



10 Steps To Create A World-Class Oil Analysis Program

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Why Should I Read Ten Steps To Create A World-Class Oil Analysis Program?

Oil analysis can uncover, isolate, and offer solutions for abnormal lubricant and machine conditions when used as a predictive maintenance tool. These abnormalities can result in expensive, sometimes catastrophic damage causing lost production, extensive repair costs, and even operator accidents.

The goal of an effective oil analysis program is to increase the reliability and availability of machinery while minimizing maintenance costs associated with oil change-outs, labor, repairs, and downtime. Accomplishing this goal takes time, training, and patience. However, the results are

dramatic and the documented savings and cost avoidance are significant.

Many organizations throughout the world have implemented oil analysis programs to help manage equipment reliability. Some have experienced substantial savings, cost reductions, and increased productivity, while others have received only marginal benefits. A successful oil analysis program requires a dedicated commitment to understanding the equipment, the lubricant, the operating environment, and the relationship between the test results and actions to be performed.

The most successful oil analysis programs are those that are thoughtfully designed after careful evaluation and development of clearly defined goals. The emphasis should be on designing quality and excellence in the beginning, not force-fitting it in along the way.

The following 10 steps will provide a guideline for implementing an effective oil analysis program: a program considered to be one of the critical technologies to increasing equipment reliability while maintaining a safe and cost-effective plant operation.

#1 - Identify Critical Equipment

When you start implementing an oil analysis program, you need to decide which equipment in the plant to sample. This can be a daunting task but it cannot be overlooked. Supervisors and management need to take the time to identify the targeted equipment, write detailed procedures, establish routes, and sampling schedules.

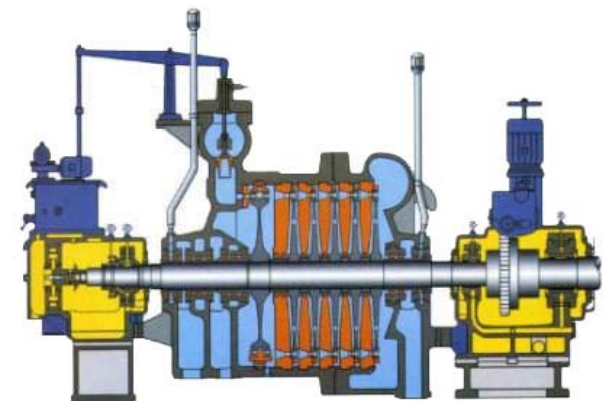
Equipment critical to plant operations should be identified first. This equipment often does not have a backup unit to replace it when it is not in service. In addition, major repairs and overhaul of critical equipment often require a complete plant shutdown, substantial manpower and subsequent loss of production activities.

Critical equipment in plants typically have these common characteristics:

- They require very high capital investment and are expensive to maintain and repair.
- They are engineered for long service lives when operated within design specifications and in a predictable environment.
- Many are quite large and are made up of several individual components.
- Downtime is quite expensive since production is usually halted when unexpected problems or a system failure is experienced.

Appropriate testing for critical equipment includes, but is not limited to:

- Wear metal analysis
- Moisture content
- Viscosity
- Acid number
- Analytical ferrography
- Particle counting



#2 - Determine Test Packages

Oil analysis test packages should be carefully considered. Different equipment have different test profile requirements. When determining what test packages to choose, the actual equipment and the surrounding environment should dictate what tests are appropriate.

Keep in mind that with oil analysis your goal is to increase machine reliability through improved fluid condition and early detection that otherwise would not be obvious unless it causes machine failures. Having an idea about what the various tests are, what they can accomplish, and taking into account the maintenance philosophy being practiced, test packages can easily be drawn up to accomplish the desired results.

For example, you may know that some equipment can be run to failure much less expensively than the cost of performing a regular oil analysis. On the other hand, on machines with smaller reservoirs when oil quality is all that would be monitored, it may be best to continue with regular or even increased frequency of oil changes.

If you are not sure what tests are right for your equipment, it is best to consult a quality lab for assistance in this area.

When determining what test packages you need, ask yourself the following questions:

1. What is being monitored, the machine, the lubricant, or both? These three items require a different set of tests. Each type of machine should have a test package tailored to its needs. You should also begin a dialogue with an oil analysis lab to help you determine what test packages will help you reach your goals.
2. How often will samples be taken from each machine? Depending on the criticality and type of testing, frequency of sampling could range from once a week to annually.

#3 - Consider Testing Options

When designing an oil analysis program, you have a few choices on how to have your oil samples tested. This section outlines these options and helps you see which one is best for your organization:

	Pros	Cons
Maintain an onsite lab	<ul style="list-style-type: none"> • Turnaround time for results can be controlled in-house. • Not dependent on an outside resource. • Testing packages can be easily changed. • Quick response for emergency samples. 	<ul style="list-style-type: none"> • Cost of purchasing and maintain laboratory instrumentation. • Cost of LIMS software and updates. • Lab technicians must be trained for each test procedure and interpretation of results. • Lack of comprehensive testing.
Use your lubrication vendor	<ul style="list-style-type: none"> • They have expertise in understand and knowing lubrication formulations • Lube suppliers often offer to perform oil analysis for free to large volume customers. • Convenience of using one supplier. 	<ul style="list-style-type: none"> • Lubricant manufacturers are in business to sell lubricant, not analyze it. • No access to analysts to discuss test results. • Turn around is not a priority. • Not a business they necessarily invest resources into.
Contract an outside lab	<ul style="list-style-type: none"> • Full complement of testing services • Most labs maintain ISO certification • Highly trained lab staff performing the tests in a controlled environment. • Experienced analysts available to discuss test results. • Continual investment in resources to maintain the highest quality of services. 	<ul style="list-style-type: none"> • The cost per sample. • Each test performed on an oil sample costs money, so some labs may look at ways to save money and potentially cut corners. • Some outside labs can be costly and slow to deliver results.

#4 - Choose an Oil Analysis Lab

If it is determined that contracting an outside lab is the best course for your oil analysis program, care must be taken to insure that the lab is a good fit for your company. It is important to match a lab with the predictive maintenance strategies that your plant employs.

It should be understood that some labs cater solely to industrial applications while others are primarily focused on engine oils. You should be aware of this, as it is best to contract with a lab that focuses 100% of their time serving the industrial sector. The lab that focuses solely on industrial applications will be familiar with your type of equipment and the analysts will have much more expertise in analyzing your test

results. While any lab will agree to perform your testing, the question that must be asked is “Does the lab have the experience required to be my oil analysis provider and will I receive the correct tests?”

Customer service is another important aspect to consider when choosing a lab. In order to resolve issues quickly your lab should be available on your first call. It is important to note that some labs have limited access to analyst and rely heavily on voice mail services.

When evaluating a lab, consider the following questions.

- What is turnaround time on samples?
- What does pricing include?
 - shipping cost
 - site visits from lab
 - training
 - rush samples
 - supplies
 - lube audits
- Will technical help be available? Does it cost extra?
- How long will the contract last? Is there a charge to break the contract?
- How will my results be communicated to me?
- Does the lab offer unlimited, online access to my data?

#5 - Invest in Training

One aspect of a reputable, self-sufficient oil analysis program that is often overlooked is training. Trained technicians that understand how important quality lubrication procedures are will be key in maintaining a program.

Staffing of a lubrication program is extremely important. You may consider hiring someone with a proven track record of success, however do not overlook the talent you already have in your plant. There are likely several people already in your organization that would be good fits.

Once your staff is in place you can look at outside resources to assist with training. There are several companies that offer

excellent training in lubrication fundamentals and practices and most will be willing to come to your site if you have enough people to fill a class. Do not forget to include supervisors and managers. They need to be onboard and be aware of what is required and the benefits that can be achieved by implementing an oil analysis program.

Oil analysis is an ever-changing technology and to reap its benefits, one must continually receive quality training.

Training options may include:

- Classes and/or certifications .
- Trade shows and conferences are another way to help personnel stay on top of recent advances in their field.
- Department budget should reflect these educational opportunities from year to year.



For oil analysis training options visit: www.testoil.com

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#6 - Learn How to Interpret an Oil Analysis Report

The oil analysis report is a vital tool for a smooth running operation. Going deeper than the report summaries and knowing how to analyze the oil analysis report can help prevent equipment breakdown and unnecessary equipment teardowns.

Typical oil analysis reports feature problem summaries, lubricant and machine condition status, and critical alerts. They should also include graphical depiction of various tests, as well as other visual elements to assist in the interpretation of the test results.

Reading an oil analysis report can be overwhelming unless you know what you are reading. Too often in lube analysis the

failure of a program can be attributed to the lack of interpretation of the conditions report and an inappropriate response to the results. When this happens, valuable information is lost. The reason for this can largely be attributed to the lack of training of your maintenance professionals.

Without a solid understanding of the purpose of lube analysis and the ability to interpret test results they can not be expected to carry out this duty.

Maintenance professionals should receive training and education in lube analysis. In fact, training and education should occur at several different levels and with everyone who contributes to machine reliability, from management all the way to craftsmen.

Your Lab's Responsibilities

Your lab should also be adept at interpreting results. Many labs advertise that their analysts have degrees, but when it comes to analyzing test results, experience in the field is paramount. Make sure the analysts' education is relevant and note the experience of the technical people in the lab as well.

#7 - Use Proper Lubrication Storage and Handling

Having lubrication storage and handling systems in place is important as well.

Lubrication products are expensive, so they need to be handled in a fashion that maximizes the return on investment.

Make sure your storage and handling areas are clean, well organized, and climate controlled. You are responsible for ensuring the new oil and grease placed in your equipment is clean and dry, and has not been exposed to extreme temperature variations.

If you have oil storage racks, consider separate pumps and filters for each different lubricant. Furthermore, make sure your transfer containers are clean and be

sure not to expose lubricants to contamination in route to the equipment.

Test all your oil for acceptance before placing it into your system for use. Doing so is especially valuable with bulk shipments, because you never know what was in the tanker before your load of oil.

Reasons for using proper lubrication handling and storage:

- Protect lube products from environment
- Protect from plant dirt/moisture/sunlight
- Filter new lubes or lubes as you use them
- Keep lubes separate from other plant chemical/products



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#8 - Justify Your Program

As you put together any type of predictive maintenance technology, like an oil analysis program, you need to justify the program.

One common way of justifying oil analysis is keeping records of all predictive oil changes, filtration requests, dehydration requests, and so on. For example, the goal may be to improve the overall fluid cleanliness levels in the plant's hydraulic press by using improved filtration. In this case, oil analysis — and specifically the particle count data — becomes a performance metric that can be used to measure compliance with the stated reliability goals.

The metrics provide justification and accountability, not just for those directly

involved with the oil analysis program, but also for the whole plant, sending a clear message that lubrication and oil analysis are an important part of the plant's strategy for achieving both maintenance and production objectives.

You also need to annually evaluate your oil analysis program's effectiveness, which includes a cost-benefit evaluation of money saved by avoiding maintenance issues or machine downtime due to oil analysis.

Evaluation allows for continuous improvement of the program by realigning the program with either preexisting or new reliability objectives.

Consider the following justifications for oil analysis

- Some reasons to use oil analysis are: to avoid catastrophic failures, extend lubricant life and to extend equipment life.
- A good oil analysis program can save big dollars for a really small investment. You can learn to predict conditions that are the precursor of failure through oil analysis and trending.
- A solid analysis program results in making condition-based decisions both on the state of the equipment and the lubricant.

#9 - Establish and Maintain Credibility

Probably one of the most essential elements to any successful oil analysis program is credibility. After you establish credibility in a program, you must maintain the credibility. Any knowledgeable predictive maintenance person will agree that how internal customers view the program can determine if the program is a hero or a zero. When establishing credibility in any oil analysis program, consider these points:

1 Credibility in any oil analysis program is somewhat political.

One of the best ways to avoid this phenomenon is education. Management, operations, maintenance, and others may view the program differently. The oil analysis program may be forced on them just because it's part of the current maintenance strategy. As a result, you want to educate everyone on what oil analysis is and isn't. Tailor your message to each level within the company to reduce any political issues.

2 Having personnel who can communicate clearly is of utmost importance.

When someone asks a question concerning the program, give them an answer that they can understand. Most managers don't want a lesson in oil analysis, they just want to know if their oil is good and if their equipment is going to fail or be reliable until the next sample frequency. For example, simply stating, "Contamination level of foreign particulates exceeds our desired level and oxidation has caused the viscosity of the oil to raise past a safe level for this machine" is much easier to understand than a technical explanation, such as, "The PC is 21/19/16 and the VIS has raised 20 percent."

3 You earn credibility by having a program that adds value to the company and its users.

You want to ensure that benefits are ongoing. If too much time lapses before a manager sees value from oil analysis, trust in the program may decline. On the flip side, make sure that every maintenance action requested from oil analysis results be backed up with data.

The program needs to stand on its own merit. The program's manager must also have merit of being knowledgeable, truthful, and easy to work with. Without this, the program manager is no more than an outside consultant trying to sell a solution to a problem that may or may not exist.

#10 - Manage Your Program Using Web-Based Tools

Once a sample is tested and the data is in place there must be a way for the lab to communicate the data to you.

Many labs now offer web-based tools that enable customers to easily process the information contained in their oil analysis reports.

Web-based program management can help your staff make better, more informed decisions about your oil analysis program and take necessary steps required to avoid catastrophes.

By using a web-based management tool, you and your maintenance staff can collaborate and manage reports because all

the data is in one easy-to-use interface, which all parties can access at all times.



Ideally, the web-based program should offer tools to quickly manage sample results and monitor equipment in these important ways:

- Review equipment sampling history
- Analyze machine condition
- Access and review recent and past reports
- Graph trends and inconsistencies through interactive graphs

For more information on web-tools go to: www.testoil.com/datasight

Conclusion

Just sending an oil sample to the first lab found on the Internet may not guarantee a quality oil analysis program. Simply taking a few precautionary, well-planned steps should minimize any unforeseen problems. With a good vision, correct communication, and an understanding of what to expect from oil analysis, a program can be established that will be credible and a merit to the reliability of any company.

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About TESTOIL

TESTOIL is a full service oil testing laboratory owned by Insight Services. Since 1988 the laboratory has been providing fast and reliable oil analysis results across all industries throughout the Americas.

The firm's comprehensive range of oil analysis services assists reliability engineers with condition monitoring and identification of machine wear.

TESTOIL employs a sophisticated diagnostic technology that assists their Machine Condition Analysts in making equipment and lubrication condition assessments.

