

MODERN MINING

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- Ergo's FFG circuit fully operational
- Stellar Diamonds heads for mid-tier status
- Rail-Veyor® installation up and running
- Feature: Surface mining contracting





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COVER

A Cat 777D off-highway truck belonging to Liviero working at Keaton Energy's Vanggatfontein coal mine in the Delmas area. Liviero's Caterpillar fleet has been supplied and is supported by Barloworld Equipment. See page 16 for further details.



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[Lighten up. Think ash.]



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South Africa slips in latest mining destination ratings

The annual global survey by Canada's Fraser Institute of mining jurisdictions worldwide always makes for interesting reading and the latest edition – *Survey of Mining Companies: 2014* – is no exception. Particularly noteworthy from the perspective of *Modern Mining's* readers is the fact that Namibia has now overtaken Botswana as Africa's most attractive mining investment destination (although the two countries are running virtually neck and neck) while South Africa – no surprise – has been downgraded quite significantly, falling from a ranking of 53rd in last year's list to 64th (out of 122) in this year's.

The Fraser Institute report, which first appeared in 1997, is based on a survey of mining executives around the world, with the 2014 survey – conducted between August and November last year – being based on the responses of nearly 500 managers and executives in companies involved in mining exploration, development and other related activities. The result is a series of indices or 'scorecards' – the key one being the 'Investment Attractiveness Index' – which rate countries and jurisdictions, as the Fraser Institute puts it, on their "geologic attractiveness and the extent to which government policies encourage exploration and investment."

The top 10 jurisdictions in the latest survey are identified as Finland, which has increased its rank from fourth to first place, followed (in order) by Saskatchewan (Canada), Nevada (US), Manitoba (Canada), Western Australia, Quebec (Canada), Wyoming (US), Newfoundland and Labrador (Canada), Yukon (Canada) and Alaska (US). As readers will note, there's not a single African country in the top 10. However, at the other end of the spectrum several African countries – Kenya, Egypt, Nigeria and Sudan – feature in the bottom 10, a list headed by Malaysia, followed by Hungary, and then Kenya.

In respect of Africa, the ten best countries in terms of investment attractiveness are Namibia, Botswana, Zambia, Morocco, Ghana, Burkina Faso, Mali, Tanzania, Ivory Coast and the DRC (with the DRC just edging out South Africa for 10th place). The greatest deterioration by an African country came from Nigeria, which dropped from a ranking of 75th in 2013 to 116th in the latest survey. Remarkably, Zimbabwe, which one might have thought would be near the bottom of the listings, beats 10 other countries in Africa and another 12 globally to rate as 100th in the world. Can it be possible that there are 22 countries in the world

that are even worse as mining destinations?

Botswana is still rated top in Africa in terms of policy factors (ranking a very impressive 13th in the world) but Namibia's mineral potential gives it the edge in the overall score, giving it a ranking of 25th with Botswana immediately behind it at 26th. Interestingly, the African country to show the biggest improvement in its ranking is Ivory Coast, moving to the 61st position globally from 105th in 2013. Also enjoying a much improved ranking is Angola, which moved from 108th in 2013 to 78th this year, reflecting better ratings for trade barriers and the availability of labour and skills.

The survey contains comments from respondents about the various jurisdictions and the ones on South Africa are pretty much what one might have expected. One respondent describes the country as having a "highly political unionised workforce that perpetually demands more and more in return for less and less productivity" while another refers to South Africa's "inadequate power generation and inadequate labour laws regarding mineral sector strikes."

On Botswana, one respondent describes the process for issuing mineral licences as slow and lacking in transparency while on Namibia a respondent comments as follows: "Open-door policy at all levels of government in most ministries is complemented by probably one of the best and most co-operative geological surveys in the world." A respondent giving his views on Zambia says there is "excellent all round support from the Ministry of Mines" while another, referring to Zimbabwe, maintains there are "impromptu changes in policy over ownership of mineral rights."

One could reasonably argue that the Fraser Institute survey is based as much on perception as fact and question whether the DRC, for example, with its notorious political instability, endemic corruption and almost total lack of reliable road and rail links, is really a better mining destination than South Africa, a reasonably stable democracy with excellent infrastructure and almost certainly the biggest reservoir of mining skills in Africa. But perception is everything and there is now clearly an urgent need for all players in South Africa's mining space, not least the government and the unions, to arrest and reverse the decline in the country's standing as a mining jurisdiction. Not to do so could result in the country losing out during the next mining boom – as it did in the last – due to lack of investor confidence.

Arthur Tassell



South Africa has a "highly political unionised workforce that perpetually demands more and more in return for less and less productivity."

A comment quoted in the Fraser Institute's latest annual 'Survey of Mining Companies'

Life-size stope panel handed over to Wits



Measuring some 7 m long, the model stope dips at 10 degrees, has a stoping width of 1 m and extends some 3 m on strike. It has been equipped with various items of support infrastructure to demonstrate to students the variety of technologies employed underground (photo: Arthur Tassell).

A life-size mining stope panel was handed over by New Concept Mining (NCM) to the Wits School of Mining Engineering recently to help students learn about stoping activities through a better visualisation of how a real mine looks.

The stope panel— sponsored to the tune of R250 000 by NCM – is part of a range of simulated facilities sponsored and developed at the School’s premises on West Campus, in partnership with companies active in the mining sector such as Aveng, Gold Fields and Sibanye Gold. These include a mine tunnel, mine shaft

steel work and a lamp room.

Said Professor Cuthbert Musingwini, newly appointed Head of the School of Mining Engineering at Wits: “We are delighted to add this new facility to our School’s resources and grateful to be partnering with far-sighted stakeholders like NCM who share our dedication to skills and technology development.”

NCM Marketing Director Brendan Crompton said the sponsorship of the model stope panel was driven by NCM’s commitment to safety, efficiency and productivity in South African mines. The

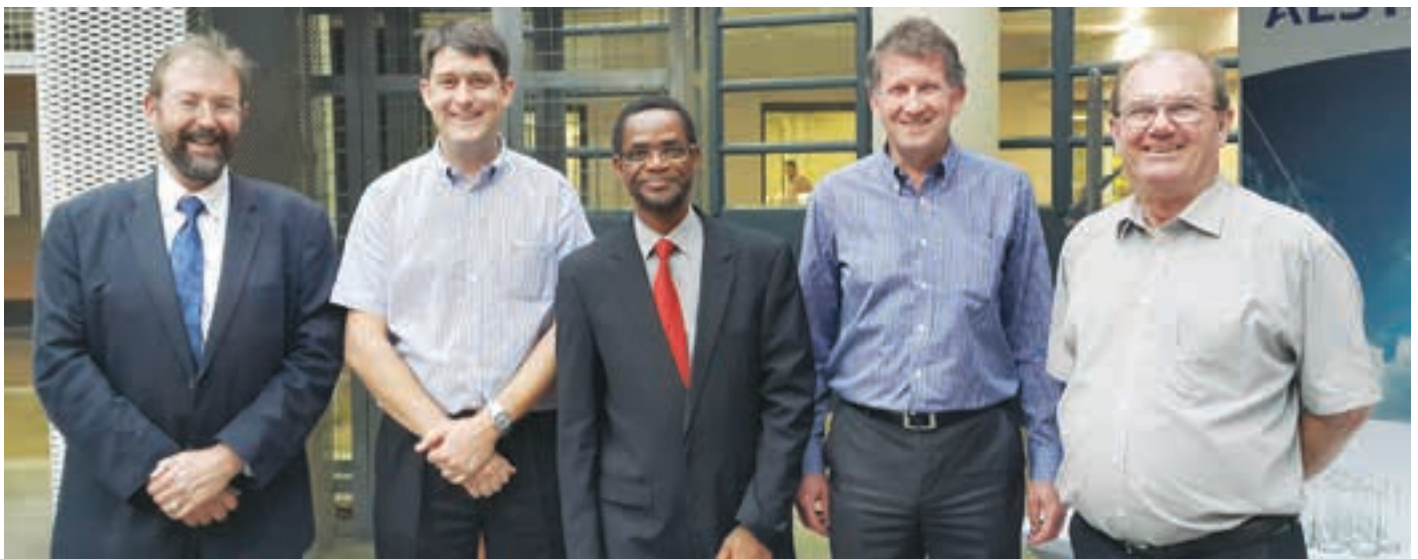
SA-based company is a market leader in narrow-reef stope support products, having expanded into a number of countries worldwide.

“As a quality-focused company rooted in South Africa, we recognise that the future of our mining sector is built on the calibre and skills of graduates from institutions like Wits University,” said Crompton. “Partnering with the School of Mining Engineering at Wits is one of the ways that we contribute to sustainability and safety in mining, especially as we both prioritise technological innovation as a key factor in the success of the sector.”

Measuring some 7 m long, the model stope was constructed from a metal framework, mesh and concrete, and is the work of sculptor Russell Scott. He used various materials and techniques including, hand-packed cement and layers of paint to achieve the realistic effect of a working stope face in an underground platinum mine.

The panel dips at 10 degrees, has a stoping width of 1 m and extends some 3 m on strike. It has been equipped with various items of support infrastructure to demonstrate to students the variety of technologies employed underground. These include timber props, timber packs, rockbolts and safety nets suspended near the working face.

NCM has contributed roof support equipment both from its own range of products and from other sources. It is also making available some of its electronic monitoring and warning devices in the



Pictured (left to right) at the handing over of the mining stope panel are Professor Ian Jandrell, Dean of the Faculty of Engineering and the Built Environment at Wits, Brendan Crompton, Marketing and Sales Director of New Concept Mining, Professor Cuthbert Musingwini, the Head of the School of Mining Engineering at Wits, Philip Maxton, MD of New Concept Mining, and Barry Prout, Senior Lecturer in the School of Mining Engineering (photo: Arthur Tassell).

◀ stope, augmenting the School's focus on digital, remote monitoring technologies to enhance safety on mines.

Like the recently completed model mine tunnel, the stope panel is situated in the basement of the School of Mines premises, where it incorporates one of the building's beams as a geological feature.

Former Head of School Professor Fred Cawood had initiated the stope panel construction as part of his digital mine research at Wits Mining. These simulated facilities form part of the 'digital mine' environment which is providing invaluable tools for learning and research, bringing a real mine experience to mining engineering students at Wits.

"Most of the 200 first-year students we welcome into the School each year are straight from school and have never been in a mine before," said Musingwini. "While mine visits are arranged from time to time, this facility gives easy access to students – so that they can visualise and test what they are studying theoretically."

"While the facility is invaluable for our teaching work, it will also be made available to our research students as they push the boundaries of productivity with digital and other technology in mining," said Professor Cawood. "Now more than ever, SA needs to encourage and facilitate research that can stimulate our mining sector; through facilities like these, Wits School of Mines is showing its commitment to doing that."

The Wits School of Mining Engineering ranks among the top in the world. It is the largest English-speaking school of mining engineering and one of the fastest growing – with a student body in excess of 800 students. Among undergraduates, over a third are women. ■

Funding for phosphate projects secured

Montero Mining and Exploration, listed on the TSX-V, has entered into a definitive agreement with Ovation Capital to fund the development of Montero's phosphate rock projects near Saldanha Bay in the Western Cape. Ovation is a South African based investment firm that is currently developing a portfolio of mineral beneficiation projects focused on a targeted set of industrial minerals.

As part of the agreement, Ovation will fund studies relating to an integrated fertiliser plant in the Saldanha Bay Industrial Development Zone in close proximity to Montero's projects.

"Ovation will earn a 30 % interest by completing a Pre-Feasibility Study and a Bankable Feasibility Study of the South African holding company which is 100 % owned by Montero," says a statement issued by Montero. Ovation is finalising agreements with three large engineering and consulting groups to complete these studies within a two-year period.

Dr Tony Harwood, President and Chief

Executive Officer of Montero, commented: "Our partnership with Ovation Capital provides Montero with a strong foundation to develop and advance our South African phosphate assets in order to produce phosphate rock and further beneficiate this to produce phosphoric acid and other potential fertiliser products at a fertiliser plant in a continental hub."

In 2012 Montero completed a compliant Preliminary Economic Assessment (PEA) of the sedimentary phosphate Duyker Eiland project, the first of Montero's phosphate assets set to be advanced to feasibility. Duyker Eiland is located 30 km north of the Port of Saldanha.

The PEA is based on an initial inferred mineral resource of 32,8 Mt, grading at 7,15 % P_2O_5 , as previously reported following an independent resource estimate prepared by AMEC Earth & Environmental (UK) Limited. Preliminary metallurgical test work indicated that an acid-grade phosphate concentrate of 33 % P_2O_5 to 35 % P_2O_5 could be produced by flotation. ■

Beltcon 18 conference coming up in August

The 18th biennial International Materials Handling Conference and Exhibition – Beltcon 18 – is to be held on 5 and 6 August this year. Now in its 36th year, the Beltcon conference is recognised worldwide as a valuable resource in bringing the very latest developments in materials handling to a wide audience.

Up-to-date research, new conveyor techniques, report-backs on methodology and installations and new technology are presented by some of the most eminent international conveying specialists.

Beltcon is supported by the Conveyor Manufacturers Association and is organised by Cost Time Resource. This is the same team that recently held the successful inaugural conference on Safety in the Conveyor Industry – Safecon – which will now be held every second year, alternating with Beltcon.

Delegates attending can claim credit points towards the ECSA Continuous Professional Development requirements. Full details plus an application form are available on the Beltcon website: www.Beltcon.org.za.



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Impala Platinum says that the capital expenditure programme for No 17 Shaft (seen here) will be slowed to conserve cash, prioritising the completion of the main shaft-sinking programme.

Impala Rustenburg to be re-positioned and modernised

Impala Platinum Holdings Limited (Implats) recently announced its results for the six months ended 31 December 2014, as well as key components of the Group's strategic review. Implementation of the strategic review will see major changes being made at Implats' Rustenburg operations.

Revenues at R15,9 billion were 3,6 % lower than those achieved in the six months to December 2013, largely as a result of a reduction in sales volumes of platinum, palladium and nickel due to the lower Impala production. Group unit costs increased by 40,7 % from R16 310 per platinum ounce to R22 952 per ounce due to group inflation of 10,4 %, comprising mining inflation for the South African operations of 10,5 % and Zimplats inflation of 10,3 %. Headline earnings, which excludes the after-tax impact of R158 million for the partial asset write-down as a result of the Mutambara shear collapse at the Bimha mine in Zimbabwe, decreased by R460 million or 53,5 % to R400 million (or 66 cents per share).

Mine-to-market output decreased by 20,4 % to 539 200 ounces of platinum from the previous comparable period, primarily due to lower production from Impala Rustenburg, Zimplats' Bimha mine and Marula. Third party production decreased by 16,3 % to 91 400 ounces due to one-off material treated in the previous comparable period. Gross refined platinum

production decreased by 19,8 % to 630 600 ounces.

"Implats' performance in the first six months of FY2015 was impacted by the ramp-up of the Rustenburg operations following industrial action across the platinum industry in early 2014 and safety stoppages at this operation," commented Implats' CEO, Terence Goodlace. "The suspension of operations at Zimplats' Bimha mine as a result of a major ground collapse, as well as depressed PGM prices and industrial action at Marula, also impacted performance. Encouragingly, pre-strike production rates have been restored at Impala Rustenburg and the operation delivered planned production for the six months.

"Looking forward, we believe PGM market fundamentals are sound over the longer-term but US\$ PGM prices are likely to remain 'lower for longer'. Within this context, we will position the Group to conserve cash while we restore and optimise operational performance and profitability. In doing this, Implats will maintain strategic optionality to safeguard the long-term value potential of our assets and plans to invest R30 billion across our operations over the next five years."

A key outcome of the strategic review is that Impala Rustenburg will be re-positioned and modernised "into a more concentrated mining/footprint opera-

tion producing 850 000 ounces platinum per annum from 2019." This will involve completion and ramp-up of the 16 and 20 Shaft complexes and further ore reserve development and the consolidation of the mature shafts (E/F, 4, 6, 7, 7A, 8 and 9 shafts) under one overhead structure to optimise costs and improve synergies. The mature shafts will be mined out as fast as possible as these are amongst the lowest cost operations within the lease area due to their relatively shallower mining depth and low capital requirements.

At the mid-life shafts (1, 10, 11, 12 and 14 shafts), the emphasis will be on improving mining flexibility and efficiencies to optimise shaft capacities, underpinned by a targeted operational excellence programme.

As regards 17 Shaft, the capital expenditure programme will be slowed to conserve cash, prioritising the completion of the main shaft-sinking programme with "the optionality to review the Group financial position on an on-going basis."

In respect of Zimplats, the intention is to restore mining flexibility and grow output to 6 Mt/a (260 000 platinum ounces per annum) by initiating opencast mining and re-deploying Bimha's mining crews at the other operations while re-developing the mine.

In South Africa, the Afplats project will be deferred for four years. ■

Caledonia provides update on Blanket

In November last year, Caledonia Mining Corporation, listed on the TSX and AIM, announced the Revised Investment Plan and production targets for the Blanket gold mine near Gwanda in Zimbabwe.

In terms of the plan, Blanket is developing a 'Tramming Loop' 750 m below surface and continuing to sink the No 6 Winze to provide rapid – but limited – access to deeper level resources. In addition, it is sinking a new 6-m diameter Central Shaft from surface to 1 080 m. The new Central Shaft will provide access to the current inferred mineral resources below 750 m and allow for further exploration, development and mining in these sections along the known Blanket strike, which is approximately 3 km in length.

On December 2, 2014, Caledonia published a Preliminary Economic Assessment

of the Revised Plan which includes the following conclusions: an Internal Rate of Return of 267 % and a Net Present Value of the Blanket mine of US\$147 million.

Caledonia has now provided an update on the implementation of the Revised Plan as at the end of January 2015.

Work on the Tramming Loop began in November 2014. Some 384 m out of the total length of 800 m have been completed and the loop is on target for completion as scheduled in June 2015. A further 60 m of sinking is required at the No 6 Winze to achieve the interim objective of 930 m below surface. Completion of the No 6 Winze is expected, as planned, at the end of July 2015. The winders at No 6 Winze have been installed and commissioned.

At the Central Shaft, preparatory work is in hand to allow pre-sink work to com-

mence, as scheduled, in July 2015. Two 3 100 kW double-drum winders have been acquired which, once refurbished, will be sufficient for the sinking phase and eventual production up to a depth of 2 000 m below surface.

Steve Curtis, Caledonia's Chief Executive Officer, commented: "The Board is pleased with the ongoing implementation of the Revised Investment Plan and we look forward to keeping the market updated with further progress." ■

Askaf iron ore project comes to a standstill

In October 2014, ASX-listed Sphere Minerals (which is controlled by Glencore) initiated a slowdown and a review of the Askaf iron ore project in Mauritania. Iron ore prices in China were then approximately US\$80/t; the 2015 year-to-date average price is around US\$65/t.

Based on the results of the review, Sphere says it has concluded that while there are potential improvements in operating costs, capital efficiency and product quality, at current prices there is no prospect for profitable development of the Askaf project. Accordingly, it has determined to defer further development of Askaf. All construction commitments are being closed out, expenditure minimised and employment numbers reduced.

Sphere says it will continue to monitor and assess market conditions and whether it is economic to restart the Askaf project at some time in the future.

Sphere reports, however, that the feasibility study on the El Aouj project, also in Mauritania, is continuing. It is being managed by the El Aouj Joint Venture Company. ■



The Blanket gold mine near Gwanda in Zimbabwe showing the No 4 Shaft headgear. The mine is to sink a new 6-m diameter Central Shaft from surface to 1 080 m (photo: Caledonia).



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Kamoa exploration team receives prestigious award



Robert Friedland (right) presenting the Thayer Lindsley Award to two members of the Kamoa Discovery Team – Dr David Broughton (left) and Thomas Rogers (centre).

Robert Friedland, Executive Chairman of Ivanhoe Mines, and Lars-Eric Johansson, CEO, have announced that members of the Ivanhoe Mines exploration team have received the prestigious Thayer Lindsley Award from the Prospectors & Developers Association of Canada (PDAC) for the discovery of the Kamoa copper deposit in the DRC.

The Award, which is presented annually by the PDAC, recognises an individual or a team of explorationists credited with a recent significant mineral discovery or series of discoveries anywhere in the world.

The Award honours the memory of Thayer Lindsley, who was inducted into the Canadian Mining Hall of Fame in 1989 and who was one of the most accom-

plished mine finders of the past century. Over his long and extraordinary career, he either founded or was involved in the development of many famous Canadian mining companies, including Falconbridge, Sherritt Gordon, Frobisher, Giant Yellowknife, Canadian Malartic and United Keno Hill.

“The PDAC’s recognition of the efforts of key members of the Ivanhoe exploration team in the extraordinary Kamoa discovery is an honour and a proud achievement for our company,” said Friedland.

“Kamoa, which now ranks as Africa’s largest high-grade copper discovery and is the world’s largest undeveloped high-grade copper discovery, was formed more than 500 million years ago and was subsequently hidden under a thin layer of Kalahari sand for an estimated tens of millions of years. The discovery, first announced in April 2009, was the collaborative effort of a global team of exceptionally talented geologists, mine finders and financiers – creative thinkers and doers – with a deep esteem for science, technology and grass-roots exploration.

“The largest major copper discovery in the DRC since the early 1900s, Kamoa represents the discovery of a previously

unrecognised and richly endowed district within the Central African Copperbelt – geologically distinct, yet geographically next door to the well-known Kolwezi deposits. We have a strong belief that the Copperbelt in DRC holds the potential for additional world-scale discoveries.”

The Ivanhoe Mines Kamoa Discovery Team was led by Dr David Broughton, Executive Vice President of Exploration at Ivanhoe Mines, and Thomas Rogers, Director of Exploration, African Mining Consultants. Team members also included David Edwards, Geology Manager, Kamoa project, Ivanhoe Mines; Dr Douglas Haynes, Director, Douglas Haynes Discovery Pty Ltd; Dr Ross McGowan, formerly of African Mining Consultants and currently CEO, Armada Exploration Ltd; and Steven McMullan, Site Manager at Ivanhoe Mines’ Kipushi project and Principal Geoscientist with African Mining Consultants. The team also included geologists from the DRC, USA, UK and Canada.

Attending the PDAC awards dinner from the DRC were Felix Mupande, Director General of Cadastre Miniere (Mines Registry), Victor Kasongo, who was the Deputy Minister of Mines in the DRC when Kamoa was discovered, Guy Nzuru Solo, Ivanhoe’s General Manager, DRC, and Innocent Mushobekwa, an Ivanhoe geologist.

This is the second time in the 12-year history of the Thayer Lindsley Award that it has been awarded to geologists from a Canadian company affiliated with Ivanhoe Capital Corporation, which represents some of Friedland’s principal business interests in the international resources sector. In 2004, the inaugural year for the award, three senior geologists with the original Ivanhoe Mines (now Turquoise Hill Resources) won the award for their work that led to the discovery of the Hugo Dummett copper-gold deposit that is slated to begin production as the second phase of the Oyu Tolgoi mine in Mongolia.

Kamoa is located on the western edge of the Katangan basin, approximately 25 km west of the Kolwezi district. According to the PDAC citation, the deposit is a new and blind grassroots discovery in an area previously written off by other explorers because of its lack of Mines Series rocks, as well as of surface mineralisation. ■

Botswana Resource Sector Conference

The 13th Botswana Resource Sector Conference will be held in Gaborone on Tuesday June 9th and Wednesday June 10th, 2015. The event, which ranks as Botswana’s largest annual investment conference, brings together most of the resource players in Botswana under one roof. Endorsed and fully supported by the Ministry of Minerals, Energy and Water Resources (MMEWR) and the Botswana Chamber of Mines (BCM), it has seen year on year growth since its inception. This year’s event is expected to attract over 350 delegates.

Presentations confirmed to date include updates from African Energy, Petra Diamonds, Gem Diamonds, Boteti Mining,

Tlou Energy, Shumba Coal, Debswana, Puma Energy, Khoemaçau and Jindal.

A panel session chaired by Boikobo Paya will see the following experts discussing the future of the resource sector – Charles Siwawa (BCM), Mashale Phumaphi (Shumba Coal), Keith Jefferis (Econsult) and Nchidzi Mmolowa (MMEWR). It is expected that the keynote address will be given by the Minister of Minerals, Energy and Water Resources while the Department of Geological Survey’s Tsiyapo Ngwisanyi will also be presenting.

Further details can be found on www.capconferences.com. Enquiries can also be directed to emma@capresources.co.uk. ■

R9,3 billion Lift II at Palabora mine approved

Palabora Copper (Pty) Limited, a subsidiary of Palabora Mining Company, has received the much anticipated nod from its shareholders to execute the R9,3 billion life of mine extension project. The project – known as Lift II – is a block-cave mine development that will see the company extending its life of mine until 2033. The approval follows an extensive investment on pre-feasibility and feasibility studies, as well as the critical early works development on which approximately R2 billion was spent.

Announcing the shareholders' decision, Palabora Copper's Acting CEO, Maboko Mahlaole, said it was exciting news for the company, the community, contractors and, most importantly, the more than 2 200 people employed at the mine. "We've always been known as South Africa's principal producer of refined copper and this project allows us to extend that legacy for the next 20 years."

Mahlaole added that the completion

of a ground-breaking bankable feasibility study (BFS) in May 2014 had been a major step forward. "That further gave credence to the shareholders and the company in understanding the orebody and the overall technical and capital requirements."

Nick Fouche, Palabora Copper's General Manager of Growth Division, leading the Lift II project, said that the BFS presented an option, at a 90 % confidence level, to develop a new Lift II mining footprint – 450 m below Lift I – that will ensure a continuation of copper mining in Palabora until 2033. "Lift I is scheduled to reach its lifespan during the year 2015," he said.

Fouche added the project team has already achieved some good results, having developed over 10 km of tunnel infrastructure at some of the highest advance rates in the world with a very good safety record. Some of these successes came from innovative means of contracting and setting up the development.

"Lift II will make the company South

Africa's first to operate electric LHDs and will be identified as one of the deepest block cave mines in the world. In addition, we intend to raisebore 2 x 6,2 m diameter holes to a depth of 1 200 m – such depth, using this technology, has never before been done in Africa," Fouche said.

During the third quarter of 2013, mining groups Rio Tinto and Anglo American divested from the Palabora Mining Company, creating an opportunity for a Chinese consortium consisting of Hebei Iron & Steel Group Co, Taewoo, General Nice and China Africa Development Fund. The Industrial Development Corporation of South Africa SOC Limited (IDC) also has a stake in the holding group.

Palabora Copper has been operational since its incorporation in 1956. Originally an open-pit operation, it evolved into an underground block cave mine in the early 2000s. It currently produces around 33 000 tons of copper a year and is South Africa's sole producer of refined copper. ■

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Activities: Game viewing, bird watching, bushmen petroglyphs, National Heritage Site.

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Tumela and BME partner on pioneering blasting initiative



Official opening of BME's training and maintenance facility at Tumela. About to cut the ribbon is Tumela Production Manager Pierre Prinsloo.

As part of its modernisation strategy, Anglo American Platinum's Tumela mine has partnered with blasting firm BME in a pioneering initiative to introduce emulsion explosives underground at its mine near Thabazimbi in Limpopo Province.

On 4 March, BME and Tumela announced the trial rollout of 54 Portable

Charging Units as well as the official opening of BME's training and maintenance facility on the mine – where some 180 underground personnel will be trained in the use of new equipment.

"We aim to drill 12 % fewer holes using this technology, saving us time at the rock face," said Tumela Production Manager

Pierre Prinsloo. "Emulsion is safer to transport than traditional explosives, as it only becomes classified as an explosive once it is in the blast hole. We also expect to use fewer explosives and transport cars underground, consume fewer drill steels, and have more flexibility with our shaft infrastructure."

The explosive characteristics of pumpable emulsions, and the improved transmission of energy to the rock mass surrounding the blast hole, leads to more efficient blasting – while being classified as UN Class 5.1 explosives makes them subject to fewer legal restrictions when being transported and stored.

A key element of the initiative is BME's Portable Charging Unit (PCU), developed over the last seven years to take the benefits of emulsion explosives into the underground, narrow-reef environment. Improved safety and higher blast performance have made emulsions the dominant explosive medium in opencast mining.

"We have worked with Anglo American Platinum in testing this narrow-reef emulsion system for over a year," said BME Senior Operations Manager Selwyn Pearton, who has led the development of the PCU. "The success of our trials on Union, Tumela and Dishaba mines has now led to this roll-out ▶

New COO for AngloGold Ashanti's South African operations

AngloGold Ashanti has announced the appointment of Chris Sheppard, a 30-year veteran of South Africa's ultra-deep underground mining sector, as incoming Chief Operating Officer: South Africa. He will replace the incumbent, Mike O'Hare, who plans to take early retirement during the course of 2015 after a distinguished career of almost 40 years with the company.

Sheppard's appointment will be effective 1 June 2015 at which point he will also join the company's executive committee. O'Hare will support him during the course of the year to ensure an orderly handover.

"We are extremely pleased to have someone of Chris' calibre, and with his deep experience of underground mining in South Africa, to take the helm," comments AngloGold Ashanti's CEO Srinivasan Venkatakrisnan. "Chris has a unique set of skills that will help us to

continue enhancing safety, driving business improvement, tighter cost control and the technological development that Mike has championed."

Sheppard, a mining engineer by profession, was most recently MD of Murray & Roberts Cementation, one of Africa's largest mining contractors and a division of South Africa's largest publicly traded engineering and construction group. Over more than four years, he had oversight across several countries and mineral types of activities including mining, shaft sinking, tunnelling, raise drilling, mine development and exploration drilling. He also led the drive to adapt the business to the challenging market conditions that have affected the global mining sector.

Prior to that, he held positions as head of both mining and technical services at Lonmin for four years, following six years

at Anglo American Platinum, where he most recently held the post of Head Mining Technical Services. He holds a BSc in Mining Engineering from the University of the Witwatersrand and has also completed an Advanced Management Programme at Harvard Business School and a Management Development Programme at the University of South Africa.

O'Hare, the outgoing COO, has had an exemplary career at AngloGold Ashanti, holding a range of high-level technical and operating roles during his career which started in 1977. He oversaw the successful completion of the ultra-deep mine-life extension at Mponeng Phase 1, championed the development of raise boring technology as a credible way to safely extract high-grade gold pillars that would otherwise be sterilised, and led the successful integration of the large Mine Waste Solutions surface reclamation operation into AngloGold Ashanti's portfolio. ■

◀ of 54 PCUs across Tumela mine's underground operations."

Prinsloo said the testing process to date had included engagement with the union leadership, underground crews and employees in general to ensure that all stakeholders were involved in playing a role in establishing the value of any new interventions undertaken by Tumela mine. He said the positive feedback and blasting results had led to this next phase.

"Our resources on site include a PCU workshop, a training centre and spares stores for the support of operations," said Albie Visser, BME's General Manager for South Africa. "We have 12 staff on site to ensure a smooth roll-out, including managers, administrators, maintenance technicians and training practitioners."

Among the breakthroughs achieved in the evolution of the PCU has been its compact, lightweight and robust design; weighing just 14 kg, the pump component is carried separately from multiple 20 kg emulsion bags. The sensitiser tank is also in a separate container – latched onto the pump just before charging – and renders the emulsion ready for blasting as it enters the blast hole.

"Our Closed Emulsion System prevents emulsion contamination and waste through the use of dedicated bag-filling stations, located underground close to the work face," said Pearton. "These stations are supplied from transfer cassettes which bring the emulsion from our facilities on surface."

He said the simplicity of the pump's design and operation procedures allows training to be conducted cost-effectively and relatively quickly, with training facilities including a mock-up blasting rig to ensure real experience during training.

"The quality of BME's emulsion is another vital element of the process," said Pearton, "as it can be pumped numerous times without causing any product degradation; it can also be stored for extended periods with no reduction in quality."

To optimise efficiency and minimise downtime underground at Tumela mine, units can be easily 'exchanged' and replaced from the stores. Radio frequency identification (RFID) technology is employed to track the location of pumping units at all times. ■

Bulk sampling programme starts at Oena diamond project

Canadian company Tango Mining Limited reports that the bulk sampling programme at its Oena project in the Northern Cape began in February on schedule. Oena is located 50 km upstream of Namdeb's Auchas and Daberas alluvial diamond mines which are on the Namibian or north bank of the Orange River, while Trans Hex's Reuning and Baken alluvial diamond mines are respectively 15 km and 60 km downstream of Oena on the South African or southern bank of the river.

Mining contractor earthmoving equipment to support a 1,5 Mt/a throughput capacity has been mobilised to the site and the first 24 421 tonnes has been excavated, of which 3 390 run of mine tonnes have been processed through the newly commissioned rotary plant and recovery system.

According to Tango, the newly acquired high volume Bouvestnik (SA) (BVX) X-ray recovery equipment, to be commissioned in March 2015, will allow for increased recovery efficiencies and product insurance and protection. ■

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New Liberty on target to pour first gold in May

In its report on the December quarter, Aureus Mining Inc, listed on the TSX and AIM, says that construction has continued to progress on its New Liberty Gold Mine (NLGM) in Liberia despite the challenges of operating throughout the Ebola outbreak. The first gold pour at New Liberty is expected by the end of May 2015.

All significant areas of civil works have now been completed and handed over to the structural steel, mechanical, plate work and piping (SMPP) contractor for steelworks and further commissioning. The primary and secondary crushers and ball mill are now fully installed and awaiting power for directional testing with work

focusing on the completion of the conveyor systems.

According to Aureus, the Marvoe Creek diversion and Kinjor and Larjor village relocations were completed in mid-2014, allowing the commencement of mining operations in October 2014, with the first blast of 25 000 tonnes of waste rock successfully completed in January 2015.

A new updated mine plan aligned to the current gold price environment has been developed to further de-risk the project. The plan increases operational flexibility through the creation of two starter pits, providing increased face length and stockpile management and giving greater confidence that production targets will be met.

Expected all-in sustaining cash costs are reduced by 7 % to US\$789/oz and the post-tax project NPV of expected cash flows from commencement of commercial production increase to US\$328 million. An additional 28 000 ounces of gold is expected to be produced in the first year of production through the mining of an additional starter pit, which brings the total Year 1 target production to 122 000 ounces of gold.

Although New Liberty is expected to be producing gold by the end of May this year, further plant optimisation and final commissioning is only expected to occur in June and July, leading to steady state production at the end of July 2015. ■



Mining equipment working in New Liberty's Larjor pit. Although Aureus is undertaking the mining itself, the mining fleet has been supplied and is being maintained by MonuRent (photo: Aureus Mining).

Vast Resources to divest itself of its Zambian assets

AIM-listed Vast Resources plc (previously African Consolidated Resources) reports that – as part of the transition of its focus from exploration to mining and to near term cash generation – it has, subject to due diligence, agreed to divest its non-core Zambian assets.

It has agreed to sell its subsidiary, African Consolidated Resources (Zambia) Limited, and the company's remaining directly owned Zambian copper interests, which include its contract to acquire the Kalengwa mine for US\$1.1 million. It has also entered into an earn-in arrangement for the continued exploration of the Nkombwa Hills project for rare earths and phosphates under the operational management of a new earn-in partner.

Roy Pitchford, Chief Executive Officer, commented: "Over recent months our attention has turned toward high value brownfield assets with the ability to generate material cash flow in the near term. With these criteria in mind, the Baita Bihor polymetallic mine in Romania and the Pickstone-Peerless gold project in Zimbabwe have been prioritised for accelerated development. Subject to the conclusion of satisfactory due diligence and the subsequent acquisition of an interest in Baita Bihor, the Board is targeting commercial production from both Baita Bihor and Pickstone-Peerless by H2 2015.

"With this strategy in mind, it has become evident to us that success in

Zambia requires a considerable investment by the company, not only in money but in senior management time. It is our opinion that, notwithstanding the potential of our Zambian assets, the immediate resources required to achieve a successful operation in Zambia would be better utilised on mining and short term cash generation in the areas of our ongoing focus.

"I am therefore very pleased that we have achieved, on the one hand, an outright sale and release from future liabilities in relation to our Zambian copper assets and, on the other hand, an earn-in agreement on our Nkombwa Hill assets where we retain a significant interest but with no further investment required and no material demands on management time." ■

Record sales in February by Universal's Kangala colliery

ASX-listed Universal Coal has reported record sales for the month of February 2015 of 172 000 tonnes, 28 000 tonnes over target. The record comes almost 12 months after maiden production at the company's 2,4 Mt/a run-of-mine (ROM) Kangala colliery, located near Delmas in the Witbank region.

Of the record result, 160 000 tonnes of domestic thermal coal were delivered to Eskom and 12 000 tonnes exported through the Richards Bay Coal Terminal. The result follows the successful achievement of target sales for the month of January 2015 and positions the company well to deliver a strong Q3 2015 result.

Besides the record sales tonnes, Kangala also achieved the milestone of having processed 2 Mt through the Coal Handling and Preparation Plant from the start of production to date.

Commenting, Tony Weber, Universal Coal CEO, said, "This is an outstanding achievement and is testament to the



Universal Coal's Kangala colliery has achieved the milestone of having processed 2 Mt through the Coal Handling and Preparation Plant from the start of production to date (photo: Universal Coal).

quality and efforts of our management team and contractors Stefanutti Stocks Mining Services and Mineral Resource Development.

"With Kangala now hitting its stride, we look forward to delivering continual strong production and sales figures for the year ahead, in parallel with bringing on stream

our next operation, the 2,8 Mt/a ROM NCC Roodekop." ■

(Editor's note: As this issue was going to print, Universal announced – on 16 March – the occurrence of what it called a 'high potential incident (HPI)' at Kangala, which led to several employees suffering minor injuries during a blast.)

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A view of the Moma Titanium Minerals Mine in northern Mozambique. The mine will be reducing its workforce by between 15 and 20 % (photo: Kenmare Resources).

Kenmare Resources to cut workforce at its Moma mine

Ireland's Kenmare Resources plc, one of the leading global producers of titanium minerals and zircon, which operates the Moma Titanium Minerals Mine in northern Mozambique, has provided an operational update.

As previously announced, Kenmare has been engaged in a substantial cost cutting programme in an effort to reduce unit costs and conserve cash. Unit cash operating costs per tonne of product produced declined by 14 % for H1 2014 relative to H1 2013. However, these and subsequent savings have been insufficient to offset the decline in prices experienced by the company.

Kenmare has undertaken a thorough review of operations and staffing which

has resulted in the identification of areas where further efficiencies can be achieved. Unfortunately this will result in what the company calls a 'focused reduction of employees' at the mine.

The company says it has been engaged with employee representatives to explore alternatives including amendments to pay scales and voluntary redundancies. However, it is now expected that compulsory redundancies will be necessary. The redundancy process is expected to result in a reduction of 15-20 % of the mine's workforce. Kenmare says it is continuing to engage with the Government of Mozambique and workers' unions on this matter.

Kenmare also reports that recent flooding in Nampula Province has resulted in

damage to the power line between Moma and the city of Nampula, causing an interruption to the supply of grid power to the mine. The power failure occurred when the Meluli River burst its banks, compromising the overhead line. A temporary repair was recently carried out in this location following a previous storm and, as a result, some of the materials necessary for repair are already at site with additional supplies to follow. A joint Kenmare and Electricidade de Moçambique team has been mobilised to begin repairs as the flooding subsides.

In the meantime, the diesel generators have continued to operate and the mine has been processing HMC stocks, magnetic and non-magnetic concentrate stocks, and exporting product. ■

Kombat Copper explores open-pit scenario

Kombat Copper Inc, listed on the TSX-V, announced recently that it was preparing for a surface drill programme at the Kombat mine property in northern Namibia, expected to commence this month (March). According to the company, the programme will begin a renewed focus on defining a near surface mineral resource to support an open-pit scenario that would allow a fast track to production.

The programme includes a 2 000 m diamond drill campaign targeting the area surrounding the #1 and the #3 shafts,

which were the primary access points for the historic Kombat mine. Past production from the mine over a 45-year period was 12,46 Mt grading 2,62 % Cu and 18,0 g/t Ag.

Kombat Copper has enlisted the services of a reputable Namibian-based drill contractor to complete the drilling activities.

"There is evidence from past drilling and established underground workings in the area to be tested by this drilling that supports the concept of a potentially significant near-surface mineral resource

that could be mined by open pit," said Bill Nielsen, President and CEO of Kombat Copper. "This initial drill programme's objective is to establish the style and structural emplacement of mineralisation in several prioritised areas.

"Additional drilling will be required to attain a sufficient density to calculate a compliant mineral resource estimate. The company is greatly encouraged that recent compilation work and consultation with past mine staff have provided this opportunity to define near-surface mineral resources that could be fast tracked to production." ■

Technical paper by AEL employee wins recognition

The International Society of Explosives Engineers (ISEE) has awarded Ashlin Pillay with the sought after Paper of the Year award at this year's ISEE conference held in New Orleans in the US. The conference is a gathering of explosives users, manufacturers of explosives and drilling equipment, researchers and professionals involved in quarrying, mining, demolition and construction.

Pillay, an Electronics Field Technician with AEL Mining Services, a South Africa-based supplier of commercial explosives initiating systems and blasting services, presented a paper that gave insight into a project at Ho Man Tin Station in Hong Kong. The station is a cross-cut interchange station between the Kwun Tong Line Extension and Shatin Central Link which carries over 8 million passengers daily. The project needed to deliver on the construction of a sub-surface transportation network at this interchange. Due to the high volume of passengers, the project had to be executed safely and under strict physical constraints and city regulations.

Pillay's paper gave insights on innovative means of tunnelling and blasting applications that AEL offers. "The blasting and explosives industry, like the mining industry we serve, is continuously innovating. Blasting operations in both surface and underground mining continue to be receptive to new technology as it enhances productivity and employee safety. My paper spoke directly to those issues, how AEL responds to them and the kind of solutions we deliver as a result. The paper made special reference to the Ho Man Tin Station and sharing best practice and how these techniques can add value to our industry," said Pillay. ■

SINOMA to partner with Magnis on graphite project

ASX-listed Magnis Resources Limited reports it has signed a Memorandum of Understanding (MOU) with SINOMA as the first step in proceeding to a formal binding agreement covering financing, process engineering and construction of the Nachu graphite project in Tanzania. This follows the recent 80 000 t/a binding agreement with China-based SINOMA for graphite offtake.

Chairman Frank Poullas commented: "A leading role by SINOMA in financing, design and construction will substantially de-risk the Nachu project." He added that SINOMA was one of the largest and most recognised integrated graphite companies internationally with world leading expertise in graphite process engineering and plant design.

Magnis recently announced the completion of a positive PFS on the Nachu project, based on an open-pit operation producing 180 000 t/a of graphite concentrate with an average ore grade of 5,1 % graphite. The PFS put the capex at US\$171,4 million with a capital payback period of 1,4 years. It estimated the after-tax NPV at US\$1 040 million and the IRR at 84 % (at a 10 % discount rate). Operating costs for the first three years of mine life are projected at US\$448 per tonne of product.

The plant design is based on a relatively standard crushing, rod mill grinding and flotation process. Several stages of regrind and cleaner flotation have been included. ■

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Extracting the tonnage value

Forging ahead on mining, civil and building projects, the Liviero Group is well positioned for growth across its niche market segments. In mining, the company is on track to meet its medium term goal of becoming a mid-tier contractor at around 50 million BCMs per annum.

Since entering the opencast contracting sector in early 2012, Liviero Mining has continued to invest in people and technology to deliver on major projects, the first being for Keaton Energy Holdings Limited's Vanggatfontein Colliery, a brownfield development situated some 15 km east of Delmas in Mpumalanga. Keaton Energy supplies 2 and 4 seam washed thermal coal to Eskom; plus 5 seam low contaminant vitrinite dominant bituminous coal for the domestic metallurgical industry. Liviero was awarded a five-year contract.

Liviero Mining forms part of the Liviero Group, South Africa's largest privately owned multi-disciplinary contractor, which has a long established track-record and has grown organically from its initial core building focus into civil engineering, and then mining. More recently, this latter capability has been extended to include a drill and blast in-house

service, with the downstream intention of rolling out the offering to the open market.

"In the past Liviero Civils has been instrumental on a number of mine infrastructure projects, which include major concrete structures and haul roads," comments Liviero Group's CEO, Neil Cloete. Liviero Civils has a 9CE Construction Industry Development Board (CIDB) rating.

Milestone construction programmes in mining include contracts at Sasol Mining's Impumelelo Colliery development, situated within 30 km of the Sasol Secunda refinery in Mpumalanga. Here Liviero's scope of works included a 12 km surfaced road; 26 km of overland conveyor line formation, which starts on the mine and terminates inside the refinery; various earth platforms and gravel access roads; two bridges; plus multiple reservoirs and four lined earth settling dams. Meanwhile at Wesizwe's Bakubung Platinum Mine (BPM) greenfield underground project near Sun City in the Western Bushveld region, Liviero was responsible for intensive reinforced concrete pre-sink works, a key portion entailing the collaring of the main and ventilation shafts.

Alongside mining, current road construction works include various South African National Roads Agency Limited (SANRAL) contracts, an

Below: A Cat D10T belonging to Liviero in action at Keaton Energy's Vanggatfontein Colliery.

Centre: The backbone of the haulage operation at Vanggatfontein is provided by 90,5-tonne nominal payload Cat 777D off-highway trucks.



with Liviero



example being the N8 Botshabelo Interchange in the Free State. This contract forms part of a R800 million plus construction order book for Liviero.

“Going forward, the intention is to expand our civil engineering niche in South Africa across the surface mining segment, as well as in key cross-border territories, where we are also actively researching contract mining opportunities in countries that include Mozambique,

Zambia, the DRC and Namibia,” says Cloete.

Well established in coal, Liviero is now seeking opportunities in hard rock segments that include copper, chrome, iron ore and gold.

The Liviero Group has various BBBEE (Broad Based Black Economically Empowered) accreditations, including Level 2 in Liviero Building. The Group is registered with the South African Green Building Council. For the mining segment, key opportunities in

Above: A section of the Vanggatfontein Colliery.

Below: Liviero's workshop facilities at Vanggatfontein.





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building include a development model for staff accommodation, which, as in all Liviero activities, will be governed by the company's ISO 9001 and 18001 quality control management systems.

Total adherence to health and safety is defined by Liviero's acronym LIFE, which stands for 'Liviero Incident Free Environment'. The Liviero Group DIFR benchmark is 0,36 and all operations are continually assessed against this threshold.

As for Liviero Civils, the ability to win and deliver on large scale, multi-faceted mining contracts is backed by a comprehensive earthmoving fleet that is constantly being updated. Included in the mining mix are Cat earthmoving machines sold and supported by Caterpillar's Southern African Cat dealer, Barloworld Equipment.

The Liviero Plant Division supplies all Liviero business units, as well as the external hire market, depending on project capacity constraints. Mainstay Cat products on the mining front include Cat D9T, D10T and D11T track-type tractors, with the backbone of the haulage operation provided by 90,5-tonne nominal payload Cat 777D off-highway trucks. Powered by a Cat 3508B EUI engine delivering a net output (ISO 9249) of 699 kW, the Cat 777D achieves a top speed (fully loaded) of 60,4 km/h. Haul road maintenance is performed by a series of Cat 14H and 16H motor graders.

At Vangatfontein, Liviero's current scope of works entails the movement of around 4 Mt of run of mine (ROM) per annum, which equates to approximately 14 million BCMs for the same period. Mining the 2, 4 and 5 seams, the top bench is between 12 to 15 m; the middle bench is 20 to 25 m; and the bottom bench around 6 to 10 m. The drilling depth is down to around 70 m.

This project runs in parallel with other mining ventures. These include long-term Liviero plant hire solutions at Usutu West Colliery for client Vunene Mining, an older underground mine where the remaining in-situ coal is now being extracted from surface. Vunene subsequently outsourced the turnkey contract mining solution to Liviero in September 2014. Currently, Liviero moves around 1,5 million BCMs per month. This mine provides a dedicated supply to Eskom's Camden power station in Ermelo.

"To achieve the monthly production targets set by our clients, we need to guarantee minimal downtime and maximum efficiency,"



explains Liviero Mining Director Nehan Deysel. "For this reason we place major emphasis on optimum machine selection combined with strong working relations with the original equipment manufacturers (OEMs) that we partner with. It all comes down to designing and maintaining the most efficient mechanised load and haul model that maximises cycle time throughput from the production face to the primary crusher."

Liviero Mining's operating model hinges around the ongoing replacement of earthmoving equipment at pre-determined hours so this is a young fleet. On the maintenance front, Liviero is also addressing artisan skills requirements, particularly for earthmoving mechanics, where there is a critical industry shortage. For Vangatfontein, an added training initiative will identify and develop suitable candidates from surrounding communities in line with Keaton Energy's Social and Labour Plan. To address key skills gaps in industry, Liviero has also set aside funds for external learnerships, ranging from boiler-makers to auto electricians, with a main emphasis on diesel mechanics.

"Our success as a group has been on planning and delivering a quality product in all operational sectors," Cloete concludes. "We built Liviero Mining around three focal areas: firstly, on our existing experience in the plant hire industry; secondly, our investment in the best OEM solutions; and thirdly, our ability to identify, attract and retain key skills. These ingredients are the solid foundation on which our future mining roll-out strategy will be based." ■

At Wesizwe's Bakubung Platinum Mine, Liviero's project scope included intensive reinforced concrete pre-sink works, a key portion entailing the collaring of the main and ventilation shafts.

Ergo starts to see the benefits

The new R320 million flotation/fine-grind (FFG) circuit at DRDGOLD's Brakpan plant on the East Rand has been fully reactivated after a temporary suspension of operations for several months last year. While the FFG technology is not yet performing fully to expectations, DRDGOLD's CEO, Niël Pretorius, told media representatives – including **Modern Mining's** Arthur Tassell – who recently visited the new facility that all the statistics and trends were now moving in the right direction. The Brakpan plant forms the centrepiece of DRDGOLD's Ergo operation, one of the largest tailings retreatment operations in the world.

The company's recently announced results for the quarter and six months to 31 December 2014 support Pretorius's claim of improved performance, with gold production increasing by 6 % to 73 015 ounces for the first half of FY2015 compared to the first half of FY2014, with the improvement being attributed to a 9 % improvement in the average yield to 0,196 g/t. Higher gold production and gold sold, together with a stronger average Rand gold price received, drove revenue 9 % higher to R1 015,5 million and, notwithstanding increased total cash op-



DRDGOLD's Niël Pretorius.

The flotation section of the FFG circuit at DRDGOLD's Brakpan plant (photo: Arthur Tassell).



of its FFG circuit



erating costs, operating profit rose by 5 % to R164,1 million.

The Ergo operation – run through DRDGOLD's operating subsidiary Ergo Mining Proprietary Limited (Ergo), which is headed by MD Henry Gouws – is now DRDGOLD's sole source of revenue, following its divestment of its last underground asset, Blyvoor, in 2013. Pretorius told the media group visiting Ergo that the company was now 100 % focused on hydraulic surface mining, which he described as a fully mechanised business, either remote controlled or automated, with a lower exposure to labour and electricity costs than conventional underground mining and with a superior safety profile. Another advantage was an uninterrupted production cycle.

Pretorius noted that ERGO was processing about 1,8 Mt of material a month and employed about 1 000 people and compared this with the Blyvoor operation which – when owned by DRDGOLD – did 80 000 tonnes a month and required around 4 500 permanent employees.

The Ergo assets stretch across the central and eastern Witwatersrand over a distance of 62 km and include not only the Brakpan plant (originally established in the late 1970s by Anglo American) but also the Knights plant in Germiston, milling and pump stations at Crown Mines and City Deep (both former plants), as

DRDGOLD is now 100 % focused on hydraulic surface mining.



The concentrate stream is subjected to the new fine-grind process, which involves milling the slurry material with tiny beads using four vertical stirred mills, three of which are seen here (photo: Arthur Tassell).

well as an extensive network of pipelines. The Brakpan plant is DRDGOLD's flagship and is responsible for the majority of production, with most of its feedstock (roughly two thirds) being sourced from the Elsburg tailings complex and the L/29 dump. The overall resource being exploited by Ergo amounts to 11 Moz of gold.

DRDGOLD has been involved with the Ergo assets since 2007 (initially in joint venture with Mintails, whose stake it purchased in two deals in 2008 and 2010) and has since modernised and extended the operation, among other things constructing a 50 km long, 600 000 tonne/month capacity, HDPE-lined pipeline to link Crown and the Brakpan plant. The FFG circuit is the latest enhancement of the operation and is designed to increase the efficiency of extraction by roughly 0.03 g/t – representing an approximate 10 % increase in recovery.

The need for the FFG was identified several years ago when research by DRDGOLD (including trials in a pilot plant) revealed that pyrite particles, containing some 40 % of the gold entering the Brakpan plant, were not responding as well as expected to the CIL process. A dual process solution was identified – re-introducing flotation (originally used

by Anglo American when the plant was first commissioned but subsequently discontinued) and adding an additional stage – fine grind or milling of the flotation concentrate followed by treatment in a small dedicated CIP circuit. The FFG project was approved in 2012 and implemented during 2012 and 2013 by DRDGOLD using an in-house project team.

Although the FFG or high-grade circuit came on line in January last year, it operated for less than three months before DRDGOLD decided to suspend the new section – a decision that Pretorius described as one of the biggest and most difficult decisions he has had to take since joining DRDGOLD ten years ago. “Suspending something that was brand spanking new was difficult,” he said. At the time the decision was announced, DRDGOLD said that while the float and milling sections had performed well, the CIP had not yet stabilised and appeared to be contributing to metallurgical instability and carbon inefficiencies downstream in the CIL or low grade section.

By September last year, DRDGOLD had completed an analysis of the problems and optimised the circuits and was confident enough to reintroduce one stream of the three-stream FFG circuit, with generally positive results. It followed up in January this year by restarting the other two streams. Commented Pretorius: “The plant has its own personality, its own tempo, but we are now starting to see the upside of the flotation and fine grind coming through.”

With the FFG now fully operational, all the slurry entering the Brakpan plant enters the flotation section after passing over linear screens to remove organic material and debris. After the material is conditioned with reagents, it enters the float cells where it is separated into two streams. One stream, the flotation concentrate, contains the sulphides which are enriched with gold while the second stream, the flotation tails, is made up of lower-grade material which is treated in a conventional CIL process, which is the treatment process that has been used for the past 30 years with an extraction efficiency of 39 % to 40 %.

The concentrate stream is subjected to the

new fine-grind process, which involves milling the slurry material with tiny beads using four vertical stirred mills (sourced from FLSmidth). At this stage the milled product, 80 % of which is smaller than 24 microns, has been liberated from the sulphides, making recovery of the previously encapsulated gold easier as it comes into contact with cyanide during the CIP process that follows.

The dissolved gold is adsorbed onto activated carbon and the 'loaded carbon' in each circuit enters the carbon treatment section where the gold is eluted from the carbon. The carbon then returns to the CIL circuit via a regeneration kiln. Once the gold has been eluted, it undergoes electro-winning where the gold is precipitated, calcined and smelted in the existing smelthouse.

What comes next after the FFG? Pretorius told the media group that DRDGOLD would now focus on optimising its high grade operation further and that it was also planning lifting production by up to 300 000 tonnes a month by bringing the 21 Mt Van Dyk tailings dam resource into the feedstock mix, a low capex (R23 million) project which would involve



refurbishing five tanks within the CIL section at Brakpan. Finishing his presentation to the media, he said DRDGOLD had an operational profile far closer to that of a processing facility than a conventional mine and that it would continue to pursue innovative technologies to enable it to efficiently and profitably treat the huge – but increasingly lower grade – resources to which it had access and which total some 750 Mt of material.

Photos by DRDGOLD unless otherwise acknowledged

The flotation section produces two streams. One stream, the flotation concentrate, contains the sulphides which are enriched with gold while the second stream, the flotation tails, is made up of lower-grade material which is treated in a conventional CIL process (photo: Arthur Tassell).

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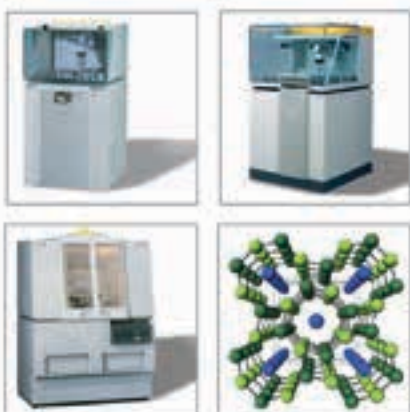
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Stellar poised to emerge as a



Karl Smithson, Chief Executive Officer of Stellar Diamonds.

*Stellar Diamonds plc, a junior diamond mining company whose shares are quoted on London's AIM, seems to be heading for mid-tier status, with an ambitious trial mining exercise underway at its Baoulé open-pit kimberlite project in Guinea and the development of a fissure mine – the Tongo Dyke-1 project – in Sierra Leone imminent. **Modern Mining's** Arthur Tassell recently caught up with Stellar's CEO, Karl Smithson, at the Mining Indaba in Cape Town to learn more about the projects.*

Explaining the history of Stellar, Smithson says it was formed in 2007 as a spin-off of Mano River Resources, a company originally founded in the 1990s by well-known resources entrepreneur Guy Pas (who was, incidentally, also a co-founder of Samax Resources, which did much of the early development work on the Geita gold project in Tanzania). Mano River itself merged with African Aura Resources in 2009. The latter has since morphed into Aureus Mining which is developing the New Liberty gold mine in Liberia.

Smithson joined Mano River in 2000 and in his first few years with the company was instrumental in building up the portfolio of diamond assets which allowed Stellar to be established as a standalone venture in 2007 and to list on

AIM in 2010. He has managed Stellar as CEO since its inception and has, over the years, successfully raised over £15 million in equity for the company. He also transformed Stellar from a pure exploration company into a junior miner/explorer. The company mined 128 000 carats from the alluvial Mandala deposit in south-east Guinea between 2009 and 2011 and plant and equipment used on this project has now been deployed at Baoulé.

Although he is based in the UK, Smithson – who is a geologist – spends much of his time in West Africa. He is also no stranger to Southern Africa. Earlier in his career, he spent 10 years with De Beers in Botswana and Zimbabwe and in fact was De Beers' Exploration Manager in Zimbabwe. In between leaving De Beers and joining Mano River, he also spent a couple of

Trial mining underway at Baoulé in November 2014. The project is located in the Aredor diamond district of Guinea.



mid-tier diamond miner

years with Southern Era, which at that time owned the Marsfontein diamond mine in South Africa.

Smithson describes Baoulé – located in the Aredor diamond district of Guinea – as an attractive deposit which could ultimately evolve into a mid-size open-pit mine. “The pipe is 5 ha in extent and was discovered in 1999 by a Canadian company,” he says. “It was subsequently drilled and bulk sampled by, among others, Rio Tinto. We acquired the project with a local partner in late 2013 and our work since then – all internal and non-JORC compliant at this stage – points to us having a plus 20 Mt resource containing 3,3 million carats. We’re hoping to do a bit more drilling this year to get to 5 million carats.

“We’re expecting to get a good price for Baoulé’s diamonds. We believe at least US\$200 per carat is possible for the long term run of mine given that a small parcel of diamonds sold in 2000 by a previous operator yielded US\$157 per carat. The really interesting point is whether Baoulé can deliver large stones. Alluvial miners in the area have recovered a number of stones of over 100 carats and a couple exceeding 200 carats, one of 284 carats and another of 255 carats, so we are optimistic

that our kimberlite could be a large stone producer.”

After relocating the requisite plant and equipment from Mandala (and a second Stellar project in Guinea, Droujba) in the second and third quarters of last year, Stellar started trial mining in the eastern lobe at Baoulé in October. Says Smithson: “Our strategy over the next year or so will be to mine at a rate sufficient to deliver between 100 000 and 200 000 tonnes of kimberlite to the plant over this period and we would expect this could yield up to 2 000 carats per month over the course of 2015. The trial mining – apart from generating cash flow – will give us a good handle not only on grade and value but also the frequency and distribution of large stones. All this data will inform our decision as to whether or not we should proceed to mining on a commercial scale. Our current thinking is that commercial mining would see the tonnage mined and treated



Gem quality diamonds recovered at Baoulé.

Mining operations at Baoulé in February this year.





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The first results of the trial mining were reported early in January this year, with Stellar announcing the recovery of 2 145 carats, including a total of 138 stones greater than 1 carat with the biggest being a 9,2 carat diamond. Gem and near gem diamonds accounted for approximately 60 % of the diamond population recovered. The average grade was 14,6 cpht (at a +1,25 mm cut-off), slightly higher than the 13 cpht anticipated based on the historical exploration and sampling work. The first parcel of diamonds has been exported to Antwerp and will probably have been sold by the time this article is in print. Stellar anticipates the export and sale of diamonds every two to three months during 2015.

The trial mining is being carried out using a smallish fleet of mining equipment consisting of several 45-t excavators working in conjunction with 25-t and 30-t articulated dump trucks. The processing plant is an amalgam of a 100 t/h DMS plant from the Mandala project and a 5 t/h bulk sampling plant from Droujba. Stellar retained ADP Metco to reconstruct the plants and combine them into a fully integrated kimberlite processing facility (able to handle both weathered and fresh material) with primary and secondary crushing and final recovery via Flow Sort machines.

“We’re currently running the plant at a throughput of approximately 50 wet tonnes per hour on a 2 x 8-hour shift basis,” remarks Smithson. “This is only half its capacity, so we do have a lot of flexibility in terms of increasing the mining and processing rate if we deem it necessary. After some initial modifications post



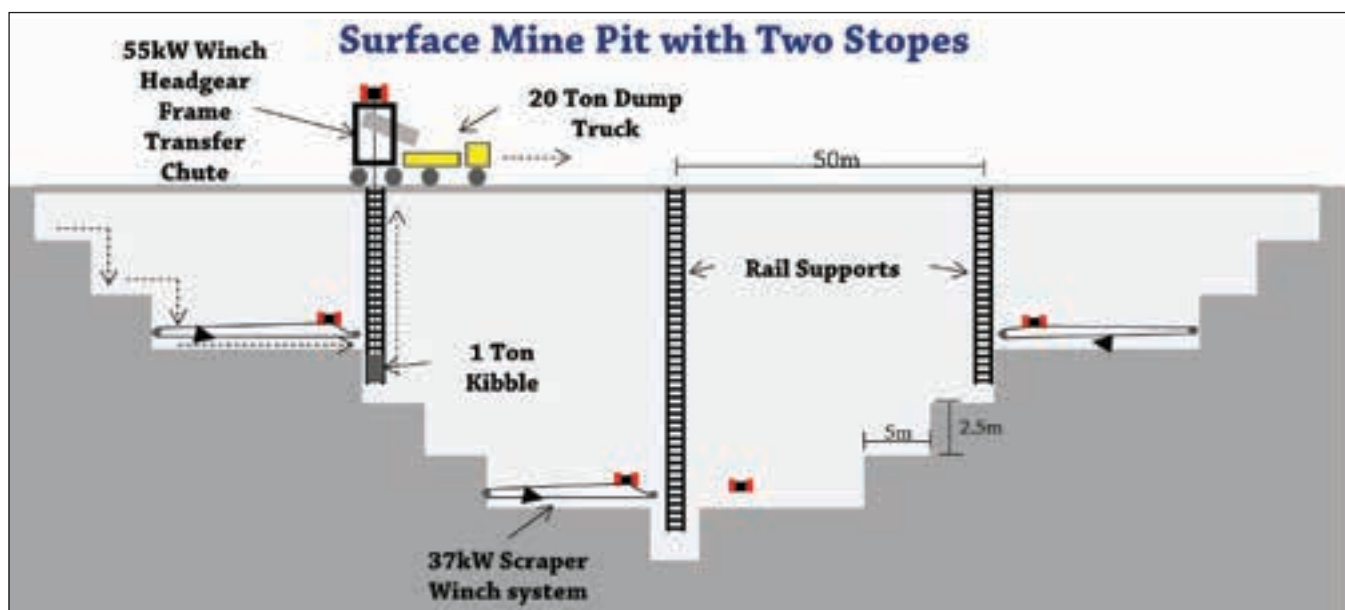
Processing plant at the Tongo kimberlite dyke project in Sierra Leone.

commissioning, the plant is now working very well and is efficiently treating a wide variety of ore types.”

According to Smithson, the staff and labour complement at Baoulé now numbers around 70 people. This includes five expats, one of them being Stellar’s Chief Operating Officer, Rowan Carr. Like Smithson, he is a geologist who spent much of his earlier career with De Beers, gaining experience in many of Africa’s diamond mining countries, including South Africa, Botswana, Angola, the DRC and the Central African Republic. As Smithson says, “Most of our permanent staff are out in the field and we have only a tiny head office establishment in London.”

Turning to the Tongo Dyke-1 project in Sierra Leone, Smithson says Stellar’s intention is to fast track it into production over the

Bench stope mining from surface to 40 m depth will be used to get Tongo into early production.



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coming year if the necessary funding can be raised. “This is a smaller deposit than Baoulé but it is a high-grade, high-value resource – by which I mean 165 cpht and US\$145 to 270 per carat – which can be mined from surface for three years, with the operation transitioning gradually into an underground mine starting from year two,” he states. “The life of mine is 16 years and over this period we would expect to produce nearly a million carats with the peak production – starting in year 8 – being about 90 000 carats a year generating approximately US\$40 million a year. The capex is very low at around US\$16 million for the first three years of operation, and we hope to secure the majority of this through debt funding.”

Smithson describes Tongo Dyke-1 as being somewhat similar – geologically – to Petra’s Helam fissure mine near Swartruggens in South Africa. “Helam is now mining at about 700 m below surface whereas we’ll be starting with a surface operation, which will be relatively low-cost in nature and should deliver 120 000 carats over three years,” he adds.

Stellar has completed an economic scoping study for the project and is currently well advanced with a feasibility study which it is undertaking in conjunction with Paradigm Project Management (PPM) of Johannesburg. PPM has also been responsible for a surface mining study. Explaining the reason for this, Smithson says it was originally envisaged that Tongo Dyke-1 would be developed entirely as an underground operation, with the 300 m shaft and associated infrastructure required taking up to two years to develop before first production and first cash flow. “We decided to look at options to accelerate production and bring cash flow forward, hence the appointment of PPM, which has huge experience in the diamond mining field.”

Based on the results of the study, bench stope mining from surface to 40 m depth has been selected as the most appropriate and attractive mining method. The plan is to have three pits of 500 m length spread across the 2 000 m strike length. Each pit has two stope faces being mined in different directions, with the stope width being 1,5 m, the face height 2,5 m and the face length 5 m. Ore will be extracted by a winch and rail-mounted mechanical 1-ton kibble. Comments Smithson: “This is an innovative approach which will allow multiple working faces with all that this implies in terms of providing us with maximum flexibility in maintaining production levels.”

Smithson points out that the Tongo Dyke-1 project has plenty of upside given that Dyke 1 is



Loading ore into the Tongo plant as part of bulk sampling operations.

just one of four diamondiferous orebodies (the others, not surprisingly, are labelled Dykes 2 to 4). “Our current JORC-compliant resource of 1,45 million carats is entirely based on Dyke 1 so clearly there is potential for it to grow as our exploration of the other orebodies continues,” he says. “In addition, at Dyke 1 the orebody has only been defined to a depth of 300 m and resources beyond this point could extend the life of mine.”

On the subject of Ebola, Smithson says that it has impacted the Tongo project more than Baoulé. “Guinea has been less affected by the Ebola outbreak than its neighbours and we have had no hold ups at Baoulé,” he observes. “Tongo, by contrast, is located in an area of Sierra Leone which was badly affected by the epidemic and our site has been on lockdown at times. But the worst of the crisis has now passed and we don’t see Ebola as an obstacle to our operations as we move forward.”

Finally, and discussing Sierra Leone and Guinea (which share a common border) as a mining destination, Smithson says his own experience of the region goes back 15 years and that it has never been more politically stable than at present. “When we started working in this region, it was highly volatile. But Sierra Leone has now enjoyed around 12 or 13 years of peace and has become a surprisingly robust democracy – it’s had three successive elections which were generally regarded as free and fair. The story in Guinea is perhaps more mixed with the political scene being quite turbulent at times but certainly the country is in better shape than it was during the days of military dictatorship. Overall, we believe that the future looks pretty good for Sierra Leone and Guinea and that conditions are now ripe for the region’s mineral wealth to be effectively and sustainably developed.” ■

“... the worst of the crisis has now passed and we don’t see Ebola as an obstacle to our operations as we move forward.”

**Karl Smithson, CEO,
Stellar Diamonds**

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Liqhobong off to a strong start

Firestone Diamonds, the AIM-quoted diamond development company developing the Liqhobong mine in Lesotho, says that the project is currently within budget and on schedule to achieve initial production at the end of H1 2016. In its recently released results for the six months ended 31 December 2014, the company says achievements thus far include a safety record of zero lost time injuries and the creation of approximately 1 000 jobs in Lesotho.

Although Liqhobong has been mined in the past, the new project will see mining at the site on a much larger scale. The new US\$185,4 mine is designed to deliver 1,1 million carats a year over 15 years, which is roughly 10 times what nearby Letšeng – Lesotho's best known mine – produces (although the dollar price per carat of Letšeng's stones is the highest of any kimberlite mine in the world).

The project is based on mining the main pipe (there is also a satellite pipe) at the site down to 393 m over 15 years, exploiting a reserve of over 11 million carats at a grade of 32,07 cph. The anticipated average strip ratio of waste to ore is 2,28. The ore will be treated in the Main Treatment Plant (MTP) which utilises a conventional flowsheet comprising scrubbing, screening, crushing, concentration via DMS, and final recovery using X-ray machines. The plant will have 2 x 250 t/h streams.

According to Firestone Diamonds, the first six months of the construction phase – which started in late June 2014 – encountered both winter and summer weather conditions. The winter was relatively mild which enabled the project to start well and the project team to get ahead on a number of work streams before entering the start of the rainy season in November.

The above average rainfall experienced in November and December and delays experienced in the issuing of work permits to the civils and earthworks contractor had an initial negative impact, necessitating a re-scheduling of certain works and increased work load. The project team also encountered areas where excess top soil needed to be removed which, in combination with the wet weather, caused days to be lost through personnel not being able to work safely. Additional crews were deployed to ensure that development remains on schedule and within budget.

Work on the residue tailings facility starter wall and the accommodation terraces is also progressing well. Overall, as at the end of



December, the project was marginally ahead of schedule with significant progress being made on the construction of the tailings dam wall, as well as other earthworks and site preparations. Design, engineering and procurement were set as a priority by the development team and significant progress has been made ahead of the scheduled targets to ensure the smooth completion of the project.

The provision of electrical infrastructure to connect the mine to grid power is a separate undertaking which is also progressing as planned. The total grid power project cost is R165 million with Firestone funding R145 million and the balance of R20 million being funded by the local company engaged to construct the power infrastructure. All equipment and long lead item orders have been placed and site preparation for the substations is well advanced. Connection to grid power is expected to be achieved during the second half of 2015, ahead of the initial schedule.

At the end of December, a total of R1,28 billion in orders out of the total budgeted R1,43 billion EPCM contract (being undertaken by DRA) had been placed. The three largest sub-contracts under the EPCM contract, totalling R943 million, have been agreed on a fixed price/cost basis to remove price escalation risk.

The grid power and Main Treatment Plant projects combined have created over 1 000 local jobs, and it is expected that the level of employment will continue to increase as construction progresses. ■

View of the site in January this year (photo: Firestone Diamonds).

Connection to grid power is expected to be achieved during the second half of 2015, ahead of the initial schedule.

Another Rail-Veyor® system in

The latest Deebar Rail-Veyor® system to be installed at a South African mine is now operational at a site in North West Province. The system will ultimately consist of three trains and will move up to 525 000 tonnes of ore a month over a distance of 2,2 km. It is expected to deliver a 30 % reduction in energy consumption compared to a conventional surface conveyor belt.

The company behind the system is Johannesburg-based Deebar, which was established in the mid-1970s by Dereck Soekoe, who is the current CEO, and whose two sons, Desmond and Brandon, now assist him in the running of the business. Deebar originally made its name as a supplier of mine shaft signalling systems and this is still its core business although its market offering has now grown to encompass many other products such as station stopping devices, mine communication devices and switchgear, starters and Fortress interlocks.

The Deebar Rail-Veyor® is a relatively recent diversification, with Deebar's involvement in this technology dating back to 2004. The first mine to adopt the system was Harmony Gold's Phakisa operation near Welkom, which placed an order with Deebar in 2005. The Phakisa installation – which is underground and just over 5 km in length – has now been running since 2007 and has proved very successful. In fact, when *Modern Mining* visited Phakisa several years ago, a senior Harmony Gold executive, Tom Smith (then responsible for the group's South African operations although he has since moved on), told the magazine that Harmony was delighted with the system.

“In terms of capex, it cost roughly R18 million to install whereas a conventional rail system, the main alternative we looked at, would have set us back R30 million,” Smith said at the time. “Operating costs are also excellent – approximately 30 % less, we estimate, than a rail system on a cost per ton basis.” He added that installation time was also much less with the Deebar Rail-Veyor® – six months as opposed to about 24 months.

Comments Desmond Soekoe: “Phakisa was the first commercial Deebar Rail-Veyor® application in the world and represented something of a learning curve for Deebar, as the



system was basically conceptual at the time we received the order. A great deal of credit must go to Harmony Gold, which essentially backed an unproven technology. Thankfully the system is now working extremely well – although it was not without its teething problems, which all had to be addressed and rectified.”

Deebar has now placed its Rail-Veyor® business in a newly established company within the Deebar group, known as Deebar Rail-Veyor®.

The Deebar Rail-Veyor® contract in North West Province has been carried out on a turn-key basis by Deebar and encompasses the design, manufacture, installation and commissioning of the system. In essence, the Deebar Rail-Veyor® will collect ore from two separate stockpiles and transport it to the stockpile feeding the concentrator. Currently only two trains have been installed but once in full production three will be needed, with each train consisting of 140 cars, each 2,14 m long. By comparison, the Phakisa Rail-Veyor® has 296 cars per train.

The project includes all track work, an incline structure to accommodate a tipping loop approximately 20 m high to allow the rail cars to tip onto the plant stockpile, and a return loop to get the trains back on track for the loading section.

The Deebar Rail-Veyor® was chosen for

South Africa up and running



Phakisa because it proved to be more economic on both capex and opex costs than the possible alternatives – either a conventional conveyor or a conventional loco system. In the case of the North West project, Desmond Soekoe believes the decisive factor influencing the mine's decision to go with Deebar Rail-Veyor® is the low

projected operating costs. "The system will save on electricity and will also cut labour costs, as it is entirely automated and requires only a single operator," he explains. He believes that the Rail-Veyor® will deliver a much lower opex than a conventional conveyor.

The North West installation incorporates

Above: The system collects ore from two separate stockpiles and transports it to the stockpile feeding the concentrator.

Centre: The completed Deebar Rail-Veyor® at the mine in North West Province.



Traction is provided by a number of equally spaced, energy efficient, dual drive stations, together with tyres in contact with the side drive plates of the cars, thus providing forward thrust.



The North West installation features a new tubular design for the supporting structures, a pneumatic tensioning system, a braking system and a new SCADA logging reporting system.

many enhancements over the Phakisa Rail-Veyor®. These include a new tubular design for the supporting structures, a pneumatic tensioning system, a braking system and a new SCADA logging reporting system, which will deliver accurate production statistics to management.

Most readers of *Modern Mining* will be familiar with the Deebor Rail-Veyor® concept but, to recap, it is a bulk material transport system described by Deebor as being based on the principle of a roller coaster, where a train consisting of a series of articulated trough-like, two-wheeled cars runs on light rails up inclines, down hills and around bends on a rail that can turn back 180 deg within 30 m. Each car is connected to the car in front by means of a swivel clevis that allows articulated movement for curves and dumping. Sealing of the gap between cars is maintained by the use of overlapping flexible rubber flaps that prevent spillage of the material and also operate as discharge chutes for dumping the load.

Traction is provided by a number of equally spaced, energy efficient, dual drive stations, together with tyres in contact with the side drive plates of the cars, thus providing forward thrust. Drive stations only switch on through sensors as the train arrives near a drive station and switch off once the train has passed through. This means that at any one time only two sets of drives are running per train, resulting in a major saving in energy costs.

An interesting question is whether the Deebor Rail-Veyor® can be described as a South African development, given that a company

based in Canada also offers a similar system under the same name. According to Desmond Soekoe, it most certainly can. “The concept on which Rail-Veyor® is based was developed in the 1960s by SECCAM, the French railroad operator, but the technology to make it work – such as variable speed drives and fibre-optic communications – didn’t really exist at that time,” he explains.

“The point to stress, however, is that the installation at Phakisa was entirely a South African designed and engineered system and was the very first commercial application in the world. We own the intellectual property rights to the system as installed at Phakisa and have taken out a number of international patents on aspects of the technology – for example, the hydraulic drive stations. We manufacture all the elements of the system locally, for the most part in our own workshops. Our only real technology partner is Mitsubishi, represented locally by Adroit Technologies, from whom we source the variable speed drives and the PLCs we use.”

An advantage of the Deebor Rail-Veyor® is its ability to adapt to a customer’s existing infrastructure. As Soekoe says, “The system can handle bends of up to 30 deg and inclines or declines of 11 deg, which would all pose problems for its competitors – locos or conventional conveyors. The Phakisa installation, for example, has six 30 deg bends along the route and climbs a 1 in 200 incline on the return side of the dedicated haulage route. Design is very site specific and each installation is customised to meet the needs of the site and, of course, the

operating parameters stipulated by the client.”

Another plus he points to is the flexibility of the Deebor Rail-Veyor®. Rails can be added and drive stations relocated to meet operating requirements while production is easily increased by simply adding additional trains (although the maximum number of trains will obviously be constrained by the total length of track). Moreover, the variable speed drive system allows for the speed to be varied at different stages of the route in order to achieve specific tonnages.

Summing up, Soekoe says the Deebor Rail-Veyor® is a world-beater with the potential to revolutionise materials handling in mining (and indeed other industries). “With two installations in place, the technology can now be considered as mature and we’re now ready to roll it out in earnest to the mining industry, with the initial focus being on mining operations in Southern Africa. In fact, we are currently in very serious discussions with three separate clients to install the Deebor Rail-Veyor® at four separate projects, three in South Africa and one in Zambia. I feel confident that we will soon be announcing further orders.” ■



The Deebor Rail-Veyor® at the Phakisa gold mine in the Free State has been running since 2007.



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Bulk bag filling station handles abrasive zircon and rutile

Tronox Western Australia operates the world's largest fully integrated titanium ore and titanium dioxide (TiO₂) project, covering the spectrum from mining of mineral sands through extraction and upgrading to obtain TiO₂ pigment. The project is also a major producer of the mineral zircon (zirconium silicate), which is also obtained from the mineral sands.

The chief products at Tronox's Western Australian operations are rutile (TiO₂) and zircon (ZrSiO₄), which ultimately are loaded into bulk bags at Tronox's Henderson shipping facility and transported in shipping containers to nearby Fremantle, Western Australia's largest and busiest cargo port – for export and domestic use.

The loading of bulk bags over the years had become a bottleneck, but has been remedied by a special bulk bag filling station from Flexicon Corporation Australia.

The granular zircon and rutile are brought to the company's shipping facility in Henderson in tipper trucks, which empty their loads onto the concrete floors of large storage sheds. From there, the product is loaded into bulk bags.

The bagging operation was largely a manual process in which a forklift truck held the bag while a second forklift truck held a V-shaped funnel (or hopper) over the bag and a front-end loader dropped the ore through the funnel into the bag.

Tronox dramatically improved its bulk bag filling with a heavy-duty skid-mounted mobile bulk bag filling station that integrates a 2,5 m³ capacity hopper, a 4,5 m long steel tube screw conveyor, and a Twin-Centrepost™ bulk bag filler.

Nicknamed 'Rhonda' at the Henderson facility, the bulk bag filling station stands 3,3 m at its highest point and is 3,6 m long. It was engineered and supplied by Flexicon (Australia). The unit doubles output per operator over the former method, while improving health and safety since filling is enclosed and essentially dust-free, according to the company.

Formerly, three employees filled about 80 bags in a 10-hour day. Currently, two employees fill about 90 bags in an 8-hour day.

The Flexicon Twin-Centrepost™ design with two on-centre posts maximises strength, which

is essential since the unit must fill material of differing weights – 1 000 kg, 1 750 kg and 2 000 kg. The basic design consists of two steel posts, which support a fill head and pneumatically-retractable hooks on which the bag hangs. Enclosing the bulk bag filler and supporting the 4,5 m long tubular conveyor is the station's heavy-duty outer frame.

The bulk bag filling station moves between the zircon- and rutile-filling operations, which are located approximately 800 m apart. Due to its relatively small footprint, the skid-mounted system can be moved using a three-ton forklift.

Nevertheless, the capacious hopper can hold 6,4 to 7,3 tonnes of zircon or 4,5 to 5,4 tonnes of rutile, in granular form. During filling, the front-end loader empties material into the hopper while the conveyor draws the material from the inlet at the bottom of the hopper and transports it 4,5 m, at an incline of 40 deg, before it gravity feeds through the conveyor outlet, transition adapter and telescoping steel downspout into the bulk bag.

The conveyor consists of a rugged steel screw that rotates within a 220 mm dia steel tube. Since both the rutile and zircon are abrasive, the screw is made of a thick stainless steel conveyor spiral designed to heavy-duty mining specifications. The high-capacity screw automatically self-centres within the tube, allowing a 100 % fill percentage. The throughput capacity of the conveyor is 20 m³/h, and can fill a 1,8 tonne bag with zircon in approximately one-and-a-half minutes.

A programmable logic controller (PLC) governs the filling operation. The operator pre-sets the bag weight, then starts the conveyor. The conveyor speed slows when the bag is almost full and stops when the bag reaches the desired weight.

The Flexicon system is available locally from Flexicon Africa, based in Port Elizabeth. ■



One operator attaches the bag to the fill head as the other operator pre-sets the bag weight and initiates filling at the PLC. The Twin-Centrepost™ design filler frame and heavy-duty outer frame impart strength for filling bags weighing between 1 000 and 2 000 kg.

Moolmans shows its resilience in



Stuart White, MD of Aveng Moolmans.

A 500-ton RH200 (now the Cat 6050) shovel belonging to Aveng Moolmans at work at the Sishen iron ore mine. This is the largest machine in the company's mining fleet.

The severity of the downturn in mining is such that it has left many open-cut mining contractors desperate for work, with the result that competition for new contracts is intense with bids being cut to the bone. One company, however, that is weathering the storm well is Aveng Moolmans, which probably ranks as the biggest surface mining contractor in Africa. Says its MD, Stuart White: "We remain profitable and we certainly have no intention of indulging in the practice of 'buying' work. Obviously, we need to put in competitive bids but there has to be a limit to how far this goes. At the end of the day, the mining industry needs a healthy, well-resourced and professional mining contracting sector and this can't be achieved if work is taken on at sub-economic levels."

White points out that Moolmans, which has been in business for 65 years (it was founded by brothers Mike and Cedric Moolman in 1950), has survived multiple recessions over the years and has learnt to take them in its stride. "The key thing is not to do anything stupid or anything reckless," he says. "Like everyone else, we've experienced a drop in turnover. But we have a relatively healthy order book – with certain contracts still having several years

to run – which will see us through the downturn. In the meantime, we are focusing inwards on efficiencies and the quality of earnings. In the contracting business, you're probably going to get eight out of ten contracts right. In a normal market, you can live with the two that aren't performing on all cylinders. In the current market, however, you need all 10 contracts to be firing. This is where we're placing the emphasis on ensuring that every contract is producing to plan and to budget."

He adds that Aveng Moolmans probably



feature

a highly competitive market



has 15 to 20 % of its fleet standing. “We’re not unique in this – all our competitors have the same problem. In fact, one of the larger equipment suppliers has told us that around a third of the global surface mining fleet is currently parked so we’re probably doing better than most. Obviously, in this situation we have no immediate plans to invest in new kit – although we wouldn’t shy away from new investment should the right opportunities present themselves.”

White, who describes himself as “a civil engineer with an identity crisis”, started his career as a civil engineering student with what was then LTA in 1982 but soon transferred over to Moolmans (which by then was part of the LTA Group). “Moolmans was still at that stage mainly a roads and earthworks contractor but it was already starting to move into mining,” he recalls. “So I ended up as a civil engineer working mainly in the mining field.” Since those early days, White has worked for Moolmans all over Africa and in 1997 became GM of Moolmans’ West African operation, which saw him relocating to Accra in Ghana. He has been an Executive Director of Moolmans since 1999

and in February 2012 succeeded Brian Wilmot (who moved on to become head of Aveng Mining) as MD of the company, by then known as Aveng Moolmans.

According to White, an interesting feature of Aveng Moolmans’ current workload is that almost two-thirds of it is in South Africa. “We’re down to about 35 % of our turnover coming from outside our borders, which is a complete reversal from two or three years ago when cross-border work accounted for about 70 %,” he says. “This change is not by intent and we intend restoring our footprint around Africa but at the moment it’s a case of fishing where the fish are – and that’s South Africa.”

Aveng Moolmans now only has one contract in the West African region compared to three several years ago. “This is at Sadiola in Mali where we’ve been continuously working since the mine was established in the mid-90s,” notes White. “I suppose the problem we’ve had in West Africa is that we were over-exposed to a single client and to a single commodity, gold. We’ve always been aware of this and we have tried to diversify in the region. For example, about 18 months ago we targeted the

Tati Nickel’s Phoenix open-pit mine near Francistown in Botswana, where Aveng Moolmans has been working since 2002.



Cat 777F dump truck working at the Klipbankfontein pit, Kolomela iron ore mine in the Northern Cape.

multitude of iron ore projects in countries such as Mauritania, Sierra Leone, Guinea and Liberia but nothing came of this, as the iron ore price started to slide and the opportunities all dried up. We remain optimistic about West Africa though and are confident that it will eventually once again become a major source of revenue for us.”

In South Africa, Aveng Moolmans has contracts at Kumba’s Sishen and Kolomela iron ore mines in the Northern Cape and – in the same area – at Tshipi é Ntle’s Tshipi Borwa manganese mine. Across the country in Mpumalanga it has secured a major, five-year contract at Nkomati Nickel. This started in July last year and is currently running very successfully. Elsewhere in the Southern African region, it is working in Namibia at the Langer Heinrich mine (where it has been busy for the best part of ten years) and at Phoenix mine for Tati Nickel in Botswana. In the past, it has worked in both Tanzania and Zambia but has no current contracts in these countries.

“Most of our contracts are of substantial size,” says White. “In fact, we have positioned ourselves as a contractor able to handle the demanding requirements of ‘blue chip’ clients in terms of both the huge volumes and the high safety standards that they invariably require. This end of the market is far less crowded and prices are far more realistic. Our biggest single client is Kumba and I would estimate that we are currently moving about 80 Mt a year at Sishen and Kolomela – which is massive by

any standards. We have some of our biggest plant on these jobs, including 200-ton payload trucks and 500-ton shovels. Nkomati is also involving substantial tonnages – around 30 Mt of waste and ore a year.”

What of coal mining? “We have a long track record in coal with our first contract in this field dating back to the mid-80s – when we even had a Marion dragline in our fleet,” responds White. “But at the moment we have no coal contracts on our books. One of the problems is that with so many small coal projects around, you’re tending to get anybody with a few items of plant moving into opencast coal mining contracting – earthmoving companies looking to diversify, water well drillers and plant hire companies among others. The result is that coal has become the entry point for contract mining with predictable effects on pricing.

“Encouragingly, though, some of the bigger coal mining groups have identified the risks of taking on just anyone as a contractor and will only accept bids from the likes of Aveng Moolmans and a handful of the other big players. Our absence from coal is just temporary and I’m certain that coal will be very important for us going forward – particularly with new coalfields such as the Waterberg starting to open up.”

On geographical diversification, White emphasises that Aveng Moolmans will go anywhere in Africa – for the right projects and the right clients. “We don’t rule out any countries. We have an intensive risk assessment process

that assesses the client profile and the project profile. If these are right, then we're not too concerned about the specific country. We have huge experience of Africa and are confident that we can work successfully anywhere on the continent." He adds that Aveng Moolmans may in the future look beyond Africa. "I think it would be a natural evolution for us to take the business beyond Africa within, say, the next five years. The areas we are most likely to target are the Middle East, South America and the CIS region of Central Asia."

Discussing Aveng Moolmans' strategy in Africa, White emphasises that the company does not have the normal contracting mindset. "Most open-pit mining contractors will move into a country and then move out again as soon as their contract is finished," he explains. "By contrast, we commit to a country. Our goal is to build a sustainable business and we back ourselves that we'll extend the business beyond the normal three or five years for which most contracts run. We believe this is the only way to operate successfully in Africa. We also localise our operations. When we start a contract our rule is that up to 10 % of the workforce might be brought in from South Africa to get things established. But it's also our rule to bring this figure to below 5 % as soon as possible. In the case of our Langer Heinrich operation in Namibia, the entire workforce, including senior management, is 100 % Namibian."

On the subject of safety, White says Aveng Moolmans has many achievements under its belt and that its record compares favourably with its peers. "Having said this, we still have our blemishes and this is not acceptable," he observes. "We have all the right systems and processes in place but the challenge is to make safety awareness a part of our DNA. We work at this constantly and we've made very significant progress over the years but we can't let up – ensuring high safety standards is an on-going process that can never be relaxed. It will continue to be top of our agenda for as long as we operate."

Very close to safety in importance is training and Aveng Moolmans believes that it has world class systems and programmes in place, which are MQA accredited in South Africa, and carry accreditation by local training authorities in certain of Aveng Moolmans' other countries of operation. Says White: "I won't go into all the details of our training initiatives, which could be tedious, but suffice it to say that one of the keys to contracting success is to have high quality operators backed by first-rate technicians and mechanics. We can take someone who has



never before so much as seen a big mining truck and turn him – or, increasingly, her – into an operator in 240 hours. Many of our sites, incidentally, have sophisticated mining equipment simulators and our goal is to have these on all our contracts."

Finally, what of the prognosis for mining? "The short answer is that no one really knows," White responds. "Around 18 months ago, we were predicting an uptick in late 2015 going on 2016, and we've now put that back a year. But no downturn lasts forever. In the meantime the task of Aveng Moolmans' management team is to ensure that we're in good shape when the upturn comes and ready to take advantage of all opportunities and this – as I've said – is precisely what we're doing."

Photos courtesy of Aveng Moolmans

One of Aveng Moolmans' Cat 789D mining trucks. These 181 tonne (200 ton) payload machines are the biggest trucks that the company operates.

Moolmans and Shafts & Underground to merge

As this article was being written, Aveng was in the process of consolidating Aveng Moolmans and Aveng Mining Shafts & Underground. "These two business units were clustered together under the Aveng Mining banner in 2012, the rationale being that they were both involved in mining contracting," explains White. "A full integration of the two businesses, however, never took place and they each continued to carry their own overheads and operate more or less independently of each other. Aveng has now decided to fully merge the two entities, so that they share a common management, operate under a single brand and share central services."

The combined entity will be a formidable player in mining contracting, with the two business units having contributed R6,5 billion in revenue (12 % of the total) to the Aveng Group's overall revenue in the year to 30 June 2014. Of this R6,5 billion, Aveng Moolmans was responsible for R4,7 billion. The combined net operating earnings for the year were R529 million.

White will act as MD of the new combined mining business unit. As of this writing, the name under which it will operate had not been finalised. ■

Concor pioneers a new approach to contract mining

Concor Opencast Mining, part of the Murray & Roberts Group, reports it is pioneering a new approach in the contract mining industry whereby it forms alliances or partnerships with its clients in order to agree upon a common objective and a defined initiative to realise the best outcome for all concerned. "Our vision is to move away from conventional practice which is dominated by a rate-per-ton approach," Gert Buitendach, Contracts Director, says.

According to Buitendach, Concor Opencast Mining is diversifying away from conventional contract mining and focusing on offering a value-added service in terms of its practical knowledge base. "This means we have an intimate understanding of the cost structure of a mining operation and how to achieve the required production rate," he says. He also reveals that one of the company's most significant investments in 2014 was its procurement of the Geovia Surpac and MineSched mining software.

"This enables us to carry out detailed scheduling of projects, which means we are able to fully quantify the solutions we offer our clients.

As part of our value-added service, we can also back up or augment the internal design scheduling capacity of our clients by being able to verify or carry out our own studies as well. In addition, if clients do not have access to such a service, we can offer this as well."

Buitendach adds that contracts delivered purely on price often do not entail the best long-term solution for the client. "There is a trade-off between short-term benefits and long-term losses. This is particularly prevalent in commodity sectors such as coal, which are under pressure and hence extremely competitive in terms of contract pricing."

He believes the advantage Concor Opencast Mining has in this tight market is its proven capability to deliver results and meet the requirements of its clients. The company has operations in both soft- and hard-rock mining, from coal to platinum and iron ore. "We have experience in the full commodity spectrum. We have also diversified into certain value-added mining requirements by offering crushing solutions, drawing on the construction infrastructure we have at our disposal."

Having full access to the group resources of Murray & Roberts itself gives Concor Opencast

Concor Opencast Mining operations at the Vlakfontein coal mine.



feature

Mining a distinct advantage with this approach. “We have a cross-functional platform in terms of underground mining, civils, infrastructure and engineering. We are part of a diversified group and have a significant knowledge base to draw upon,” says Buitendach.

“We are able to offer the appropriate client and project the option of transitioning from an opencast operation to underground mining. This is particularly suited to the platinum sector, where operations commence with opencast mining and progress to underground decline development. We can offer a combined solution.

On crushing solutions, Buitendach says: “It is not just the crushing operation itself, but the associated equipment as well. Concor Opencast Mining has access to some of the largest mobile crushing trains in the country, which gives it the capability to carry out significant crushing projects and crush to the required specification.”

Another strong market differentiator for Concor Opencast Mining is the considerable experience it has accumulated on dipping or inclined orebodies, especially on the platinum belt. “The knowledge we have gained on utilising mobile plant in this sector stands us in good stead when working on traditional orebodies. If we are able to operate successfully in the most difficult inclined conditions, then it becomes so much easier on the level areas.”

Buitendach explains that while Concor Opencast Mining positions itself to be able to deliver medium- to large-sized projects, if a particular client has a requirement for a larger



Concor Opencast Mining has extensive experience in platinum mining. Seen here are operations at Lonmin.

project, its partnership with Downer Mining of Australia gives it the necessary capability in this regard. The combined effort of Downer Mining and Concor Opencast Mining will ensure that any joint operation “has sufficient resourcing, infrastructure and systems to enable the delivery of a Tier 1 project.”

Downer Mining has extensive experience in running ultra-class mining equipment, comprising some of the largest units in the world, such as 800-t class excavators and 300-t class dump trucks. “In principle, what this agreement means is that when there are projects

Machines from Concor Opencast Mining working at the Beeshoek iron ore mine in the Northern Cape.



feature



Undertaking a bulk sample for Sasol in the Waterberg.

of mutual interest that are suitable for both of our objectives, we will partner with Downer Mining.”

The Australian mining giant has also developed proprietary systems to ensure the efficient and effective utilisation of this ultra-class equipment. “We can combine our local knowledge with Downer Mining’s Tier 1 mining practices in order to be able to offer a total solution to the local market,” Buitendach says.

In terms of fleet, Concor Opencast Mining has access to Murray & Roberts Plant, a sister company. “We procure equipment for specific projects as contract requirements differ. Our fleet ranges from typical road milling machines through to 120-t excavators and 100-t dump trucks.”

Also key to Concor Opencast Mining’s diversification is its move into tailings dam construction, such as a project it is undertaking for a large platinum mine in Limpopo. “We are constructing an impoundment wall. This does not only involve bulk volume placement, but also incorporates detailed compaction placement for the interface layer. This is one of the specialised areas we are diversifying into,” Buitendach explains.

Concor Opencast Mining has SABS and MQA accreditation as an ISO 9001 training provider, which means it is able to deliver

competent operators. Sister company Murray & Roberts Plant also has ISO 14001 and OHSAS 18001 accreditation. “This ensures that our operations are safe and controlled, as well as ultimately delivering reliable equipment in terms of both operation and maintenance.”

Buitendach adds that Concor Opencast Mining also effectively implements Murray & Roberts Group initiatives such as its STOP. THINK.ACT 24/7 health and safety campaign and its Visible Felt Leadership programme. “Safe production is the ultimate outcome that we need to deliver. If it is unsafe in any aspect, then it is not sustainable.”

Looking at its strategy for 2015, Buitendach says that Concor Opencast Mining remains focused on operational excellence, combined with accurate cost management within its operations, in addition to a strong focus on health and safety. Another major focus is active labour engagement. “We are working actively to get closer to our people.”

Buitendach adds: “Our ability to achieve excellence in project delivery and safety performance also depends on our partners and suppliers. We therefore focus on the proactive management of our construction partners, with Concor Opencast Mining hosting an Open Day to engage with business partners and sub-contractors. We distribute a supplier engagement



pack in addition to an induction into the way we work and how we do business. A corollary of this is a harmonised system with alignment between client and contractor expectations.”

In addition, Concor Opencast Mining is developing its skills base internally, such as its participation in the Construction Management Programme (CMP) hosted annually at the University of Stellenbosch. “There is an

ongoing and stronger focus on project management excellence to enhance our project delivery performance,” Buitendach says. In conjunction with the University of Pretoria’s Gordon Institute of Business Science (GIBS), a leading business school, Murray & Roberts has also developed a number of leadership programmes to develop its future leaders.

Photos courtesy of Concor Opencast Mining

Construction of an interface layer. Concor Opencast Mining is diversifying into tailings dam construction.

feature

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Liviero moves into drill and blast

Multi-disciplinary construction group Liviero has added a new service offering to its capabilities. Liviero Drill & Blast (Pty) Ltd is a new company that has been launched to enable Liviero to offer its clients drilling and blasting services that meet the group's high standards in safety and quality, says Group CEO Neil Cloete. It rounds off Liviero Mining's opencast business and will add exceptional value for clients, he notes.

Johan Pieterse is the director at the helm of Liviero Drill & Blast. He has a career in drilling and blasting that spans more than 20 years and was previously CEO of JEF Drill and Blast.

Liviero's opencast mining business (see also page 16) has grown substantially since it was launched five years ago. Today, the operation moves more than 35 million m³ of material a year. "All blasting was previously contracted out of the Liviero Group, so the next logical step was to investigate the feasibility of starting a Liviero company to undertake the drilling and blasting in-house," explains Cloete. "This investigation turned out to be very positive, and prompted Liviero to embark on the new venture as soon as possible."

Liviero Drill & Blast's short-term strategy is to manage the drilling and blasting operations on all Liviero Mining's current contracts, and those in the pipeline. The company will expand this customer base in the future, Pieterse says.

Liviero Drill & Blast is based in Middelburg. "We will develop the company into a sustainable, respected and proud brand that will add a new value proposition to the Liviero Group's existing expertise," Cloete concludes. ■

Light tower selected by mining contractor after 'shoot-out'

Chicago Pneumatic's CPLT M10 light tower has been chosen by opencast mining contractor Diesel Power Open Cast Mining following a live demonstration in which the unit reportedly outperformed models from other suppliers.

Chicago Pneumatic, represented by its authorised South African distributor, United Sales & Service (USS), demonstrated the features, effectiveness and benefits of the CPLT M10 through a day-night demonstration with the results closely monitored by Diesel Power's technical staff.

Each manufacturer was required to demonstrate the ease of assembly and stability of the light tower. With safety being a priority in all mining environments, Diesel Power required the light tower to be safe, stable and easy to position. With its quick and simple-to-deploy manually winched mast, safe locking mechanism and robust 819 kg base stabilised by its wide outrigger footprint of 3,4 x 2,8 m, the CPLT M10 met these requirements.

The night demonstration included Diesel Power independently measuring the lux results. The CPLT M10 outshone its rivals with 110 lux at 50 m, 21 lux at 100 m and 3 lux at 150 m.

All 10 CPLT M10 light towers purchased by Diesel Power are currently in place at one of its copper mine operations in Botswana. ■

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APE Pumps completes orders for Iranian mine



Pontoon assembly adjacent to the tailings dam at Sungun mine.

APE Pumps has completed two orders placed by Iran's Sungun copper mine, one for a train of eight pumps to operate as a very large multistage machine transferring slurry to the tailings dam, the second for four pontoon-mounted axial flow pumps to recycle dam water. The two orders are together worth some US\$6.4 million to Wadeville-based APE Pumps.

John Montgomery, the engineer behind the design of the twelve machines covered by the two orders, said when commenting on the order that South African engineering companies are stepping in to fill part of the void left by European firms reluctant to enter into contracts with Iran.

"We have this year received an order for

a large mixer pump related to the Iranian oil industry, and we are tendering on several other contracts in that country," he said. "Orders from Iran are likely to increase."

APE's multistage pump train for Sungun comprises eight high pressure (70 bar) slurry pumps fitted with modified impellers to improve efficiency and performance, and delivering a capacity of 1 000 m³/h to manage slurry transfer in the recently expanded mine. These pumps were installed mid-2014 to complement two similar slurry pump trains, one operational and one on standby, manufactured by a competitor and installed in the original concentrator plant.

The open-pit Sungun mine is located

at high altitude (2 390 m) in the Qarabagh Mountains of East Azerbaijan province, north-west of Ahar city. Annual ore production of approximately 14 Mt is deposited in a large tailings dam after copper extraction.

Iran's scant average annual rainfall of 230 mm dictates that the mine recycles its tailings dam water for reuse in the extraction process, and it is for recycled water transfer that the pontoon pumps were ordered. Sungun mine has a recycled water target of 85 %.

The pontoons were assembled and fitted with APE's vertical turbine pumps in a small excavation immediately adjacent to the tailings dam. When assembly was complete, the wall of the excavation was broken through to the dam, allowing the pontoons to float free.

Each equipped with two standard 18-inch APE vertical turbine pumps driven by 600 kW WEG motors, the two pontoons are fitted with weatherproof housings as well as de-icing agitation pumps as protective measures against the very cold winters of East Azerbaijan. Winches are used to anchor them to various points around the dam.

Commissioning is scheduled for later this year.

APE Pumps, tel (+27 11) 824-4810

MSA launches emergency escape breathing device

Workers unexpectedly caught in toxic atmospheres can secure life-saving respiratory protection within seconds using the new PremAire Escape compressed air emergency escape breathing device (EEBD), launching locally early-2015 by MSA Africa.

MSA Africa Respiratory Products Manager Suraksha Mohun notes that the PremAire Escape device can be fitted in under five seconds. "What's more, it provides an air supply of 10 to 15 minutes, thereby allowing the wearer to escape without difficulty from any hazardous environment."

The patented PremAire Escape is designed to withstand high levels of industrial gas leaks, in harsh chemical environments such as hydrogen sulphide (H₂S). "The major components of this device have undergone critically high H₂S concentration

testing by a third party. Despite concentrations exceeding 25 %, the permeation detected remained minimal," observes Mohun.

The PremAire Escape is said to be ideally-suited to the oil and gas sector, and was specifically developed by MSA following extensive input from global customers in this sector, who highlighted the need for a fast-to-fit and easy-to-use respirator.

The standard PremAire Escape is equipped with a 3S full face mask suitable for standard escape scenarios where gas leaks are under control. For protection in situations where there is a high concentration of uncontrolled lethal gas, a mask-hood is also available. This combination provides two independent protection barriers.

Another innovative EEBD being launched locally in the near future by MSA Africa is the PremAire Combination Airline/

Escape. Mohun explains that the core component of the PremAire Combination is the unique combination valve design.

"It combines the first stage pressure reducer, the cylinder valve and the cylinder gauge within one assembly, creating a small size and profile less likely to snag when working in a confined space. A hard cover for this assembly ensures additional protection and easy handling of the air cylinder," she says.

The belt and shoulder harness assembly provides increased comfort and ergonomics for long duration jobs while at the same time allowing the repositioning of the air cylinder from the right hip to the left hip or any other comfortable position without the need to doff the whole device. The holster carrier secures the air cylinder while allowing easy and fast detaching or attaching of the cylinder to provide high manoeuvrability in tight places.

Suraksha Mohun, MSA Africa, tel (+27 11) 610-2600

Bell introduces innovative mobile plant

Bell Equipment, the distributor of Finlay mobile crushing and screening equipment in Southern Africa, has introduced an innovative new product born from a joint venture partnership between Finlay and Spaleck of Germany.

The company says the processing of what was once believed to be awkward materials, such as difficult and wet waste or demolition materials, is a thing of the past now that Finlay, who are pioneers in mobile tracked equipment, have created a partnership with Spaleck of Germany, who themselves are market leaders in static recycling technology.

At the heart of this mobile plant is a two-deck German-designed and constructed high performance screenbox. The unique stepped top deck design, combined with state-of-the-art flip-flow technology on the bottom deck, places the Finlay 883+ Spaleck into a class of its own, says Bell.

Its processing and application flexibility make this machine the only all-in-one

mobile solution for processing difficult waste, recycling slag, construction and demolition waste, shredded metal, wood, compost, mulch, ores, coal and soil.

Large-grained material can also be screened on a screening machine fitted with the Spaleck Flip-Flow screen deck. The screening deck, with its 3D screen segments, is positioned above the Flip-Flow screen deck to form a cascade and protects and reduces the stress on the Flip-Flow screen mats. The service life of these mats is therefore increased while optimal screening results are guaranteed.

Thanks to their modular construction, the 3D screen segments with maximum open screen area can be quickly changed when necessary.

The first Spaleck screenbox in the Southern African region has been retro-fitted onto an older Finlay 883 screen. It is currently being deployed on a mine in Namibia where it is used as a scalper for producing gabion rock. According to



The Spaleck screenbox available from Bell Equipment.


the machine's owners, the retro-fitting of the screenbox was quite simple and it really dropped into the Finlay 883 with no problems.

"We see the addition of the Spaleck screenbox to our established Finlay machines as a value-adding exercise and believe that once the market is exposed to this state-of-the-art technology, there will be no limit to its application in the Southern African market," says Paul Chappel, the Finlay Regional Sales Manager supporting Bell Equipment.


Bell Equipment, tel (+27 11) 928-9700

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Johnson completes heavy lift for mill change-out



Johnson Crane Hire brought in a LR 1600/2 600 t crawler crane from Europe to take off the gears, remove the old mills and install the new one at Zimplats' Selous Metallurgical Complex in Zimbabwe for client FLSmidth.

Johnson Crane Hire's Heavy Lift Division has completed a major heavy lift project at Zimplats' Selous Metallurgical Complex (SMC) in Zimbabwe for client FLSmidth. The mechanical contractor was Competitive Construction Services (CCS) of Vanderbijlpark, Gauteng. The project was completed without any Lost Time Injuries (LTIs) due to the close working relationship between the professional team and a strong focus on health and safety.

"We were contracted to remove an old mill weighing 225 t, with a radius of 31 m,

and to replace it with a new one weighing 170 t," says Grant Parker, Project Manager at Johnson Crane Hire. The successful completion of the project marked the culmination of two years of detailed planning and engineering.

Johnson Crane Hire used a 250-t crawler crane – on site at the SMC since the beginning of September 2014 – to assemble the new mill. The components weighed about 60 t to 70 t each. "We then brought in a LR 1600/2 600 t crawler crane from Europe to take off the gears and remove the old mill and install the new one, as we were concerned our LR 1750 Liebherr crawler crane was not going to finish on time at a project at Nacala in Mozambique," Parker explains.

Johnson Crane Hire had a tight window from 29 September to 22 October 2014 to complete the heavy lift project, which was when the SMC had a shutdown period. The 600-t crawler crane completed the lift on 13 October, well within the timeframe. "The entire project went off very smoothly and we managed to hand the new mill over ahead of time. It was a tremendous team effort in conjunction with our client as well as the mechanical installation crew," Parker comments.

Kurt Domain, Project Engineer at

FLSmidth, explains that as the OEM, FLSmidth supplied the replacement shell of the new semi-autogenous grinding mill in sections for assembly on-site. "At the point where it was ready for installation, the complete mill was lifted by the 600-t crane directly into its final position. We worked very closely with the Johnson Crane Hire team during this process."

Domain comments that what differentiated this project was the fact that the mill shell was essentially pre-assembled on site and then lifted into place as a single unit. "Normally what we do is simply build the shell on the foundations, where the bearings are located. However, in this instance we had to adopt a modular approach in order to cater for the production and thus time constraints. This meant a great degree of upfront planning was involved."

Zimplats Holdings Limited is 87-% owned by Implats. At present it operates four shallow mechanised underground mines and a concentrator at Ngezi. The SMC, located some 77 km north of the mine, comprises a concentrator and a smelter. Zimplats' Phase 2 expansion project is expected to increase production to 270 000 ounces of platinum in matte in 2015.

Peter Yaman, Johnson Crane Hire, tel (+27 11) 455-9242

Weir Group strengthens its comminution capability

The latest trend in the mining and minerals industry is a move towards the design and construction of modular plants, says Gavin Dyer, Regional Managing Director, Weir Minerals Middle East and Africa. In support of a strengthened comminution offering, The Weir Group has acquired Trio Engineered Products of the US. This further improves Weir Group's position to capitalise on the modular plant trend and to increase its market presence in the sand and aggregate sector.

Trio's range of products is currently distributed in South Africa by Pilot Crushtec International, a relationship that will remain intact after the acquisition. Trio designs and manufactures a range of crushers, screens, feeders, washers and materials handling solutions for the aggregate and minerals sector.

The agreement to acquire Trio will leverage significant opportunities for both Weir

Minerals and Pilot Crushtec International in accessing new market opportunities and utilising their specific engineering excellence and expertise. "Modular systems comprise quick and easily available modules that can be on site and operational within a day or two. This methodology is being adopted by the entire market, certainly in the crushing and screening sector," says Sandro Scherf, MD of Pilot Crushtec International.

Another advantage of modular plants is that, in terms of any potential process changes, these can be slotted in easily. "Sometimes the requirements change, as with the aggregate sector when another product fraction is called for. Tracked mobile plants are the easiest in terms of mobility, but due to high capital and operational costs, these are not always the best option. Semi-mobile modular plants have a lower capital cost, as they usually do not

rely on diesel power. They are far cheaper to operate and can still be relocated quite easily."

Scherf says that the Original Equipment Manufacturer (OEM) market in Africa is still quite depressed, which has meant a renewed focus on customer service and aftermarket support. Dyer comments: "We have always been close to our customers, from a technical service and aftermarket point of view, and that is unlikely to change with our agreement to acquire Trio."

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

Rene Calitz, Weir Minerals Africa, tel (+27 11) 929-2622

Maptek re-launches open-pit scheduler as Evolution

Mining solutions developer Maptek has re-launched the open-pit scheduler which it acquired from Orelogy in 2014 as Maptek Evolution.

Evolution contains strategic, tactical planning and optimisation tools for preparing development plans and medium to long term mine schedules. The software runs on a cloud-based server using algorithms which are ideally suited to multi-objective problems such as scheduling.

"Processing schedules within a single solution and leveraging the cloud is 10 times faster than traditional methods," says Maptek Mine Scheduling Manager Steve Craig. "Many iterations are run to analyse the most relevant solution for a particular set of data inputs and operating conditions. Planning teams can concentrate on developing the scenarios that add value.

"Evolution employs cut-off grade optimisation which is the single most effective task that can add value to a project," he continues. "This optimisation accounts for the complex geo-metallurgical environment, balancing mining, milling and refining capacity constraints to maximise value and does it extremely efficiently. This complicated process is now encapsulated in a straightforward application, so engineers can readily explore where value can be added to their projects."

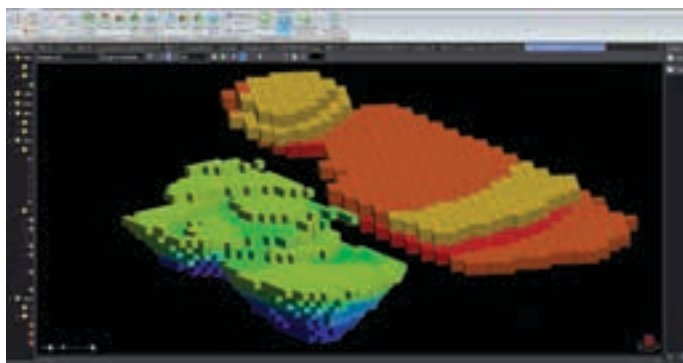
Evolution's tactical approach generates a production schedule while also optimising the haulage fleet and the shape of waste landforms. This results in the optimised allocation of haul routes with calculated cycle times, productivity and fuel burns. Scheduling across planning horizons helps operations hit blending targets and meet customer specifications.

"Holistic scheduling ensures optimised haulage routes and grade/tonnage consistency throughout the mine life. Mine planners and management can feel confident that their decisions are based on profitability right from the start of their project. Yet there's flexibility to adapt to fluctuating commodity prices," Craig added.

"Engineers always look for practical solutions. The integration of Evolution with Maptek Vulcan mine planning software will provide the necessary tools. Our first project is phase optimisation, a tool which is in high demand for finding the most practical phase design for a schedule."

Founded over 30 years ago, Maptek is a leading provider of software solutions for the mining industry.

Maptek, tel (+27 11) 750-9660, e-mail: info@maptek.co.za



Maptek Evolution contains strategic, tactical planning and optimisation tools for preparing development plans and medium to long term mine schedules.

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Black Rock expands its simulator fleet



Black Rock has recently acquired a CYBERMINE simulator for an Atlas Copco 235-H bolter.

Assmang's Black Rock manganese operation in the Northern Cape is expanding its training simulation capacity to increase safety and productivity levels. Black Rock's training team recently completed factory acceptance testing of their new CYBERMINE simulator for an Atlas Copco 235-H bolter at global training simulator provider ThoroughTec Simulation.

"We have a big need for operators that know how to use this bolter safely and efficiently," says Gideon Hayward, HRD Manager at Black Rock Mine Operations. "Operators of the 235 need to know how to support the hanging walls correctly to prevent potentially fatal rock falls."

Black Rock has seen a reduction in Lost Time Injuries (LTIs) since moving over to the advanced 235-H bolter, of which they have around 20 in their fleet across their Gloria and Nchwaning 2 and 3 mines. Now it wants to use its latest CYBERMINE high fidelity simulator to improve upon these safety and efficiency levels in a cost effective way. Black Rock now boasts five CYBERMINE simulators across a range of underground equipment, including complex drill rigs, scalars, ADTs and LHDs.

Safer, more advanced equipment is only as good as the operator. "We need to ensure that our operators follow correct operating procedures when handling the equipment and by using the simulator we are able to achieve that," says Hayward. The simulator will monitor functions such as colliding the boom with the face, drilling without flushing and inserting the incorrect amount of resin and will score the operators on their performance.

"It costs nothing to damage the machine during a simulation exercise," says Willie Koekemoer, Black Rock's Training Facilitator. "It's a cheaper environment to make mistakes." For example, damage to certain components on the bolter can cost

tens of thousands of rands a day and it also means the bolter is taken out of operation. "We obviously want to prevent this from happening, so we'll use the simulator to show the operators where they're going wrong without using an actual bolter and it's in a safe environment," says Koekemoer.

New bolter operators at Black Rock will be required to use the simulator extensively before going underground. "There will also be annual refresher training for every operator," says Hayward.

ThoroughTec's CYBERMINE simulator system is now in its fourth generation. Every mining simulator features a simulated cab, a highly realistic replica of the actual mining equipment, with fully functional simulated instruments and controls. The replicated cab is mounted on a motion platform capable of imparting up to six degrees of freedom and is surrounded by a full 360 deg panoramic, high-resolution projection display system with surround sound audio. Control of all aspects of training and evaluation is exercised in real time from an advanced instructor station.

ThoroughTec is able to simulate any machine from any mining OEM, surface or underground, and claims to have the widest range of simulator cabs in the industry.

Thoroughbred Technologies, tel (+27 31) 569-4033

Sarens demonstrates its heavy-lift capabilities

Sarens South Africa has performed a lift of a Boeing 737-300 across the R21 highway in Kempton Park. The operation was carried out for the South African aviation company Comair, which is building a training centre in which the Boeing 737-300 will

be used as a real-life evacuation trainer.

Sarens was asked to lift the Boeing 737-300 from its location at OR Tambo International Airport to the Comair training centre, being built on the other side of the highway. During this overnight opera-

tion, several roads, including the main access route to the airport, were temporarily closed.

The Boeing with the engines removed and portions of the wings and tail clipped, had an initial dead weight of 25 tonnes. The length of the Boeing was 33,35 m, the width 18 m and the height 5 m. The equipment used in this lift comprised three Sarens hydraulic cranes – an LTM1400, an AC500 and an AC200.

"The stakes were high. Our specialised engineering and rigging teams defined the most time- and cost- effective solution, making sure the road closures were kept to a minimum and all safety and quality standards were met. Successfully lifting the Boeing and safely relocating it to its new home was the result of months of planning and collaboration with many stakeholders involved," comments Marius Cilliers, Country Manager Sarens South Africa.

Sarens, tel (+27 11) 861-3800

Hytec appoints Zimbabwean distributor

Hytec Services Africa (HSA) has officially appointed Zimbabwe-based Hilmax Private Limited as a distributor in that country. The appointment came into effect after three months of discussion, incorporating reciprocal visits between senior members of each organisation.

The family-owned Hilmax, which has hydraulic hoses and fittings as its core business, is now distributing the entire range of the Hytec Group products. Petrus Viljoen, Sales Supervisor, HSA, who facilitated visits between the two companies' senior directors, will attend to the

Hilmax business on a monthly basis.

"Hilmax's core business, the fact that they have strategically placed operations to service the mining industry, as well as their primary focus on servicing this industry's hose and fitting requirements, are only a few of the reasons Hytec believes them well-suited to represent the Hytec Group in Zimbabwe," says Viljoen. "Hilmax's client base comprises customers that HSA would naturally target, and this will aid in facilitating the rollout of the Hytec Group products to the Zimbabwean-related industries."

Hytec Services Africa, tel (+27 11) 573-5460

Sandvik Mining launches 'next-generation' blasthole drill

The Sandvik DR461i is a diesel-powered, self-propelled, crawler-mounted blasthole drill that is automation-ready and features forward-thinking design and technology for bulk mining operations. According to Sandvik, it is designed to withstand the harshest conditions and is equipped for rotary or down-the-hole (DTH) drilling. The DR461i was developed from the preceding DR460 drill rig and includes upgrades that make it extremely reliable, easy to maintain and safe.

"For decades, customers have counted on Sandvik to develop the most durable products on the markets – rigs that will be able to work a mine site for decades," said Ken Stapylton, Vice President of Rotary Drilling, Sandvik Mining. "In developing the DR461i, we've taken our customers' feedback into our research and development efforts and are proud of the newest addition to our drilling equipment product line."

The DR461i includes several safety enhancements such as autonomous pipe handling, above-the-deck bit change, additional walkways, hand railings and safety interlocks. The drill was designed to fully comply with the various safety standards around the world, such as Mining Design Guidelines (MDG) for mobile and transportable equipment in mines, Earth Moving Equipment Safety Roundtable (EMESRT) Design Philosophies and CE conformity marking.

The DR461i has a completely new cab designed to ensure the maximum comfort and ease of operation for the operator. The cab includes air conditioning and sound insulation to 80 decibels or less. It also offers unique 'all in the seat' drilling and tramming controls.


The new machine is equipped with a Graphical User Interface (GUI) system. The GUI system digitally displays the features of the DR461i while operating and tramming. Running off the CanBus system on the drill, it acts like an electronic depth counter and drill monitoring system in one, picking up information that sensors monitor in different parts of the machine such as the motor, compressor, rotary head and tracks. It then represents this data through an interactive touch screen that the operator can then easily scroll through.


The unit has a hydraulic main access stairway. Developed to be a safer alternative to accessing the drill rig rather than using vertical hanging steps, the stairway enables the operator or maintenance personnel to bring tools up onto the drill with a reduced risk of falling. It is designed to be self-levelling depending on the topography of the ground around the drill, and was also built to accommodate the different heights of the drill levels depending on the height of jack extension.

Dean Kangleas, Sandvik Mining Southern Africa, tel (+27 79) 496-7038



The Sandvik DR461i blasthole drill rig.





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New range of overbelt magnets from Multotec

A key differentiator for Longi-Multotec in the marketplace is having highly skilled and experienced experts on hand. "It is important to work with an original equipment manufacturer that understands the system parameters and is able to see past the one-size-fits-all option that has been the tendency in the past," says Willem Slabbert, Process and Applications Engineer at Multotec.

An example of this expertise in action



Longi-Multotec's standard range of air-cooled magnets goes up to a 30-t machine.

is the introduction of the latest developments in air-cooled overbelt magnets to the African mining industry. Multotec's new range of standard range Longi-Multotec air cooled overbelt magnets is capable of operating in an ambient temperature of up to 45°C. "However, in specific instances where a more customised approach is called for, Multotec can size the correct magnet from its range of forced cooled magnets," Slabbert points out.

The standard range conforms to the standard conveyor widths used in the African mining industry with international standard widths also available. There are four models available for each conveyor width. While the conveyor belt dimensions remain the same for all these model variants, the difference lies in the coil height, which can be raised in order to increase the strength of the magnet.

"Depending on the process parameters, we will decide which one of the four model variants is the most applicable. This gives

Multotec the necessary flexibility to be able to carry out custom selections for specific applications, which depends on the tramp metal that needs to be removed," Slabbert explains.

The Longi-Multotec air-cooled overbelt magnets represent a step change in this critical technology. They incorporate a split coil design, whereby heat is dissipated over ten different surfaces compared to conventional technology's six surfaces, making this cooling method far more efficient in terms of the overall system. "We are now able to offer this innovative technology to the African mining industry through our agreement with Longi," Slabbert says.

"By means of this technology we have completely eliminated the use of fans or forced cooling. This lack of forced cooling, along with the improvement in natural convective heat transfer, adds to the safety and efficiency of the equipment."

Bernadette Wilson, Multotec Group, tel (+27 11) 923-6193

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Bravo submersible slurry pumps deployed at Kamoto

Integrated Pump Technology of South Africa has supplied 20 Bravo 900 submersible slurry pumps and 20 M20 control panels to Kamoto Copper Company (a subsidiary of Katanga Mining) of the DRC. These heavy duty electrical submersible slurry pumps are the largest of their kind in the Grindex product family, says Klint Bawden, General Manager: Sales & Marketing, Integrated Pump Technology.

Chris Heunes, Export Sales Manager, Integrated Pump Technology, explains that the company's products are being deployed at three different areas of Katanga Mining's operations in the DRC. These are the Luilu metallurgical plant, the Kamoto concentrator (KTC) and the KOV open-pit mine (KOV). "Our Bravo range has proved particularly successful for Katanga Mining, which has been using Grindex products for three years now and has about 300 pumps in operation."

Heunes says that EC Mining has been formally appointed as the distributor for Integrated Pump Technology for the DRC and is in the process of establishing a fully-fledged service and repair workshop at Kamoto Copper Company to cater for its aftermarket needs.

"Pumping slurry is one of the most demanding applications for any pump, due to such issues as sediment build-up leading to costly downtime and repair costs," Bawden explains. "The Bravo range from Grindex is robust and hard working enough to result in reduced operating and maintenance costs." These pumps, with a maximum submersible depth of 20 m, do not require any support superstructure, which makes for quick and easy installation and less space needed for their operation.

The cartridge seal is preassembled for quicker and easier mounting, while the Hard-iron™ impeller and pump housing feature high wear resistance, which is critical in slurry applications. The large throughlet means that the pump can handle solids of varying sizes. A leakage sensor allows for early detection of any problems, while the single adjustment screw makes it easy to tweak the impeller for optimal performance. The agitator has been designed specifically for coarser slurries, and is able to stir

up and pump sand, sludge and solids in suspension.

Integrated Pump Technology has also supplied about 50 stainless steel Inox pumps over the last six months. "These are specialised electrical submersible drainage and sludge pumps that can handle acidic operating conditions," Bawden explains. Features include zinc anodes for added protection, with all cast parts made from acid-proof stainless steel.

Integrated Pump Technology is the sole importer and principal distributor for the Grindex range of dewatering, slurry and sludge pumps for Southern Africa.

Klint Bawden, Integrated Pump Technology,
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Shaw Controls extends its product offering

Shaw Controls, a company within the Zest WEG Group, has extended its product range to encompass low voltage (LV) and medium voltage (MV) applications. It manufactures switchboard panels and control systems from 24 V up to 36 000 V (36 kV) for the industrial, mining and infrastructure sectors.

“Shaw Controls offers a complete product line from MV switchgear to LV withdrawable Motor Control Centres (MCCs),” Valter Luiz Knih, Group Automation



Low voltage, fully withdrawable Motor Control Centres (MCCs) form part of the Shaw Controls product line.

& Systems Director, says. These locally manufactured products are independently certified in accordance with the IEC 62271-200 and IEC 61439-1/2 standards. According to IEC specifications, LV covers applications up to 690 V, while the MV range is from 1 kV up to 52 kV. In addition, Shaw Controls has recently received ISO 9001 accreditation from Bureau Veritas.

LV switchboard panels range from SC 100, SC 200 to SC 300 models, which can be configured for various applications at different fault levels and current ratings. This gives Shaw Controls the flexibility to be able to offer fit-for-purpose solutions. A recent addition to the Shaw Controls product range is the CCM 03 ZA withdrawable MCC which is an already well-established product of WEG Brazil. This highly successful MCC solution will now be manufactured in South Africa.

All products include both a mechanical and electrical interlock system to ensure

maximum safety, while the construction itself is robust. Switchgear panels are manufactured in bent steel profiles and enclosed on all sides by steel plating. Overpressure relief devices in the top provide for pressure relief in the event of internal arc. Shield-type MV switchgear has metal divisions separating the compartments.

The general busbar configuration comprises one or more rectangular bars, manufactured from electrolytic copper with tin-plated fittings. The LV compartment is located in the upper front part, which houses the measuring instruments, protection relay, terminals, thermostats and contacts. This is completely isolated from the MV via a steel plate, with its own closable door.

The Zest WEG Group recently also announced a significant expansion of Shaw Controls’ manufacturing capabilities. This is to cater for the significantly extended product range as well as the increased demand for Shaw Controls’ E-Housing solutions. This expansion will include the design and establishment of a 2 000 m² standalone E-House and container conversion facility. Shaw Controls’ E-Houses represent a cost-effective alternative to traditional containerised solutions manufactured in standalone marine containers.

The expansion of Shaw Controls is in line with the Zest WEG Group’s strategy of extending its manufacturing capability to boost its presence in the local market and in Africa, which is perceived as a major growth area. “Our aim is to position the Zest WEG Group as a regional hub of WEG and in so doing position Shaw Controls as the number one panel builder and systems integrator in Africa,” says Louis Meiring, CEO of the Zest WEG Group.

Shaw Controls, tel (+27 11) 680-4534

FLSmidth equipment for Mufulira smelter

Mining and minerals processing equipment manufacturer FLSmidth is in the process of delivering an EIMCO®-Clarifier-And-Thickener (E-CAT®) and a Shriver® filter press to Mopani Copper Mines in Zambia for its Mufulira smelter. The equipment removes and dewater dust particles from the water system.

Ricus van Reenen, Sales Manager: Products at FLSmidth, explains that FLSmidth’s E-CAT® technology, which boasts no moving parts at all, combines optimised flocculation, high rate clarification and high density in a single compact unit. It streamlines liquid-solid separation flow sheets by optimising chemical settling aids and providing a dedicated escape route for displaced free liquid.

The fact that there are no moving parts translates into a lower cost and lower energy consumption, meaning reduced maintenance in the long run. The E-CAT® also has a smaller surface area than conventional thickeners and therefore a smaller footprint that optimises space on constrained sites, particularly in remote locations in Africa.

In addition, the self-diluting feed makes for optimal flocculant utilisation, while no external dilution pumps are necessary either. Good overflow clarity means that effluent can be re-used while the dense underflow cuts down on the energy needed for drying. The smaller ponding area necessary also means a reduced handling volume.

FLSmidth, tel (+27 10) 210-4820

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