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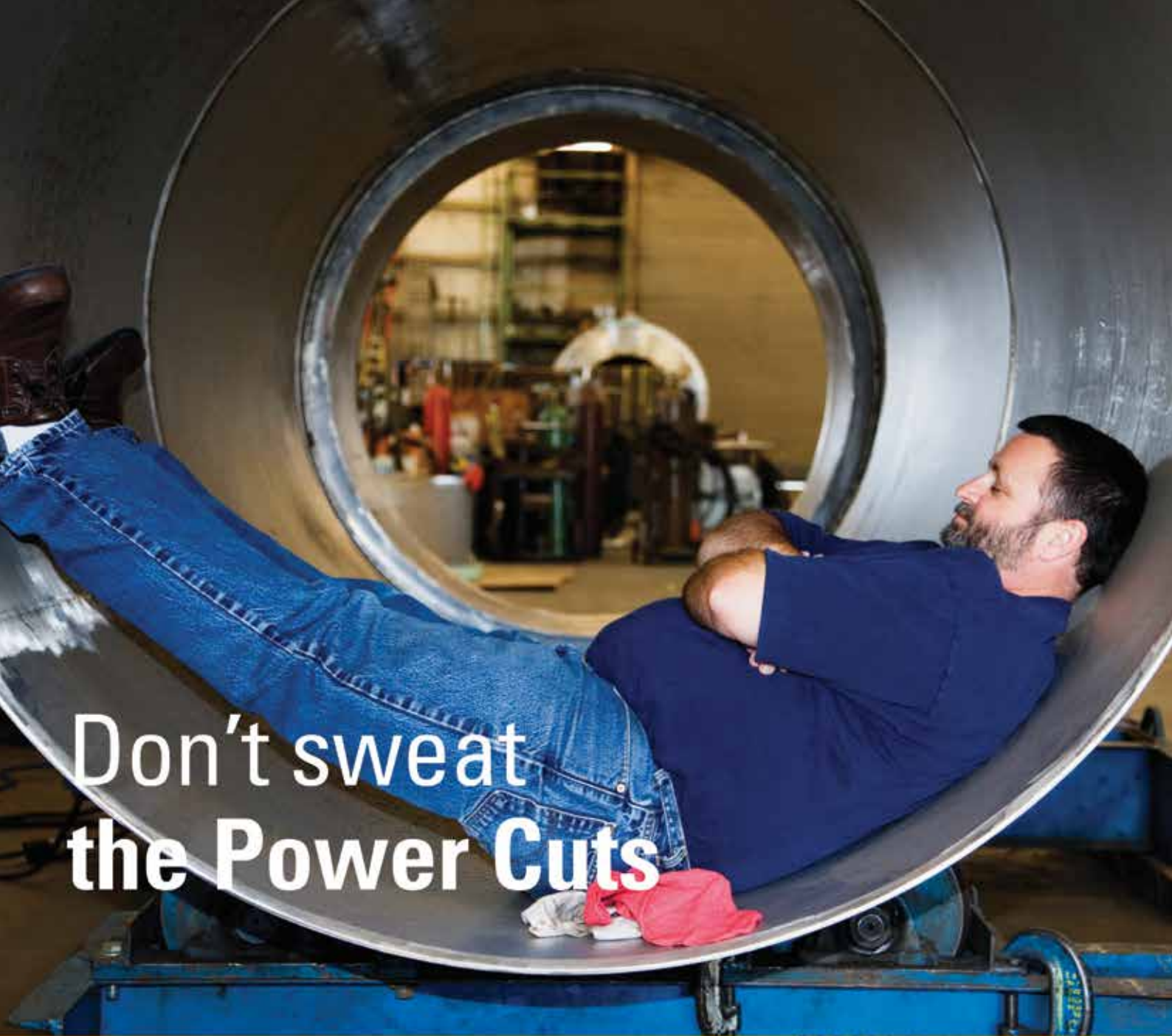


Bench crests – risks and remedies

Brewelskloof – a flagship operation

Aspasa demands the right to be heard

IN THIS ISSUE



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Afrimat's Brewelskloof quarry in Worcester is more than a flagship operation. As part of the group's Aggregates division, the quarry produces aggregates of a wide variety of sizes and technical specifications, mainly for large-scale construction and road building projects. The quarry is managed by mining stalwart, Mike Coad.



20 **Bench crests – the risks and remedies**

Surface mines are becoming increasingly popular as a form of mineral extraction, partly because they are inherently safer than underground mining methods, with a much-reduced rock-related risk. However, this doesn't mean that they are without risk. One of the highest risk areas lies at the crest of production benches.



26 **Mining legend passes away**

In this special feature, we look back at the memories of Bill Starkey, who worked in the mining industry, both in the UK and South Africa for over 69 years. The son of a miner, he started out working with pit ponies in Church Gresley Colliery in South Derbyshire, UK, a tale he documented in his 1996 story – Clinker and Me.

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28 **Aspasa demands the right to be heard**

This Association is developing credible, practical solutions for its members on an ongoing basis. The past quarter has been a busy one in terms of transport legislation, meetings with the Chief Inspector of Mines and several very relevant workshops. Aspasa is currently objecting to the mooted new traffic regulations and the impact these will have on the industry as a whole.

44 **LAST BLAST**

ON THE COVER

The objective of the PowerROC launch held recently, was to 'wow' customers with the unveiling of the new large Top Hammer drill rig. The new PowerROC T50 units are the first of their kind in South Africa and Africa, with the potential to play a major role in the large top hammer market in Africa. See full story on page 10.



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Public protest – friend or foe?

I came across a Facebook site the other day about illegal sand mining on the Wild Coast. The page was apparently started to 'name and shame' the perpetrators involved in illegal mining in the area and by the same token to acknowledge those responsible for stopping the practise.

It reads: 'The Wild Coast and the former Transkei area in the Eastern Cape, as in a lot of the rest of SA, is plagued by illegal sand mining and theft, which is resulting in the degradation of the environment, spoiling it for future generations, and it goes on to blame the municipalities in which these activities occur for not curtailing the problem, even suggesting that they may be involved in the illegal activities themselves.

Not much substance to the accusations, unfortunately, but it then refers to an article written recently entitled 'Stop Illegal Sand Mining Destroying the Wild Coast in South Africa!' The article begins: 'As you read these words, illegal miners are rapidly carrying away the sand dunes at over 200 sites along the previously unspoilt Wild Coast.' It says: 'Illegal dune raiders are ravaging the stunning dune fields along the Wild Coast, turning them into mined-out wastelands and destroying fragile ecosystems for quick profit. In the Eastern Cape, building sand is in high demand, creating a gap in the market for shameless opportunists who are profiting from the free resources being plundered.'

The article continues: 'Undermining the hard-earned, yet tenuous wins in protracted battles against proposed titanium mining, this coastal region is now being destroyed for far less socio-economic gain in order to meet domestic demands for building sand.' It also quotes a *Daily Dispatch* report on sand mines the size of five football fields, which are being carved out of the earth inside this one-kilometre coastal zone.

Responding to this post is an interesting comment from an illegal miner, who says: 'Illegal mining is the solution to fight poverty since the DMR does not issue mining permits to poor people. They ask for bank statements and tell us that the statements we've submitted show that we do not have sufficient funds to undertake the proposed project. They don't stipulate how much an applicant must have in order to be able to operate a mining project. Let the illegal miners carry on with illegal mining without paying any taxes until the DMR takes all mining permit applications seriously.'

Sadly the reply to this post was: 'You must be very uneducated (hmmmn), informed (!) and

uncaring about the future generations. For your grandchildren's sake, please educate yourself.'

And the illegal guy responds: 'Let your organisation partner with DMR to protect your heritage sand, while us uneducated poor barbarians, we implement sophisticated tactics in mining the natural resources. These resources have been there millions of years ago. We've been given them by God to use them. No laws will prevent us from mining them. Keep on crying while we keep on doing business. If you can't beat us, join us.'

Whether the illegal miner is uneducated and uninformed is not the point and in my opinion it is a rather harsh accusation. The 'baddie' raises some good points and provides insight into the mindset of illegal miners.

This brings to mind the conservation fight of the century when Richard Bay Minerals applied for mining rights inside the Greater St Lucia Wetland Park, to utilise the titanium-rich dunes lying along the coast.

At that time, the public outcry resulted in the largest petition ever compiled in this country, even calling on the State President to stop the mining. This was followed by the most extensive EIA ever undertaken, lasting for about four years; the findings of which were that mining would cause unacceptable damage.

As a mining journalist, I visited RBM and St Lucia at that time, and strongly believe to this day, that that battle in the name of conservation, was misdirected. I believe that dune mining would have been the better option particularly in light of the lack of meaningful ecotourism development in the St Lucia area. Dune mining would have had a limited impact on the environment, and by now the dunes would have been rehabilitated with money in the bank.

What I am trying to say, is that the general public needs to be provided with accurate information and not the hysteria of an over-zealous bunny hugger. Yes, there is a problem on the Wild Coast, and there is a significant problem with unscrupulous operators in the area, but let's deal with this in a responsible and factual manner. I have written to the forum offering my help and hopefully one of these days somebody will respond.

In the meanwhile, let's continue to fight the good fight and get involved in reporting illegal mining to Aspasa and the proper authorities in the way that we know best.



Dale Kelly

Smart turnkey solutions reap rewards

SPH Kundalila's approach to supplying 'smart' turnkey solutions for its customers in the aggregate and mining industries has stood the company in good stead to become involved in some of the largest projects underway in the Western Cape region, from mining and aggregate operations to solar-energy farms.

Acquired by the Raubex Group in 2007, SPH Kundalila has provided comprehensive materials-handling solutions for the mining and construction industry since 1969. In addition, it has developed significant expertise in related engineering aspects such as site rehabilitation, road building and infrastructure development.

This has boosted the company's reputation as being a total solutions provider, with a growing reference base in the Cape region in particular. "We have a major footprint in the Western Cape, while the Northern Cape is becoming an important focus for us in terms of our future growth and expansion," says Johan Le Roux, business development manager. "The Northern Cape is a regional focus for major mining and infrastructure projects."

At present, SPH Kundalila is carrying out work at the Port of Saldanha. This was the company's maiden contract, and the source of its name which translates as Saldanha Plant Hire (SPH). It also operates a dolomite quarry at Mooresburg and an aggregate quarry at Aggeneys. "Our strong presence in such strategic

locations places us in a unique position to be able to offer a complete service for our customers," Le Roux says.

The material from the Aggeneys operation comprises concrete stone mainly for infrastructure development, while the Mooresburg operation produces material specifically for Saldanha Steel's furnace operations. In addition, Mooresburg produces agricultural lime for use in the farming industry, which is stockpiled and sold to farmers during the peak planting season at the beginning of the year. This single-source lime material is of a particularly fine quality compared to competitor products, which are traditionally blended with additional materials.

"Anticipating customers' future needs is one of our differentiators and with the mining industry being under pressure, we need to remain flexible and responsive and ensure that we offer customer optimum performance at all our contracts. We have a well-maintained fleet of equipment which ensure reliable operation at all times," Le Roux says.

SPH Kundalila boasts a major fleet of



Johan Le Roux, business development manager at SPH Kundalila.

350 pieces of equipment, including the largest number of Caterpillar 950 loaders in the Southern Hemisphere. "We have a strong replacement policy which ensures our fleet remains up to date and incorporates the latest technology. It is critical that our equipment operates at optimal efficiency at all times, which increases the productivity of our operations and reduces running and maintenance costs," Le Roux confirms.

The company recently secured a large aggregate supply order for a major customer who is supplying readymix concrete and earthwork services for various solar-energy projects in the Northern



A plant operated by SPH Kundalila at Mooresburg about 90 km north of Cape Town in the Western Cape.

Cape. The burgeoning renewable energy sector offers significant opportunities for SPH Kundalila, and the company is currently extending its reach into this market sector. These projects are often located in remote locations and require a dedicated aggregate supply for their construction. This means that SPH Kundalila's static and mobile plant offering, in addition to its total service offering, makes it an ideal partner for such projects.

"Our Aggeneys operation is strategically well placed to service the renewable energy sector in particular," Le Roux says.

"Just having a presence in this area gives us significant exposure to other contractors requiring rapid delivery of large quantities of aggregates produced to specification with the latest equipment." In terms of state-of-the-art technology, SPH Kundalila currently operates a Metso LT105 machine, an HP200 cone crusher and two Finlay screens (683, 694), in addition to a range of mobile equipment and loading tools at Aggeneys.

Le Roux confirms that SPH Kundalila is able to expand its Aggeneys operation should demand from its major customers

in the region necessitate this. "One of the main benefits of our unique placement, which covers all the major mining and infrastructure nodes in the Cape region, is that it saves on logistics and transportation costs for our customers. This is an important benefit given the rising cost pressures facing many of our customers."

The company also has a large team of trained and experienced operators, and adheres to all the relevant health and safety regulations when operating on-site.

www.sphkundalila.co.za

Forging links within DRC's cement sector

Opinion piece by SRK Consulting's Darryll Kilian, partner and principal environmental scientist and Natasha Anamuthoo, senior environmental scientist:

The Democratic Republic of Congo (DRC) recorded growth of 9,5% in 2014, above the African average of 6,0%. In March 2015 Congolese Prime Minister Augustine Matata Ponyo adopted a bullish tone when he predicted 'double digit' growth for 2015.

Against this backdrop, the DRC is seeing an increased demand for cement, as infrastructure projects and construction are amplified in the wake of improved confidence and trust in the country and its economy. However, according to South African cement manufacturer PPC: "At present, the DRC has 16 kg per capita annual cement consumption, the lowest in Africa, compared with the South African average of 240 kg and the global average of 400 kg."

This statistic highlights the drive behind current investments being made in the sector by the likes of PPC and local company group Nyumba Ya Akiba.

PPC, in partnership with local company Barnet and using the engineering skills of Sinoma

International Engineering Company of China, is establishing a US\$280-million plant in the Lower Bas Congo in the Bas Congo Province. Construction began in December 2013 and the plant is expected to come online at the end of 2016. Nyumba, working in partnership with Pakistani engineering firm, Lucky Cement and Groupe Rawji of the DRC, is also expecting to become operational in late-2016 with its \$255-million project, also in the Bas Congo Province.

SRK Consulting was afforded the opportunity to participate in environmental feasibility studies for both of these greenfield projects. Our on-the-ground presence in the country, extensive experience in conducting international standard environmental and social impact assessments (ESIA), coupled with our ability to interpret client needs, provided SRK with an advantage in conducting the ESIA processes.

A critical consideration impacting both projects was the fact that

international funding of projects requires compliance with local DRC regulations as well as international standards and guidelines. SRK, which is currently also working with the International Finance Corporation (IFC) on a broader Cumulative Impact Assessment review of the industry in the DRC, was able to interpret and align both requirements, thus ensuring that the ESIA reports met host country and Equator Principles Financial Institutions conditions.

Central to SRK's work was, and continues to be, the establishment of meaningful stakeholder relationships within the sector; building trust being regarded as a vital component to long-term success and sustainability of both businesses. Testament to this is the fact that, although the two projects are situated just 15 km apart from one another, PPC and Nyumba agreed to co-operate and share information on issues such as air quality, employment, water quality and quantity, and community involvement. Their combined involvement will provide the DRC government and the IFC with invaluable information about the Cumulative Impact Assessment and Management guidelines and allow the IFC to gauge whether or not they are user-friendly.

Such collaboration and co-operation is indicative of the multi-dimensional nature of the DRC industry, and is a facet which attracted SRK to the broader opportunity to engage at a deeper level with the cement industry in the country.

Significantly, with data being shared across two projects, it was also a way of

Natasha Anamuthoo and Darryll Kilian, partner and principal environmental scientist.





Surrounding landscape in the PPC concession area, Bas Congo Province, DRC.



Locals from the Mawete village.

gaining greater insights into the sector. In a region where there is limited data available, we believe that the DRC government can now draw on vital knowledge about air quality, water issues, bio-physical issues and social issues from these two projects. This information will allow the government to make decisions based on solid data and strategically build and develop a long-term, sustainable cement industry; thereby supporting the country's future infrastructure development plans.

SRK's support to the projects varied according to the two companies' needs and capabilities. This necessitated the ESIA team drawing on the local expertise

and knowledge in SRK DRC office to conduct context specific social assessments and facilitate stakeholder engagement, as well as apply in-depth knowledge of international funding requirements and processes.

This advantage reinforced the value of SRK's DRC-based team. Led by country manager, Susa Maleba, with Phillippe Katuta responsible for the stakeholder engagement and social field work, the in-country office has proved vital in our interactions within the DRC over the past five years.

Not only do our local SRK experts speak the language and understand the culture, their networks reach into

government and business, helping to open doors and ensure our clients can gain access to the right people, at the right level, at the right time.

Certainly, supported by this in-country backup, we've seen SRK's DRC project team grow in confidence, a factor which marks a very real differentiator for us in Africa and highlights the value to clients and the impact of having an on-the-ground consultancy by providing a strong basis for continued growth, relationship building and the establishment of trust.

As Nyumba CEO Patrick Vandewalle notes: "The strong support, knowledge and expertise of the team at SRK – both in South Africa and in the DRC – has guided us through the process of prioritising community engagement from the outset. We believe that stands us in good stead for future growth and the sustainability of the project, for all our stakeholders."

The cement sector in the DRC will continue to expand and, as a result, other funders of cement projects will enter the market.

The PPC and Nyumba projects therefore provide a benchmark linked to the Equator Principles against which others will be measured in the future. These two pivotal projects have, therefore, set a standard for best practice and forging solid ties which will surely stand the industry in good stead for future growth and expansion.

www.srk.co.za

Supply management GM

Lafarge South Africa has appointed Vishal Devan as supply chain general manager. The position is a newly-created role for the group, following its decision to adopt a more integrated procurement model. Reporting directly to the country CEO Ken McLean, Devan is part of Lafarge South Africa's executive committee.

www.lafarge.co.za

Looking forward to the challenge ahead is Lafarge's Supply Chain GM Vishal Devan.



Dealer network pays dividends

Atlas Copco Construction Technique's 21-strong official dealer network gives the global industrial group a wide geographical footprint throughout South Africa and neighbouring countries. The dealer network is a fundamental extension of Atlas Copco Construction Technique's main Customer Centre in Jet Park, Johannesburg, as well as the company's Western Cape and KwaZulu-Natal branches based in Cape Town and Westmead respectively.

"We consider our dealers as valuable partners because they provide us with an essential route to market, bringing Construction Technique products and services to the customers' doorstep," says Atlas Copco Construction Technique's dealer manager Brett Mitchell.

He says that some dealers are specialised, focusing on certain Construction Technique products ranges such as Road Construction Equipment or generators

and compressors for example. While not all dealers have access to the full Construction Technique product portfolio, all dealers carry spares and accessories and have full access to spares and technical service.

"Our extensive dealer network facilitates access for our end customers to new equipment, service and spares," Mitchell says. "Our dealers contribute to keeping lead times on deliveries and services to customers in outlying areas as short as possible. In close partnership with our dealers, we assist customers in moving their business forward by helping to keep their productivity at optimum levels."

www.atlascopco.co.za

From left: Brett Mitchell, dealer manager; Philip Herselman, GM Atlas Copco Construction Technique South Africa; and Brendan Drummond-Hay, owner, Demolition Technologies, Dealer of the Year 2014.

Beltcon 18 in August

The ever-popular Beltcon Conference, Beltcon 18, is being held from August 5-6 this year, at the Birchwood Hotel and Conference Centre in Johannesburg. This two-day event is filled with interesting and informative papers, bringing delegates in the materials handling and mining industries up to date with the latest developments in belting and belt conveying.

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Metso expands solutions partnership

In 2014, Metso and Barloworld celebrated their 10th partnership anniversary for Metso mobile solutions. Based on this unique collaboration, Metso and Barloworld have expanded the Metso solutions partnership. From 1 May this year, the existing Metso Construction Business has been transferred to Metso Aggregates, based under the Barloworld Handling Division.

Officially announced at the IQSA Conference in April this year, this is a decision supported by the executive management from both Metso and Barloworld Handling.

Outlining the benefits to the customer, Andrew Stones, Metso Aggregates manager at Barloworld Metso, says it is a leaner and meaner operational structure, "offering our customers far more focus on their requirements from a dedicated team of specialised resources. This includes full support from Barloworld Handling, Barloworld Limited, Metso South Africa and the Metso Head Office in Finland. "By providing the right dedication and focus to the quarrying industry, our aim is to offer the best advice and equipment to suit your requirements," he confirms.

"This is backed by a team of technical people who can assist you to maintain and keep your units running effectively, with the necessary inventory of spare parts on hand.

"Leveraging on the similarities of the mobile industry and the quarry industry, will allow us to improve and grow as a business helping our customers to achieve the lowest sustainable cost per ton," Stones says.

Andrew Stones can be contacted at Barloworld Metso on tel: +27 11 045 6161 or email: astones@bwmets.co.za

De Beers seeks expressions of interest

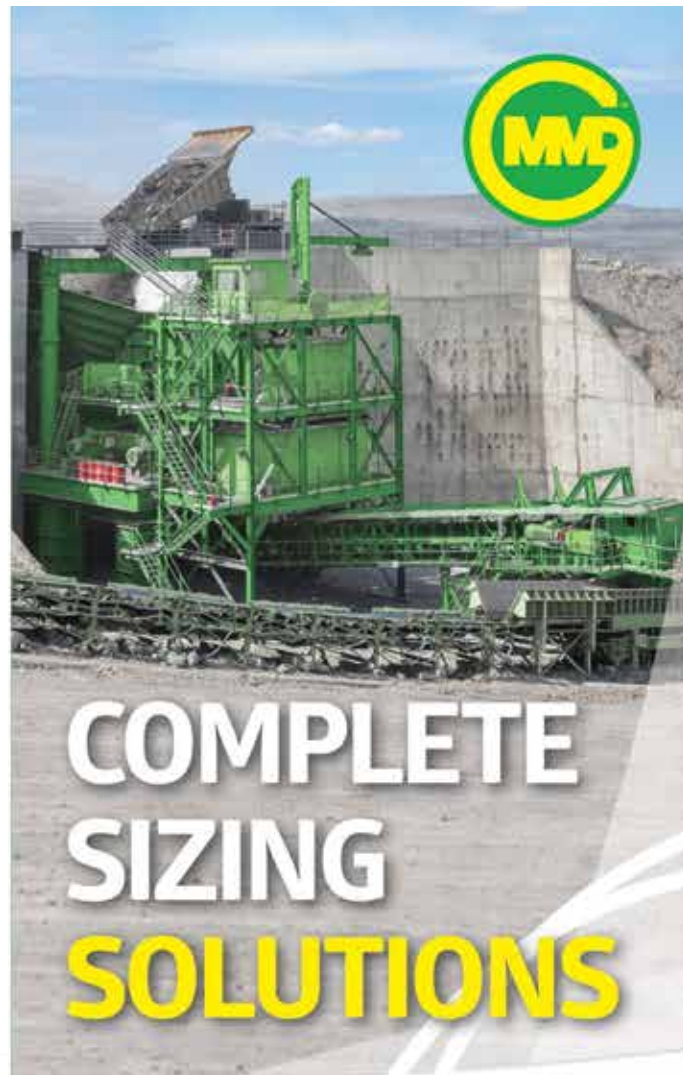
The De Beers Group of Companies is exploring the extension of the operating life of mine of the Kimberley Mines Tailings operation beyond 2018, by placing the mine on the market. The company has been investigating ways to extend the economic life of its tailings-based operation in Kimberley. In the past decade, the mine has taken steps to sustain the operation and succeeded in maintaining production in economically challenging times."

"It is encouraging that our work to date in considering all options has shown that Kimberley Mines may not have to close in the near future," says Phillip Barton, CEO De Beers Consolidated Mines. "We are liaising with directly-affected stakeholders outlining feasible options to extend the potential life of the mine and its assets. We are engaging fully with employees, union representatives and with government at national and other levels; most importantly with the Northern Cape government and the municipality.

"The asset has a superb team of managers and operators, and we are keen to offer the mine as a going concern to facilitate a greater degree of job security. The mine is De Beers' second-largest producer in South Africa, with production in 2014 of 722 000 carats. With an appropriate operator, this asset has potential into the next decade."

The company hopes to close the expression of interest phase and conclude a sales agreement within the new few months.

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PowerROC T50 set to turn large top

Built to meet the demanding conditions of the African continent head on, Atlas Copco South Africa has set the benchmark in the large top hammer market sector with the introduction of the PowerROC T50. **Dale Kelly** chats with Hedley Birnie, Atlas Copco's Mining and Rock Excavation Technique's business line manager – Surface Exploration Drilling (SED), to find out more about the launch of this formidable machine to the African market.

“When one looks at the features and benefits including performance, fuel economy, ease of operation, reliability, safety and environment, this drill ticks all the boxes,” Birnie says.

First launched at Bauma China 2014 in Shanghai in November last year, this new top hammer concept was designed and manufactured at the company's Nanjing plant in China. The unit is perfectly suited for limestone, cement and aggregate quarries as well as open-pit mines. The aim was to develop a robust, powerful, fuel-efficient rig

that could deliver exceptional performance in an easy-to-use, straightforward design – expectations which have been reached and exceeded.

“The PowerROC T50 is a replacement machine for the large top hammer range that was discontinued some five years ago (the Ingersoll Rand ECM 720). The new units are the first of their kind in South Africa and Africa with the potential to play a major role in the large top hammer market in Africa,” Birnie tells MQ. “This machine will be a strong contender in challenging the entire opposition market with the advantage of being a simple unit designed for the African market.

“Uncomplicated surface drilling technology meets Atlas Copco's superior quality design and engineering standards in this drill rig. The result of this perfect combination is a high performance, rugged and reliable machine that drills bigger holes faster; requires very little maintenance and maintains high production levels for the lowest cost of ownership.”

He explains that the high performance is due to Atlas Copco's rock COP 3060 rock drill and the new T-wiz60 drilling tools. “Penetration rates are extremely competitive as shown by several field

Rock type	Granite (290 MPa)
Hole diameter	115 mm
Penetration rate	38,5 m/hour
Production rate	27,2 m/hour
Fuel consumption	28,8 ℓ/hour
Percussion pressure	180 bar

Table 1: Field test carried out at granite operation in Pietermaritzburg.

Rock type	Shale
Hole diameter	127 mm
Penetration rate	120,81 m/hour
Production rate	64,72 m/hour
Fuel consumption	28,3 ℓ/hour
Percussion pressure	175 bar

Table 2: Field test in shale at a quarry in Piet Retief.

Rock type	Coal
Hole diameter	127 mm
Penetration rate	248,47 m/hour
Production rate	114,73 m/hour
Fuel consumption	27,4 ℓ/hour
Percussion pressure	170 bar

Table 3: Field test carried out at a coal mine in Piet Retief.



Weighing only 22,8 t (without consumables), the rugged Atlas Copco PowerROC T50 is perfectly suited for limestone, cement and aggregate quarries, as well as open-pit mines.

hammer market around



The DCT 200 dust collector provides strong dust suction capacity and excellent dust suppression. There are 20 filter elements with a total filter area of 20 m².

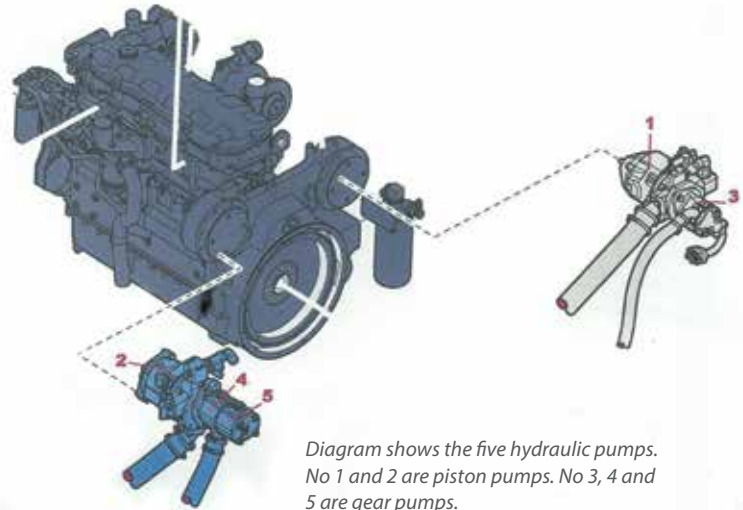


Diagram shows the five hydraulic pumps. No 1 and 2 are piston pumps. No 3, 4 and 5 are gear pumps.

tests we carried out at operations around the country." (See Table 1, 2 and 3).

The drill rig was supplied to drill and blast specialist Eire Contractors based in Durban, KwaZulu-Natal. It was also tested in quarrying and opencast mining applications in Pietermaritzburg and Piet Retief in Mpumalanga in September and October last year."

"Eire was extremely happy with the savings on diesel, and reported that the rig easily drilled holes between 140 mm and 152 mm in diameter with the rig's power, speed and fuel efficiency meeting the company's objectives." At the coal operation in Piet Retief, Birnie says the drill achieved about 200 m/hour during the practical applications.

John Moffat, founder and Eire Contractors CEO confirms that the rig's power, speed and fuel efficiency more than meets the company's objectives of achieving maximum productivity with minimum input. "In addition to substantial savings on diesel, the rig drilled the holes with ease."

Company MD Matthew Moffat agrees: "Choosing the right equipment can be a tough decision, but the resultant low maintenance and extended life delivered by Atlas Copco equipment for optimum uptime and production levels, makes the decision an easy one."

In the hard rock test applications at the Pietermaritzburg quarries, which included granite and quartzite, the PowerROC T50 achieved a drilling capacity of between 42 m/hour and 44 m/hour.

"Eire Contractors has not only purchased the demo model, but an additional five more units with Anglo American placing an order for three machines for its Kumba iron-ore facility at Sishen in the Northern Cape. We are also in negotiations

with the mining and quarrying industry for other orders. Our aim is to supply 15 machines within the next 12 months and 25 units to the local industry by 2017," Birnie says.

The straight-forward modular design includes simplified hydraulic and electrical systems for easier operation and maintenance. "What makes the drill rig particularly attractive, especially in this tough economic climate, is its extremely fuel-efficient capability," he confirms. "The machine's effective management system allows for low fuel burn at full production, giving fuel burn as low as 27 l/hour on large holes; something that is unmatched by similar-sized machines in the industry."

The machine's Tier 3 diesel power pack delivers 261 kW at 1 800 rpm, providing more tons per litre of fuel with a direct positive result on productivity. "We have found a seamless balance between efficient operation and high performance while also caring for the environment by conforming to emission standards," he adds.

Discussing the drill rig's high penetration capability, Birnie says this comes from the powerful COP 3060 30 kW hydraulic rock drill – a proven high performance unit in the Atlas Copco range. "While output is dependent on mineral type and location, the drill rig/rock drill combination's output capabilities are impressive ranging from 200 m/hour in medium rock (coal) to 70 m/hour in hard rock. Even in the most extreme environments and the hardest of material, the machine is capable of a remarkable 40 m/hour."

In terms of hole diameter, the machine is capable of remarkable power and output, drilling holes ranging from 102-152 mm in size and 35 m in depth.

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Mining Services

"In terms of hole quality the PowerROC T50 turns the large top hammer market on its head," he says. "The motor-driven aluminium feed delivers a maximum feed rate of 0,7 m/s and achieves straighter and more consistent holes compared to a steel feed."

The double-dampening system ensures constant hole bottom contact with hole quality assured by the constant and sufficient supply of air delivered by the Atlas Copco screw-type air compressor. Furthermore, the optional COP Logic system gives anti-plunging, anti-jamming, collaring, etc, for optimum hole quality.

The unit's DCT 200 dust collector system provides for strong dust suction capacity and excellent dust suppression with 20 filter element pieces and a total filter area of 20 m², including a pre-separator. A 6,0" suction between the bulk head and the dust hood reduces wear, with 5,0" between the bulk head and the DCT.

There are several excellent options available for the high-performance T50, including:

- hydraulic support leg;
- combined warning sound and light beacon type;
- central lubrication system (CLS);
- reverse camera with display;
- angle indicator (2D and 3D);
- 400 l water mist system with pump and tank;
- electric pump for filling duel and hydraulic oil;
- radio and CD player;
- hydraulic oil choice (VG32, VG36, VG68);
- sleeve retainer; and
- conversion kits (T51<=>TW60).

Other options include an automated ladder; Ansul fire suppression; Wiggins fast fill; tilt trip switch; engine idle timer; camera system X4; external isolator with jumpstart; LED and Xenon lights; additional shutdown (E-stop); and wear check sample fittings.

"Safety and comfort go hand-in-hand with the unit, as a comfortable operator is a safe and productive one," Birnie adds. "The ergonomically-designed ROPS- and FOPS-certified cabin provides added operator comfort with great visibility and extra vibration dampers. All vital functions are at the operator's fingertips for excellent drill control."

Weighing only 22,8 t (without consumables), the compact drill rig's high ground clearance and tracks ensure easy manoeuvrability and transportation. The extendable boom system aids quick position which Birnie says are factors that keep uptime to the maximum.

Discussing service he says Atlas Copco provides service solutions to safeguard an optimised relationship between productivity, availability and operational cost. "Our parts and services offering comes with the ROC CARE option, inspection controls, extended warranty and planned service activities."

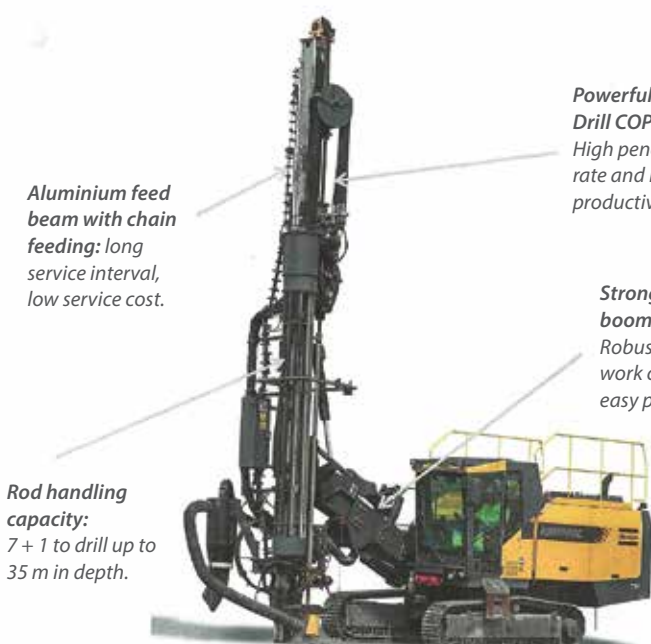
George Stirling, regional business manager for Atlas Copco in Africa comments: "Word is spreading very fast here that Atlas Copco has a rig that performs exceptionally well, so we believe it is set to be a huge success."

Delivering everything the customer, fleet owner or end user wants from a drill rig, the T50 is designed to work anywhere in any industry to meet the most demanding of drilling applications, including road building, trenching, construction, open pit mines, as well as limestone, cement and aggregate quarries. "Building on the quality and success of Atlas Copco's previous large top hammer range, the new PowerROC T50 will enable us to secure a strong foothold in this lucrative market and gain significant market share to complement our other business areas," Birnie adds.

www.atlascopco.co.za



Atlas Copco Mining and Rock Excavation Technique's business line manager – Surface Exploration Drilling (SED), Hedley Birnie.



Aluminium feed beam with chain feeding: long service interval, low service cost.

Powerful Rock Drill COP 3060: High penetration rate and high productivity.

Strong extended boom: Robust for tough work conditions, easy positioning.

Rod handling capacity: 7 + 1 to drill up to 35 m in depth.

The objective of the PowerROC launch held at Sun City was to 'wow' customers with the unveiling of the new large Top Hammer drill rig. Atlas Copco focused on the Power factor and the launch was a resounding success. Pictured from left are: Heino Hammann, business development manager, Atlas Copco Namibia; strongman and MC Garth Collins; Hedley Birnie, business line manager Surface and Exploration Drilling, Atlas Copco South Africa; and Augustine Asare, drill maintenance superintendent for Rocksure International, Ghana.



Brewelskloof does its own grading and material is tested constantly. In-process quality control is ensured by constant monitoring and evaluation with a computerised maintenance strategy employed to ensure absolute reliability and minimum downtime.

Brewelskloof – a flagship operation

There is no doubt that JSE-listed Afrimat has firmly entrenched itself as a leader in the industry it serves in terms of its aggregate, concrete products, readymix, industrial minerals and contracting services. The company's story really started with two major construction industry players of the time – Prima and the Lancaster Group – a history that dates back to the 1960s. One of the first quarries owned by Prima Klipbrekers was Brewelskloof in Worcester, a quarry which is still a flagship operation.

Dale Kelly visits Mike Coad in Worcester for an update.

This old operation is an impressive one. The quarry is meeting customer demand with its quality products, the main drive at present being roadstone. "With our geological source being metamorphic andesite, some of Afrimat's customers demand products from Brewelskloof," Coad says. "Part of the hornfels range, the product is a good one, hard but not abrasive."

Products supplied include basecourse, sub-base, concrete aggregate, roadstone aggregate and fill material.



Afrimat Brewelskloof quarry manager Mike Coad.

Brewelskloof, which is part of Afrimat's Aggregates division, produces aggregates of a wide variety of sizes and technical specifications, mainly for large-scale construction and road building projects. Its client base includes civil engineering contractors and road builders.

The Concrete and Readymix division supplies concrete primarily to large-scale civil engineering and infrastructure projects through fixed and mobile plant, where concrete is batched on demand and transported to site. Coad says the majority of raw materials for the Concrete and Readymix division are supplied from Afrimat's various quarry operations.

Coad hails from a mining background with some 17 years in platinum production, where he was mine captain with extensive underground experience, later moving over to the old Pioneer Readymix, and then RMM (Lafarge) in the aggregate division before joining Afrimat seven years ago. He says Brewelskloof has come a long way since its old Prima days with Francois du Toit, who is still on the Afrimat board. (Interestingly, Prima was established in 1963, as the brainchild of Francois' father Christiaan du Toit. He was a grader operator who identified a market for aggregates. Francois took over the Worcester-based company on his death, and the driven principles established then continue to influence the company of today).

"The economy is up and down but our production drive is ongoing. We are very busy and there are several new tenders in the process at the moment. There is a lot happening in the Western Cape, and this is an advantage for our other quarries as well."

Asked about the DMR, he says the company has a great relationship with the Inspectorate. "Coming from a mining environment, I would say that this is the best I have experienced. With Louis Bezuidenhout as our Principal Inspector here in the Western Cape, our relationship is very good. He understands mining. We have an open door policy and appreciate any assistance they offer to us."

Coad also sees the company's Aspasa membership as a major benefit. "I strongly believe in Aspasa because the issues they raise are relevant. They fight for our cause in terms of the new regulations, and that fact that underground and surface mining are identified in terms of legislation as one and the same. We are a Five Star quarry on the environmental and safety and health side. Also, the third-party audits by Aspasa, Sarma and external consultants support our environmental conservation and protection efforts and assist with our EMPs."

As a group, Afrimat prioritises health and safety as the key to successful and sustainable operations, with management primarily responsible for implementing the company's extensive health and safety policy. "Implementation is monitored very closely and all incidents are tracked on a monthly basis," Coad tells MQ.

Drilling and blasting is handled by the company's Contracting division with blasting at Brewelskloof carried out on a monthly basis.

Talking about skills transfer, he says it is a work in progress to encourage youngsters into the industry. "Let's face it, there is a shortage of artisan skills. The majority of youngsters don't want to sit behind a welding machine and this is a problem across the board. We have to look after them and give them a decent start-up salary and incentives."



Second wash plant in the foreground. While taking the photograph, the plant had just been started up, hence the dust in the background.



The weighbridge at Brewelskloof.



Phase one of the planned new development, of which the first stage has already been completed.

Coad explains that Afrimat prioritises ongoing training to raise performance and productivity standards. "We offer internal courses and use external sources to facilitate continuous development."

The group has a focused training division in this regard, and in line with succession planning, candidates are identified and receive personal mentorship in furthering their formal education and operational knowledge. Focus is on the areas of mechanical and civil engineering as well as management, where previously disadvantaged candidates have been appointed as trainee/assistant managers as part of two-to-three-year development programmes.

At the time of MQ's visit, the plant was in the process of a screen change, so all was quiet on our walkabout. The primary plant consists of a 30/42 jaw crusher, two secondary cone crushers and one Barmac shaper. As the plant is quite old, there have been some upgrades with more planned in the future. The latest acquisition is a Sandvik CS430 deep throat crusher which Coad is very happy with. "It is robust, and with its constant intake opening, is ideal for a high-capacity secondary crushing operation."

Coad says production on a monthly basis averages out to about 30 000 t/month and between 360 000 to 400 000 t/year.

*Ikaya Lethu – Our Home:
The new canteen was
named by the staff.*



*The mine is carrying out the pre-split lines on the benches
with future development being on the floor.*



Brewelskloof does its own grading and material is tested constantly. In-process quality control is ensured by constant monitoring and evaluation with a computerised maintenance strategy employed to ensure absolute reliability and minimum downtime. "We have a zero-tolerance approach towards defects or deviations from quality standards and specifications," Coad says.

The quarry has two major washplants for its roadstone aggregate. Looking at the closest wash plant, Coad says in terms of wash plants, this is huge. "That's what makes it a challenge," he says. "You have your Colto specification and from January or February next year, we will fall under the SANS specification, so quality standards are critical." During our walkabout, the large wash plant was washing a 6,7 mm roadstone product. The older wash plant was also in use, washing a crushed material.

The Bell brand was clearly evident in the quarry with B30 dumpers, 2106 loaders and some older B17 dumpers. "There are upgrades planned, and we are looking at possibly putting in B20s as part of our efficiency and productivity drive," Coad says. There was a 30 t Hitachi excavator working in the quarry at the time of our visit.

The quarry site is extremely neat and efficiently stockpiled. Discussing the mining plan, Coad says the final benches are in the process of completion. "We are doing the pre-split lines on the benches and then we will start developing the floor. Our plan is to start skyline stabilisation and we are



waiting on the DMR in this regard. However, our future development is on the floor."

There are three more layers to go down on the floor and MQ could see that the quarry has opened up. There is no apparent rock movement and the general stability of the quarry is good. "The quarry was bouldered-out a while back, and we have managed to clean it up. There will be no more mining of the benches," he says, pointing out where Phase one and Phase two will take place in the future.

Life of mine is about 25 years with the planned new development for which the mining rights have been approved.

From an Afrimat point of view, a person can

The Bell brand was evident in the quarry with B30 dumpers, 2106 loaders and some older B17 dumpers at work.



Entrance to Brewelskloof quarry.



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be very proud of Brewelskloof," he says. "This is a flagship operation and as far as I am concerned, as long as I am here, it will stay that way. It has come a long way and our values form a major part of every aspect of our culture and performance."

As a manager, he says he believes in mutual respect and team work. "Respect is key, work safety and customer relationships, and work performance are a driving force behind my philosophy as quarry manager."

Editor's note: Shortly after our visit to Brewelskloof, Afrimat published its provisional consolidated financials for the end ended 28 February 2015, announcing that the aggregate operation increased its contribution to earnings through a pleasing recovery in the markets it supplies. According to Afrimat CEO Andries van Heerden, the year was further underpinned by increased government spend on road maintenance and smaller service delivery projects, which Afrimat, due to its extensive geographic footprint was able to benefit from. See full report on the Afrimat website.

Certainly on the West Coast, Afrimat is extremely busy and the current business climate is expected to continue with moderate market growth. This is a company that lives up to its vision, to be the most respected construction materials and industrial minerals supply company in Southern Africa, a respect it has earned.

MQ

Report and photographs by Dale Kelly

The mine has a zero tolerance approach towards defects or deviations from standards and specifications. Picture shows 19 mm roadstone material.



Brewelskloof workshops.

Journey to the present

- **1963:** Prima established
- **1965:** Lancaster established
- **1973:** Lancaster Precast established
- **2003:** Empowerment transaction between Mega Oils and Prima
- **2006:** Afrimat formed from merger of Lancaster and Prima; Afrimat listed on Main Board of JSE in 'Construction and Building Materials' sector
- **2007:** Acquired Malans Group and Denver Quarries
- **2008:** National footprint into Gauteng, Limpopo and Mpumalanga
- **2009:** Afrimat BEE Trust acquires 15,8% interest in group; large-scale infrastructure contractors secured; BEE shareholding increased to 26,1%; acquisition of Blue Platinum Quarry
- **2011:** Diversification into industrial minerals with acquisition of Glen Douglas dolomite quarry
- **2012:** Diversification into clinker market with acquisition of SA Block Group
- **2013:** Acquisition of 50,7% stake in Infrasons Holdings Limited



Bench crests – the risks and remedies

Surface mines are becoming increasingly popular as a form of mineral extraction around the world, partly as they are inherently safer than underground mining methods, with a much reduced rock-related risk. This does not mean that they are without risk. One of the highest risk areas lies at the crest of production benches, where persons/machines could fall off the edge or the weak crest could fail, leading to potentially fatal consequences.

This paper by Applied Rock Engineering's Dave Fenn looks at some of the risks associated with crests and suggests actions to minimise them.

Many industry leaders and notably the Department of Mineral Resources (DMR) are pushing for crest protection measures. Along haul roads and especially inclined ramps, this is largely an industry standard and widely accepted, but there is a need to define safety berms.

- Safety berms are mostly used to describe a continuous wall of loose material emplaced close to a crest edge to warn, discourage or prevent pedestrians/vehicles from falling off the crest edge.
- Haul road berms are safety berms that are used along haul roads and especially inclined ramps. These berms are often large and are generally long-term or permanent installations.
- Rock traps or toe berms describe a

wall of loose material emplaced close to the toe of a slope, primarily to prevent rock rolling into the workplace from the adjacent highwall (Figure 1). They also act as a barricade and monitoring device, trapping fallen rock.

- Perimeter berms are placed around a quarry to negate the effects of noise, visual and dust pollution, and can help to prevent inadvertent and non-authorized access. These can be very high and placed a safe distance from the crest edge, anticipating post-closure instability.

There is little standardisation in the materials to be used in the construction. Examples include waste overburden or aggregate sand to boulders and are often a combination of material types and sizes. There is also no standardisation in their construction method required, compaction,



Consultant rock engineer Dave Fenn
(Photo: Dale Kelly).

drainage and future maintenance. High berms would have to be laid in lifts which adds to the safety risk. The dimension of safety berms is another area where many standards have been adopted:

- They are often not constructed to a particular standard of height or width, being bigger where copious quantities of convenient waste materials of various sizes exists.
- Guidelines in international literature normally quote the berm height as half the height of the largest TMM wheel.



Figure 1: Sandy rock trap designed to stop the rolling rock threat from above and act as a barricade and even a monitoring device, if rock is trapped.

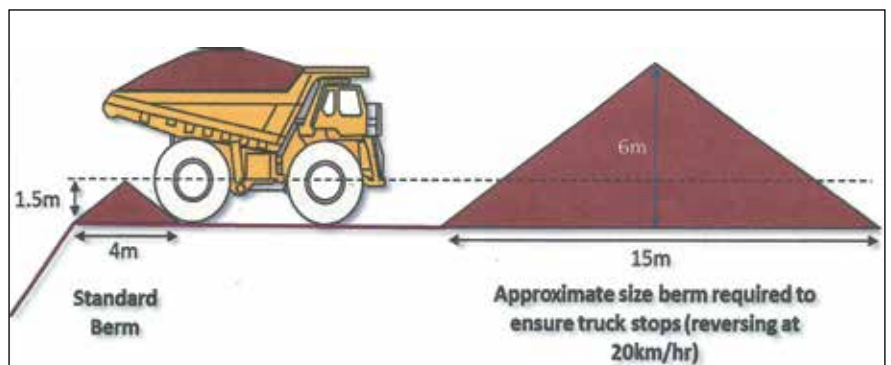


Figure 2: Size of berm to halt a heavy truck.

- However, to halt a laden 100 t truck, Xtrata suggests that a safety berm would need to be in excess of 6,0 m in height and 15 m wide (Figure 2). This may effectively be half a vehicle but is manifestly impractical with other safety-related consequences.
- Tests in the UK show that a berm of 1,5 times the wheel height is needed to halt an 85 t truck. Larger trucks require the berm to be even higher.

Motivation

Safety berms usually act as an effective warning device. However, the reported occurrence of machines (Figure 3) and especially persons (Figure 4) falling off crests or crests collapsing under them on production benches are very rare, with occasional cases of drill rigs and dozers reversing over crests. Incidents are mostly confined to run-away trucks on haul roads. The motivation for not using safety berms, especially on production benches includes:

- they cover tension cracks and joints (Figure 5);
- they lead to ponding of water, encouraging water to percolate into cracks;
- they encourage pedestrians to stand on top of the loose safety berm material to see into the quarry;
- they add mass to the weakest section of the bench;
- in practical terms, especially if placed slightly away from the crest edge to avoid the hazards outlined above, they lead to difficulties for the drill crew in drilling the first row of holes;

- if the berm is placed over the first row to be drilled, it will be removed prior to drilling, negating the safety benefit while performing the higher drilling and charging activities;
- as lifting the berm is difficult/hazardous, it is usual to push it over the crest leaving the face full of loose rock. This obviates any scaling and may cause contamination to the orebody being mined (Figure 6); and
- it is important to note that the MHS (7.9.2) requires benches to be cleaned of loose material for a distance of at least 3,0 m from the crest.

Alternatives

If placing a safety berm on a production level is considered impractical or could potentially lead to greater risk to workers and machines, then alternatives should be considered:

- Harnesses (Figure 7) lead to a trip risk and drag along the floor, so they have to be set very short or can be snagged by LDVs. They are cumbersome, require training and have proved to be very unpopular and prone to workers not using them correctly.
- No-Go zones are in common use and should demand that machines and workers stay on the safe side of tension cracks. However, even with soft engineered rules such as ensuring workers never work with their back to the crest and machines always face the crest, these zones



Figure 4: Workers at risk.



Figure 5: A mine with safety berm placed on a crest edge that covers the prominent tension cracks. It is so high that a person would have to stand on the loose material to see inside the void.



Figure 3: Machine at risk



Figure 6: A front-end loader pushing waste overburden over a crest onto the orebody below.



Figure 7: Example of a harness system in use.



Figure 8: Barricade erected to prevent worker access to the crest area and in front of the drill when it is in operation. Note that the chevron tape has since been replaced with medium weight rope.



Figure 9: Photograph of a UK quarry with well-constructed but poorly-positioned barrier (Source: QNJAC).



Figure 10: Drilling with a portable barricade can be cumbersome.

can be transgressed accidentally.

- Barricades warn of the crest but do not necessarily prevent access.
 - * Many types of solid barriers have been tried but can be cumbersome and, in practice, have been found to be a falling object risk.
 - * Chevron '1 day' tape can blow in the breeze and so lie beyond the crest (Figure 8).
 - * Ropes are a good warning but people can still fall under them. There have been cases where workers have stored equipment on the unsafe side of these barriers.

Rope barriers are mostly used in hard rock quarries. In coal mines, the TMM risk is perceived to be higher and safety berms are more common.

Straps can be tensioned, acting as a more effective physical barrier for workers and not swaying in the breeze. Figure 9 shows an example of a strap-type barrier, but also shows that if a rope barrier is not laid out carefully, the risk to pedestrians can increase. If necessary and depending on the barrier to be erected, a pole barricade can be placed in holes drilled for that purpose. Some operations have tried to use the holes drilled for blasting, arguing that the major risk to workers lies in the charging-up phase and not in drilling.

To mitigate against the risk to drill operators while drilling, smaller, portable barriers have been tried with some success (Figure 10).

Typically, after examination, the marking of blast holes by the blaster is the first major task to be performed on a newly-cleaned production bench. Prior to blasting, the drill crew can quickly and easily erect the barricade in the position marked by the blaster. This would be dismantled by the blasting crew only after charging up.

Baseline risk levels

Different types of mining, rate of production, size and training of the workforce plus bench configuration and excavation methods adopted, will all lead to differing levels of baseline risk. The mining risks also vary. For example, use of contractors (control of personnel and training risk), night shift mining in lower visibility, drilling method used, with or without drill assistants and the use of single or multiple benches. Also blasting methods; for

example the use of sub-drill over future crests, smooth wall blasting, charging-up procedure and survey methods (remote vs GPS vs wall-mounted reflectors, etc).

Geological variances include the depth of the semi to very weathered rip-pable overburden, rock type, pinnacles, boulders, jointing and presence of ground water; all leading to different levels of risk in a single operation. This all serves to emphasise that each mining operation should be required to conduct its own risk assessment and ensure that its standards reduce the rock-related and TMM risks to reasonable levels, also ensuring that there is no conflict regarding use of berms between the slope and TMM COPs.

Observations

The author has seen many examples of hazardous crest conditions and poorly-executed examples of barricades, but in most cases, permission to show these examples to help educate the wider audience has not been forthcoming. A single example of a well-intentioned, but poorly-executed barricade is shown in Figure 11. The barricade was erected by contractors and not according to the mine's standards, resulting in a work stoppage Section 54 being issued. Where poorly constructed, a barricade can add to the hazard. As seen in Figure 11, the tension cracks have been extended beyond the barricade; thus a worker could easily inadvertently stand on the unsafe side of the crack. The barricade was constructed of heavy steel poles that were difficult to man-handle and the chain acts as a trip hazard and a falling object threat.

No-Go zones

The use of No-Go zones has met with wide acceptance in the surface mining industry and are used to denote areas with low risk, to areas of unacceptably high risk. The definition of each zone commonly used in the South African surface mining industry is given below:

- Green Zone: An area of the mine considered to be safe; ie (almost) no risk of a rock-related incident.
- Orange Go Zone: An area of the mine which has an elevated risk of a rock-related incident.
 - * Preferably machines and especially workers should stay outside this zone unless absolutely necessary.

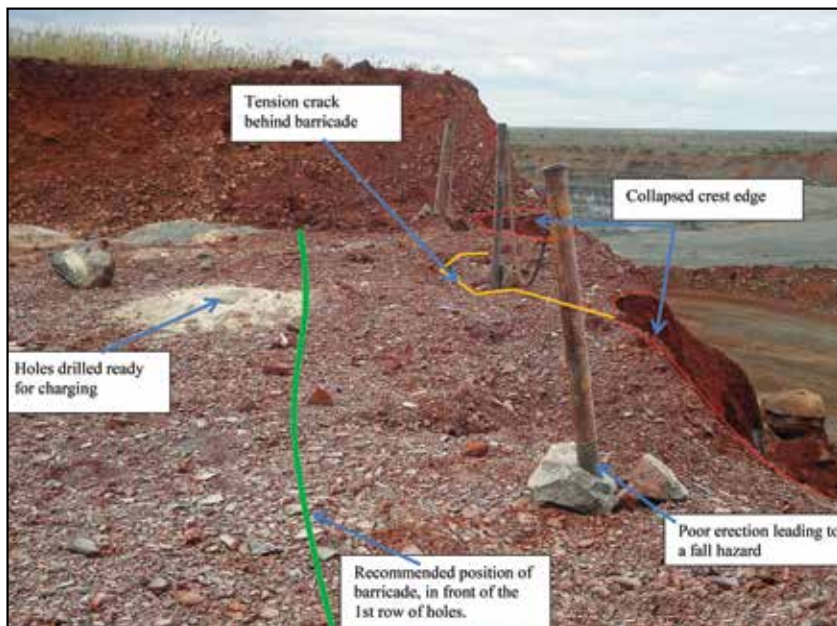


Figure 11: Example of an operation where a poorly-erected barricade could lead to workers standing too close to a crest edge, in front of tension cracks and where the barricade constitutes a falling object hazard. Arrows show the collapsed crest edge.

- * Only competent workers are allowed within this zone.
- * The area close to the crest and toe of a bench is often designed an Orange Go Zone.
- Red No-Go Zone: An area of the mine with an unacceptable rock-related risk – no entry.
 - * Either the area has not been inspected and declared safe; or
 - * Has been inspected and found to be unsafe/hazardous.

Figure 12 depicts a bench where a worker can safely work close to the crest inside the Orange Go Zone, perhaps to lay out drill holes or charge up a face; ie performing work that cannot be performed elsewhere. He is protected by a barricade placed behind the furthest-most tension crack, splitting the crest Orange Go Zone into an Orange and still-hazardous Red section. In practice, he would not stand above an operating drill rig. The other size of the barricade should

be considered to be a Red No-Go Zone where entry to workers and machines is forbidden.

Typically, in most hard rock surface mines, tension cracks are found up to around 2,0 m from the crest, meaning that the zone of elevated risk is often taken as 3,0 m. The first row of blast holes have to be collared beyond these cracks, but could be inside the Orange Zone if deemed safe by the Competent Person.

The Competent Person in charge (with valid Examine and Make Safe certificate), would also ensure that the zone is extended if the rock-related hazard is wider than normal. All workers should be trained to identify site-specific, rock-related hazards. When encountered, they should know to withdraw from that area, mark it as a Red No-Go Zone with cones or similar, and call the supervisor. The concept is shown diagrammatically in Figure 12 and demonstrated in

Figure 13. This type of barricade is not intended as a hard engineered barricade to prevent a person from falling off the crest edge, but does act as an effective physical warning of the crest edge. The pennants act to improve the visibility of the rope.

It is possible to use both a rope barricade for the crest edge and also a safety berm to prevent vehicles

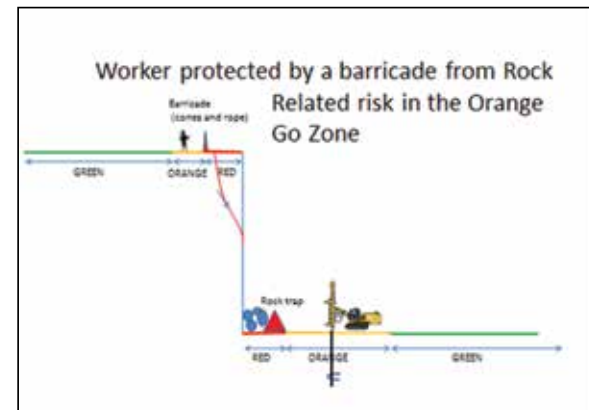


Figure 12: Use of a barricade to ensure the section close to the crest where the rock-related risk is highest remains out-of-bounds to workers as a No-Go Red Zone, without covering up the tension cracks or adding to the water-related risk.



Figure 13: A text book example of a barricade that prevents access to the crest and is easy to erect and dismantle.



Figure 14: A UK example of a crest management system (Source: QNJAC).



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travelling too close to the crest edge (Figure 14). Here, a solid safety berm has been erected for vehicles. In addition, a line of cones has been erected to warn of the crest edge and its Red No-Go Zone. A worker transgressing this zone can easily be seen and corrective action taken.

Conclusion

The crest edge risk in surface mines and quarries varies from virtually no risk for low inclined benches found in many clay mines, to high risk for high benches that are vertical with poor crest conditions. Each operation has to perform a full site-specific risk assessment determining both the probability of a crest failure and fall of worker/machine and its consequence. The assessment should include the impact (literally) onto the toe of the bench below.

It is suggested that where the risk level is found to be moderate to high, a physical barricade should be erected to warn workers and pedestrians of the high risk area close to the crest. On operating benches, safety berms composed of

rocks or chippings are not normally necessary. All benches that are not in operation should be closed with a physical barricade that prevents vehicular access; for example, a solid rock berm.

Along haul roads and especially inclined haul roads (ramps), the risk of a machine driving over the crest is significant and this risk can be reduced by the erection of a safety berm, typically the radius of the largest wheel.

It is important that this berm does not add to the rolling rock risk and therefore should be typically composed of homogeneous, non-binding material, eg 13 mm crushed aggregate. The edge of the berm should be at least 1,0 m from the crest edge. Regular gaps should be left in the safety berm to prevent water ponding and allow for safe viewing into the quarry and examination of any tension cracks.

The barricade should be marked by a Competent Person on every operating bench to warn of the high risk crest area and form a Red No-Go Zone between the crest and tension cracks. **MQ**

About the author

Consultant rock engineer Dave Fenn, holds a Master of Business Administration (MBA) from the UCT Graduate School of Business; a Graduate Diploma in (Rock) Engineering, University of the Witwatersrand; AA Advanced Certificate in Rock Mechanics; Chamber of Mines Certificates in Rock Engineering (including Surface Mining); Dip CSM (HND) Mining Engineering, Camborne School of Mining (UK). He is a SANIRE and SAIMM member.

He has 25 years mining experience of which 24 have been in rock engineering in soft coal measures as AngloCoal's section head from surface to 280 m deep, to hard rock gold and platinum mining (tabular and bulk UG methods) from surface to 2 600 m deep as a rock engineering officer.

He opened a successful independent rock engineering consultant practice (Applied Rock Engineering cc) in 2006, and has gained extensive open-pit experience augmenting his underground work. This includes the compilation of over 50 slope COPs, lecturing for a SAQA-accredited training company, performing operation geotechnical audits and a geotechnical service, including geotechnical feasibility studies and pit slope design for many leading mining organisations.

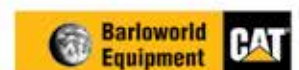
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Memories of a coal pit pony driver

Mining legend passes away

William Starkey, fondly known as Bill in SA mining circles, has passed away. Having worked in the mining industry for over 69 years, Bill was a legend in the sector. The son of a miner, he started out working with pit ponies in Church Gresley Colliery in South Derbyshire, England, at the age of 14 – a tale he documented in his 1996 short story – Clinker and Me.

A position at the Londa Collieries group as deputy chief engineer saw Bill relocate from the UK to India. In 1969 he made the move to South Africa, taking up the position as sales and marketing engineer for Trolex Stockport, UK. He fell in love with the country and decided to stay. He started up Syscom, which was acquired by Davis of Derby in 1978, and he stayed on as MD.

In 2001, Paul Wright approached Bill to join AST (Alien Systems & Technologies (Pty) Ltd. He was looking for a person experienced in both electrical engineering and mining, which is a rare combination, then and now. Bill ticked all the boxes and held his position as divisional project manager for the Pyrogen brand until 2014, when he retired.

Bill was a certified mining electrical engineer, held a UK National Certificate in Electrical Engineering, as well as a UK National Certificate in Electrical Engineering Higher.

According to AST, his unwavering love for his late wife and constant support for his children, as well as his knack for serenading the AST offices with his Frank Sinatra impressions made Bill a loved figure in the company and the industry at large. Bill passed away peacefully in his sleep on 22 June.

Clinker and Me

The use of animal power in its various forms worldwide is well documented and known, from dog sleds, horses, donkeys, buffalo, elephants, dolphins and even monkeys. However, one use of horses little known is their role in underground coal mining. This is Bill's personal recollection of his experience as a pit pony driver:

'August 1942, during the Second World War, the school-leaving ceremony consisted of a brief school report and a bonus of finishing school at lunch time. On arrival home, No 17 of the Church Gresley row of terraced houses, the aspect of

leaving school culminated in a visit to the adjacent colliery offices to see the mine manager. My interview was short and to the point: "Are you Bill's son?" and on a "Yes" reply, the instructions were to see the pit bottom deputy at 6:45 Monday morning and "... and tell him who you are!" No training, no hard hats, no uniforms and not even cap lamps.

Wearing my oldest clothes, I collect my Tally (brass identification disc) No 1092 from the Tally office and exchanged it for a bottle lamp 1942 model, long before the now commonly-used cap lamps.

With this lamp hanging on my belt banging my knees as I walked and wearing a borrowed peak cap, I arrived at the pit top and stood in line to be one of 14 mineworkers, per cage, to be lowered underground. The cage gates closed, the pit top bells rang and the cage descended, leaving the bright early morning light to be replaced by the darkness and dank air of the shaft. The descent of only half a minute seemed endless, and I remember the cage passing the arched brick roof of the underground landing and continuing to the actual landing.

Gates were opened and with my fellow miners, I set foot for the first time on the floor of a coal mine, with the coal walls and coal roof all whitewashed to assist the few electric lamps on the roof on either side of the pit bottom. At the position near the pit bottom, all I saw were tubs of coal leaving a rope haulage and free-wheeling past me to the cage. When the cage was in position, the full tubs, two top deck, two bottom deck, were pushed into the cage, forcing the empty tubs off the cage to start their trip to the coalface; there to be filled with coal and to complete the transport cycle.

This was my job for approximately two weeks until I was replaced by another new boy. My promotion and duties as a pit pony driver are the main focus of this article, written from very clear memories some 50 years later.

Day one of my new job started as before, but this time following the signs painted on the whitewashed walls 'Stables →'. Leaving the main traffic roadways the path to the stables was reached and after walking half of the 200 yards to the actual stables, the smell of the horses grew stronger until the entrance to the stables was reached.

The entrance was brick-lined, brick-paved and led to the different parts of the underground stables. Walking past the many individual stalls I noticed that they all had the horses' names painted on, a few I remember: Major, Bunty, Beauty, Hero and Dasher. Here I was greeted by the stable deputy.

With my name taken and recorded, I was allocated a duty 'South West Empty Shunt' and introduced to Clinker, already fed and harnessed and

waiting for me. Clinker was a chestnut pony, standing about chest height (as one of a family of eight of a coal mining father, previous experience or exposure to horses was nil).

Armed with the basic commands on driving a pit pony, I took Clinker by his halter and we led each other to the working place, quite near to the pit bottom. The job comprised of coupling eight pit tubs together, positioning Clinker between the rails, and attaching the hook of the harness to the first tub. I was to lead Clinker about 200 yards along the roadway, stepping him to the side of the track, releasing the harness from the tubs and leaving the train to be connected to a rope haulage for transport two miles to the coal face.

The first few days were routine pony driving and following instructions, one being to tie to pony's halter to a pit prop when not driving. After several days I forgot this instruction and turned around to discover no Clinker. He had, on his own, walked back to the stables and was back in his own stall. A lesson well learned and to be remembered.

Each day driving Clinker was an experience and we became quite attached to one another. On my part, a friendly greeting in the morning and a loving pat on the neck, a daily tit-bit – part of my sandwiches or part of an apple. And from his part, a return greeting was an affectionate nuzzle of his nose occasionally during the day.

Each day on visiting the stables, either at the beginning or end of the shift, there was now time to explore all the facets of the stables. There were approximately 40 stalls occupied with ponies of different colours and sizes, each named; an office area for recording the ponies usage; a large open area containing bags of oats and chaff for pony feed; the stores and workshops for the harnesses; and a most interesting horseshoe store. The ponies had their feet measured and sets of steel horseshoes were manufactured in the pit blacksmith's shop, brought underground and stored, ready for use – fitted cold.

The stables were complete with a well-equipped hospital where injured horses were treated, including a complete hammock arrangement to support horses with leg injuries. Obviously 40 horses generate quite a large amount of waste, solid and liquid. The solids were loaded out daily in pit tubs and sent to the surface for disposal and the liquid waste had a most interesting disposal method. The stalls in the stables had a brick-lined



The late Bill and Mrs Starkey (Courtesy AST).



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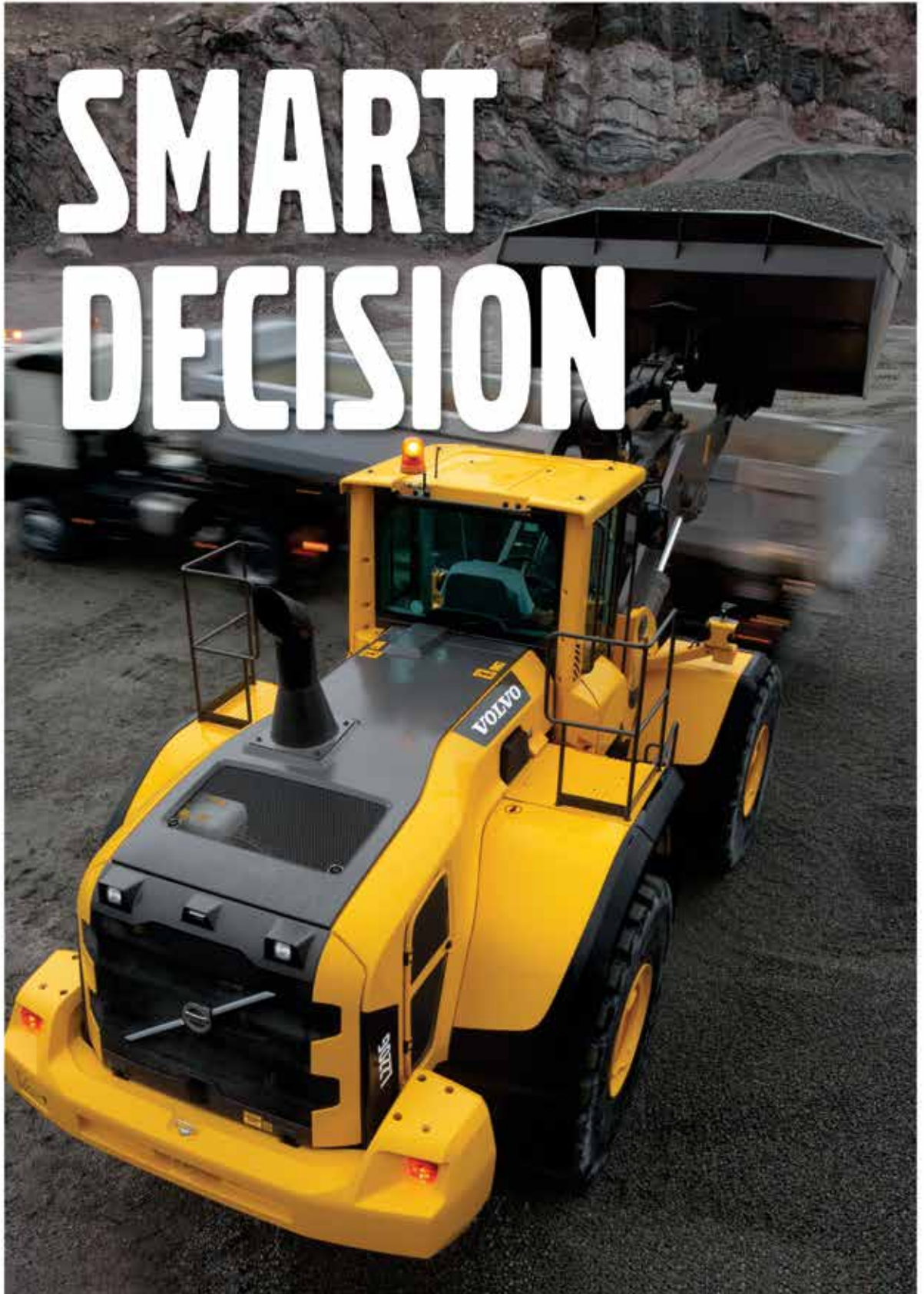
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drain graded to a large pit at the end of the stables. The horse urine was pumped into tar-lined barrels and sold to tanneries for the treatment of leather. One other unusual feature of the stables was a special stall with a sunken floor, filled with about 25 cm of water. The ponies were periodically housed in this stall to prevent their hooves from splitting, caused by the unnaturally dry conditions in the mine.

Each pony was chosen for different duties by size and build, and at the start of each shift Clinker and I would be part of approximately 20 ponies, each group disappearing down different roadways to their allotted workplaces.

After approximately two months with Clinker, I was 'promoted' to drive Major, a large fat black horse. Major was harnessed and ready for work and I very cautiously led him from the stables to the South West Woodfield coal face. After walking with Major for approximately one mile along unlit roadways, the working place was reached. Very different from the secure pit bottom empty shunt, this was the supply gate to the coal face and here Major had to pull supplies of material (props, roof bars, conveyor rollers, belting, etc) from the haulage end to the coal face.

With the roadway being part of the strata where coal was being extracted, the floor and side-walls were cracking and the roof converging made travel and movement of material difficult and dangerous. These conditions and the smoke from the blasting made Major and me very dependent on each other.

From experiences and observations, each pit pony had their own character and I believe I discovered the meaning of the term 'horse sense'. One example was when connecting tubs to each other to form a train, the horse would count the clink of the couples and refused to attempt to move a train with more than the normal number of tubs. Another was the skill of the ponies to use their front hoof to split a joint on a crossing, pulling the tubs off the rails – giving them a rest while the tub was being put back on the rails – plus many more tricks. One very troublesome trick was to smell an apple or orange in a miner's jacket hanging in the roadway, and eat away the corner of the jacket with the apple in it.

During my year as a pony driver, I had many different ponies and many workplaces and became attached to several ponies and their skills. A complete understanding of the operation on the subject of pit ponies was gained; some pleasant, others not so pleasant.

Pit ponies were used underground in the majority of the British Coal Mines. Some areas like South Wales used ponies on weekdays and brought them to the surface at weekends and holiday periods.



Other areas, including the South Derbyshire area where I worked, took the ponies underground on a Sunday when the mine was not working, very slowly in a padded cage and they were then given a period of time to adjust to the conditions before being put to use.

With the mines being deep, the food being dry chaff and oats and the darkness of the mine workplaces, it was considered unwise to allow the ponies to the surface. The inevitable release of the ponies, with injury or old age was tragic – they were humanely killed in the cage, brought to the surface and collected by horse meat butchers, which was very distressing when working so closely with the horses underground.

From 1942 when I started with Clinker, it was in 1950 when underground mechanisation was developed and the use of ponies was phased out. In fact, my progress from pit ponies was to a training centre to learn mechanised mining machinery, after which I returned to Church Gresley Colliery as an electrician on the machinery that replaced the ponies. As an underground electrician I used to see Clinker, and I like to think that he remembered me.

There have been many memorable new experiences in mining, but none have diminished my most memorable experience – that of 1942, my baptism to mining and working with Clinker. Where ever you are Clinker 'in the big corral in the sky – you retain a very permanent place in my memory'. **MQ**

Photographs unless otherwise accredited courtesy Shutterstock

In shaft mines, ponies and mules were normally stabled underground and fed on a diet with a high proportion of chopped hay and maize, coming to the surface only during the colliery's annual holiday. Typically, they would work an eight-hour shift each day, during which they might haul 30 t of coal in tubs on the underground narrow gauge railway.

Old mining carts in the 1940s.



Aspasa demands the right to be heard

It is always good to catch up with Aspasa director Nico Pienaar every quarter, to discuss at length some of the work it is carrying out for its members. This past quarter has been a busy one in terms of transport legislation, meetings with the Chief Inspector of Mines and some very important workshops. The Association is developing credible, practical solutions for its members on an ongoing basis.

Discussing some of the key issues, Pienaar says: "We are objecting to the mooted new traffic regulations and believe that the draft changes gazetted in May this year will have a negative impact on individual businesses, the construction industry as a whole and the country's economy."

He believes the amendments mooted by the Department of Transport will undermine government's National Development Plan (NDP), inhibiting growth in the main sectors where jobs can be created and in some instances, it will further corruption and encourage dishonesty.

Discussing the heart of the problem, he says Draft Regulation 107D, which requires applicants to be evaluated and given a practical test by an examiner is not feasible. "We suggest rather, that attention be paid to the problem of the cloning and forging of licences."

The Draft Regulation 247 dealing with people being transported in goods vehicles also needs to be relooked at. Both Aspasa and Sarma (of which Pienaar is also a director) agree with the regulations as far as heavy-type trucks are concerned with limited cab space, but disagree strongly if the same legislation is meant to cover lighter vehicles. It also seeks clarity on how occupants should be seated on the rear of vehicles and seeks better definitions of 'Scope of Employment' in the regulation.

Regulation 292 in which speed limits will be reduced to 40 km/h in urban areas, 80 km/h outside urban areas and 100 km/h on highways, where they pass through urban areas, is also being challenged. The objection raises the point that heavy vehicles cannot operate within

their optimal efficiency at 40 km/h with a load and tend to overheat.

"In terms of Draft Regulation 318A, in which vehicles with a gross mass of more than 900 kg may not operate in urban areas at peak times during the week – this will have a serious affect on both the industries represented by Aspasa and Sarma," Pienaar points out. "Among others, building material deliveries need to be scheduled within working hours when the labour force is present. The feasibility of smaller trucks is limited, as more of these will need to be utilised. In addition, large trucks that are accidentally caught in the curfew time will have to pull over, creating even bigger problems in terms of logistics. Transport costs will increase dramatically and this will push up the price of construction. Bear in mind also, that readymix concrete has a 'shelf life' of about three hours while in the back of the truck.

"We are more than happy to work with any government department and law enforcer to make our roads safer, but this must not be to the detriment of the economy as a whole," he adds.

Autonomy

Aspasa strongly believes that quarrying operators are being over-regulated and pushed to the point where small operations become unviable and are left with no choice but to close their doors.

In this regard, Aspasa chairman Gert Coffee says the problem is that regulation of quarries is lumped into the same legislative framework as mining, with the same rules applying for small quarries as they do for large mines.

"The burden on the financial resources of small quarrying operations is enormous and can easily drive input costs



*More than a voice for the industry:
Aspasa director Nico Pienaar.*

beyond the price attainable for sand and stone.

"For this reason, we want to be recognised as different from the mainstream mining industry. Input costs are pushing up the price of sand and stone and as a result, building costs are rising to the point where illegal quarries and borrow pits are starting to thrive. With no regard for legislation, tax, royalties or the well being of their workers, these operators are able to undercut the legal operations, and drive them to closure," he warns.

Coffee says Aspasa wants to work with the authorities to explore a separate sectorial classification, which can be tailored to the industry. "It is not that we don't want to be regulated; rather we don't want the regulations to be counter-productive.

"As a key role player in the mining industry, a member of the Chamber of Mines executive committee and an active participant on various governmental and industry panels, we believe the time has come for us to define our own sector with our own rules designed to protect and promote companies and individuals within the mining sector," he adds.

Crushing

A recent workshop was held for members on crushing optimisation, which is



a guaranteed method of boosting production with benefits that extend from the extraction of material to the stockpile, and the sale of graded products. The workshop was addressed by none other than Metso's crushing specialist Alan Fletcher.

Depending on the type of material available at the quarry, the process of sizing and shaping stone and aggregate is usually undertaken with the use of a series of crushers to break rocks into manageable sizes until they conform to the required specification. Bottlenecks at any of the steps along the process can have a dramatic effect on overall production and a negative effect on the profitability of the quarry.

"The single most important aspect of rock processing is safety and training of all staff in the correct operation and procedures when operating heavy processing equipment," Fletcher says. "Thereafter it is important to understand the types of crushing processes required to manufacture the products needed and procure the right equipment to deliver the required tonnages.

"Once we have established the type of product and tonnages, we can build the processing plant around those principals and work out what type and how many crushers are required. The typical plant will have primary crushers at the first stage (usually a jaw crusher), and then materials will go to secondary crushing

(typically cone crushers) and on to tertiary crushers if finer materials are required. Quaternary crushing is sometimes used to make materials finer still."

He says that as a rule, it takes comparatively little energy to break big lumps and considerably more for small stones each time the particle is reduced further. "That is precisely why plants need to be designed for efficiency to work out the correct pinch point to break the material quickly and efficiently. It is also important to keep running the plant efficiently thereafter."

Regular checks and clearing need to be done especially on feeders, screens and scalping screens. Even a 10% buildup of materials on a screen can have a big effect on efficiency as it will block 10% of the material; in addition, it will recirculate missed material and cause a buildup that will further compound the problem. Screen size and stratification also determines the amount of material that is delivered to the crusher and it is therefore important that the screen is correctly specified to deliver the correct tonnages.

"Users must know that crushers need to

Aspasa believes the time has come for the aggregate and sand industry to define its own sector with rules designed to protect and promote companies and individuals within the smaller mining sector."

Specialist crushing guru Alan Fletcher.



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be choke fed for optimum performance. It is therefore vital that feeders and screens deliver the right amount of materials to the crushers at all times. Moisture should also be kept to lower than 5,0%, fines and the use of water minimised to avoid wear on liners from the bottom. If you screen right, your crushing is right," Fletcher says.

It is always advisable to run a plant at 100% for less time, rather than running it on trickle feed for a long period of time, as the low material levels may cause damage to the crusher.

Any crusher works better when full. Equally important is the selection of the right type of liner with the right type of profile to feed materials and ensure the correct movement within the process. Depending on the application there are coarse to fine profiles that can be specified to meet crushing requirements.

According to Fletcher, maintenance staff should monitor the wear pattern regularly to ensure it is even from top to bottom and also ensure that the liners are replaced at 25-40% of their thickness to prevent damage to the machine.

"They should also look at the wear pattern to ensure crushing is taking part

across the entire section, which determines the overall utilisation you are getting out of crusher. Reputable companies will be able to look at a liner and tell you the effectiveness of crushing taking place and be able to develop liners to address inefficiencies."

Active representation

Pienaar has once again been appointed to the executive council of the Chamber of Mines, and is also involved with the MHSC which is chaired by the Chief Inspector of Mines. This tripartite body comprises the unions, the state and employers.

Pienaar is an alternative on the Council, chairperson of the HR Committee and an alternative on the MRAC Committee, which oversees draft legislation as it comes in from the various task teams.

Aspasa is more than a voice for industry; it champions the interests of its members and Pienaar says the issues it is fighting for are aimed at providing a sustainable, responsible and professional industry.

MQ

Report and photographs by Dale Kelly

Regulation 292 in which speed limits will be reduced to 40 km/h in urban areas, 80 km/h outside urban areas and 100 km/h on highways, where they pass through urban areas, is also being challenged. The objection raises the point that heavy vehicles cannot operate within their optimal efficiency at 40 km/h with a load and tend to overheat.



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A view of the secondary crushing plant at the B&E International crushing site at Kusile.

Aggregate for major power station projects

The ability to understand customer requirements in challenging conditions coupled with years of experience in a variety of crushing and screening applications, has set B&E International in good stead for supplying aggregates to major power station projects in SA.

Janse van Rensburg points out that B&E International's involvement in such power station projects is not as simple as transporting equipment to site and then just commencing with crushing and screening operations.

"It is much more about understanding the specific requirements of the customer, as well as the particular conditions on the project, and then determining the appropriate solution that will produce the required tonnages and quality required. This means that the equipment selection is critical, combined with the in-house expertise and experience of B&E International."

He says the current quarry at Kusile will be operational until early 2016; whereafter the company will commence with a new quarry closer to the planned New Largo coal mine.

In the case of Kusile, B&E International established a crushing and screening operation on site in 2011. What was particularly challenging in terms of this contract was the fact that the entire operation

is driven by standby power. This means that a tight control needs to be kept on operational costs, while at the same time ensuring that the aggregate specification and quantities are met.

Added to the power supply issues at Kusile power station is the fact that the crushing and screening operation is located in an environmentally-sensitive area.

Janse van Rensburg says that his company has put stringent measures in place to ensure that all work carried out is in line with all the environmental requirements of the project, such as reducing dust and noise emissions and minimising water use so as to conserve scarce natural resources.

While Eskom is B&E International's major customer it is supplying from the crushing and screening operation at Kusile, it is also providing aggregate for associated infrastructure development in the area, such as roadworks. "We anticipate a fair quantity of construction spin-off, with the power station as the hub of the development," Janse van Rensburg says.

B&E International established its credentials in the power generation sector by crushing 3,5-million t of aggregates at the Medupi power station in Limpopo. "That was a significant operation, and stands us in good stead for securing work in future when additional power stations are built," Janse van Rensburg says.

Commenting on B&E International's success at Medupi power station, he maintains that the large equipment fleet at its disposal was a critical factor. "Our major advantage at Medupi, which gave us the competitive edge in the market, was that we had three complete crusher fleets at our disposal. This meant we were able to produce the volumes required and meet all the production targets."

B&E International was established in 1972 in the Eastern Cape. It soon established its own mobile and static crushing division, followed by further diversification into mining services and bulk mining and minerals processing and beneficiation. The company was acquired by the Raubex Group in 2009, completing its transformation as a total solutions provider in the mining and construction industries.

"There was a time in the infrastructure sector when a lot of contractors opted for in-house crushing, but this has changed significantly over the years. There are very few contractors that choose this option, as it is now correctly perceived as a specialist skill set. With this follows the recognition that it requires the knowledge and applications experience of a seasoned operator," Janse van Rensburg says. "B&E International is that operator."

The company's largest crushing contract to date was at Eskom's Ingula pumped storage scheme near Ladysmith in the Free State. Janse van Rensburg confirms that the power generation sector offers major opportunities in Africa, with major hydro-electric projects being mooted in the Democratic Republic of the Congo, for example.

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All-new TwisterTrac good to go

Pilot Crushtec International has begun its first production run on the ground-breaking TwisterTrac VS350E vertical shaft impact crusher (VSI). Following an extensive design and development programme, including field trials at both domestic and international sites, the all-new product is good to go.

National sales manager Nicolan Govender believes the TwisterTrac VS350E represents a major step change in tertiary and quaternary crusher technology and performance. "From the outset this product was intended to add significant value to our customers' operations. We have evolved from the traditional diesel-hydraulic drive package to a diesel-electric drive. Customers will enjoy substantial gains in output and at the same time experience reduced fuel bills and maintenance costs."



Pilot Crushtec International's TwisterTrac VS350E is ideal for the road building, quarrying & construction industries and is suitable for several mining applications.

The concept behind the development project was the construction of a product that could deal with South Africa's notoriously hard rock while delivering high volume output at the lowest possible cost per tonne.

"The product is ideal for the road building, quarrying and construction industries and is able to produce quality G1 and G2 sub base material, shaping

aggregate and producing large volumes of fines from diverse rock. It is also suitable for several mining applications. The rock-on-rock crushing option is well-suited for diamond extraction and the ability to cope with hard rock is useful in applications like the extraction of chromium ore."

Design manager Dawie Scholtz explains the logic that has achieved these advances and how it has resulted in some important features that will unlock profitable opportunities for TwisterTrac operators. "The transition to a mechanical-electrical configuration has gained us several important advantages. The fuel efficient Volvo engine coupled with a large generator is used to generate electrical power which drives the

machine's crushing, tramming and conveyor functions. All control systems are now electronic thus operators will no longer have to deal with the complications of piping and oil servicing or inefficiencies associated with hydraulic systems."

Additional features incorporated in the VS350E design include a load volume control which ensures that the crushing chamber is always fully loaded but never overloaded, while variable rotor speeds can be set when the machine is in operation.

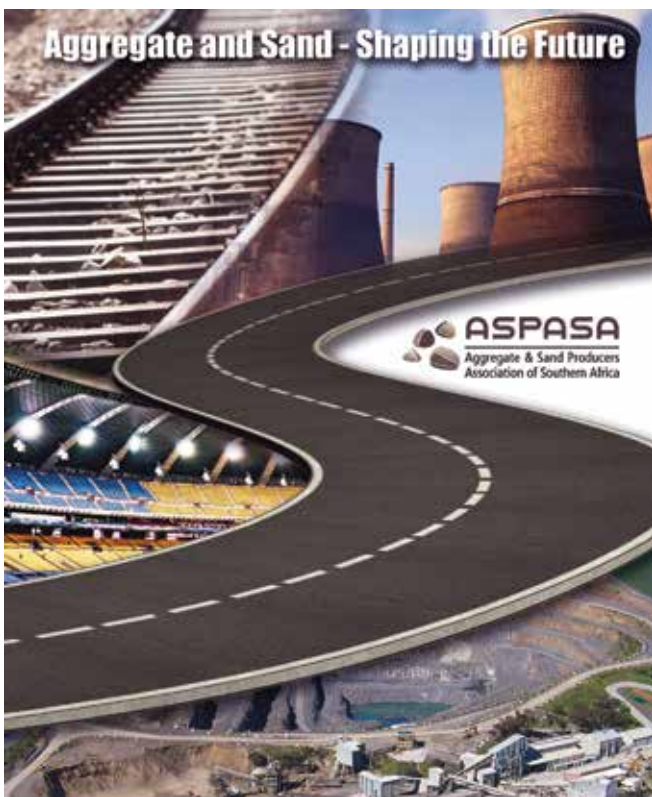
Yet another benefit is the crusher's cascade facility which allows feed that does not need processing to bypass the rotor in the crushing chamber. This can raise output to an impressive 400 t/hour, eliminate unnecessary fuel consumption and reduce wear on critical parts within the chamber.

All of these combined deliver the product's outstanding fuel economy and Govender says that the diesel in its 1100 l tanks is sufficient to cover more than two back-to-back 10-hour shifts.

The track-mounted TwisterTrac VS350E is also economical from a labour perspective. Using the product's onboard remote control system, the crusher can be off loaded from a lowbed trailer, trammed to site, complete its task and then be reloaded with the aid of a single operator.

"The TwisterTrac VS350E is an exceptionally versatile product but there is one particular area where it is expected to excel and that is in road construction. We believe that it will prove to be an absolutely indispensable addition to the crushing train of contractors working with dolerite to produce G1 and G2 material," Govender adds.

www.pilotcrushtec.com



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Locally-designed modular plant in Siberia

A modular plant designed and built in South Africa by Elandsfontein-based manufacturer Osborn is currently being installed and commissioned in snowy Siberia. Osborn's R11-million export order was for a full modular plant for the Al Rosa iron ore facility in Russia. It was shipped from SA to the port of Magadan then transported to the plant, which is situated close to Vilyuyst in Russia's Siberia region.

Marketing director Martin Botha says that Osborn's robust equipment is ideally suited for the harsh operating environment in Siberia, where temperatures drop to -40°C.

The full modular plant at the Al Rosa facility offers primary and secondary crushing and screening capabilities. It features an Osborn 3042 jaw crusher, 6 x 20 triple deck screen and an Osborn 44H Gyrasphere cone crusher.



The full modular plant at the Al Rosa facility offers primary and secondary crushing and screening capabilities.

Osborn has also supplied a 5 x 14 screen. In addition to the modular jaw, cone and screening plants, Osborn offers a full quarry processing plant, by adding the new Horizontal Shaft Impactor modular plant to the set-up.

www.osborn.co.za

Robust wheel loaders

With the addition of Doosan's DLA wheel loader series to the range nearly two years ago, Doosan has significantly increased its position in the South African wheel loader market.

"Doosan, which has been manufacturing heavy earthmoving equipment for over 40 years, has an ongoing development programme to manufacture robust machines with advanced design features and high performance materials, for optimum productivity, reduced running costs and low emissions," says Rod Watson, MD, DISA Equipment (Pty) Limited, trading as Doosan, part of Invicta Holdings Limited.

Operator safety, precise control and comfort are key to product advancement. "Doosan earthmoving equipment - which encompasses heavy, wheel and mini excavators, articulated dump trucks (ADTs), as well as wheel loaders and various attachments - has been designed to cope efficiently and safely in Africa's harsh operating conditions." The DLA series, which encompasses four wheel loaders - DL200A, DL250A, DL300A and DL420A - have bucket capacities between 2,0 m³ and 4,5 m³, with optimised breakout force and machine balance.

The operating weight of these wheel loaders has been increased, with greater tipping load capacities. These environmentally friendly machines are driven by Doosan Tier 2 engines, which are less sensitive to fuel quality than Tier 3 engines, yet still offer reduced fuel consumption and low exhaust emissions.

The Doosan air to air intercooler engines offer high torque and low rpm for improved response. High power and torque characteristics, coupled with efficient synchronisation of the drive train with the hydraulic system, ensure optimum productivity, even in tough operating conditions.

www.doosan.co.za



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Afrimat Limited is a leading black empowered open pit mining company providing an integrated product offering ranging from aggregates, industrial minerals, concrete products (bricks, blocks and pavers) to readymix concrete.

Afrimat has established a strong foothold in contracting services comprising mobile crushing, screening, drilling and blasting.

Backed by more than 45 years' experience, Afrimat listed on the JSE Limited in 2006. As part of its continued diversification strategy, the group is expanding its footprint into Africa.

The group's capabilities enable Afrimat to service projects of any scale from major infrastructure and construction projects for state-owned enterprises and parastatals through to small private sector contracts.

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The importance of clean fuel

Fuel represents the largest operating expense on any mine site, so its correct storage and cleanliness needs to be carefully managed to ensure that it remains free of contaminants caused, typically, by dirt or water ingress. Dirty fuel, for example, causes accelerated wear and failure of fuel injectors, leading to unscheduled and costly downtime for their replacement. In contrast, injectors in engines using clean fuel typically last through the full engine life cycle to overhaul.

Distilled fuel leaves the refinery very clean. However, fuel picks up contaminants during shipment and storage between the refinery and the time it is consumed.

"Fuel quality can also be severely degraded after it is delivered to the user's storage tank if there is evidence of poor tank design or maintenance practices," explains Barloworld Equipment group product specialist, Reuben Phasha.

In order to keep most of the contaminants out, fuel should be filtered as it goes into the storage tank. Coalescer filtration systems are the ideal solution, and have been the standard method to clean large volumes of fuel in the airline and petroleum industry for more than 40 years.

Caterpillar offers a specially designed line of coalescers in four different capacities, namely 190, 379, 757 and

1 135 l/minute. Each unit is skid mounted, self-contained, and requires no electrical power. They are designed to remove solid particles and water with single pass filtration, matching the flow requirements of the fuel delivery system.

The second line of defence is the machine's onboard filtration system. The standard fuel filtration arrangement on machines is designed to act as a final cleaning step for moderately clean supply fuel of ISO 18/16/13 or cleaner, with water content of 0,05% (500 ppm) or less. The standard fuel filtration arrangement is not designed to clean very dirty or water-laden fuel.

If diesel is to be cleaned by the machine fuel system (in the absence of a coalescer) additional filtration capacity must be added. This includes a water separator and additional filters. The amount of additional filtration required depends on the level of fuel contamination and the risk of filter plugging between scheduled service intervals.

Standard filtration arrangements on machines vary. A typical standard arrangement on a Cat 3500 series diesel engine would contain the following: Two 10-micron absolute primary filters in parallel; and two 4-micron absolute secondary filters in parallel



Barrier-type water separators shed water droplets from the element, which are collected in the bowl. Water must be drained before it rises to the level of the filter element.

Additional filtration may include changing the primary filters to combination primary filter/water separators. However, these are barrier type separators that capture only large water droplets, which accumulate in the bottom of the filter housing. The filter must be periodically drained in order to prevent the water level from reaching the filter media.

"If this occurs, fuel flow will push the water through the media and cause fuel injector damage or failure," says Phasha. "The amount of water in the fuel determines how often the separators need to be drained or how many separators need to be added."

Either way, draining the machine's fuel tank of particulates and water routinely according to the Cat Operation and Maintenance Manual is an important preventative maintenance practice. "How often this needs to be done will depend on the cleanliness and handling of bulk fuel," he adds.

www.barloworld-equipment.com

Redesigned exciter box

Specialist vibrating equipment supplier Joest South Africa has introduced a new exciter gearbox that has been completely redesigned by its in-house research and development team. The company is a locally-owned OEM that designs and fabricates vibrating screens and feeders in-house. It has a 39-year track record of developing and supplying products for the African mining bulk materials handling market.

"Joest South Africa's philosophy of 'Engineered Solutions' ensures that we fully understand each customer's specific needs, delivering a customised solution, which ensures that downtime is reduced dramatically," says MD Kim Schoepflin.

A significant advantage of the new

exciter gearbox is that it is fully compatible with the previous model sold by Joest South Africa. "In fact, it is important to note that the old and new model can both be included on a single piece of vibrating equipment," says Service GM Theresa Walton. "Major design improvements include an enhanced housing design that provides for longer in-service life. This is in addition to thicker mounting feet and stiffer ribs, as well as rigid weight cover mountings. The internal components feature improved tolerances and surface finishes." The material is cast specifically to Joest South Africa's specifications for robustness.

"Joest South Africa places

a major emphasis on engineering and manufacturing its products to the most stringent quality standards," Schoepflin adds.

www.joest.co.za

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Dual power train

Bell Equipment has received the first Finlay dual power crushing and screening 'train' on the African continent. These products mean that African customers can now have the flexibility to operate a fully mobile crushing and screening plant that can be powered from mains, electric or run self-powered if required.

This is the first in a number of exciting new Finlay product introductions to the southern African market place taking place this year. The dual power train is a new concept for Finlay crushers and screeners and comprises the J-1175 jaw crusher, C-1540 cone crusher and 694+ inclined screen. These three machines are market leaders in their size category with many units already operational across the African continent

The dual-powered crushers are electrically driven allowing users to run from electrical supply with the aim of giving significant savings on energy costs. These machines are also fitted with an onboard gen-set allowing the operator to move and use the machine where there is no

electric supply giving the flexibility and versatility of current standard models.

In applications where a full train is powered by the on-board gen-set configuration, the crushers generate sufficient energy to enable the operator to run the FINLAY 694+ dual power inclined screen for 'free' when used in conjunction with the J-1175 dual power jaw crusher.

"We are very excited with the introduction of these new models to the South African marketplace. These crushing and screening models are already well respected and the flexibility of dual power will only enhance their reputation with operators in the market place. We've already had a positive response from our conversations with customers and are confident that



The dual-powered Finlay J-1175 jaw crusher offers operators flexible power operations.

this will result in firm orders in the near future," confirms Finlay regional sales manager Paul Chappel.

www.bellequipment.com



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Excellence in quarrying

Aspasa member quarries were recently recognised for their excellence at an awards ceremony to honour top achievers in the field of quality, safety, health and environment, as measured by the Association's auditing regime.

The top achievers in the Initiating Safety Health Education (ISHE) health and safety conformance audit category were:

Top Performer 2014

AfriSam Newcastle 97,64%

Top Independent Performer

Midmar Crushers 96,23%

Most Improved Operations

Umdlali Quarry KZN
Drift – (Both more than 30% improvement)

Consistency in achieving Showplace

AfriSam Newcastle	97,64%
AfriSam Ladysmith	96,98%
AfriSam Coedmore	96,87%
AfriSam Verulam	96,45%
Raumix SPH Centurion	95,28%
PPC Laezonia	95,10%

Safety and Health Management Excellence

AfriSam Northern Region	Letisha vd Berg
AfriSam Southern Region	Chris Pillay

Safety Practitioner

AfriSam Newcastle/Ladysmith	Gerrie van Antwerp
Lafarge	Elton Goosen
Raumix	Bertus Rossouw

Safety Management Commitment & Support

Afrimat National	Katarien Deysel
	Mogamat Bailey
	Brian Wevell
	Steven Jansen van Vuuren

The top achievers in environmental conformance when measured against the About Face RSA Audit were:

Top Score 2014

PPC Mooiplaas 98,9%

Highest Score First Runner Up

Afrisam Peninsula 98,88%

Best Physical Conditions

Lafarge Moregrove	98,7%
Afrisam Newcastle	96,8%



Top non-quarrying operations

SPH Kundalila Aggeneys 98,83%

Most improved Quarry

Lafarge Komatipoort	95,91%
Umdlali Quarry KZN	+ - 20% improvement

Best Performing New Member

Robberg Quarry Plettenburg Bay
Infrasors Marble Hall

Consistent High Performer across a group

Raumix	Aliwal North
	Cradock
	Queenstown
	Rosslyn
	Rossway
	Willows

Top Performing Group

Lafarge Aggregates 13/15 Showplace
average score 96,26%

Management Excellence

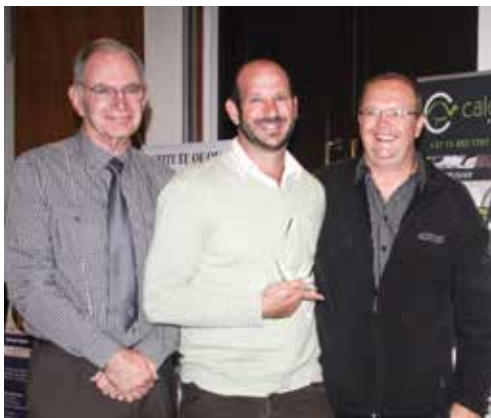
– Two or more operations

Afrisam Pietermaritzburg/Umlaas	Prince Kwela
Afrimat Harrismith/ QwaQwa	Anton Marnewick

Environmental Practitioner 2014

Lafarge	Wendy Pienaar
Afrimat	Louis de Wet

Photographs by Dale Kelly



Top Independent Performer: Midmar's Derryn Fourie stands with Gert Coffee and Nico Pienaar at the award ceremony.



Aspasa's well respected auditors Marius van Deventer and Alan Cluett.

MQ on show

The Modern Quarrying team exhibited at the last IQSA's annual conference and exhibition in Somerset West. Pictured are the editor Dale Kelly and MQ's advertising manager Bennie Venter. Visit our website: www.modernquarryingmagazine.co.za for more photographs and a regular update on the movers and shakers in the industry.



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*Jorge Abelho Director
of operations Pilot Crushtec*

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