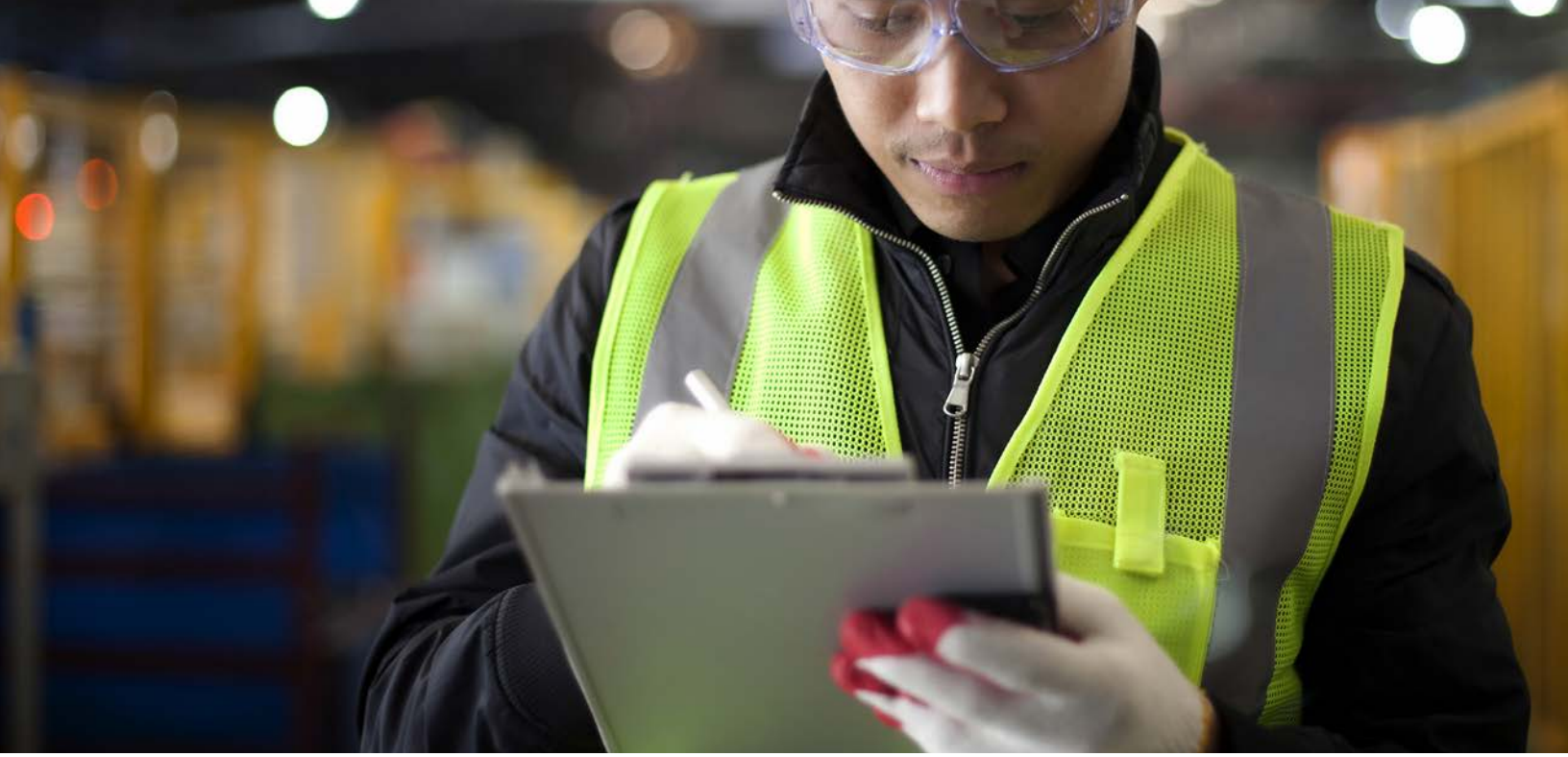
Energy lives here™

Work smarter, not harder

How to make your maintenance program more efficient

Contents



10 steps to kick-start a comprehensive lubrication program

Lubricants are an essential part of the operation of industrial machinery. Of all the numerous purchases made by industrial customers, lubricants can potentially have one of the most profound effects on their profits. Just take a look at the 10 lubrication steps listed below. Each tip provides a valuable opportunity for you to work with your lubricant supplier to reduce expenses and enhance your plant's operating efficiency.

1 Streamline lubricant inventory

Work with your lubricant supplier to audit plant equipment and existing lubrication practices. This process will help you identify the fewest correct lubricants needed to meet plant requirements and operating conditions.

2 Follow lubrication instructions

Maintenance personnel should refer to lubrication charts and schedules to identify the parts of equipment that need to be lubricated, and to specify the lubricant to be used and the method and frequency of application.

3

Establish clear roles and responsibilities

To ensure proper application and avoid unnecessary labor, staff should undergo appropriate training and be made aware of their duties through a clear organization chart.

4

Reduce oil waste with longer oil life products

Synthetic products, such as the Mobil SHC™ Series, can offer longer oil life, helping to reduce labor costs, increase uptime and minimize waste.

5

Ensure proper storage and handling

Proper handling, storing and dispensing of lubricants can reduce waste, misapplication, and fire or safety hazards while also helping to prevent contamination.

6

Conduct equipment and oil inspections

Implement proper inspection methods to reveal contamination and establish filtering/drain schedules to minimize production shutdowns, reduce labor costs and extend oil life.

7

Install a filtration system

To extend the useful life of oil in centralized systems, install an effective filtration system, which will also help reduce the costs associated with the proper disposal of used lubricants.

8

Maintain thorough lubrication records

Keep lubricant and operational costs to a minimum by maintaining a robust record-keeping system, which provides an initial baseline to show where improvements are needed and what results have been achieved.

9

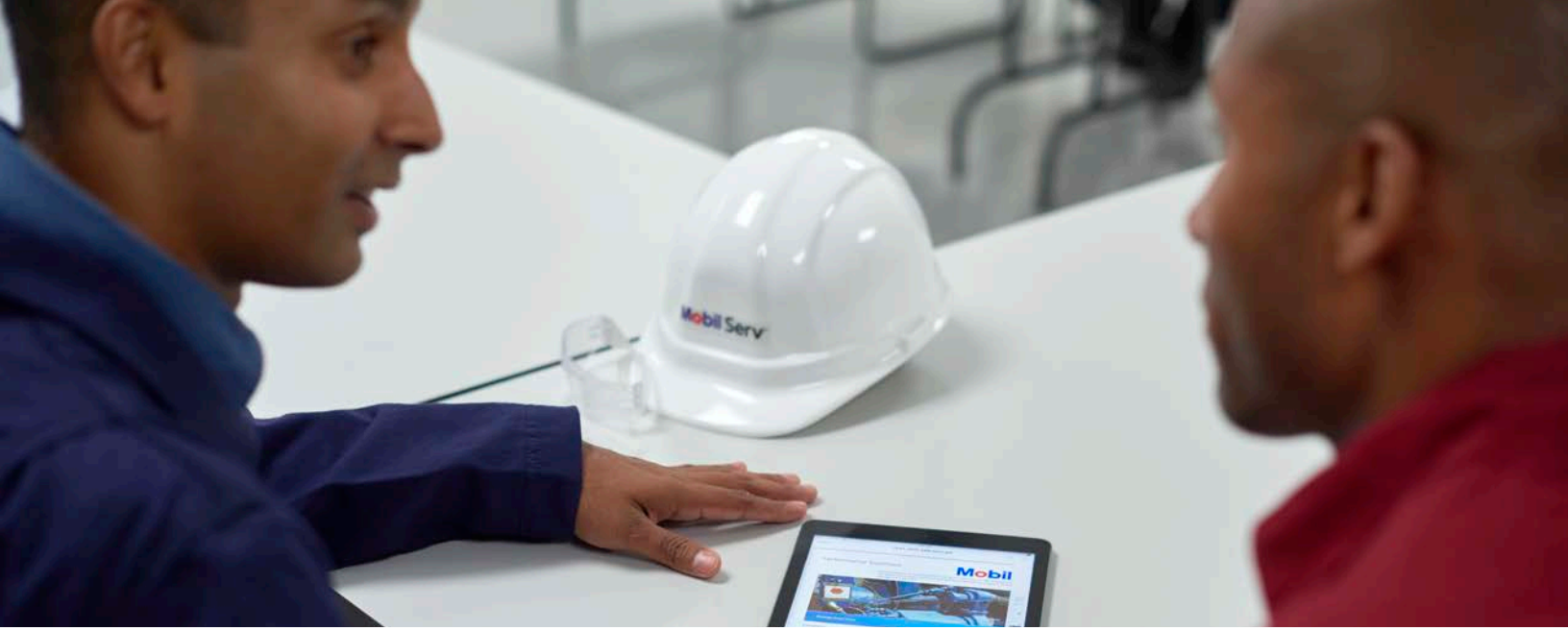
Ensure adequate training of plant personnel

Reduce the risk of hazards associated with inexperienced maintenance staff through appropriate training of plant personnel. Both program leaders and lubricators must continually learn best lubrication practices as well as new techniques in their specific discipline.

10

Lower costs with preventive maintenance

Continuous analysis of operating conditions, regular inspection of equipment and examination of high-cost areas can all play a significant role in helping reduce your plant's maintenance costs. This includes implementing a used oil analysis program, such as Mobil Serv℠ Lubricant Analysis, to monitor the condition of oil and equipment.



For an effective maintenance program, partner with your lubricant supplier

By Alan Suan, Industrial Americas Offer Advisor, ExxonMobil

There is no one-size-fits-all approach to designing and implementing a successful maintenance program. However, your lubricant supplier can help you make the right decisions to ensure your program works for you, as it can leverage decades of experience working with equipment builders and developing new technologies to help you identify the best solutions to fit the needs of your specific equipment.

Below are a few ways in which working with your lubricant supplier can help you optimize your maintenance program and achieve productivity goals.

Assessing your product mix

You need to use the right products for your equipment, which is not always easy for operations that use a wide range of industrial equipment.

Your lubricant supplier's engineering teams can analyze your equipment operating conditions, specifications and OEM recommendations to help identify the best product choices for your needs.

This can help you navigate some complex decisions – such as whether you should use a mineral-based or synthetic product. The teams can also help you select the right mix of lubricants formulated to withstand your equipment's specific operating challenges, which may include extreme temperatures, heavy loads or exposure to contaminants.

Ensuring proper storage and handling practices

Improper storage and handling is another important consideration, as it can significantly reduce a lubricant's effectiveness and even turn safe lubricants into potential waste.

Many lubricant suppliers have teams of highly trained field engineers that can conduct lubricant storage and handling studies across your plant, providing comprehensive review and analysis.

These teams will conduct a walk-through review of your facility before reviewing current practices, location of inventory, logistics, manpower resources and order patterns, among other factors. They will then identify trends, critical products, safety and environmental issues and any capital or manpower investments that may be needed before delivering a report that documents the study findings.

Leveraging data to improve equipment performance

Used oil analysis services are critical to assessing equipment health, as they can help identify root causes of failure, prevent equipment breakdown and optimize oil drain intervals.

Specifically, lubricant engineers can use oil analysis data to diagnose problematic equipment conditions before they result in equipment failure and determine the optimal oil drain interval for the application.

Working with your lubricant supplier can significantly benefit your operation, so as you develop your equipment maintenance approach, be sure to leverage some of these practices to help ensure your plant is safe, effective and profitable.

Contact your ExxonMobil representative to find out how we can help you boost your operational efficiency.

Product consolidation

Over time, as companies change/upgrade equipment, it's not uncommon for them to begin using multiple types of lubricants.

This can lead to a variety of unforeseen complications. It can add complexity to inventory management practices as well as lubricant storage and handling procedures, which can increase the risk of application errors. That's why using high-performance, multipurpose synthetic lubricants is highly recommended.

Obviously, the potential benefits of using high-performance synthetic lubricants vs. conventional lubricants are well-established and include:

- Enhanced thermal/oxidation stability
- Improved varnish and sludge control
- Higher load-carrying capability
- Exceptional resistance to rusting and corrosion

Each of these benefits can have a significant impact on a facility's bottom line, reducing total cost of ownership and improving operational efficiency, with:

- **Revenue enhancement** – Improved productivity through simplified lubrication maintenance, with reduced risk of error in application
- **Process improvement** – A reduction in administrative expense, with fewer orders to process
- **Expenditure reduction** – Reduced maintenance, repair and electrical energy costs
- **Asset improvement** – Reduced overall inventory of products results in lower associated carrying costs of storage. Additionally, fewer products increase inventory turns, which can more effectively ensure products are used prior to reaching the end of their shelf life.

In addition to the potential performance benefits cited above, this type of product consolidation can help improve administrative tasks and minimize environmental risk, as each storage container, drum or tank has individual maintenance requirements to ensure proper containment and disposal of residual product. So, by managing a smaller range of lubricants, operations can yield fewer contaminated containers, which can help a facility meet its environmental care-related goals.

Lubricant storage and handling

Good storage and handling practices can help deliver productivity, safety and sustainability benefits for any industrial operation. They will help ensure that lubricants are in peak condition to properly protect equipment and keep it running with minimal unscheduled downtime while also helping to reduce potential lubricant waste. Here are four fast facts to help operators get the most out of their storage and handling program:

1. Lubricants are susceptible to contamination and degradation even when not in service

Lubricant condition does not only change when in service, it can also change when in storage. Any exposure to dust, dirt, water or other particles during the storage process could result in lubricant contamination, making that lubricant less effective in service. Similarly, prolonged exposure to adverse conditions, such as extreme temperatures, can alter key lubricant characteristics. That's why storage in properly sealed containers and dedicated storage areas with the right ambient conditions is critically important.

2. Storing lubricants indoors is best

Whenever possible, lubricants should be stored indoors, ideally in an area that is air-conditioned and that can maintain constant temperatures. The floor should be level and oil resistant and the storage area should be well-ventilated. The area should also have shelving that adequately protects all containers.

For example, the viscosity index improver polymer additives in crankcase oils can degrade in sunlight, so these oils should not be stored in clear containers exposed to sunlight.

3. Handling lubricants requires proper care

Storage isn't the only time the lubricant is susceptible to contamination – proper lubricant handling is equally important. Maintenance personnel should implement good handling practices to ensure cleanliness, including the use of regularly maintained lubrication trolleys and dispensers. The maintenance team should also properly clean the lubrication points prior to application to minimize the risk of contamination.

4. Your lubrication partner can help design a best-in-class program

Many lubricant suppliers have experienced field engineers who can conduct lubricant storage and handling studies across an operation, providing comprehensive review and analysis. A walk-through review of the facility is conducted before reviewing current practices, location of inventory, logistics, manpower resources and order patterns, among other factors. They can then identify any gaps in product quality, safety or environmental issues and suggest procedural or equipment changes to ensure efficient and effective lubricants management.

What ExxonMobil learned after analyzing more than 1 million used oil samples

Geoff Polanek, ExxonMobil Marketing Advisor

Used oil analysis (UOA) is the bedrock of any successful equipment maintenance strategy, but deriving the right oil analysis insights depends on knowing what signals to look for in the results.

That understanding often comes from extensive first-hand experience, which is something that a global lubrication partner, such as ExxonMobil, has.

In fact, since launching its Mobil Serv™ Lubricant Analysis platform in 2016, ExxonMobil has processed more than 1 million samples, including:

- 243,000+ diesel engine samples
- 125,000+ gear drive samples
- 100,000+ gas engine samples
- 100,000+ hydraulic system samples
- 75,000+ compressor samples

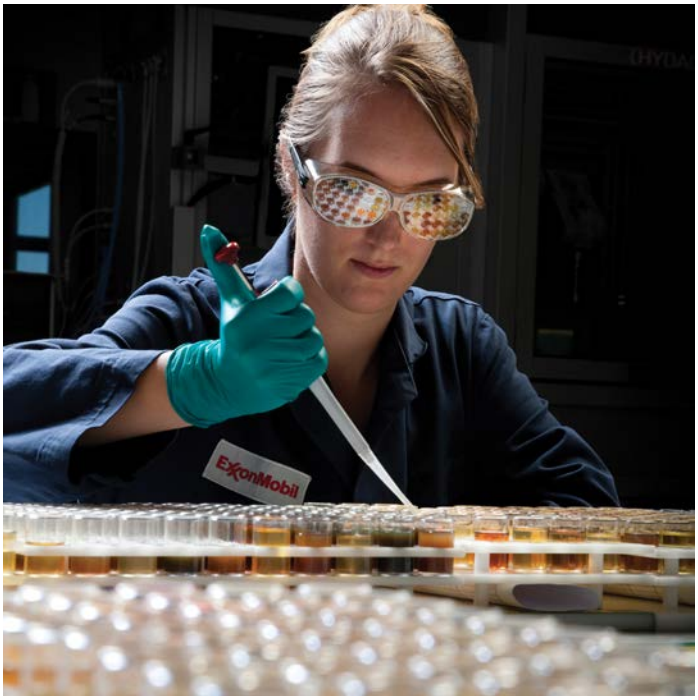
This experience, as well as the tens of millions of samples the company analyzed using previous platforms, has given ExxonMobil vast intelligence about how to interpret UOA results properly.

Here are four of the key lessons:

1. A single test does not always tell the full story

Receiving an alert for a single test is not necessarily indicative of an equipment performance issue. Instead, it's important to look at all test results for the same sample together to determine what might be happening. For example, a common test for gas engines is Acid Number (AN). In the samples ExxonMobil processed, AN results did result in alerts more than 5 percent of the time in these applications.

But assessing the AN result alone does not provide insight into how the gas engine is performing. Operators need to consider the significance and relevance of the test when making maintenance decisions. In terms of relative importance, consider oxidation, nitration, viscosity, wear metals and BN (Base Number) results to truly understand if the lubricant is still performing well. Relying solely on the AN result may lead to the wrong interpretation. This is why consistent monitoring of the complete analysis results trend is an effective method to understand what is happening inside the equipment.



2. Consider the trend, not the absolute test limit

A single alert doesn't necessarily mean the lubricant is underperforming. In some cases, test limits may not always indicate a cause for concern or may not account for equipment design. Operators must look at the trend over time to understand true performance. A consistent alert over multiple sampling periods, for example, would certainly be cause for closer inspection.

For example, the test for copper wear metal appeared consistently as a top alert in the diesel engine samples tested by ExxonMobil. However, some engines have undergone significant design and component changes in recent years. The program must adapt to changes that may affect the limits applied to properly confirm the actual engine condition, and as a result, a single copper alert may not indicate a performance issue. Instead, operators should monitor the trend to see if the copper wear increases over time.

3. Sometimes, lubricant formulation can influence test results

When evaluating UOA results, it's important to consider the lubricant formulation as well as the metallurgy of the equipment. In some cases, components in the formulation can cause alerts for certain tests. For example, some hydraulic oils are formulated with zinc-based additives. These lubricants may cause metal wear test results – including copper tests – to seem abnormally high. In those instances, operators should take a closer look to understand if copper is actually entering the system or if components in the lubricant formulation may be triggering the alert.

4. When dealing with water, perform the right test

Water contamination is a major challenge for several industrial applications, including compressors, steam turbines and paper machines, so this potential contaminant deserves its own callout.

There are two types of tests that are typically used to measure water contamination in industrial applications – Karl-Fischer and Hot Plate tests. The Hot Plate only signifies if water is present – it doesn't provide insight into how much water is present. The Karl-Fischer test gives a quantifiable measure, providing far more insight into whether or not the lubricant is suffering from too much water contamination. Therefore, operators should consider the hot plate as a conditional test to decide if the more in-depth Karl Fischer analysis should be conducted to determine the actual level of contamination.

In summary, to properly evaluate UOA results, it is critical to work with a lubrication partner that has the right experience to deliver application-specific insights and guidance.

mobil.com/industrial