rolling elements result in increased run time, productivity, longer bearing service life, and lower heat. PCI Infinity Roller™ Technology designs provide improved lubricant life, lower maintenance and operating cost. PCI Load Bearing Rollers are available with multiple bearing types within the same dimensional package – with many designs exceeding load capacities of other brands. Each specific bearing type has its own unique set of features and benefits.
PCI Infinity Roller™ Technology offerings outlast all competitive products on the market!


Needle Bearing


Double Cylindrical Roller Bearing


Ball Bearing


Tapered Roller Bearing



Effective Seals for Contamination Prevention

PCI Infinity Roller™ Technology not only ensures mating components and proper installation practices are followed, but our seal designs and selection provide superior contaminant exclusion.
PCI Infinity Roller™ Technology seals are unmatched in the industry!

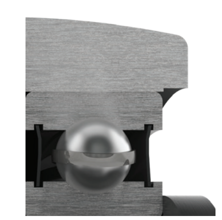
Needle Bearing

Dual function vented, moly-filled nylon lip seal provides low level incidental thrust capacity, a lubricant reservoir and multifaceted contact points while excluding contaminates with minimal seal drag.

Double Cylindrical Roller Bearing

Rubber lip seals with expanded grease barrier rotates with the roller body and functions like a slinger to move contaminates away. These seals have slightly higher seal drag but are more effective at excluding contaminates.

Ball Bearing



SKF® RSH series premier seals are in contact axially with the inner ring and incorporate a secondary lip seal, radial slots and proper lubrication. SKF® RSH seals have slightly higher seal drag but are more effective at excluding contaminates.

Tapered Roller Bearing

Timken® DuoFace™ seals are unrivaled in the industry with double lip contact on housing bore and the ground surface of the outer ring- with no need to machine special seal surfaces. DuoFace™ seals have slightly higher seal drag but are more effective at excluding contaminates.

Lubricant – right lubricant, right quantity, right interval

PCI Infinity Roller™ Technology features premium synthetic lubricant which exhibits better mechanical stability to help prevent slumping or leakage at high temperatures. Synthetic lubricants excel at the other end of the spectrum with reduced torque at low temperatures. This provides proper lubrication at critical start up in cold temperatures.
PCI Infinity Roller™ Technology offerings feature high performance grease to minimize downtime!

"Other" Improvements

Production Standards Perfected

PCI Infinity Roller™ production and management systems utilize principles of lean manufacturing, continuous improvement and employee engagement. Our production areas are routinely audited by Quality Control professionals, including Timken® and SKF® application engineers who have certified our assembly and storage areas, tooling, and processes to ensure proper handling as well as overall customer satisfaction. Our manufacturing teams pride themselves in producing quality products day in and day out.

TIMKEN BEARING CERTIFIED

Application Assistance Mastered:

To assist customers with their specific application, our staff engages in the specific details, evaluates and provides analysis of failure modes, wear patterns as well as costs associated with routine maintenance, replacement cycles and performance. Our industry knowledge, coupled with our desire to help craft the most viable options, drive PCI to be your trusted advisor in proper bearing selection and mounting assistance for your application. PCI Load Bearing Rollers offer multiple bearing types within the same dimensional package. Each bearing type has its own set of features and benefits.
PCI continues to provide Solutions Through Innovation!

PCI®
Solutions Through Innovation

LOAD BEARING ROLLER ASSEMBLIES
SPECIALS & CUSTOMS

Solutions Through Innovation for More than 35 Years!

Can't Find What You Need?

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(989) 358-6148

For additional information and to explore all the choices for your solution, contact PCI - ProCal Innovations, LLC. or visit us on the web at www.pcimfg.com.

PCI is your trusted advisor - providing you with:

PRODUCT KNOWLEDGE

PCI has a thorough understanding of what it takes to manufacture a successful product. PCI provides you with pre-engineered products, modified units or products engineered specifically for your needs.

PCI provides you the maximum number of viable choices, so you can make the best decision for your economic and delivery requirements.

APPLICATION ASSISTANCE

Our experience and market research enables PCI to offer unique market solutions that fulfill industry requirements including:

- food processing
- marine
- mining
- petrochemical
- lumber, sawmill, wood
- steel and metal treatment

QUICKEST DELIVERY

Along with an innovative design, a solution needs desirable delivery. PCI secures your application solution when you need it.

Pre-Engineered - IN STOCK
Industry Solutions - IN STOCK
Plus, Industry Leading Delivery for Custom units including EXPEDITES