Independent oil and grease analysis is essential

A great deal of expertise is required to analyse greases. Van Meeuwen also approaches independent research centres for oil analyses on a regular basis. Not only does this lend credibility, but underlying causes of issues might come to light. In-depth analysis also helps determine the condition of an asset so that preventive maintenance can take place.

"An independent analysis of lubricants is important for many reasons", says Taco Mets, Technical Director at Van Meeuwen. "We always approach independent laboratories for our oil and grease analyses. This is where independent study of the condition of both machine and lubricant takes place in the course of the lifespan of a lubricant. It improves our credibility."

In cases of problems or damage investigations, research centre expertise is required. Mets provides an example. "A customer – an ice cream manufacturer – notified one of our Service Engineers that oil spatter was discovered on ice creams following a lubrication service. It was a very unfortunate situation. When we receive this type of notification, it is very important to contact an independent expert for a closer inspection."

DEKRA Rail in Utrecht took charge of the investigation. Their research report indicated that it was not oil spatter, but rather bits of metal from the cooling section that had corroded into the ice

cream. "It had nothing to do with lubricants or the maintenance performed by our Service Engineers. If an independent investigation does not take place in such a situation, it can easily turn into a case of he said/she said, which should be avoided at all cost. In addition, we were able to help the customer discover the cause, and therefore prevent the problem from recurring."

Grease analysis

There is a third reason why Van Meeuwen relies on independent expertise, which is particular important in cases of grease analysis. Mets: "Oil analysis is fairly simple. A representative oil sample is collected from the installation and the sample is sent to a laboratory for further analysis. However, grease analysis requires far greater expertise. Collaboration with an independent research centre such as DEKRA Rail is absolutely necessary."

Gerrit van Middelkoop: "With grease analysis and condition monitoring, risks can be managed and overhaul postponed or scheduled sooner."

Independent expertise

The Tribology Department at DEKRA Rail in Utrecht has done a great deal of research into the lifespan of lubricants. Not only related to railway transport, but to all kinds of other assets such as locks, steamrollers, turbines and transportation systems. The group provides independent advice for condition monitoring of lubricated systems and lubricants (oils and greases).
Gerrit van Middelkoop, a researcher with many years of experience at DEKRA Rail, explains. "If you want to implement condition monitoring for a grease-lubricated system, it is important to sit down with engineers and laboratory staff to discuss how samples will be collected. As soon as this has been decided, it should be carefully recorded, so that a system of sampling can be reproduced. This is very important."

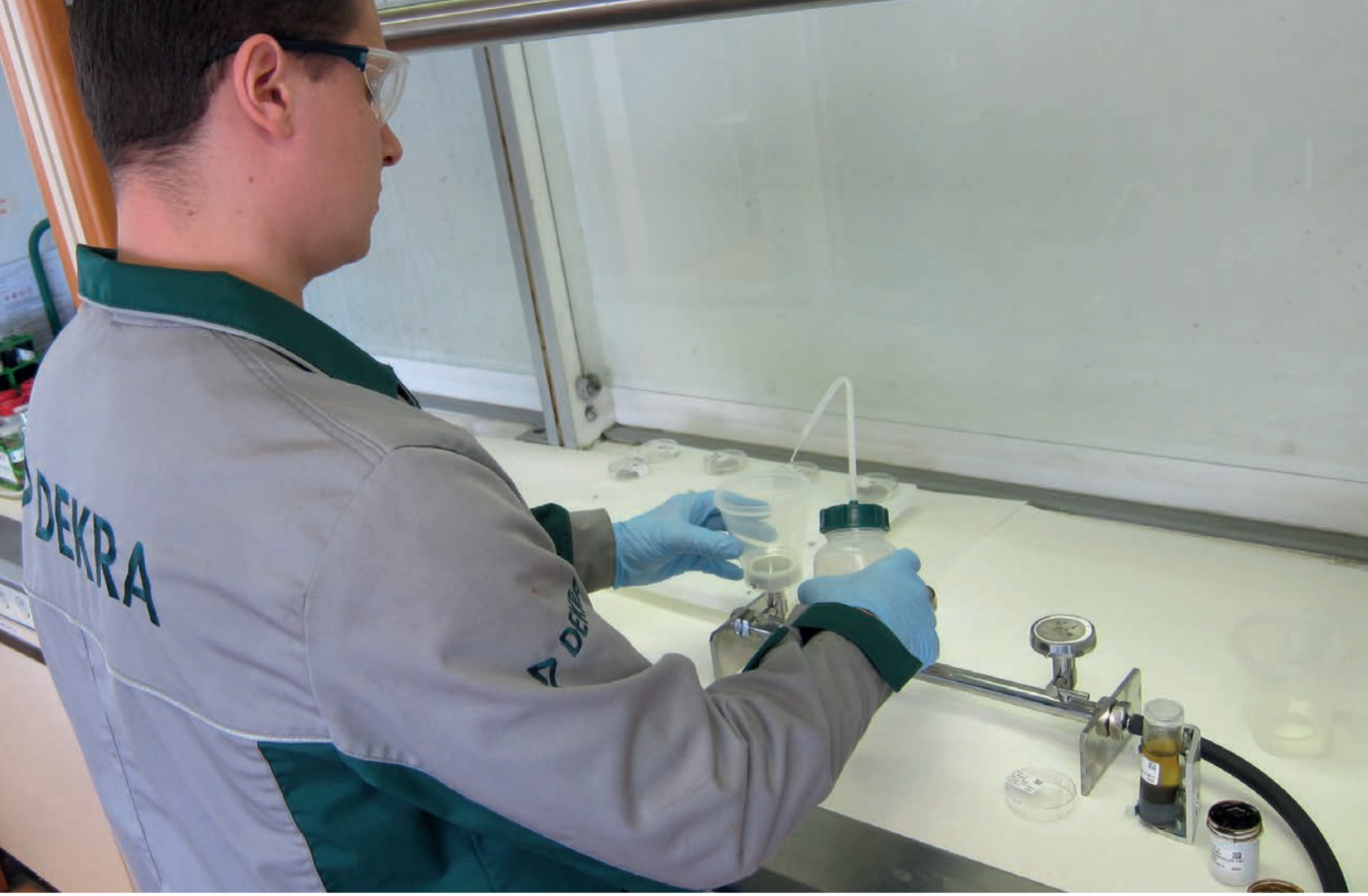
It is a tricky business to collect samples of grease properly. "In order to perform proper analysis, grease samples must be collected from the correct position in the system. That is to say, a reproducible sample from a position where the grease is taxed and deterioration takes place. Often more grease is present than during the actual moment of taxation, and it is possible that the sample taken is of some of the extra grease. This will lead to skewed results."

The second challenge is laboratory research. "Grease is a physically complicated product, because in addition to additives, it consists of a polar material – the thickener - to which a nonpolar material – the oil – has been added. Because of the difference in polarity, it is difficult to analyse. If the oil dissolves well with a certain solvent, the thickener remains, and vice versa. After extensive research we, as one of only a few laboratories in Europe, were successful in removing both oil and thickener from the grease, and cleanly extracted the wear particles in a way that can be reproduced serially in a laboratory setting. We can determine the activity of additives with this method, measure particles, and make an analysis of the concentration of wear particles in grease samples." These are important parameters for the creation of proper system condition monitoring.

Interpreting

Interpretation of results follows the analysis. "We often have a good idea of the situation, based on the analysis. For example, if we know how a machine is performing, and the components it consists of, we can use the composition of wear particles – the type of materials and the shape of the wear particles – to determine whether it is caused by fatigue, abrasive wear, or something else. We always present the customer with an analysis report that includes conclusions and recommendations for what to pay attention to when performing maintenance on the machine."

Van Middelkoop believes good communication with customers is key. "Our conclusions after an overhaul can be confirmed by feedback from the customer, which means we can continue to improve our analyses and conclusions. It is also important for us to be made aware when a customer changes the maintenance system - for example by adjusting the load of a machine or scheduled maintenance periods - in order to make relevant recommendations. Good communication and interaction contributes to the conservation of assets."



Condition based maintenance

Condition monitoring is important at various phases of the lifespan of an asset. It is useful to record the condition of a new asset for future reference, or to verify the condition at delivery. After some time has passed and traces of wear begin to show, the rate of condition deterioration at current use can be estimated for the first time. Condition verification at the end of the lifespan is relevant to determine the best time for overhaul or replacement.

Taco Mets: "We were able to help the customer discover the cause, and therefore prevent the problem from recurring."

"In-depth analysis also helps determine the condition of an asset for preventive maintenance to take place", says Van Middelkoop. "Our Wear and Tear Scan gives us a good idea of the deterioration of components such as bearings and gearboxes. If you have an entire fleet of one type of machine, and you want to know how the wear values of certain components hold up in comparison to the amount of time they are in use, such as active hours or kilometres, you eventually end up with a scatter graph that statistically - after applying a margin of error – captures the average behaviour of the entire fleet. If this is made accessible to the entire fleet, the data will clarify the risks that an operator actually faces."

"You might determine that one item in the fleet behaves more favourably than was projected, or that it starts showing wear earlier in its calculated lifespan", Van Middelkoop continues. "In this way, with grease analysis and condition monitoring based on actual results, risks can be managed and overhaul postponed or scheduled sooner. This is condition based maintenance, which is a far more reliable way to perform maintenance and implement service provision. We want to support our customers in this process."

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