

# CUSTOMER CHRONICLES



NEWS YOU CAN USE FROM BARLOWORLD EQUIPMENT AND CAT® 2<sup>ND</sup> EDITION 2013



PAVING PAGE 10

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# Mining Rustenburg Imperial



A Cat 988F transports a cut block, typically weighing up to 20 tonnes, from the quarry to the nearby dressing yards on site.

**North West contractor, Classic Dimension Stone Mining, expands its Cat fleet with the recent addition of two new Cat 336D L excavators that work alongside long serving Cat 988 Series wheel loaders in the downstream preparation of the finest granite blocks.**

Reaching niche construction and memorial markets both locally and across the globe, dimension stone mining operations in South Africa's greater Rustenburg district in the Pilanesburg region have been ongoing since the 1950's. Many small companies started this industry and most have now been absorbed through successive acquisitions so that today the main players tend to be listed multi-national entities.

Essentially, mining occurs within a massive volcanic plane that has left a legacy of enormous mineral wealth. The area lies within the famed Bushveld Igneous Complex, home to the world's largest reserves of platinum group metals, plus there are allied deposits of massive potential, such as vanadium. In fact, this is the Earth's largest layered intrusion of its kind, divided by past geological surveys into the north, west, east and south limbs. The Rustenburg Layered Suite, a basic plutonic phase of the intrusion, occurs within this

multi-faceted and unique geological mix. It is here within this zone that some of the world's best granite dimension stone products are mined.

For Brits based quarry contractor, Classic Dimension Stone Mining, unlocking the value has been a life-long passion with company head, Craffie Crafford, first being exposed to this business back in 1989, initially as an employee for various dimension stone majors, having first earned his production experience in South Africa's deep level gold mines.

Today Classic Dimension Stone Mining operates on two major Rustenburg district sites in this region for Kelgran Investments, commencing from 2001, in which Italian dimension stone multi-national, RED Graniti, has a 50% interest.

These sites are in close proximity and comprise the Transvaal Quarry on farm Boschpoort, and the RIBST6 deposit on the farm Beestekraal.

▶ (To page 3)

Both are situated at elevation, providing sweeping vistas over the surrounding relatively flat terrain, with progressive mining of the hillsides working down to a maximum commercial depth of around 100m, the Zebra layer being at the cut-off.

The end product: Rustenburg Imperial, characterized by its distinctive greyish black colour, is unique to South Africa. The bulk of the end product, being R1 (graded as first choice material) is exported and distributed to markets that include continental Europe and the Far East. (Other granite specifications are Second Choice and Commercial grades.)

Overburden typically runs to around 5 to 6m. Thereafter, sourced material is clearly defined, comprising the B and A Reef, interspersed by a PX marker around 6m thick, which is mined as the commercial grade product. B and A reefs chiefly yield R1 product.

The B reef goes to an average depth of 30 to 35m thick, and the A Reef – separated by the PX band – then travels further down to another 60 to 65m to reach the maximum viable depth for dimension stone mining. Depending on the formation, the extraction approach typically entails slab mining using diamond wire saws and drills, backed by specialist earthmoving machines.

"Geological characteristics are defined as solid, semi-solid, and loose formations. In your loose and semi-solid horizons you don't use diamond wire cutting, since you cannot drill clean holes through, so this involves conventional plug and feather drilling and block blasting techniques," explains Crafford.

"Final product recovery is optimally between 8 to 10% but sometimes lower than this, so as a contractor the goal is always to reduce your cost and up your yield through the most efficient mechanised mining methods, which in turn is dependent on optimal equipment selection and in this respect Cat block handlers have always been an integral part of our extraction programme."

Placed in perspective, and assuming a 10% recovery, you have to mine around 90% of the in-situ material to yield a saleable 10% R1 product. For example, 300m<sup>3</sup> of R1 dimension stone granite weighs in at around 1 200 tonnes (or 4 tonnes per m<sup>3</sup>) so that equates approximately to a total of 12 000 tonnes mined of which 10 800 tonnes is predominately waste discard.

On both the Transvaal and RIBST6 sites, large solid blocks, typically weighing in the vicinity of 800 tonnes, and measuring around 10m long by 2m wide and 8m to 10m high, are separated from the working face by using a hydro-cushion pushing device. Sometimes one of Classic Dimension Stone Mining's recently acquired Cat 336D L excavators will be used to either push or pull a block down.

## 2 | POWER SYSTEMS

# Mobile lighting: when & where you need it

*For each area of today's evolving open pit operation.*

**B**arloworld Power is meeting the demand for fixed highwall and in-pit illumination with the Allight range of lighting lowers, designed for maximum personnel safety, both in terms of set-up and functionality.

Produced by Perth based Australian original equipment manufacturer (OEM), AllightSkys, the product offering locally is comprehensive, catering for mining, construction and municipal markets. Currently, around 3 000 Allight units are manufactured annually for worldwide distribution, and all products meet the strict health and safety requirements of the Australian mining industry, which is one of the most regulated globally. (Barloworld Power is AllightSykes' southern African dealer.)

Allight products are available 'off-the-shelf' or for rental via Barloworld Power's Rental business unit, with a low hour certified used option available for purchase.

Units are either wheel-mounted for easy towing, or skid-mounted, depending on the model and application. On all models, individual horizontal and vertical lamp adjustment enables operators to focus light direction more precisely.

Key products within the in-pit range include the Combilite for heavy

construction and light mining environments, and the purpose-built MineSpec series.

There are currently seven MineSpec models, a popular mid-range example being the MS6K-9 unit, available in single or double-axle wheeled configuration. The unit has a gross weight of 1 500 kg for legal on and off-road towing, enabling rapid deployment. Once erected, the maximum mast height is 9m, with area coverage provided by a series of four highly durable 1 500 W metal double-ended halide lights that keep on burning through designated shifts thanks to a 130 litre fuel tank.

"We've supplied a number of MineSpec units to major existing and green field projects in southern Africa in recent months where we've assisted in providing optimal pit illumination using a combination of towers to light up working areas that can typically range up to a radius of 300 metres," explains

Brett Trojanowski from Barloworld Power, based in Boksburg.

Then, when size matters, there's the Allight Super Skids, available in four models. In addition to the standard MineSpec features and benefits, this model range offers the choice of fifteen 1 000 W high pressure sodium lamps delivering almost 2 million lumens of intense yellow tinted light, or twelve 2 000 W metal halide lamps delivering nearly 2,3 million lumens of clear, true-white illumination for virtual 'daylight' coverage.

All Super Skid units come with a 12m fully extended mast offering and 10,7m highwall overhang capability, which when positioned according to a surveyed lighting plan ensures that working areas, roadways and cross haulages remain highly visible, and mine safe.

*There are currently seven MineSpec models. Shown here is the MineSpec MS10K-9 unit.*

**ALLIGHTSYKES PRODUCTS ARE DRIVEN BY EITHER CAT OR PERKINS ENGINES.**



*The Allight Super Skid series is available in four models. All Super Skid units come with a 12m fully extended mast offering and 10,7m highwall overhang capability.*

GET

## UNDERSTANDING *BUCKET WEAR*

### Simple tips that save time and money

A worn bucket costs you money every day you run your machine. It means your wheel loader works harder to accomplish less. Your productivity is cut and in most cases downtime for 'patch-up' repairs is increased. Which is why regular bucket inspections are so important, ensuring that signs of worn parts and structural damage are identified early, before they can rob equipment owners of valuable production time.

Conservation is one of your best defences against rising maintenance

costs, and the following practices have been tested and proven:

- Always replace worn edges with the latest Cat edges;
- Rotate bucket tips from the ends to the centre and from the centre to the ends;
- Turn bucket tips over. The results are a re-sharpened tip and extra wear life;
- Reuse rings and pins. Also inspect hardware for reuse and discontinue the practice of automatically burning it off;
- Minimise ground contact with the bucket. Some operators lower the bucket to the ground long before they are ready to enter the stockpile. This extra scraping unnecessarily wears the bucket bottom;
- Protect the bucket bottom with bolt-on or weld-on wear plates. They can prevent expensive structural damage to the bucket, resulting in longer bucket life; and
- Lubricate the bucket linkage pins or install sealed linkage pins where possible.



◀ (From page 1)

# Mining Rustenburg Imperial *(continued)*

Main tasks for Classic Dimension Stone Mining's Cat 336D L's entail the opening up and clearing of overburden, and the top cleaning of the slab faces, plus the transporting of diamond wire saw machines around the site. "This is a very versatile machine with tremendous reserve power," says Crafford.

Once large blocks are removed from the mining face they are then washed clean and inspected for faults, stains or cracks. Saleable stone is then cut into smaller, more manageable blocks – always working along the grain – typically 3m long by 2m wide and up to 1,5m thick (however, the thickness can range from 0,6 to 2m).

Thereafter these cut blocks are then lifted and transported by Classic Dimension Stone Mining's Cat 988 block handler fleet to the nearby dressing yards on site. There the final preparation takes place, with workers trimming the blocks to the perfectly rectangular shape required for the downstream market.

"As with any dimension stone quarry worldwide, block handling loaders are the backbone of the operation, and in the case of the Cat 988 Series, these have been purpose-built for the ultimate lift and balance in transporting blocks on the front end forks, weighing up to 20 tonnes," explains Barloworld Equipment Cat sales professional, Michael Winterbottom, based in Isando, Johannesburg.

The Cat 988 wheel loader was first launched by Caterpillar back in 1963. Since



From left to right are Barloworld Equipment Cat sales professional, Michael Winterbottom, and Craffie Crafford from Classic Dimension Stone Mining.

then subsequent standard Cat 988 wheel loader specifications and allied 988 block handler configurations have evolved over time.

Powered by a Cat C18 ACERT engine (net power 397 kW as per ISO 14396), the latest series Cat 988H block handler has a standard operating weight of around 57 276 kg, with a straight tipping load of 38 tonnes (and 33,4 tonnes articulated 37°). The block handling package includes a purpose-built linkage, larger lift and tilt cylinders, additional counterweight and a high rimpull transmission.

Previous generation units are in turn extremely capable, with Classic Dimension Stone Mining's Cat 988F Series I and Series II units delivering high availability, having recording on average more than 30 000 hours, respectively, in service. Dating back to the late 1990's they keep on delivering, thanks to Caterpillar's in-built second and third life rebuild philosophy, with typical upgrades entailing engine and transmission overhauls, whilst the frame integrity has remained firmly intact despite the machines' arduous operating conditions.

"As a contractor, it's all about the cost per tonne with the overriding goal of upping your yield and ensuring the mining and delivery of marketable R1 or equivalent stone," adds Crafford. "That all depends on sound quarry management together with the right machine mix. Thanks to our Cat 988's, we keep on delivering with best-in-class availability."



Progressive mining of the hillsides goes down to a maximum commercial depth of around 100m, the Zebra layer being at the cut-off.

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## Did you know...

That the first production Cat 988 articulated-steering wheel loader rolled off the assembly line back in 1963? This five cubic yard loader was powered by a six-cylinder Cat D343 diesel engine. And at the time, it was the fourth model in Caterpillar's line of wheel-type loaders.

Since then, the Cat 988 has undergone continued research and development upgrades over the past 50 years, evolving with the B, F Series I and II, and G Series models to the current Cat 988H unit.

Latter generation Cat 988's, having undergone second and third life rebuilds, continue to work productively alongside H-Series models in mining and quarrying applications across southern Africa.



## 4 | CONSTRUCTION

# Highland Construction

*Ongoing infrastructure programmes build capacity for the Basotho nation*

**M**aseru based company LSP Construction (LSP) is expanding its turnkey contracting base across a wide range of private and public sector initiatives in Lesotho being driven by sustained foreign and domestic investment.

Recently completed building contracts include the construction of a new office block and polishing facility for Letseng Diamonds, completed in June 2013 (project value R86 million), whilst construction of the new R137m Royal Palace for the Kingdom of Lesotho is scheduled for completion in June 2014.

Currently LSP's order book is around R306 million, a significant portion allocated to a Millennium Challenge Account (MCA) contract, valued at around R194m, for the construction or rebuilding of 21 health centres countrywide, due for completion in December 2013. These are design and construct projects.



LSP Construction team members (from left to right) are David Rantekoa (financial director), Danny Bothma (junior), Andre Bothma (managing director), Marius Viljoen (contracts director), and Roger Pietrucci (contracts director).

Previously in June 2012, LSP completed another MCA contract that entailed the construction of 14 out-patient departments, attached to respective hospitals located throughout Lesotho, for around R94m.

MCA contracts are being awarded to qualifying contractors in set phases by the USA based Millennium Challenge Corporation, which has allocated an approximate US\$362 million funding package for Lesotho that targets broad priority areas aimed at uplifting local Basotho communities.

Meanwhile, on the civil infrastructure front, LSP is at an advanced stage on a R17m contract entailing the construction of a 48m long concrete gauging (or measuring) weir.

Forming part of the groundwork for Phase II of the Lesotho Highlands Water Project, this crump weir is located 200m from where the proposed new Polihali Dam will be constructed on the Senqu River. The dam site is about 130km east of Maseru.

"Construction of the Polihali dam will create major opportunities for new work, where we are well placed to tender on the electrical, power-line, building and civil phases," explains Andre Bothma, LSP's managing director. "We have also established a separate steel reinforcing company specifically to cater for Phase II."

An estimated 100 000 people presently living in the dam catchment area will need to be relocated, which will require new housing, services and roads.



Construction in progress on the Polihali Dam gauging weir.

To support these and other projects, LSP continues to expand its earthmoving fleet. Additions in 2013 include latest generation Cat F-Series backhoe loaders, Cat skid steers loaders, and Cat 320D L hydraulic excavators.

"One of LSP's new backhoe units, a Cat 428F, is a special unit as it has the distinction of being the 500th F-Series backhoe loader rolled off the production line at the OEM's Leicester factory in England. The F Series was first introduced globally in March 2012.

This Lesotho milestone coincides with one celebrated by Caterpillar earlier in 2013, when the 10 000th F-Series backhoe loader rolled off the production line at the OEM's Leicester factory in England. The F Series was first introduced globally in March 2012.

Adds Bothma: "An all-wheel drive unit, the Cat 428F is the ideal multi-task machine for Lesotho's tough terrain environment."

## BATTERIES

# CAT BATTERIES

## TOUGH AND POWERFUL BY DESIGN

*Long-lasting, instant response starting*

**D**esigned and tested rigorously to Caterpillar specifications, Cat Premium High Output (PHO) batteries are built for the toughest jobs and the harshest climates, delivering dependable and consistent start-up.

"PHO applications cover Cat earthmoving and power generation systems, meeting demanding specifications to provide industry leading Cold Cranking Amp (CCA) capability up to 1500 CCA, and maximum vibration resistance," explains Barloworld Equipment group product specialist, Reuben Phasha.

Due to their high CCAs and reserve capacities, Cat PHO batteries claim the highest performance ratings in the industry. That equates to vibration resistance levels that are five times the industry standard and easier starts because less capacity is used.

Built for hard work, heavy-duty, forged terminal post bushings provide maximum strength and resistance to acid seepage, whilst thicker internal posts with extra corrosion resistance provide built-in overcharge protection and higher CCA output. In turn, rugged

partition connectors, anchored to resist vibration, shorten the electrical path and maximise starting power. The battery's impact-resistant, reinforced case further provides extra strength in all temperature extremes, and helps prevent flexing and punctures.

To ensure durability, Caterpillar uses the 72 hour deep discharge/recharge cycle test, run five times, to simulate the most demanding field conditions, which requires batteries to recover to 25 charging amps within 20 minutes and meet industry electrical performance standards. The associated 30 day complete discharge test demands batteries recover to 25 charging amps within 60 minutes, after being completely discharged for 30 days.

Adds Phasha: "You can't buy a battery with too much power and Cat batteries ensure that there's always enough cranking power, reserve capacity and vibration resistance to get the job done."



Caterpillar's 100 hour vibration test lasts over five times longer than the industry standard of 18 hours. Because vibration is the number one reason batteries fail, Cat batteries must withstand tremendous vibration forces – without suffering mechanical damage, loss of capacity, loss of electrolyte or developing internal/external leaks – and then pass a high rate discharge test.

## Put your battery to the test

A dead battery means equipment downtime, and that leads to lost productivity and reduced profits. No battery will last forever, but using a few simple management and maintenance techniques will maximise their lifespan.

- **Charge batteries slowly:** a fast charge risks overheating the battery; boiling out the water and buckling the plates.
- **Store batteries properly:** for storage periods of four weeks or more, disconnect battery cables to avoid discharge. In cold weather, remove batteries and store them at the correct, recommended temperatures.
- **Inspect batteries periodically:** damage, corrosion and improper connections can lead to sudden failure.

# THE K SERIES™ TOOTH SYSTEM

*Easy-to-install GET that stays sharper for longer*

**The Cat K Series Tooth System is a groundbreaking design that sets new performance standards for tip retention, ease of change-outs and long-term sharpness.**

The low-profile shape of the Cat K Series Tooth System provides better penetration and digging ability, placing less strain on the machine and extending ground engaging tool (GET) wear material usability by between 10 and 15% when compared to other GET options, with major downstream benefits that include faster cycle times and greater bucket fills. Tips can be run in one direction, then "flipped," or reversed, to get the maximum use of wear material.

Installation and removal of Cat K Series GET is facilitated by a twist-on design that fits smoothly onto the adapters welded to the bucket. On both sides of the adapter, rails angle or slope in opposite directions to provide this twist-on motion when the tip is installed.

Each GET tooth securely locks in place via the installation of a vertical retainer, which is inserted and latches securely into a slot in the tip. This retainer is replaced with a new unit following each subsequent GET change-out.

"During operation, the harder the bucket digs in tough materials, the tighter the tip screws onto the adapter," explains Barloworld Equipment group product specialist, Deon Delpont.

The Cat K Series Tooth System is either supplied in hammerless or drive-through configuration, which depends on the size of the GET tip and the wheel loader or hydraulic excavator model match. When removing worn teeth a standard prying tool is used to disengage the 'latch' for removal of the hammerless retainer. In turn, the drive-through retainer is removed from the top or bottom of the tip using low force with a light hammer and punch. In both cases, fast replacement of GET minimises machine downtime.

"The vertical orientation of the K Series retainer makes installation and removal much easier than comparable side-pinned systems," adds Delpont. "Additionally, a precise fit between the tip and adapter limits movement and wear, improving tip retention and providing longer adapter life."

Comprehensive tip options are available, ranging from Penetration Plus to General Duty, Heavy Penetration and Heavy Abrasion, to suit varied digging conditions.

CAT K SERIES DRIVE-THROUGH MODEL COVERAGE						
Model						
Wheel loaders			Excavators			Size
950	953	962	315	318	320	K80
950	962	963	318	320	324	K90
966	972	973				
	980		324	325	336	K100

CAT K SERIES HAMMERLESS MODEL COVERAGE							
Model							
Wheel loaders			Excavators			Size	
980	988	324	325	330	345	349	K110
988	990		345	349	365		K130
990	992		365	374	385		K150
992	993		374	385	390		K170

### Adapter Options

#### Loaders

- > Two Strap
  - Left, right and centre
- > Bolt-on
  - Centre and corner
- > Flushmount
- > High Abrasion

#### Excavator

- > Two Strap
  - Centre and corner



*The tip and adapter fit together precisely, significantly reducing tip movement and adapter wear.*



*An artist's impression of the K Series hammerless tooth system shows the integrated tip and adapter. The one piece retainer locks to the tip to keep it securely in place with no special tools required. The hammerless retainer is installed and removed from the top.*



*An artist's impression of the K Series drive-through system. The drive-through retainer can be installed or removed from either the top or the bottom of the tooth assembly.*

### The K Series Tooth System:

- **Stays sharper:** the redesigned tip shape stays sharper throughout its wear life.
- **Changes easier:** vertical retention makes tip change-outs quick and easy.
- **Holds tighter:** tips stay in place cycle after cycle.

# 6 | HYDRAULICS

## Maintaining the perfect seal

Matched to your system, Cat O-rings are designed for maximum seal life in demanding applications that include high temperature environments.

**C**at O-ring materials are specifically selected based on the different fluids and fluid temperatures in Cat engines and machines. Seal material hardness is matched to the different fluid system pressures to maintain proper sealing force, as well as to minimise seal extrusion and seal abrasion. In addition, some Cat O-rings have special coatings, like PTFE, to minimise friction and ensure proper seal installation in tight seal grooves.

"Precise seal dimensions help ensure Cat O-ring seals fit properly into Cat seal grooves without damage to the seal, and there are unique Cat O-ring sizes designed for use in special applications where SAE standard sizes won't perform well," explains Barloworld Equipment group product specialist, Paul Verwey.

Caterpillar offers several O-ring seal kits, saving you time and up to 15 percent off the cost of ordering O-rings individually. Seven different kits are available for hydraulic fittings and air-conditioning systems.

For more extreme environments, Cat FKM rubber seals offer an optional upgrade on standard nitrile butadine rubber (NBR) seals to meet exceptionally high temperature applications ranging anywhere from -40°C to 175°C.

"In lab tests conducted at 135°C, FKM seals lasted 10 times longer than NBR seals," says Verwey, "and longer-lasting seals mean less downtime to replace them, reducing costs."

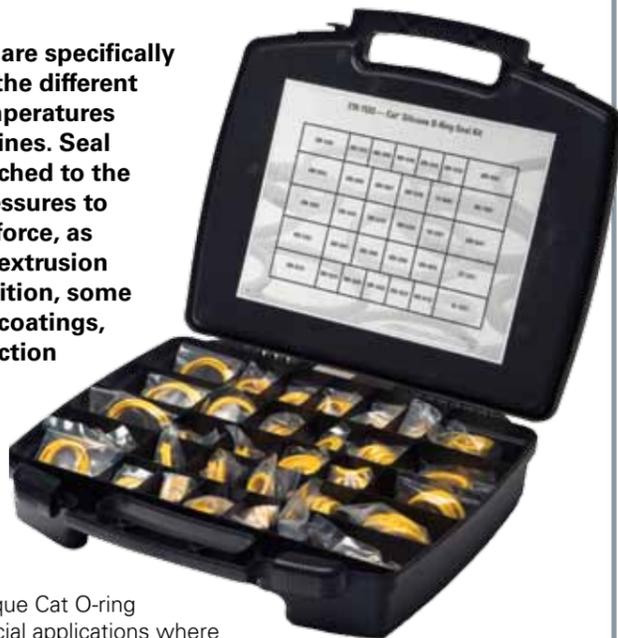
In certain environments, for example, NBR seals can experience hardening and a subsequent loss of sealing capability following prolonged exposure to excessive operating temperatures (above 100°C), especially near mufflers, after-coolers and turbochargers.

FKM seals also cater for high-pressure applications where improved performance is required. Here FKM's increased material strength allows the O-ring to withstand higher pressures without extrusion or "nibbling" on the outside diameter.

"That's because FKM seal material has better resistance to 'compression set', or loss of sealing force," Verwey continues.

FKM solutions are available for O-ring face seals (ORFS), straight thread O-rings (STORS) and D-rings.

Adds Verwey: "Always ensure that your cooling system is well maintained as high fluid temperatures are the number one cause of shortened seal life."



An example of one of Caterpillar's refillable O-ring seal kits.

### CAT O-RING MATERIALS

Material	Hardness
Nitrile Buna Rubber (NBR)	55, 60, 70, 75, 80, 90
Highly Saturated Nitrile	
Buna Rubber (HNBR)	60, 78
Fluorocarbon Rubber (FKM)	60, 75, 80, 90, 95
Silicone (VMQ)	60, 70
Ethylene Propylene Diene	
Modified Rubber (EPDM)	50, 70

These are the primary materials used in Cat O-rings. Other materials, in a variety of hardness types, are used in specialty applications.



### Did you know...

That Barloworld Equipment supplied around 5,3 million litres of Cat Oil in our past financial year and we expect to supply over 6 million litres during 2013?



## CAP & PLUG

And extend system life

**C**apping or plugging mechanical openings during routine maintenance is an essential discipline as it minimises the risk of external contaminants entering the machine's hydraulic circuit. This can occur during the removal and reinstallation of hose or pump connections.

To keep these areas temporarily sealed, Caterpillar supplies specialist kits containing various sizes of non-threaded caps and plugs, designed to counter dirt and moisture ingress, plus potential corrosion, during storage, shipping and repair.

Units are available in tapered as well as standard format, depending on the component, to either plug multiple inner diameters or cap multiple outer diameters.

For further information about ordering your Cat cap and plug kits, contact your Barloworld Equipment customer service representative.



Prior to installation, keeping new hydraulic hose sections sealed at both ends is of key importance to reduce the risk of contamination.

## Hose container roll-out meets regional demand

**F**or mines and contractors operating on remote sites, the introduction of Barloworld Equipment's hydraulic hose assembly container service cuts out part delivery lead times and ensures fast and efficient maintenance. On the spot hose changes mean there's minimal machine downtime and all tooling meets the requirements for Cat no-skive and reusable couplings.

"Catering for low, medium or high pressure applications, hose and coupling inventories are customized to match the client's machine population for both Cat and other OEM products, whether operating on surface or underground," says Barloworld Equipment group product specialist, Paul Verwey. These container units are available on longer-term rentals.

Each purpose-built 40 foot high-rise container, typically requiring six weeks to build and equip, comes installed with the latest Caterpillar technologies and is manned and managed on-site by Barloworld Equipment Parts Department personnel that include trained hose assemblers. Ongoing inventory management ensures that replacement parts are always available.

Standard for each container configuration are features that include an air conditioning system; an office area; and ISO electrical points with lock-out. To run all systems, the container requires a 380V connection.

"We redesigned the original 20 foot container launched back in 2007 to accommodate the need for larger stock holdings required by our customers," Verwey explains.

Hose tooling comprises a Cat S6.2 radial press with the Series (III) Crimputer permanent coupling software set-up for no-skive products; an XT press for all reusable coupling changes; a fully ventilated hose cutter; a workbench with vice; a contamination control cupboard; storage shelving; and hose reel racking.

"The container's easy portability also means that the unit can be loaded onto a truck and moved from site to site, when required," adds Verwey.

In the past 18 months, strong market demand experienced across Barloworld Equipment's southern African footprint has seen the supply of hose container solutions to mine sites in South Africa, as well as Angola, Botswana, Mozambique and Zambia.



Ready to roll: Barloworld Equipment's 40 foot long hose container is designed to be portable for maximum operational flexibility.

# Cat recyclers

*The competitive edge*

**N**yoni Projects is forging ahead on two major road upgrades in North West province, where its recently acquired Cat RM300 rotary mixers are fast-tracking the construction programme.

Within its comprehensive portfolio, the roads segment has always been a major focus since Nyoni Projects' inception back in 1998 and to date this Gauteng based civil engineering contractor has completed a wide range of gravel to surfaced upgrades, as well as new flexible pavement construction.

Current contract examples include two major rehabilitation projects awarded by the North West Department of Public Works, Roads and Transport, both of which commenced in March 2013, where two recently acquired Cat RM300 rotary mixers form the backbone of the construction programme.

The first North West route entails the rehabilitation and reconstruction of a section of the N4 over a distance of approximately 25km from near Zeerust, with a scheduled duration of around 12 months. Running over a distance of approximately 33km, the other section entails reconstruction of the R565 starting just past the R556 Sun City turnoff and

heading north, with a project duration of 22 months.

In the past, Nyoni has relied on its Cat grader fleet for the sub-base stabilisation phases, a process that is machine and labour intensive since each grader needs a dedicated team. Now a single Cat RM300 on each North West road section is being deployed to perform the in-situ recycling phase. On the Cat RM300, the rotor width is 2 438mm, with a maximum cutting / mixing depth of 508mm.

"For road construction we've found that the Cat RM300 ensures a consistency of the mixed material that's perfect for layer works, achieving precise densities. The speed and efficiency is truly outstanding, providing us with a major competitive advantage," says Maclaud Nyoni, managing director of Nyoni Projects, which has a 8CE rating from the Construction Industry Development Board (CIDB). "On the 33km section, for example, we expect to complete all works two months earlier than scheduled."



From left to right: Stephan Bekker, Barloworld Equipment Cat sales professional; Fortune Malila, plant manager, Nyoni Projects; Barloworld Equipment product manager, Johan Hartman; and Matt Rowe, territory manager: Cat Global Paving, Johannesburg District Office.



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320D L



329D L



336D L



390D L



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## 8 | DAM BUILDING

# Bulk water delivery for Maseru



Concrete quantities for the dam entail approximately 280 000m<sup>3</sup> of RCC and 40 000m<sup>3</sup> of normal concrete, with Sinohydro having set up batch plant facilities on site. Concrete aggregates are drilled, blasted and excavated from nearby sources.

**In the initial phase, the installed pipeline system will have the capacity to supply around 75 000m<sup>3</sup> daily.**

Meeting Maseru's medium to longer-term needs, construction is now well advanced on the Metolong Dam and Water Supply Programme (MDWSP), designed to ensure a dedicated future downstream source of potable and waste water for domestic and industrial use for Lesotho's capital, as well as the neighbouring towns of Teyateyaneng, Roma, Mazenod and Morija.

Valued at in excess of R540m, implementation of the project has been divided into set phases. Chinese contractor, Sinohydro Corporation Limited (Sinohydro) was awarded the contract for the construction of the key stage, namely the Metolong dam and allied

pump station, and established on site in January 2012.

Situated on the Phuthiatsana River some 35 km distant from Maseru, this will be a 73m high roller compacted concrete (RCC) dam.

The coffer dam was completed at the end of February 2013, allied with the earlier construction of a 4,4m by 5,5m high deviation tunnel measuring 248m in length and drilled through solid rock.

Once fully constructed, the dam will have a designed capacity of 53 million cubic litres with a 210m crest length and a reservoir with an upstream reach of approximately 16 km.

A global hydropower specialist and construction group based in Beijing, Sinohydro is presently active on a range of contracts across the African continent,

A GLOBAL HYDROPOWER SPECIALIST AND CONSTRUCTION GROUP BASED IN BEIJING, SINOHYDRO IS PRESENTLY ACTIVE ON A RANGE OF CONTRACTS ACROSS THE AFRICAN CONTINENT WHERE, AS IN THE REST OF THE WORLD, THEIR PREFERRED EARTHMOVING REQUIREMENTS ARE DRIVEN BY CAT MACHINES.

where, as in the rest of the world, their preferred earthmoving requirements are driven by Cat machines. (US based magazine, Engineering News-Record ranked Sinohydro 23rd out of 225 international contractors according to their latest 2012 poll.)

On the Metolong project, Sinohydro's Cat fleet includes the deployment of a Cat D8R dozer for general construction, and three Cat D3K dozers that are being used for the RCC phase.

By the end of 2013 Sinohydro's goal is to have around 70% of the dam wall completed.



From left to right are George Mojaje, Maseru depot manager, Barloworld Equipment; Xie Yunhua, deputy project manager, Sinohydro; Vusi Dondolo, after-sales manager, Barloworld Equipment Bloemfontein; and Ivy May, Chinese assistant business development manager, Barloworld Equipment.

## FILTERS

# 'GREENER' FILTERS

## Maximise component life and help the environment

**T**aking functionality to new levels, the latest Cat Advanced Efficiency hydraulic/transmission filters feature a new media design that provides excellent component protection over their lifetime.

"The new media offers extremely good flow characteristics with low pressure drop, which helps minimise filter bypass in the transmission system during cold start situations," explains Barloworld Equipment group product specialist, Reuben Phasha.

The innovative filter housing design, which incorporates a robust centre tube, is reusable over the life of the machine, so only the element cartridge that slides in needs to be changed at service intervals. Environmentally friendly, the new interchangeable filter elements are completely non-metallic in their construction.

Adds Phasha: "Filter element pleat spacing is rigidly maintained by acrylic beads that prevent bunching and provide maximum filtration surface area, whilst an integrated seal separates the 'clean' and 'dirty' sides of the element, thereby maximising contamination control and machine health."



Cat transmission/hydraulic filter elements feature a new media design.

# Era of the 'virtual' operator

*Better, faster and safer*

**B**arloworld Equipment's Operator Training Academy in Isando, Johannesburg, continues to invest in the latest Version II Cat simulators. These units are available for rent or purchase, with strong take up being experienced, particularly from the mining sector, says Academy head, Willie Haasbroek.

The Operator Academy trains around 700 candidates annually from across all industry sectors for accredited courses in terms of CETA (the Construction Education and Training Authority) and the MQF (Mine Qualifications Framework). During 2013, the number of Academy instructors increased from 8 to 12 to meet rising demand.

There are two proficiency grades, namely Level I: Certified and Level II: Expert (determined both in terms of theoretical competency and the number of additional hours completed in-field on the machine during training.)

"Our courses, which run throughout the year, place equal emphasis on theory and practice, and experiential learning in both instances is being greatly enhanced by the use of Cat simulators. These now form a core component of all operator training programmes at the Academy," Haasbroek explains.

Caterpillar is progressively expanding and updating its simulator range across various machine classes; one of the latest additions is the rope shovel trainer. This unit joins simulator stations for major categories that include hydraulic

excavators, graders (M-Series only), wheel loaders, off-highway trucks, dozers, and scrapers.

"From experience we find that the best way to enhance general competency is to start trainees off on the Cat e-Learning CD series or through our theoretical courses, followed by time on the simulators, before they operate an actual machine in the training area," says Haasbroek.

Cat e-Learning CD's first teach candidates about the controls, safety and operating standards. There are test questions after each section with an overall score generated. Achieving the minimum pass mark is a prerequisite for simulator training, where candidates again have to pass a battery of tests that emphasize safe operation at every stage. Before the machine will start in the simulator computer programme, for example, the candidate first has to run through a checklist, which includes a machine walk around inspection.

The full range of Cat e-Learning CD's can be ordered from the Academy. New CDs now available include M-Series Graders, Articulated Trucks, and Backhoe Loaders.



Caterpillar recently introduced a rope shovel trainer to its expanding Cat simulator range.

Going forward, the Academy is also investigating the possibility of investing in full motion simulator technology. Similar to an aircraft simulator, 'full motion' provides a live experience with physical feedback. "You can upload actual mine terrain maps and haul road layouts, and simulate parameters such as rain, or a cab fire," Haasbroek continues.

Full motion simulators are intended as an advanced training aid for skilled operators, typically with at least five years experience under their belt.

Adds Haasbroek: "Our end goal is to qualify professional operators certified to the highest Caterpillar and industry standards."

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**info**

**Did you know...**

That Caterpillar's Building Construction Products (BCP) division recently celebrated a major milestone with the roll-out of its 10 000th F-Series backhoe loader at the OEM's facility in Leicester, England? The F Series was first introduced in March 2012.

The 500th F Series machine sold locally was acquired by LSP Construction, based in Maseru, Lesotho.



## 10 | PAVING

# OPTIMAL CONTACT PRESSURES: PERFECT MATS

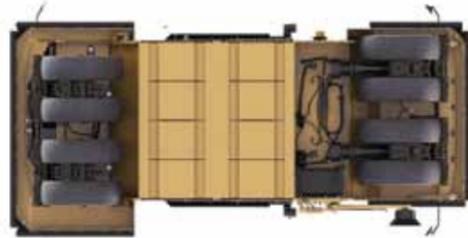
*Introducing the Cat CW34 pneumatic roller for southern Africa*

**P**erforming equally well on granular materials, as well as all types of asphalt mix designs, the new, top of the range Cat CW34 pneumatic roller can be deployed on every compaction phase due to its high contact pressures – consistently delivering density targets.

An eight wheel roller with an operating range from 10 to 27 metric tonnes – depending on the shedded or added ballast configuration – the CW34 provides an overall compaction width of 2 090 mm with 42 mm overlap. This makes the machine well-suited for applications that include highway resurfacing, urban street lane additions, industrial sites, airport runways and other high production jobs. Ballast choices include modular and non-modular steel, sand and water.

Machines supplied to the southern African market will come standard with an open FOPS canopy, with the option of specifying a fully enclosed, air-conditioned cab.

“On the move, the oscillating front and rear tyres deliver vertical and horizontal forces that reduce air voids, ensuring surface uniformity, while the ‘air on the run’ feature allows the operator to automatically adjust tyre pressures to increase or decrease static loads for optimal surface quality,” explains Barloworld Equipment product manager, Johan Hartman.



“The vertical suspension further improves results on uneven surfaces by uncovering voids and enabling consistent, even compaction, so no unnecessary passes are required.”

As with any compaction project, quality depends on keeping the tyres free of asphalt build-up. In this respect, Caterpillar has placed special emphasis on the CW34’s water spray, and optional emulsion systems, the latter providing additional protection against asphalt adhesion. All eight tyres have dedicated spray nozzles and are fitted with self-adjusting scrapers.

Powered by a Cat C4.4 engine with ECO-mode for improved fuel consumption, the Cat CW34 operates efficiently at ambient temperatures up to 49°C under maximum engine load due to the roller’s high volume cooling system and large fan.



*A Cat CW model in open cab configuration, with optional rolled up heat-retention wheel covers. These can be lowered to regulated tyre temperatures when working in cooler ambient environments, such as night-time surfacing jobs.*

During operation, the CW34’s automatic speed control feature enables the operator to tune the system for maximum speed within low, intermediate, and high ranges.

When operating in intermediate and high, the system shifts smoothly through the speed ranges and offers a top speed of 19 km/h for quick movement around and between job sites. The system also has the ability to coast, leading to less fuel consumption and lower sound levels, an added benefit when working within urban areas.

“For extra precision, the optional Cat Compaction Control system provides

an easy to use interface that keeps the operator informed of mat temperatures and rolling patterns,” Hartman adds.

Infrared temperature sensors combined with mapping keeps the operator informed of current mat temperatures, machine position, and where coverage has taken place.

“This intuitive system greatly enhances night-time performance, while also recording information for future data analysis and quality control documentation, another way that Caterpillar is supporting the road industry with best-in-class flexible pavement solutions.”

## UNDERCARRIAGE

# TRAVERSING ON A SOLID FOUNDATION

**A**cross the large hydraulic excavator range, Caterpillar’s class leading undercarriage delivers as one integrated system, with specific product offerings available to match varied on-site applications.

For example, customers can choose between Positive Pin Retention (PPR2) and non-PPR2 track or heavy duty (HD) cast and fabricated idler options. All Cat rollers and idlers utilise Duo-Cone™ seals, which provide exceptional sealability and longer component life.

“Keeping roller and idler oil sealed inside the system is the key to realising long undercarriage life and low operating costs,” points out Barloworld Equipment group product specialist, Deon Delport.

For added durability, PPR2 track is a Caterpillar exclusive offering for excavator products and is designed to reduce end play (the loosening of the track joint) by eliminating the movement of the track pin (known as pin walking). “Keeping the track joint properly pressed together prevents entry of contaminants and the exit of vital lubricants, increasing track life and

reducing the operating cost per hour,” he explains.

HD cast idlers provide longer structural life under the most severe applications, incorporating harder shafts and bores along with solid centre flanges to prevent collapsing in demanding situations, failures which can result in costly downtime and repairs.

For even tougher applications in varied ground conditions where heat build-up and longer travel distances are a factor, an ideal option is Cat Moly Grease Lubricated Track (GLT). This feature eliminates internal track wear until the grease dissipates from the track assembly, extending internal wear by 25% or more.

Adds Delport: “To match this longer internal life, the outer bushing diameter is increased, allowing machine owners to get the maximum life from the complete system.”



*Caterpillar’s Positive Pin Retention (PPR2) system is designed to reduce end play by eliminating the movement of the track pin.*

# Cylinder heads that last

*Appreciating the design difference*

**A**t the heart of every Cat machine is the engine, and here millions invested in research and development continues to yield unique performance features that set the industry benchmark. The development of the Cat cylinder head configuration is no exception.

The following key points make the difference when it comes to achieving the best output and long hours in the field:

- > **Machined water holes** ensure adequate cooling of the head, allowing maximum life and reliability.
- > **Rigid manufacturing tolerances** and processes increase wear material in vital areas and provide smooth sealing surfaces for resistance to warping, cracking and wear.
- > **Designed for remanufacture:** the costly head casting's bottom deck can be machined to clean up minor damage and still be reused for additional lives.
- > **Valve material:** high strength material allows Cat valves to flex for more fatigue strength. Proper forging prevents "laps" or inclusions, which can lead to breakage and premature engine failure.
- > **Valve stem height / length / diameter:** longer valves with larger diameters allow better fit, proper valve function and increased performance and maximum productivity.
- > **Multiple Reman (remanufacturing) options:** 100% factory leak tested and fully assembled groups are ready to be installed to reduce turnaround time. Basic heads without installed valves are also available ready for customer assembly.
- > **Clean heads:** casting processes can leave behind core sand deep inside cylinder heads, which later serve as harmful contamination to the engine or prevent proper cooling during operation
- > **Standard and oversize guides / inserts:** the availability of multiple sizes of guides and inserts provides maximum cylinder head reuse and repair, avoiding costly replacement
- > **Valve head hardness:** proper hardness minimises premature cracking or fatigue failures after extensive use.
- > **Valve seat angle:** the steeper angle yields better fit and performance.

For more information on the Cat cylinder head advantage, contact your Barloworld Equipment customer service representative.

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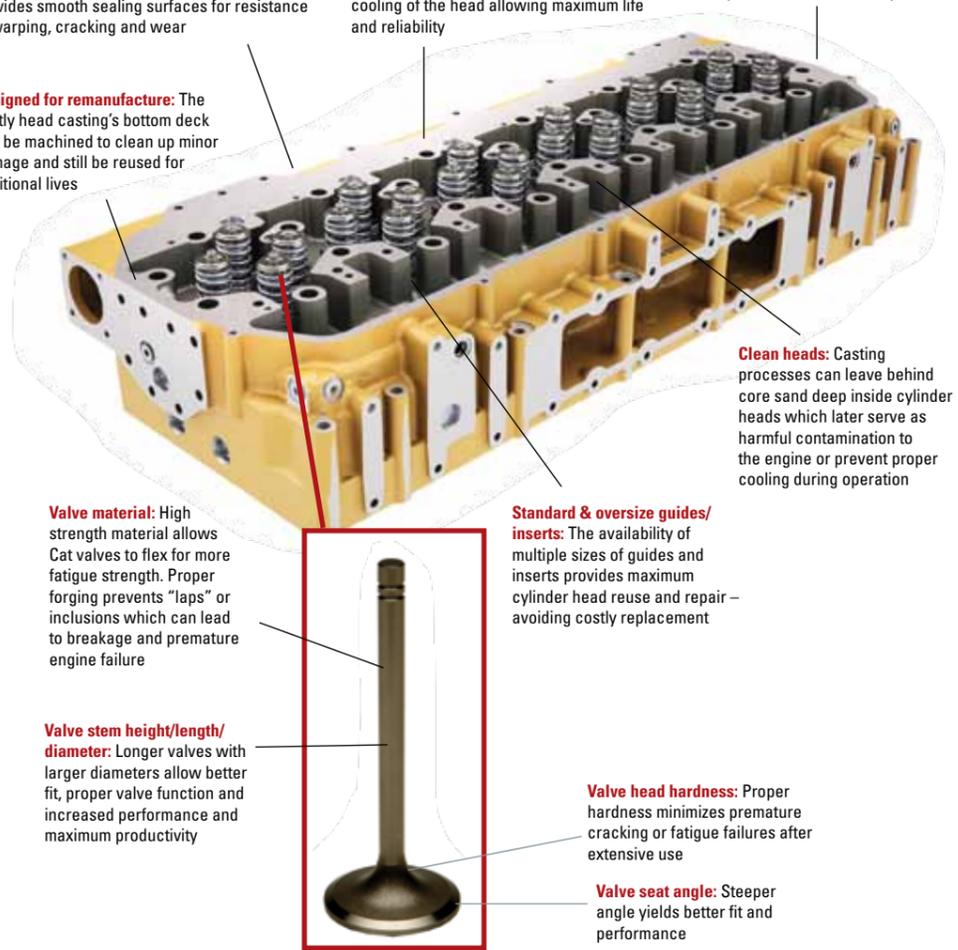
**Valve material:** High strength material allows Cat valves to flex for more fatigue strength. Proper forging prevents "laps" or inclusions which can lead to breakage and premature engine failure

**Standard & oversize guides/ inserts:** The availability of multiple sizes of guides and inserts provides maximum cylinder head reuse and repair – avoiding costly replacement

**Valve stem height/length/ diameter:** Longer valves with larger diameters allow better fit, proper valve function and increased performance and maximum productivity

**Valve head hardness:** Proper hardness minimizes premature cracking or fatigue failures after extensive use

**Valve seat angle:** Steeper angle yields better fit and performance



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