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A Publication of the Lubrication Engineers Technical Department

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BEARING FAILURES

RECOGNIZE THE CAUSES AND WHAT TO DO ABOUT THEM

The Egyptians built pyramids of huge stone blocks. They moved them by rolling them on top of logs. Today's heavy-duty trucks aren't near the size of pyramids, but the rolling principle of the modern bearing is basically the same as those logs. Bearings have proven their worth by reducing rolling friction which permits parts to move without being destroyed.

However, bearings do fail. Such failures can be costly in terms of repair costs and downtime. The more we learn about bearings and why they fail, the better we can protect equipment from unnecessary repair and downtime expense. Leading bearing manufacturers say there are several reasons for bearing failure, and many causes for those failures, such as:

Fatigue - which is evident in spalling, flaking or breakdown of the races and/or rollers. The cause can be: excessive weight or pressure from the abnormal meshing of gears or machine overloads; rollers fail to fully contact raceways; Roller-raceway adjustments that are too tight; misalignment, cocking of the bearing, out-of-round or bowed shaft, or the cone seat is nicked or rough; Sudden impact such as a wheel striking deep chuckholes or exceeding known life of the bearing.

Wear -lapping, abrasion or indenting of races or rollers are common signs. The cause can be: Lapping-where a very fine debris, gradually cuts away at raceways and rollers, causing a dull gray appearance of running surfaces. Abrasion-where rollers force sharp debris around surfaces causing score lines. Tiny brinell marks where rollers run over hard particles causing indentations or scarred marks in raceway and roller surface are known as indenting.

Overheating -discoloration of raceways, thrust flange and/or rollers, which generally is straw brown, ink blue or purple in color. The cause can be: improper lubricant; insufficient lubricant; over lubrication-too much lubricant; presence of foreign or abrasive material; adjustment too tight, misalignment, or electrical current or external use of heat while removing or replacing bearing on the shafts.

Rust - reddish brown, black or dark gray pitting, etching or staining on surface. The cause can be: parts are exposed to moisture either from cleaning or from hands or perspiration or improper lubrication of damaged sealing members.

Brinelling -results from rollers indenting the raceways, but not severe enough to cause fatigue breakdown. The cause can be: striking the cone with a blunt tool at assembly or removal; cup mounted in oversized housing with too tight an adjustment or sudden heavy shock either from load or vehicle wheel striking holes.

False Brinelling -wear in cup or cone race where rollers oscillate through short arc instead of revolving. Marks generally coincide with spacing or rollers. The cause for this is vibration of the unit while shaft and bearing are not in operation.

Fracture -a partial or through crack in cup or cone race. The cause can be: excessive press fit of cone on shaft; striking cup or cone with a drift pin and/or hammer during assembly; cocking of cone with excessive assembly pressure or oversized housing, along with heavy loads, causes shattering of cup in loaded zone.

Roller Retainer Breakage -fractures in retainer ribs, deformed or mutilated retainer. The cause can be: loose adjustments allow retainer to drop over rollers to the cup race in loaded zone; rollers pinch or grab retainer; inadequate lubrication or skidding and skewing of rollers and abusive assembly.

Roller Retainer Fall Free - loss of lock of roller retainer cone. The cause can be: the roller retainer face is damaged or distorted from tool impact; extreme pressure on retainer face from tube or assembly tool or puller damage when removing cone assembly.

Lubricant Failure - resulting in bearing failure. The cause can be: water or chemicals in the lubricant; solvents left after cleaning, or grease oxidation; grit-when lubricant container is left exposed to dust/abrasive materials-or dirty grease gun fittings or improper lubricants, which contain sulphur or chlorinated components.

Early or premature bearing failure can be detected by scheduled inspection during an established maintenance program. Such inspections will help reduce dirt and debris contamination and catch early wear patterns before total failure, which will save money through reduced maintenance and downtime costs.

There are also a number of reasons why internal combustion engine bearings may fail prematurely. Some of the factors are dirty oil, improper filtration, lack of lubrication, the wrong weight oil and even the wrong bearing material. It has been estimated that common dirt and engine debris are responsible for 40% to 50% of all bearing failures. Improper lubrication causes another 20% to 30% of the failures and 20% to 30% due to improper assembly of bearings. Dirt and engine debris can be filtered out with the proper filtration. Changing filters according to engine manufacturers recommendations is a positive approach to preventing premature bearing failure.

Extending the use of a filter past its recommended lifetime can result in dirty, unfiltered oil circulating through your engine causing bearing wear and then failure. All oil filters are not alike. Check with the engine manufacturer for the particular filter specification or requirements, then only buy filters that meet those specifications.

Many bearing failures are caused by using an oil too heavy in viscosity. When it is cold, a heavy weight oil will not flow or pump readily. When pumped from the crankcase, it may stay in the upper end of the engine and not return quickly to the pan. When this happens engine bearings become starved for lubrication and wear prematurely or fail. This is very serious if the oil is at, or below, the add mark on the dip stick. Premature turbocharger bearing failure is directly related to this oil starvation problem.

While bearing failure is usually caused by dirt or lack of lubrication, using incorrect bearings can also result in failures. Oversized or undersized bearings is a common problem. To get the most life out of an engine overhaul, it is best to insist on high quality, well known brand bearing products that utilize the latest materials and engineering improvements.

For longer bearing life in today's smaller, more sophisticated engines, an oil with low temperature flowability is crucial. Such "flowability" is built in today's modern multi-viscosity engine oil. LE's MONOLEC ULTRA 15W-40, LE'S 8130 MONOLEC ULTRA-BLEND 10W-30 and LE's 8530 MONOLEC SPB Engine Oils have this flowability. LE's oil consumption reducers and drain extending additives improve fuel efficiency, reduce wear and provide all-season, all-weather performance.