

# CUSTOMER CHRONICLES



NEWS YOU CAN USE FROM BARLOWORLD EQUIPMENT AND CAT® 1<sup>ST</sup> EDITION 2014

**GET CONNECTED**  
See Cat EMSolutions poster inside!

## CONTENTS

CIVIL ENGINEERING	2
CSI	3
PAVING	4
TELEHANDLERS	5
FUEL & OIL	6 & 7
GET/UNDERCARRIAGE	8
ENGINES	9 & 10
CRUSHING & SCREENING	11

**Condition Monitoring & Cat® S•O•S<sup>SM</sup> Services: It works for you!**  
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## CONTACT US

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**MACHINE HEALTH AND LOCATION**

# IT PAYS TO KNOW

*Introducing Cat® EMSolutions: a technology enabled system that keeps machines connected and working*

**O**n 15th January 2014, Barloworld's Equipment Monitoring Bureau officially came on stream, automatically connecting to and interacting with a diverse construction and mining Cat machine population that are 'Product Link™ ready', communicating via GSM or satellite technology to a dedicated control room at the Barloworld Condition Monitoring Centre in Boksburg, Johannesburg. (Product Link is Caterpillar's onboard transmitting hardware.)

An ongoing roll-out will extend coverage across the southern African region during 2014 as successive machines are 'switched on'. GSM technology coverage is available throughout southern Africa, with satellite catering for remote connections outside the cellular grid. (GSM provides the best platform for near real-time tracking, providing immediate and/or hourly reporting on machine health, location and utilisation, whereas satellite is generally limited to daily reports.)

A comprehensive remote monitoring and asset management service offered in five levels, Cat EMSolutions meets every operational scope requirement, from plant hire and construction fleets to full-scale mine sites. Cat EMSolutions

levels range from information access to full service and maintenance support options.

"The introduction of Cat EMSolutions places Caterpillar at the forefront of original equipment manufacturers in the field of advanced conditioning monitoring," explains Barloworld Equipment Bureau manager, JP Briggs. "Research confirms that customers are seeking consistency and standardisation, areas where Cat EMSolutions is designed to deliver."

### VisionLink®

Product Link's intuitive web-based browser interface is VisionLink®, accessed via a PC or through Smartphones, making it easy for users to zoom in from any

location globally for a detailed look at individual assets.

Supporting tools include Cat S•O•S<sup>SM</sup> Services fuel and oil analysis programmes, housed at the Barloworld Conditioning Monitoring Centre, which are in turn accessible via VisionLink and optional or inclusive on all Cat EMSolutions options (depending on the level selected). Cat S•O•S Services are an essential component in machine life cycle costing, predictive and preventative maintenance strategies.

Key EMSolutions features include near real-time fuel level information; machine filtering by job site / geographical location; multiple machine tracking; payload displays on medium and large wheel loaders; and geo fencing capabilities.

Meanwhile, at the Equipment Monitoring Bureau, a dedicated Barloworld Equipment team tracks individual machine data feeds downloaded via their onboard ECM (Electronic Control Module) computers.

Alerts received via the Equipment Monitoring Bureau provide location and utilisation updates, with more detailed information transmitted depending on the Cat EMSolutions level selected. Alerts sent via Cat ECM systems notify fleet



▶ (To page 3)

## 2 | CIVIL ENGINEERING



The Pedicle Road interconnects Zambia across a section of the DRC.

# Transforming the Pedicle Road

Kitwe based multi-disciplinary contractor, Copperfields Mining Services, is forging ahead on a number of contracts forming part of Zambia's Link 2 000 and Link 8 000 road upgrade programmes.

**F**or many decades, dating as far back as the 1950's, the Pedicle Road has served as an important transit route across one of the Democratic Republic of the Congo's (DRC's) southern most sections (the Congo Pedicle), in the process connecting Zambia's Copperbelt and Luapula Provinces over a distance of approximately 70km.

Interconnected by two international border posts, and travelling on the right-hand side of the road as per DRC ordinance the route, which experiences high truck traffic volumes related to the copper mining industry in both countries, starts at Mokambo some 16 km distant from the Zambian town of Mufulira and ends at Chembe. Here a single lane bridge currently crosses over the Luapula River and then back into Zambia en route to Mansa. Without the Pedicle Road option, motorists would have to drive up to a thousand kilometres around the Congo Pedicle to reach Mansa, as well as other key destinations in Luapula Province, such as Kasama.

Historically a two-way gravel road that becomes near impassable in the rainy season, the Pedicle Road is now undergoing a major upgrade to a world class bitumen riding surface following a 100 percent investment by Zambia's Roads Development Agency (RDA), with full approval by the DRC government. (Zambia also funded the construction of the original road.)

The approximately 278 million kwacha RDA contract is being undertaken by Kitwe based Copperfields Mining Services (Copperfields), an integrated mining,



Copperfield Mining Services' Cat RM500 is being deployed for the cement stabilisation phase.

earthworks and road construction company, in conjunction with Rankin Engineering Consultants. Included in Copperfields' scope of works on the Pedicle Road is the widening of the Luapula River Bridge to a two lane structure. The contract was awarded in November 2012 for scheduled completion in November 2014 working within the planned constraints of the annual rainy season.

Pedicle Road forms part of the Link Zambia 8 000 Road Project (also known as the Accelerated National Roads Construction Programme), with a planned target of upgrading approximately 8 000 km of national road over a five year period.

An Allied RDA initiative known as Pave Zambia 2 000 (Link 2 000) plans to repave approximately 2 000 km of township roads in 10 provincial centres.

In terms of current Link 2 000 projects, Copperfields secured a contract during 2013 for township upgrades in the Copperbelt town of Ndola, where work is currently ongoing. Valued at approximately K78 million, Copperfields' project scope covers a total area of 20,9 km, with a timeframe of approximately two years.

These urban roads are being milled and relayed with a 40 mm asphalt premix, with Copperfield's Cat AP300D paver

deployed to ensure perfect matt surfaces. Supplied and supported by Barloworld Equipment Zambia, Copperfields' Cat AP300D forms part of a comprehensive Cat fleet, which includes the acquisition of a Cat RM500 rotary mixer deployed on the Pedicle Road contract.

The new Pedicle Road features a cement stabilised sub-base, with Copperfields' Cat RM500 rotary mixer responsible for all stabilisation phases.

Copperfields' first Cat rotary mixer acquisition, the company's managing director, Irvin Chilufya, says that the production results have been excellent. "On the Pedicle Road project we've never had to re-do any of the areas that we've stabilised with the Cat RM500, which consistently provides optimal results to engineering specification," he explains.

Africa's largest copper producer, Zambia is surrounded by eight countries and is strategically positioned to become a major regional trade hub, backed by Gross Domestic Product projections of up to 8% annually over the next five years. Rather than being landlocked, Zambia's Link 8 000 project intends to make the nation 'land linked', in the process stimulating macroeconomic growth at home, as well as within the wider southern and central African region.



### Did you know?

Each year Caterpillar invests substantially in research and development across its extensive product range. During the 2013 and 2012 financial years, for example, this figure was around US\$2 and US\$2,5 billion, respectively, or approximately 3,7% of total annual sales and revenues.

Examples of new product innovations include the latest generation Cat MD5150C track drill. The first of the C Series drills, the MD5150C delivers top-of-class power and high airflow for fast, efficient drilling of holes from 4 inches (101,6 mm) to 6 inches (152 mm) in diameter.

Powered by a Cat C11 ACERT engine, the MD5150C offers a choice of three different rock drills, a patented carousel rod changer, and many other features designed to boost productivity and reduce operating costs.



**MACHINE HEALTH AND LOCATION**

# IT PAYS TO KNOW

*(continued)*

◀ (From page 1)

CAT EMSOLUTIONS LEVELS RANGE FROM INFORMATION ACCESS TO FULL SERVICE AND MAINTENANCE SUPPORT OPTIONS.

owners when standard protocols have been exceeded. Examples of typical alerts are 'engine over speed', 'high torque converter oil temperature', 'machine abuse', and 'implement hydraulic oil temperature high'.

There are degrees of alerts, depending on the severity of the outcome. A Red 'Level 3' alert status, for example, would indicate the need for an immediate mechanical shut-down and service support. "Planned and well-managed maintenance programmes provide the best assurance of high machine availability within budget, which is where routine use of Cat S•O•S Services provides a high degree of certainty," says Briggs. All S•O•S sample results and reports for each machine are easily accessible via VisionLink.



This illustration shows the Product Link antenna and ECM unit for a GSM 'over the air' transmitting system (1); with Cat EMSolutions data accessed by the internet based VisionLink portal (2).

**Five options to choose from**

The five Cat EMSolutions packaged options are Level 1 Access; Level 2 Inform; Level 3 Advise; Level 4 Support; and Level 5 Manage.

In terms of summary overview, Level 1 Access, enables users to access the VisionLink portal to know where their equipment is and what it's doing with remote, near real-time information.

Level 2 Inform enables users to manage equipment health and utilisation trends compared to benchmarks via automated reporting. These reports show a range of parameters such as fuel burn trends by machine and site application; fault codes that indicate a need for operator training or repairs; the amount of time units spend idling as opposed to earning; and confirmation on individual machine hours recorded in order to schedule prescribed maintenance. The Equipment Monitoring Bureau generates a monthly fleet summary report for the customer, highlighting areas for potential improvement.

With Level 3 Advise, the package moves beyond pure reporting to include expert dealer recommendations. A Barloworld Equipment condition monitoring adviser provides valuable advice about maintenance, utilisation and repair, drawing from the data trend analysis generated. These recommendations work hand-in-hand with a conditioning monitoring programme that can include in-field machine inspections, and fluid analysis via the Cat S•O•S Services programme.

Level 4 Support builds on Level 3 and caters for larger fleet owners, entailing the outsourcing of fleet maintenance, parts or repairs to a dedicated Barloworld Equipment technical services team, backed by the full EMSolutions and S•O•S suite, plus a dedicated conditioning monitoring adviser.

For mining customers, Level 5 Manage is in turn a negotiated maintenance and repair contract option where Barloworld Equipment has sole responsibility within predetermined maintenance pricing structures for agreed machine rolling availability targets.

"Level 3 offers the best overall advantage for fleet owners seeking the benefits of mutual-monitoring, S•O•S analysis and constant on-line remote tracking and reporting by Barloworld's Equipment Monitoring Bureau," adds Briggs.



Product Link transmitting hardware for a GSM system.

CORPORATE SOCIAL INVESTMENT

## THE NELSON MANDELA CHILDREN'S HOSPITAL

*An enduring legacy project*

*A dedicated Cat fleet is being deployed for the earthworks programme.*

The official launch ceremony on 20th March 2014 marks the start of the construction programme for the Nelson Mandela Children's Hospital (NMCH), which is being built on previous Wits University grounds at their Parktown campus. The ground was donated by the university.

Scheduled to open in March 2016, the NMCH has been designed as a 300 bed hospital, with 200 beds catered for in the first phase. This will be a specialised children's hospital, in addition to serving as a research and training facility.

The sod-turning ceremony culminated with the display of a Cat Rental Store fleet, which is being deployed for the earthworks phase, carried out by specialist contractor, Zero Unlimited Earthworks.

These earthmoving machines have been supplied by Barloworld Equipment's Cat Rental Store as part of a Barloworld Limited corporate social investment (CSI) donation of around R2,3 million to date.

Units deployed comprise two Cat 329D hydraulic excavators, a Cat 140K motor grader, a Cat D6T track-type tractor, and a Cat CS533E roller, all of which will play their part in founding the future for this iconic legacy project.



At the official ground breaking ceremony are (from left to right) Lethiwe Motloung, head: group communication and marketing, Barloworld Limited; Jennifer Smith, head: CSI and stakeholder management, Barloworld Limited; Sibongile Mkhabela, CEO, Nelson Mandela Children's Hospital Trust; Clive Thomson, Chief Executive, Barloworld Limited; and Lesibana Ledwaba, executive director, Barloworld Equipment. The two children seated are hospital brand ambassadors.



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## 4 | PAVING

# Versatility and mobility

Introducing Caterpillar's latest generation B-Series utility compactors



The Cat CB24B XT has a 1 200 mm drum width and a standard machine operating weight of 3 301 kg. The weight at the front and rear drum are 1 496 kg and 1 627 kg, respectively. Inset: a close-up view of the extra weight set-up on the drum roller.



"Fast travel speeds ensure excellent mobility," says Hartman. "Additionally, the speed remains constant on grades, with smooth propel lever control at all speeds."

The vibratory drum deactivates automatically when the propel lever is in the neutral position, whilst the exclusive eccentric weight shaft delivers quick starts and stops.

The B-Series comes to market with a best-in-class water spray system. The large capacity water tank provides up to 12 hours of operation between refills and is equipped with a low level indicator for added convenience. Triple filtration delivers reliable performance and simplifies service.

Intermittent and continuous spray modes enable the operator to adjust the water flow to match site conditions, with the spray bars tucked under the frame for good wind protection.

Adds Hartman: "Along with achieving the right densities targets, preventing asphalt pickup is the key to keeping a fresh mat in place and in these and other areas, the B-Series sets new paving standards."

**L**aunched globally from the fourth quarter of 2013, Caterpillar's new B-Series utility compactor line-up builds on the success of the previous generation and comes to market in a nine model line-up to compete in the 1,8 mt to 5 mt size class. B-Series units are manufactured at Caterpillar's Rantigny production facility in France.

"Caterpillar's primary design goal on the B-Series is to enable contractors to achieve even more efficient compaction," explains Barloworld Equipment paving product manager, Johan Hartman, "with multiple vibration frequencies plus ballast options on specific models to provide best-in-class versatility on varied job sites in either granular or asphalt applications."

Popular B-Series units for the southern African market include the CB14B, CB24B and CB34B models. The vibratory system on these units provides a good balance between frequency and amplitude to meet diverse asphalt pavement applications that include urban streets, paths, parking lots, driveways, patching and shoulder work.

The CB14B has a default high frequency of 70 Hz; whilst the CB24B has three frequency selections, namely high (63 Hz), middle (52 Hz) and low (42 Hz). The CB34B in turn has a high and low frequency selection mode of 55 Hz and 48 Hz.

Standard operating weights for the CB14B, CB24B and CB34B are 1 520 kg (with a 1 000 mm drum), 2 723 kg (1 200 mm drum) and 3 699 kg (1 300 mm drum) respectively. Mid range extra weight machine options are also available, examples being the Cat CB24B XT and CB34B XW (with wider 1 400 mm drum width). Optional ballast configurations include the Cat CB34B and CB34 XW models, which provide the flexibility to add and remove weight on the drums, as required, for varied compaction requirements. Vibratory selection on most models includes front drum only, rear or both drums.

For final finishing, Caterpillar also fields two combi rollers, the Cat CC24B and CC34B, both of which come standard with rear pneumatic tyres and a front vibratory drum roller. "Pneumatic tyres provide a kneading action for a tight mat finish, creating high ground pressure that penetrates deep into the lift," Hartman continues.

Engine power on demand provides the push needed on grades, with units driven by either a Cat C1,5 or Cat C2,2 unit depending on the machine size. (The exception is the Cat CB14B, which is fitted with a Kohler engine.) These Cat engines are equipped with multiple speed settings and Eco-mode, which when selected delivers improved fuel efficiency and lower sound levels. Well-matched for southern Africa's climate, the engine cooling package has an ambient capability of 49°C at 80% load.



From left to right are Johan Hartman, paving product manager, Barloworld Equipment; and Matt Rowe, Caterpillar Global Paving territory manager, Johannesburg.

## Did you know?

Cat ELC (Extended Life Coolant) is used as a standard factory-fill for all Cat cooling systems?

Cat ELC reduces engine coolant and additive costs by as much as 500% compared to conventional coolants. It eliminates the need for supplemental coolant additives, extends coolant change-out intervals and reduces disposal requirements.

Cat ELC lasts for 12 000 hours or six years for general earthmoving machines.



# Portal frame steel structures built for Africa

*KwaZulu-Natal based company, Tugela Steel, adds new units to its Cat telehandler fleet to meet growing production demands.*



At any one time, Tugela Steel has over 100 portal frame buildings in stock and ready for delivery at its Colenso facility. Here one of Tugela Steel's Cat telehandlers loads a consignment for onward delivery to site.

**G**rowing in a competitive niche, Tugela Steel is a market leader in the design, fabrication and construction of portal frame clear span steel structures, with a project track record that celebrates 30 years in business during 2014.

"At any one time, we have over 100 portal frame buildings in stock and ready for delivery at our Colenso facility," says Tugela Steel's Bjorn Haug, speaking from the company's head office in La Lucia Ridge, Durban. The company currently secures around 350 orders annually for local and international projects. Tugela Steel also has a division that delivers and erects, which includes the construction of the concrete column foundations.

In addition to standard modular building sizes, Tugela Steel meets requirements for customised designs, working with the client's professional team. A recent project example is the completion of an 8 500m<sup>2</sup> coal warehouse facility for a developer in Richards Bay.

In Colenso, production continues at an intense pace, and at each stage of the fabrication process Tugela's Cat telehandlers provide the materials handling interface, ending in the loading of truck consignment stock for onward project delivery. Some of these telehandlers then switch from production to construction roles and are used for the erection of Tugela's building projects.

Tugela Steel recently expanded its fleet capability with the acquisition of five new Cat telehandlers to perform these multi-faceted tasks, one of which is a latest generation Cat TH407 C-Series unit and the first machine of its kind to be acquired in southern Africa.



Tugela Steel founder, Knut Haug and son Bjorn Haug at the company's head office in La Lucia Ridge, Durban.

Four Cat C-Series telehandler models have been launched locally, comprising the TH407C, TH414C, TH417C and TH514C models.

One of the most notable changes on the C-Series is a new four speed powershift transmission. A six speed transmission option is also available on Cat TH407C construction and agricultural specification machines. This increases the top speed from the standard 32 km/h (four speed) to 40 km/h, for longer travel distance requirements.

"The single lever, electro-hydraulic joystick has been redesigned with integrated transmission control, for ease of operation and reduced operator fatigue," explains Barloworld Equipment Cat sales professional, Egon Muller, "plus all controls, including auxiliary hydraulics, are fully proportional and controlled directly from the joystick."

The latest generation Cat TH407 C-Series unit: the maximum forward reach is 3 763 mm, and the load at maximum height and reach is 2 000 kg and 1 500 kg respectively.

THE SINGLE LEVER, ELECTRO-HYDRAULIC JOYSTICK HAS BEEN REDESIGNED WITH INTEGRATED TRANSMISSION CONTROL, FOR EASE OF OPERATION AND REDUCED OPERATOR FATIGUE.

Maximum forward reach on the TH407C is 3 763 mm, and the load at maximum height and reach is 2 000 kg and 1 500 kg respectively.

Adds Bjorn: "Whether in the manufacturing or erection stages of a project, our Cat telehandlers provide the overall versatility and speed in materials handling and lifting that a mobile crane couldn't come close to matching.

"Going forward this mechanised assurance will support Tugela Steel's expansion strategy, encompassing investment in the latest steel fabrication technologies and the creation of two dedicated production lines: one for stock buildings and the other for customised jobs to support our regional and international client base."



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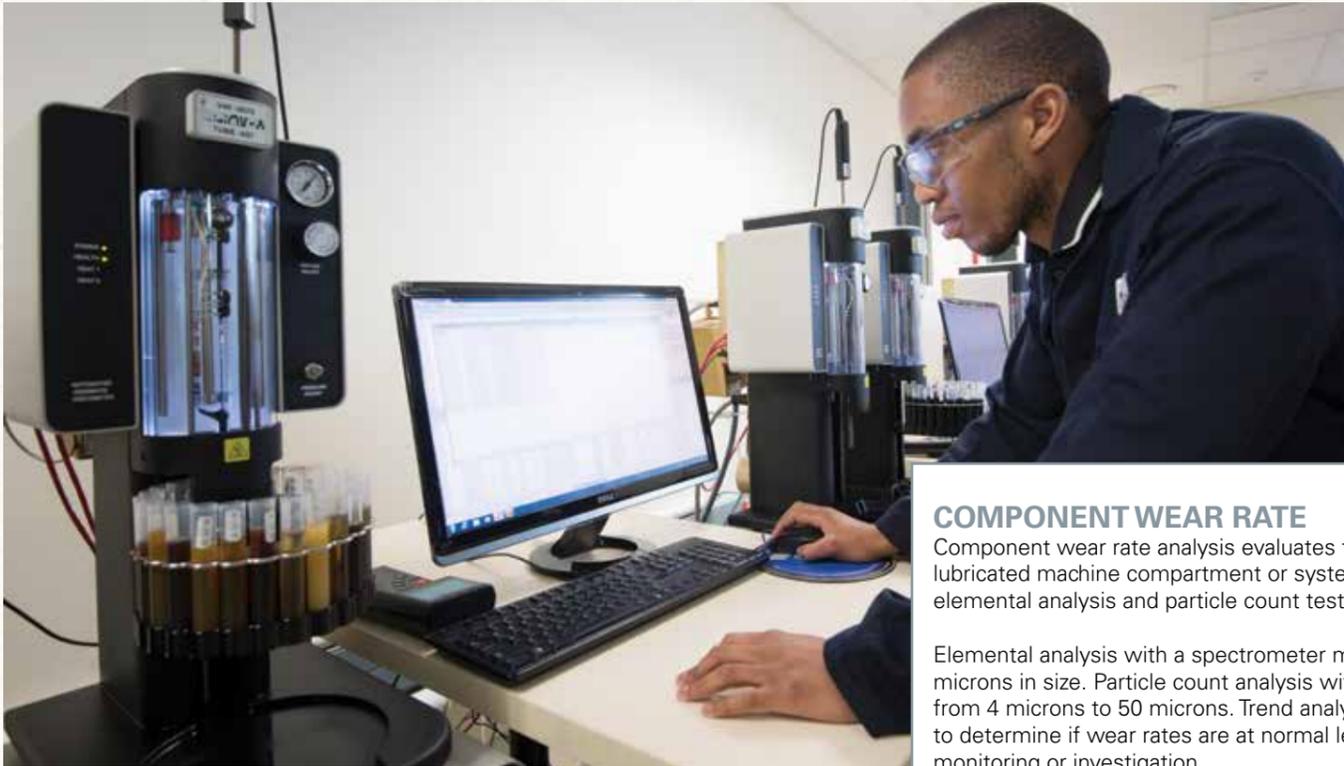


# 6 | FUEL & OIL

SECTION TWO IN A FIVE PART SERIES ON IMPROVING COMPONENT DURABILITY

## Measuring oil cleanliness, mastering contamination control

Ideally new fluids should be perfectly clean. However, during their transfer into machine systems there is always a chance that contamination can occur, which is why it is important to adhere to stipulated original equipment manufacturer (OEM) cleanliness standards.



"New oils are typically produced with very low levels of particulate or liquid contamination. However, contamination may become severe due to poor transportation and storage practices," explains Barloworld Equipment group product specialist, Reuben Phasha.

Aspects to look out for here include water condensation, metal debris released from the storage vessel, accumulated debris and water from new fluids, and dirt and water from unfiltered vent air.

"This is why on-site filtration should always be observed during fluid transfer," he continues. "Oils then need to be regularly analysed to confirm optimum health since they routinely pick up an increasing number of contaminants through usage."

The five major oil types typically found in Cat components are listed below, including their potential contamination.

**Engine lube oil** acquires wear metals from the engine along with soot that can be significant. Engine oil has the highest rate of contamination and by far typically shows the highest levels of contamination of the five oil types.

**Hydraulic oil** acquires wear metals from hydraulic components, rubber from hoses, and dirt from entry past hydraulic cylinder and motor seals. Dirt can also enter from the atmosphere through vent filters in vented systems. Hydraulic oil has the lowest contamination rate and typically remains the cleanest of the five oil types.

**Gear oil** acquires wear metals from heavily loaded gears and bearings, and some dirt past oil seals. Dirt and moisture may also enter from the atmosphere through vent filters. Nearly all gear oil contamination consists of wear metals.

New or rebuilt gear driven components will generate debris during the break-in period.

**Transmission oil** acquires debris from friction material, wear metals from loaded gears and some dirt past oil seals. Some dirt and moisture may also enter from the atmosphere through vent filters.

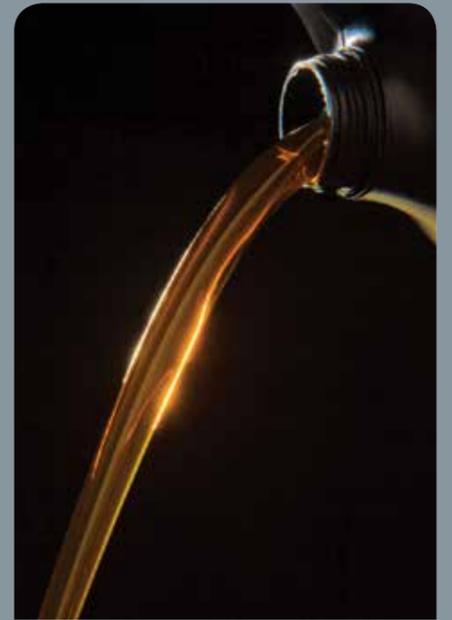
**Final drive, differential, and axle oils** acquire large amounts of wear metals from heavily loaded gears and bearings, and some dirt past oil seals. Dirt and moisture may also enter from the atmosphere through vent filters. New or rebuilt axle components will generate debris during the break-in period.

"The best way to counter and manage component wear according to OEM specifications is to remove the guess work and adopt a scientific approach," says Phasha, "incorporating Cat S•O•S<sup>SM</sup> Services fuel and oil analysis programmes into your predictive and preventative maintenance programmes."

Cat S•O•S Services are housed at the Barloworld Condition Monitoring Centre in Boksburg, Johannesburg and form part of a comprehensive suite of Equipment Management solutions.

Scheduled oil sampling is a process designed to turn fluids analysis data into usable information that can be used to help identify impending component failures before catastrophic failure actually occurs. This information is used to manage equipment and reduce operating costs. The oil analysis portion is divided into four categories, namely:

- Component wear rate;
- Oil contamination;
- Oil condition; and
- Oil identification.



### Clean by definition

Cleanliness levels (or targets) can vary based on a variety of factors such as the type of fluid and the component it is used in. In the simplest terms, clean fluids do not contain foreign particles or liquid contaminants.

### COMPONENT WEAR RATE

Component wear rate analysis evaluates the wear that is taking place inside the lubricated machine compartment or system. S•O•S Services uses the results of elemental analysis and particle count tests to evaluate the wear.

Elemental analysis with a spectrometer measures wear particles that are less than 10 microns in size. Particle count analysis with light blocking technology measures particles from 4 microns to 50 microns. Trend analysis and proprietary wear tables are then used to determine if wear rates are at normal levels or trending upward, requiring close monitoring or investigation.

### OIL CONDITION ANALYSIS

Oil condition analysis is used to determine if the oil has degraded. Tests are done to look at the oxidation, sulphation, and viscosity of the oil. Established guidelines and trend analysis are used to determine if the oil has reached its useful life. Oil condition analysis is used to evaluate oil change intervals based on the life remaining in the oil.

### OIL CONTAMINATION TESTS

Oil contamination tests are performed to determine if anything harmful has entered the oil. This analysis relies on the results from the following tests:

- Elemental analysis
- Soot content
- Particle count
- Fuel dilution
- Water content
- Glycol contamination

The Cat S•O•S Services programme has guidelines for the level of contamination allowed in the various compartments of Cat machines.

### OIL IDENTIFICATION

Oil identification is another very important part of the S•O•S oil analysis programme. The wrong oil in a compartment can severely damage major components. Elemental analysis and viscosity results are used to identify key characteristics of the oils.

The four types of analysis discussed above are used to monitor the current operating condition of equipment in order to identify potential problems so that proactive repairs can be made. Oil analysis can also be used to help extend component rebuild interval targets based on component condition.

### THE IMPORTANCE OF FILTERS

In recent years, advances in filter technology have dramatically improved the efficiency of filters available for use on machine systems. Ultra-High Efficiency synthetic media and Advanced Efficiency synthetic blend media fuel filters have been recently developed which trap and retain 4 micron particles at greater than 98% efficiency with up to three times the debris holding capacity of older cellulose filters. The ability to trap and hold more debris in the filter significantly slows the rate of particulate accumulation in the fuel.

Oil systems have also seen the benefits of this advanced technology. Systems and compartments that use these high efficiency filters operate at lower particle counts and keep oil cleaner than when a standard filter is used. Reducing the amount of particles in the oil reduces abrasive wear and increases component life plus overall system reliability.

# OPEN GEAR LUBRICANT



*Designed for Cat electric rope shovels and draglines*

**F**ormulated from a select blend of high viscosity index base oils and poly alpha olefin (PAO) synthetic base fluids, Cat open gear lube is designed to stay in place under extreme pressure and at a wide temperature range, delivering excellent protection no matter the weather or working conditions.

### Product specifics

- A high viscosity semi-synthetic compound designed to lubricate heavily loaded open gears and extend component life, while reducing consumption.
- Solid anti-wear and extreme pressure additives provide unparalleled protection in the most heavily loaded zones of gear tooth mesh.
- Available in two grades to accommodate a wide range of temperatures. Warm Weather is recommended for ambient temperatures ranging from -7°C and above.
- Resists wash-off in rain.
- And is environmentally friendly as it does not contain any solvents.

### Typical Characteristics\*\*

#### Warm Weather

Colour	Black
Appearance	Viscous Semi-Fluid
Specific Gravity	1.01
Flash Point	113°C
4 Ball EP Weld Point (diluted, finished)	620 kg
4 Ball EP Weld Point (non-diluted, unfinished)	>800 kg
4 Ball Wear Scar (mm)	0.97
Rust	Pass
Copper Strip Corrosion	1A
Ventmeter, 600 (psi)	20°F @ <30 sec
Base Oil Viscosity @ 40°C	50,000 cSt

*\*\*Typical Characteristics, as reported by Caterpillar Inc., are based on finished product (with non-solvent dilutant). Some competitive products publish typical characteristics based on unfinished (no dilutant) product, resulting in inflated values.*

## HYDRAULICS

# Certified hose assessment

*OEM compliant for mining, construction and general industry*

**B**arloworld Equipment has introduced an advanced Master Class hydraulic hose assembly training programme, which is being rolled out across all its operating centres in southern Africa, ensuring that the highest levels of competency are maintained in accordance with industry safety, health and environmental legislation.

Barloworld Equipment group product specialist, Paul Verwey, says that the training is in accordance with the MERSETA (Manufacturing Engineering and Related Services SETA) unit standards for hydraulic hose assembly, with qualifying candidates receiving SAQA (South African Qualifications Authority) certification.

“OEM specification training is provided by a Caterpillar instructor, with final competency determined by a Barloworld Equipment accredited assessor,” he explains.

The week long training course places equal emphasis on theory and practice to ensure a comprehensive understanding of hydraulic system functionality and correct hose assembly techniques. This is then followed by a competency trade test.

This training initiative forms part of an ongoing expansion in Barloworld Equipment’s hydraulic after-sales customer support strategy. In the past 12 months, for example, the company has invested in new state-of-the-art Cat hydraulic hoses presses, with 39 currently installed across its service centre network. These hoses presses cater for both reusable and No-Skive couplings for all Cat machine classes.



*The first eight Barloworld Equipment (BWE) hose assemblers to complete the Master Class training programme, seen here with their Caterpillar trainer and BWE accredited assessor. From left to right (staggered) are Wes Everett, Caterpillar instructor (Peoria, USA); Mischack Tjabadi (BWE Polokwane); Anesh Devduth (BWE Durban); Robert Ratshipanga (BWE Middelburg); Neto Eloy (BWE Angola, Luanda); Desmond Kitchin (BWE Kathu); Vusi Mkhwanazi (BWE Richards Bay); Hans Madisha (BWE Isando); Ryno Jacobsz (BWE Namibia, Windhoek); and Paul Verwey (BWE group product specialist and accredited assessor).*

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# 8 | GROUND ENGAGING TOOLS

## With ARM tracks last longer

### Introducing Cat Abrasion Resistant Material (ARM) shoes

**Recommended for high abrasion, low-impact environments, ARM shoes are designed and manufactured to provide up to a 50% increase in track shoe wear life, depending on the application, and are now available for Cat D10 and D11 size track-type tractors.**

“Composed of tungsten carbide, durability is enhanced because this abrasion resistant material is welded to the grouser in a controlled environment,” explains Barloworld Equipment group product specialist, Deon Delpont, adding that maintaining a taller grouser height also passes on benefits in terms of improved traction and productivity.

The finer tungsten carbide materials are better supported by the weld matrix, making them more resistant to impact and less likely to chip off compared to any other option available.

“It also ensures that longer grouser life will be achieved compared to other industry methods,” adds Delpont.

#### Scallop resistance

Track utilisation on Cat D10 and D11 units can now also be extended with the fitment of Caterpillar’s recently developed scallop resistant link assemblies.

These link assemblies are designed with an increased depth of hardness, which in addition to ensuring reduced idler scallop wear, leads to improvements in fine grading, overall machine operation, operator comfort, as well as increased life throughout the undercarriage system.

Expected link life gains can reach up to 18% compared to conventional Cat link assemblies.

#### Undercarriage management lowers costs

To help maximise Cat undercarriage utilisation, Barloworld Equipment offers a comprehensive Custom Track Service (CTS).

By monitoring and inspecting your track regularly and providing reports that list service options, CTS helps machine owners make informed decisions, so you can plan maintenance and avoid costly unscheduled downtime. When your track does need repair, we have the trained professionals, proper equipment and parts availability to get your machine back up and running quickly and reliably.



## UNDERCARRIAGE

# Track selection is application dependent

### Cat General Duty track for Cat D6 medium sized track-type tractors

**Choosing the right undercarriage system will have a direct impact on improved productivity and durability in a given application, which in turn passes on major maintenance savings over time. This is why Caterpillar supplies a range of track options to provide the best machine match.**

“Since there are multiple factors to consider, we use specialist tools to help determine which undercarriage option is the best fit for the site requirements,” explains Barloworld Equipment group product specialist, Deon Delpont. “These factors include the envisaged ownership period, hours of machine usage, purchase price and cost-per-hour.”

#### Track Design Variations

##### Heavy Duty track

For medium track machines with an elevated sprocket design (Cat D6N, D6T), Heavy Duty is the choice for top performance and long life in demanding applications. Heavy Duty components are built with high grade steel and through hardened for exceptional strength and wear life.

In most tough underfoot conditions, Heavy Duty track can extend undercarriage system life by up to 20 percent more than Cat General Duty, with the greatest benefits realised in aggressive, high-impact applications such as:

- Logging / reforestation;
- Side-sloping work;
- Rocky conditions; and
- Any uneven terrain with wide track shoes (specifically Low Ground Pressure (LGP) machines)

##### General Duty track

Meanwhile, Cat General Duty track is designed for use in low-to-moderate impact applications where the

elevated performance of Heavy Duty is not needed. Like all genuine Cat undercarriage, General Duty components are through hardened and quality tested for reliable productivity and performance.

While General Duty is built to different specifications than Heavy Duty, its design makes General Duty and Heavy Duty components interchangeable, eliminating any need for retrofitting and keeping downtime to a minimum. For example, Cat Heavy Duty shoes can be installed on General Duty link assemblies to meet various customer requirements.

General Duty offers a variety of track shoe options, which is another important consideration. “In addition to undercarriage components, track shoe selection can impact traction and flotation, as well as overall undercarriage wear life,” Delpont point out.

For the conditions in which General Duty undercarriage will typically operate, moderate service shoes offer optimal performance and wear life. (General Duty moderate service shoes for track-type tractors are available in preassembled track groups.)

As with other Cat track systems, General Duty is covered by the Cat Undercarriage Assurance programme. The standard programme covers all major moving undercarriage components for four years or three thousand hours.

#### Custom Track Service

Along with track and shoe selection advice, Barloworld Equipment also provides a Custom Track Service (CTS) to assist customers in managing their undercarriage system.

Using advanced diagnostic equipment, such as ultrasonic wear indicators, the Custom Track Service programme

accurately monitors undercarriage performance and predicts wear rates. Machine owners can then evaluate service options, plan for maintenance and schedule downtime.

“Overall, CTS analysis helps you make informed decisions that keep your operating costs as low as possible,” adds Delpont.

## Track selection tips

### Key factors to consider

Track Frame Configuration	Standard, Extended (L) (XL), Extra Wide (XW), Low Ground Pressure (LGP)
Width of Track Shoes	Narrow, intermediate or wide
Type of Track Shoe	Extreme Service (ES), Moderate Service (MS), Self-Cleaning, Centre Hole, Chopper
Blade Type	Variable-pitch Power Angle/Tilt (VPAT), Semi-Universal (SU), Angle, Straight
Rear Attachment	Winch, Ripper, Counterweight, Drawbar
Other Attachments	Sweeps, Window Guarding
Underfoot Conditions	Light, moderate or severe abrasion and impact
Terrain	Side slopes, ground objects and V-ditching
Packing Conditions	Operating in extrusive materials, which can usually be squeezed out from between track parts when wet, e.g. clay soils  Operating in non-extrusive materials, which can't be extruded from the link windows and track shoe centre holes of most undercarriage tracks, e.g. branches

# Cat Engine Kit Range Extended

**D**esigned to save time and money, Caterpillar's Precious Metals Engine Rebuild Kit series is being progressively expanded. The most recent addition in 2014 is the introduction of a Cat C15 engine kit, catering for machines that include the Cat 980H wheel loader and Cat D8T track-type tractor.

Precious metals kits are also available for Cat 3306, Cat 3406 C/D/E, Cat 3176 and Cat C-9 engines.

"These pre-packaged kits contain all the necessary components to affect maintenance interventions at set stages in an engine's working life," explains Barloworld Equipment group product specialist, Reuben Phasha. "Compared to ordering loose parts, these Precious Metals kits have proven to be far more price-competitive."

There are four kit options, namely Bronze, Silver, Gold and Platinum: all parts enclosed meeting Caterpillar's exacting quality standards.

"Bronze covers basic repairs typically caused by factors such as dust ingress, whilst Silver and Gold kits are designed for mid-life top and bottom rebuilds," explains Phasha. "Platinum kits meet



The Gold Precious Metals kit for Cat 3406 series engines.

complete rebuild requirements, optimising the second and third life capabilities of Cat engines."

As the basic building block for all higher levels, Bronze includes components that one might not think of replacing, but which could lead to unplanned downtime and costly failures, a prime example being exhaust manifold sleeves.

Bronze components include gaskets and seals; oil and fuel filters; camshaft

bearings; turbo nuts and bolts; and coolant temperature regulators.

Silver builds on Bronze with the addition of pistons, cylinder liners, wrist pins, piston rings and retainers. Gold in turn includes the Bronze kit, plus six Cat Reman cylinder pack assemblies; whilst Platinum incorporates all Gold kit components plus a Cat Reman cylinder head, Reman fuel injectors, and Reman water and oil pumps.

"Choosing the best engine kit option for each stage in the life of your machines will significantly extend their overall utilisation," adds Phasha.

**CHOOSING THE BEST ENGINE KIT OPTION FOR EACH STAGE IN THE LIFE OF YOUR MACHINES WILL SIGNIFICANTLY EXTEND THEIR OVERALL UTILISATION.**

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# 10 | ENGINES

## Cat Reman engine components

### CAT REMAN: THE BENEFITS

Cat Reman parts are factory remanufactured by Caterpillar to their original specifications so they deliver good-as-new performance and long life at a competitive upfront price.

The remanufacturing process incorporates the latest engineering design changes, plus Reman parts carry a same-as-new parts warranty.

There is also a sustainable advantage: by reusing much of the original component, remanufacturing conserves most of the energy consumed in the initial fabrication, helping to conserve the environment whilst at the same time passing on lower part ownership and operating costs.

- > Alternators/Starters
- > ECUs

Barloworld Equipment stocks a wide range of Cat Reman components.

Included within the engine line-up are alternators, starters and ECU's for most Cat machine models. As with all Cat Reman components, they are supplied with a one year warranty.

### ALTERNATORS/STARTERS

To ensure same-as-new performance, all alternator and starter gaskets, seals, O-rings, bearings and boots are replaced.



### ECU'S

Cat Reman has developed its own line of remanufactured ECU's. This ensures electronic control units are thoroughly diagnosed and remanufactured, and critical engineering updates are completed.

As with all Reman components, when the remanufacturing process is complete, the units pass through rigorous durability test requirements.



### ENGINES

## Cat REMAN engines for backhoe loaders

Since the launch of the first Cat backhoe model in 1985, successive generations have evolved over time. The latest range is the F-Series, launched globally in the fourth quarter of 2012.

"However, there are still many examples of earlier generation models that are in daily use, underscoring their legendary built quality," says Barloworld Equipment group product specialist, Reuben Phasha, "which is why we've taken the decision to stock Cat 3054 Reman engines for B and C Series models in response to market demand."

B and C Series models include 416, 426, 428 and 436 units, with Cat 3054 engines available in either naturally aspirated or turbocharged versions, depending on the specific machine.

"Cat Reman engines provide a cost-effective solution for backhoe machine owners seeking to extend the life of their initial investment," Phasha adds.



A Cat 3054 engine.

### HYDRAULICS

## CAT TOUGHGUARD™

*The benchmark for hose performance*

Cover abrasion is the leading cause of hydraulic hose failure, which in turn has downstream impacts on machine availability and productivity.

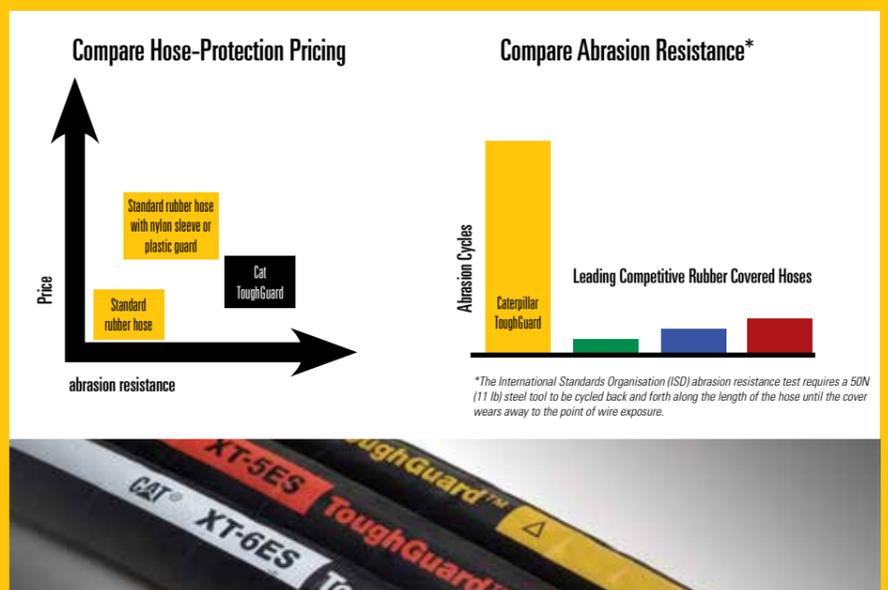
Caterpillar's research and development team has responded with the ToughGuard series, designed for XT™ ES (Enhanced Spiral) hose.

"Engineered to meet the toughest working applications, ToughGuard provides up to 20 times more abrasion resistance than industry standard hose, as confirmed by ISO abrasion-resistance testing," explains Barloworld Equipment group product specialist, Paul Verwey. (This ISO test requires a 50N steel tool to be cycled back and forth along the length of the hose until the cover wears away to the point of wire exposure.)

### Built to last

Each ToughGuard hose features a polyethylene exterior that provides increased resistance to abrasion caused by hoses rubbing together or against other abrasive materials. Additionally, this cover:

- Eliminates the need for nylon or plastic add-on protection in most applications.
- Does not sacrifice minimum bend performance.
- Offers protection against chemicals and weathering.
- Uses existing clips and grommets.
- Has been tested to two million abrasion cycles without failure.



# New frontiers

## *in mobile processing*

*More end product, less hauling,  
less fuel*

*Metso's Lokotrack LT220D sets a new standard  
for compact performance.*



*Metso's Lokotrack LT220D is the most compact combined crushing and screening plant on the market.*

**T**he latest addition to Metso's mobile crushing and screening range, the Lokotrack LT220D is set to revolutionise the way aggregate contractors operate around the world.

Combining a cone crusher and a three deck screen on a single track-mounted plant, the Lokotrack LT220D reduces operational costs in several ways, most notably by substantially lowering fuel consumption and reducing the need for maintenance.

The Lokotrack LT220D is equipped with a proven, high-performing Metso cone crusher, either the HP200 or the GP220; whilst an intelligent control system ensures safe and reliable processes in all applications.

Paired with Metso's primary Lokotrack LT106 mobile jaw plant, the LT220D secondary crushing and screening unit is capable of producing up to three calibrated end products. In turn, the large 8,4 m<sup>2</sup> screen fitted on the LT220D provides high capacity, as well as excellent screening efficiency.

A key feature of the Lokotrack LT220D is that it enables contractors to take on smaller contracts that would previously have been considered unprofitable, with ease of on-highway transport and rapid machine deployment between sites being major deciding factors. Power to run the crusher and screen is delivered by a single Cat C13 diesel engine generating 309 kW. Hydraulically operated screen lifting and folding side conveyors enable the Lokotrack LT220D to be ready for action in just minutes.

"The Lokotrack LT220D is the first track-mounted crusher/screen combination to be developed with such compact dimensions," says Andrew Stones, manager for Metso Mobile at Barloworld Equipment.

Weighing in at 48 tonnes, the LT220D measures 16,5 m in length, with a width and height of 3 m and 3,5 m respectively.

### **High Capacity, Multi-Product Screening** *Introducing the Lokotrack ST2.4 mobile screen*

Other recent product launches from Metso include the latest generation Lokotrack ST2.4 mobile screen.

This unit processes a diverse range of feed materials, from the pre-screening of the coarsest gravel to fine classifying and



*The Lokotrack LT220D provides cost effective solutions for shorter term contracts, with ease of on-highway transport enabling rapid machine deployment between sites.*

processing of natural sands, or any demanding recycle materials. Three clean end product sizes can be produced in one process due to the ST2.4's two-stage screen set-up. A variety of screen media can be fitted, from steel meshes to rubber and polyurethane materials. All the conveyors are folded hydraulically and secured mechanically.

The Lokotrack ST2.4's screen box size measures 3,6 m in length with a width of 1,5 m. Machine and track systems are powered by a 74.9 kW Cat C4.4 diesel engine.

Optional features on the ST2.4 include a vibrating apron feeder with grizzlies or finger bars, a lamer feeder, a magnetic separator for recycling, and remote radio controls.

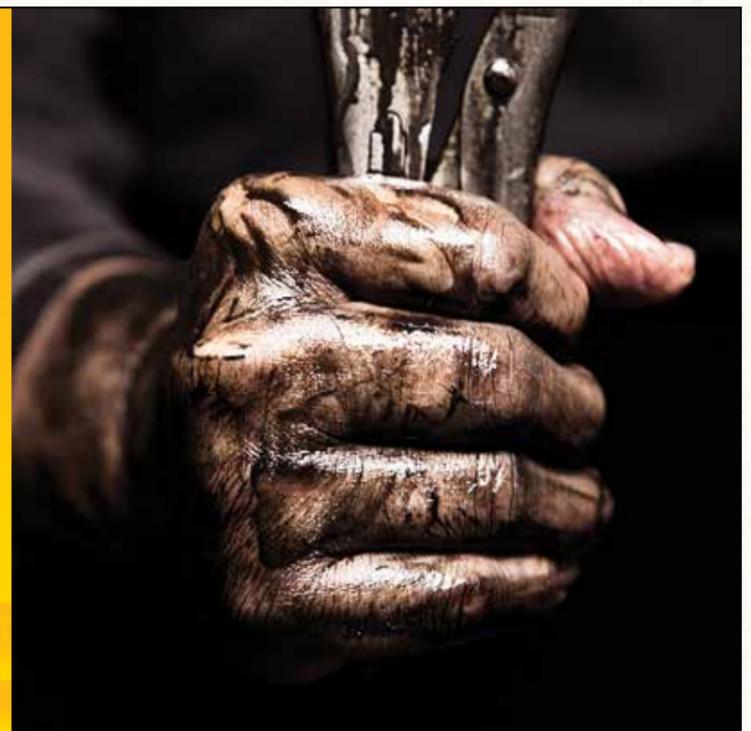
## **The real cost of not using genuine Cat® parts.**

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