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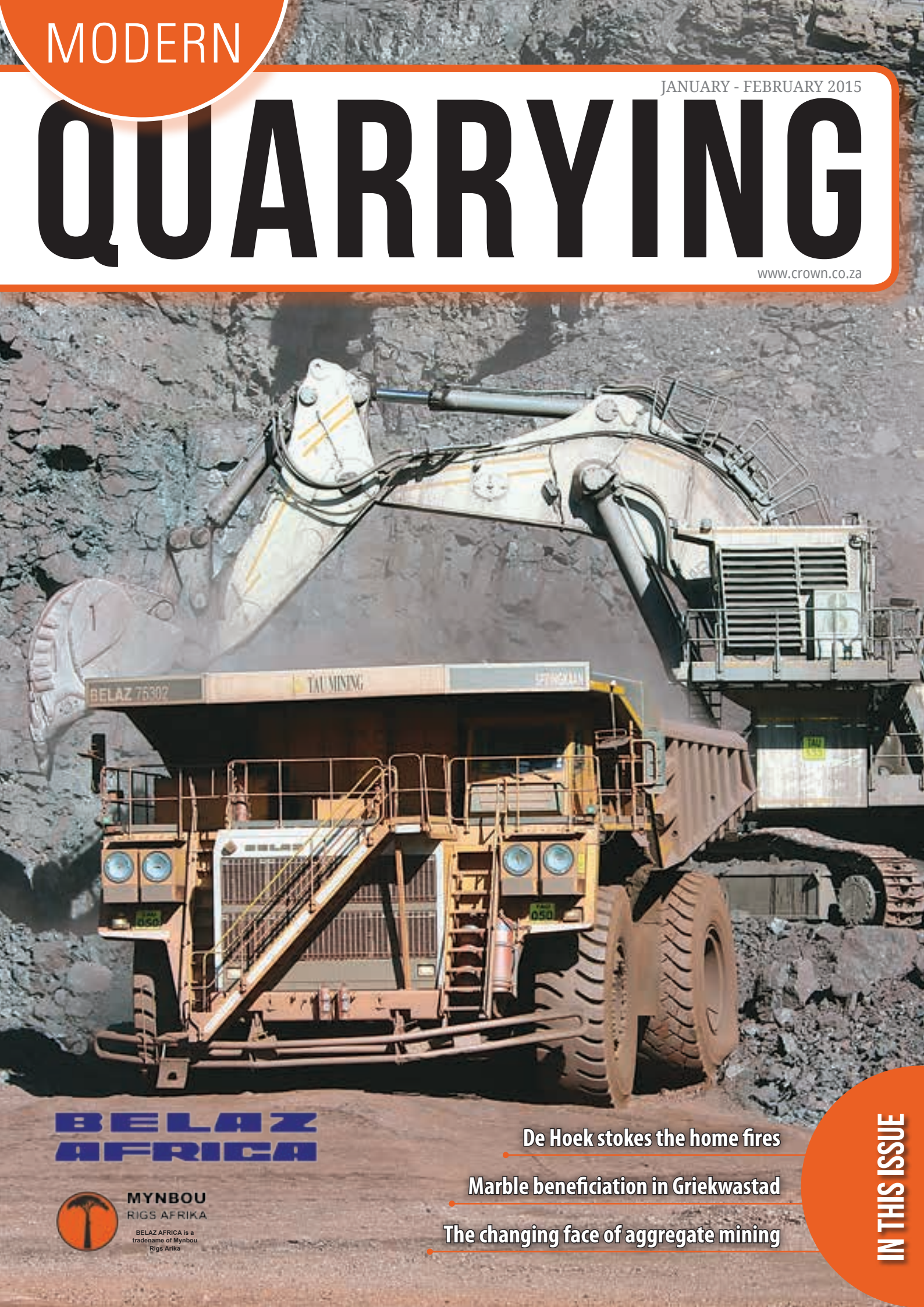

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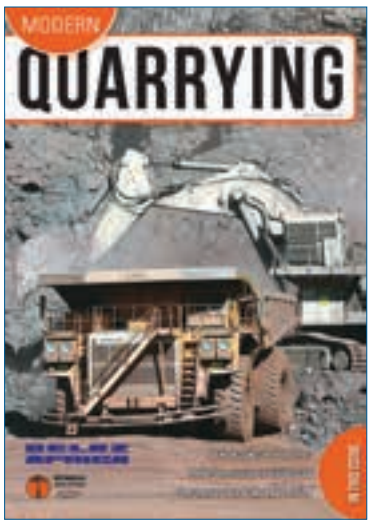

ON THE COVER

Mynbou Rigs Afrika, distributor of the BELAZ brand of heavy-duty rigid dump trucks, has increased its offering to the local market with its 450 t BELAZ-75710 haul truck, a follow on from its 220 t capacity 75302 units which are operating very successfully in Sishen in the Northern Cape. See story on page 11.

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The importance of training

A man can seldom – very, very seldom – fight a winning fight against his training; the odds are too heavy

(Mark Twain – 1835-1910)

The quarrying industry understands the need to educate and train their people on an ongoing basis, with technical skills continuing to be one of the most important requirements in our industry.

On my visits to the quarries large and small, we often discuss training and the loss of an experienced older workforce, due to retirement. Many of the larger operations have their own training academies which incorporate programmes designed to pass on the right skills, knowledge and competencies to their employees. However, many don't, especially in the smaller operations.

Xtract Training Services headed up by industry stalwarts Monty and Lynne Montgomery, is recognised throughout the industry as being in a very strong position to provide training in these areas. The company has close ties with the MQA, which it has been involved with since inception. It provides training and skills development in line with MQA requirements in close cooperation with the DMR.

Xtract Training Services has been a fully-accredited training provider with the MQA since 2005, providing quality training and skills development throughout the country and further afield. This ISO 9001:2008 certified company, is compliant at Level Two for B-BBEE.

Industry needs to understand the changing dynamics of a younger workforce, ever-evolving legislative frameworks and changing union dynamics, and clearly more emphasis needs to be placed on training.

Monty and Lynne have their ears on the ground as far as the industry is concerned; they have always and continue to be involved in the heart of this industry and are in very close contact with our movers and shakers. Current courses include: *Examine & Make Safe/Comp A – Step 1* (Rockbreakers Qualification); *Blasting Assistant – Surface Mines/ Quarries – Step 2* (Rockbreaking Qualification); and *Basic Sampling & Testing of Construction Materials*, a course that takes place in early February in Cape Town. Originally concentrating on surface mining and quarrying, the company has extended its scope to include rock engineering and strata control, as well as underground hard rock and underground coal.

Another association that has its ear on the ground is Aspasa, which for the last year in particular, has increased its focus on capturing the vital role of developing people into the needs of companies. It must be pointed out, however, that its workshops are company-related and closely-linked to its two audits and the challenges and problems found by these audits.

At the time of writing, the Association had already run two very successful workshops in Johannesburg on *Health and Safety*, and *Know your EMP*. Both workshops were extremely well attended with people from the Transkei, Upington, Komatipoort, Cape Town and Durban, and all from different companies.

The Health & Safety Workshop presented by Marius van Deventer, covered Section 54/55 issues, machine guarding, lock-outs, internal inspections and check lists, COPs, occupational health, what an H&S policy should cover, problems identified during the 2014 audits, and what is expected in the 2015 ISHE audit. The upgraded audit document was also discussed.

Alan Cluett's Know your EMP workshop, dealt with the EMP's legal setting, an overview of SA's environmental legislation, the MPRDA and its EMP-related requirements, and other applicable legislation in this regard. It looked at the DMR guidelines for the EMP in terms of its guidelines, objectives and structure, and how to manage the EMP in order to gain benefits. He discussed weather-related information, fauna and flora, hydrological studies, heritage sites, reporting requirements, performance assessment, and employee training. And finally, looking at the About Face 2015 audit, Cluett outlined what is expected in this audit.

An important workshop being run in early February at Tygerberg in the Western Cape is on *Grading & Related Issues*, with participants including Sanral, SAFCEC and the City of Cape Town, and the Western Cape government. Aspasa has developed a sound relationship with these key bodies, and aggregate specification will be a key point in the discussions. Also problems experienced with laboratories, and the COLTO standards which are causing some consternation in the industry. Cost implications in terms of sieve changing, and waste implications are on the agenda.

Later this month, Alta Swanepoel will be running a *Transport* workshop, looking specifically at AARTO and its latest legislation. The basic principles of AARTO will be discussed, the implications of which will have a major impact on our industry if not understood and followed.

I've only mentioned a few of these, which will be repeated in the various provinces. Others include the tax issues industry is experiencing in terms of the Royalty Act and the diesel rebate saga. Please visit the Aspasa website www.aspasa.co.za for further details or telephone (011) 791 3327.

Futurist calls for faster African integration

Only 13-15% of Africa's trade is within the continent – compared to 63% in Europe and 40% in North America – leaving huge scope for better economic integration between African countries, according to futures strategist Guy Lundy (left). "We have a lot of work to do in integrating our regional economics, although borders are starting to become more efficient. He was speaking at the 22nd BME Annual Drilling & Blasting Conference held in Pretoria late last year.

Leading explosives supplier BME, active in Africa for 30 years, holds the conference annually for blasting practitioners, as part of its commitment to developing skills and technology. As the keynote speaker, Lundy reminded delegates that South Africa has been playing an important role in inter-Africa investment and trade.

"We are seeing very strong investment taking place out of South Africa into the rest of Africa," he says. "In 2012, SA was the single-largest investor in foreign direct investment projects in the rest of Africa – which is definitely a step in the direction of regional integration."

A vital factor fuelling recent progress has been the spread of democracy. "Across Africa, the belief in democracy is undoubtedly on the rise, encouraged by better flows of information supported by mobile communications and internet access," Lundy says. "Between 1960 and 1989, only five African countries held elections on a regular basis; since 1990, however, there have been over 30 changes of government through democratic processes."

Growth rates of over 6,0% are expected in Mozambique. Picture shows the city hall and the statue of Michel Samora, in Maputo.

As democracy increasingly takes root around the continent, better macro-economic policies are being put into place, and this will lead to higher growth of gross domestic product in many African countries. Growth rates of over 6,0% in the next three years are expected in Angola, the Democratic Republic of Congo, Ethiopia, Malawi, Mozambique, Rwanda, Tanzania and Zambia.

"There is an issue with public sector corruption in Africa, but we do tend to blow this out of proportion in terms of their impact on attracting investment," he says, citing Transparency International's Corruption Perception Index, which shows that most African countries are generally at similar levels to Brazil, China, India and Vietnam. "So it is not a total disaster; the reality is that Africa is starting to move more and more in the right direction," he says. "If you look at Rwanda, for example, it is now considered the 13th least corrupt country in the world. It is the least corrupt country in Africa, and is using this very specifically to attract more business."

There is also a positive change in the nature of economic growth, as African economies diversify to include more manufacturing and services sectors.

Looking ahead to 2050, Lundy says Africa will have the largest number of working-age people of all the continents' populations, making it a huge consumer market attracting the attention of the world's factories. ***wwwbme.co.za***

Hillhead dates announced

Hillhead Quarry Exhibition organiser QMJ, has announced that the 17th edition of the biennial showcase event for the minerals and construction industries, will take place from June 28-30, 2016, at Lafarge Tarmac's Hillhead Quarry, near Buxton, Derbyshire, England.

Following the hugely successful event in 2014, demand for stand space is expected to be very high. Further details will be posted on the website in due course.

www.hillhead.com

The popular Hillhead Quarry Exhibiton has been set for June 2016.

BCCEI sets wage proposal deadline

The Bargaining Council for the Civil Engineering Industry (BCCEI) has set the end of February as the deadline for all employer organisations, representative trade unions and non-members to submit their wage proposals for the 2015 wage negotiation process.

BCCEI general secretary Nick Faasen is embarking on a countrywide road show in January and February this year to address all stakeholders, and urges anyone with queries to contact him directly at the BCCEI's Bedfordview head office on tel: +27 11 849 3142.

The BCCEI was registered at the Department of Labour on December 7, 2012, with Faasen assuming his role on June 1, 2013. "A bargaining council is a creature of law," he says. "We are bound by the Labour Relations Act (LRA), Act 66 of 1995. This has several implications including that it is a statutory body and completely independent."

General secretary of The Bargaining Council for the Civil Engineering Industry Nick Faasen.

Faasen says his vision for the BCCEI is to level the playing field in the industry, "which means that terms and conditions of employment, minimum wages and social benefits will be the same for everyone in the industry."

www.bccei.co.za

Crushing specialist earns global award

Pilot Crushtec International's reputation as a world-class supplier of crushing and screening equipment received a global endorsement recently, when the company was honoured at Sandvik Mobiles' 2014 Distributor Awards. The Jet Park-based business was judged top performer in two categories. Firstly, as Sandvik's best distributor in terms of marketing support; and secondly, for a remarkable aftermarket sales performance in 2014.

Pilot Crushtec International has achieved this recognition, while still being a relative newcomer to marketing Sandvik products. CEO Sandro Scherf signed the distribution agreement with Sandvik as recently as October 2012, and his company's performance was judged against stiff opposition in the form of nearly 75 other distributors from almost 50 countries around the globe.

The panel of judges drawn from Sandvik management, praised the South African company for its approach in promoting Sandvik mobile products and for its effective use of social media channels. Special mention was made of the success Pilot Crushtec International has achieved in endowing Sandvik with a vibrant media personality in both local and international publications as well as on the company's website.

The prize for best aftermarket sales performance was particularly noteworthy as it was based on sales volumes, something Sandvik regards as especially significant in view of the relatively short time in which the two companies have worked together.

Sandro Scherf, CEO of Pilot Crushtec International, accepts the award for Best Marketing Support from Eugene Lyons, global sales director, Sandvik Mobiles.

At the ceremony, which was held at Northern Ireland's prestigious Slieve Russell Hotel, Sandvik Mobile's global sales director Eugene Lyons described the association between the two organisations: "We share a very open and honest relationship with a mutual focus on the needs of the end user. Pilot Crushtec International's marketing in this industry is truly world class and is an example to all other dealers on how they should market."

www.pilotcrushtec.com

Bauma to host MBSA Congress

The second edition of this international trade fair for construction machinery, building material machines, mining machines and construction vehicles, takes place this year from September 15-18, at the Johannesburg Expo Centre (JEC). Master Builders SA is aligning its congress with this event as it presents a perfect opportunity for delegates who will be attending the congress.

The alignment of the MBSA Congress with Bauma Conexpo Africa will provide the necessary platform for industry players to engage and come up with African solutions that will accelerate the continent's growth potential. The event will give industry players the opportunity to meet, connect and expand with the view to drive growth in African mining and construction. ***www.bcafrica.com***

Bauma Conexpo Africa takes place in September this year. Photograph: Dale Kelly

Addo Elephant trail run

Leading southern African cement supplier PPC, has partnered with Free Spirit Adventures as the platinum sponsor for the 2015 Addo Elephant Trail Run, which takes place on February 28, at the Addo Elephant National Park in the Eastern Cape.

The Addo Elephant Trail Run will put trail runners' mental and physical resilience to the test with a 44 km or 76 km trail run through the vast Addo Elephant National Park. The park is located 75 km from Port Elizabeth and runners will experience the beautiful remoteness of the Eastern Cape Bushveld.

PPC Port Elizabeth general manager Karlwim Heese says this marks the first year that PPC is involved with this event, "and we are very excited about this partnership. PPC and the Addo Elephant National Park both stand for the same principle of caring for the environment. We have partnered with the national park in conservation and tourism initiatives since 1995. We have also partnered with the park's honorary rangers in other projects, such as the construction of the PPC Discovery Trail in the Addo Main Camp in 2002."

The Discovery Trail is a short walk in the main camp where visitors learn more about the fauna and flora of the region. The first loop is suitable for visually-impaired and wheelchair-bound visitors.

Heese adds that the iconic elephant that the Addo Elephant National Park represents communicates what the PPC brand is about. "PPC's elephant logo fits perfectly with the Addo Elephant Trail Run as an elephant's strength demonstrates the reliability and consistency of our products."

www.ppc.co.za

The Addo Elephant Trail Run takes place on February 28, at the Addo Elephant National Park in the Eastern Cape. Photograph: Dale Kelly

Student funding and financial aid debacle

The higher education sector is at risk due to a lack of substantial funding from the State and other societal actors. The amount of funding available for students in South Africa wanting to pursue tertiary education is inadequate and well below that of international norms in similar developing countries.

"This is a national, systematic problem that should be addressed at the highest levels of government if we are committed to investing in the future of our country," says Wits vice-chancellor and principal, Professor Adam Habib. "We recognise that the funds allocated by the State to the National Students' Financial Aid Scheme (NSFAS) has quadrupled over the last five years to R9,5-billion. Despite this, the demand for financial aid still outstrips the availability of funds dedicated to higher education study.

"Wits, like other higher education institutions in the country, administer funds on behalf of NSFAS. The amount of money allocated to universities from NSFAS in 2015 is limited and universities have been explicitly instructed not to overspend on the amounts allocated to them," he says.

For 2015, Wits has been allocated R179-million by NSFAS, of which approximately R152-million has been offered predominantly to returning students. The R152-million has been offered to some 2 090 returning students and 330 new, first-year students. It is anticipated that by the completion of registration in mid-February, that Wits will have offered NSFAS funding to about 450 additional students. In total, NSFAS packages will be allocated to about 2 870 students at Wits this year.

The university will continue processing NSFAS applications as registration takes place over the next few weeks.

Wits has consistently awarded the most number of bursaries and scholarships in the country to students, according to data collected by the Ministerial Committee on the Funding of Universities. Last year, Wits administered about R828-million in student funding which it obtained from various internal and external sources including NSFAS, bursaries, scholarships, governments and the private sector.

"The university must also stress that it informed students several times last year that they should prepare to pay their fees should there be insufficient funding from NSFAS. Other issues which are surfacing are that many students did not apply, or did not apply on time, while others submitted incomplete information, resulting in their applications not being processed timeously," Habib confirms.

The higher education sector is at risk due to a lack of substantial funding from the State and other societal sectors.

"There is definitely a need for more financial aid for students throughout the country and rather than directing misguided anger towards universities, we should be approaching NSFAS, government and other sectors of society to collectively invest in developing the high level skills that our country and continent desperately requires," he urges.

www.wits.ac.za

Corobrik upbeat on building sector

Brick manufacturer Corobrik is upbeat on prospects for 2015, following an increase in government infrastructural spending since the May 2014 general election. Managing director Dirk Meyer says that added to infrastructural spending, there has been a 15% increase in sales due to a modest recovery in the residential market. In the first three months of the current financial year, the group has sold more bricks into dwellings than in the past few years.

Optimistic about the future: Corobrik managing director Dirk Meyer.

"While growth is slow, it is steady and we are confident there is sufficient building activity n the market for Corobrik to successfully gain an improved shareholding in the walling and paving arenas. A key in 2015 will be growing organically as the group implements internal capital projects aimed at competing for more market share."

His comments come as the industry recovers from some of the worst years experienced; particularly after the 2010 World Cup Soccer tournament once the infrastructure demanded for that event had been completed.

While experiencing a slow resurgence in residential and building activity, the Western Cape has picked up significantly. Meyer says several projects that had been suspended are back on track and development activity in this area, which had been halted following the economic slump and a resultant glut of residential stock, is also showing recovery.

Corobrik has identified four entities: government, the building material suppliers, contractors and end users or beneficiaries, as being the significant players in the company being able to achieve its goal for greater influence in the public sector. Government facilitates building and construction of schools, hospitals, clinics, houses and roads; building material suppliers supply the materials to contractor building facilities on government's behalf, and communities receive quality houses and schools.

According to Corobrik commercial director Musa Shangase, each entity has a role to support one another so that chain will not break. ***www.corobrick.co.za***

Know your project's risks

Miners, ministers and other mining industry players are gathering at the Cape Town African Mining Indaba in February, under a cloud of low commodity prices, rising mining costs and falling productivity – a risky environment that requires higher levels of technical certainty, according to SRK Consulting.

"Tough economic conditions are making it harder to fund new mines to even sustain existing conditions, so explorers, developers and operators must ensure that the risk factors are well understood and mitigated," says SRK chairman and corporate consultant, Roger Dixon (*above*). "As margins for proposed mining projects are squeezed between softer prices and higher costs, there is less room to deal with project risk. The key to success is to properly address the various 'modifying factors' that stand between a prospective deposit and a viable mine."

With a 40-year reputation built initially on geotechnical engineering, SRK Consulting has grown into a global network of engineering consultants with in-house expertise ranging from exploration, mining and infrastructure engineering to water, tailings, and social and environmental impact assessment.

"Integrating the various technical disciplines is the only way to fully understand project risk," Dixon says.

"Open-pit economics, for example, are heavily dependent on the pit slope angle. To optimise this angle, a detailed knowledge of the structural geology is required, as well as rock characteristics and groundwater behaviour."

"The three areas of knowledge can then be integrated into the preliminary mine design, and pit optimisation runs can be completed with confidence."

www.srk.co.za

New Lafarge Aggregates GM

Praveen Bechoo, whose appointment commenced on October 1, 2014, is based at the Lafarge head office in Longmeadow. He is also a member of the country executive. Bechoo holds degrees in BSc Mechanical Engineering, Bachelor of Commerce and a Masters in Business Administration.

Prior to joining Lafarge, he occupied various senior management roles with companies including Eskom, Holcim and M-Web Commerce Zone. His recent position was Business Unit CEO at Macsteel Coil Processing and Macsteel Special Steels, where he spent 13 years.

Bechoo has replaced Jacques Schutte, who has been overseeing the Aggregates product line for the past nine months. Schutte has returned to his position as strategy and business development manager.

www.lafarge.co.za

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Experience needed to up blasting skills

Tony Rorke, director, blasting technology for BME.

The mining sector has plenty of bright, up and coming professionals coming through the ranks, but the missing ingredient in the field of blasting is experience, according to BME technical director Tony Rorke. "The real problem is that we have moved away from the apprenticeship system, and also lost many experts to other mining countries like Australia, so there is now a gap between the younger skills and the older specialists who are approaching retirement."

He says this experience gap is proving difficult to close because many mine-based blasting technicians and engineers are not spending enough time in the field of blasting technology to become fully proficient. "Often they are moved into other areas of production or management as the operations try to spread the skills available. The result has been a gradual erosion in the depth of experience on the blasting side in many mining companies."

As an explosives supplier and blasting contractor, BME often finds itself called upon to provide fundamental blasting duties that mines have historically assumed as part of their core competence.

Rorke says it is important for mines to work collaboratively with blasting specialists from explosives suppliers rather than becoming dependent on advice from international sources who are not as familiar with their operations and not necessarily motivated to improve the expertise of mine personnel on site. Critical input from both sides is vital to ensure that the best quality blasts can be delivered cost effectively.

"We have the benefit of dealing regularly with new blasting-related challenges, giving us a great deal of experience in troubleshooting and innovation. However, training by itself will not solve the challenge facing us. The sector really needs to have skilled people in place who will steadily gain experience over a number of years, learning every day from their own activities and the mentoring of others," he adds.

www.bme.co.za

Dlamini buys stake in engineering firm

Former Richards Bay Coal Terminal chairperson and Anglo American head for the South African operations, Kuseni Dlamini, has signed a deal with Caldas Engineering and Manufacturing Services, a leader in the supply of re-engineered wear parts for fixed and mobile crushers. The deal will see Dlamini, through his brainchild KDI Holdings, own 35% of the 18-year old Edenvale-based engineering company.

"We are very pleased to have signed the deal with Kuseni Dlamini, and we have no doubt that the experience and expertise he will bring to the table will be invaluable to us, as we embark on our journey to take Caldas Engineering to the next level," says company founder and CEO Rui Caldas.

Caldas Engineering currently provides products and services to the quarrying, construction, demolition and recycling industries and is now looking at penetrating the mining industry as part of its strategy. The company also intends spreading its wings to the rest of the African continent.

Kuseni Dlamini has partnered with Caldas Engineering in a 35% ownership deal.

"I am pleased to be partnering with the long-established world-class engineering and manufacturing firm," Dlamini says. "It is an exciting opportunity to be partnering with an organisation that has been providing superior products and services to business in South Africa and across the world for almost two decades."

In addition to the head office in Edenvale, Caldas Engineering has offices in Durban and Kimberley with plans to open another branch in Limpopo Province.

www.kdi.co.za / www.caldas.co.za

BELAZ set to increase local

Mynbou Rigs Afrika, distributor of the BELAZ brand of heavy-duty rigid dump trucks, has increased its offering to the local market with its 450 t BELAZ-75710 haul truck, a follow on from its 220 t capacity 75302 units which are working very successfully in a challenging environment at Sishen in the Northern Cape.

Detailing the advantages of buying BELAZ, Mynbou Rigs Afrika director Dmitry Venchik says the machines are typically 20-30% more economically efficient than competitive machines and yet comparable or even better in terms of performance. "We believe that the BELAZ trucks offer superior fuel efficiency with fuel consumption being between 10-15% lower than those of its competitors."

A 220 t capacity BELAZ-75302 truck, one of several BELAZ machines supplied to mining contractor Tau Mining by Mynbou Rigs Afrika.

The trucks have also been proven in some of the harshest mining conditions in the world, operating equally well in the cold of Siberia, the highlands of South America and the heat and dust of Sishen.

"They have been designed for easy maintenance and operation as they have less dependence on electronic systems than their competitors, which we see as a direct advantage," he says. "They are manufactured in accordance with all the appropriate international standards and codes and the Belarus factory is equipped with state-of-the-art facilities to guarantee an advanced, high-quality product."

The range can be tailored to customer specifications; in the case of the units leased by Tau for Sishen several modifications were made including engine cooling systems, custom-made buckets, and enhancements to the cabs to ensure comfort and safety.

This Jet Park-based company, while being relatively small in industry terms, is well equipped to maintain its machines. It holds a generous stockholding of parts in South Africa, and on the rare occasions when a part is not available, Mynbou Rigs Afrika is able to air-freight this in from its factory in Belarus.

In the case of Sishen, the company has its own technicians on site, while also using sub-contractors such as MTU South Africa and others.

According to Venchik, while the BELAZ trucks are not so numerous in South Africa, globally they account for 30% of rigid dump truck sales. They lead the market in Eastern Europe and are also extremely popular in China, Mongolia and other Asian countries. The trucks are manufactured in Belarus, a country which was previously part of the old USSR, but which has been independent since the early 1990s. The manufacturer Belaz (JSC Belarusian Autoworks), is based in Zhodino, Belarus, where its factory produces around 2 000 units a year.

BELAZ first introduced its trucks in the early 1960s as small machines with 27 and 40 t payloads. However, the range has broadened over the years and today the company supplies mechanical drive trucks in the 30-60 t payload class and electric drive trucks in the 90-360 t payload class. Its 360 t (or 400 t) machine is equivalent to the top-of-the-line machines from Caterpillar (with its Cat 797F and

market share

Unit Rig MT6300AC); Komatsu (with its 960E); and Liebherr (with its T 282 C).

Now, the company has launched its 450 t giant hauler, officially acknowledged in the Guinness Book of World Records, as the biggest haul truck built on the planet. From August to November last year, in a trial at a large coal mine in Russia, the unit's overall payload was in excess of 1-million t of material. The machine was utilised in a 24-hour operation, with BELAZ technicians and engineers on site to monitor the unit, and to make adjustments where necessary.

"It is important to note that the BELAZ-75710 boasts some revolutionary technology solutions for this type of equipment," Venchik says. "This includes all-steerable wheels, eight tyres and two engines. Based on the results of the pilot operation, the factory started building the second machine due for completion this year, which will include all necessary improvements and features suggested by the end-user."

The BELAZ-75710 is rated at 4 600 hp (3 430 kW) and utilises Siemens drive systems. The company also has plans to introduce a full line of articulated trucks, underground trucks and LHDs, in addition to developing a 90 t electric drive truck, which will be a world first. BELAZ is also working on a large front end loader with a 12 m^3 bucket capacity, which is expected by the end of 2015.

The BELAZ brand has been in South Africa for over a decade, with a distributorship in which Venchik was involved, being established in 2002. The current distributorship, however, dates back to 2008 when Mynbou Rigs Afrika was founded. A major landmark occurred in 2011, when Tau Mining, a mining contractor based in Kathu in the Northern Cape, put several units into service on a long-term contract it has with Sishen mine – five BELAZ-75302 machines with a 220 t payload capacity and two BELAZ-75137s with 136 t capacity.

Venchik confirms that Tau has been impressed by their performance, ordering a further six Belaz trucks, mostly the 220 t model. "We believe the machines have now proved themselves in South African conditions and we are focusing on signing up new customers. Indeed, Mynbou Rigs (which also trades under the BELAZ Afrika name) managed to secure several new lease contracts with other mining contractors in the Northern Cape, during the last year, and the total fleet of BELAZ machines in the area now exceeds 30 units."

The BELAZ-75710 boasts some revolutionary technology solutions for this type of equipment. The unit is rated at 4 600 hp (3 430 kW) and utilises Siemens drive systems.

Located in the Republic of Belarus, the BELAZ factory is one of the oldest and largest manufacturers of off-highway haul trucks in the world. The company's 65-year old history includes over 50 years of successful experience in the building of haul trucks for quarries and mines.

"BELAZ dump trucks could soon become a familiar sight at South Africa's open-pit mines," Venchik says. "We have established a strong foothold with the BELAZ brand and our intention is to increase our market share and export our footprint in South Africa and Southern Africa respectively."

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De Hoek – stokes the home fire to

With just a few years to go before celebrating its own centenary, PPC De Hoek has grown from strength to strength. Its history dates back to 1919 when Hermon Piquetberg Lime Company discovered limestone at De Hoek. In 1923, Cape Portland Cement took over and started production with one kiln. The company traded under this name until 1983, when it became Pretoria Portland Cement. ***Dale Kelly*** *visited this impressive operation on the N7, just outside Piketberg.*

Johan Vorster, general manager at PPC De Hoek.

Right: *Mine manager Vincent Diergaardt at the Vondeling pit.*

The De Hoek operation became the fourth cement factory in South Africa, with cement from the De Hoek plant going into early projects such as the Table Bay Docks, the Boland and Cape Town grain elevators, the Oliphants River Irrigation Scheme and the Cape Town Station. Today the volumes required to make cement for the Western Cape are in the region of: limestone: 1-million to 2-million tpa; overburden: 2,5-million to 4,5-million tpa; and shale: from 24 000 to 48 000 tpa.

Looking back at De Hoek's history, general manager Johan Vorster says that the Jewish Synagogue in Piketberg, which is now a museum, carries a special section on the town's local history, which includes photographs and mementoes dating back to the old Hermon Piquetberg Lime Company and PPC De Hoek's early operations. The Synagogue is an extension of the house museum. The building was erected in 1925 by Hungarian Jew Lodewyk Ando Simon, for refugee Jewish families who had settled in the area from around 1880.

"There is a map there dating back to about 1927, which shows what the old operation looked like in those days, and there are four greens of a golf course. Now I am not sure how many golf courses there were in South Africa in those days, but that was probably one of the first golf estates. Remember, there was the village, and this had a golf course," Vorster says proudly.

Vorster and mining manager Vincent Diergaardt, showed *MQ* an aerial geographical map of the operation, and pointed out the N7 and the back road I travelled on to get to the mine from Veldrif, as well as the Zoutkloof and the relatively new Vondeling pit. They compared this to a picture taken in 1977, showing the old De Hoek pit alongside the factory and the N7 which was in fact, a dirt road. Driving on the N7, one can't see the quarry on the opposite side of the N7.

The old De Hoek quarry was mined out in 1980, and there are various rehabilitation options currently underway. The current Zoutkloof pit is almost at the end of its life, and is currently running at about 170 m deep. The aim is to mine to a depth of 180 m and according to Diergaardt, there are two benches still being mined. "There is about 800 000 t left, and we plan to phase this in over a period of two years at 400 000/year. We will probably stop mining here at the end of this financial year, and in the last year will stockpile the volumes in case we run into trouble with quality."

expand PPC's African footprint

He says the reserve quality is still high at this stage.

Looking at the Vondeling pit which commenced operation in 2007, the current depth is 50 m with planned mining until 2042. The final depth then will be 200 m. The aerial map shows a pink area, which was Phase One with a water canal running through a portion of the planned mine area. He says the new pit is roughly the same size as Zoutkloof and has the same quality limestone orebody.

The map shows the concurrent rehabilitation taking place at Zoutkloof, and the overburden/waste from the pit. "As we are opening up the new pit, we are closing the old one. We will actually be able to fill the whole pit and form a little bit of a hill. We are currently at -60 m below sea level, and will go down to -70 m."

The old waste overburden dump has been rehabilitated and the farmers renting the area have planted wheat fields and are utilising the land for agricultural purposes. There is no difference whatsoever between the natural and the rehabilitated areas.

Diergaardt has been with the PPC group for six years, having started off at PPC Riebeeck in the Western Cape, then moving to the Eastern Cape, followed by Dwaalboom in Limpopo Province.

He says he is very proud to be part of the transition phase at De Hoek, "which is very exciting because we are closing one pit and opening up another. Shale is also sourced from the De Hoek operation, and Diergaardt says there are a lot of shale reserves.

Showing *MQ* the two major shale deposits on the aerial map, he says when mining in Vondeling began; there was a lot of shale which was mined when the pit was opened up. "There is a huge stockpile in the pit area, and we are focusing on that at the moment.

"What happened with the initial design which went downwards is that after drilling we realised that there was another limestone body sitting closer to the surface, which means less overburden stripping. This is why the river diversion plan came in. The deeper deposit is sitting at a 55° angle, and as you go eastwards it is getting deeper, so the moving of the canal is critical for us to be able to mine in that area," he explains, adding that this will be carried out by the end of this year.

Above: *The back area at Zoutkloof which is filled with water is the final 180 m depth of mining. Here the limestone deposit sits at 55°, and on the sidewall, one can see the phyllite which is screened out to the waste dump in order to enhance its quality. The area at the back of the pit is overburden from Vondeling, which has been backfilled into the pit.*

Centre: *The current Zoutkloof pit is almost at the end of its life, and is currently running at about 170 m deep. The aim is to mine to a depth of 180 m with two benches still being mined.*

Left: *Close up view of the topsoil and overburden, phyllite, granite and limestone.*

The new Vondeling pit, which commenced mining in 2007, is at a current depth of 50 m. One can see the sump established at the back, and the next cut will be into the limestone. In the short to medium term, the plan is to extend the front area because of the shallow limestone deposit. . In the front one can see the overburden and a small amount of limestone in the corners, with the majority of the limestone being on the lower level.

"We are trying to squeeze the life out of the old pit, while opening up the new one," he says. "When I came here two years ago, we had two years left on Zoutkloof, and it is already two years down the line, while we are still talking about another two years of mining life ahead of us."

Discussing the materials, Diergaardt says that the raw materials (limestone and shale) are mined at De Hoek with the other raw materials – sand, coal and FDG (Fe) and gypsum – sourced externally. "We have two kilns which produce about 800 t of clinker/day. Kiln 5 produces about 1 150 t/day and the upgraded Kiln 6 produces some 1 650 t/day." Clinker storage capacity is 55 000 t.

The Kiln 6 upgrade included the design, manufacture, supply, installation and commissioning of a 350 000 m^3/hour capacity bag filter to de-dust Kiln 6 and Raw Mill 6 as part of an extensive upgrade and expansion at the De Hoek factory. The coal plant upgrade included an indirect firing system and the upgrade of the coal mill bag filter.

The upgrade of Kiln 6 complies with 2020 emission limits. The kilns are currently operating below 10 mg/Nm^3. The total cost of these upgrades was in the region of R350-million.

The finishing mills 5 and 6 are horizontal ball mills, with an output of 45-85 t/hour depending on the product. Over 1,2-million t of cement can be produced on an annual basis.

Discussing plant on the quarry, Diergaardt says the primary crusher is an 800 t/hour gyratory cone, with two secondary horizontal impact crushers at 400 t/hour each. "The primary crusher crushes the material from blasted rock to about 150-300 mm and the secondary crushes to 25 mm. The primary crusher builds a stockpile which goes through the secondary crusher, and then making up the mix which goes to the limestone stockpile is a four-kilometre belt conveyor which carries the material under the N7 to the plant."

The primary crusher is a semi-mobile unit, which is moved to the service area every three to four years for maintenance purposes. "When moving a unit of this size, we have to do a lot of planning in advance to ensure that we have sufficient limestone stock to feed the factory for the three-week downtime period. This was done last year and the whole process went very smoothly. Some of the maintenance work is carried out by Metso, and we also have our own maintenance workshop.

"The crusher is lifted onto our crawler and it takes a day to travel to the service area. There is a lot of preparation beforehand," he adds.

The service area has an overhead crane, and the crusher is connected to an electricity supply for the maintenance work. The whole structure is 880 t, and the crawler weighs over 220 t, with the total weight of the equipment being in the region of 1 100 t – no easy task in terms of ensuring that the road to the service area is well prepared and finely graded. "We had to redesign the road for the crawler, because it wants fine material on the road so that it can travel smoothly, and we have to grade the corners very evenly."

Mining equipment includes seven Cat rigid 50 t 773 haul trucks, two Cat 990 front end loaders, one Cat 385 excavator, two Cat D9 dozers, and an Atlas Copco drillrig. "We also have one Cat 14G grader which was bought in the 1970s, and which is still working well. We look after our equipment," he says. A new addition to the equipment fleet is an Astra 32 000-litre water truck.

Discussing energy supply and electricity

Above: *The ramp is being shortened to enable more efficient hauling in terms of the whole pit, the wall will need to be shifted towards the east as the limestone is getting deeper and deeper.*

Centre: *Stacking and reclaiming: Three are three limestone piles, one full, one being reclaimed and one being stacked at 18 000 t each.*

shortages, Diergaardt says the operation is one of Eskom's clients on a major drive to save energy, "and we also switch off some of our equipment during peak times especially during 18:00 and 20:00 in the evening."

"We are on Eskom's time-of-use tariff and in the mornings between 08:00 and 10:00 we also stop our plant if our stockpiles are sufficient," Vorster confirms, adding that the 18:00 to 20:00 is critical for Eskom and De Hoek. "We also have a curtailment-of-time contract with Eskom which says that on request, we will stop operations. So they will notify us that it's either a Stage One or Stage Two, the municipality is load-shedding, and then at Stage Three, they will ask us to stop significantly more of our plant.

"If we look at fuel, there is not really much that we can do. However, despite carbon tax introduction being delayed to 2016, we are busy with a number of initiatives. In terms of alternative fuels, we have concluded an agreement with the Recycling and Economic Development Initiative of South Africa (REDISA), to process waste tyres at De Hoek, and to commence the burning of these by mid-2015. What happens in the landfill areas of the municipalities and metropolitan areas is that tyres tend to shift the landfill. You are not allowed to landfill tyres.

"Some of our competitors are also burning tyres, but what we are providing is a major capital outlay to build an automated, environmentally-friendly facility for this purpose. That is Phase One, and Phase Two will be refuse-derived fuel from municipalities in 2018. It's a process of small steps to first see the impact from the tyres and then see the impact from the raw material, and to follow this up with minor adjustments."

As part of PPC's strategy and long-term plan to grow revenue by 40% outside of South Africa, the group is expanding its operational footprint into the rest of Africa, including Algeria, Botswana, DRC, Ethiopia, Rwanda and Zimbabwe.

Asked where the De Hoek operation fits in, in terms of PPC's African strategy, Vorster says: "We have a slogan 'Keep the home fires burning', and the funding for the African strategy comes from the group's South African operations, so we need to be efficient. De Hoek is a primary plant within the PPC Group which makes clinker for the Western Cape."

Products produced at this facility are a 52,5 down to a 42,5 premium cement. "This deposit is high in alkaline, which assists in making the quality products at De Hoek," he adds. "We are very fortunate in having a quality shale and lime deposit."

There are 48 employees on the quarry side, 21 people per shift, on a two-shift operation five days a week. "The cement plant runs for 365 days, on a 24-hour basis, so I have to work smartly for five days to keep them running for seven days," Diergaardt says. Packing and distribution is five to five and a half days a week. The total staff complement is 220 people.

"We have quite a few people who have been with us for close to 30 or over 40 years," Vorster tells *MQ*, which is something that says a lot for the operation.

The picturesque village at De Hoek incorporates some 75 houses for critical staff, one of whom is Vincent Diergaardt and his family. The first house was built in 1921, with the golf club established in 1922. "We love living in a close environment such as this. It is safe and secure, and we are part of a wonderful community."

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The houses, which have been upgraded over the years, still incorporate the solid thick walls, foundations and fireplaces built so long ago. The gardens and facilities are beautiful and *MQ* was impressed by the well-kept facilities, green lawns, fauna and flora. The village includes a well-equipped recreation facility, with a large swimming pool, and of course, a nine-hole golf course.

PPC's cement plant at De Hoek has been using Adroit's SCADA system for many years, and is a major user of this technologically-advanced open automation Adroit Supervisory Control and Data Acquisition package.

Engineering manager Steven Strauss says the whole plant is monitored by Adroit. "Each section has its own Adroit installation where the operators are able to visually see what is happening throughout the plant. It will indicate all your running conditions at that stage, and it is also possible to draw statistics from the past if you do fault finding for example, together with weights, temperature pressures, etc. There are a lot of decisions made via the information stored on the Adroit SCADA system."

Taken on a drive through the quarry, Diergaardt explains that the 760 ha property was purchased from the nearby farmers, and the same farmers rent it back from PPC for agricultural purposes. "We are only mining a small area, the rest of which they use for wheat planting and for their animals."

En route to the Zoutkloof pit, we passed the primary crusher which feeds via a belt to the secondary. The back area at Zoutkloof which is filled with water is the final 180 m depth of mining. Here the limestone deposit sits at 55°, and on the sidewall, one can see the phyllite which is screened out to the waste dump in order to enhance its quality. The area at the back of the pit is overburden from Vondeling, which has been backfilled into the pit.

The new Vondeling pit, which commenced mining in 2007, is at a current depth of 50 m. One could see the sump established at the back, and the next cut will be into the limestone. "In the short to medium term, our plan is to extend the front area, because of the shallow limestone deposit," Diergaardt says. The ramp is being shortened to enable more efficient hauling. In the front one could see the overburden and a small amount of limestone in the corners, with the majority of the limestone being on the lower level.

"In terms of the whole pit, the wall will need to be shifted towards the east as the limestone is getting deeper and deeper. At the moment we are moving 2-2,5-million t of overburden annually and we have a 2:5 stripping ratio." Blasting is carried out by PPC De Hoek one to two times a week, with BME supplying the explosives.

We drove to the stacking area of the mine, where, Diergaardt explains, is where his responsibilities end, with factory production starting its process. There were three limestone piles, one full, one being reclaimed and one being stacked at 18 000 t each. The shale stockpile was about 5 000 t at the time of *MQ*'s visit.

The primary crusher is a semi-mobile unit, which is moved to the service area every three to four years for maintenance purposes (courtesy PPC De Hoek).

In summary, the reclaiming of materials includes:

- Raw materials which are mined on site: 90% limestone and 3,5% shale.
- External supply: 4,0% sand; 6-10 t/hour coal; and 2,5% FDG.

Graduate bites the De Hoek bullet

MQ had the privilege of a brief chat with Wits graduate Matty Mukwevho, who is on the graduate programme. She is currently completing her Blasting Ticket, and says it is going extremely well. Asked how she copes in what is traditionally a male-dominated environment, she says in the beginning she battled a little, but she focused on what she wanted in life. "It is not about where I am but rather about what I want to achieve at the end of the day – and that is what my focus is."

Mukwevho was approached at Wits to join the PPC graduate programme. She went for the interview and the rest is history.

Holding a BSc (Eng) Mining Engineering, she is in her second year of the graduation programme. She has completed 54 blasting shifts, with another six to go before she is assessed for her Blasting Ticket. She says she is well accepted by her peers and colleagues at PPC, and is very excited about her future career.

Diergaardt explains that Matty has a programme layout with about 10 modules she has to complete during the course of the year. She moves from department to department. "She started in drilling, blasting, primary crusher, environmental, water management, etc, so she constantly working on those, while attending all her blasting shifts. Matty now has her driver's licence and from the end of February, will start supervising some of the shifts."

The shale stockpile is in the region of 5 000 t.

- Product extender: 9,0-37% slag and 3,0% gypsum.

On the production side, the ball mill at Raw Mill 5 has a capacity of 95 t/hour. The ball mill at Raw Mill 6 has a capacity of 117 t/hour.

On the packaging and logistics side, De Hoek has two packing machines which process 2 900 bags/hour each. There are bulk loading facilities by road and rail, and a cement storage capacity of 20 000 t. "We can pack in excess of 1,4-million bags of cement a month," Vorster tells *MQ*, adding that De Hoek can sell some 26 000 t of cement/week.

Vorster, who has been general manager at De Hoek for a year, has a long history with PPC and the cement industry in general, having been manager at Riebeeck for one year and Saldanha for four years. He has also worked at NPC Simuma and Newcastle, managing the Durban operation for eight years. He was at Newcastle for eight years, four of these as manager.

Asked about his personal philosophy, he says it is about aligning with the group's strategies. "I try to interpret that into a local content. A cement operation is about managing costs and not just that; in an isolated area that we are in, it is about keeping the Vincents of this company happy. And once they are happy and they understand the strategy, they are able to execute it. I have tried to establish this over the past year. Everyone must understand the big picture, and this year is the year of refining what was established last year.

Discussing the social and labour plan, he says PPC De Hoek is in the process of establishing two local POP centres (Path out of Poverty), which are managed through a trust, at a total cost of R5-million. "The one will be located in Porterville and the other in Piketberg, and we will build them in that order. Besides that, our corporate social investment spend is in the region of R300 000/year.

"PPC established a POP centre in Riebeeck West, and that is an example for government to care for the youth in the afternoons, and take them off the street. There is skills transfer; they do their homework and there are various supervised activities. This has been running for about four years through the trust, with government assisting us."

The Riebeeck West POP centre has been extremely successful and has created a path for similar centres in the future.

Looking at skills training from a De Hoek perspective, Vorster says there are skills classes that will start running again in February. "These are basic skills from welding, woodwork, painting, motor mechanics, and art, among others. This is run in town and we fund it. We sponsor the lecturers and the necessary equipment and tools." This has been running very successfully for the past four years."

The other CSI spend is on education, and PPC recognises the Dux learners from each school.

Discussing the loss of skills in terms of experienced industry people retiring, he says PPC has frequent succession discussions within the

The De Hoek village seen from the N7. The village consists of 75 houses. The houses, which have been upgraded over the years, still incorporate the solid thick walls, foundations and fireplaces built so long ago. The gardens and facilities are beautiful with well-kept facilities, green lawns, fauna and flora. The village includes a well-equipped recreation facility, with a large swimming pool, and of course, a nine-hole golf course.

group. "The principle of 'learning for growth' and the group's Kambuku philosophy underpins our sustainability. We believe in enriching our team members by ensuring that they have the right skills, knowledge and competencies to reach their potential."

Training programmes are designed to produce sustainable benefits for both PPC and its employees, and through the various PPC academies the group is sustaining skills, while remaining globally competitive. The various academies include:

- PPC Operations Academy
- PPC Mining Academy
- PPC Bridging Skills Programme
- PPC Leadership Academy
- PPC Technical Skills Academy
- Graduate Development Programme
- Entrenching Customer Service

"This is like a mini-technikon. We believe that the artisan who comes through the FET colleges is not always suitable for our industry, and so we put the same artisans through the academy before we taken them on board. At present we have about 12 learners at the site, and we have graduate programmes that we are running," Vorster explains. "Matty Mukwevho, who has a BSc (Eng) Mining Engineering from Wits University, is one example. She is a modest young lady from Limpopo Province, who has had to survive in this culture here. Matty is now in the final year of her graduate programme, and we are very proud of her," Vorster adds.

Picture shows the old donkey tethers and water feeder. Donkey carts were used to haul the ore from the old De Hoek pit (courtesy PPC De Hoek).

With over 8,0% of the employees at De Hoek having worked on site for 30 or more years, PPC De Hoek is clearly a happy place to work at. The feeling *MQ* got from reception right through to top management, is one of positivity and pride of place.

Report and photographs, unless otherwise credited, by Dale Kelly

The changing face of aggregate mining

MQ's *Dale Kelly has been closely associated with the Aggregate & Sand Producer's Association of Southern Africa (Aspasa) for over two decades, from the early days when Sir Rupert Bromley was chairman, and then with Aspasa director Nico Pienaar when he took over the reins many years ago. What has become more evident than ever, is that the country's mining landscape is changing rapidly, with aggregate and sand mining operations required to adapt and meet future challenges head-on, if the industry is to grow and prosper; some of these challenges are discussed below.*

Aspasa ended 2014 with a very successful breakfast meeting for the majority of member CEOs, which included company owners. The cream of the crop in industry got together in December to network and to hear at first-hand what Aspasa is doing for the aggregate sector.

Pienaar confirms that the gathering went well, and that it will be held again towards the end of this year. "We had a favourable response and excellent feedback, and next time we'll ask for input from the CEOs as to where they believe we need to focus and to discuss different issues."

He says the industry needs to understand the changing dynamics of a younger workforce, changing union landscapes and ever-evolving legislative frameworks. "This makes mining in Southern Africa a challenging proposition and something that is not for the feint-hearted."

Pienaar believes that the time has come for industry heads to step up to the plate and steer the industry towards positive growth. More emphasis needs to be placed on training and education to make BEE easier and also to uplift the skills of quarry workers. Communities surrounding operations should also be dealt with in a positive way to ensure that they are uplifted in terms of job creation and further opportunities. "By putting effort into the communities our employees stem from, it stands to reason that the workforce will be more positive towards the companies they work for."

Nico Pienaar, Aspasa director (courtesy Aspasa).

He cites Marikana as an example where the mining industry was caught by surprise. "Mine bosses were unaware of a host of problems within communities surrounding the area, and were out of touch with the workers that served them. Perhaps with better foresight on how these events developed, we can make sure that similar events don't occur in the future. As employers, we have the ability to positively influence the lives of people in our surroundings, and that is a powerful tool in running a successful business."

The perception that government and trade unions have all the power and the employees have nothing is incorrect. "Nothing can be further from the truth as we are the ones who are creating the jobs and providing a living for our workers.

Regional Aspasa chairperson Letisha van den Berg (courtesy Aspasa).

Aspasa has become a powerful voice in opposing impractical legislation affecting smaller quarry operations.

"We need to make sure that we offer decent, safe and secure jobs and empower workers and surrounding communities in their future development.

"Together we need to tackle challenges head-on constructively, and this includes other role-players including government and trade unions. As an industry body, we cannot afford to avoid issues and hope that the problems will disappear."

He urges the CEOs to join Aspasa in becoming a voice that opposes impractical legislation affecting smaller quarry operations. "We are currently dealing with the South African Revenue Services and the aggressive approach they seem to be taking towards our industry; as well as the DMR, which at times has an agenda that is not clear to us as an industry.

"As other government departments bring in new legislation, we need to ensure that it is not to our detriment in terms of sustainability."

Mosh practices not for everyone

Regional Aspasa chairperson, Letisha van den Berg agrees. She says that some practices mooted by the Mine Health and Safety Council (MHSC) in terms of a one-size- fits-all approach in eliminating fatalities on mines, is not necessarily beneficial, unless proper studies are carried out across the full spectrum of mines and quarries in particular focus areas.

Mosh (Mine Occupational Health and Safety) is a function of the MHSC, which focuses on finding solutions to particular problem areas on the mines. Recent findings that proportionately more fatalities are caused by trackless mobile machinery (TMM) on smaller mines, which sparked Mosh studies of smaller mine accidents, did not necessarily focus on quarries. The resultant 'leading practices' that have been formulated are therefore based on small, mainly underground mines, as well as coal mines. It found that proximity detection systems (PDS), Collision Avoidance Systems (CAS), and Motion Inhibitors (MI), among others, would reduce accidents.

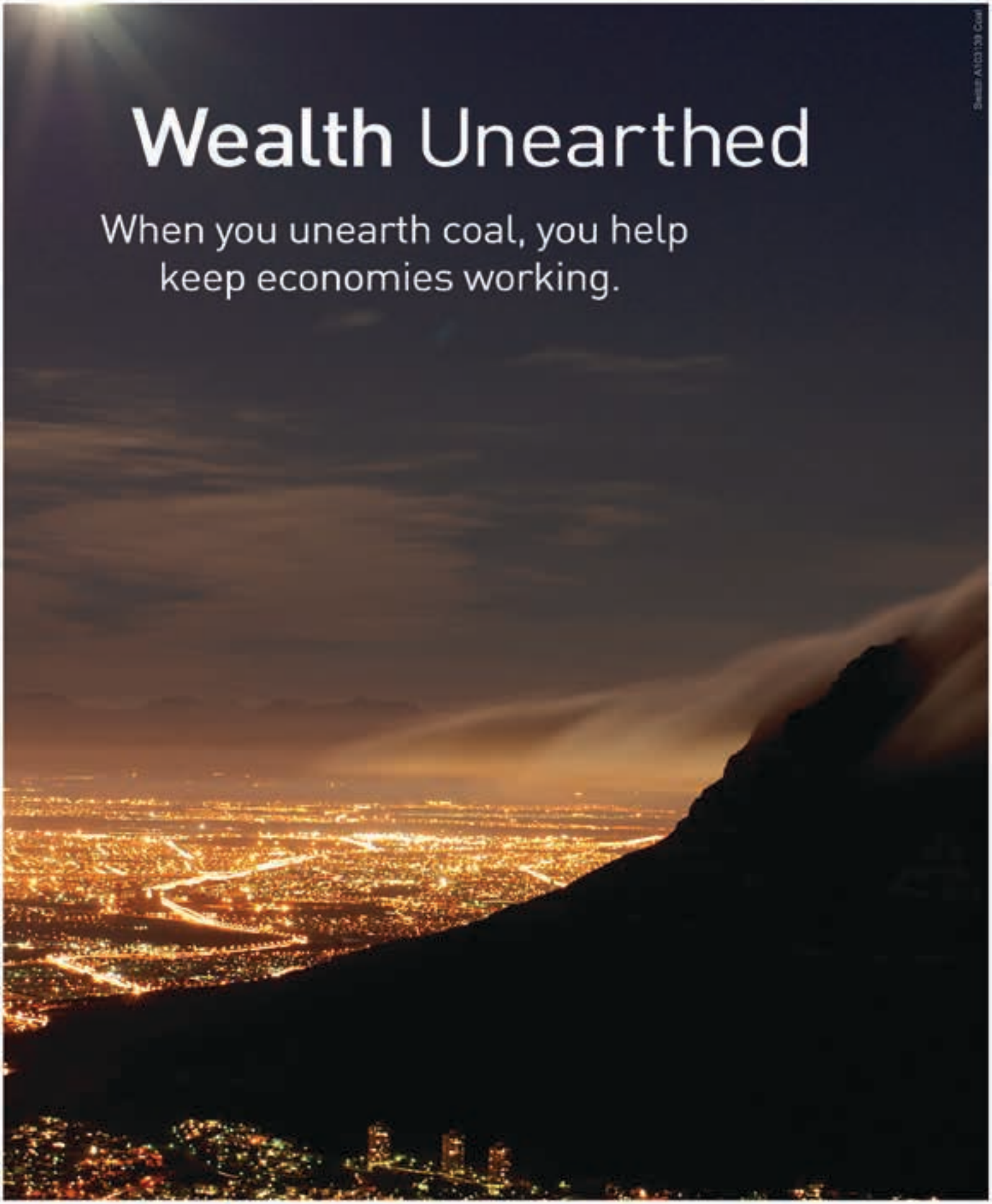
"However, the number and type of machines used in quarries are very different to those found in the studies," she says. "For example, if an operator relies too much on his PDS and it becomes faulty, he may cause an accident. Or if the warning buzzer of his CAS gets too irritating, he may switch it off or chose to disable his MI to speed up his work. Then, we have created a false sense of security for our workers and they may relax their attitude towards equipment and vehicles. We would rather advise that our member mines trial these units to ensure that they work correctly to avoid additional costs. They should also visit operations that have these units installed to see that the systems are having the desired effect."

She believes that without input from the aggregate and sand industry, the Mosh leading practices are not objective and should be reassessed. If the leading practices are deemed a success, then they may be promulgated to become law that all mines will have to abide by.

Aspasa and other small mines want the Mosh study to be expanded to include input from quarries. Leading practices can then be identified which are more suitable for this end of the mining sector. The study needs to view the physical structure, operating procedures and practices of these operations, also taking into consideration budgetary constraints faced by some of the smaller quarries.

"The potentially costly and cumbersome nature of the systems being proposed will be hard for small family-run type operations to abide by, and may not prove to be as effective as simpler, industry-defined measures that are easy to implement and manage," Van den Berg says.

"In previous meetings, we proposed that Aspasa and small mines rather adopt new practices in which a risk assessment must be conducted to indicate the level of risk and what type of control measures are sufficient," she confirms. "Interventions such as the introduction of a traffic management approach may be sufficient, in which we separate different sizes and types of vehicles and equipment to avoid accidents. Also, by separating pedestrians from equipment and vehicles, we can



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limit exposure and effectively avoid pedestrian fatalities.

"Another effective measure that can be implemented is managing operator and worker fatigue. By making them aware of the dangers of over-tiredness, we can reinforce safer working practices and prevent the kind of accidents we commonly see as a result of clouded thinking, or falling asleep at the wheel of a machine."

Van den Berg's concern is that Mosh has started inviting Aspasa to workshops but not to the feedback sessions from industry. "Nor are we being kept informed of the progress of these trials. We have not been invited to the next round of Mosh talks and if the leading practices are confirmed and accepted, then we will be left out in the cold. We therefore appeal to Mosh and to the MHSC to drop the one-size-fits-all approach to safety on our mines and our quarries."

The number and type of machines used in quarries are very different to those found in the Mosh studies, which is aimed at mines of all sizes and types.

Pienaar adds that other important issues include industry-specific training that is not being properly addressed by the various SETAs.

"In the coming years, our industry will also need to adapt to changes relating to electricity and water shortages, tough environmental and company legislation, crime, corruption and other pressures that are placed on us. Only through the unity of our members and through the involvement of all in the construction materials mining sector, will we be able to sustain a positive future for this sector. As Aspasa, our mission remains to continue building positive relationships with relevant government departments, while also fighting for the rights of companies within our industry. We will continue to look after the health and wellbeing of employees within the industry, and caring for the environment which we leave behind for future generations."

Regional conduit

Discussing regional structures, Pienaar is appealing to members and role-players within the aggregate industry to support Aspasa's regional structures and in so doing facilitate better communication between members. This will also enable a faster response to localised opportunities and threats. Regional chairpersons and committees are used as a conduit between local producers and the Association in order to identify operational requirements relating to regulatory, training and other requirements; as well as playing an increasingly important role in facilitating discussions with all role-players.

Pienaar emphasises that the regional chairperson is chosen from the Association's membership in each region, and tasks are performed on a voluntary basis. "However, the role that they play is critical in moving the entire industry forward and their work is expected to positively impact on the success of their region.

"For this reason, we are appealing to members, associate members and industry suppliers to find out who the local Aspasa chairperson is, and to work actively with them in improving the industry in their respective regions."

The chairperson is also expected to establish a sound working relationship with local DMR representatives and in many instances, will be able to directly address regulatory or law enforcement issues directly before escalating problems to the national structures, where required.

"Quarry operators and other role players can also speak to their local Aspasa chairperson to find out more information about the Association's health, safety and environmental audits. They should attend regional meetings to stay abreast of national issues and opportunities that may affect their businesses," he says. "We realise that our Association is only as strong as our members' input, and we therefore encourage member companies to support regional initiatives that are being established to ensure that our industry remains buoyant and successful in the future."

Report and pictures, unless otherwise credited, by Dale Kelly

Beneficiation of marble from Griekwastad

First published in the Journal of the South African Institute of Mining and Metallurgy (SAIMM) towards the end of last year, the Mintek authors – NP Mahumapelo and C Magaseng – base their paper on a study to determine the potential beneficiation opportunities for marble from Griekwastad in the Northern Cape Province.

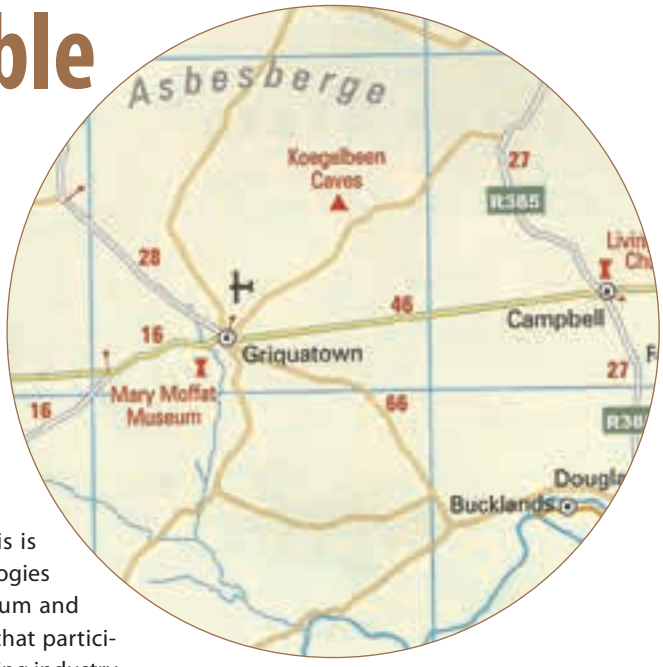

Figure 1: *Griekwastad is situated between Kimberley and Upington in the Northern Province.*

The main economic activities in the Northern Cape Province are farming and mining. Mining activities are concerned mainly with iron and manganese. Diamonds, zinc and lead are also mined in the province. Other important commodities mined in the region include copper, limestone, gypsum, rose quartz, tiger's eye, mica, verdite and semi-precious stones. To a large extent, the beneficiation of these metals and minerals takes place outside the province.

Opportunities exist to establish beneficiation plants to add value to these minerals within the Northern Cape, in this case in Griekwastad. The potential spinoffs are job creation, rural development, infrastructure development and skills development.

The Small Scale Mining and Beneficiation (SSMB) division at Mintek was established to promote mineral-based activities in rural and marginalised communities through technical assistance and skills development. This is done by developing technologies appropriate for small, medium and micro-enterprises (SMMEs) that participate in the minerals and mining industry. The SSMB division's mandate is to initiate poverty alleviation programmes and support the growth of SMMEs in the mining and minerals sector. The division uses Mintek's high-technology facilities and resources to support SMMEs in mining, extraction and value addition to minerals through beneficiation.

Mineral beneficiation has been identified as an important mechanism to further diversify South Africa's economy, and thereby also create jobs. Potential benefits include employment creation, skills development and transfer, rural development and poverty alleviation (*Paul, 2011*).

Griekwastad community

Members of the Griekwastad community mine marble at a subsistence level. The use of children in mining, although undesirable, is mainly driven by poverty in the area. Children are employed in small-scale mining elsewhere in South Africa and Africa, in many cases close to where their parents are working. The mining is carried out illegally, and the miners do not have any formal training in mining and use low-technology methods.

Members of the Griekwastad community mine marble at a subsistence level.

In many African countries, subsistence mining is carried out illegally, with no understanding of the safety issues involved.

STUDY			
Field visit:	**Literature study:**	**Testing & Processing:**	**Potential beneficiation opportunities:**
Griekwastad Northern Cape	Marble Serpentine	XRD ICP Crushing Particle Size Distribution Tumbling Polishing	Jewellery manufacture Binding marble with epoxy Binding marble with cement

Figure 2: *Study activities. The study covered the above activities. Mintek personnel participated in a visit to the Precious Stone and Jewellery Services cc in Griekwastad to interview members and obtain samples for analysis. A literature study was undertaken to develop a deeper understanding of the marble available in the area.*

The Department of Trade and Industry, Mintek, the Department of Mineral Resources, the Small Enterprise Development Agency, and the Pixley ka Seme District Municipality are collaborating to develop the Griekwastad community. This will be achieved by:

- creating employment opportunities;
- provision of State funds for equipment, training, and marketing of products (dti);
- assisting communities to apply for mining permits (DMR);
- making buildings available for projects (Pixley ka Seme District Municipality);
- facilitating registration of informal groups as co-operatives (SEDA); and
- evaluation of mineral samples and training the community on safety measures and marble beneficiation (Mintek).

Sample preparation: The samples were crushed with a jaw crusher to 20,5 mm. The crushed marble was split into 6,0 kg portions and tumbled in a roller mill with steel balls (30 mm, 40 mm, and 50 mm), and 100 mℓ of water for one day, to remove rough edges.

XRD: A pulverised portion of the marble sample was analysed by X-ray diffraction (XRD) to identify the minerals present and their relative proportions. This was aimed at an improved understanding of the physical properties that could affect the behaviour during beneficiation. The conditions for XRD analysis were Cu Ka radiation, a 28-scan range of 5-80°, a step size of 0,02°, and a counting time of three seconds per step. Only crystalline phases in amounts sufficient to diffract (usually 3-4 mass %) under the conditions employed are detectable (*Clark, 2013*).

Chemical analysis: The crushed marble sample was separately pulverised and submitted to the Analytical Services Division at Mintek for chemical analysis by inductively coupled plasma-optical emission spectroscopy (*ICP-OES*).

Sieve analysis: Sieve analysis is a method of determining the particle size distribution, which is usually experessed as the weight percentage retained upon each of a series of standard screens of decreasing mesh size. The particle distribution of the crushed sample is shown in *Figure 4*.

The sieved marble samples in each of the size fractions were used to manufacture a product; the sample retained on the 6,0 mm sieve was used in a necklace (*Figure 6*).

Polishing

An API Struers polishing machine was used to polish the samples. During polishing the operator must hold the sample carefully, because the wheel of the polishing machine rotates at high speeds. Only thick samples were polished for safety reasons.

- First, an 80-grit abrasive, which is coarse, was placed on the polishing wheel. The technician held the sample while the wheel was rotated for three minutes. Water was used as a lubricant and dust suppressed. The same procedure was then carried out on the opposite surface of the sample.
- Secondly, a 220-grit abrasive, which is medium, was used.
- Lastly, an 800-grit, which is fine, was used to achieve a smooth finish.

Product manufacture

The samples were incorporated in value-added products, using different techniques.

- To form beads from marble, a jewellery drill with a 1,2 mm bit was used to drill holes in each marble fragment.
- The necklace and earrings were handmade, with different sizes of marble fragments.
- The decorated T-shirt was made by sewing the marble to the T-shirt with a needle and thread.
- The ring was made by attaching the polished marble fragment onto the prefabricated metal ring with epoxy.
- A cement frame was formed by placing stones into a cement mould.

Results

Field visit: Mintek personnel visited the project site and interviewed members of Precious Stone and Jewellery Services cc. Questions were asked regarding safety aspects, knowledge of stone beneficiation, pricing, marketing, and the impact of mining marble on the environment. The findings were recorded and additional information was obtained telephonically at a later stage. The findings from the field visit were as follows:

- The Griekwastad community has been mining stones for generations. Knowledge has been passed down from generation to generation.
- The workers lack knowledge of the safety and health precautionary measures that need to be followed when mining and beneficiating semi-precious stones.
- People do not seem to be aware of environmental factors and the impact of their activities on the environment.

Marble

Marble is a metamorphic form of limestone, composed mostly of either calcite or dolomite. Marble may also contain varying amounts of minerals such as chlorite, serpentine, garnet and wollastonite, depending on the composition of the parent rock and the temperature of metamorphism (*Power, 1994*).

Marble is used principally for cladding buildings and monuments, interior decoration, statues and table tops (*Mesothelioma Center, n.d.*).

Serpentine ($Mg_6(OH)_8Si_4O_{10}$), which is a major constituent of the Griekwastad marble, is a microcrystalline mineral that occurs in various shades of green, yellow and red (*Oosterhuis, 1998*).

Table 1: Major element analysis of marble.

Major element analysis of marble	
Major elements	**(%)**
Al	<0,05
Si	5,68
P	0,14
S	0,12
Cl	0,02
K	<0,01
Ca	12,60
Cr	0,01
Mn	0,03
Fe	0,58

Table 2: Trace element analysis of marble.

Trace element analysis of marble	
Trace elements	**(ppm)**
Co	33,0
Ni	15,9
Cu	17,3
Zn	23,9
Ga	7,2
Ge	<0,6
As	3,4
Se	<0,3
Br	3,1
Rb	4,5
Sr	124,8
Y	1,7
Zr	7,9
Nb	0,5
Mo	<0,9
Ag	<0,4
Cd	0,3
In	<0,3
Sn	<0,6
Sb	1,7
Te	<0,8
I	<1,7
Cs	<3,2
Ba	74,2
La	<6,6
Ce	10,4
Hf	3,7
Hg	<1,0
Ti	<0,9
Pb	6,2
Bi	<0,7
Th	1,3
U	<2,5

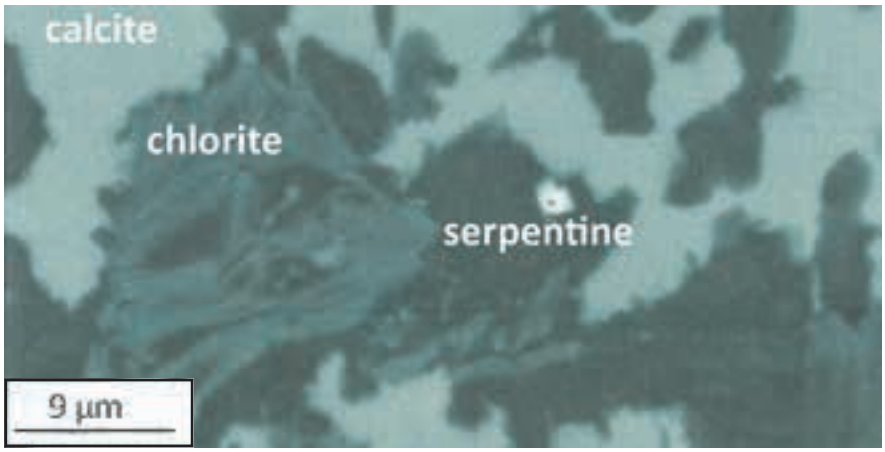

Figure 3: *Illustrates a backscattered electron image showing the distribution of calcite, serpentine and chlorite.*

- Old or traditional methods are still used to mine precious stones and there is little or no knowledge of beneficiation.
- People are not aware of the hazardous minerals that occur together with semi-precious stones.
- Due to the remoteness of Griekwastad, potential clients may be unable to access the products of the industry easily.
- The unemployment rate in the area affects local sales; people buy food rather than jewellery and therefore a market outside the area must be found.

Chemical analysis

ICP-OES analysis showed that the marble sample contained low concentrations of toxic metals. High percentages of some elements in powder form can pose a risk to human health; for example, lead in powder form can be absorbed through the respiratory system. The samples had low levels of cobalt oxide (33 ppm). The inhalation of cobalt particles can cause respiratory sensitisation, asthma, shortness of breath and decreased pulmonary function (*Lenntech, n.d.*).

The trace amount of some element in the marble indicates that they will be within the accepted limits in respirable dust. For example, an acceptable level of 600 ppm of lead in soil is suggested as 'safe' level (*Pubmed, n.d.*).

Table 1 and *Table 2* show the results of the major and trace element analyses.

XRD

The bulk mineralogical results show that the sample is marble, comprising calcite, serpentine, and chlorite. The green colour of the rock is a result of the presence clinochlore and lizardite (varieties of chlorite and serpentine respectively. *Table 3* indicates the minerals present in the marble sample.

Table 3: Bulk mineralogical composition.

Bulk mineralogical composition	
Mineral	**Relative abundance**
Calcite	Dominant
Chlorite	Trace
Serpentine	Major
Dominant: >50; major: 20-50 mass %; minor: 5-20 mass %; trace: <5 mass %; blank: not detected. (Note: XRD results are qualitative and should not be used for quantification purposes).	

Particle size distribution

The ideal size of fragments for making into products such as necklaces and rings, ranges from 6,0 mm to 20 mm. The results of the sieve analysis (*Figure 4*) show that no material was retained between the 0,075 mm and 5,0 mm sieves. More than 75% of the material was in the size range above 6,7 mm.

This is a positive result, since it shows that crushing to 20,5 mm does not generate a significant amount of waste material.

Potential beneficiation opportunities

The raw marble sample collected at Griekwastad had sharp edges, a rough surface, and a pale and dull appearance (*Figure 5*). The sample was converted into valuable products after processing at Mintek:

- Different shapes of beads were pro-

Figure 5: *Raw marble sample before processing.*

Figure 6: *Marble products made at Mintek.*

duced by crushing the samples.

- The texture of the marble sample was smoothed by tumbling.
- The colour of the samples was enhanced by polishing.

Marble beads were used to produce a necklace, earrings, a decorative shirt and a ring; thus adding value to the mineral. These products are of good quality and aesthetically appealing as illustrated in *Figure 6*. The marble and prefabricated metal bonded well with epoxy to form a ring.

Weight plays an important role in the marketability of jewellery products. It has been observed that end users prefer lightweight jewellery. A weight comparison between marble and glass bead jewellery was conducted.

Table 4: Weight comparison between marble and glass jewellery.

Weight comparison between marble and glass		
Product	**Marble (g)**	**Glass beads (g)**
Ring	15,8	11,3
Necklace	65,3	66,3
Earrings	5,5	9,5
T-shirt	92,9	98,9

Conclusion

Mintek's role in this collaborative product was to perform a technical evaluation of the mineral products in order to determine their properties and the potential beneficiation opportunities. The interview conducted with members of Griekwastad Precious Stone and Jewellery Services cc resulted in a better understanding of the knowledge of the community regarding beneficiation. The information gathered in this study was very valuable, because now we know about the mineralogical composition of the marble.

The workability of the marble was good, and all the products were produced with little effort. The aim of the research was achieved, and Mintek will now be able to train the Griekwastad community in marble beneficiation, the minerals present in marble, safe use of equipment, and health and safety.

Recommendations

This study should be developed further.

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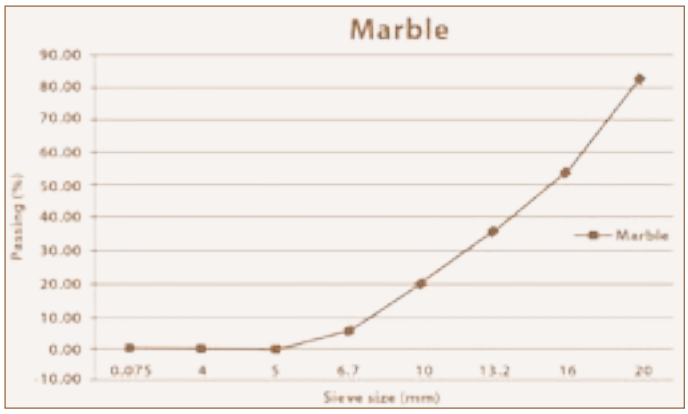

Figure 4: *Cumulative particle size distribution of marble samples.*

SSMB designer can explore additional designs and uses of marble. It is recommended that members of the Griekwastad Precious Stone and Jewellery Services cc should be assisted in the following ways:

- Funding to purchase jaw crushers and polishing wheels.
- Provision and training in the use of personal protective equipment.
- Health and safety education.
- Pricing of products.
- Safe use of equipment.
- Training on the forming and fabrication of different products.

The fact that Griekwastad in particular and the Northern Cape in general is far from major centres of economic activity, makes it difficult for these communities to easily access markets. This means that more effective ways of marketing needs to be considered. For example, exporting of products to other provinces within South Africa and other countries. It is therefore recommended that the Department of Trade and Industry should conduct a study on the status of marble beneficiation projects.

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Trio acquisition adds value to sand and aggregate sector

The recent acquisition of Trio Engineered Products by The Weir Group provides important opportunities and advantages for both southern African distributor Pilot Crushtec International and the group in terms of additional product and market opportunities. In this exclusive article, ***Modern Quarrying*** *looks at the reasons for this acquisition.*

Gavin Dyer, regional managing director, Middle East and Africa for Weir Minerals.

"In terms of the acquisition itself, we will remain with the original distributor, Pilot Crushtec International," confirms Gavin Dyer, regional managing director for Weir Minerals Middle East and Africa, adding that Weir Minerals Africa (WMA) is represented mainly in the minerals space, whereas Pilot Crushtec International has considerable experience in the sand and aggregate sector. "Instead of creating such a route from market to scratch, we decided to capitalise on the mutually beneficial relationship that is already in place."

Sandro Scherf, managing director of Pilot Crushtec International concurs. "We are thrilled that the brand will now have the backing of a major international company like The Weir Group. It will only improve and build upon our own relationship with Trio as the original equipment manufacturer (OEM)," he says.

Both MDs have toured each other's facilities. "We have been suitably impressed by what we have seen," Dyer says, "and are looking forward to other synergies between the two businesses. "Since the announcement, our companies have already identified certain market opportunities where we would be able to leverage a combined suite of products."

Pilot Crushtec International will still source products from Trio Engineered Products of the US. According to Mike Burke, former owner of Trio Engineered Products, Trio has a longstanding relationship with Pilot Crushtec, which has successfully taken the Trio products to market in Southern Africa. "I have no doubt that this acquisition will position Weir Minerals to offer comprehensive solutions to comminution clients, whether aggregate or ultimately mining."

WMA will continue supporting that arrangement and add value to it wherever possible. "We have a best-in-class geographic footprint, so if the synergies are as we envision, Pilot Crushtec International will have an instant springboard," Dyer says.

While the strategic approach to the acquisition agreement is 'business as usual' for both companies, Dyer explains that he and Scherf will plan a collective approach to market in order to maximise opportunities. "For example, we already have a footprint in the Middle East in terms of the oil and gas sector, so our ability to be able to service that growing market and again add value to what Pilot Crushtec International is doing in that space, will be significant."

Sales, marketing and engineering director of Weir Minerals Africa Rob Fawcett is pictured with Pilot Crushtec representatives at WMA's Alrode facility.

Commenting on the acquisition of Trio Engineered Products at a time in which global mining and construction industries are facing an array of difficulties, Dyer says: "One of the advantages of being part of a financially stable group like Weir is that, during any downturn, it is ideally positioned to capitalise on any upswing. Smaller companies just do not have the same degree of flexibility or depth of resources to be able to do that."

Such exposure to a broader market also lessens the impact of any downturn. "I am sure we are going to go through business cycles where construction is depressed and mining is in a boom," he says. "When that happens, we will be able to take Pilot Crushtec International into that space with us. At the moment the situation is reversed, with mining in a downturn and construction, while not nearly as depressed, also lagging."

Scherf says that while the overall market remains challenging, "we

continue to work hard at all the usual aspects of the business. We are excited at this acquisition and confident that it will improve the opportunities for all involved. We are confident we can work well together in growing the market even further for Trio's product range." This is because The Weir Group's acquisition strategy is well thought out and planned. "Strategically, we are very well aware of what we are doing and how our various products and processes complement each other," Dyer says. "We then look carefully at how to use that expertise to not only add value to the acquisition, but how it can boost our own market presence which, in this instance, is the sand and aggregate sector."

He says it represents a natural progression of WMA to enter the comminution sector, as it is already manufacturing High Pressure Grinding Rolls, for example. "Our strength as an OEM is based on technology, products and manufacturing processes, which we will now be able to introduce to other market sectors where Pilot Crushtec International has a particular advantage."

Scherf points out that, like WMA itself, Pilot Crushtec International already distributes a range of products from global OEMs. "We will continue to service all our customers as quickly and as efficiently as possible. It is important that we maintain and build on that value proposition. I am pleased that both companies share the same view that it is not just about the Trio product range. It is also about what else we can bring to the market and about leveraging off Weir Minerals' engineering strengths and our intimate knowledge of the sand and aggregate sector."

Rob Fawcett and Pilot Crushtec International's CEO Sandro Scherf, at the WMA facility in Alrode.

An important differentiator in this regard is customer service and aftermarket support, which depends on flexibility and a quick turnaround time. "Our major focus at the moment is to strengthen these aspects of our business. With many repeat clients, it is not just about selling products to them, but the fact that they can pick up the phone anytime there is a problem in the knowledge that there will be someone on the other end of the line to assist them," he adds.

Dyer says a large proportion of WMA's business is derived from the aftermarket sector. "We continue to hold a sizeable market share even in a mature market, as repeat business is critical for growth and allowing one to access new opportunities."

In terms of the agreement to acquire Trio Engineered Products, WMA's integration process should be relatively easy simply due to having Pilot Crushtec International on board. "I think the synergies we will be able to derive from this relationship will be significant," Dyer adds.

Scherf has some thoughts around additional opportunities linked to Trio, which his company hopes to exploit in the near future, and to increase sales with the assistance of WMA.

www.weirminerals.com

A modular plant purchased from Pilot Crushtec International by local civils contractor Zana Manzi.

Industry benchmarks the norm for this specialist

Pilot Crushtec International, a leading supplier of mobile and semi-mobile crushing, screening, washing and materials handling equipment, has for more than two decades set industry benchmarks for product, technical and service excellence. The company continues to build and consolidate its business through the development of relationships with customers in Asia, Australasia, Europe, India, the Middle East and Southern Africa. In this feature, ***MQ*** *looks at where this company is taking output and efficiency to higher levels in terms of its quality brand.*

Pilot Crushtec International's CEO Sandro Scherf.

Danoher Contracting's bold decision to purchase the first Sandvik UH450E ever to operate outside Scandinavia, has been rewarded. The revolutionary mobile cone crusher and screening unit recently completed its first major contract well ahead of schedule, demonstrating its ability to deliver an exceptionally high output combined with outstanding fuel efficiency.

According to Nicolan Govender, national sales manager for local Sandvik distributor Pilot Crushtec International, the UH450E passed its first test at a quarry in Verulam, KwaZulu-Natal, with flying colours. "It was working in a mobile Sandvik train preceded by a UJ440 jaw crusher and US440 cone crusher, with the trio producing G2 sub-base material from blasted dolerite, which is no easy task."

The trio processed a <500 mm feed and the new UH450E consistently produced a perfectly-shaped 0-37,5 mm product at a rate of 300 t/hour. Not only was this sufficient to reduce time spent on site by a significant margin, but the fuel economy shown by the Sandvik units was equally impressive. The three machines' total diesel consumption over the duration of the contract averaged no more than 100 ℓ/hour.

Danoher Contracting bought the machine to increase the volume of output necessary to gain a competitive advantage in the contractor market. A visit to the Sandvik stand at Germany's Steinexpo 2014 early last year left Danoher's director of operations Royden Webster in no doubt that the UH450E was the solution needed; and he wasted no time in placing an order for the 71 t machine.

Despite its impressive size, the Sandvik UH450E is relatively easy to transport and the machine is now working at Danoher's Standerton site producing technically-challenging G1 sub-base material for a major road renovation project.

Initial experiences with the UH450E have created a favourable impression on Webster and his team.

"Apart from its very high output, we have discovered that it is a user-friendly and versatile machine, so we can definitely say that it has met our original expectations. Fuel economy is also vitally important in a cost-sensitive business like contracting and for the duration of the Verulam contract, it was using no more than 35 ℓ/hour. It is true to say that there are some products on the market with similar rates of fuel consumption; however, they do not produce anything like the tonnages we are gaining from the Sandvik UH450E," he says.

This fuel efficiency is derived from the fact that the UH450E is powered by a diesel generator set as opposed to a conventional diesel engine. The Volvo TAD 1641 500 kVA powers electric motors on the crushing and screening units enabling high-volume outputs at a relatively minimal operating cost.

Service is also a crucial factor in the contractor market and Webster rates the service and support rendered by Pilot Crushtec International to Danoher's growing Sandvik fleet as "the best in the country at this moment."

At a glance, the Sandvik UK450E specifications include:

- Sandvik CH440 hydrocone;
- LF850 double-deck linear motion screen;
- SS1221 double-deck pre-screen;
- high-performance recirculating conveyor
- power plant Volvo TAD1641 GE 500 kVA; and
- transport dimensions 19,50 m (L); 3,5 (W); 4,45 (H).

Pilot Premio

The company has announced another industry first, with the launch of its Pilot Premio Loyalty Programme.

Pilot Crushtec International CEO Sandro Scherf explains further: "Pilot Premio is the new, innovative rewards

Above: *The addition of an overband magnet to a modular plant or conveyor system is a customer's insurance policy against the risks of mechanical damage and downtime.*

Left: *The revolutionary Sandvik UH450E mobile cone crusher and screening unit recently completed its first major contract well ahead of schedule.*

programme that rewards customers for their loyalty. Premio Points will be earned by all qualifying customers on every purchase they make from our company. It's just another way for us to show our appreciation to our customers for partnering with us."

The Pilot Premio Loyalty Programme offers clients up to 2,5% back through the accumulation and redemption of Premio points for equipment, spare parts, labour and services purchased.

"We are very excited about this initiative," confirms marketing manager Yolanda du Plessis.

"The Pilot Premio Loyalty Programme is an industry first, which gives Pilot Crushtec International the competitive advantage and innovative edge we constantly strive towards."

Premios can be used to pay for spare parts purchases and/or payment of service purchases. Joining this programme gives Pilot Crushtec International customers access to exclusive benefits and special offers. The programme is presently limited to South Africa-based customers, but it is expected to be launched to all customers this year.

Magnets – an essential component

Pilot Crushtec International has passed another milestone by selling the 50th magnet to be used in its Pilot Modular plant and conveyor systems. What is more significant however, is the dramatic increase in sales over the last few months as more and more operators realise that magnets make sound economic sense.

"A magnet used to be regarded as an optional extra, something that a customer would add to the plant at their discretion. Now they are becoming accepted as an essential component of our modular crushing and screening plants," says Africa sales manager Wayne Warren. He explains that there are two compelling reasons for this growing trend.

"The first is security. Significant damage can be caused to cone and impact crushers engaged in processes like aggregate production by particles of ferrous metal in the feed material. Known as 'tramp metal', this covers a wide range of potentially harmful objects, including nuts and bolts, broken grinding blades, angle iron, small hand tools and pieces of broken machinery."

Specific applications where he believes the integration of a magnet into a plant is absolutely essential include most forms of recycling. Post demolition crushing of concrete and masonry is particularly problematical as a substantial amount of building material is steel reinforced. The reclamation of disused mining properties and day-to-day green and rubber waste also contains the risk of damage from metallic objects.

Warren regards the addition of an overband magnet to a modular plant or conveyor system as being the customer's insurance policy against the risks of mechanical damage and downtime. "The price of a magnet is relatively insignificant in comparison to a multi-million rand plant and is minimal when one considers the costs of a breakdown. These can include repairs, freight charges, valuable items of plant standing idle and commercial pressures related to contractual obligations. In short, it provides a simple low-cost solution to what could be a very expensive problem."

The second motivation, which has helped boost the sales of magnets over the past 12 months, is the fact that they have added an important new dimension to a customer's business. "Magnets are increasing customers' operational profits as the ferrous metals which are being recovered by the magnets are saleable products and provide an attractive source of extra income, especially in the case of a major demolition project. The customer effectively owns a two-stage operation – crushing and recycling."

The magnets are Trio Engineered Products. The powerful self-cleaning products are suspended over the feed conveyor mounted on heavy-duty skid frames and traversed by a heavy-duty stainless steel armoured belt. The magnets themselves do not require a power source and the self-cleaning belts are electrically driven at a rate of up to 300'/minute.

They are covered by a global one-year warranty and both finished products and essential spares are available from stock in keeping with Pilot Crushtec International's commitment to ensuring its customers enjoy 'legendary after-sales support'. ***www.pilotcrushtec.com***

AfriSam cements KZN presence

AfriSam operates a fleet of 50 readymix trucks and two sophisticated boom pump vehicles in KZN.

Above: *The company operates seven readymix plants and six quarries in Durban, the Natal Midlands and Northern KZN.*
Left: *AfriSam uses its C-Tech cement to produce its concrete mixes, which assists in reducing the carbon footprint of its concrete products.*

AfriSam is cementing its presence in the key province of KwaZulu-Natal (KZN) with the commissioning of readymix plants at Pietermaritzburg and Umlaas Road.

The plants were commissioned in late 2013 in response to increased demand in the Durban/Pietermaritzburg corridor development, as well as to give AfriSam a readymix presence in areas where we already had quarries established," Pieter Uys, sales manager at AfriSam in Durban, says.

"As we use AfriSam cement in readymix production in KZN, it also gave us an opportunity to pull through additional volumes of cement," Uys adds. The construction materials group currently operates seven readymix plants and six quarries in Durban, the Natal Midlands and Northern KZN. It also operates a fleet of 50 readymix trucks and two sophisticated boom pump vehicles. "KZN is a strategically important market for a construction materials company, hence the plan to expand the footprint of AfriSam in the province."

AfriSam focuses on a range of market segments in KZN, from building (residential and non-residential), to civil, retail, national and local government, municipalities, asphalters, readymix, concrete product manufacturers and cash customers. "Although we had a presence in terms of cement at retailers for many years, we started marketing cement to other market segments through our KZN sales team from 2012," Uys explains.

AfriSam has supplied flagship projects in KZN such as the Galleria Shopping Centre, widening of the harbour mouth at the Port of Durban and the Spring Grove Dam (picture).

In KZN, AfriSam has already supplied product to flagship projects such as the Galleria Shopping Centre in Amanzimtoti, the widening of the harbour mouth at the Port of Durban and the Spring Grove dam on the Mooi River at Rosetta. Major growth opportunities at present include the dug-out port that Transnet proposes to construct on the site of the old Durban International Airport (DIA) at Isipingo.

Another major opportunity for AfriSam to bolster its presence in the province is the 20-year, multi-billion rand Cornubia mixed-use development in Umhlanga, the eThekwini Municipality's first Cabinet Lekgotla priority project. "Additional provincial flagship projects at present include development plans at Richards Bay Harbour, the Durban to Pietermaritzburg Corridor Development and mass housing throughout the province," Uys says.

Looking at particular initiatives launched by AfriSam in KZN, Uys says it offers various services to its customers, "including mix optimisation using our high performing cement as well as providing on-site training on aggregate and concrete sampling and concrete cube making procedures. All our operations comply with environmental regulations and are audited by external parties on a periodic basis. We also use AfriSam's C-Tech cement to produce our concrete mixes, which assists in reducing the carbon footprint of our concrete products."

The KZN Provincial Development Plan aims to make the province the 'gateway to Africa and the world' by 2030. It is a major contributor to the South African economy, behind Gauteng but ahead of the Western Cape. Of the nine provinces, KZN has created the most jobs, with 128 000 employment opportunities generated from October 2012 to December 2013. The 2014/15 Medium Term Revenue and Expenditure Framework for KZN has earmarked R32-billion for infrastructure projects in the province. This represents a significant injection of funds into the economy and will act as a major stimulus to growth and development.

"Major provincial projects such as these not only require large quantities of concrete, but will also prompt the development of ancillary infrastructure to support these projects, which in turn will generate additional demand. Our strategy in KZN is not only to grow in order to meet this increased demand, but also to ensure we are able to offer our customers a total solution for their specific requirements," Uys concludes.

www.afrisam.com

Cat's new-generation track-type tractor

For decades Cat D10 track-type tractors, in successive model configurations, have delivered on mine sites worldwide in roles that include truck dump maintenance, ripping, stockpile management, stripping overburden, dragline support, trapping, or road building.

Keeping pace with industry requirements, the latest generation Cat D10T2 launched globally in the first quarter of 2014 debuts as the safest and most fuel-efficient model to date. Refined large structures in key areas, such as the track roller frame, increase the machine's already legendary durability, plus there are new features such as the Advanced Productivity Electronic Control System (APECS), and Enhanced AutoShift (EAS) that enhance output.

"APECS is a key enabler to obtaining the full benefits of EAS, which improves fuel efficiency and productivity by automatically selecting the optimal gear and engine speed combination based on power train load and desired ground speed. This feature is similar in function to an automatic transmission," explains Barloworld Equipment's Product Application Group manager Johann Venter. Barloworld Equipment is the Cat dealer for southern Africa.

The D10T2 is powered by a Tier II Cat C27 ACERT™ engine that performs at a full rated net power (ISO 9249) of 447 kW at 1 800 rpm in forward drive with a high torque rise of 21% (in forward gears), enabling the machine to doze through tough material. The previous D10T model has a net flywheel output of 433 kW for all modes of travel. On the move, the A4E4 engine controller automatically switches power settings based on direction of travel. In reverse mode, this translates to a rated net output (ISO 9249) of 538 kW, an approximately 20% power increase when compared to the previous model.

New safety features include an in-cab emergency stop device, a seat belt warning alert, and an 'operator not present' monitoring system, which locks out the power train and hydraulics under certain conditions to prevent unintentional movement when the operator is not in the seat.

During the dozing cycle, an auto downshift feature adds value by enhancing safety and productivity when not in EAS mode and when significant load increases are detected. "However, this feature won't automatically up-shift when load is reduced," Venter expands. The operator can override these automatic shift features at any time.

Engineered for maximum production and service life: the Cat D10T2's mainframes are built to absorb high impact shock loads and twisting forces encountered during severe dozing and ripping applications.

To further enhance durability where operating loads are highest, the Cat D10T2's newly-redesigned roller frames consist of three main castings to resist bending and twisting. The new roller frame improvements also include larger rear major bogie pivot pins, redesigned carrier roller mounting pads, and improved major bogie mounting locations to consistently deliver in varied and demanding mining conditions.

The undercarriage system also features a redesigned track master link with single tooth and coarse thread bolts, which provide superior reliability and durability.

www.barloworld-equipment.com

One-source focus pays off

Original equipment manufacturer FLSmidth is poised to supply a complete Coal Handling Preparation Plant (CHPP) for a junior mining company. "We have been given limited detailed engineering release, pending completion of project funding for execution, which is anticipated for early this year," Terence Osborn, capital sales & marketing manager, Mineral Processing South Africa, says. "For FLSmidth to have this project is a significant testament to our 'One Source' capabilities in the coal sector."

Osborn ascribes FLSmidth's success in securing this project to its unique 'One Source' approach. This is based on the idea that "once a client has bought our technology, they are committed to a long-term relationship with us. We know that they will have a need for ongoing support from a spares, technology and even an operational maintenance point of view," Osborn says.

For example, the company currently has a major operations and maintenance (O&M) contract for five cement plants in Nigeria. It has also just completed a full two-year maintenance contract for a concentrator in Zambia. "We have commenced with an O&M contract for a crushing circuit, including a high pressure grinding roller, for a major South African platinum producer."

In terms of the services that FLSmidth is able to offer in this regard, these range from ad hoc inspections to routine inspections, guidance with planned maintenance, spares supply and support services to client maintenance works, all the way to full O&M contracts, including spares supply.

FLSmidth has been operating successfully for over a century in Africa, where many mine sites are remote and hampered by a lack of infrastructure and services. "We not only have project references in a large number of countries, but have strong representation in all the major mining markets in Africa, across all the commodities," Osborn says.

Woven wire polyurethane surround panels from FLSmidth, which has been operating successfully in Africa for over a century.

"Our spectrum is so broad that we have products for almost any type of flow sheet. Due to the remoteness of most of our African customers, it is important that we assist them not only with stockholding management and spares supply, but also to give guidance in terms of the reliability of the equipment," he concludes.

www.flsmidth.com

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Remanufacturer capacity is key

When customers look for engine remanufacturing services, they should audit the status and suitability of the remanufacturer's equipment to determine if it is capable of machining new generation engines. This is because new generation engine components require far tighter machining tolerances and advanced machining methods during the remanufacturing process, Andrew Yorke, operations director at Metric Automotive Engineering, says.

The benefit of quality engine parts and skilled engineering is seldom seen in the first thousand hours of a vehicle's operation. This only becomes evident later, when the engine starts to log extended machine hours. Coupled to this is the fact that modern engine designs are more complex than ever before, in the quest to achieve improved fuel efficiency and higher emission standards.

"The engines currently being installed into new vehicles are highly sophisticated, not in their major elements, but in the minor components that are so critical to performance and emission efficiencies," Yorke notes. "Although the primary elements have stayed the same, when it comes to engine rebuilding, machining tolerances and clearance tolerances have become a lot tighter.

"This necessitates far higher skill levels among remanufacturing engineers, even compared to the recent past, as well as more accurate equipment because there is a great deal less room for error." Yorke points out that some fleet owners, plant managers and foremen are unaware that the major engine OEMs share basic engine designs and simply adjust these to suit their own requirements.

"It cannot be assumed that because the engines look the same, the same parts can be used. Certain engine models are being shared by up to five different OEMs. The engine block is the same, but there are small size variations in the componentry, with subtle variations even within a single OEM's range of engines," he says.

Engineering and artisan machining skill levels are also critical. When remanufacturers outsource certain elements of the process because they lack the necessary equipment or skills in-house, it can affect quality and turnaround time, as well as adding to the overall cost and even impact the warranty terms.

"Remanufacturers must have access to the correct engine parts," Yorke adds. This means that such companies must have critical information such as the engine serial number, model number and VIN code on hand. Although differences in parts may not be obvious, fitting the incorrect parts will affect performance significantly.

"An engine is not just an engine anymore. Remanufacturers can no longer supply a part simply because of its similarity to the original part. There are critical differences, and if you do not work within these parameters, the engine will never run as it is intended to. There are no more quick fixes in such a scenario because once the vehicle is back on the road, it will be extremely difficult to identify why it is not running optimally," Yorke says.

Small-end bush machining at Metric Automotive Engineering's facility.

Metric Automotive Engineering provides world class IPD engine cover parts for its Caterpillar® customers in particular. "Our highly skilled in-house engineers understand the latest generation engines and have the knowledge to install correct parts that are of an appropriate standard. We are familiar with the subtle differences between engine variants, ensuring that the customer receives the correct parts first time round," he concludes.

www.metricauto.co.za

SDLG receives global recognition

Babcock received an award for sales excellence at the recent SDLG construction equipment conference in Shanghai, China, held directly after Bauma China which is China's largest construction equipment trade fair.

SDLG is a value-added range of mechanically driven wheel loaders, graders and vibratory rollers, ideal for applications in the re-handling, construction, quarrying, agricultural and aggregate industries. These machines offer extended trouble-free operation and are extremely maintenance friendly, fitted with basic electronics and standard components.

Babcock's general manager SDLG, Grant Sheppard, who attended both events accompanied by his two top-performing salespeople, says he was thrilled to receive the award, particularly since Babcock has only been the exclusive distributor of SDLG construction machinery in Southern Africa since early 2012. "The award recognises the outstanding sales year we enjoyed in 2014," says Sheppard. "We were one of only two dealers to be recognised with this award and this is a milestone achievement for us.

"SDLG really came into its own in Southern Africa in 2013, but 2014 truly entrenched us as a brand to be reckoned with in the market. Over the course of last year, we more than tripled our sales staff and we have now representation in all the major centres of South Africa and its neighbouring countries. This investment into our personnel and footprint is earning significant dividends and, building on this dynamic foundation, we have very high hopes for 2015.

"Our achievement lies the fact that within a market sector that did not grow last year, we actually doubled the sales penetration of the SDLG brand. The reasons for this beyond-expectation success include the level and quality of the support we offer our customers, our philosophy of partnering to enhance customer operations and the extensive sales and support footprint available to our customers across Southern Africa. SDLG is represented in all Babcock service centres in the region, which translates to more than 20 outlets. This shrewd strategy has successfully exploited the best possible advantage out of Babcock's existing footprint and afforded us a major competitive advantage."

Sheppard says during 2015 Babcock will extend its SDLG product range within the wheel loader and other market segments.

www.babcock.co.za

Modular hoppers in demand

Pilot Crushtec International's Pilot Modular GFH560 is being used by EXR Construction in a Lesotho roads project.

A recent delivery of a Pilot Modular GFH560 grizzly feed hopper for use by EXR Construction in a Lesotho roads project, heralds the fact that close to 200 of these rugged units are in active service across the African continent.

Pilot Crushtec International's national sales manager Nicolan Govender explains that the hopper's compatibility and ease of integration with both his own company's crushing and screening products as well as those of other manufacturers means that the GFH560 is fast becoming the feed hopper of choice. "Current economic conditions dictate that mining and quarrying operations need to maximise the efficiency of workflows and in the crushing and screening industry, an efficient feed hopper is a prerequisite to achieving this goal."

Govender explains that the installation of a feed hopper between primary and secondary crushers or immediately prior to screening automatically creates efficiencies by balancing the plant's operation. This balance facilitates a steady flow of feed which permits plant components – crushers, conveyors and screens, to operate at their design efficiencies.

"The balancing effect derived by these efficiencies also means that a product like the Pilot Modular GFH560 saves wear on working surfaces, bringing about a saving in maintenance costs not to mention that of power, which is especially significant in an operation working 24/7." He adds that Pilot Crushtec International's ability to offer a rapid response to customer needs, as was the case with EXR Construction, has had a major influence on sales.

"EXR Construction is engaged in a R680-million project for the building of a road between Roma and Semonkong, and needed to replace an existing feed hopper. The urgency arose from the fact that some 40 km of the road was to be constructed at an altitude in excess of 2 200 m and work had to be completed before the onset of winter snowfall."

Following recommendations from onsite contractors with previous experience of Pilot Crushtec International products and a visit to its Jet Park headquarters, an order was placed and the GFH560 was immediately shipped from stock direct to its destination in Lesotho.

From EXR Construction's perspective, contracts manager Lawrence James reports that both the grizzly feed hopper's performance and Pilot Crushtec International's after-sales service have lived up to expectations. "We are very happy with the product and the attention received from our supplier. The unit has already been earmarked for use in another assignment once its involvement in the Roma to Semonkong project has been completed."

Significantly, EXR Construction has now ordered its second Pilot Crushtec International product, a Pilot Modular Impact Crusher.

The Pilot Modular GFH560 grizzly feed hopper is a heavy-duty machine ideal for quarrying and recycling operations and is particularly adept at removing fines or oversize rock and ore from feed material before further processing. It is also well suited for standalone operations, examples being the scalping and screening of coal, aggregate, sand, construction and demolition waste, mine ore blasted rock and river gravel.

The GFH560 grizzly feed hopper comes standard with a heavy duty 50 mm diameter grizzly bar with an 100 mm aperture and is compatible with the company's entire range of crushing, screening and washing equipment. Mounted on a heavy-duty skid frame, the hopper is easy to transport and install while strategically positioned inspection doors and grease points ensure in-built reliability and ease of maintenance.

www.pilotcrushtec.com

Customised screens

Screens from specialist vibrating equipment manufacturer and supplier Joest, are customised to match the metallurgical requirements of a client's process and the associated mechanical duty. Joest brands this benchmark its 'Engineered Solutions' approach to supplying its clients with a total solution.

"Our customised screens are often the preferred equipment due to the robust design and proven performance," says Derrick Alston, Joest CEO. "Understanding the difference in design and duty for process plant screens, particularly sizing feed preparation in washing and Dense Media Separation (DMS) applications, is a key feature of our ongoing success in other sectors of the mineral processing industry.

An example of Joest's 'Engineered Solutions' approach is its design and development of a 4,3 m wide banana screen to cater for the ongoing trend in the coal processing sector to opt for larger equipment so as to increase throughput and boost efficiencies. "We have paid close attention to our clients' needs by assessing the failure modes of existing 4,3 m wide screens from other suppliers in this market, and designed our screen with the focus on reduced downtime and ease of maintenance when required," Alston says.

"There are 50 to 60 screens of this size in the coal processing sector at present, many of which are approaching their point in their lifecycle where they will need to be replaced. Our 4,3 m wide screen, which incorporates the latest technology and refinements, is ideally positioned to fill this gap in the market."

Joest's 4,3 m wide screen incorporates the latest technology and refinements.

www.joest.co.za

Telsmith jaw crushers prove their worth

An R8-million export order for two Osborn Telsmith 36 x 48 single toggle jaw crushers and an apron feeder, to be employed at Petra Diamonds' Williamson mine in Tanzania, has been awarded to Osborn.

This is the latest in a series of orders that the Johannesburg-based manufacturer has received from Petra Diamonds. Osborn's Chris Slade elaborates: "Osborn already has jaw crushers and apron feeders in this application at Petra operations in South Africa, and these have proved themselves over the years. Osborn has also previously supplied an apron feeder to Williamson mine in Tanzania's Shinyanga Province. This latest order reflects our client's confidence in our products' quality and performance."

The scope of Osborn's contract included manufacturing and supplying Williamson's new jaw crushers, as well as supervising their installation and commissioning.

The single toggle crushers are designed for a high capacity throughput due to the elliptical movement of the swing jaw, which also assists in the discharge of the crushed material. "As the single toggle crusher will achieve far higher capacities than the double toggle design, they are often used as a primary crusher," Slade explains.

The Osborn Telsmith single toggle jaw crushers offer a production capacity up to 1 000 t/hour and boast rock compressive strength up to 500 MPa. They feature a patented hydraulic beam locking system and excellent nip angle, with reversible jaw dies for maximum wear.

The apron feeder for Petra Diamonds' Williamson mine in Tanzania.

www.osborn.co.za

Nordberg GP7 – efficiency at its best

Metso continues to expand its range of high-capacity crushers by launching the Nordberg GP7, its largest Nordberg GP secondary crusher to date.

The new 58 t crusher features the most ideal combination of feed opening, cavity design and capacity, which Metso claims, is the best in the market.

This ensures high crushing performance with even the hardest feed and helps maintain operational costs. In addition, safety features have been enhanced.

The steep cavity and easily changeable stroke ensures high performance when using a power rating as high as 55 kW.

www.metso.com

In Health and Safety

MQ has been in contact with retired mining inspector Ted Dow, who is a veritable walking encyclopaedia when it comes to health and safety on mines. The fatality below, which occurred during his time, clearly highlights the importance of machine guards and skills transfer.

The importance of guarding, or lack of as shown in this photograph (courtesy Mr Machine Guarding, Marius van Deventer).

An artisan aide was fatally injured when he was drawn into the tail pulley of a duff coal feeder conveyor belt installation at a brickworks. The accident occurred in a tightly-confined area which was neither adequately illuminated nor ventilated.

The investigation revealed that the deceased had been attempting to 'track' the belt and the tail pulley guard had been removed to access the alignment mechanisms. The subsequent enquiry brought to light the fact that the artisan aide had not been authorised by the engineer to work on conveyor belts. He had not been trained in the dangers of working in confined spaces or the danger of wearing loose clothing, and he was not being supervised at the time.

In addition, the risks associated with the task at this site had not been properly assessed and no special working standards had been prepared.

The law says: 'All persons who are to operate, work on or clean conveyor belts shall be specially trained in the correct procedures and be authorised by the Engineer in terms of Regulation 8.9(1)(i) to do so.

'All confined spaces shall be identified and remedial steps shall be taken to reduce the risks to persons have to work there.

'In addition, all tracking mechanisms shall be so designed that it is not necessary for guards to be removed during belt tracking operations'. **MQ**

History of quarrying

On MQ's travels around the country, I often meet and chat to retired quarrymen, who mostly agree that records of the history of the first quarries in SA are few and far between. PPC De Hoek is an exception, and its precious old records, are stored in what the operation may, in the future, turn into its own museum.

Beautiful leather-bound ledgers that MQ is itching to go through.

Beware the simpletons that parked in Mr Shepard's or Cronje's parking bay.

De Hoek's history goes back to 1919 when Hermon Piquetberg Lime Company first discovered limestone in the area. Its records date back to 1923, when Cape Portland Cement took over. PPC De Hoek's general manager Johan Vorster took *MQ* into the storage area, and we delved into some of the dusty ledgers and paraphernalia.

Photographs by Dale Kelly

A pyrometer, still in its beautiful hand-made wooden box, which is stored in a leather case.

These letters which were typed in duplicate, with the carbon copy being on flimsy tissue-like paper, are all filed away in leather-bound books. This letter is an official request that a board meeting in 1922 is moved to another date, as one of the board members was otherwise occupied.

A Cape Portland Cement Diary for the year 1934.

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