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LOOKING BEYOND URETHANES

HIDDEN COSTS OF
SUBPAR
LUBRICATION
IN INDUSTRIAL SETTINGS

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NOTABLE WORDS
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HIDDEN COSTS OF SUBPAR LUBRICATION IN INDUSTRIAL SETTINGS

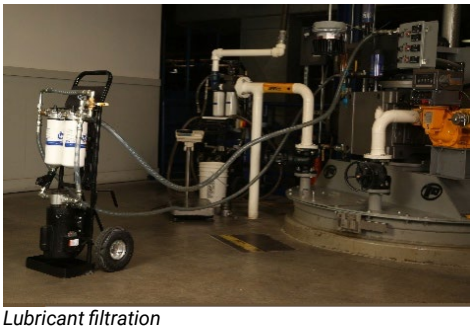
By **Clay Calk,** *Director of Market Development, Lubrication Engineers*

Industrial facilities face many lubrication-related challenges, particularly with the demanding conditions found in areas such as cement, mining, and construction. The biggest obstacles are contamination from dirt, infiltration of moisture, and incorrect lubricant choice for the application. Failure to deal with these issues increases wear on mechanical equipment, resulting in greater rates of equipment downtime and higher maintenance expenses. Read on to learn how proper lubrication practices lead to better equipment performance and substantial cost savings.

COMMON LUBRICATION-RELATED ISSUES FACED BY INDUSTRIAL FACILITIES

Approximately 75% of mechanical wear on industrial equipment is due to contamination from external silica. Internal friction and outside particles are extremely destructive to metal. Circulating solid particulates in the lubricant risk damaging the base oil, stripping away additives, and harming critical components.

The best practice is to begin by filtering the lubricant, even when new, because newly delivered lubricants in pails, drums, or totes tend to have elevated particle counts. Before and after filtration, oil samples should be sent to the lab for two reasons. First, it's important to verify that the product inside the container matches the label and product type ordered. Second, it's essential to confirm that filtration is effectively accomplishing the specific ISO cleanliness codes for the assets these new oils are going into.



Lubricant filtration

The second biggest challenge is water or moisture; ridding the oil of moisture is critical to provide the best overall performance. Moisture can lead to lubricant degradation and equipment damage, particularly in environments like surface mining and construction, where equipment is frequently exposed to water and humidity. It should be noted that any type of manufacturing facility may be affected by these destructive contaminants, but the worst cases are found in mining. This is especially true for surface mining, where outside equipment is affected by rock, dust, and debris; any time equipment is running, it is breathing in water and silica. Construction is another example, as well as power plants, especially those that use pulverized or ground coal as a source.

The third challenge is making sure plant personnel are storing the lubricants properly and putting the correct lubricant into the correct application. Lubrication Engineers has conducted surveys that examine lubricants used in assets and cross-reference them with original equipment manufacturer (OEM) instructions and manuals. The studies have found that about 12-14% of lubricants being used are either the wrong type or the wrong viscosity, which may lead to more frequent oil changes or speed up the oil's rate of oxidation. Once the lubricant film is ruptured, it cannot protect the critical component of the asset and may result in a faster mean time between failure (MTBF).

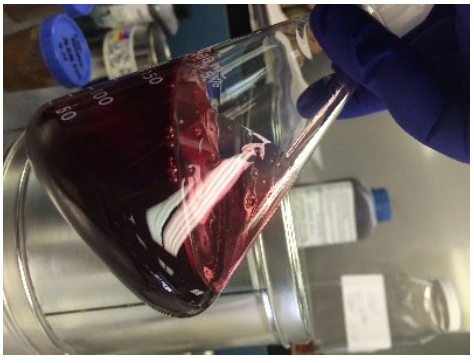
Reviewing asset and oil health is essential. It's also key to analyze fluid properties, wear metals, particle count, contaminants (fuel, soot, and moisture), and contaminant metals (silica and coolant) to ensure the asset's integrity is not jeopardized. Failing to do this will contribute to the need for more frequent oil changes or repairs.

HIGHER QUALITY LUBRICANTS EXTEND EQUIPMENT LIFESPAN AND IMPROVE RELIABILITY

To overcome obstacles, facilities should consider using higher-quality lubricants to maintain the integrity of oil, so it lasts longer. Maintaining oil viscosity without breaking it down is key; once you lose the integrity of lubricating oil, you are risking more wear on metal. With a higher quality lubricant, viscosity is maintained for a much longer period. While lower quality lubricants may cost 3 to 4 times less than premium products, their use leads to more mechanical wear, more reactive labor, and more machinery unavailability or downtime.

Using high-quality lubricants will result in fewer oil changes, repairs, reactive labor, and unplanned downtime. With quality products, facilities may go from changing the lubricant every 6 months to once every 2 years. If the quality products are combined with condition monitoring and contamination prevention, the lubricant lifespan could be extended as long as 3 to 5 years. Differences in how lubricants are formulated have a huge impact on their ability to perform and protect. Lower-quality commodity-type products do not begin with high-quality base oil or an additive package, which will lead to shorter lubricant lifespan and asset protection. In addition, failure to effectively remove and prevent contaminants will result in shorter lubricant lifespan and speed up critical component MTBF.

High-quality lubricants differ in both formulation and the level of service behind them. They begin with the use of base oil from North America, which is a richer and purer quality of crude oil. The second aspect is the degree of base oil refinement to clean it to very high standards. The cleaner the oil, the more integrity it has. Once refined and cleaned, it goes to a secondary refinery. The third factor is the additive package blended into the final lubricants.



Example of the many high-performance oil formulations featuring proprietary additives by Lubrication Engineers

When comparing the cost of lubricants for facilities using commodity lubricants and those investing in premium solutions, it is important to evaluate the lubricants' ability to reduce cost centers, including oil change intervals, reactive labor, repair costs, and downtime. Implementing best practices and protecting assets by using higher-quality lubricants will result in greater savings across

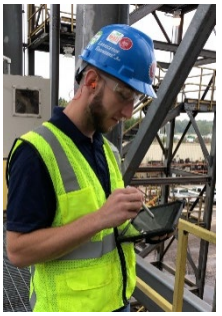
repairs because they happen less frequently. Facilities achieve lower overall costs using higher-quality lubricants paired with both preventative and predictive maintenance. Using the right lubricants and strategies will allow oil to maintain its health for the longest period. This maximizes the return on that lubricated asset by reducing labor, parts in the storeroom, and the cost associated with asset availability and downtime.

Often, companies consider lubricants to be commodity supplies and opt for lower-cost products without stopping to think about what this means long-term. For example, if a critical conveyor line bearing goes down, the cost of that $50 bearing may be inexpensive, but then they must pay $75 per hour to schedule repair, plus the cost of the lubricant and downtime while the part is repaired. Losses from a power plant not feeding coal due to a broken conveyor bearing may run up to half a million dollars a day. It may cost $200K or more per hour because they are not generating electrical output due to downtime. If a higher quality lubricant saves the bearing, the plant achieves a huge return on investment (ROI). Even though the price of lubricants makes up only 1-3% of the overall maintenance budget, facilities are saving by reducing reactive labor, replacing parts, and handling unplanned downtime due to machinery unavailability.

PAIR LUBRICANTS WITH PREVENTIVE MAINTENANCE AND STAFF TRAINING

In addition to the use of quality lubrication products, the use of predictive or preventive maintenance plays a key role in optimizing lubrication efficiency. Strategies should be developed to predict when a piece of equipment is expected to fail. From there, scheduling and planning maintenance on the asset helps to avoid that failure. Many industries are trending toward scheduling oil changes with predictive condition-based methods versus older time-based methods.

These strategies can be helped by a thorough evaluation of a facility's lubrication program. For example, Lubrication Engineers offers its Xpert Lubrication Benchmark Audit, a one-day walkthrough that looks at a facility's lubrication program and ranks it compared to industry standards and best practices. Audit categories include lubricant identification, contamination control, filtration, training, skill development, and certifications, among other areas. Also available is the Xpert Equipment Reliability Assessment, in which every rotating piece of equipment is evaluated with the goal of building reliability around critical assets. After review, the team prepares an agenda with a prioritized plan of action by priority to move the facility's needle up to best practices and expected ROI.



LE's Benchmark Audit ranks facility's program according to industry standards and best practices.

Finally, education and technical support are critical. Facilities should ensure their staff is properly trained in lubrication fundamentals, so they can understand and respond to OEM lubrication recommendations and specifications. Training helps personnel understand what greases and oils are compatible and what is needed to make sure the equipment runs most efficiently. One example is Lubrication Engineers' Xpert Lubrication Reliability Fundamentals

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(LRF) class, a convenient private onsite training option designed primarily for a facility's maintenance and lube technicians to understand the core fundamentals of lubrication and contamination control.

QUALITY LUBRICATION LEADS TO SIGNIFICANT COST SAVINGS OR OPERATIONAL IMPROVEMENTS

Budget is frequently addressed as the reason higher-quality lubricants are not used. In many cases, switching lubricants may lead to a reduced need for electrical energy or reduced temperature, yielding electricity savings. Here are a few real-life examples that showcase the excellent ROI achieved from investment in higher-quality lubricants.

EXAMPLE 1:
Cooling Tower Gearboxes

In a 32-month analysis of cooling tower gearboxes used by Wolf Hollow Electrical Energy in Texas, Lubrication Engineers converted 14 gearbox drives to its Multilec® Industrial Oil (6806). Periodic electrical readings performed on the gear drives before and after the lubricant conversion showed an average amp drop of 9.38 amps, an average of 5.12%. Using a standard electrical formula (volts x amps saved x 1.73* = kW Savings *conversion factor for a 3-phase power source), they determined that every 1,000 hours run on the gearboxes will yield electrical energy savings of $223.92. This adds up to a 908% ROI based on electrical energy and lubricant savings.

EXAMPLE 2:
Fleet Maintenance Program

Peak Oilfield Service Company, located on Prudhoe Bay, Alaska, partnered with Lubrication Engineers to evaluate the company's fleet maintenance program with a goal of implementing a more proactive predictive maintenance program. The evaluation included benchmarking the current program to understand the overall cost per mile to operate the fleet.

Peak's fleet is comprised of more than 2,000 pieces of equipment, including service trucks, dozers, wheel loaders, scrapers, cranes, pressure pumpers, snow blowers, diesel generators, and haul, vacuum, and water trucks. Prior to its new reliability program, Peak performed all service truck engine oil changes every 200 hours, and all heavy-duty, off-road equipment engine oil changes every 300 hours. Repeated trials and evaluation of LE's Monolec® Engine Oils showed that the new product extended drains out to 1,500+ hours while maintaining superior wear protection. In fact, some equipment had extended oil drains as far out as 2,200 hours, and oil analysis demonstrated that the Monolec Engine oil still maintained its viscosity and TBN while delivering outstanding wear protection in the engine.

Following consistent trial successes, Peak switched all its engines to LE's Monolec Engine Oils, establishing 1,200-hour drain intervals for all mobile equipment. Within 18 months, they had achieved 50% total savings in cost per run hour, 46% savings in engine oil usage costs, and 67% savings in engine oil disposal costs. Additionally, they attained 76% savings in annual engine oil change labor costs and 76% savings in annual oil change downtime costs.

EXAMPLE 3:
Drill Rig Transportation Vehicles

Peak Oil also used enhanced lubrication to solve a problem with frequent, costly bearing failures in its custom-made John Deere Rolligons that transported drill rigs to remote drill sites in Alaska. Due to the harsh environmental conditions, these roller bearings are subject to -60°F temperatures, extreme high loading, low RPMs (8-10), dirt, moisture, and idle time. The lubricant in use was a mineral-grade lithium-thickened NLGI 2 EP grease that would wax up when exposed to freezing temperatures, allowing the oil to run out of the thickener and bearing while permitting the ingress of dirt and moisture. The complete saturation of the bearing and housing caused excessive rust, lubricant degradation, bearing starvation, and frequent bearing failures.

Lubrication Engineers recommended its heavy-duty synthetic NLGI 2 EP grease containing proprietary additives. Almaplex Ultra-Syn Lubricant (1299) provides optimum performance under extreme operating conditions, ensuring superior high-temperature functionality, low-temperature pumpability, and excellent performance in the presence of water. In 2017, Peak experienced a total of 114 roller bearing failures in its Rolligon fleet with the previous commercial grease. After switching, that number was reduced to only 24 failures in 2018, a 73% reduction. At a cost of $1,450 per bearing with consideration for parts and labor, Peak saved approximately $196,200.

EXAMPLE 4:
Winery Maintenance Program

A final example can be found in a new reliability maintenance program implemented by E. & J. Gallo Winery's plant. Looking to improve equipment effectiveness, reduce costs, and increase plant profitability, the company began by performing a comprehensive reliability assessment and equipment and lubrication survey of all 1,820 lubricated components. They discovered that 12% of the application points were being lubricated with the wrong viscosity or the wrong type of additive system. They found that consolidation opportunities existed to reduce lubricant products by 31%.

Plan implementation included adding proper lubricant storage with three-way filtration and desiccant breathers. Other steps included the installation of lubricant sampling valves for all critical assets, a contamination control program to protect critical equipment from destructive particulates, and implementation of a comprehensive training program for lubrication technicians. The results, published in an article in Uptime Magazine, *How a New Reliability Maintenance Program Delivered a 705% ROI,* showed that overall plant equipment effectiveness improved by 9%.

LONGER LIFE AND BETTER PERFORMANCE

Proper lubrication practices are crucial for industrial facilities to achieve substantial cost savings and improve equipment performance. The challenges of contamination, moisture, and incorrect lubricant usage can lead to significant downtime and maintenance expenses. However, by implementing best practices such as using higher quality lubricants, maintaining proper storage and handling, and integrating predictive maintenance strategies, facilities can significantly reduce these costs.

Investing in premium lubricants can yield impressive returns on investment, such as reduced energy consumption and extended equipment lifespan. By pairing quality lubricants with comprehensive training and maintenance programs, companies can optimize their operations, reduce downtime, and ultimately enhance their bottom line. This approach not only improves equipment reliability but also contributes to a more efficient and sustainable operational environment. ●