

MOTION: IMPOSSIBLE



WITHOUT THE RIGHT LUBE

By Dennis Woodley

WATER IS EVERYWHERE IN THE MANUFACTURING—AND OPERATING—ENVIRONMENT, AND MINUSCULE AMOUNTS CAN FOUL GEARBOX ACTION. CHOOSING THE RIGHT LUBRICANT CAN MINIMIZE DOWNTIME.

In a recent survey conducted by Shell of U.S. industrial companies, 50 percent of respondents said that industrial gearboxes were one of their most critical components, while 30 percent said that they had experienced a lubricant-related gearbox failure within the last 12 months.

The following is a discussion of the main causes of gearbox failure and how they can be avoided.

Today's industrial environment is more demanding than ever, with trends toward smaller equipment and commercial pressures to raise throughput. The result is that equipment needs to be able to run at higher operating temperatures, handle increased loads, and cope with exposure to water and other contaminants. In these tough conditions operators need a gear oil that is designed to tackle the problems that can affect operational efficiency.

The type of gear oil you select can have a significant affect on your operational costs, but if you choose an oil that doesn't perform the true costs could be much greater than anticipated. Many industrial operators still view lubricants as simply a commodity but, increasingly, operators that take a more holistic approach to maximizing production, minimizing costs, and reducing unscheduled downtime are starting to see the true value of investing in their choice of lubricant. In an increasingly competitive industrial climate, operators need to use every strategy they can to maintain operational efficiency and minimize overall costs; factoring in high performance lubrication to address the issue of unscheduled downtime can help maximize productivity.

Bearing the Cost

Because gears are such sensitive pieces of equipment with hidden components, gearboxes can be prone to failure, which often goes unnoticed until serious problems have occurred. A bearing failure can cause the whole gearbox to stop working, resulting in unscheduled downtime and the potential costs of maintenance work, component replacement, and even lost production. For example, in the cement industry, failure of the main drive box in a cement kiln can result in significant repair costs as well as all the headaches caused by unscheduled downtime. The unique challenges posed by gearboxes require advanced lubrication technology to ensure the gear oils used are up to the job. Unfortunately, not all products on the market have been specially formulated to address some of the most common risks, and the use of poor-quality base oils in many gear oils may mean that operators can be exposed to potentially high cost operational issues.

A Heated Question

With the pressure to increase productivity and reduce overall operating costs, prompting operators to increase equipment loads, gearboxes are operating under increasingly hotter temperatures. As a result, it is now more important that the gear oil is specifically designed for use in industrial gearboxes, and that it has excellent thermal stability to cope with the higher operating temperatures.

The effectiveness of a gear oil depends on selecting and maintaining the correct viscosity: too thin and it will fail to protect components from metal-to-metal wear; too thick and the gearbox will require more power for operation. Operators need to use a gear oil that has been formulated to withstand the whole temperature range to which the gear may be exposed. This will not only help to maximize gear oil life, but also to avoid the potential costs associated with component wear, such as maintenance and unscheduled downtime.

Watering Down Your Profits

However, temperature is not the most-common reason for gearbox failure. Just 1 percent of water in an industrial gear oil can reduce bearing life by up to 90 percent*, which can have significant cost implications in terms of both component costs and potential unscheduled downtime. While awareness of the problems that water contamination can cause is strong, operators are often surprised to learn how quickly contamination can escalate and the level of damage that can be caused by just a small amount.

Since water is an inherent part of many production processes, avoiding the potential for contamination is simply not practical. However, it is possible to manage the contamination issue to help prevent it from becoming a serious problem.

A gear oil's lubrication effectiveness is compromised when the oil and water do not separate so that the oil—and its properties—are diluted. As part of your production process, there are undoubtedly steps you can take to help reduce the potential for water contamination. Good maintenance practice, and the careful selection of a gear oil that quickly separates from water, is by far the most effective way of reducing the risk of serious component failure and unscheduled downtime caused by water contamination.

Because Shell Lubricants works so closely with manufacturers and OEMs across a wide range of industrial sectors, we understand the need to prolong gear oil life and reduce operational downtime to enable operators to maintain production. Our R&D

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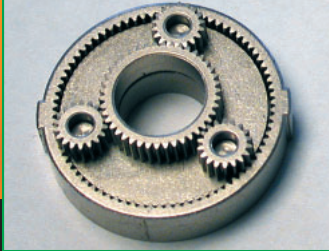
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A Range of Reasons

Shell Lubricants companies have launched a revitalized range of mineral and synthetic industrial gear oils for the U.S. market. Shell Omala, Shell Omala HD, and Shell Tivela S gear oils have been specially formulated to help prolong gear life and reduce unscheduled downtime, which can help industrial companies reduce their overall operating costs.

- **Shell Omala Gear Oils**—New Shell Omala, which has been reformulated for the U.S. market, is a mineral-based gear oil suitable for highly loaded gearboxes operating under normal temperatures. Approved by key OEMs, and with excellent gearbox protection properties, Shell Omala addresses the needs of industrial applications in normal operating environments. It has been designed to help extend component and oil life and has excellent water separation properties, critical for operations in wet environments such as steel, mining, and paper mills.
- **Shell Omala Fluids HD**—Shell Omala HD has been reformulated to offer even better performance for increasingly harsh industrial environments. It is a high performance synthetic oil based on poly-alpha-olefin (PAO) and specially selected additives. Shell Omala HD has improved thermal and oxidative stability, which minimizes sludge formation and viscosity increases, to help increase oil life and reduce maintenance costs, while its excellent anti-wear performance offers longer gearbox life in steel-on-steel applications. Designed to provide excellent low friction properties, it reduces power losses and lowers operating temperatures, contributing to energy and cost saving benefits compared to gear oils manufactured from mineral base oils.
- **Shell Tivela Fluid S**—Shell Tivela S is a high performance synthetic gear fluid based on polyalkylene-glycol (PAG) technology and specially selected additives, designed for use in enclosed, sealed-for-life or worm-helical gear units operating at higher temperatures. Used successfully overseas and approved by many leading European OEMs, Shell Tivela S is now available in the United States. Used in the field, a Tivela S customer documented lower energy costs after switching to Shell Tivela S.

The new Shell Industrial gear oil range is available in a wide variety of packaging and viscosities and is supplemented by an extensive choice of support services, including oil analysis. As a global leader in finished lubricants, Shell has over 60 years of expertise in the gear oil market. With ongoing liaison, testing, and research—in close association with world-leading gear OEMs, and in compliance with all major international quality standards, including AGMA and US Steel—the Shell Industrial gear oil range will continue to “keep gears in motion” for many years to come.

Notes:

- * Statistic sourced from a leading global supplier of roller element bearings and seals

The term “Shell Lubricants” collectively refers to the companies of the Shell Group engaged in the lubricants business. Shell lubricants companies are global leaders in lubricants and operate in approximately 120 countries worldwide.

investment means that we now have a wide range of gear oils specifically designed to meet the needs of U.S. industry.

A gear oil with improved water separation properties not only allows faster and easier water draining, but it also lessens the frequency of oil changes. As a result, the operator can benefit both operationally and financially from reduced downtime and lower oil consumption.

Cause & Effect


In the real world, protecting gears from water contamination completely is simply not possible; exposure to the elements, cleaning practices, leaking heat exchangers, process water, and condensation resulting from variable operating temperatures can all be contributory factors in building the threat of water contamination.

Often there are process improvements that can be made, but the risk factors need to be identified first, and any changes in the production process will come at an inevitable cost, from either capital outlay or implementation—or both. The important thing is to identify potential contamination points as early as possible and take steps both to rectify the risk factors and counteract the effects of the problem. In short, the most effective strategy is to combine measures to prevent water entering the system with measures that limit the water's capacity for damaging components.

Even the most vigilant maintenance team may not be aware that there is a serious water contamination problem until, for example, corrosion and fatigue failure begins to occur. Symptoms are often slow to emerge, and by the time pitting and surface wear start to appear, components may already need urgent replacement, requiring downtime and potentially a disruption in production. Vibration analysis and oil condition monitoring can help to act as an early warning system—and this should form part of an effective lubrication management program—but these are simply valuable indicators that problems may be occurring, not a preventive measure in and of themselves.

One important way to help minimize the potential for water damage within the system is to choose a lubricant designed to maintain its performance even when small amounts of water enter the system.

The Secrets of Specification

Protection from water contamination is just one of many factors that should be considered when specifying the best gear oil for an application, and it should be just one of the performance benefits a high quality lubricant offers. Choosing a gear oil formulated with a high quality base oil and designed to maintain its high performance in tough operating environments simply makes sound financial sense. A purchasing decision based purely on lower cost per gallon could lead to greater overall costs with higher annual gear oil consumption, increased maintenance time for more oil drains, and bigger-picture costs like unscheduled downtime and component wear. It's for these reasons that operators should take an overall view to cost savings and use high quality gear oils to help maximize productivity. 

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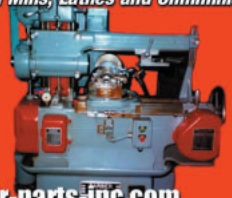
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