

Atlantis Mining

Oil Analysis prevents equipment failure for Atlantis Mining

Oil Analysis by WearCheck Africa proved instrumental in avoiding machine failure on two of Middelburg mining contractor Atlantis Mining's earthmoving units recently by detecting component wear in time.

All of the Middelburg-based mining contractors' fleet Caterpillar, Komatsu, Hitachi, Volvo and Terex equipment have been on WearCheck's oil analysis programme for the past 12 years.

On this occasion, one of the machines was a Caterpillar D9T bulldozer where samples on both final drives were diagnosed by WearCheck as borderline. The oil was resampled and drained but the samples came back as borderline again. Atlantis resampled the new oil after 100 hours in use and submitted this to WearCheck. Again the sample was borderline.

Critical Sample

'The misleading factor was that the magnetic plugs showed no signs of contamination,' said Mark Johnstone, managing director of Atlantis Mining. 'We continued to run the machine whilst monitoring the final drive oil samples until we were advised of a critical sample at 9028 hours. Again the magnetic plug showed no signs of contamination, but it was decided that the final drives should be opened.'

Machine Failure Avoided

Three weeks later the workshop removed the final drives at 9192 hours. On disassembly it was found that the inner bearing had started to 'pit' and that the wear was starting to go through the hard facing. All the bearings were replaced and a major failure was avoided.

'This was thanks to our successful oil sampling programme, accurate diagnosis by Wearcheck technicians and timeous action,' Johnstone said.

'Knowing that we can rely on our oil analysis programme gives us peace of mind, particularly as we are working with machines that are costly to replace and where equipment downtime quickly eats into profits. It is a cost-effective conditioning monitoring tool that has proved its worth time and time again.'



Concor

Condition Monitoring pays dividends at Concor plant

'**Condition monitoring** plays a primary role in maintaining our extensive fleet of construction plant and equipment,' Eric Baker, Concor Plant's technical manager, says. 'This proactive approach has paid significant dividends in terms of eliminating mechanical failures and generally optimising our fleet's operational efficiency and performance.'

'Since we engaged oil and fuel analysis specialists WearCheck to initiate a continuous programme of oil and wear particle analysis on our plant in 2009, the savings have been substantial.'

Condition monitoring - a key element in planned maintenance - allows remedial action to be taken to avoid the high cost and lost time consequences of component failure. Condition monitoring of plant and equipment is based on trend analysis and regular sampling. Concor Plant has nearly four hundred major items on the WearCheck system and Baker says this has boosted the fleet's reliability enormously.



Regular Sampling

All large frontline machines fitted with hour meters are regularly monitored on-site to flag potential problems, especially the highcost items such as drive train components. Samples are taken at predetermined times. For example, engine oil is sampled every 250 hours.

When potential problems are flagged during WearCheck's sample analysis, additional testing identifies the root cause. At least 90% of all samples are processed within 24 hours.

WearCheck generates a comprehensive in-depth report on the component's condition, provides a diagnosis and recommends corrective action.

Concor Plant sites and head office have internet access to the data, including critical data which indicates the level of urgency. Each site must respond daily with the appropriate action to the sample data.

"The big issue is being able to identify a potential problem before it develops into a full blown failure," Baker says. "Although the reports we receive are extensive, giving us information such as contaminants present, status of lubrication and viscosity, the system is only as good as the person monitoring it."

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Major Coal Mine

Oil Analysis Saves R1,7 Million

An **oil analysis and quality control programme** implemented at a colliery near Gauteng saved the mine more than R1,7 million in a single financial year.

The mine had 45 units of equipment on the WearCheck programme ranging from draglines, drills, haul trucks to secondary equipment such as front-end loaders, graders, water tankers, tyre dozers, trucks and LDVs.

Their maintenance programme was implemented following repeated failures of the final drives on the 789 dump trucks without warning, resulting in massive repair costs and high downtime figures.

Investigation – Ferrography Reveals All

The mine's condition monitoring specialist asked WearCheck to help solve the problem. During the investigation, data was gathered on the oil condition, contaminants, maintenance practices, environmental influences and operating conditions.

Because of the common oil compartment of the diff and two final drives, an increase in wear metals was revealed through standard oil analysis, but it remained difficult to pinpoint the component that was failing.

The mine's maintenance team was asked by WearCheck to gather magnetic plug debris to accompany every sample, hoping to identify the origin of the wear, and a solution was found. Because of the layout of the component and the size and weight of the wear particles, the debris found on the magnetic plugs was representative of the specific component.'

Using ferrographic analysis, the wear on these final drives were accurately trended. When the alarm level was reached, the measurement of wheel deflection was recommended. By comparing these measurements with given specs, the amount of bearing wear could be determined. Whenever these measurements were above given specs the strip-down of the final drive could be planned.

After implementing ferrographic analysis, the mine encountered only one unplanned failure on a final drive, which was due to a broken retainer bolt. Complete oil changes were reduced to 17 over the year in comparison with 35 changes the previous year, amounting to a saving of 10 980 litres of oil.'



Sappi Saiccor

Equipment availability soars for Sappi Saiccor

Since Sappi Saiccor implemented **WearCheck's oil analysis programme** several years ago, equipment availability for production has soared.

So says Ephraim Tekete, reliability engineer for Sappi, which is SA's only producer of dissolving pulp for export.

Sappi Saiccor, situated on KwaZulu-Natal's South Coast, has more than 800 components on the WearCheck programme, in equipment ranging from log loaders, turbines, bulldozers, conveyors, blowers, pumps and chipper drives to roll drives, presses and refrigeration units.

'Within the last year alone, WearCheck detected hundreds of critical problems, 88 urgent cases and 298 borderline samples – all of which could have resulted in failures,' says Ephraim. 'Oil analysis has proved to be one of the best predictive technological tools available for both fast and slow turning oil lubricated machinery.'

Ephraim cites a specific example in which oil analysis saved the company a substantial amount of money. When WearCheck found increasing wear on the non-drive end (NDE) bearing of a vertically mounted 645 kw motor operating one of the company's water intake pumps, Sappi Saiccor's condition monitoring team was alerted to the problem.

The company's two-weekly in-house vibration monitoring diagnosis confirmed there was a problem, and the motor was sent for an overhaul. When the motor was opened, the NDE bearing showed evidence of bearing creep or turning in the housing. They also found heavy wear metal sediment on the bottom of the bearing housing, the cage was broken and there was excessive wear on the rolling element and raceways.

'If the bearing problem had not been detected, the machine could have failed catastrophically, resulting in great financial losses,' said Ephraim. 'The replacement value for the motor alone is in excess of R650 000, without taking into account the cost of downtime and loss of production.'

Components on the WearCheck programme are sampled according to a planned schedule. Oil analysis complements Sappi Saiccor's other predictive maintenance tools, including thermography, ultrasound and vibration analysis.



Sappi Proactive Maintenance Team

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