

ANOTHER 'FIRST' FOR S.A.

Wearcheck opens R2m HQ

WEARCHECK has claimed another first for South Africa with the opening of its new purpose-built high-tech laboratory and head office at Westmead, Pinetown.

The R2 million facebrick complex is both attractive and functional and has been built for efficiency and comfort, says managing director Wally Crawford.

"Ours is the first laboratory in South Africa to be built specifically for services based on oil analysis and one of only two or three such installations worldwide," he says.

Also housed in the Westmead complex is the head office of Maintech, sister company to Wearcheck, which specialises in proactive maintenance programmes for industrial machinery.



Impressive facade of Wearcheck's new head office and laboratory at Westmead, Pinetown.

Careful planning was necessary to ensure that the move from Wearcheck's previous headquarters was completed without disruption to sample processing and diagnosis.

Prominently situated in a new extension of Westmead and conveniently close to Greater Durban's freeway network, the

new laboratory complex has been designed for efficient flows of sample material and data, while ensuring a safe and pleasant environment for staff.

"Good working conditions are conducive to high productivity and staff stability, so we have paid attention to providing attractive rest areas, good air-conditioning and separately ventilated fume cupboards for special test procedures," says Mr Crawford.

"Custom-building has allowed us to create special solvent stores, external collection points for used solvents as well as workshops for filter-cutting and sample bottle recycling."

Mr Crawford says the new complex has been designed to permit considerable expansion, in terms of sample throughput and support staff.

"By completing the move in the present economic climate, Wearcheck has undoubtedly secured excellent facilities at favourable cost. This means we are now ready to cope with the upturn in business that will follow a political settlement and a general improvement of economic conditions."

• Address details and phone numbers appear on the back page of this publication.

Digital speed-up

UPGRADED computer links mean that Pinetown-based Wearcheck's new oil analysis laboratory and diagnostics facility is as good as if it was on the Reef, says managing director Wally Crawford.

Coinciding with the company's recent move to custom-built premises at Westmead, Pinetown, Wearcheck has changed from the X25 packet switching system to a Diginet link with its Transvaal branch office at Bedfordview.

This offers enhanced data links between the offices, plus private voice channels that give Bedfordview a permanent hotline to the laboratory.

Mr Crawford says: "New technology now on the market makes this a cost-effective solution to the spiralling costs of conventional communication by post and telecommunications."

"Diginet technology will enable Wearcheck to achieve considerable cost savings and to provide a faster, more reliable service to customers."



Directors of Wearcheck in their new boardroom are, from left: Wally Crawford (managing), Lesley Crawford (technical) and Gary Brown (technical).

High-tech facilities

Wearcheck's laboratory — the focus of its new headquarters — is big, busy and packed with high-technology instruments, many of which feed results directly into the diagnostics computer system. These facilities keep Wearcheck among the world's leading oil analysis specialists and enable the company to offer the most comprehensive lubricants testing and diagnosis service in Africa.



TECHNICAL NOTEBOOK

Total base number (TBN)

By GARY BROWN

DIESEL fuel usually contains up to 0.55% sulphur which, during combustion, can produce sulphurous or sulphuric acids in the engine's lubricating oil.

These corrosive substances are normally neutralised by magnesium and/or calcium additives which turn them into harmless sulphates. Analysis of sulphate levels yields much information on oil and engine conditions.

A high concentration of sulphates in used engine oil indicates an excessive formation of acids — due either to overcooling, stop-start operation or to an extended period of oil use.

By measuring the build-up of sulphates in the oil and knowing how long the oil has been in use, we can determine the rate at which neutralising additives are



GARY BROWN

being depleted.

At Wearcheck we use an infrared spectrometer to determine the build-up of sulphates and oxidation by-products and the reasons — eg extended oil drain intervals, overheating, overcooling or excessive blow-by.

If the sulphate level is too high, we carry out a Total Base



Wearcheck's infrared spectrometer.

Number (TBN) analysis to determine the actual reserve alkalinity of the lubricant.

The TBN test involves pouring acid of known strength into a sample until it ceases neutralising.

The higher the TBN, the greater is the oil's ability to neutralise acids.

A low TBN can also be the

result of subjecting the lubricant to high temperatures, which oxidises the additives.

The advantage of determining the build-up of these by-products of combustion in the oil is that the infrared spectrometer will indicate a problem long before the TBN has been drastically affected. In this way corrosive wear is avoided.



Computer team expands service

GROWTH of Wearcheck's information systems has seen two recent new appointments at the Westmead headquarters.

Englishman Michael Coaker, who emigrated from Middlesbrough eight years ago, is an analyst/programmer responsible for systems maintenance and development.

Stellenbosch B.Sc graduate Jill Brown is the new data processing supervisor, in charge of the data input department.

Here the two discuss aspects of the Wearcheck computer system.

Long-range diagnosis boost

LATEST electronics technology makes international oil analysis and diagnosis a viable possibility, says Wally Crawford, managing director of Wearcheck.

And with this comes the opportunity to earn more foreign exchange — and goodwill — through the exporting of South African know-how into Africa.

The Pinetown-based oil analysis laboratory already uses sophisticated computers to process large volumes of test results and diagnostic reports — and to communicate with customers throughout South Africa.

It is now researching other channels to increase the flow of information to and from remote sites where large fleets of construction and mining equip-



WALLY CRAWFORD

ment and heavy transport vehicles are operating north of the Limpopo.

Mr Crawford says: "New mines and major construction projects tend to be in some of the most remote areas imaginable. This undermines the effectiveness of conventional oil analysis and diagnosis because of

delays in getting samples to the laboratory.

"The purpose of our service is to provide fast and accurate reports of engine and drivetrain conditions. If a sample shows evidence of an imminent breakdown the user must be warned before a component failure becomes an expensive repair.

"Some of our larger distant customers have overcome this problem by installing on-site oil analysis facilities. This is easy if they require a laboratory and qualified chemist for other reasons as well.

"Analysis data is sent by computer to Wearcheck, where our diagnosticians prepare their reports for rapid return to the customers. We also provide a calibration service to ensure that

test results from remote sites are fully compatible with those from our laboratory."

Mr Crawford says some of the larger South African transport and construction groups which are moving northwards into Africa are starting to use satellite systems to keep track of their assets.

"Much of the live TV coverage of the Gulf War was possible because of satellites. With the growing ability to multiplex signals, existing satellite channels will vastly increase their carrying capacity, making more time available to new users. This will enable Wearcheck and other companies dependent on good communication to expand services into areas previously impossible to reach."

MAINTTECH ON THE GO

Pioneering on the mines

MAINTTECH has pioneered predictive maintenance methods — with state-of-the-art monitoring equipment — for opencast mining machinery.

Sensitive vibration and lubricant monitoring provide machine maintenance crews with timely advice on machine requirements. This service gives mining engineers the confidence that their machines will continue to operate reliably, and enables them to plan for repairs.

Maintech's monitoring methods have been applied to rope shovels with components running at varying speeds and to hydraulic shovels which use pumps and motors assembled in clean-room environments.

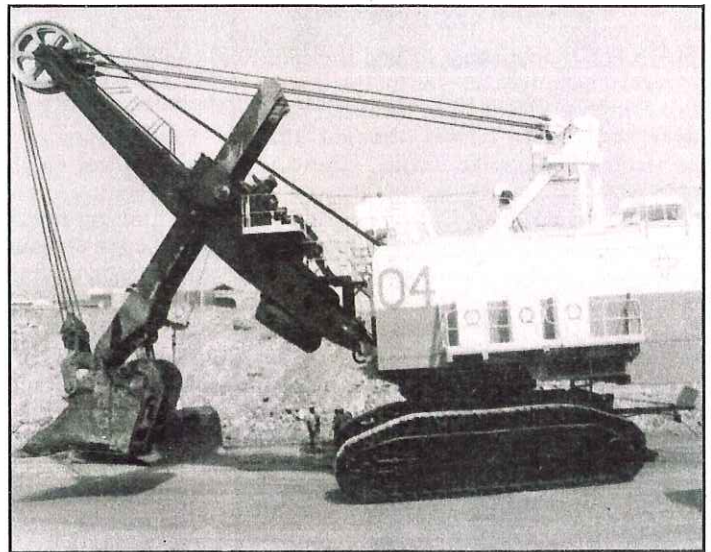
"Contamination of hydraulic fluids proves disastrous to these components," says Maintech managing director Michael Paul. "So we use a recently developed particle counting instrument to ensure the fluids meet internationally recommended cleanliness levels.

"Our service provides meaningful information to the maintenance personnel as well as a simple go/no-go gauge for machines vital to the livelihood of the mine."

Earthmoving machinery

works in the most arduous conditions of any industry, with shock loading and a dusty environment. Tasks such as daily inspections become difficult in these conditions, with the risk of introducing contaminants to lubricated systems.

Service backup is a Maintech strongpoint, says Mr Paul. "Mines are usually in remote areas, and staff often feel neglected by city-based service teams. Our service is designed to be on-site at a call, putting personal service foremost."



Predictive maintenance for big machines.

... and plenty for industry

IN the year since its launch, Maintech's industrial predictive maintenance service has expanded to meet the needs of large operations throughout southern Africa.

The service incorporates machine monitoring using vibration and oil analysis, maintenance management expertise and skills training. This package complements the Wearcheck oil analysis programme, providing users with a variety of services.

Maintech's engineering team

conducts on-site monitoring of machine conditions including collection of oil samples for laboratory analysis. And with the growing need for awareness and training in new maintenance methods, several special courses are available for in-house presentation or at Maintech's new Westmead headquarters.

Managing director Michael Paul says: "Many companies are uncertain about changing their maintenance policies and imple-

mentation of new methods. Our courses can show the experiences of other industries, enabling companies to embark on proven implementation programmes at their own speed."

Central to any company's maintenance programme is a maintenance planning function, with either manual or computerised planning facilities. Maintech offers to audit existing systems and can implement improvements where necessary.

Changing times in chemistry



NEW in the driving seat is Wearcheck laboratory manager Alistair Geach, who is responsible for ensuring that all oil samples are tested quickly and accurately.

A graduate of the University of Natal, where he obtained a B.Sc in chemistry and applied chemistry, Mr Geach taught for two years after gaining a teaching diploma in the then Rhodesia.

He then moved into industry, where he specialised in the chemistry of vegetable oils and rubber before switching to lubricants.

Mr Geach says the role of the

chemist in industry has changed significantly with the advent of large-scale computerisation of test procedures.

"We are moving further from traditional wet chemistry and closer to chemistry by calibration.

"In a big laboratory like we have at Wearcheck, the chemist's job is to ensure that all the instruments are performing correctly so that the bulk of samples can be processed with minimal human intervention.

"In fact the volume of samples is too great for me to study each one — but I have to be ready to look at the exceptions."

ENGINEERING CASE STUDY

Bouncing to destruction

By MICHAEL PAUL

MAINTECH was asked to find the cause of regular bearing failures on motors driving two compressors in a toxic chemicals plant near the coast. It was thought that apparently excessive frame vibration contributed to brinelling and subsequent failure of the bearings.

"Brinelling" is indentation damage to bearing races when rollers are subjected to vibration or high impact while not rotating. It results in spalling of the races and bearing failure.

Initial inquiry into the problem showed:

- motors were being changed every three months.
- each compressor was run in alternate weeks to reduce the chance of brinelling the motor bearings.

Machine alignment had recently been corrected and was ruled out as a likely cause of failure.

Vibration levels on the drive end bearing

of the stationary motor were 2 mm/s. Although not high for a running machine, this vibration can initiate brinelling on stationary bearings.

Examination of vibration spectra at several points on the installation showed peak vibration levels at a frequency of six times running speed, which corresponded with the six cylinder configuration of the compressor.

Maximum vibration amplitude was found in the centre of a cross member directly under the motor. Unusually, this cross member was not joined to any other along its length and it was seen to resonate strongly at 150 Hz (six times running speed) with a very high amplitude of 70 mm/s. (20 mm/s would be considered excessive).

The natural resonance frequency of the cross member was determined by a "bump test" to be 150 Hz.

Vibration analysis showed there was slight damage to the drive end bearing of

the operating compressor. Bearing travel speeds over the inner and outer races were calculated at 145 Hz and 196 Hz respectively, and harmonics of both frequencies could be discerned above the resonance vibration. Any bearing with a ball pass frequency close to 150 Hz would have the slightest damage accelerated by the destructive interference of the resonance. It would literally bounce to destruction!

The steel structure on which the two compressors were mounted had a resonant vibration synchronous with the operating frequencies of the compressors. Resultant vibration amplitudes excited on the stationary compressor were clearly enough to initiate brinelling of the motor bearings.

- Maintech recommended that the shape of the mounting structure be changed to alter its natural resonant frequencies. Stiffening individual members would have had limited effect; re-design was preferable, mounting the compressors on separate concrete plinths.

MAKE sure you receive future issues of Wearcheck Monitor. Fill in this coupon — or make a copy of it — and post it today to: Wearcheck, P O Box 731, Pinetown 3600
Please put me on the mailing list for Wearcheck Monitor.

Name

Position

Company

Business Address

..... Phone (.....)..... Fax (.....).....

Type of business

I would like more information about: Wearcheck Maintech

M3

Where to find us

TRANSVAAL
SWF House Mullin & Sovereign Streets, Bedfordview, P.O. box 75416, Gardenview 2047.
Phone: (011) 616-5200 Fax: (011) 616-5305 Telex: 42-1719.

NATAL
Wearcheck 9, Le Mans Place, Westmead. P.O. Box 731, Pinetown 3600.
Phone: (031) 700-5460 Fax: (031) 700-5471 Telex: 62-5144.

CAPE
Olivetti House, Blanckenburg Street, Bellville. P.O. Box 186, Sanlamhof 7532.
Phone: (021) 948-5797 Fax: (021) 948-5798.