7 steps for lubrication in harsh applications

Contributed by Ken Bannister

Regardless of specific industry, the resource sector is highly dependent upon mechanical equipment to power its operational processes. With up to 70 percent of mechanical failure directly/indirectly attributed to ineffective lubrication practices, resource-type reliability is intrinsically linked to good lubrication practices (GLP).

Take Seven Steps:

â€¢ 1. Consolidate your lubricants

â€¢ 2. Contamination control

â€¢ 3. Filtration

â€¢ 4. Spill containment

â€¢ 5. Engineered lubricant delivery

â€¢ 6. Disposal program

â€¢ 7. Lubrication training

And there's no end of candidates ready to benefit from GLP. For example, they can include: gear-driven pumps, fans, conveyors, gas/air compressors, generators, cranes, scoop trams, haul trucks, hydraulic systems and couplingsâ€”virtually anything on the move!

Harsh conditions associated with the resource sector manifest themselves in different ways. Oil and gas plants are often found in remote locations, requiring the correct choice of lubricant, which is capable of working in both hot and cold extremes. Mining operations can also place temperature demands on equipment, often accompanied by dirt and water that require a suitable lubricant, excellent filtration and consistency of lubricant application.

Poor accessibility to lubrication points is often experienced in elevated transfer equipment, such as cranes and conveyors. This requires an engineered approach to provide consistent lubrication similar to that of an automated single-point lubricator. Resource sector material handling apparatus and vehicles are designed to take a great deal of abuse, and as a result, are often neglected.

What you need is a diligent approach to lubrication (i.e. an automated lubrication delivery system and wear particle analysis that's used to determine oil change time based on the oil's condition). The harsh, remote environments found in the resource sector accelerate the need for an engineered lubrication management program. Currently, there's no better place to commence your "reliability" initiative than by implementing, or updating your current approach to lubrication.

Equipment-related wear is caused by frictionâ€”choosing the wrong lubricant, applying the lubricant incorrectly, at the wrong time, or allowing the lubricant to become contaminated. This results in raising the level of friction that retards bodies in motion. More energy is then required to overcome the effects of friction.

For little or no capital outlay, adopting a seven-step engineered approach toward your lubrication efforts will result in the following: significant energy cost reduction; reduced lubricant inventories, consumption and spills; cleaner equipment; reclamation and reuse of existing lubricants; responsible disposal of old lubricants; and a significant increase in equipment reliability, availability and throughput.

Step One: Consolidate your lubricants

Many companies will carry an inventory of 20 or more lubricants throughout their facilities, often stored in half-open containers, exposed to atmospheric contamination and in danger of being spilled. Today's lubricants are capable of out-performing many of the lubricants you have continued to use and purchased over the past decades. Consolidation programs can easily reduce lubricant inventories by up to 75 percent and higher depending on the industry. This leads to lower purchase and carrying costs and a simplification of the lubricant application program. Investigate the use of synthetic lubricants in situations with extreme temperatures.

Consolidation forces you to inventory all of your lubricants in the facility and list every storage location. Engage with your lubricant suppliers and have them bid on performing a lubricant consolidation exercise. This program is usually offered at little or no cost, in exchange for blanket orders that can also work in your favour by fixing lubricant costs for a set period.

Step Two: Contamination control

Contamination is an enemy of both wear surfaces and lubricants. Fortunately, it can be controlled with a little effort and awareness. Contamination issues are largely caused by poor storage, handling and application practices. Fine tolerance bearing surfaces and radial lip seals don't take kindly to lubricants carrying abrasive bodies to the wear surface.

Nonetheless, we continually grease nipples without first cleaning the grease gun and the nipple, leave off reservoir lids and breather caps on hydraulic systems, ignore lubricant container lids and store barrels of lubricants in the outside extremes of weather to rust and collect water. We also use non-dedicated and dirty lubricant transfer devices. Review how you keep contaminants from ingressing your lubrication systems and develop improved housekeeping practices. Also invest in one of the many new-dedicated lubricant transfer systems offered by your local industrial supplier.

Step Three: Filtration

Poor machine filter management can manifest as reduced lubricant flow and cause the bypass of deadly wear contaminants to your bearing surfaces. Ensure filter replacement is made a high priority as part of your preventive maintenance program. In an effort to conserve and reuse lubricants, an external pump/filtration cart can be used to clean your large reservoir lubricants and ready them for reuse. This saves lubricant, change out and disposal costs. Contact your local lubrication hardware or filter supplier for details on this easy-to-use system.

Step Four: Spill containment

Oil spills are never easy to deal with; prevention can result in a lot less effort should a spill occur. When storing lubricants, ensure all full or partially full containers are kept in an area protected by an impermeable berm used to contain the spill in a localized area. The containment system can be a steel box tray, a concrete berm system, or one of the many plastic containment systems sold by your local industrial supplier. Just in case, don't forget to have on hand a spill management kit.

Step Five: Engineered lubricant delivery

Both under and over lubrication will cause a significant spike in energy requirements (one to overcome the metal-to-metal collision and the other to overcome fluid friction). Tuning your lubricant delivery can result in energy savings as high as 20 percent. Invest in a lubrication operation effectiveness review (LOER). This will enable you to improve your current approach to delivering the right lubricant, in the right amount, in the right place, at the right timeâ€”whether it be from a grease gun, or fully automated lubrication system.

Step Six: Disposal program

Local legislation is increasingly forcing companies to own their waste and put in place a disposal plan or program. Many organizations operating under a consolidated program have also been able to set up a recycling initiative. Old reservoir lubricants are taken back, cleaned, reconstituted with additives and resold to the originating company as recycled oil at savings of up to 25 percent of virgin oil.

This not only saves the environment, but also reduces the purchase cost of new oil for maintenance departments. Collecting oil by type makes it easier for the disposal company to reduce disposal costs charged to you. Check with your disposal company to see what programs are available, which you can take advantage of immediately.

Step Seven: Lubrication training

A little basic lubrication training can significantly boost understanding and enhance your program. Surprisingly, lubrication on the surface appears very intuitive in nature. At the same time, however, it's perhaps the least understood area of maintenance. Investing in a basic course that's focused on lubrication training will facilitate your program immensely.

Ken Bannister is the author of the best selling book, Lubrication for Industry, and the new lubrication section of the 28th edition of Machinery's Handbook, published by Industrial Press. He performs lubrication effectiveness reviews and lubrication training programs for all industries. You can reach him by email at kbannnister@engtechindustries.com. This article was previously published in REM magazine.