MODERN MINING
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Objective, incisive editorial for people who are serious about mining

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- Black Rock's technology roadmap ushers in new capabilities
- Next-generation intelligence and automation for exploration rigs
- Bulk materials handling: the state of the market, demand drivers and trends

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Having created a new local structure this year, which coincided with the global rebranding exercise to now operate as TAKRAF Group, TAKRAF South Africa – with its integrated DELKOR brand – is well positioned to make the most of the few opportunities in the market. See story on page 8.

COMMENT

Is mining ready for its own future?

Munesu Shoko

A lot has been said about the future of mining in the past few years. In the South African context, for instance, a big concern is that finding minerals after more than a century of digging often means going deeper than ever before, posing cost and safety challenges for miners.

Declining ore grades at current depths mean that mining companies have to mine deeper to reach new deposits, significantly increasing the cost of extraction. According to Deloitte, since the start of 2000, over 75% of new base metal discoveries have been at depths greater than 300 m. Mining at these depths also introduces additional safety issues due to the high risk of rock falls, flooding, gas discharges, underground earthquakes and ventilation problems.

To provide context, six of the 10 deepest mines in the world are found in South Africa, with Mponeng Gold Mine, the last of AngloGold Ashanti's assets recently sold off to Harmony Gold, currently the deepest mine in the world with an operating depth that ranged between 3,16 km and 3,84 km by the end of 2018. Ongoing expansions are expected to extend the operating depth further to 4,27 km.

In such an environment, the future of mining goes way beyond just the deposits and reserves that are yet to be extracted. A fundamental component of mining's future is technology. Many mining companies have a deeply ingrained, conventional view of their sector and the environment in which they operate. But while it's served them in the past, it's less likely to work in the future.

If there is anything that COVID-19 has taught us, it is the fact that miners can no longer afford to ignore the role they play in a much larger economic, social and technological ecosystem – an ecosystem that is growing and becoming more complex every day.

In its Future Insight Series, PwC notes that technology is not just a factor in the future of mining operations; it's also impacting the market for mining's outputs, often faster than companies can respond. For example, the growing use of smartphones, tablets and batteries has seen shares in rare earth and lithium miners skyrocket, while the price for thermal coal was recently bumping along at historic lows. The once reliable foundations for competitive advantage in the mining sector are shifting under companies' feet.

Mining companies, in South Africa and Africa at large, need to begin to realise the significance of innovation in order to be able to compete at a global level. Innovation will be the key for mining companies and should be implemented in every area of their operations. Innovation can help mining companies mitigate and manage risks, strengthen business models and foster more effective community and government relations. Mines have squeezed the 'optimisation lemon' as hard as they can and it is no longer enough to sustain the sector. This explains why many leading organisations are rallying behind the innovation imperative.

In its "Future of Mining" report, Deloitte notes that innovation "mandates companies to think in entirely new ways". Traditionally, for instance, miners have focused on extracting higher grades and achieving faster throughput by optimising the pit, schedule, product mix and logistics. A truly innovative mindset, however, will see them adopt an entirely new design paradigm that leverages new information, mining and energy technologies to maximise value.

For decades, mining companies have understood the imperative to adopt technologies to accelerate automation and reduce fatalities. That explains why leading companies continue to look at new technologies – such as nanomaterials, 3D printing, modular design, robotics, bioengineering and alternative haulage – in an effort to further improve operational performance.

I am, however, encouraged by a step change being taken by some miners in the local landscape. As you will see in this edition of *Modern Mining*, Black Rock Mine Operations (BRMO) is turning out to be a true model of innovation. As part of its technology roadmap, the Northern Cape-based manganese producer is rolling out the Mobilaris Mining Intelligence system.

The mine understands that one of the key levers it can control is its cost per tonne. BRMO is, therefore, constantly seeking for ways to reduce cost, improve efficiencies and safety. To achieve this, it realised that it needed to make use of technology, but at the same time it had to manage the risk of identifying and implementing the different technologies available successfully.

As mining companies begin to apply innovation to their full operational ecosystem, they stand to realise significant gains. Although BRMO has partially implemented the Mobilaris system on a section of one of the three underground shafts to prove concept, the mine has already witnessed several low hanging fruits that the technology brings.

A key takeaway from BRMO's and Epiroc's partnership is that mining companies need to be prepared for divergent future scenarios where collaboration is a key component, and consider how to move from business of today thinking to business of tomorrow success. ■

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BOD completes acquisition of Sekaka Diamonds

Botswana Diamonds (BOD), the AIM and BSE listed diamond explorer, announces that the acquisition of Sekaka Diamonds Pty Ltd (Sekaka), previously announced on 20 July 2020, has now been completed. Sekaka was Petra's exploration vehicle in Botswana and holds three prospecting licenses in the Central Kalahari Game Reserve in Botswana, PL169/2019, PL058/2007 and PL224/2007, which includes the high grade KX36 kimberlite pipe. The acquisition also includes an extensive database, built up over 15 years of exploration.

John Teeling, chairman of BOD, comments: "We are delighted that the acquisition has now closed. This now paves the way to explore commercial development options for KX36 and begin to evaluate the extensive database in conjunction with ours to discover more kimberlites in prime diamond real estate."

KX36 is a 3,5 ha kimberlite pipe, discovered by Sekaka, in the Kalahari. The kimberlite is situated approximately 70 km from Gem Diamonds' Ghaghoo Mine, and 260 km north-west of Botswana's capital Gaborone. Sekaka has undertaken extensive exploration work on KX36, including extensive core and large diameter drilling (LDD).

There is a historic SAMREC compliant Indicated Resource of 17,9-million tonnes at 35 cpht, and an Inferred Resource of 6,7-million tonnes at 36 cpht, estimated for the pipe by Z-Star in 2016. As Sekaka owns 100% of KX36, gross and net resources are the same. Sekaka is the operator of KX36. BOD has not independently verified the historic resource estimate. Modelling these grade estimates suggests overall grades of between 57 cpht and 76 cpht. The estimated diamond value from the LDD is US$65/ct, with an upside range of between US$97/ct and US$107/ct, all assuming a +1,15 mm Bottom Cut-Off (BCOS) or +3 DTC diamond sieve.

Sekaka also holds a recently constructed, fit-for-purpose bulk sampling plant on site. The sampling plant includes crushing, scrubbing, dense media separation circuits and x-ray recovery modules within a secured area.

Sekaka's extensive diamond exploration database contains the results of work undertaken since 2005. It includes data in respect of airborne (including the Falcon survey) and ground magnetics (including gravity and electromagnetics), in addition to heavy mineral sampling. BOD believes that the information contained in the database will provide substantial support to its future kimberlite exploration activities in Botswana.

The first deferred consideration cash payment of US$150 000 will be payable on 27 November 2021, being the first anniversary of completion of the acquisition. ■

The transaction includes a bulk sampling plant at the KX36 site. Image courtesy of Petra Diamonds

Site selected for rare earth processing facility

Pensana Rare Earths Plc (LSE:PRE, ASX:PM8) announces that Saltend Chemicals Park in the Humber Local Enterprise Partnership has been selected as the proposed site to build the UK's first rare earth processing facility with a view to helping create the world's first fully sustainable magnet metal supply chain.

Working with Wood Group, the UK engineering consultants, the processing facility would become one of only two major producers outside China of rare earth oxides used in the manufacture of powerful permanent magnets, critical to the offshore wind and electric vehicle industries. Lynas Corporation of Australia is currently the world's largest non-China producer of magnet metal rare earth oxides from its facility in Malaysia.

Gerry Grimstone, UK Minister for Investment says: "We very much welcome the proposal to establish a fully sustainable rare earth oxide magnet metal processing facility in the Humber region. This facility is an important step in the establishment of a permanent magnet supply chain in the UK which could support a range of industries important to building back greener and our Net Zero ambitions."

The Saltend Chemicals Park is a cluster of world class chemicals and renewable energy businesses including BP Petrochemicals, Ineos, Nippon Gohsei and Air Products, strategically located on the Humber estuary, a gateway to Europe and the UK's busiest ports complex.

The 370 acre site, which is managed by the px Group, has had £500-million of investment over recent years. The px Group provides a range of services including power, water, reagents, waste disposal, centralised control and administration which will allow the Company to focus on the operational aspects of the facility.

Chairman Paul Atherley comments: "The Saltend Chemicals Park offers an exceptional range of services allowing us to plug into power, water, reagent supplies and services and to recruit a highly skilled local workforce at internationally competitive rates.

"It is very clear that it is no longer acceptable for British and European companies to import the raw materials critical to the Green economy from unsustainable sources.

"The Saltend facility has the potential to become a world class producer of rare earth oxides and to help establish a sustainable supply chain for the manufacture of powerful permanent magnets critical for the offshore wind and electric vehicle industries in the UK and Europe."

The company is looking to commence development of the Longonjo mine in Angola in the first quarter of next year and bring it online as the first major rare earth mine in over a decade.

By importing mixed rare earth sulphates from Longonjo, which is being established to international standards as one of the world's most sustainable rare earth mines, and processing them into separated magnet metal oxides in the UK, for the first time customers can purchase these critical raw materials with confidence that they have been sourced and processed sustainably. ■

Exxaro's Leeuwpan Mine hands over new homes to Rietkuil families

Exxaro hosted an official Rietkuil Housing handover ceremony on December 4 to celebrate the completion of the company's Leeuwpan Mine Rietkuil Resettlement Project after five years of hard work.

The event was attended by key Exxaro executives, as well as Nora Mahlangu, MEC of Human Settlements for Mpumalanga and Councillor KV Buda, executive mayor of the Khanye Local Municipality. Members of the community and representatives from each household were also invited to honour Exxaro's ongoing commitment to the Rietkuil farming community and welcome local families into 49 brand-new resettlement homes in Botleng (about 15 km from Rietkuil). To ensure that the families settle in well and have a smooth transition into their new homes, Exxaro will also be covering the costs of municipal services for the households for the first five years.

"Exxaro has always sought to be actively engaged in building South Africa, so we wanted to make it possible for every family unit to own their own house. We used the strength of our business to collaboratively foster an empowered Rietkuil community that can access and participate in, more socio-economic possibilities. What we are doing here today, is about creating impact and leaving a legacy for future generations. We exist as Exxaro to power better lives for everyone single one of our stakeholders," said Mxolisi Mgojo, Exxaro CEO.

The resettlement project goes hand-in-hand with the mining leader's Leeuwpan Lifex project located in Delmas, Mpumalanga. The R500-million extension initiative is expected to increase the life of the mine by a decade, providing an additional 4,7-million tonnes a year of mining capacity and continuing to contribute to the surrounding communities.

After anticipating that Lifex would impact Rietkuil, Exxaro consulted extensively with the community and initiated the relocation plan as a way to continue the safe operation of the mine and the wellbeing of the community. At the time, 143 community members were living in 20 separate households, but Exxaro offered to build more houses so that every family unit within a household could own their own house. This resulted in the 20 households splitting into family units of one or two adults with child dependants, creating 49 new households of various sizes (two to four bedrooms).

In line with Exxaro's commitment to local economic development, Leeuwpan mine appointed five local companies to construct the houses and another company to do the earthworks of the resettlement project. All of these businesses were instructed to employ local community members and provide certified training for their employees. A total of 386 jobs were created during the project, including other subcontractor opportunities such as rubble removal, painting, landscaping and fencing. Although COVID-19 challenges affected the construction of the resettlement houses, the teams worked together tirelessly to ensure that relocation could be completed by December 2020. ■

Exxaro recently welcomed local families into 49 brand-new resettlement homes in Botleng.

Key progress at Nayéga Manganese project in Togo

Keras Resources plc, the AIM listed mineral resource company, has provided an update on progress at the Nayéga Manganese Mine in Northern Togo, which is wholly owned by the company's 85% owned subsidiary, Société Générale de Mines (SGM).

CEO Russell Lamming recently returned from Lomé, Togo, where he had meetings with key government officials. These included Mila Aziablé, the Minister of Mines and Energy, and Kayi Mivedor, the Minister of the newly formed Ministry of Investment Promotion, which is focused on encouraging and enhancing investment in Togo. Follow-up meetings were also held with state-owned Togo Invest Corporation S.A. (Togo Invest), which is helping to assist the permitting process at Nayéga.

"Constructive meetings were undertaken with both the ministries of Mines and Energy and Investment Promotion during my recent trip to Togo; I expect to get feedback in the near term on what the pathway to final permitting at Nayéga comprises," says Lamming.

"I am particularly encouraged with Togo Invest's endorsement of Keras' investment in the country, which marks the start of a constructive collaboration, in tandem with the creation of a Ministry of Investment Promotion by the new Togo Government; both are positive steps for the Nayéga Mine and Keras's further investment. I look forward to updating shareholders once we have further information related to permitting at Nayéga." ■

Emmerson Plc completes ESIA for the Khemisset Potash Project

Emmerson Plc, the Moroccan focused potash development company, has completed the baseline and all of the workstreams required for the Environmental and Social Impact Assessment (ESIA) for its Khemisset Potash Project in Northern Morocco. The ESIA package will now be submitted to the relevant governmental bodies for approval.

Drilling work at Emmerson Plc's Khemisset potash project in Morocco.

The ESIA package comes as a capstone to two concurrent phases: an extensive baseline programme, which commenced in the early stages of the project development; and the ESIA study, which commenced in early 2020. The project team, in partnership with Moroccan headquartered firm Phénixa S.A.R.L., has consulted the various project stakeholders at every stage and inventoried the applicable Moroccan legislation.

The related workstreams have been completed in compliance with International Finance Corporation Performance Standards and the Equator Principles. These standards are the global benchmark for the development of mining projects and complying with them is vital for mining projects, especially those seeking finance from international capital providers.

The company's vision of doing the right things in the right way is translated to effective actions in the ESIA workstreams. Findings of the baseline investigations have been integrated in the ESIA and the proposed monitoring programmes. These are planned to be reflected in the final project design in the forthcoming FEED (Front End Engineering Design) so that positive impacts are maximised and negative impacts are minimised in the construction, operation, and closure stages.

"We have said that we want to do the right things in the right way, with no exceptions. The ESIA has been done to the highest standard recommended by the World Bank, with no corners cut. It is the culmination of two years of studies and monitoring in the field and is a piece of work that everyone involved can be proud to have delivered," comments Graham Clarke, CEO of Emmerson.

"The environmental and social impact of a new major project is of real importance to any company that concerns itself with maintaining a record of sustainability. We are confident that the results of our work will demonstrate that Khemisset is going to be accepted as an important new potash mine to the benefit of Morocco and the shareholders of Emmerson. I am grateful to the dedication of all those who were involved in producing this excellent report." ■

Sustainability – the future of mining

Global law firm Hogan Lovells, in partnership with Africa Legal, has published its annual Future of Mining report, raising awareness of the core issues affecting the future of the mining sector. This year's report focuses on sustainability.

The report found that two-thirds of mining companies are pursuing community impact programmes – focused on areas such as jobs, transport and clean water – as part of their sustainability policies. Waste management was equally prioritised, followed by employee wellbeing by 57% of respondents (including aspects such as medical health and health and safety in the workplace), and local education and skills training at 55%.

Transition to renewables in the mining industry has so far been slow to pick up. The impact on local communities has been prioritised over renewable energy in Africa as the continent remains underdeveloped and improving the communities where mining companies operate is often integral to obtaining mining permits.

Mining is an energy-intensive industry, and companies need a reliable power supply that presents a challenge with certain types of renewables, delaying widespread uptake. 28% of respondents said their company had targets around renewable energy.

Mining companies recognise the importance of greener energy to achieving greater sustainability in the African mining industry. When respondents were asked to rank their top three sustainability areas for intensified focus, increased renewable energy utilisation ranked highest, followed by net carbon reduction and greater adherence to voluntary ESG standards, such as the United Nation's Sustainable Development Goals.

The report considers why community impact and employee wellbeing remain critical considerations for any mining operation, and why Human Rights is core to effective sustainability policy.

It also examines how sustainability within the mining industry across Africa compares with other emerging markets around the globe, and the hurdles that have hindered faster progress on sustainability and prioritising growth, including in areas such as adoption of renewables.

Laurie Hammond, partner, Hogan Lovells, Johannesburg, South Africa, says, "Sustainability is integral to good business. However, there is no single definition or one size fits all approach. It really depends on each company, and the variations can be huge depending on what they do and where they are. Hogan Lovells is ideally placed to help clients find the solution that is the best fit for their business." ■

Cora commences drilling programme across Yanfolila project area

Cora Gold Limited, the West African focused gold company, has commenced a new drilling programme across its Yanfolila project area in southern Mali. This follows previous positive drilling results all within 25 km radius of the Hummingbird Resources plc (AIM: HUM) Yanfolila Gold Mine.

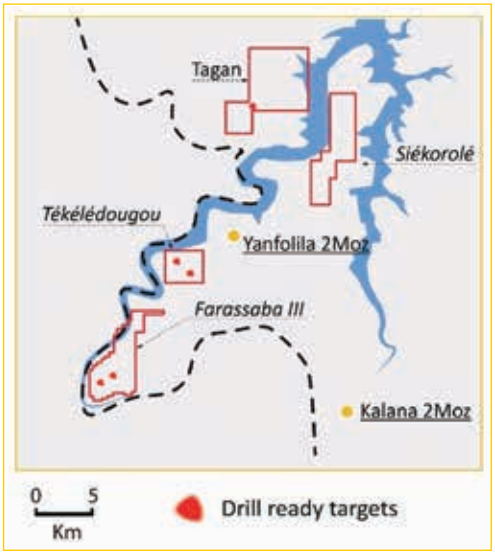
"We are excited to be heading back with the drill rig to permits in the Yanfolila Project Area where we have historically had some very strong results, generally in shallow oxides. These results are further encouraged when you consider the proximity to an operating gold mine. We look forward to releasing the results as we receive them," says CEO Bert Monro.

Cora continues to advance a portfolio of projects located in two world class gold regions in Mali and Senegal in West Africa, namely the Yanfolila Gold Belt (south Mali) and the Kedougou-Kenieba Inlier gold belt (also known as the Kenieba Window) (west Mali / east Senegal). In addition to its flagship Sanankoro Gold Discovery, which this year received a US$21-million mandate and term sheet to fund its future development as a highly profitable standalone oxide mine, the portfolio includes the Yanfolila and Diangounte (Kenieba Window) project areas that cover 715 km^2 between them.

During H1 2020, exploration included the use of Cora's owned and operated rotary air blast (RAB) drill rig at the Tagan permit within the Yanfolila project area. With inclined holes and depths typically up to 26 m in length, the drill rig sampled below extensive and often thick ferricrete and transported cover.

Panning of the RAB samples provided an effective semi-quantitative evaluation technique for identifying the presence of primary gold bearing structures. The combination of visible gold in conjunction with quartz veining, observed in panning of RAB samples, points to the presence of primary gold structures with potential length exceeding 800 m.

At one target, the shallow RAB drilling suggested the presence of extensions to a gold intercept of 1,7 g/t Au over 14 m achieved in an historic standalone core hole drilled by a previous permit owner. This drilling is aiming to, initially, extend existing known mineralisation and, dependent on results, form part of a strategy to grow resources regionally. ■



Map of Cora Gold's Yanifolia project area.

Giyani's Lobatse prospecting licence renewed

Giyani Metals Corporation's wholly-owned Botswana subsidiary, Menzi Battery Metals, has had its prospecting licence for the Lobatse prospect renewed by Botswana's Department of Mines on November 13, 2020.

K.Hill, Giyani's flagship project and the Otse prospect licences were renewed in June this year. The renewed prospecting licence has been granted for a term of two years, ending on December 31, 2022.

The Lobatse prospect has a similar geology to that of K.Hill, with a near-surface, stratiform manganese mineralisation hosted in a siliceous shale/sandstone. Lobatse is located near the South African border, 45 km from K.Hill and is within trucking distance of K.Hill.

All of the company's Menzi's prospecting licences have been renewed and represent a total licence area of 2 588 km^2 as detailed in the following table:

Robin Birchall, CEO of Giyani Metals Corp, comments: "I am delighted by the renewal of our Lobatse licence which completes the renewal of all of our licences in Botswana. The K.Hill feasibility study is progressing well and this renewal by the Government of Botswana represents a vote of confidence in the company and its ability to continue its exploration and development programme across the licences." ■

PL Number	Licence Area (km^2)	District	Expiry Date
PL258/2017	95	South East District	December 31, 2022
PL294/2016	479	South East District	June 30, 2022
PL297/2016	483	Southern District	June 30, 2022
PL298/2016	479	South East District	June 30, 2022
PL322/2016	438	Southern District	June 30, 2022
PL336/2016	118	Southern District	June 30, 2022
PL337/2016	144	Southern District	June 30, 2022
PL338/2016	127	Southern District	June 30, 2022
PL339/2016	77	Southern District	June 30, 2022
PL340/2016	148	Southern District	June 30, 2022

BlueRock Diamonds recovers 12,6 carat diamond

BlueRock Diamonds plc, the AIM listed diamond mining company, announces that it has recovered a 12,6 carat diamond from its Kareevlei Diamond Mine in the Kimberley region of South Africa.

Mike Houston, executive chairman, comments: "In line with our reporting policy to inform the market of diamonds recovered estimated to be valued at over US$50 000, we are delighted to announce that another large diamond has been recovered from Kareevlei. To put this into perspective, given the average engagement ring weight in the UK is 0,6 carats, a 12,6-carat diamond is considered exceptional. We are hopeful that the recovery of this diamond marks the start of mining better quality diamonds, having worked through a difficult area in recent months." ■

TAKRAF South Africa weathers

Having created a new local structure this year, which coincided with the global rebranding exercise to now operate as TAKRAF Group, TAKRAF South Africa – with its integrated DELKOR brand – is well positioned to make the most of the few opportunities in the market. The strength of the business, explains MD Richard Späth, lies in the agility of the team, which has been central to the company's ability to weather the COVID-19 influenced economic storm, writes *Munesu Shoko*.

Earlier this year, TAKRAF South Africa implemented a restructuring exercise aimed at streamlining its business, well before the COVID-19 pandemic hit. The strategic idea behind the exercise, says Späth, was to create a conducive environment for the business to thrive, but more importantly to underline the group's core strengths and value-adding proposition towards its clients within the mining and adjacent industries.

As part of the exercise, the operational side of the business was divided between Bhavesh Bhaga and Paul Davies, respectively, who both bring a wealth of experience. Bhaga is GM TAKRAF Systems and DELKOR, and in this role he is tasked to lead the capital projects arm of the business on the materials handling side, as well as the liquid/solid separation business, which is basically the DELKOR offering. Davies is GM TAKRAF South Africa Regional Products, and is in charge of comminution, as well as aftermarket.

New cylinder installation during a bucket-wheel replacement project.

"That we have great products that have withstood the test of time is no overstatement. In fact, in some of the product areas, such as materials handling and comminution, we are market leaders. However, the potency of the business lies within the strength of the team, led by Bhavesh Bhaga and Paul Davies. With the structure we have put in place, we are ready to tackle whatever the market is going to give. The essence of how we are going to get through that lies in the strength and agility of the team we have," explains Späth.

Apart from the new structure, TAKRAF instituted a global rebranding exercise. Having previously operated as a mining division of the parent company, Tenova, TAKRAF, together with its integrated product brand, DELKOR, revised its branding to now operate as TAKRAF Group, effective October 5, 2020.

TAKRAF is recognised as a leading technology brand when it comes to handling high capacity run-of-mine and bulk material. Its portfolio ranges from overburden removal, to material extraction, comminution, conveying, loading/unloading, processing, homogenising, blending, storage and final loading for onward shipment. The DELKOR brand, on the other hand, is renowned for its liquid/solid separation and beneficiation offering, with thousands of successful installations globally.

"The rebranding exercise was about bringing clarity to the market. We have, for example, carried the DELKOR brand in our stable for many years, but it has never carried the prominence that it needed. Through the rebranding exercise, we are bringing the DELKOR brand to the forefront," he says.

Sidestepping challenges

2020 has obviously been an extraordinarily tough year for industry due to the pandemic. From a capital projects point of view, Bhaga explains that the some

the storm

Jetfloat installation on new dam at a diamond mine in Botswana.

of the projects that the company has watched over the past three to five years and were supposed to get financial closure during this year, were either postponed or cancelled. “We haven’t really seen many projects in excess of R10-million being granted this year. A lot of projects that have been in the pipeline for the past three to five years have been put on hold,” he says.

The lack of new capital projects, however, did not really put the company on the fence, says Bhaga. “It gave us an opportunity to focus on important things like our staff and to self-introspect as an organisation, looking at how we can be efficient going forward,” he says.

With the capital projects side understandably down during 2020, the aftermarket side of the business, says Davies, has thrived “beyond expectations”. “I didn’t think we would do this well under the circumstances. Hats off to the staff, who have exceeded expectations in the face of a tough operating environment,” says Davies.

TAKRAF South Africa runs several offices across all the major mining regions of the country. These include the main Spartan, Gauteng office, complemented by branches in Mpumalanga, the Northern Cape and Western Cape. “Our success to a large degree lies in our aftermarket capabilities, and central to that is our presence in all the key mining regions,” he says.

This presence, says Davies, has been key to the company’s continued successes, especially during COVID-19. “One of the key advantages for us, especially during the lockdown, is that we were already close to our customers, which was key to accommodating the travel ban. Even during the middle of Alert Level 5 of the lockdown, we could still function properly, giving customers the much-needed peace of mind,” he adds.

Davies hails the dedication of the staff, who ensured the continued safe execution of projects during the lockdown. “For example, we had our team locked-down at a diamond mine in Botswana for six

Apron feeder testing before shipment to Guinea.

DELKOR BQR flotation cell with MAXGen mechanism.

weeks, and still came out of the situation and completed a challenging jetfloat system project on time. The contract was executed in the middle of a pandemic, without any late penalties. It all boils down to the dedication of the team," he says.

At a leading iron ore producer in South Africa, the team successfully completed a bucket-wheel replacement project, despite the challenges. All the spares had to be manufactured and transported to site in the middle of the lockdown. "The success of this project was made possible by a combination of factors – reliable suppliers, a committed team and the fact that we already have a branch in the Northern Cape, with our people already on site for the necessary preparations well before the parts arrived," explains Davies.

Elsewhere, TAKRAF South Africa successfully delivered and commissioned new apron feeders in Guinea and the Democratic Republic of Congo. These projects took place during the lockdown and none of them were late. "We have learnt to adapt our processes during this challenging period. A case in point are the two machines we commissioned virtually in Guinea. We dialled in over Microsoft Teams and took the guys on site through the commissioning stages virtually," says Davies.

The company also recently delivered a breaker to a globally diversified mining and metals company, with the second unit to be uplifted to site before the end of the year. Both these 100-tonne pieces of equipment were manufactured during the pandemic.

Späth believes all these projects are flagships in their own right. "We take these projects as little flags 'waving in the air'. Because of our attention to detail, we are addressing each of these projects as flagships, and that is important to us. We as TAKRAF South Africa are not necessarily the answer to all of the mining industry's problems, but where we provide solutions, it is our mission and our goal to make sure that once we leave that site, the project is addressed," says Späth.

Health and safety in a COVID environment

With the spotlight on health and safety in the mining industry, extra pressure has been placed on companies such as TAKRAF South Africa to ensure that they continue to deliver on their commitments to their clients without compromising the health of their own workforce as well as that of their clients. The company's commitment to health and safety and zero harm, says Davies, is non-negotiable, hence TAKRAF South Africa has to date not recorded a single case of COVID-19 across all its offices.

"Our maintenance teams continued to operate throughout the lockdown. We took every precaution – we issued them with all the necessary PPE, continuously sanitised the offices and vehicles, and to this day we haven't recorded a single case of COVID-19 in any of our offices and among our maintenance teams situated at mines. We take this very seriously, and that approach has benefitted us immensely," says Davies.

While management has played its part in this achievement, Davies believes credit must go to the TAKRAF South Africa team for their buy-in. "They take this seriously and each of them understand that they are not just responsible for their own health and safety, but that of their colleagues and the business at large. We commend them for not engaging in any activities, either during working or non-office hours, that jeopardise the health of their colleagues," explains Davies.

Managing health and safety during the COVID era has been challenging, but remains a matter of priority for the company, says Späth. Through its toolbox talks and communications, the company has communicated the importance of adhering to COVID-19 stipulations, but not forgetting all the other health and safety parameters.

"The COVID-19 frenzy has gripped the world and it's easy to focus on observing the COVID regulations and forget all the other important safety parameters

in the process. We have, therefore, tried to sensitise our workforce to the fact that COVID-19 is a reality, but don't forget about other equally important issues that we deal with on a day-to-day basis," says Späth. The relentless focus on health and safety is paying dividends. The company has recorded a zero Lost Time Injury (LTI) rate for the past 12 months.

Bradford Breaker enroute to a mine.

To the future

Looking ahead, Bhaga is excited about DELKOR's new generation BQR flotation cell system recently brought to market after four years of intense research and development. DELKOR's new generation BQR flotation cells – equipped with the proprietary MAXGen mechanism – achieve best-in-class metallurgical performance with a view to maximizing the sustainable recovery of minerals.

The MAXGen stands for superior recoveries with higher grade, along with faster flotation kinetics by generating a favourable bubble size distribution and energy efficient hydrodynamics. The distinctive configuration of rotor and stator enables operation at lesser tip speed. Hence, it reduces operational cost with lower power consumption and wear.

"The MAXGen mechanism is the result of four years of extensive research and development from bench scale tests, 3D prototyping, pilot scale studies and plant scale trials of the DELKOR India team. Since late 2018, some small orders have been executed to test the whole process from design to fabrication at the DELKOR India Product Centre and prepare the complete sales package and supply chain. During the recent months, the BQR launch team conducted the internal training of all colleagues involved in the sales of the product and we see a lot of interest from the market on our initial grassroots marketing," says Bhaga.

Späth agrees, saying that in terms of products, the DELKOR BQR flotation cell system, launched locally a month ago, will be the most exciting offering for the company in 2021. "We are making a strong statement that DELKOR is back in town. We as a company, both locally and globally, have invested a lot in the DELKOR product," he says.

In terms of the offering to the market, Späth says a key differentiator is the energy that the TAKRAF South Africa team brings to the market. "It's about our service capabilities and not running away from issues. Everybody has issues, but what matters is how you address them. That's our offering to the market, that we are here to support our customers through thick and thin," he says.

In conclusion, Davies believes that based on 2020 performance, the comminution side of the business is in for a good year in 2021. He, however, reiterates that aftermarket will continue to remain an important pillar of the business. ■

Black Rock's technology roadmap ushers in new capabilities

As part of its technology roadmap, Northern Cape-based Assmang Manganese – through Epiroc South Africa – is rolling out the Mobilaris Mining Intelligence system at its Black Rock Mine Operations. Although the system has only been partially implemented on a section of one of the three underground shafts to prove concept, the mine has already discovered several low hanging fruits that the technology brings, writes *Munesu Shoko*.

Cobus Lerm, technology and innovation project manager at Black Rock Mine Operations.

When Black Rock Mine Operations (BRMO) developed its technology roadmap, which is to be rolled out over a 10-year period, one of the biggest drivers was the need for more granular information in the mine's underground working areas. "The integrity and frequency of receiving this information was also limiting our decision making to become more proactive and reduce variability. Through a thorough and robust process, we identified Mobilaris Mining Intelligence (MMI)," explains technology and innovation project manager, Cobus Lerm.

Located on the Northern Cape's Kalahari Manganese field, which holds approximately 80% of the world's known manganese ore resource, BRMO comprises three underground mining operations – Gloria, Nchwaning 2 and Nchwaning 3 shafts.

Mining operations commenced in 1940 at the Black Rock hill and subsequently expanded to the Nchwaning and Gloria mines. Gloria was commissioned in 1975 and produces medium grade semi-carbonate ore. Nchwaning 2 and Nchwaning 3 were commissioned in 1981 and 2004, respectively, and produce various grades of high grade oxide ore.

The three operations employ a bord and pillar mining method. Once ore is drilled and blasted underground, it gets transported by loaders and dump trucks into tips. From there it is either hoisted or taken out via conveyor belts through washing and screening plants. From the plants ore gets transported to stacks, where it will be either blended to the final product in the stockyard or loaded onto trucks for road transport. Stackers and a reclaimer move the final product to the train load out station.

Following the partial implementation of the Mobilaris system, TMM and personnel positioning data is now fed via Wi-Fi tracking tags, and the data is integrated into one platform.

BRMO is currently producing just over 4-million tonnes per annum, the majority of which is exported. Ore is predominantly railed to Port Elizabeth and Saldanha Bay for export. The plan, says Lerm, is to expand output to about 5-million tonnes per annum within the next five years. One of the key enablers will be the implementation of the company's technology roadmap, which is currently anchored by the rollout of the Mobilaris Mining Intelligence system from Epiroc South Africa.

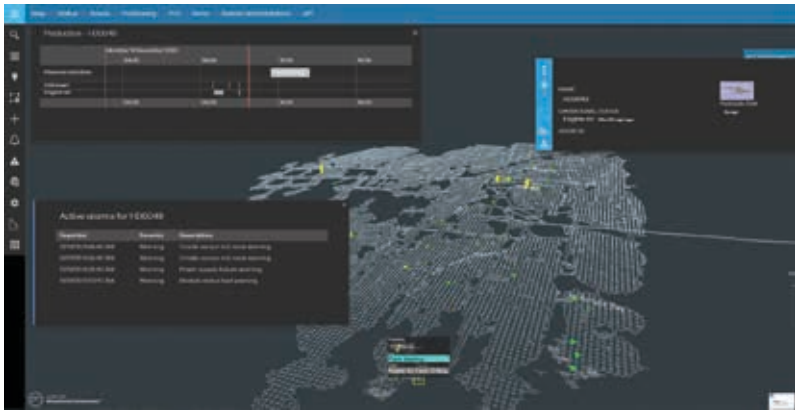
Why Mobilaris?

One of the key levers that the mine can control is its cost per tonne. BRMO is therefore constantly seeking for various ways to reduce cost, improve efficiencies and safety. "To achieve this, we realised that we needed to make use of technology, but at the same time we had to manage the risk of identifying and implementing the different technologies available successfully," explains Lerm.

This was one of the triggers that led to the establishment of Black Rock's Technology Office, which focuses specifically on identifying and implementing various technologies across the company's operations.

In developing its Technology Roadmap, one of our biggest requirements was the need for more granular information in its underground working areas. After a thorough market research, the company identified Mobilaris Mining Intelligence as the ideal solution for its specific requirements.

"One of the main reasons why we chose Epiroc and the Mobilaris Mining Intelligence is that their system is agnostic and very well advanced to integrate various OEMs' equipment and systems. Given the pace at which technology is advancing and changing, this was key for us to ensure that we can keep up and adopt accordingly as the need arises," explains Lerm.



A live report from the Mobilaris system.

Another reason for going the Mobilaris route was that Epiroc was also extremely accommodative to allow BRMO to give its input with respect to the development of the system to ensure that the mine's needs were taken into account from a system functionality perspective. "Although a lot of unknowns were and are still being discovered as we go, Epiroc and Mobilaris are always willing to improve their product as well as supporting it. Both the international team in Sweden and the local guys really take our operational needs into account to give us the best practical solution in support of our business strategy," says Lerm.

The Mobilaris system has thus far been rolled out on a selected portion of Nchwaning 3, which is BRMO's biggest shaft. Initially scheduled for February this year, the implementation was only done in November this year as a result of COVID-19 influenced delays. "We basically started full testing during the first week of November. Before that we had done some functionality testing with the project team," he says.

Lerm says the rollout of the Mobilaris system has several streams. "We first need to rollout an underground Wi-Fi network, which will enable us to collect and transmit data. We are therefore currently rolling

The Mobilaris system has thus far been rolled out on a selected portion of Nchwaning 3, which is BRMO's biggest shaft.

BRMO plans to increase its output from the current 4-million to about 5-million tonnes per annum within the next five years.

out our Wi-Fi underground network as the first pillar of the Mobilaris rollout. In parallel to that is the smart enablement of the equipment, which is already underway. We will then finally have the Mobilaris system implemented," he says.

A major reason why Nchwaning 3 was chosen to prove concept is that the mine is already running the majority of BRMO's smart-enabled machines, mainly provided by Epiroc, including drill rigs, loaders and trucks. "Our current focus is on the primary production TMMs, which include both Epiroc and other brands. A big advantage is that the Mobilaris Mining Intelligence system is totally technology and vendor agnostic, thus allowing us to use it on non-Epiroc machines," he says.

The agnostic approach allows real-time location, tracking and monitoring of vehicles, personnel and any equipment using a mixture of technologies from various vendors. Mobilaris is therefore a fit-for-purpose, homogeneous and cost-efficient solution to track assets in the mine. To integrate planning data, machine production and maintenance data or sensor data into one decision support system will help BRMO increase the production efficiency and safety of its mine.

Key changes and benefits

Following the partial installation of the Mobilaris system, the biggest change thus far, says Lerm, is how data is captured and available in near real-time for short interval control purposes. The mine has moved away from capturing data reported via radio or manual log sheets, to utilising various digital streams of feeding data into the system. For example, TMM operators and supervisors now capture and update data via tablets, while smart enabled TMMs report data (both production and machine health) via the telemetry system. Meanwhile, TMM and personnel positioning data is fed via Wi-Fi tracking tags, and all this data is integrated into one platform, allowing for it to be turned into information on which decisions can be made.

"This shifts the focus from capturing to a monitoring and coordinating function by our control room personnel. Previously we were only able to focus on TMMs but now we are also able to focus on face (workplace) statuses, which include manual activities as well. This gives us the ability to optimise all activities in our mining cycle. With the predictability of the MMI State Engen, we are also able to always account for time on both TMMs and mining cycle activities. This brings me to the next point, which is shift planning and execution," explains Lerm.

As a bord and pillar mine, he explains, scheduling activities or delays on both mining cycle activities and TMMs is extremely complex due to the fact that there are so many different activities that need to happen throughout a shift. The functionality of the scheduler with customisable planning templates and drag and drop functionality makes planning of activities so easy.

"All the information is collected, processed and displayed in near real-time to improve planning and execution. Managers, supervisors and control room personnel have access to accurate information displayed in such a way to improve decision making for both the current shift as it happens as well as for future planning. It's what we call one single version of the truth," says Lerm.

BRMO has progressed well since its continuous improvement journey started in 2015. However, with the Mobilaris system, says Lerm, the mine has discovered many low hanging fruits, for example, the ability to use time optimally during a shift. "Although we have not fully rolled out the system to all our shafts, we have already seen benefits by improving time of first and last tip for dump trucks and time of first and last hole for drill rigs in the areas we have implemented the system," he says.

BRMO already has cases where TMMs were easily located due to positioning/locations tracking capabilities of the system. "We still need to test the emergency evacuation functionality fully, but we can already see how this will improve our safety significantly," adds Lerm. "Managers and supervisors are able to improve planning by knowing all the statuses

of their equipment and faces upfront. It all boils down to planning optimally and improving compliance to the plan. This will, in essence, reduce variability and enable us to be more predictable."

Other projects

Meanwhile, BRMO is implementing its Integrated Remote Operating Centre (iROC), in which the Mobilaris system will play a central role. iROC will give the mine a full view of its whole value chain for all its three shafts, in near real-time, from the face underground all the way through to the load-out station – 'one version of the truth'.

"The short interval control platform will give us the capability to monitor and control the performance of the core value chain functions from a central facility. The video wall will enable us to easily identify and act on any functions of the value chain deviating from the shift plan that can prevent us from achieving our shift goal," explains Lerm.

Lerm believes that iROC will allow BRMO to set the benchmark in the African mining industry. "With any underground mine there is a lot of room to hide inefficiencies due to the fact that information is not always readily available, because unlike opencast mines, underground operations don't always have a full view of activities throughout a shift. This project will give us the capability to become more proactive with regards to planning and executing. This will empower us to become more predictive, which will, in essence, reduce variability throughout all functions in our value chain. The value chain will be optimised to get us as close as possible to just in time supply," he says.

The future

The COVID-19 pandemic has accelerated the 'arrival of the future of work', with technologies such as automation and digitalisation now the talk of the industry. According to Lerm, unlike in other mines, autonomous mining is not easy to implement in a bord and pillar mine like BRMO. He believes that the Mobilaris system will, however, lay a foundation to enable the mine to get closer to automation.

One of the main reasons why BRMO chose Epiroc and the Mobilaris Mining Intelligence is that their system is agnostic and integrates with various OEMs' equipment and systems.

"Mining in the future will be more predictive and consistent. The biggest shift or challenge in the future will be to maintain and enhance all the systems and enablers that will be more advanced. All expertise and intelligence will be incorporated in IOT (Internet of Things) and the focus will shift from expertise to mine effectively, to expertise to maintain and use these technologies effectively. Little will be unknown and the focus and energy can be placed on those deviations or exceptions when they do occur," concludes Lerm. ■

Key takeaways

- ❑ When Black Rock Mine Operations developed its technology roadmap, one of the biggest drivers was the need for more granular information in the mine's underground working areas
- ❑ Through a thorough and robust process, Black Rock Mine Operations identified the Mobilaris Mining Intelligence as the ideal solution for its needs
- ❑ One of the main reasons the mine chose the Mobilaris system is that it is agnostic and well advanced to integrate various OEMs' equipment and systems
- ❑ Following the partial installation of the Mobilaris system, the biggest change thus far is how data is captured and available in near real-time for short interval control purposes

Bulk materials handling: the state of the market, demand drivers and trends

John Pelser, Major Wire Industries business development manager for Africa and Australia.

Reportlinker finds that the global bulk material handling products and technologies market is expected to grow by a CAGR of 1,5% over the forecast period 2018 – 2024, driven largely by the expanding demand for bulk material handling products in the mining industry. In this feature, we focus on the state of the bulk material handling market, demand drivers and some new trends in the sector. By *Mark Botha*.

Addressing the growing demand for bulk materials handling equipment in the mining sector, Major Wire Industries business development manager for Africa and Australia John Pelser says there has been a paradigm shift in recent years to bulk material handling products and technologies that focus on safer working conditions while optimising overall production.

"In my opinion," he says, "the need for this equipment is a significant challenge for many African mining end-users compared to users in developed countries because the cost of importing bulk materials handling equipment inflates operating costs significantly."

Ken Mouritzen, MD of BLT World.

Astec Industries marketing manager Mairead McCrory concurs. She says mobile equipment has increased in popularity across all sectors due to the need to increase flexibility, productivity and efficiency, and to minimise Capex investment where possible.

"The reduced need for planning or civil infrastructure is another factor contributing to the growing trend towards mobile equipment, as is the ability to use the same equipment along several parts of the logistics chain from pit to port, pit to plant or port to plant."

She says the mining industry, like many others, is susceptible to variable factors such as political instability and volatile commodity prices.

"For some, the true benefit of mobile equipment lies in the ability to disassemble, remove from the site or country and relocate or resell globally into another mine or quarrying application."

For others, she says, the benefit lies with the ability to obtain third-party funding more easily for mobile equipment compared to static equipment. Mobile equipment also often lends itself better to finance programs such as leasing.

"The initially lower outlay is a much more attractive risk, given the number of variables in the industry."

Mining trends have also shown a rise in contract mining, which works on a fixed price whereby the mine owner buys the coal from the contractor at a guaranteed price per tonne or price per metre for either a fixed duration or life-of-mine.

"An increased emphasis on plant utilisation is a key factor here and mining contractors are achieving, at the very least, comparative plant utilisation results from mobile equipment, compared to more traditional means."

The analysis validating the reduced operating costs has also steered a growing acceptance within mining houses and engineering, procurement and construction (EPC) towards mobile equipment as the sector moves increasingly away from what would be considered the "traditional" means to move dry bulk material.

"The ability to meet safety and environmental requirements using bespoke mobile solutions is also a substantial gain for the mobile sector."

BLT World MD Ken Mouritzen says the COVID-19 pandemic has "changed the way we do business" and will permanently alter how production plants operate and how all industries function.

"It has become critical that extra care is taken to protect people working in potentially dangerous environments and to make sure that working distances are maintained," he says.

"It is the responsibility of companies to minimise people's exposure to environmental pollution, which is a major problem in dry bulk handling, caused by fugitive dust."

Demand drivers

Pelser views mechanisation as the future of South African mining: "This drives the demand for improved bulk handling equipment. It will no doubt also impact the rest of Africa, too," he says.

To McCrory, the need to keep tonnages high and production costs low is a key driver for producers and consumers of ores globally, as they "strive to remain agile in an often-unpredictable industry".

Mouritzen says companies around the world are continually looking for more efficient, dependable systems to alleviate problems associated with dust generation and belt misalignment in bulk handling.

"Common difficulties include dust, spills and contamination at the transfer points of conveyor systems. Misalignment, abrasion and subsequent belt damage are other problems industry faces. An added advantage is for industry to be able to cope efficiently with the challenges of moist and sticky materials."

Products and technology

Pelser says more producers are making use of high-vibration screen media like Major Wire Industries' Flex-Mat high-vibrating wire screens, featuring high-frequency movement which "makes it an active part of the screening process".

A FLEX-MAT high-vibrating tensioned screen from Major Wire Industries.

"The style of screen media improves efficiency compared to static media such as woven cloth or synthetic panels, and can provide a significant return on investment." This ROI comes from reduced downtime and fewer screen media change-outs due to improved wear life and virtually eliminated pegging and blinding.

He says high-vibration screen media also feature a significant amount of open area and increased stratification. This means more production, an improved feed rate per hour and reduced chance of material carryover. He says it also produces cleaner material, more in line with specifications.

"The reduced need to stop and start the plant regularly to clean decks means reduced labour costs, safer working conditions and less stress on the plant equipment."

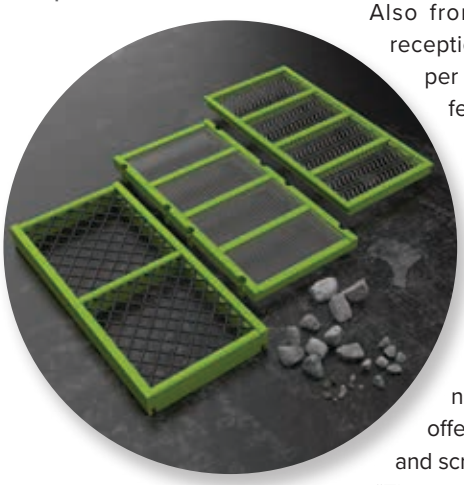
Right: The ABHS All Wheel Travel ship-unloader from Astec Industries offers added mobility and flexibility.

Below: BLT World's Samson eco-hopper for dry bulk materials handling.

The heavy-duty RS radial stacker range from ABHS offers belt widths up to 1800 mm wide and works at production rates up to 5 000 tph.

The heavy-duty ABHS RS radial stacker range from Astec Industries is available in belt widths up to 1 800 mm and can achieve tonnages of up to 5 000 tph.

Also from ABHS is a mine-spec bulk reception feeder range of mobile hopper feeders including bulk reception feeders, reclaim feeders and ROM feeders which work at production rates of up to 5 000 tph. The mobile machines are available in a range of power options including diesel, all electric, dual power, and onboard generator.



The FLEX-MAT modular panel series from Major Wire Industries.

McCrory says ABHS' tracked ROM feeder is a feasible alternative to a fixed reception feeder offering true flexibility to any crushing and screening operation.

"The priorities of any heap leaching operation are to increase the production of a continuous flow of material, to keep downtime to a minimum, and to keep the operation flexible."

ABHS automated heap leach conveying systems are programmed to stack per specification, and provide a flat top to each heaped pile.

"The mobility of the units is a huge benefit in this type of application, ensuring greater flexibility for the operator with radial travel wheels on the radial telescopic conveyor, for example, as a cost-effective way to gain optimum traction on uneven surfaces," she says.

New products

Major Wire Industries, says Pelser, manufactures its flagship screen media, FLEX-MAT, with a high-carbon, high-manganese chemical content to outlast and outperform traditional woven mesh.

"We manufacture our screen media with some 3% tolerances to give the end-user a more precise and in-spec product."

Astec Industries has introduced a range of mobility options for mobile equipment for improved flexibility. The range is sold and supported through its regional offices and global dealer network.

"The benefits are clearly evident in ship loading and unloading applications," says McCrory. "We have also enhanced the 'truck to ship' concept by incorporating our All Wheel Travel technology for bulk reception feeders and ship loaders.

She says this technology has achieved "great results across many applications", including at a bauxite application in West Africa, an iron ore mine in Australia and coal mines in South America.

"Going forward, the future of mining lies in electrical sophistication; decreased operator intervention; a reduced carbon footprint; increased investment in telematics and greater emphasis on health and safety on site."

BLT World's dust suppression systems include ScrapeTec's solutions for conveyor systems used in diverse industries for the handling of abrasive materials with excessive dust.

New to the range is the Scrapetec PrimeTracker belt tracker which eliminates conveyor belt issues including misalignment, abrasion and belt damage. The company's Samson travelling Eco-Hoppers feature a dust control system to minimise the escape of dust during the grab discharge cycle.

ScrapeTec's AirScrape and TailScrape systems prevent dust formation while limiting material spill. This enables belt-cleaning to minimise the risk of explosion along the conveyor route and at transfer points.

The new PrimeTracker belt tracker eliminates other problems associated with conveyor belt systems, including misalignment, abrasion and belt damage.

"Conventional dust control measures which have side seals, covers, shrouds or enclosures around the dust source do help to suppress dust and dust dispersal in the short-term, but many of these measures wear out quickly because of friction, and can damage the conveyor belt under extended use," says Mouritzen.

He says the company has found "substantial benefits" when combining the ScrapeTec AirScrape, TailScrape and PrimeTracker belt tracker on a conveyor system.

"The PrimeTracker ensures the belt stays in the correct position to eliminating problems with belt mis-tracking, while the AirScrape and TailScrape control dust, prevent material spill and minimise explosion risks." ■

Key takeaways

- ❑ There has been a paradigm shift in recent years to bulk material handling products and technologies that focus on safer working conditions
- ❑ The ability to meet safety and environmental requirements using bespoke mobile solutions is a substantial gain for the mobile sector
- ❑ COVID-19 pandemic has changed the way we do business and will alter how production plants operate permanently
- ❑ The need to keep tonnages high and production costs low is a key driver globally

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Next-generation intelligence and automation for exploration rigs

Ricardo Ribeiro, MD of Rosond.

Drilling services provider Rosond is using ground-breaking technology, including data analytics, automation and software, to transform exploration drilling in the mining industry. *Modern Mining* caught up with MD Ricardo Ribeiro about Rosond's R2-billion multi-year drilling agreement with Anglo American to implement the new technology at Kumba Iron Ore. By *Mark Botha.*

Following the financial crisis of 2008, Rosond, which celebrates its 65th anniversary next year, took the step in 2012 to develop new technology for the drilling and exploration industry. It had embarked on a research and development drive prior to this decision.

Ricardo Ribeiro, the company's MD, explains that Rosond manufactures all its underground drilling and pack support equipment, and has only partnered up on the exploration side. The drill rigs are manufactured exclusively for Rosond, while the software has been developed and refined in-house.

Following an initiative by Anglo American's JSE-listed Kumba Iron Ore to modernise its geoscience operations and extend its life-of-mine at its Kolomela and Sishen iron ore mines, Rosond was awarded a R2-billion multi-year contract in 2019 to develop and implement 28 rigs featuring advanced technology.

"While it is not yet proven, we expect efficiency to improve by up to 30%," says Ribeiro. "This was the perfect time for Anglo American and Kumba to buy in to the technology. Few thought the tender would be awarded to a single contractor, but we hit the ball right out of the park."

The innovation behind the new rigs centres on software, telemetry and automation.

Anglo American awarded Rosond a R2-billion contract for 28 advanced drill rigs for Kumba Iron Ore.

Technological innovation

The technological innovation behind the new rigs centres largely on software, telemetry and automation, whereby the handling of heavy equipment such as drill rods is mechanised.

"We brought in a lot of technology from the construction and oil & gas industries to develop functionalities such as dust suppression and automation, as well as software and telemetry systems," says Ribeiro.

Rosond will ultimately deploy 28 of these hi-tech dill rigs located in an 80 km radius at Kumba to ensure that exploration drilling is optimised and to provide crucial information about the geology at the site under investigation.

"We have the hardware and now we're opening up a software division whereby data analytics and AI, among others, become part of our business to enable us to optimise our drilling process." The end-result will be that the drill rigs collect and collate data for the purpose of machine learning.

"With Anglo American's buy-in, we've certainly delivered in terms of technology at Kumba. The last two rigs arrived on site recently, likely making Rosond the only company in the world with so many drill rigs equipped with telemetry in use by a single client."

Telemetry

"The truly exciting part will start in 2021, with the development of our software and AI. We are optimistic that, in the future, the machine will identify the parameters within which it is drilling and guide the operator in order to optimise the drilling process." He says the end goal in development would be to have a fully autonomous drill rig.

"Our priority in 2020 was primarily to get this technology to the mine. For this step, we recruited an additional 250 operators. We had a training centre where three rigs were used for almost a year as we provided training on the new technology. The learning curve is quite steep and it takes an average operator three to six months to master."

Anglo American

Rosond has a decades-long relationship with Anglo American and was able to meet its needs in light of the drive in the mining industry towards improved technology, safety and gender equality.

"Understanding your client gives you insight into their requirements. Once we'd identified their particular needs, we had an edge over the competition."

He says Rosond now has a "great opportunity" as this contract includes 45 drill rigs in total, making

To the left is the air-conditioned portable control room, including its own restroom facilities.

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Rosond's end-goal is a fully autonomous drill rig.

it one of the largest drilling contracts in Africa, if not in the southern hemisphere.

"The telemetry system will also help further R&D into tool optimisation that could outperform the market standard."

Women in mining

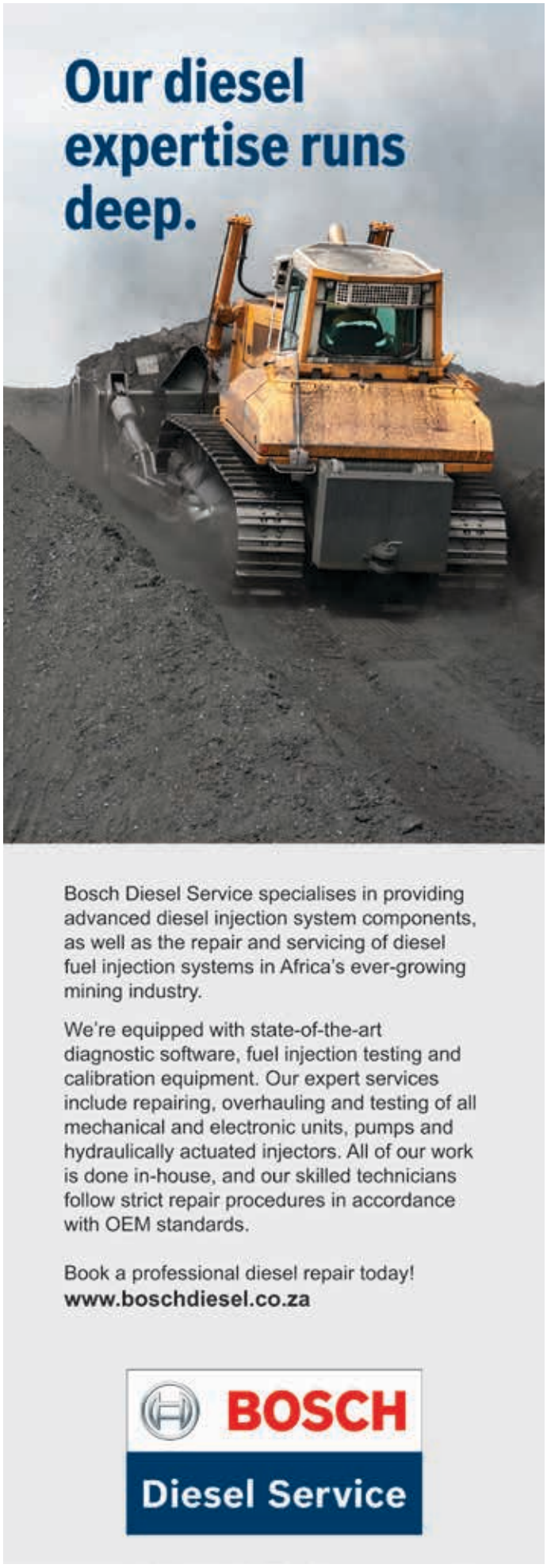
A far cry from the 'hard and dangerous work' normally associated with core drilling, Rosond's next-generation exploration rigs are controlled remotely, from an air-conditioned control room complete with its own restroom facilities.

Rosond recruited six women from the local community at Kumba and provided them with intensive training as dill rig operators.

"These ladies are dynamic and excited over their new skills. This is true community development and empowerment," says Ribeiro. ■

Key Takeaways

- Rosond was awarded a R2-billion multi-year contract in 2019 to develop and implement its next-generation drill rigs
- The drilling contract is one of the largest in Africa, if not in the southern hemisphere
- The last two rigs arrived on site recently, likely making Rosond the only company in the world with so many drill rigs equipped with telemetry in use by a single client
- Rosond has a decades-long relationship with Anglo American and was able to meet its needs in light of the drive in the mining industry towards improved technology, safety and gender equality



The science of addressing climate change risks in mining

Climate change is exacerbating many of the risks that mines already face in their daily operations, and needs to be factored into planning decisions right from the pre-feasibility stage of projects.

Ashleigh Maritz, senior environmental consultant at SRK Consulting SA.

Water management, for example, is becoming more complex as rainfall patterns in many areas start to change in frequency and intensity, according to Philippa Burmeister, principal scientist at SRK Consulting.

"This affects mines' management of their surface water and groundwater resources, as well as biodiversity and wetland management," says Burmeister. "It has implications for infrastructure design, as it raises the risk of flooding, water insecurity and environmental damage."

Water balance

As an example, she highlights the importance of water balance as a key aspect of tailings dam design. Here, historical rainfall data is a crucial part of the information necessary to ensure dams' safe operation in the long term.

"As rainfall variability and intensity change, the historical data becomes less reliable in guiding design parameters," she says. "Operations generally are more likely to be disrupted due to severe weather events like floods or droughts. For instance, heavier storm events may increase water volumes seeping into mine workings, requiring more pumping capacity."

Ashleigh Maritz, senior environmental scientist at SRK Consulting, notes that climate change is also likely to affect the livelihood resilience of mining communities.

Social licence

"As temperatures and rainfall patterns change, traditional forms of livelihood could be threatened, making communities more reliant on the mines for income and corporate social investment," says Maritz. "The way that a mine engages with their stakeholders and supports communities is therefore critical, as it is vital to maintaining its social licence to operate."

She points out that an important outcome of climate change is likely to be scarcity of precious resources like water – which could set mines in direct competition with local communities. Rising average temperatures in some regions may also lead to the geographic spread of communicable diseases like malaria – which may affect employees and surrounding communities.

Philippa Burmeister, principal scientist at SRK Consulting.

Impacts on public infrastructure will also have a knock-on effect for mines. More frequent flooding or drought will change municipalities' planning and investment in water supply or stormwater facilities. This may disadvantage the mines or affect mines' social license to operate.

"This will demand not just a technical solution but careful relationship building, so that platforms are created for collaborative and long-term answers with buy-in from all stakeholders," she says.

Risk and compliance

Burmeister says that mining clients are increasingly cognisant of climate change risk. Industry standards are evolving – even in advance of national standards or requirements.

"With financial institutions also seeing the potential risks to their investments posed by climate change, they are increasingly stipulating that climate change issues are addressed in planning studies for mining projects," she says.

To effectively address the varied risks that accompany climate change, she emphasised that solutions need to be integrated. In other words, technical input must be coordinated across a range of professional disciplines. It is crucial that climate change impacts be 'mainstreamed' into various technical disciplines if it is to be effectively addressed.

"Our philosophy at SRK is that climate change

must be considered by all disciplines in the project team," she says. "This includes expertise in various facets of engineering, as well as in the natural and social sciences."

SRK uses a range of quantitative and qualitative methods to investigate clients' exposure to climate change risk. These include measuring the project's greenhouse gas emissions as part of its environmental impact assessment, and applying climate change models to identify specific project risks posed by predicted changes in climatic conditions.

Innovating for sustainability

"By integrating SRK's professional input, we ensure not only that clients are compliant with regulations, but that the many and varied risks of climate change are addressed in their projects," she says. "This makes them more sustainable and robust in the longer term."

Maritz notes that the science of climate change modelling is relatively young, leading the company to take an adaptive and dynamic approach – while leveraging off partnerships to develop and apply the power of predictive modelling.

"This assists us in pioneering strategies and tools to manage climate change risks, from initial mine design and operational technical inputs through to social transitioning and mine closure," she says. "While monitoring is being undertaken extensively at most mine sites, the interpretation of the data is critical to identifying trends that could prevent undesirable events."

Digital and data

A key concern for SRK has been the development of better data processing and analysis capacity for the considerable mine data that is already available. This helps guide decision-making around climate change and the risks it poses.

"SRK recently established a dedicated data services unit that works closely with the climate change team to leverage and evolve the latest digital technologies" she says. "For instance, as part of an innovation project, the team is developing an interactive mining map of South Africa; this provides a coordinated source of geo-located data on various aspects and stages of mining."

SRK is also looking at developing site-specific climate change-related rainfall models for its mining clients, to better inform their project and operational planning. To support its ongoing innovation efforts, the company holds an annual innovation conference that fosters collaboration between specialists and opens doors to valuable applications. ■

Tackling digital transformation in the local mining sector

A digital trick operating on a mine site.

With a focus on how technology can help move the local mining sector into the future, ICT solutions provider Datacentrix recently held the first virtual version of its Mining Indaba event, welcoming an audience of over 200 delegates.

Datacentrix's 2020 Indaba was concise, and reiterated the importance of digital transformation with greater urgency now than ever before in light of the COVID-19 pandemic. In his welcome, Datacentrix CEO Ahmed Mahomed spoke on the profound changes COVID-19 has had on the local economy, on businesses and the way we work, as well as on our personal lives, and how these consequences will continue to be felt in all areas into the future.

"It stands to reason that the effects of technology – be it robotics, artificial intelligence (AI), data mining, intelligent networks or remote working environments – will also endure across every industry, including the mining sector. The issues of how mining companies operate, how they improve both safety and productivity, and how they mine data, are becoming increasingly critical when it comes to gaining competitive advantage."

Issues of how mining companies operate, improve both safety and productivity, are becoming increasingly critical when it comes to gaining competitive advantage.

Mahomed's sentiment was echoed by the event's keynote speaker, chief economist and director of Efficient Group, Dawie Roodt, who discussed several trends that were already well established pre-COVID: the so-called 'gig economy' (also known as the 'sharing economy', with reference to the likes of Uber and Airbnb); the increasing use of online shopping platforms like Amazon; growing numbers of remote workers; and a developing dependence on AI and algorithms.

"These are simply being accelerated because of the lockdown," he clarified. "We have also seen that tertiary sectors – more service-oriented businesses – have become much more important in recent years, while the primary sectors, such as agriculture and mining, have been eclipsed.

"However, the real winners during this time will be those primary sector businesses that manage to transform themselves into secondary and tertiary players. For example, the agriculture sector has already made changes, such as genetic engineering or drones for instance. Global economic growth is happening in one place, the tertiary services industry."

Roodt's advice for individuals moving forward was to stay informed, read, listen to analysts, and keep abreast of what is going on in South Africa from both a political and economic perspective. "Identify the risks within your specific industry, and ensure that you are able to manage them.

"There are many opportunities in South Africa, and I urge people to make use of them. The only way to have a successful country is to have successful businesses."

Modernisation to the fore

Included on the virtual Mining Indaba 2020 agenda was a panel discussion with Two Rivers Platinum, a large underground platinum mine located in Steelport, Limpopo. The panel focused on the modernisation of the mine's underground Wi-Fi with a view to improving both productivity and safety. Mine management had considered establishing a reliable and stable communication network despite the complex environment, where challenges included the density of the rock.

"A proof of concept (POC) with Datacentrix and Huawei put a modern network in place, connecting people, equipment and management at Two Rivers Platinum. The POC has enabled reliable underground communications as well as live condition monitoring and real-time data feeds that empower informed decisions based on the trends uncovered by this data," said Gys Malan, data and communications network solutions architect at Huawei.

The transformation of the network has improved the mine's ability to react to challenges, making autonomous mining a possibility. The POC has provided the mine access to greater innovation and to the future state of mining. Malan further spoke on the technical implementation of the POC in a separate demonstration.

Remote working

Rudie Raath, Datacentrix' chief digital officer, deliberated the national corporate shift to remote working as a result of the global COVID-19 pandemic, stating that many organisations were not prepared for the full-scale remote workforce adoption. His discussion highlighted the significant challenges that companies have faced, including connectivity and cost management, the secure, remote access to corporate applications, and user productivity.

Datacentrix has gained valuable insight in its own move to remote work as well as from its role in mobilising its customer base. Kitted with the right modernisation strategies, technology adoption roadmaps and information on the IT and operational technology (OT) environments, Datacentrix helps customers mature and enhance their operations and ensures business continuity, growth and success.

Additional technology-focused content was provided by Stephanie Rosenmayer, business unit manager at Datacentrix, who delved into the power of AI in mine surveillance. "Traditionally the camera was used for security purposes only," she explained. "Today, surveillance has changed, and the camera has become a multipurpose device that can collect information spanning far broader areas. This data can inform business decisions by delivering actionable intelligence to be used in operations, manufacturing, health and safety, and even sales and marketing."

Rosenmayer cited several cases where cameras deployed at local mining sites were used to harness AI, specifically behavioural analytics and deep learning. In one example, the camera was able to recognise objects and categorise 'normal' behaviour, alerting operators to 'unusual' behaviour (in this case vehicles parked in the wrong place).

Data is the new 'gold' in the mining industry.

Datacentrix also installed a thermal camera at an open pit, with the objective of picking out movement within the pit, of vehicles or people, up to a distance of one kilometre. This data assisted with meeting stringent health and safety precautions to alert the mine in question about activity within the pit prior to a blast.

Data interrogation

She also emphasised the ability to mine petabytes of footage, to demonstrate how data can be interrogated to find deeper information around a specific event.

"By applying filters to camera footage, mines can gain access to a host of information not necessarily pertaining to surveillance. This could include identifying common paths travelled and generating an activity map, tracking the speed of vehicles, testing facial recognition at entrance turnstiles, and even tracking individuals throughout the mine to determine whether they are wearing the appropriate personal protective equipment (PPE), and whether they are adhering to social distancing requirements."

In keeping with the overall theme of the value of data, the topic of accelerating productivity, governance and digital transformation within mining was tackled by Datacentrix' Shakeel Jhazbhay, GM: Digital Business Solutions, who stated that data is the new 'gold'. "During COVID-19, the gold price shot up even higher than oil, so it makes sense then to describe the value of data within this context." ■

Bell launches future proof side-mount low profile ADTs

Delivering low cost per tonne operation, the latest generation Bell B30L and B35L low profile articulated dump trucks (ADTs) offer an 'autonomous ready' platform that is easily configurable for remote operation, either by a handheld remote control or a more sophisticated autonomous control centre.

Bell Equipment product designer, Shaun Tucker, explains that making the truck 'future proof' was a key design input as "these machines generally have a long life underground and in five years' time there may be more of a need for autonomous control than there is today. Underground haul roads don't change and could easily allow worksites to be automated in the future, so we chose components that would open that gap for us.

To achieve a more practical layout, product designers listened to customer feedback and moved from a centre-mounted cab to a left-hand side mount.

Additionally, the remote capability allows the machine to be operated via remote control in dangerous conditions where it might not be safe for an operator. This machine has all the bells and whistles in terms of being PDS (pedestrian detection system), remote control and autonomous ready."

To achieve a more practical layout, product designers listened to customer feedback and moved from a centre-mounted cab to a left-hand side mount. The vehicle height remains unchanged at 2,6 m but the cab now sits much lower resulting in increased headroom and operator comfort. With this configuration Bell can offer a cab height of 2,4 m as an option.

The ergonomics of the cab have been further fine-tuned with an Isringhausen suspension seat and a workstation featuring Bell Equipment's robust sealed switch module (SSM) and an all-new 7-inch colour monitor that is more responsive and displays improved graphics. A 360-degree camera gives a bird's eye view of the vehicle and defaults to the right-hand side blind spot for added safety.

Under the bonnet the new generation Mercedes Benz OM471LA (320 kW – B30L; 360 kW – B35L) engine replaces the Mercedes Benz OM501LA (290 kW) engine and provides a highly efficient power-to-weight ratio with superior drive up or out of the shaft and fuel efficiency gains.

Other driveline components are common to the industry and have been derived from the large surface Bell B40E and B45E truck platform to provide shared aftermarket support.

According to Tucker, the new underground trucks also offer many of the same standard safety features and productivity advantages of their surface counterparts. Safety features include keyless start, HillAssist, speed control, Bin Tip Prevention, Auto Park Application (APA) and Turbo Spin Protection to protect the engine. In terms of productivity, the Bell B30L and B35L are now fitted standard with onboard weighing and Bell Equipment's proprietary fleet management software, Fleetm@tic, so machine owners have access to daily production figures.

Product designers spent great effort ironing out acute angles in the bin design to prevent carry back at "seeding points". In addition, rolled edges and a tipping angle of 70-degrees ensures optimum dispersion of the payload. ■

Orica and Epiroc unveil prototype system for first stages of underground automation

Orica (ASX: ORI) and Epiroc Rock Drills AB have successfully co-developed a prototype of what is said to be the world's first semi-automated explosives delivery system.

Customers in the underground mining industry can look forward to safer, efficient and more productive development blasting as early as the end of 2021, as Orica and Epiroc commence commissioning on Avatel, the first-of-its-kind, industry-driven explosives delivery system in coming weeks.

Front impression of a commercially ready Avatel unit in an underground mine.

A sought-after technology by customers in the underground hard rock mining sector, Avatel will deliver a completely new way of approaching development blasting operations by eliminating charge crew exposure at the face.

The solution provides safe access for an operator in cab to execute the development cycle while reducing the reliance on costly, time-consuming and at-times ineffective controls put in place to manage the risks to personnel working in one of the highest risk areas of an underground mine.

Orica's chief commercial and technology officer Angus Melbourne says: "The mining industry is moving rapidly toward a digitally integrated and automated future, and Avatel will fulfil our shared vision of developing safer and more productive blasting solutions.

"Achieving this significant development milestone, despite COVID-19 disruptions, shows the strength of our collaboration with Epiroc and our collective ability to deliver the future of mining."

Epiroc's president underground division Sami Niiranen says: "With this partnership, we continue to raise the safety bar by combining world leading technologies that will make a difference in underground mines.

"The Avatel prototype represents the first step towards autonomous charging – a vital step in the journey toward safer and more productive blasting operations underground. We are looking forward to bringing this ground-breaking solution to customers worldwide."

A key enabling technology of Avatel and Orica's automation vision is WebGen, the world's first fully wireless initiation system. When combined with Orica's LOADPlus smart control system, specifically designed onboard storage, assembly, digital encoding capability and Subtek Control bulk emulsion, Avatel provides customers with complete and repeatable control over blast energy from design through to execution. ■

Caterpillar and Guardhat to deliver expanded mine safety solutions

Caterpillar is collaborating with Guardhat to offer their proven safety solutions to surface mining operations through Cat dealers. The two companies are also developing a new system, Cat Connected Worker, which will use wearables to provide added protection for people. The new system will also deliver event-based monitoring and mapping to aid analysis and enhancement of the mining environment.

"Leveraging Guardhat technology, proven in challenging industrial settings, will speed development of a comprehensive, digital solution sought by mining customers," says Bill Dears, Cat MineStar Solutions marketing manager. "As a component of Cat MineStar Detect safety capabilities, Connected Worker will provide insight that will enable managers to create safer operations – and to respond quickly if an incident does occur."

"We are pleased to work with Caterpillar to deliver 'smart' technology to enhance miners' safety," says Indranil Roychoudhury, chief operating officer, Guardhat. "Our safety monitoring and data analysis system is a multi-product, feature-packed intelligent safety and productivity system that integrates cutting edge wearable technology and advanced proprietary software. It is equipped to detect, alert and help prevent industrial work-related incidents, and it is designed to collect and analyse data to support and improve worker safety and productivity programmes."

When developed, Cat Connected Worker will provide precise location of all workers to the mine monitoring system, and it will allow communication between individuals, teams and sites. Data will enable monitoring personnel to understand the environment workers are facing in near real time, which will facilitate decision making.

As part of Cat MineStar, Connected Worker will be supported by Cat dealers worldwide. The same Cat dealers are equipped to supply current Guardhat technology to surface mining operations of all types.

Connected devices in the Guardhat line include hardhats, personnel tags, asset tags and smartphones using Guardhat applications. The system is Wi-Fi and cellular compatible for communications with the Safety Control Centre. ■

Track mine site personnel with Cat Connected Worker.

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BME builds skills in mining communities

Unemployed youth are being trained in technical skills to improve their employability and even open doors to starting small businesses, thanks to BME's partnerships with training providers.

According to Reuben Ramahlare, senior human resources business partner at Omnia Group company BME, this follows the signing of service agreements earlier this year training colleges around the country.

"An important strategic focus for us is to develop and empower communities through training, as part of our positive impact in the areas where we operate," says Ramahlare. "This includes communities near our operations in North West province, Northern Cape, Mpumalanga and Gauteng – and targets 70% women's participation in the programmes."

One of the ways in which BME strives to develop and empower communities in which it operates is through offering training days.

Through this initiative, BME has been sponsoring the training of a range of vocational skills such as welding, plumbing and general property maintenance. The training bodies provide learners with certificates of competence, facilitating their path to employment or self-employment.

He notes that groups of learners are put forward by local municipalities and spend up to a month in training. In the case of the welding course, the successful learners are provided with welding and personal protective equipment by BME, to apply their skills in the marketplace. They are also trained in basic business skills for starting their own small enterprises, including financial management and applying for tenders. 35 candidates have been trained this year in Brits, Kathu, Middelburg and eMalahleni.

"We are also involved in developing specialised skills for the blasting sector, through courses for blasting assistants," he says. "This gives young people opportunities not just with blasting specialists like BME, but also with companies working in drilling activity or with explosive magazines – and of course with mines themselves."

The training organisations that BME has partnered with include the Mineral Mining Training Institute in Brits, Kathu and Middelburg, the Colliery Training Centre in eMalahleni and the Ekurhuleni Artisans and Skills Training Centre in Kempton Park.

He highlights that BME's contribution to local empowerment is also supportive of its mining customers' commitment to the Mining Charter, which places growing importance on local content and socio-economic development. Through its enterprise development focus, the company aims to procure from local women-owned and youth-owned businesses. It has recently partnered with taxi organisations to outsource its staff transport needs, for instance.

"We are also working on a programme to engage more women-owned businesses in the logistical aspects of our supply chain across the provinces," says Ramahlare. "This will assist these businesses with aspects like licencing for Code 14 drivers, which is the category required for transporting our emulsion explosives."

There are also less frequent initiatives where BME seizes the opportunity to contribute to learning in local communities. One of these was the recent donation of computer hardware from head office to schools in Phola near Ogies, Phokeng near Rustenburg, and Eldorado Park near Johannesburg.

"We were grateful for the chance to support these schools with valuable technology – which was still suitable for their purposes while having outlived their use for our applications," he says. ■

Booyco expands PDS footprint to Namibian mine

Proximity detection leader Booyco Electronics is equipping 19 trackless mining machines with its latest Booyco CXS proximity detection solution to enhance safety during the development phase of underground operations at Namibia's largest gold mine.

According to Anton Lourens, Booyco Electronics Chief Executive Officer, the order was placed by long-time customer Murray & Roberts Cementation, who will be establishing the underground stoping horizon for the Wolfshag zone of B2Gold's Otjikoto mine.

The contract also includes sensing devices for 120 underground personnel on the operation, which will be located in the employee's cap lamp to provide an alarm.

"Our equipment will help achieve the highest level of safety by mitigating the risk of collisions between pedestrians and vehicles, and between vehicles, on this project," says Lourens. "The installation of our CXS units is in line with the commitment by the mine and the contractor to zero harm in the workplace."

Murray & Roberts Cementation's project will take 28 months and will be conducted with local company Lewcor Mining. The contract will include a decline of 5 metres wide by 5,5 m high being driven to the orebody from a portal in one of Otjikoto's depleted open pits. The operation will be highly mechanised, with equipment including drill rigs, dump trucks, load-haul-dumpers and utility vehicles, as well as shotcreting and ancillary equipment.

Lourens highlights that Booyco Electronics' latest generation CXS system being used on the project is a comprehensive and integrated proximity detection solution.

"The CXS system on this project will deliver Level 7 and Level 8 capability in terms of the Earth Moving Equipment Safety Roundtable (EMESRT), and can also accommodate Level 9," he says. "Although there is not yet a legal requirement for collision avoidance systems in Namibia, our customer and the mine adopt a global best practice approach to all aspects of safety in mining operations."

With the mine's location more than 300 km north of Windhoek, it was important that the equipment is robust and reliable to ensure maximum uptime, he says.

"To ensure that the equipment performs optimally, we have trained the customers' artisans on how to look after it," Lourens says. "A qualified serviceman from Booyco Electronics will also visit the site regularly to audit performance, assess the equipment and conduct any necessary maintenance."

A pioneer of proximity detection systems in South Africa, Booyco Electronics' homegrown technology has seen wide take-up in underground operations – both hard rock and coal – as well as in the opencast environment, plants and warehouses.

"Since our inception in 2006, safety regu-

Crane agent wins Condra orders

North Coast Cranes & Lifting, the Richards Bay-based lifting equipment company, has won separate orders for Condra cranes to be installed in a chemical element refinery furnace and on a mining dredge. An order for two further machines is expected.

North Coast Cranes is Condra's Northern KwaZulu-Natal agent, with a mandate to install and commission machines as they arrive from the main Johannesburg factory, and provide scheduled maintenance and on-call service support. Annual load tests and the quarterly sling inspections required by law are also carried out.

The agent has a very strong customer focus, concentrating on service and maintenance capability rather than equipment sales. All brands of lifting equipment are supported, but orders for complete cranes are usually met by Condra.

The first of the two orders just received is for a 10-t, 6,5-m-span Condra furnace crane. This will be a double-girder electric overhead underslung machine supporting an underslung crab and foot-mounted hoist moving between two girders arranged as an extendable boom to allow the retrieval of casting pots from an adjacent bay.

Lift height will be 15,2 m, with lift speeds of up to 8 m per minute delivered by a variable-speed drive. Further drives of the same type will achieve speeds of up to 16 m/min on the cross travel, and 30,7 m/min on the long travel. Travel on the telescopic boom will be 4,3 m per minute.

Brakes and electrical enclosures will be water-proofed to IP65 standard, with the electrical box itself being fabricated from stainless steel instead of the more common powder-coated mild steel. The electrical supply to the telescopic section will additionally be protected by a cable drag chain in place of the usual festoon system. There will be limit switches on all motions.

The second order is for a maintenance and repair machine to be installed on a mining dredge. It will be a 10-t, 13,5-m span Condra portal crane of straightforward design with cantilevers to allow equipment to be lifted and lowered from adjacent vessels.

The lift height of this machine will be 12 m. Service platforms with cat ladders and lockable gates will be fitted to legs at both ends.

North Coast Cranes & Lifting took the orders for the two cranes in early November. Delivery is scheduled for the end of January 2021.

Immediately before delivery, corrosion-resistant finishes will be applied in an environmentally-friendly emission-filtered chamber by Rust Busters, the Wadeville-based abrasives blasting and coating company. The special finish will comprise a zinc phosphate primer followed by layered two-component epoxies.

The new orders will further add to Condra's already substantial installed base of cranes in and around Richards Bay. ■

Condra crane with extendable boom, similar to the one recently ordered from North Coast Cranes & Lifting for a furnace application, seen here under test in Condra's Johannesburg factory.

lations have changed significantly," he says. "An important strength of our technology is that it has constantly evolved to meet the needs of the industry."

The company now has a footprint of over 100 mining customers in South Africa, and this Namibian project is part of its gradual expansion into other countries in Southern Africa. He highlights that collision avoidance systems are likely to become increasingly mandatory in neighbouring states as these countries usually follow South African regulations. Major miners are also driving change through the globally recognised EMESRT guidelines.

"The International Council on Mining and Metals is also an important stakeholder in this process," Lourens says. "The ICMM highlights that transport and mobile equipment accidents were highest cause of fatalities at their members' operations in 2018, accounting for 30% of fatalities." ■

Metso Outotec launches Larox FFP3716 filter for sustainable tailings filtration

Metso Outotec is introducing a new high-capacity filter for demanding tailings applications. Extending the product family line of the FFP filters, the new Larox FFP3716 filter comes with compact plate pack design and smart automation, redefining the overall standard in reliability, capacity and safety in tailings filtration. Combined with Metso Outotec's optimised filtration plant design, the FFP3716 filter offers a reliable and cost-efficient long term solution for tailings management even in challenging environments.

"Responsible usage of water in the mining industry is the primary driver for increasing interest in tailings dewatering. At Metso Outotec, our goal is to provide holistic tailings management solutions by bringing a step change in the way we view, handle, and manage tailings," says Geoff Foster, head of tailings filtration a Metso Outotec. "Backed by proven technology and industrial knowledge, our efficient dewatering solutions help in maximising water recovery and reuse. The Larox FFP3716 filter represents the most advanced technology currently available for safe and efficient dewatering."

With substantial increase in total filtration volume, the Larox FFP3716 uses the most optimum plate pack design leading to reduced wear on plate pack and cloth components along with ease operation and spares holding. ■

The FFP3716 filter has been designed from bottom to top with optimal safety in mind.

Ore body knowledge can save mining projects from an extinction event

Obtaining comprehensive ore body knowledge should not be seen as a cost, it is an investment that has the potential to avoid company-destroying mistakes, says mining and minerals processing expert Dr John Steen.

Dr John Steen, director of the Bradshaw Research Initiative in Minerals and Mining at The University of British Columbia, and the EY Distinguished Scholar in Metals Futures.

According to Steen, the mining industry is struggling to attract new investment capital because it has a history of poor returns to shareholders.

Recent analysis showed that much of this poor performance is attributable to write-downs on capital projects because of inadequate investment in gathering information about the orebody.

While the industry pays a lot of attention to gathering data such as reserve size and grade to prove the business case for a mine, the gathering of geological data as insurance against a large downside risk event is rare.

Dr Steen, the director of the Bradshaw Research Initiative in Minerals and Mining at The University of British Columbia, and the EY Distinguished Scholar in Metals Futures, will discuss the topic during IMDEX's Xploration Tech Symposium, a highly anticipated online conference to be held on January 12 and 13 featuring a range of international speakers.

The two-day symposium, an annual event usually held in Vancouver, brings together experts at the forefront of innovation in the mining and exploration industries and will examine the latest in new technologies, tools and advanced analytics.

Recycled capital

Dr Steen says much of the capital flowing to explorers and miners now is recycled, with investors shifting money around the industry by selling out of companies and projects and into other companies and projects. This is a particular problem in the junior mining sector.

"What the industry needs to meet commodity demand over the next 30, 40 years is new capital; we desperately need new capital," Dr Steen says.

"Across all mined commodities, the places we have to go to and the ore bodies we have to try to find, are getting more and more difficult.

"What that means is that the risks associated with developing both greenfield and brownfield projects are escalating. The best way to ensure against some of those big writedown risks is investing more in ore body knowledge."

Ore body technology

Dr Steen says the development of ore body technology is one of the fastest growing sectors in mining. "We have squeezed the productivity lemon as hard as we can," he says. "We have tried to extract everything from the milling operation, we have automated our haul trucks.

"The big frontier now is for geology. In the past that was something that was always going to be a black box but with the new technology, the analytics and the AI that is coming through we really don't have an excuse to proceed with projects that shouldn't have gone ahead or developing a mine project in the wrong way."

He says an analysis of poor returns from companies on the Toronto Stock Exchange shows that most poor returns come from "company destroying" write-downs because project risk has not been managed properly.

New tools are starting to make the job of ore body assessment easier. "IMDEX BlastDOG is a classic example; it makes it easier and quicker to get a better picture of the bench and the mine," concludes Dr Steen. ■

IMDEX Blast DOG is a semi-autonomously deployed system for logging material properties and blast hole characteristics at high spatial density across the bench and mine and is commodity agnostic.

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