

CUSTOMER CHRONICLES



NEWS YOU CAN USE FROM BARLOWORLD EQUIPMENT AND CAT® 2ND EDITION 2015



CAT FIRE TRUCK A WORLD FIRST PAGE 3

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RCC PHASE ADVANCES AT LAÚCA DAM

Brazilian contractor, Odebrecht Infrastructure, is forging ahead on a new hydroelectric dam project on the Kwanza River, deploying a comprehensive Cat earthmoving fleet to meet the fast-paced construction programme. Key phases include the establishment of the internal tunnel systems, the turbine hall and the roller compacted concrete (RCC) dam wall.

The largest hydroelectric project since Angola's independence in 1975, the estimated US\$4 billion Laúca Dam development forms part of a longer-term strategy to add an additional 9 000 MW to the national grid by 2025.

Harnessing the mighty Kwanza River, the dam is located at a point where the altitude drops by 1 000 m over a

distance of 120 km, adding tremendous velocity to the water that will rush through Laúca's future turbines. (Travelling some 965 km, the Kwanza is Angola's longest river, joining the Atlantic Ocean just to the south of the capital, Luanda.)

Laúca has an envisaged installed capacity of 2 070 MW, and will more than double Angola's current hydroelectric supply

when the project goes live towards the end of 2017, ensuring constant power on demand for Luanda, as well as neighbouring towns in the country's central, north and south zones, covering six provinces and catering for upwards of 750 000 families.

The project commenced in July 2012 and as of April 2015 some 40% of the total works had been completed on this five year development.

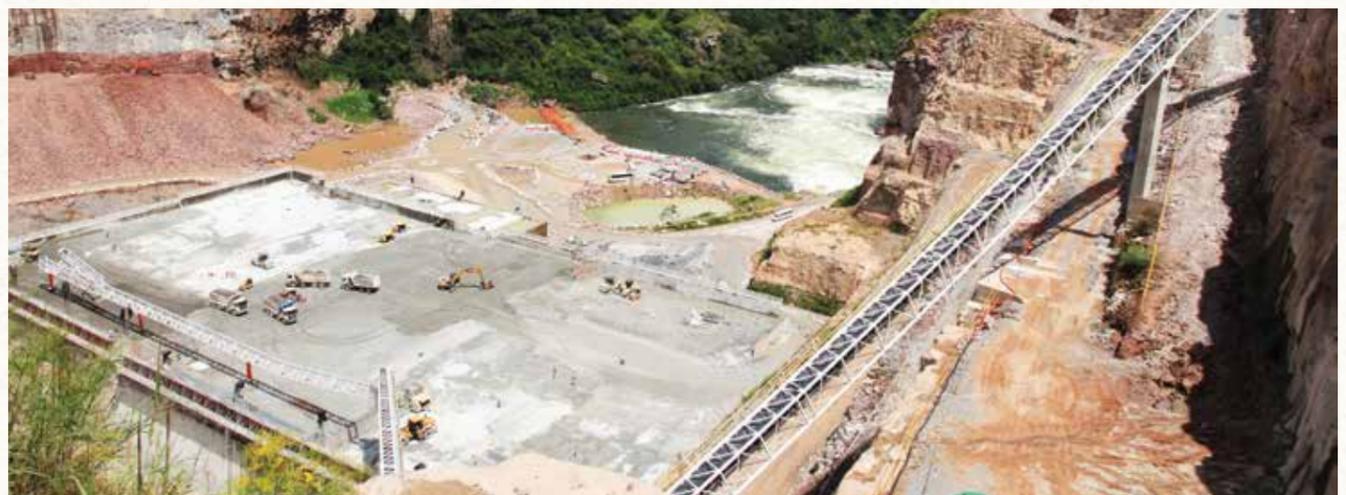
Construction is being carried out by Brazilian contractor, Odebrecht Infrastructure, in conjunction with Angolan state-owned entity, GAMEK (Gabinete de Aproveitamento do Médio Kwanza), which is responsible for the management of the medium Kwanza region. Odebrecht is the EPC contractor for all phases.

Laúca is positioned at Km 307,5 on the Kwanza River between two existing hydroelectric developments, namely the Capanda dam (520 MW) in Malanje Province, 47 km downstream, and the Cambambe dam situated on the border of the Kwanza Norte and Bengo provinces, approximately 100 km upstream. Cambambe is currently undergoing rehabilitation works, also being carried out by Odebrecht Infrastructure, with construction and electro-mechanical phases scheduled for completion by the end of 2015, bringing the dam's capacity to 960 MW.

Celebrating 30 years in Angola, Odebrecht Infrastructure is a subsidiary of the Odebrecht group, founded in 1944, a multinational conglomerate with diversified businesses in the fields of engineering, construction, chemicals and petrochemicals, and operating in 21 countries on four continents.



Construction in progress on the dam wall.



◀ (To page 3)

2 | COMPACT EQUIPMENT

THE CAT 305.5E2 CR: A NEW DIMENSION

Small in size, massive on delivery

Manufactured at Caterpillar's Athens factory in Georgia, USA, the latest generation Cat 305.5E2 CR (Compact Radius) mini excavator has now been launched into the southern African market for diverse, high performance applications across the building, construction and allied industrial segments, including the refractory and mining sectors.

A multi-task workhorse suited for anything from trenching to tunnel wall scaling (when fitted with a hammer), the Cat 305.5E2 CR has an operating weight of approximately 5 335 kg (with cab and standard stick) and a transport length (with boom) of 5 330 mm, making it well-suited for towing or truck loaded transport, and rapid deployment. The shoe width is 400 mm, with rubber tracked undercarriage fitted as standard.

Like all E2 Series models, the Cat 305.5E2 CR comes equipped with a new, innovative cab design and a high definition hydraulics system. The pin back door on the cab offers a wider entry into an operator environment with industry leading comfort, ergonomically designed 100% pilot controls, adjustable arm rests, updated air and heat controls, and excellent visibility for superior productivity and safety on the job site.

Other key features include 200 degree bucket rotation; dozer blade floats; the Cat 305.5E2 CR's compact radius design (the upper body stays within the width of the undercarriage during rotation); and two way hydraulic lines, which makes the machine work tool ready. The Cat 305.5E2 is compatible with all 5 tonne Cat E Series work tools, including couplers, thumbs, buckets, hammers, augers, shears and rippers. An optional hydraulic quick coupler further extends their versatility, enabling rapid tool changeovers for diverse on-site tasks.

"200 degree bucket rotation allows deeper flat back trenches without having to reposition the machine; plus more material retention is achieved at the top of the lift cycle while truck loading," explains Barloworld Equipment product marketing manager, Desigen Naicker.



The Cat 305.5E2 CR can be fitted with an optional rear view camera. In addition to maximum workplace safety, this improves operator productivity and efficiency through a 360 degree view of the job, making tasks easier to execute.

Power is provided by a Cat 2.4 model engine generating a rated net power output of 32,9 kW (ISO 9249). Excelling in mass excavation roles, the maximum bucket breakout force is 50,9 kN, with a maximum dig depth and height of 3 470 mm and 5 330 mm.

On the ground, precision is delivered by the machine's high definition hydraulic

system. This load sensing, flow sharing set-up provides improved efficiency, controllability, and reduced operating costs. Additional savings are achieved by the Cat 305.5E2 CR's new Power on Demand feature, which replaces the previous generation Eco mode. Power on Demand ensures optimal fuel burn by automatically selecting the appropriate engine rating selection to match each work task.

HYDRAULICS

FAST HYDRAULICS DEPEND ON CHS

In today's competitive climate, you can't afford to operate slow machines

Today's Cat machines are faster, more powerful, and easier to operate thanks to technological advancements in their hydraulic designs. But maximising this performance depends on strict contamination control, which is why making Caterpillar's CHS (or Custom Hydraulic Service) a part of your overall maintenance programme is so important.

"In essence, CHS enables you to maintain peak hydraulic system performance and catch problems before they turn into costly repairs," explains Paul Verwey, a group products specialist at Barloworld Equipment. "In fact, long before contaminants cause component failure, they slowly reduce system efficiency, which has a tremendous impact on machine productivity."

Consider this: controlled studies have shown that without a monitoring mechanism in place, hydraulic efficiency can fall off by as much as 20% before being detected by even the best operators. "Efficiency losses of this magnitude can equate to a day of lost production each week. They also cause machines to burn more fuel and shorten component life."

Designed for today's hydraulic-intensive machines, periodic CHS inspections are the best way to keep repair costs down and performance up.



Performed twice a year or every 1 000 hours, the Custom Hydraulic Service is comprehensive and typically entails a range of performance tests. The latter include hydraulic cylinder drift, and hydraulic system cycle times and pressures.



<http://goo.gl/5Lxt9H>



WHY CHS?

It helps you maintain peak hydraulic system performance and catch problems before they turn into costly repairs.

Here's what each inspection typically includes:

Performance test

- Engine performance tested
- Hydraulic cylinder drift tested
- Hydraulic system cycle times and pressures tested
- Minor adjustments made as needed

Cat S•O•SSM fluids analysis

- Oil sample taken from the hydraulic compartment
- Oil sample analysed for contamination level, physical properties, and wear particle count

Visual inspection

- Hydraulic system checked
- Engine and cooling system checked
- Cab checked
- Electrical system checked
- Undercarriage checked
- Ground engaging tools checked



Service solutions

- Performance test, oil analysis, and visual inspection results interpreted
- Feedback report provided
- Service solutions recommended, if needed

RCC PHASE ADVANCES AT LAÚCA DAM

(continued)

◀ (From page 1)



Across its projects, Odebrecht Infrastructure owns and operates a predominately Cat earthmoving fleet, which includes equipment deployment on the Laúca Dam development. Here Cat D6N XL and D6T dozers (for spreading and fine grading), together with 12 tonne Cat CB564D and 2,7 tonne Cat CB24B double drum vibratory rollers are currently hard at work on the Roller Compacted Concrete (RCC) phase to form the dam wall.

Equipped with 2 130 mm wide drums, the Cat CB564D is a high production unit designed for larger jobs and wider paving, efficiently compacting sub-base, base and surface courses, thus making it ideal for this RCC application.

Allied units involved in initial site preparation and ongoing civil works include Cat 966H wheel loaders, Cat 740B articulated trucks, Cat 246D skid steers, and Cat 320D2 L hydraulic excavators. These units are supplied by Barloworld Equipamentos Angola, with on-site field service teams providing dedicated support.

An estimated 3 000 000 m³ of readymix concrete will be used to construct the dam wall with approximately 90 kg placed and compacted per cubic metre. Deployed for the RCC phase alongside the Cat rollers and dozers are some thirty tipper trucks operating on a two shift system. Concrete is being supplied by two on-site batch plants reaching a peak output of close to 600 m³ per hour, which underscores the intensity of the RCC programme.

Once completed, the dam wall will have a final height of 132 m and a crest length of 1 075 m, holding back a reservoir some 36 km long and 15 km wide and covering an area of 185,4 km². The base width of the wall is approximately 80 m.

River diversion

A key aspect of the first phase was the successful diversion of the Kwanza River via two new horseshoe shaped tunnels, measuring 14 m in diameter and with a length of approximately 1 021m, constructed on the right bank to allow for continuation of the dam construction, with this phase completed in September 2014. This marked the end of an initial 20 month programme.



In phase two, work includes the construction of the RCC wall, the spillway, the adduction channel, six gravity water intakes, six 2 000 m long adduction tunnels to the underground power house, equipped with six 334 MW turbine sets located in a 21 wide by 273 m long cavern, and six evacuation tunnels with gate structures.

A second 67 MW power house will be constructed downstream to take advantage of the ecological flow remaining in the river (at an estimate flow rate of 60 m³ per second).

This will be followed in phase three by the installation and commissioning of the electro-mechanical equipment.

Currently, some 5 200 personnel are employed on the project. Odebrecht Infrastructure has an employment programme in place coined 'BELIEVE' which recruits and trains people from villages in the surrounding community. By their nature, all dams displace existing inhabitants, and the project caters for this with new housing and initiatives that include aquaculture schemes, Small Medium Enterprise (SME) skills development, and investment in agricultural projects.

"The potential exists to construct upwards of six further hydroelectric projects in the medium Kwanza zone," explains GAMEK project director, Eng. Elias Estevão. "In the immediate future, more projects are planned from 2016 till 2017, which together with the Laúca Dam, will increase current hydroelectric capacity by some 5 000 MW."

From November 2016, the filling of Laúca's reservoir will commence in the build-up to the 'go live' date in September 2017. Electricity will be supplied to the national grid via a new 400 kV substation, adding impetus to Angola's macro-economic growth plans regionally. Already, Laúca has a viable fish farming industry.

CAT ARTICULATED FIRE TRUCK A WORLD FIRST

The colour is distinctively red, which is unusual for a Cat machine, but then again this is an emergency response vehicle, and a very unique one, which took close to a year to design and configure.



During a fire, the main tank has the capability of deploying 2 900 litres per minute from a height up to 28 m and an estimated range of close to 45 m.

Built around a Cat 740B articulated truck chassis, Johannesburg based specialist body builders and fluid handling specialists, Cobra Petro Projects, have developed what is believed to be a world-first: an all-terrain vehicle that combines and integrates a rescue and fire-fighting aerial sky lift platform with an onboard 21 000 litre tank incorporating an AFFF (Aqueous Fire-Fighting Foam) compartment, pumping equipment, plus allied hose and cannon connections. The truck also has an onboard fire suppression system.

It's a formidable machine purpose-built for Kumba Iron Ore's Sishen mine that meets exacting safety and performance standards.

"Globally, conventional designs to date have seen aerial platforms mounted on rigid on-highway vehicles," explains Cobra Petro Projects' managing director, Lloyd Darby, "but never to our knowledge on an articulated truck and not in combination with a water bowser tank system." Cobra secured the order from southern African Cat dealer, Barloworld Equipment.

The sky lift is designed to reach a vertical height of around 28 m (with the stabilisers down) and supports a basket with a 325 kg carrying capacity for transferring personnel to safety during a fire. A stretcher attachment facilitates rescue operations for injured personnel. The basket rotates 360 degrees endlessly via a rotary union arrangement in the turret and is connected via telescopic pipe work to the water tank. The sky lift draws its 24 V power from the Cat diesel engine, whilst the fire-fighting pumps operate off the hoist hydraulic system.

The aerial technology was provided by Finnish original equipment manufacturer, Bronto Skylift, in consultation with their South African agent, Fire Raiders, the latter responsible for installing the fire-fighting equipment. Bronto has extensive experience in designing stair ladder systems for fire brigade trucks worldwide, but this project definitely put their engineering team to the test in finding an optimal solution. Technical input was also provided by Caterpillar's articulated truck manufacturing centre in Peterlee, England.

One of the biggest challenges was the need to identify the best position for the truck's 21 000 litre tank, which needed to be positioned on top of the sky lift platform tied in to the chassis, thereby optimising the centre of gravity and weight distribution.

The final gross vehicle mass is around 70 tonnes, of which the cab and chassis accounts for approximately 28 000 kg.

During a fire, the main tank has the capability of deploying 2 900 litres per minute from a height up to 28 m and an estimated range of close to 45 m. The truck also comes equipped with lay flat hose connections, as well as hose reels for bush fires (with an output rate of between 150 to 200 litres per minutes).

Water replenishment of the 21 000 litre tank takes around 7 minutes via dam water sources, and even faster via the truck's mine gooseneck connections.

Once all the design details were finalised on the Cat 740B fire-truck, assembly moved along rapidly, taking just six weeks to complete and commission a master-piece in mechanical engineer that establishes a new machine class for off-road fire and rescue.

4 | GROUND ENGAGING TOOLS (GET)

DOZER BLADE PROTECTION

AT THE CUTTING EDGE



A Cat D10T working in conjunction with an electric rope shovel.

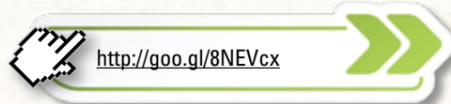
For maximum uptime in the most abrasive applications.

Developed specifically for Cat D10 and D11 track-type tractors, the new Cat High Abrasion Cast Cutting Edge System is built specifically for extreme, high abrasion pushing applications with low to moderate impact, moving more material with less machine downtime, shift after shift. The system is designed for fitment on Cat universal and semi-universal blades.

"The high abrasion end bits are now married up with complementary cast high abrasion cutting edges, a new development from Caterpillar," comments Barloworld Equipment group product specialist, Deon Delpont. Typical abrasive pushing applications include feeding a shovel, stockpiling, or maintaining a pit floor. In these applications, end bits are designed for half the life of the reversible cast cutting edges.

A new edge measures approximately 40 cm (16 inches) in width with a thickness of 50 and 80 mm for Cat D10 and D11 systems, respectively. The edge should be regularly monitored and flipped once it reaches approximately 34 cm (13,5 inches). Then at approximately 28 cm (11 inches) the edge is due for replacement.

"Excess wear on the base edge could lead to premature cutting edge breakage, which is why it's important not to exceed 7,5 cm (three inches) of wear per side," adds Delpont. "Adopting this practice will ensure maximum wear life performance and contribute towards lowest cost production."



<http://goo.gl/8NEVcx>

UNDERCARRIAGE

CAT DURA LINK

Move more material, more efficiently

Available now for Cat D10 track-type tractors and from 2016 for D11 models, Caterpillar's new Heavy Duty Extended Life Undercarriage with Dura Link is manufactured to tackle the most rigorous terrain without breaking.

"The more precisely the iron matches the application, the more effective and efficient your work will be," points out Barloworld Equipment group product specialist, Deon Delpont.

Dura Link comes to market with a 40% larger diameter bushing, and a 9 mm larger diameter track roller. The new link is 2 mm taller on the ends and 7 mm taller in the centre and features increased depth of hardness for reduced idler scallop wear.

Together with the correct maintenance disciplines, users can expect a 20 to 40% longer wear life, depending on the application and the level of operator proficiency.

Designed for longer life

Caterpillar's new high abrasion cast cutting edges and end bits provide up to 40% longer wear life when compared to the Cat Extended Wear Life (EWL) ground engaging tool system.

Key benefits to note:

- Optimised material placement results in more wear material and less throwaway weight.
- The system is available for universal and semi-universal blades.
- Features drilled and tap holes for easier installation and removal.
- Constructed with DH-3 material for high abrasion resistance and strength.
- Designed for use in extreme abrasion applications with moderate impact.

CORRECT INSTALLATION TIPS

Ensure correct installation and longevity for your blade by following these easy steps:

1. INSPECT

- Ensure that the base edge is flat and not excessively worn.

2. CLEAN

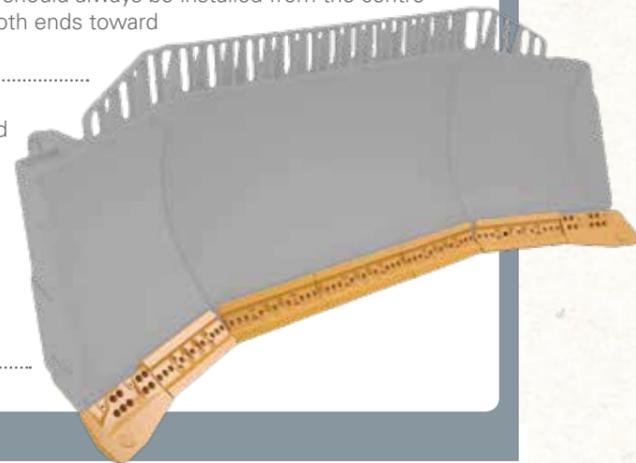
- Surfaces, bolts and nut threads should be clean to ensure maximum clamping force.
- Use new hardware as old bolts may have metal fatigue.

3. CENTRE OUT

- Cutting edge and end bit bolts should always be installed from the centre outward. Do not install from both ends toward the centre.

4. TORQUE, BANG, TORQUE

- Tighten all bolts to the required torque.
- Seat bolt heads in the countersinks with a heavy hammer.
- Tighten the bolts again to the required torque. For 5P-8823 bolts, the required torque is 2 300 +/-300 Nm.

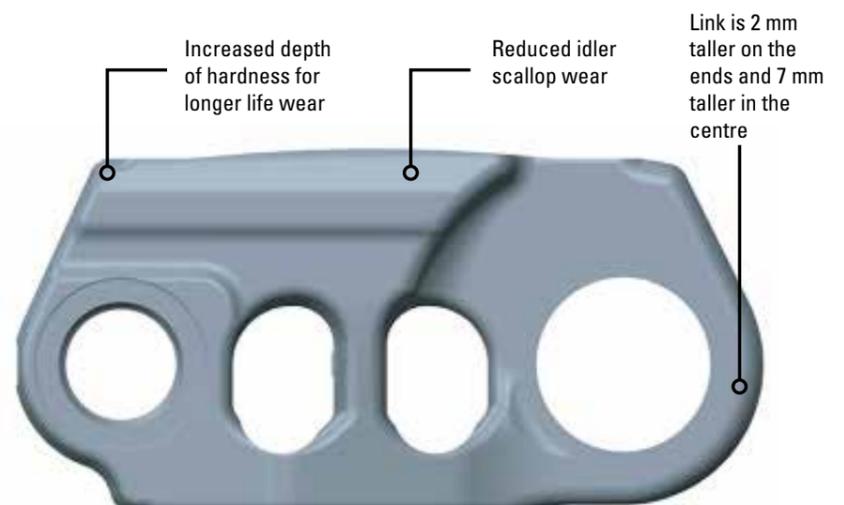


Did you know?

Caterpillar designs and manufactures its own undercarriage and continues to develop new innovations that maximise uptime and minimise owning and operating costs.



PATENTED CATERPILLAR DESIGN



ORPEN'S BOUNDARY PARK UNDER WAY

As on other milestone property developments, the earthworks programme on Orpen Group's R1 billion plus Boundary Park project will be led by a predominately Cat earthmoving fleet.



The entrance to Northlands Production Park: to date AZ Engineering and Plant Hire has completed approximately 1 000 000 m² of development across five industrial townships. Properties currently owned by Orpen include the Northlands Business, Northlands Production and Northlands Commercial Parks in North Riding.

Orpen Group is expanding its property footprint in North Riding, Randburg, with the turnkey development of Boundary Park, a new secure access mixed-use industrial, commercial and distribution complex that is strategically positioned as it borders Malibongwe Drive – some 400 m down from the Witkoppen Road interchange that it transects.

A major arterial route, Malibongwe interconnects Sandton with Randburg via the N1 and beyond to Lanseria Airport and linking to the N14, thereby providing access to a burgeoning lower, middle and upper income residential node in the area seeking access to neighbouring business and employment opportunities.

"Boundary Park has a zoned footprint of 400 000 m² of which approximately 250 000 m² will be constructed under roof," explains Orpen Group director, Fabiano Cellini, adding that there are seven phases planned, some of which will be developed in parallel over a six to seven year period.

Land clearance and infrastructure works, including earthworks platforms preparation, commenced from January 2015 and will be ongoing to accommodate all phases, with the building programme due to start from the first quarter of 2016.

The site was originally zoned as an agricultural holding, so Orpen Group

will be installing the full suite of electrical, storm water, water reticulation and sewage services, in addition to constructing the internal road layout and perimeter walling. Water services will include the construction of an approximately 5 km pipeline.

As the land owner and developer, Orpen Group will project manage the R1 billion plus building programme at Boundary Park, working with designated sub-contractors.

The main contractor is Orpen Group's sister entity, AZ Engineering, which is currently rated as a 6CE in terms of the Construction Industry Development Board (CIDB) grading system. AZ Engineering will carry out all civils works on site.

To provide free flowing access to Boundary Park, AZ Engineering will also be responsible for road upgrades on the Malibongwe Drive and Epson Road intersection, valued at around R11 m, which



On location at the Boundary Park site are (from left to right): Barloworld Equipment Cat sales professional, Jane Shaw; and Orpen Group director, Fabiano Cellini.

is due to commence towards the end of 2016, for respective clients, Gautrans and the Johannesburg Roads Agency (JRA).

On all phases, earthmoving and allied equipment requirements will be supplied by Orpen Group division, AZ Engineering and Plant Hire. This latter concern provides earthmoving plant for AZ Engineering's own construction projects, as well as those of the open market.

Every plant owner remembers their first earthmoving machine acquisitions, especially when they have been pivotal to their business success. In this respect, AZ Engineering and Plant Hire (AZ) is still currently using a Cat 950B loader, and a Cat 235CME hydraulic excavator, that pioneered Orpen's earlier Northlands Projects Development.

These units are now deployed at Boundary Park, working alongside a modern Caterpillar fleet that includes the latest generation joystick controlled Cat 140M motor grader, which AZ acclaims for its precise performance. AZ's plant component also includes an extensive fleet of Cat 140G and 140H conventionally steered motor graders, in addition to Cat compaction rollers, hydraulic excavators, and backhoe loaders.

"What we particularly like about the Cat 140M grader is the high level of accuracy achieved by the operator," says Cellini. "This means that we avoid over-grading and consistently meet our 5 mm tolerance target for the building platforms. Downstream, this saves significantly on the volume of concrete required to lay the foundation level."

Quality builds long standing relationships

From streets to parking lots to high production projects, paving applications need powerful, mobile, and easy-to-use equipment. Barloworld Equipment and Cat help you to increase job site efficiency.

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6 | AGRICULTURE

MASTERING SUSTAINABLE BEEF PRODUCTION

Blending science with optimal mechanisation, a leading beef producer finds creative uses for its Cat earthmoving fleet to add value to their intensive farming programme, with a latest generation Cat 950 GC loader joining the machine mix.



From left to right: Barloworld Equipment Kimberley Cat sales professional, Hendrik de Wet; and Roelie van Reenen from Beefmaster.

A premium beef leader in South Africa, every day Beefmaster® formulates and distributes anywhere from 300 to 400 tonnes of nutritionally formulated food for its cattle at its world class feedlot facility at farm Kromellenboog in Christiana, North West province. Here, under optimally controlled conditions, healthy animals are reared in a stress-free environment that lends itself to downstream product quality.

Today Beefmaster, owned and managed by the van Reenen family, is a multi-disciplinary, vertically integrated business, serving both the local and international markets in beef, lamb and hides. The Christiana farm is supported by the Beefmaster abattoir in Kimberley that in addition to supplying swing beef, houses a state-of-the-art boning facility that packages meat for both the wholesale and retail sector. Beefmaster processes all of its own cattle and lamb (a diversified segment), as well as those from other feedlots.

In 2009 Beefmaster opened its first retail outlet and now has several stores operating in South Africa, including a factory outlet in Olifantsfontein, Gauteng, which sells directly to the public, as well as wholesalers and spaza shops under the Beefmaster brand. Beefmaster also has a joint venture agreement in place to supply store outlets and also owns and operates

numerous in-store butcheries with one of South Africa's foremost retailers.

This is a company with a proud legacy dating back almost 300 years when Jacob van Reenen landed at the Cape of Good Hope in 1722. Jacob's key business interests at the time were predominately focused on the ship chandler trade, supplying vessels calling into the Cape from all points of the compass.

The modern day founder, Lourie van Reenen, launched a cattle feeding enterprise back in 1965, which subsequently led to the acquisition of the Kromellenboog farm in 1983, where Beefmaster now trades. This farm is centred in what is widely regarded as North West 'cattle country'. Lourie's two sons, Louw and Roelie, form the core management team running the business.

In addition to its Christiana operation, Beefmaster carries out commercial farming in the eastern Free State, and grows around 50% of its own feed requirements.

Mechanisation trends

As operations at Kromellenboog matured, the transition to more advanced mechanisation evolved in line with global benchmarks for beef producers, driven by new market requirements for mass production.

Beefmaster imported its first feed mixer from the USA in 1971 and in 2015 now fields the latest rotary mixers on the market, transported by new Massey Ferguson tractors supplied and supported by Barloworld Agriculture.

"In today's farming environment, mechanisation is the norm, but mixing

MOTOR GRADERS

A GRADING ICON SINCE 1938

Simplified maintenance, fuel efficiency and precision grading best define the new Cat 12K motor grader.

Succeeding the H-Series model, the new Cat 12K motor grader launched within the southern African market in 2015 continues a proud heritage that can trace its lineage back some 77 years to 1938. This was the milestone that marked the first introduction of the 'Caterpillar Diesel No. 12 Auto Patrol'.

The machine was renamed as a 'motor grader' a year later and a legend was born. Since that time, there has been a continued evolution of the No. 12 grader, with the Cat 12K conventionally operated unit being the most recent example.

Manufactured at Caterpillar's Suzhou factory in China for worldwide distribution to Tier II emission standard markets, the Cat 12K sets the next industry standard in its class as a versatile machine for general construction and governmental applications (typically here for gravel road maintenance).

A high visibility lift arm design, consistent with that found on the joystick controlled M-Series, is featured on the Cat 12K, a set-up that provides enhanced visibility to the front of the machine.

VHP power delivery

This is a powerful and fuel efficient machine, equipped with a Cat C7 ACERT engine – designed and rated to handle tough loads – delivering a net output of 108 kW base power in first gear. The standard variable horse power (VHP) feature enables delivery from 108 to 123 kW, whilst the machine's Power Shift transmission features direct drive and electronic control for smooth, powerful shifts at any speed.

High torque output and high torque rise make the C7 engine very responsive. The engine's lugging capability allows it to pull through sudden, short-term increases in load, reducing the need to downshift. As a result, the operator can maintain desirable working speeds, which means the work gets done faster.

Important for efficient grading, proportional hydraulic flow provides outstanding 'feel' and predicible movements, a standard requirement for general as well as final level work.



The 12 Series pioneer: A Cat Auto Patrol in operation around February 1939.



Every component, from blade linkage to the long wheel base on the Cat 12K is designed for optimum moldboard control and material movement. Operationally, the standard blade width for the southern African market is 4,3 m (14 foot).

<http://goo.gl/mg40ty>

◀ (From page 6)



Beefmaster's new Cat 950 GC medium wheel loader excels in the movement and handling of low SG (Specific Gravity) materials.

feed by hand was still a common practice as recently as the early 1970's," comments Beefmaster company founder, Lourie van Reenen.

On the earthmoving front, one of Beefmaster's first acquisitions was a Cat 920 front end wheel loader in 1983. These were subsequently joined by further Cat 920 and then Cat 930 units, both of which share the same Cat 3304 engine. A number of these units are still in operation on the farm, having undergone a series of rebuilds along the way, carried out by Beefmaster's workshop at Kromellenboog.

"We pride ourselves on developing our earthmoving artisan and mechanical engineering personnel to achieve the best cost per tonne production and in this respect Caterpillar's second and third life rebuild philosophy has definitely enabled us to achieve an excellent return on investment."

Subsequent machines now in service include Cat 988B wheel loaders, as well as Cat 769C rigid trucks (with a rated payload of around 36 tonnes), both derivatives dating back to the 1990's.

The Cat 988B is an optimal match for the Cat 769C in 'load and haul' operations at Kromellenboog. For these machines, one of their key tasks is to remove the waste material following pen cleanout in the feedstock section. Before this happens, Beefmaster's Cat 920's and 930's loosen the hard packed manure material composition that forms on the in-situ limestone base in the pens.

Aside from these roles, Cat 988B and Cat 769C units also report for duty as infield agricultural machines when it comes to silage harvesting, a mainstream cattle food source. For this task, the Cat 769C's are fitted with special flotation tyres to suit the typically saturated ground conditions.

Loading in the kitchen: enter the Cat 950 GC

Cat loaders are also deployed for materials handling work in the animal feedstock section, commonly referred to as the 'kitchen'. This feed material naturally

lends itself to spontaneous combustion, so stockpiles have to be moved around regularly. Alongside this is the intensive task of loading the continuous stream of rotary mixer feed units that constantly head out in a planned and synchronised manner across Kromellenboog's extensive feedstock pens.

Joining Beefmaster's Cat fleet from 2015 is the latest generation Cat 950 GC medium wheel loader, a purpose designed unit that excels in the movement and handling of low SG (Specific Gravity) materials. Beefmaster pilot tested various Cat medium wheel loaders, supplied and supported by Caterpillar's southern African dealer, Barloworld Equipment, before selecting the Cat 950 GC as the best fit.

"To match the application, this Cat 950 GC unit was specified with a 4 m³ bucket to achieve optimal materials handling," explains Barloworld Equipment Cat sales professional, Hendrik de Wet, based at the Kimberley depot. The standard bucket size is 3 m³.

The Cat 950 GC was the best choice for high volume materials handling in the kitchen, typically with an SG of less than 0,5. The Cat 950 GC also has the right loading height reach for Beefmaster's new class-leading rotary mixer trailer units.

Another key factor for Beefmaster in the selection of the Cat 950 GC is the machine's simplified electronics and ease of maintenance. "It fits into our model," says Roelie van Reenen, "the emphasis being on lowest owning and operating cost."

Weighing in at around 18 676 kg, the Cat 950 GC wheel loader is a complete new design leveraging proven Cat components and technology. Power is provided by a fuel efficient Cat C7.1 engine generating a rated net output of 151 kW (ISO 9249) at 2 200 rpm.

Well-suited for stockpiling, truck loading, and general materials handling tasks, the machine features Caterpillar's proven Z-bar loader linkage, providing aggressive digging abilities and high breakout forces; whilst the bucket pin height and dump clearance are best in class for a 5 t capacity wheel loader.

"The Cat 950 GC has proven itself to be an excellent multi-task unit since joining our fleet in March this year, and along with our new rotary mixer and Massey Ferguson investments enables us to keep pace with market demand," Roelie van Reenen adds.

"South Africa remains our main market, allied to which are excellent export opportunities into Africa, as well as overseas," adds van Reenen, "where in all cases there is strong demand for the highest quality pure grained beef."



One of Beefmaster's Cat 769C trucks working in an agricultural harvesting role.

ARTICULATED TRUCKS

ALL-TERRAIN HAULAGE IN THE 41 TONNE CLASS



Manufactured in Peterlee, England, the Cat 745C joins the current 725C, 730C and 730C EJ (Ejector) models launched in southern Africa during 2014. Production of the first Cat 745C units at Peterlee commenced from March 2015.

The new flagship in Caterpillar's articulated truck range, the Cat 745C comes to market with an all new power train, more power on demand, improved fuel efficiency, plus greater payload capacity.

A major advance on the world leading Cat 740B model launched locally in 2011, the new Cat 745C features a host of new performance features designed to lower owning and operating costs in mining, construction and allied industrial segments.

"Tonnes moved per hour and per litre of fuel burned are key drivers to business success in today's contracting market, and Caterpillar has made this a key focus during the research and development, and pilot testing phases of the Cat 745C," explains Barloworld Equipment group product and application manager, Johann Venter, adding that this includes comprehensive in-field trials in South Africa.

Along with more power and improved operational efficiencies, the rated payload on the Cat 745C has increased to 41 tonnes, compared to the Cat 740B's 39,5 tonne capacity. The Cat 745C has a newly designed dump body with a capacity (heaped SAE 2:1) of 25 m³.

Driving the Cat 745C is a new CX38 High Density Power Shift (HDPS) transmission with Advanced Productivity Electronic Control Strategy (APECS) and nine forward / two reverse gears, with power delivered by a Tier II Cat C18 engine generating a gross output of 381 kW (SAE J1995). This compares to the 365 kW Cat C15 unit installed on the Cat 740B.

Updated automatic traction control

Standard fitment on the Cat 745C is an updated Automatic Traction Control (ATC) system, which leads the market in terms of technology. ATC significantly improves ease of operation by removing all manual traction control decisions from the operator. The system automatically changes the level of inter-axle and cross-axle differential lock engagement on the go, which aids in maintaining traction at all times.

The ATC system is also fully proportional, constantly modifying and applying the exact amount of torque to each wheel to match changing ground conditions.

Automatic Retarder Control (ARC) has been introduced to further improve ease of operation. Working in forward and reverse gears, this feature can now be set to fully automatic, in addition to manual control. In automatic mode, the machine manages retarding through a combination of engine brake, gear selection and supplemental application of the service brakes. Two position manual retarding is also retained for more experienced operators. Both ATC and ARC are unique Caterpillar proprietary systems. "ATC was first introduced on the Cat 735B, 740B and 740B EJ in 2011 and has received excellent market feedback from customers," points out Venter.

8 | FUEL & OIL

FLUID ENGINEERING

The life blood of the machine

For every Cat product class there are specially formulated oils and hydraulic fluids that have been proven through rigorous laboratory and in-field trials, backed by a comprehensive Caterpillar research and development programme. In the past financial year ending December 2014, this amounted to approximately US\$2,1 billion, the majority of this spend being tied to new product introductions.

"Every Cat product is purpose-built to work as part of a sustainable, integrated system, and Cat fluids are a key component in maximising machine health and downstream production," comments Barloworld Equipment group product specialist, Reuben Phasha.



Cat FDAO is the preferred lubricant for Cat off-highway truck front wheels, differentials and final drives

CAT COMPACTOR OIL

For Cat compactors and hydraulic mining shovels

Providing exceptional rust and corrosion protection, Cat Compactor Oil is a premium PAO (polyalphaolefin) synthetic gear and bearing lubricant with no viscosity improvers. This is the only oil recommended by Caterpillar for use in certain compartments of Cat compactors and Cat hydraulic mining shovels.



Applications:

- All 500 Series soil compactors with the new pod style drum;
- All earlier 500 Series model compactors without oil pockets in the old style drum; and
- Distribution-, travel- and swing gearboxes in Cat hydraulic mining shovels.

Core benefits of this oil include superior rust and corrosion protection. Plus the oil's high anti-wear properties extend component working life.

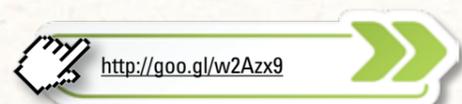
Cat Compactor Oil also minimises the effects of micro slip in rolling contact bearings for longer rolling element life potential; and extends equipment high temperature operating capability.

Cat FDAO™

The final drive axle oil for off-highway trucks, large track-type tractors, pipe layers and track skidders

Used as standard factory fill for Cat off-highway trucks and large track-type tractors, Cat FDAO is compatible with Cat final drives and axles which previously specified TO-4 lubricants and that do not contain friction material.

Cat FDAO is the preferred lubricant for Cat off-highway truck front wheels, differentials and final drives and enables extend drain intervals to 4 000 hours (double that for TO-4 commercial oils), when monitored by the Cat S•O•SSM oil analysis programmes. The Cat S•O•S laboratory for the southern African region is housed at Barloworld Equipment's Condition Monitoring Centre in Boksburg, Johannesburg.



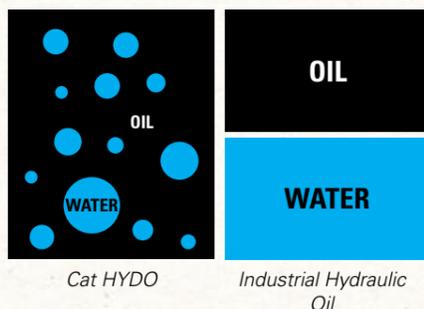
Cat Bio HYDO™ Advanced

For optimum environmental protection and a positive CO² balance

Developed for use in a wide range of applications and conditions where environmental impacts are a key consideration, Cat Bio HYDO Advanced provides superior performance across a broad temperature range.

A green solution, Cat Bio HYDO Advanced is a synthetic ester based hydraulic fluid with >90% bio-based content (per ASTM D6866 test method). Unlike fossil carbon, bio-based carbons are derived from renewable sources: fluid biodegradability to OECD 301B is estimated at around 80% after 28 days.

Comparable to premium mineral-based hydraulic oils, Cat Bio HYDO Advanced



has been awarded a number of eco-labels, including the EU Flower. (The EU Flower is the only eco-label that covers all aspects of sustainability, including product performance, toxicology, pollution mitigation, and the utilisation of renewable

resources.) The product is also listed in the US Department of Agriculture's BioPreferred® programme

Key product features include superior, consistent wear protection throughout the entire temperature range from -30°C to 45°C, excellent corrosion resistance, and fast air release.

Good foam control and fast air release are important properties of any hydraulic fluid. Air trapped in hydraulic oil reduces system response and causes "sponginess" at the controls. Trapped air also accelerates oil degradation.

"Excessive air and foam can lead to cavitation (collapsing air bubbles) and damage to hydraulic components," explains Barloworld Equipment group product specialist, Reuben Phasha. "Cat Bio HYDO Advanced releases air very quickly and special additives keep the hydraulic fluid clear of foam, even when it becomes contaminated with engine oil."

Due to the oil's excellent oxidation stability, extended drain intervals up to 6 000 hours are achievable when combined with S•O•S fluid analysis monitoring.

"In the past, switching from a premium mineral-based hydraulic fluid to a synthetic ester fluid meant shorter drain intervals and increased operating cost," he adds.

For further information on the range of Cat oils, fluids and greases, please contact your Barloworld Equipment Parts Sales and Service Representative.

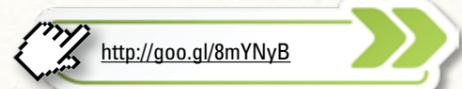
TYPICAL INDUSTRIAL HYDRAULIC OILS SEPARATE WATER AND OIL, WHICH CAN CAUSE VALVE STICKING OR EXCESSIVE WEAR ON THE HYDRAULIC SYSTEM. IN CONTRAST, CAT HYDO DISPERSES SMALL AMOUNTS OF WATER THROUGHOUT THE OIL TO ENSURE PROPER LUBRICATION.

FACT



Did you know?

Caterpillar ToughGuard hose has been tested to two million abrasion cycles without failure. That is double the international standard.





An aerial view of a section of the Rustenburg Rapid Transport (RRT) system at an advanced stage of construction.

FORMING THE RRT SYSTEM

Once completed, the Rustenburg Rapid Transport (RRT) system will serve an 18 km trunk line network of dedicated bus lanes and station terminals, with local contractor, M Civils, forging ahead with key phases of the construction programme.

The RRT forms part of the 2025 Rustenburg City Development strategy that sets out to transform the city and the way it interconnects with the neighbouring mining and agricultural communities that it serves. Similar to other BRT (Bus Rapid Transport) initiatives constructed in Johannesburg and Cape Town (referred to under their project names of Rea Vaya, and MyCiTi, respectively), the first phases of Rustenburg's RRT are due to come on stream during 2016 via trunk corridors, direct routes and feeder services. Some 80% of the Rustenburg Local Municipality will be covered once the RRT system is completed, catering for upwards of 200 000 commuters.

M Civils completed the first phase of the RRT contract in January 2014, which was valued at around R412 million, and extended over a project duration of around 18 months. The scope of works here entailed the construction of 5 km of RRT section. This required the upgrading of the north and south bound sections to a dual carriageway, installation of a dedicated central concrete lane for the buses, as well as the foundations for the bus stations.

Thereafter in May 2013, M Civils was awarded three of the four contracts (namely A, C and D work packages) for the second phase of the RRT, with a combined value of around R798 million. Stage A has been finalised and the balance is due for completion in April 2017.

Supporting the construction programme is M Civils' expanding mixed earthmoving fleet, now numbering more than 100 units. This fleet includes Cat machines such as Cat 140K motor graders, Cat 428F backhoe loaders and Cat 320D L hydraulic excavators. Cat graders remain M Civils' preferred choice for building site work and road construction.

"For any civil engineering contractor, optimal grading performance is essential and we regard the Cat 140K as the industry benchmark," says M Civils contract manager, Richard Stone. "This has been reinforced time and again on our road and infrastructure projects."



MORE POWER. BIG AIR. BLAZING FAST SET UPS.

Maximum productivity with the Cat® MD5150C Track Drill. Fast cycle times and a low operating cost from a reliable rock drill. Expect a long life that one is used to from Barloworld Equipment and Cat.

For more information contact our call centre on 0800 21 22 48 or visit www.barloworld-equipment.com

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10 | ENVIRONMENT

COMBATING ENVIRONMENTAL HAZARDS 24/7

Durban based company, Spill Tech, leads the market in oil and chemical pollution control, including the specialised field of bioremediation, backed by a Cat earthmoving fleet.

Wherever there's industrial activity, from petrochemical plants to manufacturing centres, underground services, sewage treatment works, mining and construction, Spill Tech provides a 24 hour emergency response solution to counter unexpected environmental threats.

"Regardless of whether the spill is the result of human error, mechanical failure or environmental conditions, like severe storms, the clean-up needs to be an immediate priority for the organisation responsible for the incident," explains Spill Tech's Head of Sales, Christopher Boyce, based at the Group head office in Durban.

Spill Tech has a national spill response network with branches in all nine regions throughout South Africa for quick response, as well as cross-border capabilities in countries that include Namibia, Botswana, Mozambique, the DRC and Zimbabwe.

Core Spill Tech services encompass waste management, industrial cleaning (including cleaning of bulk tanks), and spill response. More specifically, this includes fire decontamination and debris removal; industrial flood damage; and asbestos stripping and removal.

Bioremediation ramp-up

Allied to these activities has been a major ramp-up in the highly specialised field of bioremediation, the process of restoring

contaminated land to its original state by adding micro-organisms and enzymes. This either takes place at the source of the spillage or under controlled conditions.

Spill Tech is probably the largest bioremediation specialist in Africa in terms of project scale, working on sites that can range from 10 m³ up to 10 000 m³ and beyond.

"Typically following a spill, a geohydrologist will carry out core sampling,

as well as mapping of the plume of the product and then together with Spill Tech will formulate a bioremediation process," says Boyce. "This will also determine the depth of the excavations, which in the past have gone as deep as 18 m on some projects."

Whilst spill impacts may appear irreversible, many potentially harmful compounds can be efficiently broken down through bioremediation.

In a typical working application, the contaminated soil is excavated and housed in geotechnical cells, or biopiles – that need constant forced aeration – after which the remediated material is backfilled into the previously contaminated section and compacted.

A major factor is the management and prevention of cross contamination, taking into account ground water sources, as well as nearby streams, rivers or reservoirs.

Cat earthmoving fleet

In the bioremediation scenario, Spill Tech deploys a comprehensive Cat earthmoving fleet to carry out mechanised solutions on larger-scale sites that have been contaminated. Smaller scale bioremediation projects are dealt with traditionally by a deployed work crew.

Current units in Spill Tech's earthmoving fleet comprise Cat 428F backhoe loaders, a Cat CS533E vibratory soil compactor, and latest generation Cat 320D2 L hydraulic excavators. Spill Tech has also developed a rapid mobilisation solution in the form of a truck transported specialised trailer design that carries a Cat 428F as well as skips, which is available 24/7, nationwide.

"Spill Tech's operations are capital intensive and fast-paced, so we researched the market extensively before deciding to standardise on Cat machines for our bioremediation projects. Performance to date has met our exacting output requirements," adds Boyce, "as we progressively expand our footprint in this niche segment across South Africa, as well as southern African."



Cat 428F backhoe loaders and skips standby to tackle a bioremediation project.

MILITARY

SA DEFENCE FORCE CHOOSES CAT

In September 2014, Armscor (Armaments Corporation of South Africa) appointed Barloworld Equipment as its sole supplier for their earthmoving equipment replacement programme. The agreement applies to Category 1 and 2 machines in terms of Armscor's MOEMS (Military Operation Earthmoving System) project. Armscor is a dedicated organisation servicing the materiel and allied requirements of the South African Department of Defence.

Cat machines procured by Armscor are deployed with the SA Army Engineer Formation and will support the Department of Defence's internal and external construction requirements.

Allied to these activities will be the South African government and the Department of Defence's involvement in United Nations and African Union missions on the continent. Here the SA Army's Cat machines will play their part in building essential infrastructure, such as roads and potable water reticulation.

Barloworld Equipment is the sole supplier for parts, service, training and support, with comprehensive coverage provided via their southern African network when necessary and required.

To date more than 40 Defence Force personnel have been trained and certified at Barloworld Equipment's Operator Academy in Isando, Johannesburg on a range of earthmoving machine classes. Train-the-trainer courses are also being run for SA Army operator facilitators at the Academy, as well as army maintenance support technicians at Barloworld Equipment's Technical Centre.

Cat units supplied to date include Cat D6R and D8R track-type tractors, a Cat 824K wheel dozer, a Cat 323D2 L hydraulic excavator, Cat 428F backhoe loaders, Cat 950H wheel loaders, Cat 246D and 277D skid steers, as well as latest generation Cat 120M and 140M motor graders.



Lefa Mallane, Head: Government Relations, Barloworld Equipment Africa together with South African National Defence Force personnel at Barloworld's Isando campus in Johannesburg.

GENSET ASSEMBLY LINE PROMOTES LOCALISATION

Caterpillar and Barloworld Power have launched a combined initiative to assemble Cat electric power generators in South Africa to meet rising demand, reduce unit costs and promote localisation.

The establishment of the new assembly line marks a significant milestone in the partnership between Caterpillar and Barloworld Power, its southern African dealer for Energy and Transportation.

"We are now assembling Cat branded generators at our Boksburg, Gauteng, premises that have the same quality standards for which Caterpillar is renowned worldwide," says Mark Mencil, executive director of Barloworld Power southern Africa. "Barloworld Power can now offer truly competitive Cat products while aligning with government objectives in local employment and development."

The assembly unit was set up with the assistance of experts from Caterpillar's power systems assembly factory in India and is being managed and staffed by Barloworld Power. Initially the facility will assemble the Cat i6 and 400 series generator sets, ranging from 400 kVA to 1 000 kVA and suited to the provision of standby power for medium to large industries. Barloworld plans to produce about 500 units a year, expanding according to market demand.



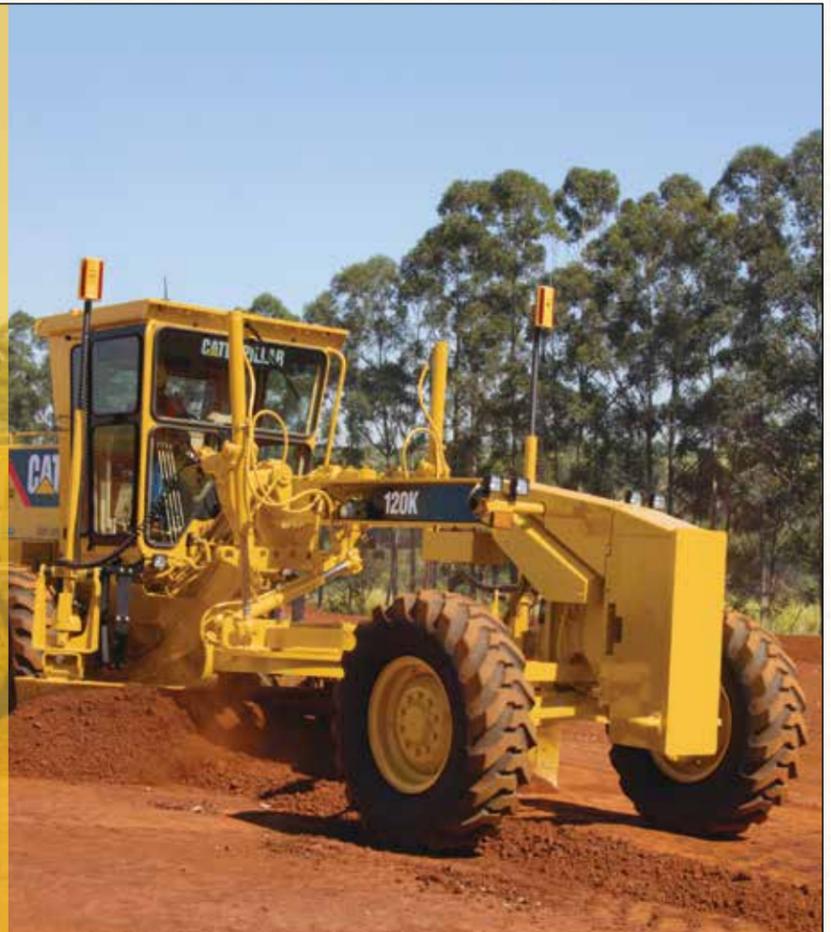
A 550 kVA Cat C15 generator set being assembled at Barloworld Power's Boksburg facility.

Maximum power and efficiency.

The K Series Motor Grader is the machine you can count on when you need to get work done. Cat motor graders help you make the most of your investment by delivering maximum productivity and durability. The Cat C7 engine, direct-drive power shift transmission and load sensing hydraulics work together to ensure the power and precision you need to work in demanding conditions. Always backed by Barloworld Equipment to keep you up and running.

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12 | DRILLING TECHNOLOGY

MASTERING

MID-RANGE PRODUCTION DRILLING

The new Cat MD6420C rotary drill sets the next benchmark for fast and cost efficient performance, delivering a maximum bit load force of 42 874 kg.

Building on the class leading reputation of Caterpillar's rotary drilling series is the recent worldwide release of the Cat MD6420C model, which comes to market with key technological refinements, an intelligent drill monitoring system, plus safety features designed to deliver optimised solutions for the lowest owning and operating costs in opencast mining.

The machine, which succeeds the highly successful Cat MD6420B, joins Caterpillar's six model rotary drill line-up, which extends from the MD6240 to the range topping Cat MD6640. These units are all manufactured at Caterpillar's Denison factory in Texas for worldwide distribution.

Like all Cat drills, this is a highly robust machine well suited for both rotary and DTH (down the hole) drilling in soft and hard rock applications. Power is delivered by a Tier II Cat 32 ACERT engine.

"The components work together as an integrated system to enable top-of-class bit load, torque and rpm, plus bailing air for optimal penetration rates and fast cycle times," explains Barloworld Equipment Cat drills product manager, Ramon Glaus.

"Power groups are arranged in-line for easy access, from both sides, to the engine, compressor, hydraulic pumps, plumbing and other components, which translates into safer serviceability and lower maintenance cost."

From an output perspective, the rotary drive head delivers a horsepower of 216 kW and a rotation speed of 0-137 rpm (with 0-173 rpm available), and a torque of 0 – 15,185 Nm.

Transporting the drill is a Cat 345 excavator undercarriage equipped with a three-point oscillating suspension and greased and lubricated track, which allows the MD6420C to negotiate rugged terrain without transferring excessive torsional forces to the mainframe. Additionally, the

undercarriage delivers continued stability while traversing between holes at a tram speed of 2,27 km/h. Gradeability with the mast down is 25% CDU (CUH 13%).

"The Cat MD6420C is the next advance in Caterpillar drilling technology, and we are positive that the machine will make strong gains within our southern African market," Glaus adds.

"EASE OF ACCESS IS ENSURED THANKS TO THE SPRAWLING DECK DESIGN, TOGETHER WITH 360 DEGREE WALKWAYS FOR UNINHIBITED, SAFE MOVEMENT."

Three mast options

The Cat MD6420C has three mast height options, namely 10, 13 or 16 m, in single or multi-pass configurations. Angle drilling comes standard and reaches up to 30° (in 5° increments).

Single pass depths are 10,29, 13,4 and 16,46 m for the 10, 13 and 16 m masts; whilst the maximum multi-pass depth is 63,39, 74,37, and 46,93 m respectively. At the top end this enables hole sizes up to 311 mm diameter, with a bit load force of 42 874 kg. To assure long life, all mast structures are designed with double-cut lacing in high stress areas.

Rapid to deploy, the mast can be raised or lowered in less than 40 seconds, even with a full pipe rack and drill string on the rotary head.

The MD6420C drill's pull-down and hoist is a single, double-acting cylinder, cable pull-down system. This produces a pull-down of 383 kN, and a hoist force of 311 kN. The retract rate is 0-33.5 m/min.

For optional high pressure DTH drilling, the discharge air flow is 42,5 m³/min.



The Cat MD6420C model succeeds the highly successful Cat MD6420B rotary drill.



DRILL TRAINING FOR AFRICA



During July 2015, instructors from Caterpillar's Malaga Demonstration & Learning Centre in Spain, as well as the Cat drill factory in Denison, Texas, conducted an in-depth PSSR (Parts Sales & Service Representative) training course, attended by Barloworld Equipment product specialists and management, seen here together with after-sales technical personnel from Caterpillar's local district office in Johannesburg.

"The training covered Caterpillar's full rotary and track drill line-up, focusing on parts inventory support, and component servicing and replacement across the hydraulics, power train, undercarriage and GET (Ground Engaging Tools) disciplines," explains Barloworld Equipment senior product manager, Wally Parsons (front row, third from right).

"The Cat drill population is experiencing strong growth and ongoing training ensures that we keep pace with new product introductions, such as the Cat MD6420C rotary unit, and the latest generation Cat 5150C track drill, both class leaders in their respective opencast mining and quarrying segments."

MK AFRICA EXPANDS ITS MINING BASE



From left to right are MK Africa contracts directors Gerhard van Schalkwyk and Hannes Venter, together with Barloworld Equipment Cat sales professional, Molly Breton.

Working across the mining and industrial sectors as a niche civil engineering contractor, MK Africa has been instrumental in establishing key infrastructure on a number of green and brown field projects in South Africa since the company's formation ten years ago.

Major growth has been spurred by a series of contracts within the Eastern Limb of the Bushveld Complex, predominately in the Steelpoort and Burgersfort areas, where there has been significant expansion in the platinum metals sector.

Recently completed projects include an approximately 11 month bulk infrastructure contract at Modikwa platinum mine, located some 15 km north west of Burgersfort.

The scope of work here was multi-faceted and included the construction of terraces entailing approximately 400 000 m³ of fill material to create the final 3 ha platform. The mine's new Number 2 decline shaft goes into the mountain at that level.

Also included was the upgrading of a 5 km gravel access road, together with the installation of storm water systems, the building of four pollution control dams, and the construction of a ventilation shaft.

Approximately 140 000 m³ of G5 material was sourced from the existing mine waste stockpile, with MK Africa carrying out screening operations on site. This material was used as overlay for the road reconstruction phase, as well as for final terrace surfacing.

Previous work at the mine entailed bulk earthworks and civils at Modikwa South 2. The scope here involved 39 706 m³ of earthworks; 1 150 m of precast pipe installation; and 283 413 m³ of terrace layer works.

A Construction Industry Development Board (CIDB) 7 CE contractor, MK Africa targets projects in the R5 to R50 m range with its business philosophy centred on three core values, namely safety, cost, and quality.

"Around 70% of our work is for the mining segment, which in addition to civils includes building if this is part of the greater contract. Over time, projects have grown in complexity and provided opportunities for us to offer flexible engineering solutions," explains MK Africa contracts director, Gerhard van Schalkwyk, who along with company founder and contracts director, Hannes Venter, leads this multi-faceted business.

Supporting MK Africa's expansion strategy is an ongoing investment in mechanised solutions, which includes readymix trucks, concrete batch plants and a well stocked formwork yard for concrete activities. The earthmoving fleet contains a core Cat component for tasks ranging from haul road construction to mass excavations,



One of MK Africa's Cat 329D L hydraulic excavators at the base of a ventilation shaft construction project at Bokoni mine.

layer works, dozing and mine stockpile management. Recent acquisitions include Cat 140K graders, Cat 329D L hydraulic excavators, as well as the latest generation Cat 938K medium wheel loader.

"Our ability to grow our relationships with existing mining houses and industrial clients has been fostered by our exceptional safety record to date," points out van Schalkwyk. "On recent

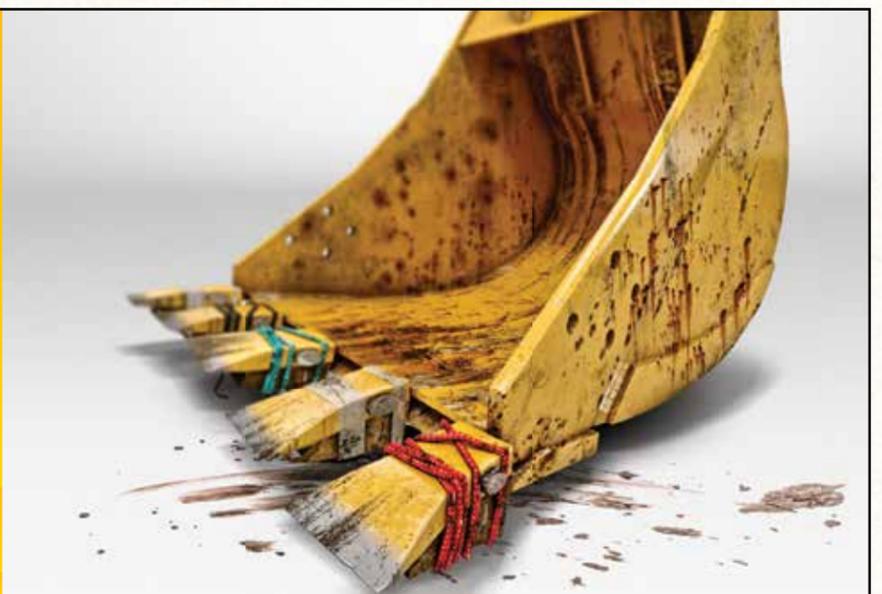
and existing contracts, we have not had a lost time injury over the past 24 months. This is an achievement that has been recognised and valued by our clients."

A Level 2 BEE contributor, MK Africa's black owned partner is Sizwe Construction, domiciled in Burgersfort. These companies are currently working in joint venture on a tailings dam rehabilitation and environmental closure project for Nkomati Nickel.

REAL CAT® MACHINES NEED REAL CAT PARTS

No matter how hard they try, competitors just can't deliver genuine Cat quality. Make sure you're using genuine Cat® parts - the only parts built specifically for your Cat machine. Find out why genuine is important at www.barloworld-equipment.com Making sure you have easy access to genuine service.

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14 | NATIONAL ROAD UPGRADES



One of Hillary Construction's Cat 140K motor graders working on a new dual carriageway section outside Kroonstad.

CONSTRUCTING SAFER TRANSIT ROUTES

Polokwane based contractor, Hillary Construction, is forging ahead on two major Free State projects with a combined value of around R720 m.

Work is now underway on a South African National Roads Agency (SANRAL) project on the N1 (Section 17) heading north from the Holfontein interchange (Km 24) to Kroonstad (Km 45). The contract commenced from February 2015, with a scheduled completion date of February 2018. The project value is approximately R560 m.

This multi-faceted construction programme was awarded to Polokwane based company, Hillary Construction, which will be responsible for all phases, from bridge and culvert development, to the final riding surface. There are three bridges involved along this route that will need to be rebuilt, including one over the Bloemspruit, as well as a road-over-rail bridge.

The project entails the creation of a dual carriageway between Ventersburg and Kroonstad. This is a green field

project in the sense that construction of the southbound carriageway is to be constructed on virgin land adjacent to the N1. Once completed, traffic will be diverted onto the new roadway and thereafter full reconstruction will take place on the existing N1 pavement, which will become the northbound carriageway.

Running in parallel as part of the overall work package is an 18 month SANRAL contract, valued at around R160 m, which commenced in February 2015 and has

also been awarded to Hillary Construction. The scope here covers the Kroonstad to Westleigh section and includes the rehabilitation of the Kroonstad bypass.

This project will involve some 60 000 m³ of recycled sub-base. Meanwhile, pavement surfacing quantities include 170 000 m² of BTB (Bitumen Treated Base), followed by 23 000 tonnes of medium grade asphalt, and a final 295 000 m² layer of Ultra Thin Friction Coarse (UTFC). All asphalt phases will be carried out by Hillary Construction subsidiary, Polokwane Surfacing.

Key benefits of using UTFC include less traffic noise, and improved rideability since this is a porous asphalt proven to be safer in wet weather as it improves skid resistance.

In terms of quantities on the Holfontein to Kroonstad route, there will be approximately one million cubic metres of bulk earthworks; 590 000 m³ of gravel layer work; 82 000 m³ of G1 base course; 300 000 tonnes of G4 for the sub-base; and 530 000 m² of asphalt surfacing. UTFC will also be the final layer on this section.

"The SANRAL specification stipulates that a 40% RA be incorporated in the new asphalt composition laid," explains Hillary Construction's managing director, Trevor Freestone. "In other words, 40% of the existing asphalt will be milled, crushed, screened and recycled to enable a sustainable pavement solution." RA screening and crushing will be carried out by Hillary.

WHY RISK IT?

No matter how hard they try, competitors just can't deliver genuine Cat quality. Make sure you're using genuine Cat® parts - the only parts built specifically for your Cat machine. Find out why genuine is important at www.barloworld-equipment.com. Making sure you have easy access to genuine Cat parts - that's the way we're built.

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OPERATOR TRAINING IN 3D WITH CAT SIMULATORS

Safe, effective virtual reality instruction that passes on cost per tonne savings.

In both surface and underground mining, the training of today's and tomorrow's earthmoving operators will increasingly focus on their interaction with onboard and remote technologies, including ongoing trends in semi and full machine automation.



The in-cab layout on the Cat M-Series grader, which is operated via joystick controls.

Barloworld Equipment's Operator Training Academy in Isando, Johannesburg, is at the forefront of these developments, spearheaded by the incorporation of Cat simulators that provide a virtual environment that greatly enhances the learning experience.

Caterpillar fields a comprehensive simulator training line-up. These include modules for articulated trucks, hydraulic excavators, medium and large mining trucks, M-Series motor graders, scrapers, track-type tractors, small and large wheel loaders and electric rope shovels. Further developments are under way to introduce Cat simulator training stations for the underground market.

Cat Simulators are compact and easily portable from the classroom environment to customer sites. These units are also available for sale or rental.

"We have found that the use of simulators greatly enhances downstream proficiency and efficiency at a time when the industry is looking for ways to save on operational expenditure and maximise the cost per tonne utilisation of their existing fleets," comments Willie Haasbroek, head of Barloworld Equipment's Operator Training Academy.

An accredited training provider in terms of the Construction Education & Training Authority (CETA) and the Mining



An instructor and trainee go through the functions of the Cat dozer simulator.

Qualifications Authority (MQA), Barloworld Equipment's Operator Academy is currently ranked in the top tier among Cat dealers worldwide. Around 700 operators from industry are trained and certified annually at the Academy.

"In addition to proven machine proficiency, we will only certify operators if they can demonstrate, via theoretical and practical examination, that they have a comprehensive understanding of the correct techniques required to achieve safe and optimum production. This includes an understanding of how these techniques can positively impact on machine health and availability. Cat simulators enable us to set the benchmark at the highest level," Haasbroek continues, "as there are no shortcuts or training gaps."

Once on board a Cat simulator, realistic controls ensure that the operator gains familiarisation and muscle memory using the same hardware found in the actual machine. Rich graphics create a virtual world as trainees move through a succession of exercises that test and record their progress.

In addition to correcting bad habits, Cat simulators also prove beneficial when addressing new technologies. A prime example is the Cat M Series motor



A Barloworld Equipment instructor runs through the in-cab layout with a trainee operator.

grader simulator that trains operators on a machine class that functions purely on joystick controls, as opposed to the conventional steering wheel and levers found on current K Series units.

"Even for experienced K Series operators, this can be a conversion challenge and we've found that it generally takes a minimum of six weeks before they grasp the basics of the new joystick technology," says Haasbroek. "Younger operators accustomed to the virtual world of 3D gaming may pick up the techniques slightly faster, but in the end the playing field is levelled by the nature of the training programme."

Core metrics are built into the programme for all Cat simulator machine classes. For the Cat M-Series module, these include controls familiarisation; the number of blade-ground contacts; total blade-ground contact time; total time spent in reverse; average speed; highest gear used; number of collisions; and number of blade-tyre contacts.

"At the Academy, our role is to ensure that we keep abreast of technological developments that maximise the machine and human interface," adds Haasbroek. "Now and into the future, this training journey begins on a Cat simulator for all machine classes."

ELEVATE YOUR OPERATOR SKILLS

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