

NEW TECHNOLOGY DRIVES WEARCHECK LABORATORIES



Laboratory manager Paul Swan played a key role in developing the new fuel screen.

WearCheck staff have recently developed a new fuel screen which reduces sample turnaround time.

This has come about because testing for fuel is expensive, difficult and somewhat slow. Gas chromatography, one of the most robust of test methods for fuel dilution, is used by WearCheck Africa for samples where fuel dilution is suspected and the result is reported as a percentage. But, if all engine samples were to be tested, a significant cost would be incurred and there would be delays in sample turnaround times. A fuel screen which flags only suspect samples for actual fuel dilution is the key.

Up to now the most reliable guide has been the viscosity at 40° C test. If the result was below a certain threshold, then the sample would be flagged and tested for fuel. Unfortunately, due to the wide range of starting viscosities, as well as the masking effects of soot, oxidation and varnish formation, amongst others, many samples containing moderate levels of fuel dilution could not be detected by this screen. Therefore all engine samples were closely scrutinised by the diagnostic team, who through experience, studying sample history and database comparisons, requested that as many as one hundred additional samples be tested for fuel on any given day. This manual process lengthened the diagnostic process but was worth the time for the sake of accuracy.

Says laboratory manager, Paul Swan, 'The new screen makes the need for the manual process of requesting fuel tests virtually redundant and cuts down on the time taken from when the sample is received until the customer receives their report. This is good news for the lab and the customer.'

QUALITY AUDITOR OF THE YEAR



WearCheck's ISO 9001/ISO 14001 Internal Auditor for 2006 is Prinda Narasi of the Pinetown office (right) who won a prize and shared an excellent in-house lunch provided by the company with the other internal auditors at the end of last year. She is congratulated by quality administrator Melanie Hynd and MD Neil Robinson.

The new screen is primarily based on FTIR (Fourier transform infrared) spectroscopy and uses advanced mathematical processes to predict the fuel content from the FTIR spectrum of the oil. This process of prediction is completely automated using custom-written software. The model, which is the heart of the prediction, has been developed in-house from many hundreds of fuel-contaminated samples and was cross-validated using gas chromatography. These FTIR predicted fuel results are combined with viscosity, and another computational process makes a final decision as to whether a sample should be tested for fuel. This combinatorial technology comprises the new fuel screen.

'The new system is better than 99% accurate,' says Paul. 'Exhaustive testing and cross correlation exercises have shown that 99.7% of all engine samples will be accurately handled by this automatic process. That means that only one or two samples a day containing 4% fuel dilution or more will not be detected by the screen. These samples will continue to be handled by the manual process.'

OIL ANALYSIS PREVENTS COSTLY BREAKDOWNS FOR DE LA REY TRANSPORT



Jaco de Beer (left), operational manager for De La Rey Transport, and Wade de Chalin of WearCheck discuss the company's cost-saving oil analysis programme.

Oil analysis is no longer a nice-to-have in order to run an efficient fleet of vehicles, according to Christo de Beer, owner of De La Rey Transport in Vanderbijl Park, whose fleet of about 180 trucks operates across southern Africa.

The company has reduced breakdowns due to mechanical problems to a minimum by means of first world technology and condition monitoring techniques. These include real-time tyre and fuel management systems, along with component condition monitoring through oil analysis provided by WearCheck.

'With new generation technology vehicles you have to adapt to new generation monitoring techniques,' said Mr de Beer, who has been using the WearCheck programme for the past six years.

Oil analysis is reducing maintenance costs for De La Rey on a daily basis by preventing

costly breakdowns. By reading and taking action on the warnings provided by oil analysis, De La Rey's maintenance team is able to identify specific mechanical problems and replace worn components long before they have a chance to do more serious damage. It is also helping the company achieve cost-effective oil drain intervals throughout the fleet.

A recent example of a substantial cost saving occurred when oil analysis enabled the company to identify increased bearing wear on the rear axle of a MAN F2000 26442 truck tractor with more than 366 000 kilometres on the clock. De La Rey's maintenance staff were able to remove the worn bearings at a regular service and replace them with new ones before catastrophic failure occurred. Had this not been detected timeously, the reduction hub on the final drive could have failed, resulting in the purchase of a new differential housing costing around R25 000, as well as downtime and delays for customers.



Score marks evident on the left hand outer wheel bearing rollers of a MAN F2000 26442 truck.

'Oil analysis is not only an accurate tool to assist us with managing our fleet, it also helps with warranties with the OEMs', Mr de Beer said.

MORE CUSTOMER FEEDBACK

We received hundreds of comments in response to WearCheck's customer service survey at the end of last year. Here are more of the responses from customers asked to name one selling point when recommending WearCheck to a friend or associate:

- Up to now the use of WearCheck has saved our company millions of Rands
- Excellent professional service – always willing to listen and participate beyond normal services offered
- 10 out of 10. I would recommend WearCheck
- Professionalism, cost savings and asset care
- The analysis is excellent
- WearCheck has helped me a lot in the past to prevent expensive failures

- It provides a documented history of what is happening in the engine box, etc
- Timely warning on failures saves mega money and time
- My top lab
- Friendly and efficient service, good technical backup when needed
- Reliability of the analysis, NetCheck system
- For cost effective maintenance, choose WearCheck!!

If you have feedback of any sort you'd like to give us – praise, problems or suggestions - there is no need to wait for a customer survey. Feel free to email us at any time on support@wearcheck.co.za

WEARCHECK SIGNS UP FOR SABS ROAD MAP

WearCheck recently signed up to participate in the SABS Road Map fuel testing system.

This is a round robin benchmarking system which enables laboratories to compare the accuracy of their analysis with others in South Africa. Participating laboratories receive a batch of samples from the SABS at regular intervals. They return their test results to the SABS who then compare all the results. The system is used by oil companies and test laboratories across South Africa.

'It basically confirms the integrity of our test data,' says WearCheck chemist, Greg Morse, who manages the Johannesburg fuel lab. 'We have sent off three sets of samples so far and received two back. Our results compare favourably with the other participating labs, some of whom have been testing diesel for a number of years compared with the two years that WearCheck's fuel lab has been in operation.'

'Subscribing to the SABS Road Map is part of our ongoing quest for optimum quality. All WearCheck's results currently conform with ISO 9001 standards and we are working towards achieving ISO 17025 accreditation for laboratories.'

MARINE ANALYSIS

WearCheck's marine analysis service is designed specifically for the shipping industry for use on all marine vessels. Applications include ship engines, hydraulics and gearboxes. The test profile covers wear metals, contaminants, additives and lubricant condition plus Total Base Number (TBN) on engine samples. WearCheck's marine kits are packed in units of ten sample bottles with prepaid, preaddressed mailing tubes which conform with post office regulations.

Product code: WMM10

DID YOU KNOW?

In the past decade Wearcheck has processed 3 million samples. This equates to:

- 3 million sample bottles or 50 000 tons of plastic – that have been recycled
- 105 000 litres of used oil – that have been sold for re-use as a fuel in various industries

Wearcheck retains customer samples for 6-8 weeks after analysis for retrieval if needed. As a result, at least 50 000 samples are stored in a retrieval system at any one time.

PRAAT ON S AFRIKAANS?

Dit is 'n algemene wanopvatting dat ons personeel in Pinetown, anders as in ons Johannesburgse takkantoor, nie Afrikaans magtig is nie.

Om in Afrikaans in Pinetown gehelp te word, kontak: Lorain de Bruin vir NetCheck/databasis navrae Daan Burger of Quinton Verster vir diagnose navrae Kay Meyrick vir kliente navrae

SHIPSHAPE GLOBAL SERVICE

Membership of the WearCheck International (WCI) group proved useful recently when a Greek shipping company approached MD Neil Robinson with an unusual request. As a result, engineers from his ships – which travel all over the world – are able to submit samples to the WCI laboratory which happens to be nearest their location whenever needed. The WCI labs then analyse the samples and send the results to WearCheck Africa for diagnosis and reporting back to the client.

So far, the shipping line has submitted samples to WCI labs in the United Kingdom, Spain, Dubai (Wearcheck Africa) and Australia through its satellite lab in Singapore.

WearCheck Africa started its buoyant marine division several years ago for the analysis of oil and filters from ships and quayside marine equipment. The company retains approved status to carry out marine oil analysis on ships and offshore units for Paris-based Bureau Veritas and UK-based Lloyds Register.

LUBE TIP

DOES FINE FILTRATION FILTER OUT ADDITIVES?

QUESTION:

"I've been told that fine filtration can filter additives out of gear oil. Is this correct?"

ANSWER:

If the gear oil is formulated without solid additives and if the additives are properly blended (fully dissolved) when new, these additives should not be filterable (even at one micron) until:

1. The additives decompose (dead additives) from normal use
2. The additives (polar additives such as AW, EP, rust inhibitors, etc) become attached to solid particles and then are filtered out
3. The additives condense (desolubilize) into solid suspensions from cold temperatures
4. The additives mix with an incompatible lubricant or other contaminant forming solid suspensions

- Courtesy of Noria Corporation

HOW TO MAXIMISE RESULTS BY OPTIMISING TURNAROUND TIME

Correctly identifying turnaround issues maximises the value of fluid analysis results. Similarly, the value of fluid analysis results diminishes significantly with the time in which it takes for the report to reach the customers.

'This is because the condition of both the fluid and the equipment being tested continues to change,' says WearCheck MD, Neil Robinson. 'As a result, turnaround time is often the number one priority when it comes to choosing a testing facility. But if and when turnaround becomes a problem, how do you know where and with whom the real issues lie?'

Sending timely samples in should be as important to you as receiving timely results

Everyone involved in the maintenance process should be on the same page and working with the same sense of urgency. Determine how critical the equipment you're testing is to production. If units critical to production are at risk or you suspect a problem, we highly recommend that you overnight the samples to the laboratory either using one of our courier sample and speed bags, or your own courier company. Alternatively, enquire about our collection service (where available) for next day results.

Set sampling schedules, stick to them and get samples out the door the day they're taken

Often, this is easier said than done since frequently more than one person is involved in the process. One person may issue the work order to pull a sample, a second person will actually take the sample, a third person is responsible for sending the sample to the lab and yet a fourth person receives and acts upon the results. Yet, often only when results seem to take too long, or when recommendations become useless because a unit has already failed does a sense of urgency on anyone's part actually surface.

Provide the laboratory with as much information as possible

Even taking good samples at the right intervals and sending them to your laboratory immediately isn't enough to maximise turnaround. You also have to accurately complete ALL of the information requested on the submission form, as well as provide any additional information the laboratory might find helpful. The more accurate and specific your information is, the more accurate your diagnostic interpretation will be. The best information means the best picture possible of both the unit and the lubricant's condition.

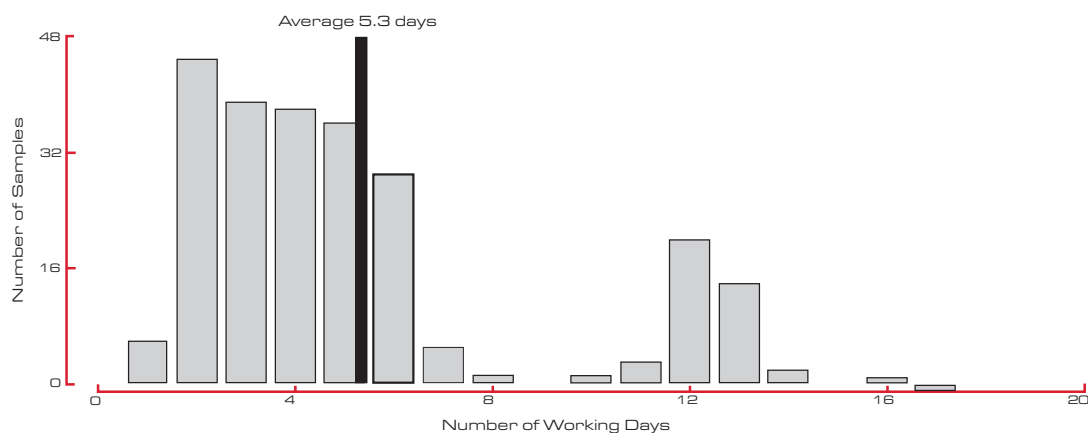
Use a trackable mail service to send samples to the laboratory

Valuable time is often lost in shipping when samples are sent via regular mail. In most instances, used oil samples are classified as non-hazardous materials and require no special handling or documentation. Using carriers such as UPS, FedEx or DHL allows you to officially document when samples actually leave your facility, track progress from pick-up to delivery and hold your laboratory accountable for time elapsed from delivery date until processing is complete.

Use a laboratory that shares the responsibility for identifying turnaround time bottlenecks

At WearCheck, we have for years provided you with information on your monthly report pertaining to the time it takes for your samples to reach our laboratory (see example below). It is in the form of a Turnaround Time Report that will track, graph and total the number of days each sample spends in shipping. This will be supplemented later this year with a graph detailing the time the sample takes to go through the lab.

DAYS TAKEN FOR SAMPLES TO REACH THE LABORATORY



The number of days is the time from when a sample is taken to when it reaches the laboratory. Working days exclude weekends and public holidays.

WEARCHECK INTRODUCES DEBRIS PAD IMAGES FOR REPORTS

Customers may have noticed that there are now photographs of wear debris on reports. Read on for the full story.

One of the drawbacks to the spectrometric analysis of wear metals like iron or contaminants such as silicon is that the spectrometer is very limited in the size of particle it can detect. Probably anything larger than eight microns is invisible to the instrument. Obviously, there could be a critical wear situation that generates large pieces of debris and the oil could be contaminated with coarse dirt. In both these situations the iron and silicon readings, expressed in ppm, might appear perfectly normal.

The obvious solution to this problem would be to filter all oils through an eight micron membrane and look at any visible debris under a microscope. Unfortunately this exercise would be time-consuming, labour-intensive and expensive. In an effort to keep costs down and still process 90% of all samples within 24 hours of reaching the laboratory, WearCheck has introduced a number of very effective screening tests over the years. These include the PQI (Particle Quantification Index), the particle count and a visual inspection of all samples in the laboratory.

27% of all samples fail these screening tests and in each case the oil is filtered and any debris present is examined by an experienced diagnostician, qualitatively graded and a subjective description of that debris given in the diagnosis. In an effort to keep things tight and to avoid abnormal samples slipping through the screening process, the limits are twice as strict as they need to be, which results in 49% of all debris pads prepared having no visible debris on them at all.

In order to give customers a numerical idea of what was observed, the MPE (Microscopic Particle Examination) scale was created, although this was primarily designed so that the diagnosticians would have an easily accessible record of what had been observed in the past. This, however, is a very poor substitute for the real thing or a picture. As Napoleon Bonaparte said, 'a picture is worth a thousand words' (even if it does require three thousand times as much disc space).

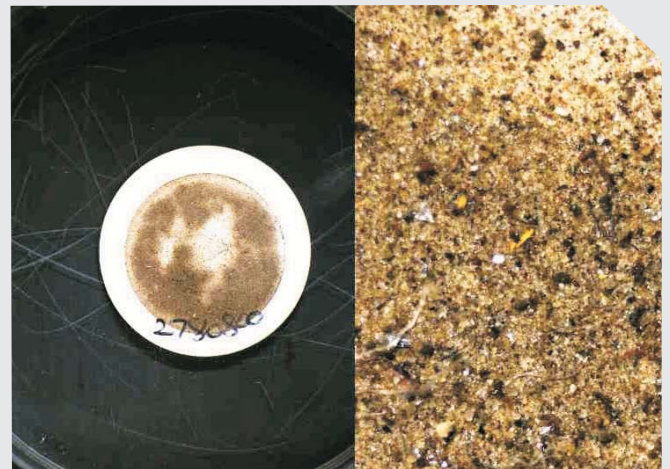
Over the past eighteen months WearCheck has invested a lot of time, effort and money in developing a system for capturing debris pad images and displaying them on the printed report and in NetCheck. The laboratory staff has researched different cameras, lighting techniques and imaging systems. Technicians have also had to be trained to capture these images. The IT department has had to write software, from scratch, to capture the images, introduce scale bars, present the images in a usable format to the diagnostics department, allow a selection of images to be chosen and to zero in on particular aspects of the images. Finally the whole exercise has had to be packaged and reported to the customer. The system, in its entirety, has been tested for six months to iron out any problems.

These are the images that you are now seeing on your reports. The laboratory has the option to capture as many images on each sample as it desires and the diagnostic department has the option to

select between one and four of those images to illustrate what may be visible in an oil sample. Generally, only two images will be presented – mainly due to lack of space (physical and electronic). The left hand panel will show a view of the debris pad, unmagnified. This is to give an overall impression of what the pad looks like. The right hand panel will show debris of interest, magnified twenty times which is the typical magnification used in the diagnostics department.

It is important to note here that, although a lot has been invested in this exercise, the system is not perfect and therefore each debris pad will still be examined by a qualified diagnostician. The MPE and the diagnosis is based on what is seen under the microscope, not necessarily what is in the photograph.

The combined images (shown below) are stored on the database at WearCheck and can be emailed separately as low resolution jpg files should customers require them for the preparation of reports or presentations. High resolution images are stored separately but can be accessed and put on disc for more in-depth investigations. The whole service has been added on at no extra charge except for the provision of high resolution images which will incur an extra cost.



Coarse dirt in a hydraulic power pack



Aluminium and clutch pack material from a transmission



TRANSFORMER OIL SPECIALIST

Transformer laboratory chemist, Loshini Govender

Loshini Govender has joined WearCheck's TransCheck transformer laboratory as chemist. She is highly respected in the industry having set up the transformer oil testing laboratory of Fluidex Engineering in 1997 and handled the transfer of the operation to GE Energy which bought the facility in 2004. At GE she was responsible for the efficient running of the laboratory

including staff training, sourcing of laboratory equipment and chemicals, maintenance and calibration of all laboratory equipment, method validation and customer liaison. Prior to this, she worked as a stability chemist for Glaxo-Welcome, as a QC analyst for Wellcome Pharmaceuticals and as an analytical chemist for the development arm of CG Smith Chemicals.

Loshini has a National Diploma in analytical chemistry from ML Sultan Technikon in Durban and is working towards her HND in Chemistry.

'We are fortunate to have Loshini on board,' says WearCheck MD Neil Robinson. 'She is a well known specialist in her field and an asset to our new transformer laboratory.'

ON-SITE CO-ORDINATOR



External data processor, Lee Clack

New WearCheck employee, Lesley 'Lee' Clack, is based at the offices of a Johannesburg customer – a major equipment supplier - fulfilling the role of external data processor. Lee attained her National Senior Certificate in Business Studies from Germiston Technical College and has completed two of WearCheck's oil analysis courses. She has eight years of administrative experience in a workshop environment, most recently with B&E International as

junior cost controller and plant maintenance administrator co-ordinating the WearCheck programme. In this time she conducted work order reconciliations reflecting workshop purchases and labour on project repairs and fabrication, and generated plant return and vehicle reports.

As plant administration manager she oversaw all routine and scheduled maintenance tasks and evaluated all WearCheck oil analysis reports, referring queries to the appropriate personnel and

following up on progress. Using NetCheck, Lee produced a weekly report reflecting overdue services and problematic samples, incorporating this into B&E's own maintenance management system.

'Lee is another valuable addition to our Gauteng customer support team in response to feedback from clients,' said technical consultant, Wade de Chalain.

2007 TRAINING COURSES

Course	Johannesburg	Pinetown
NetCheck: Software	11 June, 15 October	13 August
WearCheck 1: Oil analysis orientation	12 June, 16 October	14 August
WearCheck 2: Understanding oil analysis	13 June, 17 October	15 August
WearCheck 3: Report interpretation	14 June, 18 October	16 August
WearCheck 4: Management	15 June, 19 October	17 August
Machinery & Lubrication: Level One	25-27 June, 1-3 October	
Machinery & Lubrication: Level Two	28-29 June, 4-5 October	

The WearCheck courses are full day and cost R 1550 plus VAT with the exception of Course 4 which is half day and costs R550 plus VAT. For bookings phone Michelle van Dyk or Cathy Bolton on (011) 392-6322.

The Machinery and Lubrication (MLA) courses are run in joint venture with the ABB School of Maintenance. Level One is a three-day course costing R5456.85 plus VAT. Level Two is a two-day course costing R4354.35 plus VAT. For more information and bookings phone Lisa-Anne Fairley on (011) 236-7342.

EMPLOYMENT OPPORTUNITIES

WearCheck currently has vacancies. If you are interested in an employment opportunity with the company, please visit our web site: www.wearcheck.co.za/careers.htm

If you would prefer to receive future issues of WearCheck Monitor and Technical Bulletin via e-mail instead of in printed form, please e-mail a request to: support@wearcheck.co.za

THE LEADER IN OIL AND FUEL ANALYSIS

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