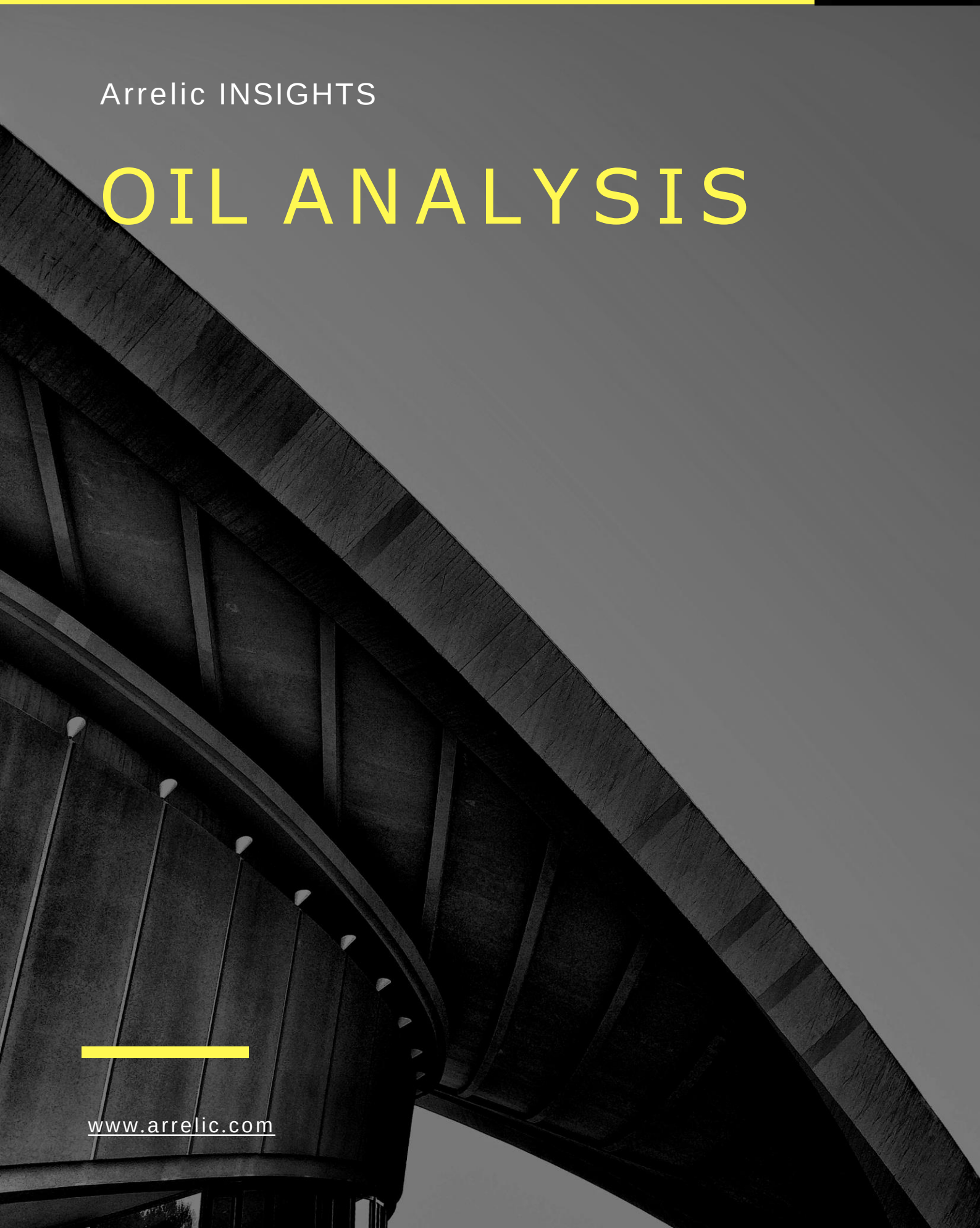
Arrelic INSIGHTS

OIL ANALYSIS



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OIL ANALYSIS

OVERVIEW

For a long time people have used oil analysis to determine when to do an oil change to do a so-called condition based oil change and for other reasons. But a lot of people ignore the value of oil analysis as a predictive maintenance tool because they are other methods such as vibration analysis and thermography etc. Often many a times, oil analysis can be the most sensitive predictive maintenance tool we have.

Using Oil Analysis, we can identify where debris is present at a very early stage in the failure process. When a machine starts to fail, it typically wears first. Using oil analysis, we can identify the spot at which the machine starts to wear.

The first test that we can use is elemental analysis. It is a simple test which is included in every oil analysis report and it tells us about the concentration of all the different metal elements so some of those metal elements are associated with wear like iron, copper, tin and chromium etc., while others are associated with contaminants and there are still others which are associated with lubricant additives.

Focusing on the wear metals now, we can use statistical analysis of historical data to identify alarms or limits. We can have a warning limit which tells us if anything goes above the limit, we may need to take a closer look. We can have a critical limit that among other things may trigger further testing. For example, if we have an iron concentration that climbs above our critical limit, that might trigger Direct Reading Ferrography Test or a Particle Quantifier (PQ) test.

DIRECT READING FERROGRAPHY TEST

This test tells us about ferrous density or the amount of magnetic material in the oil but it separates that amount into DL, which is for particles larger than 5 Micron's and DS, which are for those smaller than 5 microns. So, we can use those 2 values to do some meaningful calculations and one that I like to use is called Percent Large Particles (PLP).

So, if we know the ratio of large particles to total particles, that is a very meaningful value we can trend essentially as a machine component gets closer and closer to failure. material now one of the things especially with the previously-mentioned test one of the things that we really have to do well to make this meaningful as sampling we have to get good oil samples if we don't sample consistently we need to sample well we need to get a good valid sample that gives us good information but it also needs to be very consistent because the consistency is going to is going to factor into those statistical alarms we set and that's what really going to determine the sensitivity of this PDM tool or of this aspect of oil analysis as a PDM tool.

So, we've got a sample consistently and we really need good documented procedures too, so that different technicians can take samples and we can get the same information each time though oil analysis is it's been around for a long time most people do oil analysis but most people don't use it effectively for predictive maintenance. Add this component to oil analysis in your PDM program and you'll reap the benefits from doing so. This has been used in the oil analysis for predicting machine failures.

DIFFERENT METHODS

- Direct Reading(DR) Ferrography Test
- Particle Quantifier(PQ) Test

PARTICLE QUANTIFIER (PR) TEST

DIFFERENT METHODS

- Direct Reading(DR) Ferrography Test
- Particle Quantifier(PQ) Test

Particle Quantifier is an instrument that tells us about the amount of magnetic material that is present in the oil. This can be very useful to know about the characteristics of an oil. It is a useful thing to trend. We can also apply similar statistics to PQ values and set limits the same way the next test we would want to do which a little more involved is Direct Reading Ferrography Test.

Similar to DR ferrography, the quantifier gives the measured the ferrous concentration as an index value. However, this is where the similarities between the two end.

PQ results are given as a single index versus the two values provided in DR ferrography. There is no separation of size. The PQ is not sensitive to particle size. When utilized in conjunction with atomic emission spectrography (AES), several evaluations can be made. If both the PQ and AES values increases, it is likely that many small particles are being generated. However, if PQ increases and there is no change or decrease in AES ferrous debris, this suggests large particles are being generated which indicates an abnormal level of wear.

INDUSTRIAL OIL ANALYSIS

You are responsible for the care of important and expensive equipment. You want to keep that equipment running well. For a very long time, your company works, with analysts incorporated in an ongoing program to monitor the performance of the lubricants or other fluids used in the equipment and to detect contamination or early signs of excessive equipment. Where this analysis program detects the beginning of a problem. Before it becomes severe, letting you fix the cause and the boy them expensive, shut down and repair, your part in this valuable service is to take a sample of the fluid label the sample and fill out necessary paperwork and send it all to the laboratory. You may also be expected to review the analysis report and responded to its recommendations.
There are five steps in this sampling analysis and reporting process, we'll go over them one by one.

The first step is collecting the sample. The usefulness of the analysis will depend on thoughtful, consistent and careful sampling if it can be done safely, take the sample while the system is running or within 15 minutes after shutdown. If it is at all possible, do not take the sample from the bottom of the oil pan or tank. These practices ensure that the sample represents the lubricant as it is working not after contaminants and where particles have settled out. You may use any one of four methods of sampling: sampling accessories are available for each method. The best and recommended method is sampling through a qss valve. If the tank or oil pan does not have a qss valve petcock or similar sampling device, you may obtain a qss valve through analysts incorporated. The valve is easy to install to take a sample through the qss valve press.

One end of the tubing on to the valve stem then press in the stem to open the valve the valve closes when you release the stem. Bellows sampling uses a single-use sampling kit, consisting of a bellows pump and tubing. The length of the tubing inserted into the reservoir should not exceed the length of the dipstick. This avoids drawing the sample from the bottom of the reservoir, compress the bellows and release it to fill the bellows at least half-full using a vacuum gun place the tubing in the same manner as for the bellows, draw the sample to fill the container at least 3/4 Full the pat the drain carefully clean the area around of the drain plug take the sample after about one third of the oil capacity has been drained. Now comes the paperwork if the sample source is already registered at the laboratory, fill out the sample processing form for the sample on the first sample from any component fill out every item on the form the laboratory may not be able to accurately evaluate the sample if Any item has been omitted to repeat. It is very important that you fill out every item on the form after the first sample from that component has been submitted. You only need to complete the section which records changing information. It is vitally important that you note in the comments box any mechanical work or operating problems with the equipment being sampled. This information feedback will affect our evaluation, separate the two parts of the form send the white part, along with a sample and file the yellow part in your maintenance files. Some programs use a form 50 identification sheet instead of the sample processing form, whichever you use be sure to fill these out completely. The next step is easy. Just fill out all the information requested on the sample label.

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The upper part of the tabular data shows the amount in parts per million of different metallics found in the sample. Results from successive analysis appear on consecutive lines. That is the first analysis from a particular sample source is on top, and the last is on the bottom. A line below a test result marks a particularly significant measurement or trend that may suggest investigation and possible maintenance action. The lower part of the data section shows results of several physical tests. The reverse side of the report explains the significance and possible source of each condition or element measured. You are encouraged to call the laboratory to ask questions about your samples reply to our questions or get additional information about a report. Now we've covered the entire sampling analysis and reporting process. Let'S review the steps collect the sample, fill out, the sample, processing form and sample label send the sample to the laboratory without delay. The laboratory performs the analysis and informs you of significant results, recommending specific corrective maintenance action. Communication between the laboratory and your maintenance department is the key to a productive analysis program. Finally, you study the analysis report and initiate any suggested maintenance action be sure to call the laboratory. If you have any questions about the report, note, you can save valuable time by downloading analysis. Reports from analysts website on the Internet. This reduces paperwork and postal delays. This analysis program makes your job a lot easier and keeps your equipment running better and longer, without failures and consequent downtime. This isall about the industrial oil analysis and different methods for doing it.

" We'll help manufacturing industries to improve plant productivity, reliability and minimize total production cost by eliminating machine downtime, lightening management decisions by analysing the machine data with right mind and expertise; for a worry free operation."

If you have any questions or would like further information on our product and services or if you would like to discuss a potential initiative, you feel we could help with, please don't hesitate to contact us.

ARRELIC RELIABILITY PVT LTD

KIIT-TBI, Campus-11, KIIT University, Patia, Bhuvaneswar, Odisha, India - 751024

WE ARE READY TO BE YOUR BUSINESS SOLUTIONS

info@arrelic.com

www.arrelic.com

+91 674 657 0007

@Arrelic_ /Arrelic /company/Arrelic

About Arrelic

Arrelic is a fast-growing deep-tech firm aiming to bring the next level of IoT based sensor technology to transform the mode of manufacturing operation and maintenance practice of various industries with extensive expertise in Reliability Engineering, Predictive Maintenance, Industrial Internet of Things (IIoT) Sensors, Machine Learning and Artificial Intelligence. We provide a single ecosystem for catering all industry needs from Consulting to IoT and Analytics as well as providing Training and Development courses for different stakeholders. We aim to help manufacturing industries to improve their overall plant productivity, reliability and minimize total production cost by 25-30% by eliminating machine downtime, lightening management decisions by analyzing the machine data with right mind and expertise; for a worry free operation

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