

MODERN MINING

May 2024 | Vol 20 No 5



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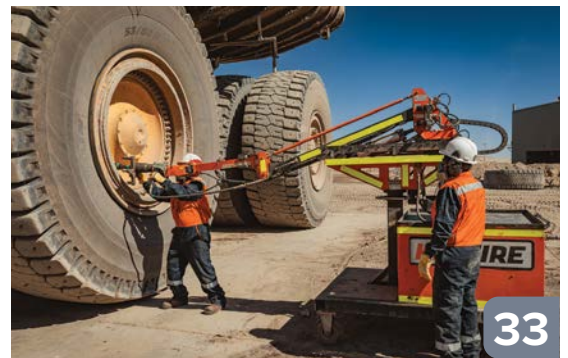
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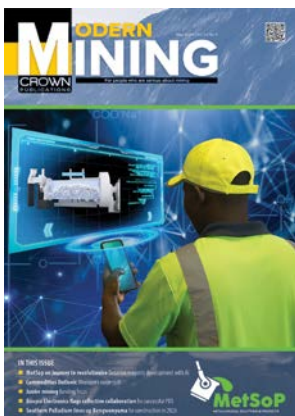
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ON THE COVER

MetSop continues to push boundaries by embracing the transformative potential of artificial intelligence and dry lab concepts. See story on page 6.

Golden glow – happiness for some commodities

The colour yellow has traditionally been a symbol of hope, joy and happiness; and with gold and uranium – also known as yellow-cake, in strong demand, miners of these commodities are certainly radiating happiness.

Gold hit some high notes early in April, surging above \$2 300/oz and sending markets into a frenzy. Uranium too is tracking prices not seen in a while.

Although gold's contribution to the South African economy has declined significantly over the years, it still contributes about 15% to overall South African mining output.

Interesting news from the gold sector is that miner, Harmony Gold, will extend the life of Mponeng mine – the world's deepest gold mine, stretching more than four kilometres below ground, by 13 years.

The miner announced an investment of R7.9bn to extend the life of the Mponeng mine from seven to 20 years, with works scheduled to commence in 2025.

In some really exciting news, Zimbabwean geologist, PhD recipient Dr Steve Chingwaru, is said to have made a groundbreaking discovery of the world's largest gold resource, valued at billions.

Dr Chingwaru's revolutionary research in geomaterials has potentially uncovered the world's largest invisible gold resource, valued at R450 billion. Chingwaru is the first scholar to calculate that the six billion tons of tailings around Johannesburg's mines contain up to 460 tons of gold.

Robust demand for gold and South Africa's declining gold output are all the more reason why this 'find' is so valuable.

Meanwhile, uranium, which is an important commodity in the energy sector as it provides fuel for nuclear power generation and supplies 10 percent of global energy needs, is also basking in the glow of high prices. Rising uranium prices have spurred the revival of uranium mining operations previously scaled back after the 2011 Fukushima disaster.

Analysts and industry players anticipate more uranium mine restarts in 2024. Plus, new builds

are getting more attractive due to rising prices and anticipated supply deficits over the coming years.

According to Tom Price, Head of Commodities Strategy at Liberum, "Since its dormant days of 2015-20, the trade's flagship oxide price has reported a stunning 250% lift to just over \$100/lb in January."

Liberum is bullish on uranium demand, which is underpinned by a "worldwide re-acceptance of nuclear power as a carbon-free base load option. But we're even more bullish on supply: reactivations are underway; the project pipeline is expanding," says Price (see pg 8).

In this edition

We feature Junior Mining in the May edition with Minerals Council South Africa's Junior and Emerging Miners Desk lead, Grant Mitchell, sharing insights into some of the latest developments underway in the junior mining space, including a shot in the arm from the Junior Mining Exploration Fund, which is allocating R400 million to encourage companies to enter the mineral exploration space.

The fund is set to open in May 2024 to provide much needed assistance to black emerging miners looking to unlock opportunities in the junior mining space (pg 10).

Also of interest is the conversation with Peter Major, director at Modern Corporate Solutions, where he provides a viewpoint from investors and corporate financiers for evaluating Greenfields projects (pg 14).

Emerging miner, Southern Palladium, keeps us abreast of progress on its flagship Bengwenyama project, which is lined up for construction in 2026. The project is now firmly placed on the radar of numerous potential financiers who attended the 1-2-1 event and the Mining Indaba in February, says MD Johan Odendaal, who believes that the next year-and-a-half could see slow improvement in demand for PGMs, driven by the automotive industry and a shift to hybrid vehicles (pg 16).

Also of note is the health and safety feature which includes: Booyco Electronics, De Beers, Kal Tire, Tru-Trac and Murray & Roberts Cementation Training Academy. ■



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Printed by: Tandym Print

The views expressed in this publication are not necessarily those of the editor or the publisher.



Average circulation
October-December 2023: 14 533

Altona Rare Earths Zambia copper license acquisition

LSE-listed Altona, a resource exploration and development company focused on critical raw materials in Africa, has entered into an agreement with Sustineri Group and with the beneficial owners of Phelps Dodge Mining (Zambia) to acquire the issued share capital of Phelps Dodge Mining (Zambia), the registered holder of large-scale Exploration Licence 21403-HQ-LEL, located in the Mufumbe District of Northwestern Province of Zambia.

The consideration for the transfer of the exclusivity over the Tenement from Sustineri to Altona is £40 000, to be satisfied by the immediate issue of 800 000 new ordinary Altona shares at a price of 5p. The tenement has a surface area of around 616 km² and is valid for copper, cobalt, nickel, lead, zinc, gold and diamonds. The tenement is located 4 km west of the Kamweji copper occurrence, and 60 km southwest of the Mufumbwe copper mine. Immediate exploration work will include reprocessing the magnetometer survey data and an ionic leach soil sampling survey at a reduced sample spacing, ahead of defining drilling targets by year end.

Cedric Simonet, CEO of Altona, commented: “Securing an asset with enough potential to have historically attracted the



Altona Rare Earths Zambia inks copper license acquisition.

attention of a major player in the copper mining industry is a significant achievement for Altona. We are delighted to make our entry into Zambia with this acquisition; a country where world-class copper and cobalt discoveries regularly make the news. ■

Awalé hits multiple shallow high-grade intercepts the Odienné Project

TSX.V-listed Awalé Resources has reported significant assay results at the Odienné Project. The BBM Zone is a grassroots discovery. The latest holes followed up on this promising new discovery, and the company expects to restart drilling in April. The multiple, shallow, broad, high-grade intercepts demonstrate the BBM zone’s excellent continuity and scale potential.

Andrew Chubb, CEO of Awale Resources, commented: “We are delighted with these assays from the follow-up programme at the BBM target. The mineralisation is robust, and we have now confirmed plunging high grade mineralisation over 500 m of strike, which remains open in all directions. The consistently


high-grade gold mineralisation encountered in multiple drill holes underscores the prospectivity of our exploration area and highlights the substantial value it holds for our company and stakeholders.”


With an established robust geologic framework, the company can progress with a targeted drilling programme to scope size potential, geological and grade continuity of the mineralisation as well as test for new parallel shoots along the 8 km of open strike. ■




Andrew Chubb, CEO of Awale Resources.

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Langer Heinrich Mine in Namibia.

Commercial production achieved at the Langer Heinrich Mine

Uranium miner, Paladin Energy, has announced that uranium concentrate production and drumming were achieved at the Langer Heinrich Mine (LHM) on 30 March 2024. Focus will now shift to production ramp-up and building a finished

product inventory ahead of shipments to customers, the company said.

As part of the transition to production, Paladin's Chief Operating Officer, Paul Hemburrow will assume responsibility for all LHM activities. ■

Kenmare Resources MD to step down



Kenmare Resources, a producer of titanium minerals and zircon, which operates the Moma Titanium Minerals Mine in northern Mozambique, has announced that Michael Carvill will step down as MD later this year. As part of the company's succession planning, Kenmare's Nomination Committee has commenced a process to find Carvill's successor. Carvill founded Kenmare in 1987 and, under his leadership, Kenmare has evolved into one of the world's largest producers of titanium minerals. The company serves customers operating in more than 15 countries and is responsible for 7% of global supply of titanium feedstocks. Since 2019, Kenmare has returned over \$230 million to shareholders through dividends and share buy-backs. ■

Kenmare Resources MD Michael Carvill.



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Copper 360 inks MoU with FWGR for due diligence on copper tailings dams

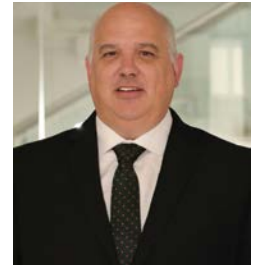
Emerging copper miner, Copper 360 recently signed a memorandum of understanding (MOU) with Far West Gold Recoveries (FWGR), a subsidiary of DRDGOLD (DRD), to conduct a due diligence (DD) on the company's copper tailings dams. The MOU is for a period of 12 months to conduct a DD on the O'Okiep, Carolusberg, Lower and Upper Nama Copper copper tailings dams. During the due diligence period, FWGR will, through an independent expert, determine (a) the total tonnage of tailings material by LIDER survey applying a density of 1.4 tonnes per cubic metre and as may be required, (b) a purchase consideration to acquire 50% of the copper tailings dams if the result of the DD is to the satisfaction of FWGR.

Jan Nelson, CEO of Copper 360 commented: "Copper 360 estimates that there are about 50 to 60 million tonnes of dump material with grades varying between 0.18% and 1.5% copper and with the potential to contain 450 000 tonnes of copper metal in situ. During the DD, FWGR will independently assess the economic viability

of the copper dumps and, if the results are to their satisfaction, the parties will enter into a joint venture agreement. FWGR may acquire 50% interest in the tailings dams at a price to be independently agreed and will become the operator of the dumps.

"Copper 360 is currently focused on commissioning two processing plants at the Rietberg Mine and drilling and evaluating five new mines. Our expertise and focus is not tailings treatment although we

recognise the potential of the copper dumps. It is therefore logical that we have approached the world leaders in dump retreatment to see if a potential partnership could be negotiated to potentially bring these assets to account if the DD is viable." ■



Jan Nelson, CEO of Copper 360.

Fluor announces first gold from Gold Fields' Salares Norte Mining Project in Chile

NYSE-listed Fluor Corporation's Mining & Metals business has announced that first gold has been achieved at Gold Fields' Salares Norte mining project in Chile. Salares Norte is a high-grade gold-silver, open-pit deposit in the Atacama region of northern Chile at an altitude of between 12 750-15 400 feet (3 900-4 700 metres) above sea level.

"Salares Norte is a project at the forefront of innovation, technology and environmental care," said Harish Jammula, President of Fluor's Mining & Metals business line. Fluor is responsible for the engineering, procurement and construction management of the project.

Construction and pre-commissioning is scheduled for completion in April. Once fully operational, some 350 000 ounces of gold is expected to be mined annually through the life of the mine. ■



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MetSop embarking on a journey to revolutionise

In the dynamic realm of mining technologies, MetSop, a leading flotation reagents company, continues to push the boundaries by embracing the transformative potential of artificial intelligence (AI) and dry lab concepts. With an unwavering commitment to innovation, MetSop is poised to revolutionise the development of flotation reagents, driving efficiency, sustainability, and profitability to unprecedented heights.

Traditionally, the development of flotation reagents has relied on labour-intensive processes and empirical experimentation. This approach however is rife with inefficiencies and limitations. Recognising the need for a paradigm shift, MetSop has embarked on a visionary path, harnessing the combined power of AI and dry lab concepts to redefine the future of flotation reagents.

At the core of MetSop's strategy lies a deep integration of AI and dry lab methodologies into every facet of reagent development. Through advanced data analytics and machine learning algorithms, MetSop can analyse vast datasets derived from mineral compositions, ore characteristics, and flotation process variables. This data-driven approach offers researchers and developers invaluable insights, enabling them to design and optimise reagents with unprecedented precision and efficiency.

Moreover, MetSop's use of dry lab concepts further enhances its capabilities in reagent development.

Right: Implementation of artificial intelligence.

Below: Metsop employee packaging a filtered concentrate product before drying in the oven.



By simulating and modelling complex chemical interactions in a controlled environment, MetSop can conduct virtual experiments to explore myriad reagent formulations and assess their performance. This enables MetSop to accelerate the development cycle, minimise costs, and mitigate risks associated with traditional wet lab experimentation.

The formulation and optimisation of flotation reagents stand as the primary area where AI and dry lab concepts converge within MetSop's innovative approach. Through AI-driven algorithms and virtual screening techniques, MetSop can rapidly design and evaluate novel reagent compositions with enhanced performance characteristics tailored specifically for flotation processes. By leveraging the predictive power of AI, MetSop can customise reagents to suit various ore types and processing conditions, thereby maximising recovery rates while minimising environmental impact.

In addition to driving operational excellence, MetSop's embrace of AI and dry lab concepts underscores a strong commitment to sustainability within the mining industry. By optimising reagent formulations and reducing waste, MetSop is helping miners to minimise their environmental footprint and comply with stringent regulatory requirements. From

flotation reagents development with AI



reducing water and energy consumption to minimising the use of hazardous chemicals, AI-powered solutions are driving towards a more sustainable and responsible approach to flotation reagents development.

As MetSop continues to lead the charge in innovation, the company remains dedicated to collaboration and partnership with industry stakeholders, academia, and technology providers. By fostering an ecosystem of innovation and knowledge-sharing, MetSop aims to accelerate the adoption of AI and dry lab concepts, unlocking new opportunities for growth and prosperity in the flotation reagents sector.

MetSop's pioneering efforts in integrating AI and dry lab concepts into flotation reagents development mark a significant milestone in the company's journey towards excellence and sustainability. By harnessing the power of AI and dry lab methodologies, MetSop is not only redefining the future of reagent development but also shaping the future of industrial innovation. As we stand on the cusp of a new era in flotation technology, MetSop stands at the forefront, driving towards a smarter, more efficient, and more sustainable future for the flotation reagents industry and beyond. ■



MetSop employee filtering a concentrate product from a flotation test.



MetSop employees checking the efficiency of the rotary splitter.



MetSop employee rotary splitting a sample.

Uranium's oxide rush

By Tom Price, Head of Commodities Strategy at Liberum



It is estimated that 175 mlbs of uranium oxide will be required to fuel the 437 reactors operating globally, this year.

The tiny global commodity market of uranium is having a moment. Since its dormant days of 2015-20, the trade's flagship oxide price has reported a stunning 250% lift to just over US\$100/lb in January.

What prompted the rally? It's the outcome of a series of macro-scale events – beginning with the universal price driver of post-lockdown's demand recovery, boosted then by 2022's war-spike of global energy markets, buoyed more recently by the market realisation that nuclear power can help us decarbonise global power generation.

In recent weeks though, the price retreated to \$90/lb. Has the rally ended, with all bull elements now 'priced in'? Or is it a pause, before the signal pushes even higher? Die-hard bulls of the market – dominated by mining majors of Canada-Kazakhstan-Africa-Australia – insist that there's more upside from here, on a winning combination of a structural shift in global demand versus weak mine supply growth.

Yes, we too see an enduring bullish twist in uranium's demand growth outlook. But how uranium's supply-side responds to it depends far more on the behaviour of its two biggest miners – Cameco and Kazatomprom – than many investors seem to realise. For at least in the short-term, their effective joint production rate will directly impact oxide's price. So, do they maximise returns? Or do they secure their share of total mine supply?

Before we explain this price-driving supply-side dynamic, we need some perspective on key elements of the mutually dependent global markets of uranium oxide and nuclear power.

Global reactor demand snapshot

According to World Nuclear Association, there are 437 nuclear reactors operating worldwide, for a total of 393 GWe of net-capacity, delivering about 10% of the world's total electricity supply, with another 61 reactors being constructed (+65 GWe).

Our estimate of the total uranium oxide required to fuel these reactors this year is 175 mlbs (+2.5%YoY). Of this, we expect 136 mlbs will come from mines. The 40 mlb supply shortfall will be met by the on-going flow from various stockpiles located worldwide. All this oxide is required to undergo preparation – conversion-enrichment-fuel assembly – before it can be used in a reactor (generally, the

oxide itself represents <30% total cost of fuel assembly).

WNA's reactor capacity growth forecasts suggests oxide demand growth over the next decade is robust. A net-65 GWe lift, or 15%, in the global reactor fleet. Over 40% of this growth will occur in China (+25 GWe; total net-lift to 77.5 GWe), followed by India (+10% of total; +6.1 GWe to 12.8 GWe).

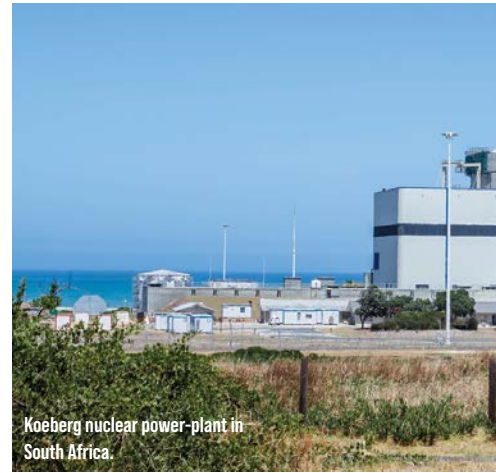
The big miners

For 2024, we forecast that the world's top-10 miners will deliver 75% of total mine supply (top three, 45%). Compared to the broadest range of global commodity markets – Metal, Energy, Bulks – uranium's supply-side industry is regarded as moderately consolidated. That is, the top producers possess some price power, via their collective production rate. While it remains untested, the pricing power of the top uranium miners is akin to crude oil's OPEC.

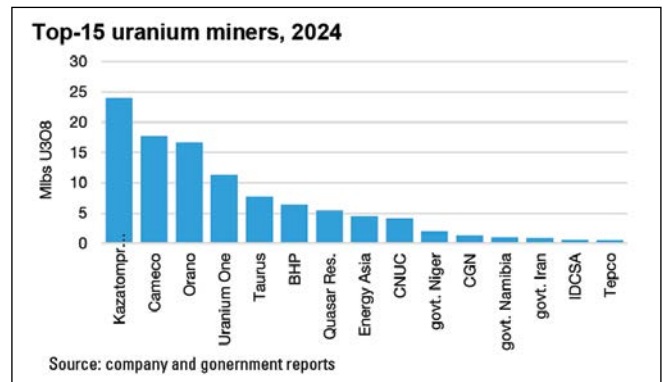
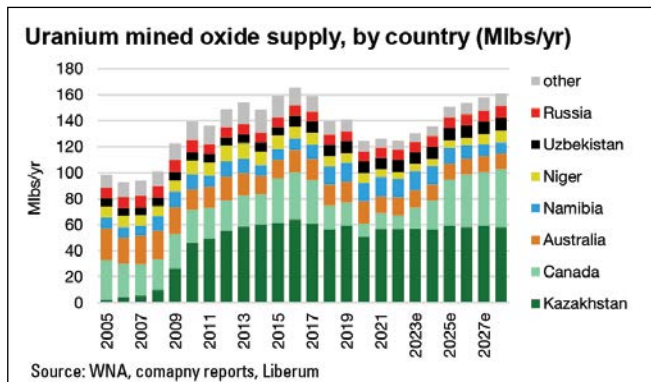
Of the miners, we review here 2024's three big ones. The world's top miner is 24 mbl/yr Kazatomprom, Kazakhstan's government-backed entity, runs ISL operations in the country's south; maintains local JVs with Cameco, Orano, Uranium One. 18 mbl/yr Cameco has its core mines in Canada's Saskatchewan; partly vertically integrated (conversion; power gen/distribution); reactivation of its key McArthur River mine is a response to uranium's price lift. 17 mbl/yr Orano is France's vertically integrated nuclear power-gen utility (mining, conversion, enrichment); mines located in Niger.

The stockpiles

Over the past decade, about 80% of total global uranium supply has been delivered from mines, the rest from various inventories located worldwide. Uranium's flow from stockpiles is a feature of this market. No other commodity trade's total supply is so dependent on its inventories. Also, with known and accessible inventories



Koeberg nuclear power-plant in South Africa.





totalling at least 850 mlbs (>4x annual demand), few markets have such a large overhang (includes reactor tailings, mixed radioactive fuels, weapons-grade material).

Re-activations & projects

Not since this market's 2007 oxide price spike has uranium's industry featured the current surge in industry reports on asset reactivations, expansions, project deployments – a general response, over the last 6-12 months, to this latest price rally.

Of these, we regard the key market-driving events include Cameco's reactivation of its 18 mlb/yr McArthur River & possible expansion of its neighbouring 10 mlb/yr Cigar Lake (Canada); reactivation of Orano/Denison's >3 mlb/yr McClean (Canada); Paladin's 5 mlb/yr Langer Heinrich (Namibia); Lotus Resources' 3 mlb/yr Kayelekera (formerly Paladin; Malawi); possible expansion/normalisation of Kazatomprom's local ISL operations (>30 mlb/yr; assuming it can boost acid supply) and at Orano's Niger operations (5 mlb/yr).

Key projects worldwide include Deep Yellow's Tumas (Namibia) and NextGen's Rook I (Canada). Elsewhere, exploration programmes are now being deployed in Namibia, Tanzania, Western Australia, Uzbekistan and Tajikistan.

A price rally, explained

Again, what sparked this price rally in uranium in 2021? We see three partly related events, emerging in succession, contributing to the signal's sustained 2-3 year lift:

1. 2021's post-lockdown rally: as with many commodity markets, uranium's price reported a sustained lift from mid-2021 on post-lockdown's synchronised recovery in demand & stocking;
2. 2022's war inflation: further price lifts occurred in 1H22, a response to war-related hits to global energy (Russia cutting EU gas supply, a primary catalyst), and a rising risk of Russia terminating uranium exports;
3. 2023's 'new demand': nuclear power demand reported a step-change lift in capacity growth/investment worldwide; two motivations: need to decarbonise power systems; war-prompted demand for power sector independence (incl. Europe, Japan).

Physically-backed funds

A contributing factor to uranium's price outperformance was the buying strategies of two physically-backed uranium funds – Yellow Cake and Sprott Physical Uranium Trust.

Their collective buying programme has been large: 2021-23,



acquired & stored >50 mlbs of natural uranium, >25% global annual demand. The timing of their engagement of the market – Sprott buying from spot market vs. Yellow Cake, from Kazatomprom's inventories – just as the global oxide trade was tightening – enhanced the scale and duration of spot's rally.

Miners' strategic responses

Most commodity markets feature a 'perfect competition' structure: many producers versus many consumers, none of whom are 'price-makers'. Some markets, however, are 'oligopolistic': a few dominant producers versus many consumers. Examples include iron ore, top-grade metallurgical coal, potash and crude oil.

Given the supply-side dominance of uranium's two largest miners – Cameco and Kazatomprom – we believe that this market also has traits of an oligopoly. That is, at various points in uranium's price cycle, these two majors possess some pricing power – exercised via changes in their joint production rate.

Curiously, even after uranium's price surge, output rates at Cameco and Kazatomprom have not lifted significantly. True, it takes time to reactivate assets. But players of a perfectly competitive market would have clearly boosted production within the 12-24 months of this rally.

The incentive certainly exists for these majors to delay reactivations, to allow the rally to extend. Their returns lift with the rally, on their unchanged production rates. So, what prompts the majors to finally lift output? Market-wide asset reactivations and project deployments would be a sufficient catalyst. But the majors can pre-empt most of them, with their own large-scale reactivations. As their joint output lifts, uranium's price falls. Tracking supply-side responses, the majors can then assess what lower price-level deters most market entrants over the long-term.

2024 price outlook

We are uranium price bears, calling for a further 10% pullback in spot, towards US\$80/lb this year. Yes, we are bulls on uranium demand, underpinned by a worldwide re-acceptance of nuclear power as a carbon-free base load option. But we're even more bullish on supply: reactivations are underway; the project pipeline is expanding. Compounding this industry response to uranium's price rally is the fact that Cameco and Kazatomprom will eventually and strategically claim back their market share. And they can do this at a lower price than their competition, using their abundance of low-cost, spare mining capability. ■



Minerals Council South Africa's Junior and Emerging Miners Desk lead, Grant Mitchell.

Junior mining funding focus

South Africa's junior mining sector, which generated R88 million in annual revenue in 2021, is set to get a shot in the arm from the Junior Mining Exploration Fund (JMEF), a fund established by the Industrial Development Corporation (IDC) in partnership with the Department of Mineral Resources and Energy (DMRE). The first call for the fund, which is allocating R400 million to companies to progress mineral exploration, is set to open in May 2024. By *Nelendhre Moodley*.

According to Minerals Council South Africa CEO, Mzila Mthenjane, the country's mining exploration spend in 2023 was 0.8 percent of global spend, down from over five percent two decades ago, which is all the more reason to invigorate the waning sector.

In February this year, the DMRE and the IDC signed a Memorandum of Agreement (MOA) officially establishing the Junior Mining Exploration Fund (JMEF).

Establishing the fund forms part of South Africa's mineral exploration strategy, which is aimed at enabling eligible South African junior mining enterprises to access funding to conduct prospecting work; increase access to mine ore bodies; and promote economic inclusion to support equitable economic growth.

The fund will be administered and managed by the IDC while the DMRE, supported by the Council for Geoscience, will determine the minerals whose exploration can be funded through this initiative.

According to Minerals Council South Africa's Junior and Emerging Miners Desk lead, Grant Mitchell, the strictly regulated fund allows applicants

to apply online for between R20 million and R45 million – a boon to junior miners who face severe funding challenges. Importantly, and in line with ensuring transparency, a private-sector expert will be nominated to the board.

Discussing the criteria associated with the fund, Mitchell explains that the applicant must possess a valid 'Prospecting Right,' as defined by the Mineral and Petroleum Resources Development Act (MPRDA) of 2002 and the right must have an expiration date that is at least 12 months from the closing date of the application.

"The entity must be engaged in greenfield or brownfield exploration activities within South Africa and must have a combined direct and/or indirect ownership by black people (as defined in the Broad-Based Black Economic Empowerment Act 53 of 2003) of at least 51%. Further to this, the entity or any controlling shareholder should not have revenue generated from other mining rights."

Mitchell adds that exploration companies will be able to use the seed funding provided by the JMEF to leverage further capital.

"For instance, if a greenfield explorer with the requisite prospecting right receives funding from the JMEF, the entity will also be able to court other financiers as it takes its project up the value curve. As it is, R20 million to R40 million is not sufficient to fully advance a greenfield exploration project – the company will need significantly more in funding to develop the deposit. Essentially, the intention is to afford majority black-owned entities a platform to attract additional investment to progress development of a deposit."

Since there are currently few majority black-owned exploration companies, the fund aims to provide the impetus to grow this segment of business.

Encouraging junior companies to expand exploration activities.

In 2022, government published South Africa's Exploration Implementation Plan to attract mineral exploration

The country's mining exploration spend in 2023 was 0.8 percent of global spend, down from over five percent two decades ago.





investment, reignite mineral development, accelerate new mineral discoveries, clean technology, processing and mining supply and services sectors.

Mitchell says the junior mining sector, which plays an integral role in the mining industry, has been growing. In 2018 it generated R 55 billion in annual revenue, and this rose to R88 billion in 2021. It must be noted however that this revenue is primarily from small to mid-tier producers, and does not include explorer/developers who do not generate revenue. However, the money prospecting and mine-development companies spend does reflect in the broader economy and as a source of jobs. Green field explorers, even if they are not successful in finding a viable deposit, still make an immediate contribution to the economy.

Highlighting what the junior mining sector requires to succeed, Mitchell explains that there is an urgent need to ensure an investment-friendly regulatory environment.

“The Minerals Council South Africa is currently engaged in research to determine which aspects of the regulatory environment need to be revamped to entice more junior mining and exploration companies to enter the sector. As it is, administrative delays are often a hindrance to attracting investment and there is currently a trend of mining and prospecting right applicants competing for minerals in the same deposit. We are finding that a secondary prospecting or mining licence holder is challenging the primary applicant for the same deposit. What sometimes occurs is that a second company applies to mine the already allocated deposit for a secondary mineral. As such, government needs to provide clarity on the matter so we eliminate ambiguity and confusion.”

Mitchell points to International Best Practice for mining and prospecting rights - the First Qualifying Applicant process, which ensures that a single applicant has access to the deposit at a given



Above: South Africa's junior mining sector is set to get a shot in the arm from the Junior Mining Exploration Fund.

Left: South Africa should look to adopt the First Qualifying Applicant process for direction on minerals exploration.

time. “South Africa should look to adopt the First Qualifying Applicant process for direction on minerals exploration.”

Moreover, the various government departments required to process a mining or prospecting right need to align seamlessly to ensure that mining applications are approved timeously.

“When an applicant applies for a prospecting or mining right the DMRE and Department of Water and Sanitation and the Department of Forestry, Fisheries and the Environment interact to grant the mining right. Offering an efficient one-stop shop for mineral rights processing without the usual delays will go a long way in growing the exploration arm of mining.”

Importantly, as prospecting is highly risky and often takes years, extended licencing timeframes

Objectives of the JMEF

The Fund was established to meet the following objectives:

- to assist qualifying enterprises in the mining industry to conduct prospecting work;
- to increase Black Junior Miners' access and licence to mine ore bodies;
- to promote economic inclusion to support equitable economic growth.



A functional mining cadastral system is an online portal that displays a country's mineral wealth in a way that is accessible to the public.

must be considered, including consent for a five-year time frame for a prospecting right wherein the applicant provides a project update every two years, with the DMRE monitoring activities at the site regularly.

According to Mitchell, it is far more expedient to extend the time-frames on an existing mining or prospecting right than requiring the applicant to reapply for the licence every two years.

Cadastral system

Following years of the mining industry bemoaning the disastrous SAMRAD system and pleading with

government for an off-the-shelf cadastral system, the DMRE has finally announced the preferred bidder for the mining resource management system - the PMG Consortium. The consortium is a conglomeration of three companies, namely Pacific GeoTech Systems, MITS Institute and Gemini GIS and Environmental Services.

Canadian-based Pacific GeoTech Systems has more than two decades of experience delivering online resource management systems.

“While Pacific GeoTech Systems offers significant experience implementing the cadastral system in Canada and particularly in British Columbia, it does not have experience implementing the system in Africa or South Africa, for that matter. As such, the existing methodology and model will need to be adapted to South African mining needs. I expect local partners will play an integral role in guiding the Canadian expert in the implementation process.”

According to Mitchell, when implementing the system, Pacific GeoTech Systems will need to consider South Africa's extensive and diverse mineralogy and the country's long history of mining.

“Implementing a cadastral system in South Africa is different from implementing one in Botswana or Namibia, for instance, as those countries are primarily diamond producing destinations – although they



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mine other minerals as well. South Africa is a more challenging task given the scale and diversity of our industry.”

As it stands, data relevant to mining and prospecting rights are scattered, with some information still in paper files while other related sets of information have already been captured. The task of collating the information onto a single digital platform is set to be a time-consuming exercise.

“The challenge for the consortium lies in the accurate capturing of all the data. As such, I believe the time-frame to getting the cadastral system operational is a little too optimistic.”

The PMG Consortium reported that it would have the cadastral system operational in a year’s time with a further two years required for system maintenance.

“The good news is that the company chosen to implement the cadastral system is reputable, which is a huge step forward for the South African mining sector. The fact that the cadastral system will be transparent means there is a low chance of more than one company applying for a mining or prospecting right on the same deposit. Importantly, the online system will allow the various government departments to seamlessly evaluate the permits and eliminate the extensive mining licence backlogs that currently exist,” concludes Mitchell. ■



As prospecting is highly risky and often takes years, extended licencing timeframes must be considered.

Cadastral system

- ❑ A functional mining cadastral system is an online portal that displays a country’s mineral wealth in a way that is accessible to the public.
- ❑ It can serve the dual function of showing the state of play of mining activities while allowing companies to apply for various kinds of exploration or mining rights.
- ❑ The successful implementation of the cadastral system will be a game-changer for the mining industry, which for years has had to contend with the disastrous SAMRAD system.

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Eyeing up early-stage projects

What do investors and corporate financiers consider when evaluating Greenfields projects? *Modern Mining* spoke to Peter Major, director at Modern Corporate Solutions, for insight into early-stage projects the investor is mulling over.

“As a corporate financier, we weigh different commodities, the quality of the asset, location and market appetite for each resource. In particular, we favour commodities that we have intimate knowledge of, such as base-metals, gold and silver. However, given the logistical challenges associated with bulk metals (coal, iron ore, manganese, chrome), projects in this category have been placed on the back-burner for the moment. We are also staying away from new-age energy metals: lithium, graphite and rare earths because they are too new and too difficult to refine and market. For us at this time anyway,” says Major.

Importantly, Modern Corporate Solutions is keen to consider projects that are set to deliver near term benefits – in other words, projects that have the potential for development sooner rather than later and that can be taken up the value curve in less than two years.

Stand-out projects on the radar include base metal projects in the Northern Cape, a gold project in the Piet Retief area of South Africa, two gold properties in Zambia and the Kabwe lead zinc project also in Zambia.

“The Kabwe lead zinc project was the world’s richest zinc deposit for 90 years, (1904 - 1994) before it closed in 1994. Together with Modern Corporate Solutions, junior miner, Leopard Exploration and Mining, which owns the project, believes there are more ore bodies in Kabwe that have yet to be found. We are in the process

of raising funds from the London market and will soon be making an announcement related to project exploration.”

The company has rich data sets of existing orebodies, but given that markets require greater certainty for new orebodies, Leopard Exploration and Mining is busy with an exploration programme aimed at discovering anomalies that will point to more new large-scale orebodies.

“Leopard Exploration and Mining is preparing to undertake extensive geophysical surveys and resource definition using drone surveys, followed by confirmatory drilling programmes to allow it to increase the mineral resource and thereby attract investment in the project,” says Major.

Modern Corporate Solutions is also upbeat about gold mining in Zambia, a renowned copper belt destination, believing that artisanal miners are key indicators illustrating the significant potential for gold mining in the country.

The financier also has its eye firmly set on two Greenfields projects in the Northern Cape, with moderate, but high-tech exploration - Northern Cape Base Metals (NCBM) and Northern Cape Lithium Tungsten (NCLT).

“Using the available data-set, our experienced geophysicist has picked up some really large anomalies and he is convinced these are Black Mountain type anomalies - only bigger,” enthuses Major, who explains that the investor is also seriously considering a tin project north of Pretoria.

According to Major, financiers and investors would rather fund projects outside of South Africa, preferring to invest in a satisfactory project in Africa than a great project in South Africa, given the red-tape and myriad challenges miners in South Africa face. The country continues to receive a bad rap for the legislation, energy, logistics, administration, rule-of-law, and lack of cadastral system in place, which has seen many projects stalled and miners frustrated by what seem insurmountable challenges.

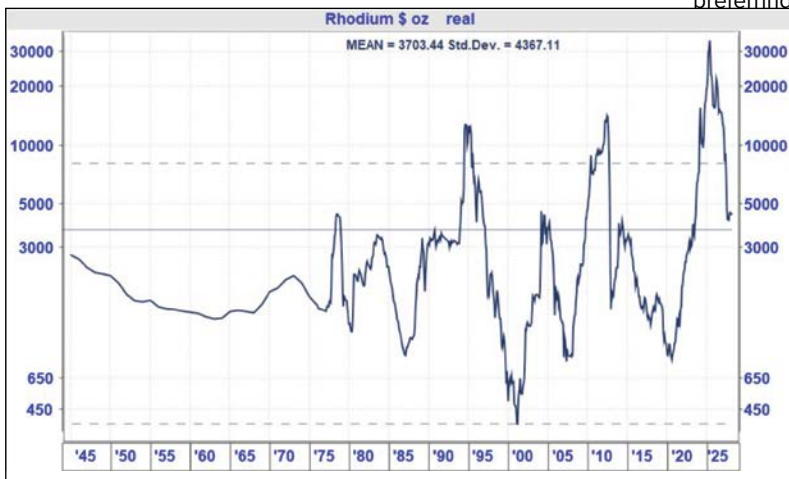
Highlighting what he considers to be attractive commodities at the moment, Major explains that two commodities stand out – namely, copper and gold.

This is underpinned by ease of identifying, exploring, mining and refining as well as robust demand for gold and copper.

“These are easy commodities to find – in fact, it is easy even for artisanal miners to identify, mine,



Attractive commodities at the moment include copper and gold.





refine and sell gold and copper. These commodities tick all the right boxes, unlike bulk commodities, such as iron ore, chrome and manganese, which face massive logistical challenges.”

Commodities performance

While gold has been a star performer, trading at well above \$2000/oz, battery metals have lost much of their shine, with lithium proving to be volatile and experiencing a massive price drop from its high of \$80 000/t to \$12 000/t over the past 12 months.

“PGMs, nickel and cobalt have also slid over 60% from their highs. Why are the prices of these minerals, used in battery metals and electric vehicles and touted by the pundits to skyrocket, falling? Is it because these commodities ran too far ahead too fast? Is there more in the supply pool than initially thought,” he questions.

According to Major, whereas demand is immediate, supply can take months or years to catch up and by the time supply does catch up, “demand isn’t as great once new supply reaches the market and this subsequently leads to a decline in the price of that particular commodity.

“Even though key commodities, such as nickel and cobalt, underpin the drive for clean energy, the prices of these commodities have not held up nearly as well as anticipated.”

Major says that an increasing number of miners are selling the by-products from their primary mining sources, which is having an adverse impact on some operations.

“Indonesia is now recovering nickel from its iron nickel deposits, which has put primary nickel producers out of work. This is the same scenario faced by miners of pure silver mines in Idaho, as miners in Mexico and Peru, who mine base-metals that produce silver as a by-product, are now selling silver into the market. This has devastated the pure silver mines of Idaho, which now lie idle.”

Attracting mining FDI

Africa is rich in resources, resources the world needs, but does the continent offer foreign investors ease of investment?

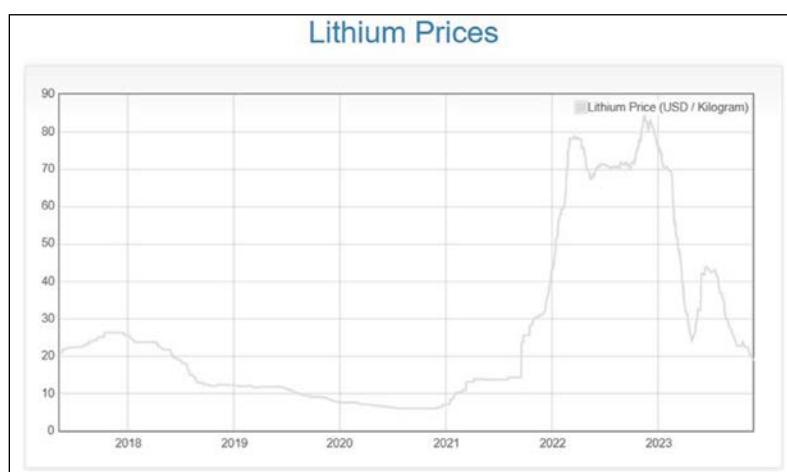
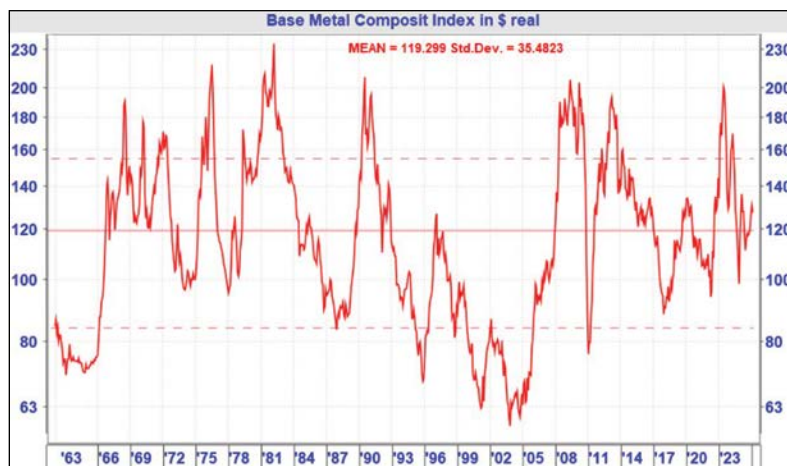
“Investors are like kids with money – they are looking for easy opportunities to grow their wealth and mining majors, and juniors alike, are happy to explore for minerals in Africa. But many countries on the continent, particularly South Africa, make doing in-country business really challenging.”

According to Major, countries in Africa need to take a leaf out of the Canadian and Australian way of doing business.

“Both these countries encourage mining companies to explore, mine and beneficiate. In fact, Canada arguably has the best exploration databases in the world. This is how Canada adds to its coffers and



Bulk metals [coal, iron ore, manganese, chrome] face logistical challenges.



miners are happy to do business in Canada because of the ease with which one can do business there.”

South Africa and Zimbabwe, on the other hand, which were once the darlings of foreign investors because of their wealth in key commodities such as gold, silver, diamonds, platinum and manganese, have such investor unfriendly policies and challenging operating environments that they now deter investors. The dire rate of new mines and valuable prospecting operations these past 20 years attests to that fact. ■



Given the sheer size of Bengwenyama, the project will employ roughly 4000 people.

Southern Palladium lines up Bengwenyama for construction in 2026



Southern Palladium's MD, Johan Odendaal.



Southern Palladium appointed industry heavy-weight Roger Baxter as its new Chairman.

Platinum group metals developer, Southern Palladium, which is lining up its Bengwenyama project on the Eastern limb of the Bushveld for construction in two years' time, says that presenting its project to investors at the Mining Indaba's 1-2-1 event, lifted the profile of the project tremendously. *By Nelendhre Moodley.*

“Even though platinum is probably not the hottest commodity on the market at the moment, the Bengwenyama project garnered significant interest at the 1-2-1 conference. The project is now firmly placed on the radar of numerous potential financiers who attended the 1-2-1 event and the Mining Indaba in February,” MD Johan Odendaal tells *Modern Mining*.

The 1-2-1 Mining Investment global event series connects portfolio managers and analysts from institutional funds and private equity groups with mining company management teams for 1-2-1, private in-person and online meetings. On 5-6 February 2024, 101 mining companies and over 650 investors joined the 1-2-1 Mining Investment Cape Town. The event is built around two-days of 1-2-1 meetings matching projects to investment capital.

Further to this, Mining Indaba - the world's largest gathering of influential stakeholders in the mining industry, provided a perfect venue for Southern Palladium Board members to gather for a strategic

meeting.

“There is so much happening with the project, the company, and the global economy that we took the opportunity to have an intense strategic planning session. Importantly, global economic activity has warranted the need for better planning regarding how we take the Bengwenyama project forward.”

Taking Bengwenyama up the value curve

Highlighting recent project milestones, Odendaal explains that the A\$19 million dollars raised at its listing on the Australian Stock Exchange in June 2022 assisted the company to kick-start its exploration programme with the aim of reaching Pre-feasibility Study stage by the end of 2024. It subsequently declared a resource which gave it the confidence to apply for a mining right.

During 2022 and 2023, Southern Palladium undertook a widespread drilling programme to better understand the Bengwenyama resource. It followed with a closely spaced drilling programme



intended deadline. By mid-October, we received a letter of acceptance for the mining rights application from the DMRE. The big milestone for us was receiving the acceptance letter as it marked the start of the next phase of project development – finishing a scoping report for the environmental impact assessment and expert studies.

Earlier this year, we received the results from the technical Scoping Study, which delivered beyond our expectations.”

According to Odendaal, the Scoping Study indicated that the project was substantial, placing Southern Palladium in the ranks of a Tier One operation.

“The recently concluded Scoping Study represents a pivotal moment for our company, made possible by the A\$19 million raised in June 2022 for the drilling programme and associated study work. The Bengwenyama project is now recognised to be of world class stature. Our commitment to exploring every avenue to maximise value and optionality for all stakeholders has been underscored by the study’s impressive outcomes: a NPV8 of US\$700 million, an Internal Rate of Return (IRR) of 21%, and a noteworthy annual Free Cash Flow (Pre-tax, real terms) of some US\$180 million at steady state over a 36-year mine life. These compelling figures make a strong case for the continued development of the orebody. Our exploration efforts have resulted in the identification of a significant resource totalling 26.22

towards the end of 2023 and zoned in on the area above 500 metres on the eastern side of the project.

“On the 29th of September 2023, we applied for a mining right which was six months earlier than our

The A\$19 million dollars raised at its listing on the Australian Stock Exchange in June 2022 assisted the company to kick-start its exploration programme.





The three key PGM products of platinum, palladium and rhodium are forecast to be in a potential deficit in 2024 and 2025.

million ounces (7E). Notably, the Scoping Study has focused on the UG2 reef only, comprising 15.72 million ounces, with 6.52 million ounces classified as Indicated Resource. Importantly, this study acknowledges the substantial remaining resource in the Merensky reef (MR) and UG2 and MR Exploration target areas, which were not included in the current assessment of the 36-year mine life.

The Scoping Study underscores that we possess a potential world-class Platinum Group Metal mine, fortified by a substantial resource within an established mining area, effectively mitigating associated risks. Recent geotechnical studies and metallurgical assays confirm the suitability of well-established mining methods and processing techniques for the orebody located in the Steelpoort area. This location offers various advantages, including energy accessibility from the national grid, potential for alternative green energy sources, well-developed transportation infrastructure, and a skilled workforce from established mining communities.”

The life of mine on the UG2 reef only is estimated at 36 years with a total of approximately 52 million tonnes mined (~10.9 moz 7E, which includes platinum, palladium, rhodium, ruthenium, iridium, osmium and gold) for an average annual production rate of 330 Koz PGM (6E basis which refers to platinum, palladium, rhodium, ruthenium, iridium and gold) with cash costs firmly at the low end of the global cost curve. Mining and processing are amenable to proven technology.

The scoping study pegged capex for mine development at \$408 million, for a life of mine of 36 years and an operation scheduled to deliver 2 million tonnes per annum, producing in order of 330 000 ounces of PGMS at steady state production.

“The project has a payback of four and a half years from a start of planned production. Another important aspect that emerged from the scoping

study is an all-in-sustaining-cost of \$970 per ounce, which places the Bengwenyama project at the lower end of the cost curve. This gives us some comfort and means that if prices start to drop, we will be fairly safe. The main reason for the lower cost per ounce is the higher grades of the UG2 reef, which can be efficiently delivered to the plant due to ideal UG2 reef mining conditions.”

Strategically situated amongst major mining operations with all the necessary infrastructure (water, power, roads, services, and skilled labour force) already in place, the Bengwenyama project will see the emerging miner focus on mining the higher-grade UG 2 Reef close to surface.

“Bengwenyama is a shallow ore body and provides us with an opportunity for early access. This gives us a significant advantage over our peers in terms of capital expenditure and the speed at which we will be able to bring the project into production. We will access the first ore at roughly 90 metres.”

In the initial study, Southern Palladium considered a single decline with a relatively slow build up to steady state production but has subsequently taken the decision to include a second decline. The second decline opens into the Horst Block, located on the north-western part of the Bengwenyama project mining area.

Given the sheer size of Bengwenyama, the project will employ roughly 4000 people.

“Considering the multiplier effect of roughly three to four times the number of people employed, between 12 000 and 20 000 people from the immediate area are set to benefit from Bengwenyama.”

Financial considerations

Following weak demand for PGMs, producers are feeling the pressure with many miners considering business restructure – this in a bid to keep afloat.

Odendaal, meanwhile, says that Southern Palladium is in a comfortable cash position, with cash reserves in the bank of close to A\$9 million that will take the project to completion of the Pre-feasibility Study stage.

The Australian listed entity is, however, planning for two potential scenarios to play out in the PGM industry.

“In the worst-case scenario – should the bottom fall-out for PGMs, Southern Palladium has a financial buffer that allows the company to complete its PFS and continue with business for another 18 months. In essence, we would still be able to sustain the office and complete our studies.”

Given the diminished demand for PGMs, the company will be keeping a close eye on the market, seeking out quarterly market assessments as it begins preparation for project construction.

“Hand-in-hand with preparing for project construction, we will be finalising our Definitive Feasibility Study and embarking on a final investment decision.



We will determine the final capital requirements later this year. Owing to the current market situation, we are flexible in terms of our capital requirements and are considering various funding options as we eye project construction in 2026.”

On a more positive note, should the PGM price improve by the end of 2025, Southern Palladium will consider “going full steam into 2025 with a Pre-feasibility Study and Mining Right in hand and possibly a slightly amended project construction time-line”.

The Roger Baxter drawcard

In January, Southern Palladium appointed industry heavy-weight Roger Baxter, who brings to the junior miner a wealth of South African mining industry experience, as its new Chairman.

The previous CEO of Minerals Council South Africa is also the chairman of the World Platinum Investment Council, and therefore able to share latest insights in the PGM market with the emerging miner.

“Having Roger Baxter on the Board of Southern Palladium is a great advantage, not only because of his intimate knowledge of the industry but also because he brings with him an extensive network of local, UK and Australian contacts.

Currently, our biggest shareholder base is in Australia and as we move into the development and construction phases, and enter the race to raise the requisite capital, we will need greater exposure and an introduction to investors, which is what Baxter offers.”

According to Odendaal, Baxter is a hands-on Board member who provides the company with

“great direction” as well. Earlier this year, Baxter, together with Southern Palladium’s board members, visited the Bengwenyama project site.

PGM outlook

According to Odendaal, the three key PGM products of platinum, palladium and rhodium are forecast to be in a potential deficit in 2024 and 2025.

With the PGM price currently sitting at below \$1000/oz, miners of the Merensky reef are facing challenges, with “as much as 25% of those platinum operations currently underwater”. In a bid to remain profitable, several miners are undergoing business restructure.

“I believe that from a demand perspective, the next year and a half could see slow improvement in demand for PGMs, driven by the automotive industry and a shift to hybrid vehicles. Coupled with being a commodity used in the industrial sector, platinum also has an investment component advantage. However, the overhang in the global economy, which sees uncertainty related to interest rates and possible recession in some major economies, including the US, continues to influence the minerals and metals market, particularly demand and supply fundamentals for PGMs.

On the upside, should there be an uptick in the global economy, there will certainly be an increased demand for PGMs, which will translate to supply deficits that will drive prices skyward. Overall, I believe there is still a good outlook for platinum going forward and that Southern Palladium is well positioned to take advantage of the market up-tick as our project begins development in 2026,” concludes Odendaal. ■

Bengwenyama is a shallow ore body and provides the company with an opportunity for early access.

Schurco Slurry: Revolutionising mining operations with reliable pump solutions

In the dynamic realm of mining, the importance of reliable pumps cannot be overstated. Often dubbed the 'heart' of mining operations, these pumps are the lifeline that sustains profitability and safety. Incorrect selection or sizing of pumps can spell disaster for operations, leading to massive losses in production and capital value. Recognising this critical need, Schurco Slurry has positioned itself as a leading provider of efficient and dependable pump solutions, tailored to meet the specific demands of modern mining processes.

The challenges faced by the mining industry are multifaceted, with variables such as environmental factors, politics, lower ore grades and resource constraints influencing market dynamics. In response, Schurco Slurry offers a comprehensive range of pump solutions designed to tackle these challenges head-on. Whether it's slurry pumps, vertical spindle pumps, or dewatering pumps, our offerings are meticulously crafted to meet the rigorous demands of modern mineral processing operations.

Customisation lies at the core of our approach, as we recognise that each mining operation is unique, with its own set of requirements. Our team works closely with clients to design cost-effective, efficient, and reliable pump solutions that align with their specific needs. From pump selection to installation and maintenance, Schurco Slurry is committed to providing unparalleled support throughout the lifecycle of the equipment.

At the heart of our success lies our dedication to manufacturing excellence and relentless research and development. Through continuous innovation, we strive to enhance efficiency, reduce costs, and meet the evolving needs of our customers. Our investment in cutting-edge technology and rigorous quality control processes ensures that every Schurco Slurry pump meets the highest standards of performance and reliability.

With a wide variety of wear/build material options available Schurco caters for the most challenging application requirements.

Examples of material options available are Abrasion and Corrosion Resistant White Irons, Corrosion Resistant Metal Alloys, Ductile Irons, Carbon and Low Alloy Steels, Grey Irons, Copper Alloys, Nickel Alloys, Polymer Composites, Natural Latex, Synthetic Latex & Polyurethanes.

A standout feature of our pump solutions is the use of polyurethane, a proven material known for its exceptional wear resistance and chemical compatibility. Polyurethane-lined slurry pumps offer unmatched durability and efficiency, making them ideal for handling abrasive and corrosive materials prevalent in mining operations. Additionally, our polyurethane-lined pumps boast reduced noise and vibration levels, creating a safer and more comfortable working environment for operators.

Furthermore, our commitment to sustainability extends beyond product performance to encompass our refurbishing programmes. With seamless repairs and readily available spare parts, we offer swift solutions to minimise downtime and keep operations running smoothly. Our extensive stock of replacement parts ensures that support is available 24/7, wherever and whenever needed.

In conclusion, Schurco Slurry is not just a provider of pump solutions; we are partners in our clients' success. Through our unwavering commitment to excellence, innovation, and customer satisfaction, we continue to redefine the standards of efficiency and reliability in the mining industry. ■



Schurco Slurry has positioned itself as a leading provider of efficient and dependable pump solutions.



Schurco Slurry is committed to providing unparalleled support throughout the lifecycle of the equipment.

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Zizwe Opencast Mining offers a comprehensive range of opencast mining services

With over 150 years of experience in the Mining Industry, Zizwe Opencast Mining offers a comprehensive range of opencast mining services, including crushing and screening, drilling and blasting, and bulk materials handling. The company's success is attributed to its ability to meet operational targets and effectively integrate with local communities, contributing to the upliftment of South Africa's economy.

Zizwe has strategically identified Smelter Material Handling as a local market segment to explore, recognising its limited competition and high entry barrier due to the complexity of the work involved. Leveraging the expertise gained from the acquisition of Fraser Alexander Bulk Mech division in 2017, Zizwe is well-equipped to

enter this market. In Smelter Internal Material Handling, Zizwe offers comprehensive solutions for both Hot Work and Cold Work applications, covering various aspects such as raw material handling, specialised slag excavation and transportation, furnace operations, and product handling. The company's ambitions extend globally, aiming to replicate its success in neighbouring countries by leveraging its mining sector expertise. By forging partnerships with local communities and adhering to best practices, Zizwe aims to contribute to economic growth, job creation, and infrastructure development, solidifying its position in the global mining industry.

Additionally, Zizwe's Crushing and Screening (C&S) division, established in 2012, serves as a crucial component in delivering comprehensive services to clients. Initially focused on fulfilling Zizwe's Opencast Mining contracts, the division has expanded its clientele independently while maintaining its core operations centred around Zizwe's major Opencast Mining clients. From a technical perspective, the division's material processing involves two distinct stages using crushers and screens. Crushers, including Jaw crushers, Cone crushers, and Impact crushers, are employed to reduce ROM material to specified sizes, while screens facilitate material separation and sizing according to client requirements, underscoring the complexity of material processing within this domain. ■



Zizwe's Crushing and Screening division serves as a crucial component in delivering comprehensive services to clients.



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Resources 4 Africa is pleased to announce the 10th edition of its annual **Junior Indaba**, a popular meeting place for junior miners which is enjoyed by all for its incisive, informative and frank discussions tackling the challenges and opportunities for exploration and junior mining companies in South Africa and elsewhere in Africa. Discussion topics this year include:

- What can be done to drive exploration in South Africa?
- What is the latest update on the South African cadastral system?
- What is the role of junior miners in meeting the demand for critical minerals and metals?
- How are commodity prices faring in 2024 and what will this mean for juniors?
- What are the challenges and opportunities for junior miners and explorers in the rest of Africa?
- What lessons can be learned from successful junior miners who are already operating in SA and beyond?
- What are investors looking for when considering African junior mining projects?
- And much more...

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The 2024 Junior Indaba, for explorers, developers and investors in junior mining, is brought to you by Resources 4 Africa, the organisers of the Joburg Indaba.

Booyco Electronics flags collective collaboration

In the drive to achieve zero harm in mining, South Africa, the first country to legislate the adoption of anti-collision systems that automatically stop diesel-powered trackless mobile machines (TMMs) and prevent collisions, is leading the way globally in the uptake of Proximity Detection System systems, Anton Lourens, CEO of Booyco Electronics tells *Modern Mining*.

Lourens was part of the panel at the Investing in Mining Indaba 2024 conference, which tackled the topic: *Proximity Detection Systems: Keeping up with new legislation*. The discussion, moderated by Dushendra Naidoo: Head of Safety & Sustainable Development, Minerals Council South Africa, included industry experts Mthokozisi Zondi: Chief Director: Mine Health and Safety, DMRE; Musa Mashaba: Senior Systems Engineer in People Centred Mine Modernisation, Mining Cluster at the CSIR; Henro van Wyk: VP and GM, Wabtec Digital Mine; and Jay Moodley: General Manager – Sales, Sany Equipment – South Africa.

“The most relevant point to come out of the discussion,” says Lourens, “was that in the move to achieve zero harm, the mining industry needs to collaborate collectively to drive the implementation of proximity detection systems (PDS). It is essential that the regulator, employer, employee and suppliers all work together to achieve the intended outcomes.”

According to Lourens, Zondi was “crystal clear” that industry had to conform; however, he was cognisant that it is a journey for miners as they interpret and align their operations to the regulations.

People at the heart of making TMMs legislation a success

Change is difficult for most people and adopting new technology, such as PDS, which drives behavioural changes, is often a challenge, with the majority of



Anton Lourens, CEO of Booyco Electronics.

mining houses keen to adopt the latest TMM requirements and others more reticent.

The deployment of PDS technology is not a silver bullet that automatically ensures a fatality free zone, says Lourens. “When installing its PDS, Booyco Electronics educates and trains customers on change management and the operational readiness to adopt PDS technology.”

“People engagement is at the core of successful adoption of the legislation. Even with the best technology, if it is not well understood and employees are reluctant to adopt it, miners will not achieve the intended outcomes of implementing PDS. A case in point is that today the vast majority of new vehicles are fitted with PDC (Park Distance Control) units yet

when not used appropriately, accidents occur. At operations where there is buy-in from management, employees, and suppliers alike, the mines achieve a greater level of success with PDS. With customers who have enthusiastically adopted PDS, we have noted significant improvements in efficiency and productivity. However, it does take time to unlock these benefits,” Lourens cautions.

PDS technology, which is continuously in development and roll-out, is being aided by exponential technology advancements across all sectors, locally and internationally.

According to Lourens, there are numerous lessons to be learnt

Traffic management strategies can be developed to keep people away from trackless mining machinery.



for successful PDS adoption



The Booyco CXS solution providing a comprehensive and integrated response to Level 7, Level 8 and Level 9 safety levels – as defined by the Earth Moving Equipment Safety Round Table (EMESRT).



All Booyco PDS systems are tested rigorously to ensure they meet the required standards.

from the implementation of the new machinery regulations, including understanding the unintended consequences of PDS deployment and continuous training, which is something Booyco Electronics flags in its change management sessions.

Lourens explains: “If you can measure something, you are able to manage it. As such, the focus is increasingly shifting to data management, reporting and using data for change management and education. This is unlocking value and leading to improved efficiencies and productivity.”

Gartner, a provider of research and consulting services for businesses in the IT sector, is undertaking research in the digital twin space and simulating real life challenges around traffic management.

Says Lourens: “There are several scenarios that improve the separation of people from machines in the underground space being evaluated. Furthermore, the adoption of IoT (Internet of Things) devices and having connectivity is going a long way in aligning evolving technology with opportunities in the PDS space.”

Although the regulation – promulgated in December 2022 – is fairly recent, the underground mining environment outpaces surface environments in the adoption of PDS.

“Equipment speeds in underground environments typically range below 20 km/h, which means that it is easier for equipment to stop more quickly and safely, unlike halting a fully loaded surface truck



travelling at more than 40 km/h, which is a regular occurrence at surface operations. It is not as easy to bring such equipment safely to a controlled slower state or standstill,” he explains.

Technology is a great enabler, but human behaviour plays a major role in achieving Zero Harm.

Challenges plaguing industry

The cost of implementing overall CPS is exorbitant and some miners, such as those in the platinum group metals (PGM) sector who are currently facing weak demand and a decline in the price of the commodity, are under massive pressure operationally and have multiple challenges in addition to investing in the adoption of PDS.

Added to this, unemployment remains a key concern as some businesses mull issuing Section 189 notices, which are designed for companies to retrench personnel if they are lossmaking.

“Apart from the capital outlay for acquiring PDS and OEM interfacing technology, the in-direct cost of implementation, e.g. production equipment unavailable for the duration of PDS installation, subsequent maintenance and training of personnel on product, use all add to the total cost of adopting PDS. However, what is important to note is that this is a journey all stakeholders need to engage in and with which all mining houses, big or small, have to comply.”

On the upside

On a more positive note, with there being a “wide” interpretation of the regulation, miners are asking the question: Which is the best type of PDS technology for my operation?

“Ultimately,” Lourens explains, “PDS technology should address specifically identified Significant Risk for each operation. We are noticing that regulators of different regions are assuming different approaches to working with customers adopting the technology and complying to the legislation. As it stands, there is no technology template for the different types



PDS technology, which is continuously at its infancy in development and roll-out, is being aided by exponential technology advancements across all sectors.

of underground mining operations; each miner chooses a technology she or he considers suitable for the operational needs.”

According to Lourens, the Minerals Council South Africa has partnered with industry specialists to establish Best Practice guidelines for the implementation of PDS for both underground and surface operations.

“The reporting process currently requires certification to ensure that the technology being implemented at the various mines is capable of performing the requisite functions. The certification offers various compliancy levels starting with a defined TRL4 (Technical Readiness Level) for PDS and OEM suppliers alike.”

Technology providers too are required to undertake performance evaluations, with Lourens advising that over the past five years best practice guideline have been established to ensure that technology suppliers themselves deliver solutions that meet industry standards.

“Devices are developed using a few basic technology hardware building blocks and differences emanate at the technology deployment and IP software development stage. One needs to have a good understanding of the technologies and their capabilities. For instance, we believe that low frequency technology is best for identifying personnel in close proximity to vehicles; however, it is certainly not the best technology for on-surface vehicle to vehicle detection. On-surface GPS technology is currently

the most suitable technology for that application,” explains Lourens.

Booyco Electronics eyes new markets

As a pioneer of PDS technology, Booyco Electronics is looking to expand its footprint to global markets. The task, however, is not without its challenges, foremost being a language barrier for key mining destinations, including South America and Asia.

“Expanding our product range globally is a mammoth task, but we have already installed Booyco Electronics PDS at mines in Chile, Namibia, Zambia and Australia. We do, however, understand that for non-English speaking regions in Europe, such as Germany or Spain and Asian regions, language is a barrier.”

In line with its focus on expanding its geographical footprint, Booyco Electronics is currently on a drive to employ competent personnel in its field to supplement the existing skills set, as the company requires more teams to assist in product installation, maintenance and technology support for global operations.

“As it is, we have teams in place ready for PDS deployment in regions that have requested product implementation and support.”

Moreover, the International Council on Mining and Metals (ICMM), which is premised on improving sustainable development in the mining and metals industry, continues to play a key role in promoting the adoption of PDS for mines across the world, which means that the PDS technology will continue to gain traction globally.

Booyco Electronics inks deal to distribute SafeGauge

Having recently concluded a distribution agreement for SafeGauge, a *safety* maintenance and diagnostics tool, Booyco Electronics reports that the product has been welcomed by local industry as it seeks solutions that promote zero harm.

SafeGauge, an Australian manufactured product, offers technology designed to remove technicians from the ‘line of fire’ when live testing heavy mobile plant machinery in heavy industries, such as mining, defence, construction, agriculture and oil & gas. The product minimises the chances of crush injuries and fluid injection while personnel conduct necessary ‘live work’ maintenance duties.

“Booyco Electronics signed the agreement to distribute SafeGauge in Africa in October last year. The product is a good fit with our existing product range and we have since garnered interest from OEMs and mining houses. In fact, even conservative mining operations have asked to test the product. The prospect for the uptake of SafeGauge is really exciting and we have a growing number of companies interested in the different SafeGauge products,” concludes Lourens. ■

Demand for PDS

Although South Africa is the first country globally to legislate the adoption of PDS on mines, Lourens explains that the legislation was a long time coming, almost a decade in the making, which is why the DMRE is adamant that PDS should be implemented immediately.

Booyco Electronics received its first enquiry for PDS from a coal miner in 2006, which illustrates that demand for the technology was evident decades ago.

MRTA – training for exceptional performance

The mining industry added over 7 500 jobs last year, which translates to more personnel requiring fit-for-purpose training to operate efficiently in the highly demanding mining environment.

In its recently released annual *Facts & Figures 2023* booklet summarising the performance of the South African mining industry, the Minerals Council South Africa estimated that the mining sector added more than 7 500 jobs last year, employing 477 000 people.

Although the industry has limited training centres available that offer skills development across a multitude of specialist areas, the good news is that engineering and mining contractor Murray & Roberts Cementation Training Academy's (MRTA)'s new R36 million 'mock-up' facility for underground mechanised mining is available to aid mining houses upskill novices.

Hosting a media delegation to view its new mock up facility, the MRTA team showcased its impressive new facility as well as resources that catered for traditional mining methods.

According to Murray & Roberts Cementation's Education, Training and Development Executive, Tony Pretorius, the company continues to invest in expanding infrastructure to cater for training aligned to modern mining.

Pretorius explains that the entity realised it could unlock further value from upgrading its Bentley Park training complex to offer a realistic, but safe and cost-effective learning environment for operators and supervisors of mechanised mining equipment.

The company delivers customised services to its clients, both locally and regionally, providing an entire scope of training across the mining value chain



from shaft sinking, mining services and engineering services to health and safety and mechanised mining, amongst others.

“When mines began to transition from conventional mining methods to more mechanised, modernised mining methods, MRTA took the opportunity to align with the latest skills development requirements. Around 2019 we took a decision to focus on skills development across three main areas – supervisory, operator, and engineering services and involved experienced mining personnel from Australia to assist in fine tuning our simulator

From left, Danie Van der Westhuizen, Roderick Swartbooi, Joseph Bahumi and Eugene Pienaar outside the new mock-up facility at Murray & Roberts Cementation's Bentley Park training complex.

The extensive new mock-up facility closely resembles a real underground hard rock mechanised bord-and-pillar mining workplace.





The training process covers a range of key activities allowing learners to experience the working place and safe declaration.

offerings as well as partnering with an equipment specialist to model our license to supervise mechanised mining programme to meet current needs.”

As part of the initiative, MRTA took a decision to fix and bring to life redundant machines for use in the training space.

“With the help of our apprentices we were able to rebuild the machines; but soon realised the need to establish a super realistic underground mock up environment. We invested roughly R36 million into the infrastructure, technology, and requisite machinery for the new mock facility.”

According to Pretorius, with the industry move towards smart mines, there is an ever-increasing demand for mechanised engineering, mechanised supervision, and mechanised operators.

“The facility is widely recognised by a number of blue-chip clients as a world class mining, underground training facility. We have had many recommendations from Tier One mining companies and the Mining Qualifications Authority (MQA) for our innovative training offering.”

Youth unemployment

Pretorius, who remains passionate about training and upskilling unemployed youth, explains that in regions where the company offers its shaft sinking, tunnelling, raise bore drilling, engineering, design and contract mining expertise, it sponsors training programmes and learnerships to host communities.

“We establish skills pools from which we draw for our business as and when required, and therefore have between 50% and 75% absorption rate for unemployed youth, which sets us apart from many Tier One companies. We are *au fait* with training novices given that legislation calls for skills development of host communities in the areas of operation.”

Over the past seven years, Murray & Roberts

Cementation has upskilled over 3 500 unemployed youth.

Training programmes

Apart from providing foundational learning, which incorporates computer-based training and e-learning, the MRTA offers extended reality tools for its Situational Leadership Model and offers Reflexive Learning on how best to handle “what if scenarios”.

“To encourage learning we adopt a combination of 2D and 3D modelling tools on touch screen, which provides students with a 360-degree view of the mining environment. For instance, they have access to obscure angles never seen before, which encourages better understanding of the scenarios presented. Although we offer trainees an immersive virtual reality (VR) gamification environment, we find that VR is not as realistic when compared to the mock-up facility which combines the fear factor necessary in the mining environment.”

As part of its training package, the MRTA offers learners accommodation, food and basic primary health care, including a full-time nurse and doctor.

At the time of the media visit, the MRTA had an intake of 320 learners – at full capacity the training centre can accommodate 450 trainees.

“For six months of the year, we achieve peak enrolment and during quiet times we have an intake of around 320 learners.”

Furthermore, the facility, has operated for the past 13 years without a lost time injury. This is a major achievement, given the large number of complete novices coming through the facility.

“As a company Murray and Roberts Cementation is approaching 8 million fatality free shifts – an exceptional feat and testament to the importance of proper training and skills development,” concludes Pretorius. ■



Under the guiding vision of 'Pioneering a Brilliant Future for Venetia Mine', a commitment was made to the principle of 'safe production' – rather than separating out the functions of 'safety' and 'production'.

'Safe production' ethos earns Venetia 10 million fatality-free shifts

Having reached 10,2 million Fatality Free shifts by the end of December 2023, the innovative safety efforts of De Beers' Venetia Mine are certainly bearing fruit.

Over the past few years, in particular, a bold new approach has been pursued, according to Gavin Anderson, Senior Manager for Safety and Sustainable Development at De Beers' Venetia Mine. "The journey is far from over and has been chartered through challenging conditions," explains Anderson, "but there is already much that can be constructively learned by other mines." The operational context is the ambitious Venetia Underground Project (VUP), which began in 2012 to transition Venetia from 30 years of open pit mining into an underground operation.

"With the transition of employees from open pit work to the underground environment, we needed a completely different safety approach," he says. "The transition shaped our journey not only from a safety perspective but across all activity on the mine."

Under the guiding vision of 'Pioneering a Brilliant Future for Venetia Mine', a commitment was made to the principle of 'safe production' – rather than separating out the functions of 'safety' and 'production'.

"The transition of employees' skills and working environment was further complicated by the numbers of contractors on site, which brought significant diversity in working culture and company backgrounds," he says.

This challenging task was underpinned by a

comprehensive risk management programme – but there was a difference: instead of focusing on safety risk, the decision was made to take everyone on a personal journey towards safely creating one Venetia Mine.

"We developed our own cutting edge holistic approach in terms of understanding what we believe operational risk management to be," he says. "We incorporated safety, occupational health, environmental care, social and community aspects, legal and regulatory requirements, business risks, and reputational risk."



Gavin Anderson, Senior Manager for Safety and Sustainable Development at De Beers Venetia.

Venetia Mine Safety Team Leaders pose at the company's annual Global Safety Day; from left Thomas van Wyk, Safety Manager, Pheonah Salani, Safety Assurance Specialist and Peter Wells, Chief Safety Officer at De Beers Venetia.



feature



Having reached 10.2 million Fatality Free shifts by the end of December 2023, the innovative safety efforts of De Beers' Venetia Mine are certainly bearing fruit.

Psychological safety

By understanding the full suite of operational risk management, Venetia created a culture in which employees can more effectively relate to what its risk management practices are, explains Anderson.

“Rather than focusing purely on safety, occupational health and hygiene, we have worked on giving employees a psychologically safe workplace in which to operate,” he says. “Psychological safety is a concept that moves away from purely management, and leans instead towards leadership.”

Many of the company's programmes are about ‘leadership time in the field’, he emphasises; this concept has evolved from a previous focus on visible felt leadership. In a traditional environment, a manager would ensure safety compliance through checking that certain standards and procedures were in place.

“By contrast, achieving a psychologically safe workplace is about ensuring that employees feel free to speak up when they believe a procedure or risk assessment is not adding the necessary value to their safety efforts,” he said. “This creates the foundation from which they can engage directly with leadership – and gain insight into how improvements can be made.”

Humanising leadership

Focusing on the human component has given Venetia Mine the edge in terms of shifting safety practices, he says. Humanising leadership means developing more open and trusting relationships between line managers and employees, so that factors affecting safety can be discussed more freely.

“These factors may include financial worries or mental wellness, which in the past have often not been directly addressed as part of the safety conversation,” he says.

The company has been working to focus the value of leadership back into the workforce, so that employees feel able to engage and challenge the *status quo* when necessary. This leads to the risk



Industrial theatre performance by a local group, reinforcing the importance of Psychological Safety.

assessment process being much more intimate and relevant to the way that work is conducted.

Showing care

“Where leaders demonstrate care for their employees, we start driving safe production,” he says. “This is a fundamental pillar of how we are pioneering our brilliant future for the mine.”

While the ‘Zero Harm’ principle is well accepted across many sectors, Venetia is going ‘Beyond Zero’ by building an environment in which colleagues in the workplace can engage openly in honest conversations.

“In the past, discussing personal factors that might affect your safety performance was often regarded as a sign of weakness,” he says. “What we have realised is that mental health and mental well-being are key to our values as an operation.”

‘Beyond Zero’ embraces the idea of doing more than just avoiding harm; by working to leverage the many benefits of working at the mine – from training and personal development to positive community impacts – Venetia wants employees to feel a personal commitment to safety and wellbeing.

Family values

An important avenue for Venetia's safety approach is to highlight the joys and responsibilities of employees' families. This, after all, is usually the most important aspect of their lives and the main reason they work so hard, says Anderson. A recent campaign reflects one way that this approach has been put into action; employees' family members were asked to send video clips urging them to come home safely from work to enjoy the Christmas season.

“These very personal messages were played on screens all over the workplace, reminding employees of why their safety in the workplace was so vital,” he says.

From this heartfelt foundation, the mine's safety policies, procedures and tools are likely to be more effectively applied – and indeed can be driven and evolved by internal energy. Anderson concludes that many interventions have been put in place to build on this groundbreaking approach, enhancing Venetia's safety outlook for the future. ■

Conveyor innovations with safety top of mind

Having initially made its name as a world leader in conveyor belt alignment solutions, Tru-Trac has expanded over almost 30 years to offer a comprehensive suite of products and services designed to minimise conveyor-related hazards and create a safer, more productive work environment.

The company originally patented its first innovative Tru-Trac Tracking Systems in 1996 – which continuously and autonomously guides the belt to the centre position. It has since expanded its product offering to become a world leading manufacturer and supplier of conveyor belt solutions.

“When we entered this market in the mid-1990s, it was still considered acceptable for a belt smith to stand next to a conveyor belt and physically adjust the idler frames to try and align the belt,” says Jonathan Rogoff, CEO of Tru-Trac Rollers. “This was done, of course, while the belt was moving – a very hazardous practice, which thankfully is no longer allowed.”

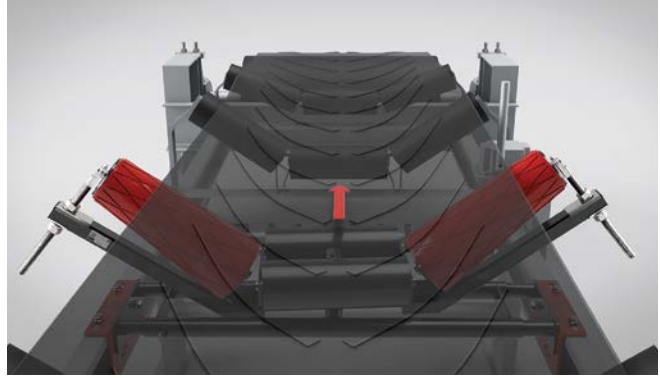
Today, workers are not permitted near a moving conveyor belt. What has made this possible is the success of belt alignment technologies that can operate reliably and without human intervention. Conveyor belt misalignment creates other safety hazards such as material spillage, which can lead to slips, trips and falls for workers. Misalignment causes uneven stress on the belt, leading to faster wear and potential failure; this can create a dangerous situation if it occurs during operation.

This maintenance-free capability of Tru-Trac Tracking Systems ensures there is minimal physical contact required from mine employees, further supporting the policy of maintaining a safe distance by all workers. The company’s trackers employ a



unique action that does not damage the belt and reacts immediately if the conveyor belt begins to drift off-centre. Being simple to install, they have a vibration-free rolling action and can be installed above or below the belt on the return side.

On the strength of its tracking systems, Tru-Trac grew rapidly over the years to encompass a comprehensive offering of conveyor belt solutions – from conveyor skirting and impact beds to standard idlers and frames. The company also developed a range of high-performance belt scrapers, including primary and secondary scrapers as well as angle and V-ploughs, which contribute to a healthier, more productive workplace and fewer maintenance headaches.



Tru-Trac’s range of trackers employs a unique action that reacts immediately correcting belt misalignment.

Tru-Trac produces a range of high-performance belt scrapers engineered to prevent carryback.

Left: Tru-Trac’s comprehensive range of skirting rubber allows careful selection of the most appropriate type to match an application.

Below: Hazards such as nip or pinch points can be mitigated using the Tru-Trac Nip Guard and Safe Guard.



feature



Tru-Trac's trained conveyor specialists conduct systematic conveyor inspections as part of the company's full service offering.

Regular inspections and maintenance are essential to mitigating risk and optimising performance on conveyor handling systems.

Beyond conveyor misalignment, an often-overlooked safety hazard lies in conveyor belt carryback. This is material that adheres to a conveyor belt after it has passed the discharge point. The build-up of material presents several dangers, including fire hazards when flammable material – that may ignite due to friction or external heat – accumulates. Carryback can also create slippery surfaces and generate harmful dust.

“If a mine’s belt scrapers are not performing well enough to clean the belt, then it will experience carryback across the entire length of the conveyor belt,” he says.

Belt scrapers play a vital role in preventing carryback, and Tru-Trac designs and manufactures a wide range of high-performance belt scrapers with a superior tensioning system that maintains tension throughout the life of the blade. Belt support is also important in minimising the health hazard of excessive dust and spillage at the load area of conveyor belts, says Rogoff.



feature

“It is critical to be able to support the belt well through a combination of heavy-duty impact beds and a good skirting rubber,” he explains. “If the belt is not supported, it will drop down, and material will spill.”

One of the unique features of the Tru-Trac adjustable impact bed is the ability to achieve fine adjustments on the troughing angle to suit the user’s application. This ensures an effective seal between the belt and the skirting rubber.

“Most of the products available on the market are set to 35% or 45%, but this does not always match what the mine needs,” he says. “If the requirement is actually 34%, our impact bed can be adjusted to exactly the right position – as that 1% difference will enhance the sealing and prevent any spillage.”

The choice of skirting rubber is also an important consideration, Rogoff continues. Tru-Trac’s comprehensive range of skirting rubber allows careful selection of the most appropriate type to match the application.

“When it comes to skirting rubber, it is not a case of one-size-fits-all,” he emphasises. “Not many providers offer a variety, but we will go to site and assess which type of rubber is best for the customer. This allows a choice between a continuous skirting, for instance, and a block-type or segmented skirting – or even a skirting with a polyurethane edge to provide good wear resistance and seal.”

Shaun Blumberg, COO of Tru-Trac, reiterates that conveyor belts represent a serious safety hazard in mines, both underground and on surface operations. He explains that the cornerstone of the company’s safety solutions is to prioritise belt inspections and proactive maintenance.

“Regular inspections and maintenance are essential to mitigating risk and optimising performance,” says Blumberg. “Our trained conveyor specialists conduct systematic conveyor inspections as part of our comprehensive full-service offering.”

This is done with a dual focus on safety and performance, he says, where customers receive detailed digital reports on the performance and condition of each component of their conveyor system. This work is based on a preventative maintenance approach, which avoids downtime by identifying any potential sources of failure before it can occur. Maintenance services are offered on a contract basis, he explains, and extend to large operations having dedicated conveyor maintenance teams on site on a full-time basis.

“Having trained maintenance teams responsible for conveyors not only ensures that your operations continue to run reliably and effectively, but that they support the mining industry’s goal of Zero Harm,” he says.

This includes the identification of hazards such as nip or pinch points, which can be mitigated with the use of the Tru-Trac Nip Guard and Safe Guard. ■

Innovative mind-set underpins Kal Tire's success

Canadian tyre specialist Kal Tire continues to institutionalise innovation with ongoing development of new tools and technology for its tyre services, John Martin, vice president, Southern Africa, Kal Tire Mining Tyre Group tells *Modern Mining*. By Nelendhre Moodley.

“Automation, robotics and artificial intelligence continue to be a key component to our future innovations as we continuously seek to minimise operational risk and build on operation efficiencies,” he says.

Discussing the importance of innovation, the tyre services provider explains that it is a core aspect underpinning the company's mindset and organisational behaviour, which lends itself to the organisational agility needed to adapt to market changes.

Martin says that to be relevant and competitive in the tyre services industry, tyre suppliers must include innovation and entrepreneurial thinking in all facets of the customer interface and must ensure that entrepreneurship is integral to the company's culture and behavioural characteristics.

“To be successful in the mining tyres service industry, a proven value proposition with measurable and verified results is required, and this is what sets us apart from the competition. Innovation and innovative thinking are key components of the value proposition our customers have come to expect from Kal Tire. The past five years have offered up some outstanding results and outcomes for the growth trajectory we initiated some years back. We remain on track to continue with the positive energy for the short to medium term.”

Understanding the integral components of the mining business and associated requirements, coupled with a hands-on field service team, ensures Kal Tire remains at the forefront as a solutions provider.

According to Martin, the ideas and themes behind Kal Tire's innovations stem from its team members working at on-site operations.

“Proposed innovative ideas are rigorously evaluated, but each innovation that progresses past the idea stage has to provide a number of common deliverables. Two of the most important criteria are a reduction in operational risk and an improvement in operational efficiency, in both the practicality of design and the ease of application. Minimising risk drives our daily behaviour. Therefore, Kal Tire's innovations are an extension and support of that behaviour profile that incrementally improves best in class safety practices and better financial returns for the customer.”



Kal Tire's strategy for 2024

Over the recent past, ESG (environmental, social, and governance) – a set of aspects that take a holistic view that sustainability extends beyond just environmental issues – has emerged as a strong area of focus for miners and equipment suppliers to the mining industry.

The requirements and expectations of ESG have been accepted by the mining community, driving change in decision making and reporting at board level.

Driven by the need to support its customers in achieving their ESG ambitions, the tyre specialist continues to innovate products to reduce risk and, in so doing, contribute to the enhancement of safety

The GATR is a tool developed to reduce “some of the more common injuries that occur when working with extremely heavy and powerful hydraulic torque tools”.

Kal Tire continues to institutionalise innovation with ongoing development of new tools and technology for its tyre services.





Above: Kal Tire's service team offers hands-on field service.

Right: The team rigorously evaluates proposed innovative ideas.



Kal Tire's Thermal Conversion centre.



Kal Tire offers WheelJaws - secure, remote-controlled clamps for safe tyre removal.

performances on operational sites.

Martin is quick to caution mindfulness, given that risk and exposure for a mining company present themselves in many forms – including operational risk, environmental risk and, in some cases, carbon emissions – and may jeopardise the long-term sustainability of some sectors of the industry.

“Kal Tire’s focus for 2024 is to continue assisting customers to achieve their ESG targets, and this offers a broad scope of initiatives, such as the provision of validated and certified mechanisms to reduce their carbon footprint, as well as a means for customers to support and fully contribute towards, and participate in, the circular economy through the recycling of their mining tyres.”

Unpacking latest innovations at Kal Tire

A key Kal Tyre innovation that is gaining popularity is the Gravity Assist Tooling Rig (GATR), a tool developed to reduce “some of the more common injuries that occur when working with extremely heavy and powerful hydraulic torque tools”. The GATR supports the weight of heavy tools, such as a 36-kilogram torque gun, and helps to reduce the physical fatigue and strain traditionally experienced by technicians.

Martin explains that the weight and power of torque tools often result in pinched fingers, muscle strains and ultimately general fatigue that sets in

after technicians work with torque tools for extended periods of time.

“When operated correctly, the GATR eliminates the risk of pinched fingers and removes the danger of muscle strain and general fatigue, as the heavy torque tools are rendered weightless through the design and functionality of the GATR. Owing to the ease of use, overall working efficiency improves, allowing wheel changes or wheel fitments to be concluded in a much shorter time. Furthermore, the GATR opens the opportunity for much needed diversification in the workplace where significant muscle strength would normally be required to handle the extremely heavy hydraulic torque tools.”

TireSight autonomous tyre inspections

In addition to the above, data from Kal Tire’s autonomous tyre inspection system – TireSight – translates to ease of tyre inspection in real-time. The technology keeps personnel away from moving trucks and eliminates the need for truck stoppages and their associated ‘dreaded’ downtime as someone inspects the tyres.

Martin explains that no matter the operational strategy adopted for tyre management, physical inspection of the tyres remains a regular practice to identify tyres that may have suffered some form of injury that could negatively affect the life expectancy of the tyre, or possibly result in a safety related incident.

“Normally, inspections are conducted manually by stopping the vehicle for an extended period to allow the tyre to cool down safely before conducting the inspection and undertaking any needed actions. TireSight, powered by Pitcrew.ai’s thermal imaging camera and AI software, now conducts autonomous tyre inspections while the truck remains fully operational, allowing tyres to be inspected for several potential failures, such as injuries, tread separations, shoulder separations and more. The uptime of the



vehicle is not impacted as there is no requirement to stand the unit down outside of scheduled maintenance practices. In addition, tyre technicians are removed from what is deemed to be risky work that would traditionally require regular interface between the tyre technician and the machine during inspections and maintenance,” says Martin.

Moreover, even though the artificial intelligence built into the system is able to identify tyre injuries, Kal Tire has incorporated additional learning to the TireSight offering through its Condition Monitoring Team, who assist in identifying hot componentry on the vehicle, hydraulic oil leaks, and engine oil leaks.

TireSight continues to assist miners in significantly reducing operational costs through the prevention of potentially catastrophic failures of damaged tyres.

Kal Tire’s proprietary solution - KalPRO

Over the years, the tyre specialist has developed a host of proprietary solutions that increase safety for its tyre technicians and deliver added value to its customers.

“At Kal Tire’s Innovation Centre in western Canada, we have designed and produced a number of exclusive purpose-built tools that create safer work environments while also increasing efficiency and productivity,” says Martin.

These include tools and technologies, such as the thermal conversion recycling solution that supports a circular economy and the Maple Program, which provides customers with validated data for emissions saved when choosing to retread a tyre versus purchasing a new one.

“Given the growing number of proprietary solutions being developed, the new KalPRO sub-brand unites and captures Kal Tire’s commitment to progressive innovation. We have only just launched this new sub-brand,” Martin continues.

The sub-brand includes the following KalPRO products and offerings:

- ❑ WheelJaws: Secure, remote-controlled clamps for safe tyre removal;
- ❑ GATR: Gravity Assist Tooling Rig for weightless tool operation;
- ❑ RamDrive: Secures rams for safer bead-breaking;
- ❑ PowerFlow: Portable, hydraulic power to operate tools on the go;
- ❑ ValveShield: Heavy duty magnetic valve stem protection keeps trucks on the road;
- ❑ SpringLock: Safer lock ring installation and removal.

KalPRO offerings:

- ❑ Thermal conversion recycling is the OTR tyre recycling technology used at a Kal Tire facility in Chile that converts tyres back to their base elements. High-value circular-certified feedstock ensures the best use of recycled rubber and promotes a circular economy.
- ❑ TOMS (Tire & Operations Management System) presents fleet planning teams with visibility into how tyres are impacting productivity and costs so they can make decisions that enhance fleet use and tyre life.
- ❑ Ultra Repair™ sends tyres with complex injuries that would otherwise be scrapped, back into production. Restores the strength and integrity of tyres with complex injuries to any area – giving customers thousands of hours of like-new performance and safety.
- ❑ Ultra Tread™ restores front tyres to their original tread depth and condition, sometimes multiples times before rotation to the rear, for significant cost-per-hour savings.
- ❑ Maple Program uses a custom-built carbon calculator to give customers validated data for oil and emissions saved when choosing Kal Tire retreads or repairs over new tyres and can be used as part of Scope 3 environmental reporting. ■

Kal Tire’s autonomous tyre inspection system - TireSight – translates to ease of tyre inspection in real-time.

ESG

Environmental, social, and governance (ESG) also incorporates how companies score on the responsibility metrics and standards for potential investment. Environmental criteria gauge how a company safeguards the environment.

Safety first, innovation always as BME maintains zero case rate

BME's zero recordable case rate (RCR) for 2023 marks the best safety record for the company in a decade, demonstrating the value of its 'Safety for Life' initiative.

Alongside the mining and blasting industry's focus on productivity, efficiency and innovation, Omnia Group member BME prioritises safety in the pursuit of advancement. According to Ramesh Dhoorgapersadh, BME General Manager for Global Operational Excellence and SHERQ, the company considers safety in everything it does, understanding this is critical in the mining sector.

"Over the past 10 years, we have woven safety into our operations and product development, driven by a culture that places emphasis on the wellbeing of its employees," says Dhoorgapersadh. "Achieving a zero RCR, which is a measure of workplace incidents resulting in injury or illness, is evidence of BME's robust safety culture and protocols."

By implementing a series of strategic safety interventions including visible leadership, process safety enhancements and medical surveillance programmes, BME has set a new performance benchmark for itself, he explains. The company's management commitment is to provide the means and ability to all employees to deliver their tasks safely, and with no impact to any stakeholder or the environment in which it operates.

"Our zero RCR is the result of a concerted effort that blends sound policies with practical, everyday



Ramesh Dhoorgapersadh, BME General Manager for Global Operational Excellence and SHERQ.

actions," he says. "BME believes that that safety and operational excellence can go hand in hand. By embedding a safety-first culture that resonates at all levels of the organisation, we have been able to meet and exceed the stringent safety standards expected by our clients globally."

BME's proactive approach extends beyond the health and safety of its workforce, encompassing a holistic view that includes environmental safety considerations.

To reduce its impact on the environment, the

company is exploring new strategies, technologies and partnerships to offer improved safety and environmental advantages. In 2023, BME formed a strategic partnership with Swedish-based Hypex Bio, which has pioneered ammonia-nitrate free emulsions. This results in a 90% reduction in nitrous oxide emissions.

BME already incorporates dual salt emulsions in its product offerings, which are proven to be less harmful in terms of potential nitrate contamination and greenhouse gas emissions.

As BME continues to innovate and lead in the explosives and blasting technology sector, its zero RCR achievement is a clear message to the industry: safety and sustainability are integral to business success. ■

BME weaves safety into its operations and product development.



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Dr Ross Harvey, director of research and programmes at GGA.

Mining must integrate with Integrated Development Plans

By Dr Ross Harvey, director of research and programmes at Good Governance Africa (GGA)

In its executive summary, the Harvard Growth Lab's 2023 study of the South African economy says the following: "[Since 1994], the national economy has experienced slow, slowing and highly vulnerable growth. Inequality is the highest in the world, and structures of exclusions remain embedded in South African society both within and across racial groups and geographies. Black South Africans continue to face poverty and joblessness at very high rates and overall wealth, although more racially balanced, remains as concentrated in a narrow few as it was at the end of apartheid." It goes on to list a litany of depressing statistics and a serious set of inhibitors to sustained labour-absorptive growth.

My own sense is that the country's failure to capitalise on the sustained commodity boom(s) since the early 2000s has largely driven the economic failure, though of course this has not happened in a vacuum. As the report indicates: "The weakening of mining began before 2008 – despite global commodity prices remaining strong for several years after – while the fall in utilities and manufacturing occurred over the last fifteen years." While this rapid deindustrialisation, which my GGA colleagues and I have studied with keen statistical interest, has been driven by deteriorating electricity affordability and reliability (among other things), I am of the view that the decline in mining has also partly driven deindustrialisation – a rapid loss of value addition and employment share in manufacturing.

Net fixed capital formation in the mining industry

has been close to zero for well over a decade, a fact that I keep lamenting in this column. Exploration investment has dried up and mining sector stakeholders are almost unanimous in their expression that the industry is in a crisis – essentially on care and maintenance. The bigger players desperately hold onto their resources, but the dynamism that should animate the sector – exploration and junior activity – is largely lacking. This is a tragedy because mining carries the potential to drive industrialisation. But, combined with other factors, manufacturing that used to be orientated towards serving a growing mining industry has all but collapsed because of plummeting mining investment. It was therefore refreshing to see the Harvard report suggest that there is room for targeted industrial policy to take advantages of global demand areas in which South Africa can build comparative advantage: "Make the support actions for pioneers in emerging green supply chains, and policies to transition the automotive industry towards electric vehicles." I think this is exactly right.

One cannot overstate the importance of the connection between mining and green industrialisation. Mining will become increasingly mechanised and digitalised, which will mean that it will provide increasingly fewer direct jobs. In our context of high, sustained structural unemployment (Unemployment at over 33% is the world's highest, and youth unemployment exceeds 60%), this is critical for policymakers to understand. Mining currently provides over 400 000 jobs. If the industry grows, this figure is likely to rise only slightly. Potential jobs are in the manufacturing sector, though the workforce will have to be rapidly skilled up to take advantage thereof. If mining remains on life support, unconnected to manufacturing potential, these startling figures are only likely to worsen.

Another aspect of South Africa's economic deterioration that the Harvard review highlights is municipal performance. At GGA, we concur. We have just released our 2024 Governance Performance Index, which ranks government effectiveness at municipal level. Many local municipalities are failing to deliver on their core mandates (utility service delivery such as water, electricity, refuse removal, etc.) Those that struggle most are those with former homelands within their bounds. The Harvard study shows that "nearly all the rural municipalities in the lower employment group are within former homelands and almost all the rural municipalities that

The country's failure to capitalise on the sustained commodity boom(s) since the early 2000s has largely driven the economic failure.



have higher employment are not within the former homelands.” Employment in non-former homelands is nearly double that in former homeland areas. It is immediately obvious from the graph in the Harvard study that most mining areas in South Africa overlap with municipalities that contain former homelands within their boundaries. This brings us to an important point.

Municipalities in remote areas tend to struggle. This would be true whether mining was present or not – where mining is present, employment levels are slightly higher on average. However, one would intuitively expect mining presence to improve municipal performance. This is not happening, in part because municipalities have become dependent on mining companies to become *de facto* service providers. Mining companies simply cannot afford this. Attaining a social licence to operate is one thing; substituting for government where service delivery is absent is another.

So, not only does the government have to do more to unleash investment into the mining industry, it also has to connect mining to green industrialisation. At the same time, the mining industry itself has to engage differently at the local municipal level and at the national policy level.

By way of example, I recall attending an Anglo-American SDG conference in late 2022. Participants around the table all indicated that the Social and Labour Plans (SLPs) prescribed in national mining law were too restrictive. Expectations of mining companies were essentially that they would provide services that the local municipality should be providing. This puts investors off because it is unsustainable. Far more optimal would be to invest in building greater institutional capacity in those municipalities and, at the very least, develop better integrated development plans (IDPs). IDPs are currently often drawn up by consultants with no skin in the game, and monitoring and evaluation of efficacy is absent. Mining companies need to desist from substituting municipal functions and instead build the human capital in those municipalities that will sustain the area long beyond the life of mine. Supporting well-crafted, practicable IDPs will go a long way to building labour-absorbing economic dynamism.

While the Harvard review is sobering, South Africa has an opportunity to grow out of the current sclerosis: “Employment patterns underscore that it is possible to generate economic opportunity in rural South Africa”. Many of the pathways they suggest are sensible. To my mind, connecting mining to green industrialisation, as well as building local municipal performance capacity, will prove instrumental in realising this opportunity. Of course, this needs to happen alongside fixing the energy crisis, resolving the logistics bottlenecks, and eliminating crime. We have our work cut out for us. ■



Mining currently provides over 400 000 jobs.



Black South Africans continue to face poverty and joblessness at very high rates.



Employment patterns underscore that it is possible to generate economic opportunity in rural South Africa.

Astec Industries announces new dealer partnership in DR Congo



Astec Industries inks partnership with Zinpro RDC SARL.

A new dealer partnership with Zinpro RDC SARL in the Democratic Republic of Congo (DRC) has been announced by global equipment manufacturer Astec Industries. It will enhance the service, support and sales of high quality Astec Material Solutions equipment in the region, which includes premium crushers, screens and feeders, as well as washing, classifying and material handling solutions, modular plants and rock breaker technology.

Zinpro RDC SARL is a leading engineering, procurement and construction management (EPCM) company, specialising in turnkey projects for the mining industry in the DRC.

Astec's premium equipment and brands, including durable Astec Osborn machines, already have a strong presence in the DRC and have earned a reputation for quality, performance, innovation and longevity. "Robust Osborn-brand crushers and apron feeders, which are now part of the Astec Industries portfolio, have been especially successful and sought after in the DRC's tough mining industry," says Serge Tshula, General Director at Zinpro RDC SARL. ■

Multotec leverages lithium experience for equipment supply to new projects

In recent years there has been a surge in the number of lithium projects in Africa, as companies continue to search for alternative lithium resources, which brings new challenges related to lithium processing.

"A decade of experience in the design and supply of mineral processing equipment into the lithium industry has allowed Multotec to provide these new operations with fit-for-purpose solutions," says Wilna Hoffmann, Business Development

Manager at Multotec.

"Multotec has leveraged the lessons learned in Australia, Canada and Brazil to assist engineering houses with equipment solutions for projects in Africa including Ethiopia, Namibia and Zimbabwe."

She says the company has been working with design houses worldwide to understand hard rock lithium mineralogy, including amongst others spodumene, lepidolite, petalite and zinnwaldite.

"A decade of technological advancements and fine-tuning equipment design in the lithium market has allowed Multotec to improve both product efficiency and equipment life expectancy," says Hoffmann. ■



Multotec offers new lithium operations fit-for-purpose solutions.

Manitou: Innovative material handling solutions for mining

Manitou South Africa is a wholly owned subsidiary of Manitou Group, which is headquartered in France and has a worldwide presence through establishments on every continent. As an innovative leader, Manitou Group designs, manufactures, distributes and services versatile material handling equipment for a variety of sectors such as mining, construction, agriculture and industry, amongst others. Since the invention of the first all-terrain forklift truck by the founder of Manitou—Marcel Braud—in 1958, the search for innovation has continued to be at the origin of the great successes of the Manitou brand, which continually evolves to offer a range of products that meet the needs of its markets.

With a strong commitment to innovation, reliability, and customer satisfaction, Manitou has established itself as a trusted partner for mining companies seeking efficient, safe and versatile equipment by offering a variety of specialised machinery tailored to the unique needs of mining. Manitou's factory-fitted mining specifications telehandlers are suitable for a diversity of tasks on the mine. Coupled with specialised mining attachments such as tyre handlers, cylinder handlers, pipe handlers and personnel platforms, the telehandlers offer true versatility to the mining site. Each product is designed to withstand harsh operating conditions, ensuring maximum productivity and safety for its customers.

In addition to telehandlers, Manitou offers a range of rough terrain forklifts, access platforms, skid steer loaders and backhoe loaders.

At Manitou, customer support and service excellence take priority. The company's network of dealers provides comprehensive maintenance, training, and technical support to ensure optimal performance and minimal downtime for its clients.



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