MODERN MINING

August 2023 | Vol 19 No 8

CROWN PUBLICATIONS

For people who are serious about mining

IN THIS ISSUE

Scan QR code to watch the founder explain how the technology works

GOLDORE
TOMORROW'S TECHNOLOGY TODAY

THESE MACHINES HAVE BEEN ENGINEERED TO ENDURE

Condra cranes and hoists are without equal in their quality, performance, reliability and overall lifetime cost. Operating data and the experience gathered from installations around the globe are today incorporated in all Condra products, the endurance of which has been proven in highly corrosive and abrasive environments, and under wide extremes of temperature, humidity and altitude. Technical support, service and spare parts delivery are guaranteed worldwide.

WORLDWIDE

condra®
Cranes & Hoists

11 Indianapolis Boulevard, Raceway Industrial Park, Gosforth Park Ext 4,
Germiston, Gauteng. P O Box 752639, Gardenview, 2047, South Africa
Tel: +27 11 776-6000 | Fax: +27 86 669 2372
e-mail: sales@condra.co.za | www.condra.co.za

CONDRA A-042019

portal cranes | bridge cranes | cantilever cranes | hoists | end-carriages
single & double-girder overhead travelling cranes | crane components

CONTENTS

ARTICLES

COVER

COMMODITIES OUTLOOK

IRON-ORE

COPPER

RARE EARTH ELEMENTS

CLIMATE CHANGE

WOMEN IN MINING

SUPPLIERS TO MINING

REGULARS

MINING NEWS

SUPPLY CHAIN NEWS

ON THE COVER

Technology specialist, GoldOre's revolutionary MACH reactor offers solutions for dramatically improved productivity, efficiency and energy saving. See story on pg 6.

COMMENT

How happy are you?

Nelendhre Moodley.

If your level of dissatisfaction is any indication, then you are among those who have influenced South Africa's rankings in the World Happiness Index.

According to the World Happiness Report 2023, South Africa ranked 85th, falling below countries such as Algeria (81st), Vietnam (65th), and the Russian Federation (70th). We are also well below the likes of South Korea, Kazakhstan and Nicaragua.

If the Russians, who have been at war since February 2022, are happier than us, then we are indeed a very sad bunch of people.

One bit of good news though is that we have improved from our pre-Covid ranking of 106th.

The World Happiness Report is a publication that contains articles and rankings of national happiness, based on respondent ratings of their own lives.

As of March 2023, Finland has been ranked the happiest country in the world six times in a row with Denmark, Iceland, Switzerland, the Netherlands, Luxembourg, Sweden, Norway, Israel, and New Zealand, among the countries with happy people. It's no wonder then that the bulk of people leaving South Africa are headed for New Zealand.

While you are pondering your level of happiness, something that should lift your spirits is that South Africa recorded a R10.2 billion trade surplus in May. According to SARS, the surplus was due to exports of R184.2 billion and imports of R174.0 billion – including trade with Botswana, Eswatini, Lesotho and Namibia.

The jump in export flows in May was driven by platinum, gold and diamonds, whilst the value of imports increased due to an upsurge in the importation of crude and petroleum oils.

China was South Africa's biggest trading partner, totalling 11.9% of exports and 23.1% of imports, with Germany being the second-largest trading partner, accounting for 8.6% of exports and 8.9% of imports, and the US accounting for 7.7% of exports and 8.2% of imports.

Interestingly, in March, Al Cook, CEO of De Beers Group, flagged the continued steady demand for rough diamonds saying that Sightholders had planned more of their purchases for later in 2023, given the economic uncertainty at the time they were taking their planning decisions at the end of 2022.

Most recently, Lucapa Diamond Company recovered a 180-carat diamond – the third largest to be recovered from Lulo diamond mine and the 37th +100 diamond found at the alluvial mine in Angola. The white diamond weighing 180.87 carats, was classified as a Type IIa.

The mining sector remains an important engine of South Africa's economy, accounting for 8% of GDP and providing direct employment to roughly half a million people. However, of that half a million, just 12% are women and although the industry is working hard to meet its transformation targets, the pace of transformation remains slow. Is the male-dominated industry just not as attractive to women? In this edition, we celebrate women in mining and showcase some of the top-achievers.

Meanwhile, the strong appetite for minerals and metals sees miners including Copper 360, Altona Rare Earths and iron-ore miner, Afrimat, eager and upbeat. Copper 360, headed up by industry stalwart Jan Nelson, former CEO of Pan African Resources, is determined to establish a copper district in the Northern Cape to rival some of the world's best as the company looks to become one of the leading copper suppliers in Africa. With South Africa currently being a net importer of copper, Nelson believes that the company's growth aspirations will play a major role in reducing the country's dependence on copper imports (pg 16).

Afrimat, a serial deal-maker, recently made a play for cement producer Lafarge, including all its subsidiaries, for $6 million. The deal is part of the Afrimat Group's ongoing diversification strategy aimed at increasing Afrimat's offering in the construction industry (pg 12).

Our cover story, GoldOre, continues to grow in leaps and bounds, expanding its offering to the battery metals, industrial minerals and PGM sectors (pg 6). ■

Editor: Nelendhre Moodley
e-mail: mining@crown.co.za
Advertising Manager: Rynette Joubert
e-mail: rynettej@crown.co.za
Design & Layout: Darryl James
Publisher: Karen Grant
Deputy Publisher: Wilhelm du Plessis

Circulation: Brenda Grossmann and Shaun Smith
Published monthly by: Crown Publications (Pty) Ltd
P O Box 140, Bedfordview, 2008
Tel: (+27 11) 622-4770
Fax: (+27 11) 615-6108
e-mail: mining@crown.co.za
www.modernminingmagazine.co.za

Printed by: Tandym Print

Average circulation
January-March 2023: 13 974

Expect **more** at every stage of tyre life

Making tyre management safer and more productive. Reducing total cost of ownership and putting ESG at the core of our offering.

By delivering more than what is expected, we help make a difference every day.

KALTIRE®

Kaltiremining.com

NextSource Materials achieves first production of SuperFlake® graphite at Molo mine

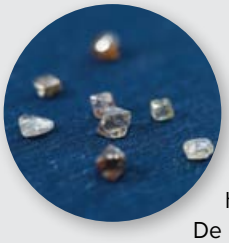
TSX-listed NextSource Materials has announced the first production of SuperFlake® graphite concentrate at its Molo mine in Madagascar.

As part of the commissioning and optimisation of the processing plant, the commissioning sequence was prioritised for initial production of coarse flake concentrate, with the first tonne of production consisting of +48 mesh (jumbo size) SuperFlake® graphite. The operations team will now shift its focus to ramping up the plant throughput to its nameplate capacity of 17 000 tonnes per annum.

The company expects to sell all the flake graphite produced at the Molo Graphite Mine to key customers under existing off-take agreements.

CEO, Craig Scherba, commented: "As we ramp up the production stage of operations, the company is in the enviable position of transitioning into a significant and sustainable global producer of high-quality graphite and anode material just as demand for their use in lithium-ion batteries is growing exponentially." ■

Molo mine workforce alongside first tonne of SuperFlake® graphite concentrate.



De Beers and Botswana agree in principle on sales agreement and mining licences

Diversified miner, Anglo American, has announced that De Beers Group and the Government of the Republic of Botswana have reached an agreement in principle on a new 10-year sales agreement for Debswana's rough diamond production (through to 2033) and a 25-year extension of the Debswana mining licences (through to 2054).

Debswana operates four diamond mines in Botswana and is a 50:50 joint venture between De Beers and the Government of Botswana. De Beers and the Government of Botswana will work together to progress and implement the formal new sales agreement and mining licences.

In the interim, the terms of the most recent sales agreement (which expired on 30 June) will remain in place. ■

Akobo Minerals appoints Helge Rushfeldt as head of mining operations

Scandinavian-based Ethiopian gold miner, Akobo Minerals AB, has appointed Helge Rushfeldt to Akobo Minerals' executive management group from 1st of July as head of mining operations. With more than 20 years of experience with the Norwegian mining industry, Rushfeldt brings a wealth of knowledge and expertise to the Akobo team as it transitions from development to production. Rushfeldt has been a consultant to the Norwegian mining and minerals industry for the past 10 years. He has also worked at many of Norway's major mines and mineral processing facilities including Titania AS, Norwegian Talc AS and Hustadmarmor AS. His scope of activity has ranged from production management to exploration projects via financing towards production. ■

Akobo Minerals mining operations.

Awalé Resources intercepts visible gold at the Charger Target

TSXV-listed Awalé Resources has announced that the first two drill holes completed at the Charger Target as part of its ongoing Odienné drill programme have successfully intersected visible gold (VG) in extensions to previously reported intervals of high-grade gold-copper mineralisation.

The two step-back drill holes (OEDD-44 and OEDD-45) targeted mineralisation underlying the 32m @ 3.0 grams per tonne (g/t) Au / 96 gram-metre (gm) intercept reported in RC drill hole OERC-132. Observing VG in these holes is encouraging and confirms the depth potential and high-grade fluid flow of the Charger mineralised system. Discovery of a potential new parallel mineralised structure opens a significant upside opportunity for the Charger Target with multiple parallel lodes, the company said. ■

Awalé Resources intercepts visible gold at the Charger Target.

Anglo American and Jiangxi Copper collaborate on responsible copper

Diversified miner, Anglo American, and Jiangxi Copper Company, one of China's largest copper producers, have signed a memorandum of understanding to work together to provide greater assurance on the way copper is mined, processed, and brought to market.

Peter Whitcutt, CEO of Anglo American's Marketing business, said: "We are developing a series of partnerships to shape a more sustainable and customer-centric value chain – one that meets consumer-driven demand for copper with demonstrably strong provenance credentials. That value chain begins with our portfolio of high-quality and long-life assets, now also including our world-class Quellaveco mine in Peru, which began production in 2022." ■

GoldOre: working to become a supplier of choice to the mining industry

The South African mining industry is highly regulated and conservative, and this poses unique challenges for technology suppliers like GoldOre, as it advances its MACH technology in support of the sector.

Given the stringent requirements that suppliers to the sector have to meet in terms of product safety and ethical business, amongst others, East Rand-based technology specialist, GoldOre's MACH's patented technology has been developed to the highest standards, says MD Adrian Singh.

Launched in 2012, the revolutionary MACH reactor offers solutions for dramatically improved productivity, efficiency and energy saving, with GoldOre working to become a product supplier of choice to the arduous mining sector.

Customisation for any application

The inventor of the technology, Adrian Singh, continues to play an active role in the company ensuring continuous improvement and development of the technology in order to meet the ever-evolving needs of the metallurgical industry.

MD Adrian Singh undertaking product quality control.

Owing to the input and involvement of the inventor, GoldOre can custom build MACH Reactors to virtually any flow requirement, with current capacities ranging from 0.5 m^3/h to 3000 m^3/h through a single unit. The materials of construction for the MACH can also be tweaked to allow operation in a range of applications in different commodity sectors.

GoldOre has a business model of outsourcing, which apart from creating employment opportunities for smaller companies, allows GoldOre to react with agility to the ever-changing demands of an evolving industry.

"Any concerns that potential clients may have regarding the stability of potential future supply of the technology can be hedged by the outright purchase of the MACH technology, which has a lifespan to outlast that of most operations."

For ease of market entry, it is not only the MACH Reactor that is customisable but also the business offering by GoldOre. Clients may choose from a variety of options including lease, purchase or rent-to-buy. Free trials are also offered to selected clients based on their specific circumstances and appetite for business.

"GoldOre's doors are always open for business and unique business deals may be negotiated, provided that they are beneficial to all parties involved," says Singh.

GoldOre's semi-pilot testrigs for MACH evaluations.

Patent protection is key

"Tainted by the many fly-by-nights that have come and gone with empty promises, the metallurgical industry is justly extremely circumspect when it comes to new players in the arena," says Singh.

As a starting point, and to ensure credibility and rightful ownership, GoldOre took the initiative to obtain worldwide patent protection for its MACH Reactor technology which not only reassures potential clients of GoldOre's legal right to the technology, but also sets their minds at ease regarding the potential infringement of patent rights of other competing technologies.

The MACH Reactor is the gold industry's only hydrodynamic, cavitating and self-aspirating shear reactor for gas injection into pulp with a relatively low power draw.

"Patent protection is the only reliable way to ensure sustainable long-term business and is a necessary right of passage to ensure a seat at the negotiating table as well as satisfying good governance principles of reputable clients," says Singh.

Collaborative R&D unlocks value

GoldOre has expanded its market footprint through close collaboration with clients that have serious metallurgical challenges to overcome in the fields of leaching, flotation and environmental remediation.

According to Singh, it is through laboratory and semi-pilot investigations, coupled with continuous research and development in conjunction with research (Mintek) and academic institutions, that GoldOre can provide a compelling techno-economic solution with the MACH that is hard for any potential client to ignore.

"Recently, GoldOre modified the gas dosage ports on the MACH to include reagent dosage points. This has yielded huge savings in both reagent consumptions (up to 30%), by improving the miscibility and mixing of reagents within the MACH, as well as efficiency improvements by introducing critical reagents into a high reactivity environment in the venturis of the MACH, to ensure a chemical reaction and metallurgical response that would otherwise not be possible. Most importantly, recovery improvements of between 2 and 8% can be attained, which goes straight to the bottom line. In conjunction with research, design adjustments have also been made to allow for the easier installation of the MACH using the existing infrastructure of thickener underflow pumps and pipelines where finances, space, flowsheet constraints and practicality do not allow for the traditional and preferred tank recirculation method of installation. The ability of the MACH to uniquely enable gas vacuum, or self-aspiration, has allowed for seamless pulp aeration when a pressurised gas supply has not been available. These small technical advances have made a huge impact on project outcomes and established the MACH as a tried and tested technology, with a worldwide track record and footprint for over a decade."

The MACH's patented technology has been developed to the highest standards.

A tough nut to crack

The South African mining industry is an extremely difficult market to break into, says Singh, adding that once the legal requirements have been satisfied, the softer aspects of reputation, track-record and credibility come into play.

GoldOre has established itself over the past 11 years as an ethical company that is based on technical excellence.

To this end, there have been numerous papers

Left: The revolutionary MACH reactor offers solutions for dramatically improved productivity.

Below: The materials of construction for the MACH can be tweaked for a range of applications in different commodity sectors.

GoldOre has modified the gas dosage ports on the MACH to include reagent dosage points.

published, by the inventor together with industry collaborators, in industry respected journals.

The company is an on-going sponsor of metallurgical societies and conferences and is frequently part of the technical programme where latest breakthroughs, developments and discoveries are shared with other industry players including academia.

"GoldOre works in collaboration with many high-ranking universities globally where one-of-a-kind laboratory sized and fully kitted out MACH test equipment is supplied at no cost to support post graduate studies at the masters and doctoral levels. We offer supervision, technical and motivational support to post-graduate students who have the MACH Reactor technology as the main focus of their studies."

GoldOre addresses the green agenda

For any technology to be taken seriously these days, it is essential to address ESG (Environmental, Social and Governance) issues, global warming, the circular economy and the quest for carbon net zero by the year 2050.

"GoldOre ensures that it delivers on this front and is proud to share that it has managed to reduce the power requirement of the MACH by as much as 70% through the optimisation of the venturis within the MACH – in terms of both number and speed – while still maintaining all the benefits associated with metallurgical response. This was done in close conjunction with research and development to ensure resilient efficacy of the technology as it evolves to support the green agenda. The MACH also contributes to the circular economy as it is a 'one-time manufacture' that lasts for the life of the project and requires zero maintenance".

Singh adds that smaller plant footprints, lower reagent consumptions and maximised recoveries guarantee minimal environmental impact and reduced requirements to retreat tailings dams to maximise profits and ensure sustainability for future generations.

"The MACH manages to achieve all of this with technology that has no moving parts, is not pressurised and with remote monitoring capabilities, in line with the 4th industrial revolution, to ensure the safety, health and well-being of employees."

Staying relevant with battery minerals

Apart from the tried and tested applications of the MACH for recovery improvement via pre-oxidation and boosted leach in gold and uranium plants and the improved recovery of valuable fines in flotation applications, GoldOre recently turned its attention to the improved recovery of battery minerals, more specifically copper.

"GoldOre is pleased to share that the improvement in flotation response for copper ores with the MACH mirrors that of the benefits seen with PGM (Platinum Group Metals) ores, with the added benefit of requiring far fewer passes with the MACH. This fact, coupled with the ability of GoldOre to supply high-capacity MACH Reactors with flowrates of up to 3000 m^3/h (the largest competitive unit has a capacity of 600 m^3/h), makes the application of the MACH to copper ores both practical and economically viable."

This breakthrough offers copper producers the cheapest capital alternative to improve metal recovery in their concentrators when compared to TSP (Tailings Scavenger Plants).

GoldOre believes that in order to stay relevant, one has to continually re-invent oneself, and be positioned to satisfy the challenges of the growing battery minerals industry is a huge advantage for future company diversification and growth.

Diversification into industrial minerals

The company has also made breakthroughs in the industrial minerals sector through close client collaboration and on-site test work with semi-pilot MACH test rigs. Technical and economic challenges had to be overcome to ensure a resilient, positive and techno-economic outcome for the client.

Challenges with arctic conditions and space constraints with fully enclosed plants had to be overcome to guarantee long term success of the project.

Collaboration for future growth

GoldOre recognises that client contact and relationships are key to market penetration and is currently looking to leverage off collaborative partnerships with other prominent industry individuals and companies in order to expand the business base into far reaching geographical territories. There is much truth in the old proverb: "It's not what you know, it's who you know."

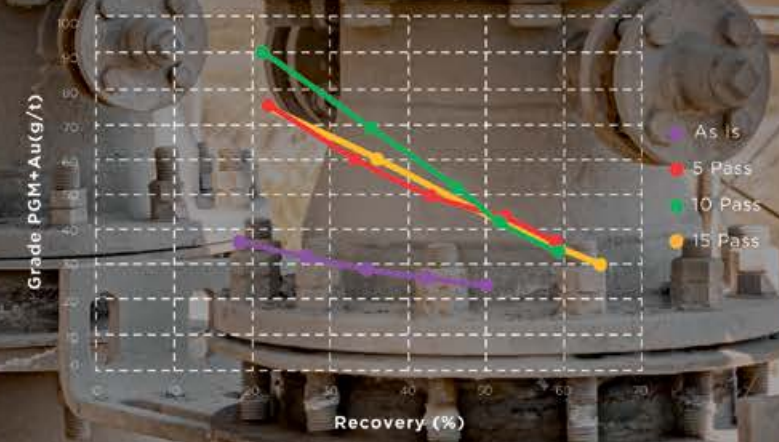
"Join us on our exciting journey and be embraced by our strategy of partnership and collaboration for mutual business benefit and diversified growth," concludes Singh. ■

GoldOre

GoldOre is a proudly South African company that currently has a worldwide client track record and a footprint that is ever-expanding, with diversification into different commodities and applications constantly being evaluated.

Improve your ESG and boost your profitability with the MACH REACTOR™

Now that is what we call Flotation Euphoria!



Invest in a MACH & boost your leach today!

Scan me for more!

adrian@goldore.org | www.goldore.org

GOLDORE
TOMORROW'S TECHNOLOGY TODAY

MACH REACTOR™ Technology *is proudly South African, operating internationally.*

Green innovation drives copper demand

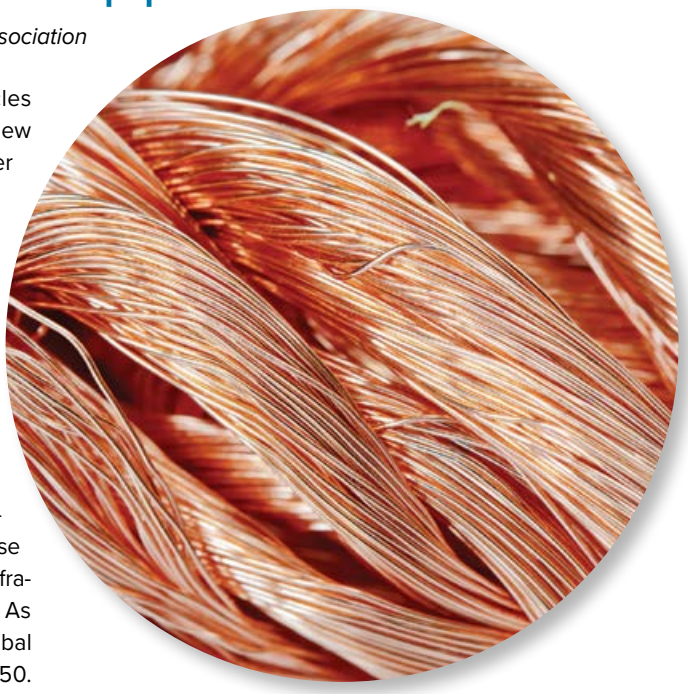
By Colin Bennett: Market Intelligence Director at the International Copper Association

Colin Bennett: Market Intelligence Director at the International Copper Association.
(Source: International Copper Association).

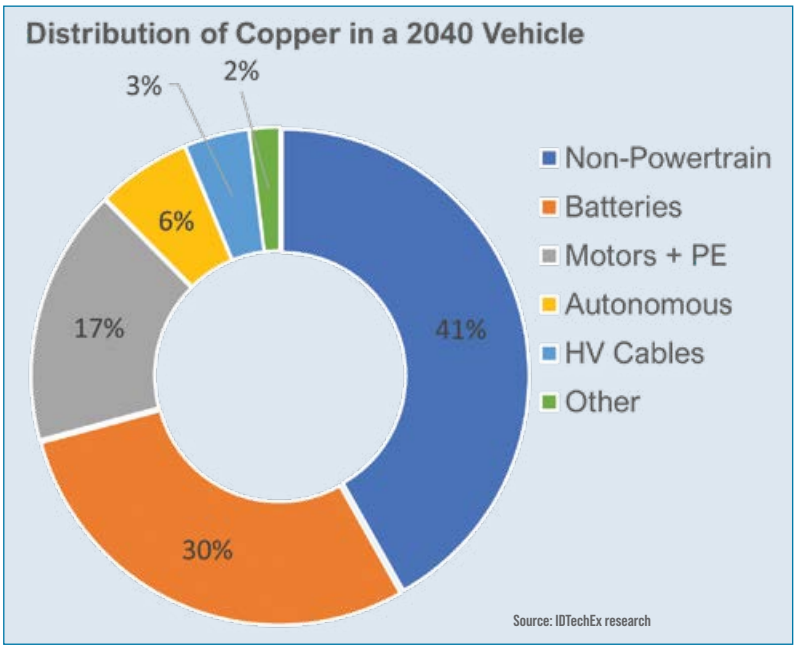
As green technologies like electric vehicles (EVs) continue to drive copper demand, new research on the automotive market, copper substitution and miniaturisation, commissioned by the International Copper Association (ICA), sheds light on expected trends for the industry.

While the world races to meet its net-zero carbon commitments, and consumers and investors increasingly look to clean technologies, the need for green solutions is on the rise. Due to its natural conductivity and energy efficiency, copper plays a significant role in the green transition. Applications that have the potential to abate up to two-thirds of global greenhouse gas emissions—from electric vehicles (EVs) and infrastructure to renewable energy—rely on copper. As the need for these technologies increases, global copper demand is projected to double by 2050. Key segments, such as the automotive market, are a microcosm of this broader trend, with innovations in electric and autonomous vehicles amplifying copper demand in the sector. For example, research commissioned by the International Copper Association (ICA) and conducted by IDTechX suggests that by 2040, vehicle-driven copper demand is expected to increase by 143 percent from 2020 levels.

Questions surrounding the ability to meet this growing demand have raised additional interest around market drivers for copper applications, particularly in relation to substitution and miniaturisation trends. Additional research commissioned by ICA has estimated that while substitution rates



are expected to stabilise in 2023, miniaturisation is on the rise. However, while cost has often been the determining factor in these trends, it is no longer the only one, with system optimisation becoming a key component in determining an application's material of choice. Copper's role in the green transition, coupled with a shifting focus to system optimisation, indicates that copper will continue to be an essential material to modern society long into the future.



Copper and the automotive market

ICA-commissioned research conducted by IDTechEx demonstrates the impact of the accelerating shift to electrification. IDTechEx expects copper demand from autonomous and electric vehicles will increase to six million tonnes annually by 2040.

EVs contain approximately 2.5 times more copper than an internal combustion engine (ICE) vehicle, which contains an estimated 23 kgs of copper. This is largely due to the copper found in the copper rotor induction motor, although the material can be also found in the wiring looms, winding wire, foil and busbar and power cables. To determine the key sources of expected copper demand in the automotive market, IDTechEx researched more than 30 components across five powertrain variants and four variations of autonomous vehicles. The study showed the low voltage wiring loom is predicted to account for more than 50 percent of copper demand through 2040. Additionally, the largest projected sources of vehicle-driven copper demand by 2040 include low voltage wire harness (39 percent), the lithium-ion battery (29 percent) and the electric traction motor and power electronics (17 percent).

Increased demand for battery electric vehicles (BEVs) over ICE vehicles is also expected to contribute to the growing need for copper, with IDTechEx estimating that demand for ICE vehicles will decline as competition with other powertrain options, such as BEVs, plug-in hybrid EVs (PHEVs), hybrid EVs (HEVs) and fuel cell EVs (FCEVs), continues to grow. According to IDTechEx, BEVs, one of the most copper-intensive of the powertrain types, is expected to become the dominant EV powertrain option by 2040.

As innovation in the automotive sector advances, autonomous cars are expected to proliferate the market increasingly, fully emerging by the end of the decade. Vehicle automation requires multiple technologies that require copper, including sensors, on-board computers, cameras, light detection and ranging sensors (LiDARs), and radars. These sensors and computers contain approximately 50 – 100 g of copper, while the autonomous vehicle systems and autonomous driving control unit make up six percent of an autonomous vehicle's copper use. Electrifying autonomous vehicles will only enhance the need for copper in the automotive sector.

Expected trends in substitution and miniaturisation

While the automotive market provides a window into the expanding demand for copper from the green transition, broader considerations on market drivers for material choice, embedded in substitution and miniaturisation trends, contextualise this growing demand. ICA-commissioned research conducted by the DMM Advisory Group has estimated that global copper substitution will stabilise in 2023, following a substitution rate of 1.25 percent of global usage in 2022. Additionally, ICA-commissioned research conducted by CRU has estimated that potential copper substitution by 2035 will account for about 1.7 percent of total global copper use, a relatively modest increase. At the same time, the DMM Advisory Group has projected that miniaturisation—or the design and production of smaller, more efficient devices with reduced material usage—is expected to increase due to natural technological progressions. As manufacturers continue to innovate, copper may be used more efficiently rather than be substituted.

According to both the DMM Advisory Group and CRU research, multiple factors play a role in substitution decisions—from cost and technical properties to material optimisation and regional regulations. As the best nonprecious conductor of heat and electricity, copper's natural energy-efficient properties will enable it to retain material advantages when it comes to size, efficiency, and energy-use, providing the best cost-performance solution at the system level for many applications. While material cost has historically been a significant factor in substitution, the system level is where performance is increasingly optimised. As technological developments aim to increase efficiency and durability, copper's versatile properties allow the same amount of copper to support multiple functions within the same application. For example, as EVs continue to optimise for efficiency and durability to increase range and safety, risk of copper substitution remains low due the metal's natural properties and the focus on system-level optimisation by designers and manufacturers to achieve these outcomes. This ensures that copper will continue to increase application efficiency and remain the material of choice for applications supporting the green transition to contribute to a more sustainable future. ■

Electric vehicles continue to drive copper demand.

Applications that have the potential to abate greenhouse gas emissions—from EVs and infrastructure to renewable energy—rely on copper.

International Copper Association

- The International Copper Association is an advocate of the copper industry, bringing together the industry and its partners to advance the UN Sustainable Development Goals and position copper as the material of choice.
- Headquartered in Washington, D.C., ICA has offices in three primary regions: Asia, Europe, and North America. ICA and its Copper Alliance® partners are active in more than 60 countries worldwide.

CEO Andries van Heerden.

Afrimat targets acquisitive and organic growth

Mid-tier miner, Afrimat's success is underpinned by its diversified portfolio, but is there a threshold to the number of acquisitions to be made? According to CEO Andries van Heerden, although the company currently has a really good product split, there is definitely capacity for one or two more product lines to be added to the business. "Specific commodities that we do not have in the portfolio, yet." By *Nelendhre Moodley*.

"We can still grow because our base is relatively small. Importantly, growth is a key part of Afrimat's DNA and our intention is to continue to grow the business," he explains.

In a recent turn of events, Afrimat announced the acquisition of Lafarge South Africa Holdings (LSA), including all its subsidiaries (LSA Group) for $6 million. The acquisition will be housed in Afrimat's Construction Materials division, which together with its subsidiaries (the Afrimat Group) supply a wide variety of aggregates and concrete-based products to the market.

"A key focus of Afrimat is our conscious operational efficiency initiatives, which are aimed at expanding volumes, reducing costs, and developing the required skill levels across all staffing categories. This exciting deal forms part of the Afrimat Group's ongoing diversification strategy and will increase Afrimat's offering in the construction industry by expanding our quarry and readymix operations nationally, and allowing for Afrimat to enter the cement value chain competitively."

Since its inception in 2006, Afrimat has made several acquisitions including, amongst others, the Demaneng iron-ore mine in 2016, Coza Mining which owned three mines namely Jenkins, Driehoekspan and Doornpan, in 2020, and the Nkomati anthracite mine in 2021.

Afrimat's business consists of Construction Materials, Industrial Materials, Bulk Commodities and Future Materials and Metals segments with a strong portfolio of producing assets and a robust pipeline of future projects, which are in the early stages of development.

"We have a pipeline of existing business, such as

Afrimat's Brewelskloof Quarry in the Western Cape.

Afrimat's Harrismith Quarry in KZN.

Jenkins, to deliver growth for the short-to-medium term and our Future Minerals and Metals projects for the longer-term. This talks to a production line-up for today, tomorrow and the years ahead."

Product demand

Afrimat's Bulk Commodity division currently produces three key minerals, namely iron-ore and anthracite for which demand remains strong and manganese, for which demand is currently soft.

"Although the dollar price has come down from its highs of a year ago, the price of iron-ore remains reasonably high for both the international and domestic markets. We are also happy with the price of anthracite. The global demand for anthracite remains solid especially given that anthracite was largely sourced from Russia in the past. However, our biggest challenge remains ramping up our mine to reach its full potential and we are, in fact, in the final stages of bringing the Nkomati anthracite project into full production."

For manganese, Afrimat is in the early stages of production; however, global demand for the commodity remains subdued.

"We have only just started producing manganese and I believe that there is an imbalance in the demand supply fundamentals for manganese globally, which resulted in demand for the product being rather soft."

Afrimat produces just over 2 million tonnes per annum (mtpa) of iron-ore and has reached steady state production from its anthracite mine, which is designed to deliver 1.2 mtpa of run of mine material and between 700 000 - 800 000 tpa of saleable product while manganese is at early stages of production, with tonnages yet to be finalised.

"The manganese mine is a new deposit at the early stages of production – we will be able to advise on production rates at a later stage."

Future Metals

Future Materials and Metals is the miners most recent addition to the group's portfolio of assets with Glenover, which produces phosphate, vermiculite and rare earth elements, being the segment's first project.

The Future Materials and Metals portfolio diversifies Afrimat's exposure wider than ferrous metals and aligns it to global trends, such as the advancement of technology for decarbonisation (through rare earth minerals) and food security (through fertiliser products).

"Glenover is a greenfield project that started its first production during this year and is currently in the ramp-up phase. The project contains three essential businesses – fertiliser for agricultural applications;

Drilling being undertaken to firm up the resource.

Afrimat's Demaneng Mine.

vermiculite for various applications from industrial to horticulture; and rare earth elements, supporting technological advancements such as high-strength permanent magnets and battery technology."

Van Heerden explains that from the Future Materials and Metals business, the company has started producing high grade phosphate and is targeting the organic food production market.

"This is a new and emerging market for the environmentally conscious farmer and while this niche market is still in its infancy stage, it is growing by leaps and bounds. Although the market is relatively small in South Africa, internationally, it is a market that is expanding rather quickly. Our next step involves completing construction of a single super phosphate (SSP) plant, which is currently underway with commissioning scheduled for the second half of this year. We plan on ramping the plant to full production in a year from now."

Afrimat will produce a total of 100 000 tpa of phosphate. Total capex for the phosphate project, which includes the purchase price of R550 million, and development of the SSP plant amounts to roughly R800 million.

According to Van Heerden, the company has a competitive advantage over most fertilizer companies as the JSE-listed entity owns the primary source of production.

Although the company is negotiating off-take agreements for its phosphate material, no agreements have as yet been inked. "Once we are producing phosphate, we will be in a position to provide material to potential clients to test, and only then will we be able to finalise any off-take agreements," says Van Heerden.

Meanwhile, the 'exciting' rare earth elements segment is at infancy stage.

"We have banked the project on the phosphates and the vermiculite, with the rare earths portfolio really a cherry on top," says Van Heerden.

The life of mine for phosphate and rare earths is pegged at more than 20 years while the rare earth elements have an estimated 10-year LOM.

The Future Materials and Metals segment generated revenue of R25,2 million, with start-up losses amounting to R11,4 million for the year ended 28 February 2023.

Financial performance

Afrimat recently posted sterling results for the year ended 28 February 2023, with revenue up 4,9% to R4,9 billion (2022: R4,7 billion) and an operating profit margin of 19,6%.

Nkomati Anthracite's Matadeni pit.

Afrimat's load-out facility.

Afrimat busy with rail load-out in the Northern Cape.

"Looking ahead, careful project implementation and the rollout of a well thought-through strategy for Glenover will be a top priority. This is expected to include vermiculite processing, optimisation of the high-grade phosphate project, and the implementation of the super single phosphate project. These product lines will add further volumes in future," says Van Heerden.

Bulk Materials

Afrimat's Bulk Commodity business remains the backbone of the company, consisting of Demaneng and Jenkins iron ore mines, and the Nkomati anthracite mine, which together contributed a whopping 81,9% to the Group's operating profit.

"This excellent performance was largely due to increased volumes from Jenkins, the successful turnaround of Nkomati, and cost-saving initiatives."

The Nkomati anthracite mine has turned the corner from initial start-up losses to profitability, contributing 23,1% to the segment's revenue for the year. It produces a high-quality product sold into the local market, and is recognised as a consistent, reliable supplier of anthracite. During F2023, volumes at Nkomati amounted to 317 943 tonnes (F2022: 219 845 tonnes). Furthermore, an exciting new operational strategy is being implemented by the mine, which is expected to improve performance significantly in the near future.

Van Heerden explains that the long-term sustainable life of mine plan is being enhanced through the opening of two opencast pits and the continued development of the underground operations.

"The first anthracite from these developments was extracted early in the new financial year. These planned new sources will enhance the mine's production capacity significantly."

Afrimat also started the development of the underground entrance, which will allow the company to add new production. Moreover, the company has upgraded the washing plant and beneficiation blocks to handle additional product volumes.

The miner invested an estimated R500 million for the development of the open-cast pits, the underground entrances and upgrades to the washing plant and beneficiation blocks.

Afrimat is also gearing up to bring the Driehoekspan and Doornpan iron ore assets online, once Demaneng volumes begin to reduce. "This should be within the next three years."

"We continue to focus on sustainable diversification in all five segments. In the new Future Materials and Metals segment, the priority is to ramp up the production of high-grade phosphate and to execute the next stages of the project as seamlessly as possible, while the Bulk Commodities segment has implemented an internal efficiency drive with new technology, which has proven to be highly successful," concludes Van Heerden. ■

Copper 360 – unlocking the copper chest

(Photo by Matian Willemse).

Copper 360 CEO, Jan Nelson.

JSE-listed junior copper producer, Copper 360, is eyeing mid-tier status as it targets production of between 20 000 tpa and 30 000 tpa of copper in the next two-to-three years, says CEO Jan Nelson, whose ambition it is to create a new copper district using the cluster mining model developed by its chair, Shirley Hayes. By *Nelendhre Moodley*.

"As the only junior copper miner in the industry, Copper 360 has no competition from a peer group point of view and, while our production at this stage is relatively small, with the assets we have on hand we will, in the near future, become one of the leading copper producers in Africa."

Formed in November 2022, following a reverse take-over of copper producer, Big Tree Copper, and copper mining company, SHiP Copper, Copper 360 is focused on producing premium copper that will yield a high cash margin.

Copper Ore Body
(Photo by Matian Willemse).

The company, which has a mining right that covers 19 000 hectares to the north of the town of Springbok, holds 12 copper mines (some with developed infrastructure) and 60 copper prospects with advanced geological datasets. It is estimated that the life-of-mine across the various operations is well over 200 years.

The Copper 360 business is focused on processing historical mined copper rock dumps through a process of environmental clean-up, and mining surface and shallow copper resources. The company acquired an extensive database from companies such as American mining conglomerate Newmont and global gold company Gold Fields, who worked the district before – and this, says Nelson, gives the company a significant competitive advantage.

"Our attraction is really the fact that we have one mining license that covers virtually an entire copper district and extremely high copper grades. We have on-surface and underground deposits, with the underground deposits already developed. The recent discovery of on-surface deposits ensures that the cost of production remains low, with the added benefit of ease of extraction. In essence, with very little effort, we will be able to unlock further value from the project rather quickly."

Latest developments from the pure play copper producer, which listed on the JSE in April, include recent drilling results that have confirmed the validity of information from the data-sets supplied by Newmont and Goldfields, which operated the mine during the 1980s and 1990s.

"We inherited significant datasets from Newmont and Goldfields that illustrate where the orebodies lie. The results from our recent drilling programme validate the information from the datasets, which

is extremely good news as it will allow us to move a large portion of our resource into the reserve category."

Further to this, the drilling results also confirmed the existence of high-grade copper intersections at Copper 360's Rietberg Copper Mine. Importantly, initial sampling has led to the discovery of a new high-grade on-surface copper deposit.

"The view from the geological fraternity over the years has been that there are no major copper deposits on-surface in the area; however, surface sampling has revealed that there exist extensive surface deposits, with copper grades of up to 10% copper. As it is, we are currently drilling several targets that have shown potential for high grade surface deposits," says Nelson.

Production strategy

"Copper 360 is looking to create a new copper district using the cluster mining model developed by our chair, Shirley Hayes, where several mines feed into one processing facility. With a centralised process facility, smaller orebodies become economically viable, and have the potential to further benefit mining in the region," explains Nelson.

The advantage of the cluster model, which allows for ore from the different deposits to feed into the processing facility, is that it gives the miner much needed flexibility.

"This kind of flexibility ensures we are not beholden to circumstance – if challenges arise with the deposit being mined, we have the option of mining any of the several deposits on-hand and, if the grades are lower than expected from one deposit, we can easily supplement this with higher grades from other deposits."

The process facility will consist of a plant producing sulphide concentrates and another plant producing oxide copper plates and will offer the miner even more flexibility in terms of type of product – all of which talks to delivering optimum profitability.

As all Copper 360's deposits lie within a 30 km radius of the central processing facility, this allows for a lower impact on the environment. However, the flipside is the higher trucking costs.

The new kid on the mining block currently produces roughly 50 tons of copper plate per month, with plans to ramp up to 100 tons of copper plate production over the next month.

Copper 360 will use the R260 million raised at its listing to 'open up' the Rietberg mine and build a concentrate plant capable of producing 600 tpm of copper concentrate.

"Following the construction of a new solvent extraction and electrowinning (SX/EW) plant, we will add another 500 tons of copper to our production, bringing the total to 600 tpm of copper metal by early next year."

Having already invested close to R200 million in the development of the existing plant, the investment outlay for the new plant and opening of the Rietberg mine will cost the miner another R500 million.

The company currently produces roughly 50 tons of copper plate per month.

In the past ten months, the mine has employed some 400 people.

According to Nelson, the company has managed to significantly curtail its project development costs, largely as a result of its high-level in-house project development skills-set, which consists of a project management team able to design, engineer and build the required plant and equipment.

Once the copper producer has completed Phase 1, the miner will begin Phase 2 of the project, which will double capacity.

"We will achieve copper production of 600 tpm by February of next year, with the plan being to double that to about 1200 tpm by the end of next year. This will take us from 8000 tpa of copper production, within the next few years to 16 000 tpa of copper production."

Nelson expects the additional production to come from the open pits, complemented by production from underground operations.

The company invested close to R200 million in the development of the existing plant.

In the next two-to-three years, the junior miner will make the jump to the big league – targeting production of between 20 000 tpa and 30 000 tpa of copper, which will firmly place the company as a mid-tier miner.

According to Nelson, if Copper 360 can begin producing from "one or two of its open pits", this will allow the company to quickly scale up to the next level.

Further to this, the miner is mulling the opportunity for downstream beneficiation to include the production of products such as copper wire and copper piping.

This, says Nelson, will significantly augment its profitability.

Delivering economic benefits to community and country

As South Africa is an importer of copper, production from Copper 360 will encourage less dependency on imported copper and thereby greatly benefit both the country's balance sheet and the local industry.

Copper plates being produced.

The revival of copper mining in the Northern Cape district of Nababeep – an area consisting of some 5000 people with an unemployment rate of close to 90% – has delivered a much-needed shot in the arm for the local economy. In the past ten months, the mine has employed some 400 people.

"This former mining district is still equipped with a diverse set of mining skills, which is something even more extraordinary than the extensive copper district itself. As it is, we are blessed with a shallow high-grade orebody, well-developed infrastructure, a great dataset and, given that the area was quite a massive mining district in the 1980s and 90s, the high-level skills set that exists in the community.

It is interesting to note that, following the development of the solvent extraction plant, which is equipped with artificial intelligence software, we undertook to train our plant operators. Following the training, software supplier, BASF, has lauded the operational ability at the plant."

Meanwhile, as the project ramps up, Copper 360 expects to employ a further 1000 people over the next three years.

Nelson explains that the revival of the mining district has been accompanied by the spin-off of several secondary businesses. This has formed part of the company's social and labour plan (SLP) initiatives and includes agricultural projects as well as upskilling and training initiatives for other businesses.

"Our SLP offers community members options to engage in economic activity in an area where, a year ago, there were no such options. With the ramp up of the project, Nababeep is going to be one of the main metal ore mining districts in the country. Importantly, as unemployment is one of the biggest challenges facing the country now, the fact that Copper 360 is able to create 400 jobs and drive the establishment of secondary businesses is good for both the area and the country as a whole," says Nelson.

Copper Outlook

Demand for copper has been climbing steadily as the global economy moves towards greener, more environmentally friendly products and clean energy initiatives gather momentum. It is expected that the growth in demand for the metal will continue an

upward trajectory because of this acceleration.

Copper is an essential element in the green economy and a critical aspect of most electrical or battery-powered devices from smartphones to electric cars with the generation of clean energy in wind farms, for example, being highly dependent on the metal for efficient conductivity. Copper has unmatched thermal and electrical conductivity properties and is used to power high-speed rail and other key elements on which today's, and tomorrow's sustainable economy depend.

A view of Copper 360's operations.

Nelson explains that with the ever-increasing demand for copper, and with large Chilean open cast copper mines reaching their end of life cycles, global copper supply is expected to be in deficit in the coming years.

"As existing large-scale open-pit mines reach the end of their lives, miners are mulling the viability of transitioning to underground operations – a highly expensive endeavour. With this, and the limited investment made into copper exploration over the past decade, the fundamentals for copper are extremely positive, and the expectation is that the price of copper will continue to climb steadily.

"We expect to see copper production fall from about 20/25 million tonnes per annum to virtually 10 million tonnes per annum in the next five to six years. Over the next decade, demand for copper is expected to grow to between 60 to 80 million tonnes per annum. EVs alone are expected to account for roughly half this quantity. With the world focused on meeting the call for clean and green energy requirements, there is just not enough copper to meet this demand. Furthermore, there is no other metal that can replace copper."

According to Nelson, copper is currently trading at roughly $8600/t and expected to trade between $12 000 and $14 000/t in the next two years – a favourable price for Copper 360, which has an all-in-sustaining-cost of $4500/t. This will allow for a bumper bottom-line, he concludes. ■

SX/EW

Solvent extraction and electrowinning (SX/EW) is a two-stage hydrometallurgical process that extracts and upgrades copper ions from low-grade leach solutions into a solvent.

Altona advances Monte Muambe, eyes geographic expansion

LSE-listed Altona Rare Earths, a junior mining company progressing its flagship Monte Muambe project in northern Mozambique, remains receptive to attractive rare earths opportunities on the continent, Altona Rare Earths CEO, Dr Cédric V.G. Simonet, tells *Modern Mining*.

The rare earths mineral developer, which recently made the jump from the Aquis Stock Exchange to the London Stock Exchange, is however, currently firmly focused on advancing its early-stage asset, and since acquiring the project in 2021, has been taking the resource up the value curve.

On June 9, the company raised £2 million on its oversubscribed shares, having initially targeted £1.25 million in the capital raising.

The Aquis Stock Exchange, a smaller UK stock exchange, was suitable when Altona Rare Earths was a smaller company. However, in line with its aspirations to grow its portfolio and subsequently, its market cap, the company looked to the LSE, one of the UK's main exchanges that is highly attractive to mining investors.

"We felt that the LSE was a more suitable vehicle to support the growth of our company as we transition from a micro-cap exploration company to a small cap mining company. The move was eagerly anticipated by our investors and has been extremely well received. It is heartening to see the huge appetite from investors for rare earths projects, which are critical to the green energy transition," explains Simonet.

Aside from the company's corporate expenditure, the funds raised will be used primarily to complete a JORC mineral resource estimate and scoping study. Altona Rare Earths is also looking to increase its project holding to 51% and lodge a mining concession application during the course of 2023 as well initiate associated prefeasibility study activities.

Altona Rare Earths has been exploring Monte Muambe since August 2021.

The funds are expected to last for a year, after which the explorer will go to the markets once more to raise funding to progress the project through to pre-feasibility study (PFS) stage. The PFS is expected to take between 18 and 24 months.

"Initially, we will place much of our emphasis on metallurgy - an extremely important parameter for a PFS and on environmental and social baseline studies which we will undertake at the onset of the PFS, after which we will advance our infill drilling programme to determine the viability of expanding the resource base."

Altona Rare Earths has been exploring Monte Muambe since August 2021 and in November 2022, advanced its resource drilling programme and subsequently published an exploration target estimate last year.

"We are currently preparing our maiden JORC mineral resource estimate, which will be published during the third quarter 2023," says Simonet.

The prospecting license for Monte Muambe – a carbonatite project – covers a tenement of roughly 40 km^2 with the mineralised bearing zone located within a 15 km^2 basin.

"The legacy drilling data initially highlighted the presence of rare earth elements, with grades and

Aerial view of the Monte Muambe project.

intercept lengths that were particularly interesting. The high-grade area that we are targeting has grades in the region of 2,5% Total Rare Earth Oxide (TREO)."

Given that Mozambique is a well-established mining jurisdiction, it offers a host of equipment and service suppliers, a skilled labour force and essential infrastructure including roads, rail, water and power.

In fact, Altona's Monte Muambe project has a number of neighbours in the coal mining space, a large iron and steel project and a scattering of small mining operation, including gold projects.

"When we started drilling, and undertook a request for quotations for drilling services, we were spoilt for choice given that there were already five contractors on hand. From an infrastructure point of view, railway transport is accessible within a short distance from Monte Muambe and there is access to clean energy from the Cahora Bassa hydropower plant."

Altona Rare Earths has ambitious plans to be a clean energy miner and is targeting net zero carbon emissions and intends to consider the use renewable energy including solar and wind power, as well as to connect to the grid to access hydropower from the Cahora Bassa hydropower plant.

"We will definitely investigate the use of backup energy which may include carbon-based energy. The Tete Province offers coal bed methane (CBM) – which is a much cleaner option than diesel and

Drilling activities underway to firm up the resource.

Altona Rare Earths team on-site.

Inspection of soil samples.

Training session underway.

as we are looking to achieve the highest possible percentage of clean energy for our operations, CBM may be a suitable option."

Time-line to production

According to Simonet, the emerging miner has set a rather ambitious objective of bringing the Monte Muambe project into production by 2027.

"We will achieve this by being highly focused in the way we advance our exploration programme and develop this project. We have the advantage of insight into how some of our peers have managed their projects and have learnt important lessons, including that we should not try to increase our resource base when we already have sufficient grade and size for an actual mining project. The aim is to stick strictly to our planned strategy. Two years from now, we will either have completed our PFS or be in the process of completing it. The PFS will be designed such that it requires only simple upgrades to ensure that the Definitive Feasibility Study (DFS) is advanced with speed. Once the PFS is completed, we will raise capital for mine construction and consider off-take agreements for our products."

During this year the company will focus on assessing the metallurgical parameters of the project and, as part of its studies, consider the viability of in-country value addition, including further minerals processing options to produce mixed rare earth carbonate (MREC), and possibly partly separated products. Rare earths elements (REE) consist of 17 different mineral elements.

"We are keen to consider the option to refine the minerals further to produce the 17 different rare earths elements. However, the step thereafter which is to engage in the production of permanent magnets, is not a space in which we wish to play."

According to Simonet, Altona's strategy ties in with the call from governments of resource rich African countries for mining operators to be more transformative and focus on local beneficiation. In many cases, African governments don't want to see raw ore or mineral concentrates being exported without being refined. At Altona we also see the potential benefits of in-country value addition not just for the host country, but also for the company and our shareholders. As far as Monte Muambe is concerned, we are seriously looking into creating value addition for the project from the scoping study stage and intend to refine our products as far as we possibly can."

Rare earths elements are used in a wide array of high-tech products, such as electric vehicles (EVs), wind turbines, mobile phone and laptop screens, alloys, ceramics, and weapon systems including aircrafts and missiles.

Some of the most sought after REE are Neodymium, Praseodymium, Terbium and Dysprosium, collectively known as the "Magnet

Team preparing soil samples.

Metals" - all of which are present at Monta Morumbi.

"These elements are critical to the world's green energy revolution. The current production capacity is nowhere near the levels of the short-term and long-term forecast. So, the fundamentals for REE are extremely strong for now and in the future."

Altona seeks complementary REE opportunities

"Given that we are based in Africa, have extensive experience in rare earths extraction and an expansive network, we are extremely well positioned to advance new rare earths projects on the continent. As it is, we are always assessing potential opportunities that come our way and it is very likely that in the near future Altona will be involved in another rare earths project, in another jurisdiction in Africa."

Rare earth elements occur in a variety of geological environments including carbonatites, hydrothermal, ionic clay and heavy mineral sands deposits.

Africa's complex geology makes it a favourable environment for REE deposits of all four types and with large parts of the continent relatively under explored for REE, the potential for new discoveries is high, especially for ionic clay deposits which are a relatively new economic geology model.

Further to this, Simonet believes that there exist opportunities to share processing and refining facilities for REE between different projects in the same country and possibly between different projects in neighbouring countries.

"Mozambique's neighbours Tanzania, Malawi, Zambia and Zimbabwe, all have rare earths projects with some at advanced stages of development. I believe that there may be opportunities in the future to share processing facilities with developed projects," he concludes. ■

De Beers to surpass Paris Agreement-aligned emission reduction targets

Diamond miner, De Beers is on an ambitious drive to surpass the carbon emissions targets it has set, in accordance with the Paris Agreement, with the Venetia Underground Mine, which is in the final leg of completion, being a showcase asset in implementing key 'green' initiatives.

Kirsten Hund, head of carbon neutrality at De Beers Group.

Louis Swartz, energy and carbon manager at De Beers Group.

The Paris Agreement's overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."

As such, businesses are implementing measures to lower their carbon emissions and progress sustainability programmes to meet the stated aspirations, guided by science-based emissions reduction targets.

De Beers, the world's leading diamond miner, set out its Building Forever goals in 2020. These are a blueprint for creating a positive and sustainable impact in its host countries and throughout the diamond value chain. Its goals span four pillars: leading ethical practices, partnering for thriving communities, protecting the natural world, and accelerating equal opportunity.

Kirsten Hund, head of carbon neutrality at De Beers, explains that in line with working towards being carbon neutral by 2030, the miner has several initiatives at play and continues to seek out new opportunities to progress its mission.

During 2022, De Beers saw advances across all four Building Forever pillars and all 12 goals, which included reduction in water use and energy intensity, innovations in diamond tracing technology, increased representation of women in senior leadership and progress towards its climate commitments.

The subsidiary of JSE-listed entity, Anglo American, has set near-term emission reduction targets that aim to reduce, by 42 per cent, Scope 1 and Scope 2 emissions by 2030 and absolute Scope 3 emissions by 25 percent within the same timeframe. In setting the targets across all three scopes, which have been validated by the Science Based Targets initiative (SBTi), De Beers is extending its climate ambition over and above its existing commitment to be carbon neutral across Scope 1 and 2 emissions by 2030.

"At De Beers," says Hund, "we are working to meet and surpass the targets, using our three strategic levers of 'reduce, replace and remove', with the category of 'reduce focused on improving efficiencies by innovating and applying the newest technologies'. By being more efficient, we can lower the quantity of emissions produced. For instance, when we operate at peak levels of efficiency, we use less electricity and diesel, which translates to cost savings. Importantly, as we move towards a lower carbon footprint, we unlock several benefits for the company, communities, and the planet."

Clean energy drive

Although the miner is on a speedy drive to move away from fossil fuel-based electricity towards renewable energy, given that most of De Beers

By electrifying equipment at Venetia Mine, De Beers is improving its level of efficiency.

operations are in Africa means that its mines are grid-tied and powered by fossil fuels, which constitutes a large chunk of its emissions.

In a bid to ramp up its uptake of renewable energy, the diamond miner has partnered with parent company, Anglo American, to progress renewable energy (solar and wind) initiatives in and around its areas of operation.

Anglo American in partnership with EDF Renewables recently formed a jointly owned company, Envusa Energy, to develop a regional renewable energy ecosystem (RREE) in Southern Africa, which will see the miner realise 600 MW of wind and solar projects in the first phase.

As such, the miner is busy with the development of a wind farm at its Namdeb operations in Namibia and a solar farm at its South African Venetia mine

Hund explains that the company is also seeking nature-based solutions to aid in removing carbon from the atmosphere, to offset remaining hard-to-abate emissions as it works to eliminate as much as 70% of its carbon emissions through absolute reductions.

"De Beers understands that for its business and host communities to thrive, it must protect the natural world and follow best practices for biodiversity and water management, air quality, greenhouse gas emissions, waste and mine closure and rehabilitation."

To this end, as a first project, the miner has invested US$2 million in a startup – Kelp Blue, a Netherlands-based company – pioneering the planting of large-scale giant kelp forests off the coast of Namibia to help restore the natural ocean wilderness, while capturing excess CO_2 from the atmosphere.

It is estimated that kelp forests can absorb carbon up to 50 times faster than land-based forests.

"The aim," Hund continues, "is to harvest the kelp to produce a bio-stimulant, which will be used in agriculture. Interestingly, one of the key characteristics of kelp is that it absorbs a significant portion of the carbon produced by humans. The project is an

"De Beers understands that for its business and host communities to thrive, it must protect the natural world and follow best practices for biodiversity and water management, air quality, greenhouse gas emissions, waste and mine closure and rehabilitation."

De Beers Group is aiming to be carbon neutral by 2030.

Solar panels on the roof of De Beers Group Industry Services Building.

example of a nature-based solution being adopted by De Beers that not only helps address our climate goals but also supports skills development and job creation in Namibia."

De Beers Group invested US$2million in Kelp Blue to help restore the natural ocean wilderness.

The start-up is fast becoming an engine for growth and innovation in the area, estimated to create about 300 jobs in Lüderitz and providing much needed employment to the local community.

The programme is receiving high level interest from masters and PhD students and encouraging the uptake of a whole new generation of Namibian oceanographers. Kelp Blue has also set up the Blue School, which teaches local children to appreciate the wonders of the natural world, with a particular focus on the desert and marine environments of Lüderitz. It has also developed an initiative that teaches local children to swim. In an area where there are few opportunities to learn to swim, children drown each year. The start-up has also initiated an ocean education programme to educate coastal communities on ocean related aspects. "The Kelp Blue project is an extremely inspiring and innovative one," says Hund.

Aside from adopting equipment that runs on clean energy sources, including hydrogen trucks piloted by Anglo American, the miner is also evaluating the option of using synthetic fuels as they are cleaner and significantly improve efficiency levels.

Another interesting initiative is a diesel replacement pilot project Debswana is executing with the University of Botswana, which entails testing the use of beef tallow as a feedstock for biofuel.

Further to this, De Beers has committed to working with suppliers in its value chain to further reduce its Scope 3 emissions. By calling on its suppliers to reduce their carbon footprints, the miner is thus influencing its entire mining value chain.

"A large part of our Scope 3 emissions come from the equipment we use, as well as the raw materials, such as steel and cement. To achieve the 25% reduction of our Scope 3 emissions target, De Beers is negotiating and signing MOUs with key suppliers to fulfill the biggest part of our Scope 3 emissions reduction commitment," explains Hund.

Further to this, the company is evaluating several initiatives, including partnering with the local community to advance sustainable farming and agriculture.

"In a broad sense, we consider prudential, regenerative agriculture and other such projects that will help us sequester carbon emissions. As we continue to innovate and implement projects, we are also constantly recalibrating to ensure our programmes are holistic and deliver to what we set out to deliver," says Hund.

Venetia – a poster child for sustainability

The miner, which is ramping up development of the Venetia Underground Project (VUP) and delivering its first underground production in the second quarter of this year, has a number of initiatives in place, including those related to reducing emissions in Scope 1 (related to direct emissions) and Scope 2 (related to indirect emissions emanating from the use of fossil fuel generated electricity) at the mine.

According to Louw Swartz (energy and carbon manager), De Beers is committed to achieving Scope 1 and Scope 2 carbon neutrality at Venetia by 2030, with the mine expecting to reduce its carbon emissions from 380 000 t-CO_2e per annum to 25 000 t-CO_2e per annum by 2030 through efficiency initiatives and fossil fuel and fossil electricity replacement initiatives. In addition, the mine is currently considering several carbon capture and offset initiatives as part of its strategy to abate the remaining 25 000 t-CO_2e and achieve carbon neutrality in 2030.

From an Opportunity Scoping pipeline of some 30 initiatives, De Beers has prioritised around 12 Key

Scope 1: Direct emissions
These are emissions from sources owned or controlled by the company directly, as well as emissions produced from on-site process chemistry. Scope 1 includes four categories of emissions sources: stationary combustion, mobile emissions, process emissions and fugitive emissions.

Scope 2: Electricity indirect emissions
These are emissions from purchased or acquired electricity, steam, heat, and cooling consumed by the industrial site. They are indirect as the emissions themselves occur at the point of generation.

Scope 3: Indirect emissions within a company's value chain
This includes all other indirect emissions that are a consequence of the activities of the company but occur from sources not owned or controlled by the company. For example, extraction and production of purchased materials, transportation of purchased fuels and use of sold products and services.

Venetia Mine is also considering several sustainable alternative fuel options.

Opportunities that have been quantitatively ranked in terms of emissions abatement, energy reduction, payback period, reliability of technologies to deliver and technology readiness, and ease of implementation, that the miner is in the process of executing.

"De Beers is looking to abate as much as 15% of its Scope 1 and 2 emissions at Venetia Mine through energy efficiency measures. In addition, electrification and renewable replacement measures will play a major role. With the transition to underground mining most of Venetia's energy consumption will shift to electrical energy – as much as 85%, where previously, when the project was an open pit mine, 80% of the portfolio was powered by diesel and fossil fuels and only 20% by electrical energy. Plans are also afoot to adopt battery electric and tethered electric equipment for underground mining," explains Swartz.

By electrifying equipment at Venetia mine, De Beers is improving its level of efficiency not just enabling replacement of energy with renewable sources.

"A battery electric loader or truck is about 52% to 55% more efficient than a diesel-powered counterpart. Underground mining typically has lower duty cycles than open-pit mining and allows for the implementation of battery electric trackless mobile machinery. Venetia Mine is aiming to adopt battery electric production equipment as opposed to diesel equipment as part of its electrification strategy review. This includes addressing the infrastructure requirements, such as charging stations. In another example, we are planning to trial a battery electric LDV later this year. Although we know that OEMs are likely to produce off-the-shelf battery electric LDVs, we want to investigate the option of retrofitting our second-hand chassis and converting them to battery electric LDVs in order to ensure feasible transition by 2030," explains Swartz.

Hund notes that in areas where it is difficult to eliminate emissions generated by fossil fuels, the objective is to reduce the emissions count to as low as possible.

Other initiatives being executed at Venetia Mine include the implementation of Advanced Process Control (APC) measures in its processing plant and the vent-on-demand system in the VUP, which delivers optimum levels of ventilation to designated areas.

"Essentially, we are changing the way we operate at Venetia – which will be extremely positive for reducing our carbon footprint," says Swartz.

Meanwhile, De Beers is partnering with Anglo American as an off taker of wheeled renewable energy to site, and is in the pre-feasibility stage of establishing a 50 MW solar facility near the mine, which will provide significant renewable energy penetration for the delivered power to the VUP.

The solar energy project will unlock opportunities for behind the meter (BTM) power to ensure security of energy supply at Venetia.

"BTM allows for more security of supply, further reduces energy charges and also helps with availability of emergency energy," explains Swartz.

He adds: "We have done some really good work in terms of understanding our requirements and how to go about achieving these at Venetia underground mine. Importantly, a couple of measures have been implemented even before the project comes online. To ensure that we are achieving the energy savings we set out to, we have Energy Management Information systems to track and help validate our progress against our Carbon Neutrality Pathway," he concludes. ■

BTM system

A BTM system provides power that can be used on-site without passing through a meter, whereas the power provided by a front-of-meter system must pass through an electric meter before reaching the end-user.

Spotlight on Multotec's Sally Khambule

Sally Khambule is Multotec Sales & Field Service Manager.

Multotec South Africa, an industry leader in metallurgy and process engineering, remains focused on progressing diversity in the workplace and advancing gender equity. The East Rand-based company currently employs 333 women in South Africa alone, constituting 22% of its workforce, Sally Khambule, Multotec Sales & Field Service Manager tells *Modern Mining*.

"I believe this is good progress considering the overall statistics for the number of women in mining stands at just 12%. We currently have well implemented Employment Equity (EE) plans in place. We have set targets aimed at increasing the representation of women in our workforce, and I am actively involved in the EE committee. Our workforce comprises skilled women in positions including management, process engineers, sales engineers, research and development, and machine operators."

According to Khambule, various practices can be implemented to increase the number of women in the mining industry. These include setting targets for gender representation and implementing hiring and training programmes specifically for women.

"It is also important to promote work-life balance by offering flexible work alternatives that accommodate women's needs. By making the sector more accessible and attractive to women, we can encourage their participation and contribution. Women should believe in their capabilities and pursue their desired fields of study and careers in mining."

Although there has, in the past few years, been steady growth in the number of women in mining careers, the main challenge is the retention of women in the industry.

Discussing some of the challenges women face in the male-dominated industry, Khambule says the stereotype that men 'take charge' and women 'take care' puts women leaders in various double binds.

Multotec offers diversity and inclusivity training to its employees to help them to understand the effects of gender stereotyping.

"For example, women are frequently judged as being too harsh, or too soft, and seldom just right. Women leaders are often perceived as competent or likable, but not both. Men may be seen as having a 'default' leadership style, requiring women to prove their leadership abilities. This effort can result in women having to work twice as hard as their male counterparts.

"At Multotec, we address these challenges by providing diversity and inclusivity training to help employees understand the effects of gender stereotyping."

She says it is interesting to note that perceptions related to female competency in the sector have changed in the recent past.

In general, women and men are considered equal in terms of competence; however, among those who do perceive a difference, most view women as more competent than men. Communal stereotypes have started to change, with women being portrayed as more compassionate, affectionate, and sensitive than men. On the other hand, men are sometimes still seen as more ambitious, aggressive, and decisive.

"The perception that leadership roles require more agency than communion has not substantially changed, and women may face disadvantages in relation to leadership due to ascribed lesser ambition, aggressiveness, and decisiveness. Nonetheless, as jobs increasingly reward social skills, women's greater communion can be seen as an additional advantage."

Khambule on site at Multotec.

feature

Multotec employs 333 women in South Africa.

Sally Khambule – a leader in the spotlight

Having grown up in a family of metallurgical engineers, Khambule was attracted to the mining sector early on in life.

Herself an extraction metallurgical engineer by profession, Khambule says that although mining is not considered a glamorous occupation, it offers excellent career opportunities.

"Through my experience in the mining industry, I have gained a wide range of expertise. Success is not accidental; it requires faith and hard work."

Khambule began her mining career in 2005 as a Management Trainee at Driefontein Gold. In 2006, she was awarded a bursary by AngloGold Ashanti to study her B-tech in Extraction Metallurgy, and in 2008 she was appointed as Metallurgical Engineer. In 2010, she moved into mining projects where she was responsible for implementation of the RIP project.

In 2013, Khambule joined DRD Gold as a Plant Superintendent of the new flotation plant.

The core areas accredited to her experience included managing processing plants, commissioning, running pilot plants and projects, and conducting field services.

She joined Multotec in 2016, bringing her substantial wealth of experience to the company. Khambule represents Multotec as the Rubber Sales & Field Services Manager, serving customers in South Africa, Botswana, Lesotho, Zimbabwe and Namibia.

Discussing the value of her mining experience to her job at Multotec, Khambule says it allows her to bring valuable solutions to assist the plants in achieving their production targets. She has been in plant operations for about eight years.

Multotec's workforce includes skilled women in management, sales and process engineering, production, research, and development, and more.

Multotec has set targets to increase the number of women in its workforce.

So how does she handle discrimination in the workplace? "I don't take gender discrimination personally; instead, I challenge it. If someone is being too hard on me, I respond with confidence in my abilities as a hard worker. I believe in treating people well and not engaging in unnecessary confrontation. When you treat others with respect, you are more likely to be treated well in return." ■

Agency vs Communion

Agency refers to an individual striving to master the environment and to assert the self, whereas communion refers to a person's desire to relate closely to, and cooperate and merge, with others.

Sally Khambule, Multotec Sales & Field Service Manager

- ❑ As a triple qualification holder, she follows her business philosophy, nothing beats hard work.
- ❑ Khambule holds the following qualifications: BTECH Extraction Metallurgy, Intermediate Programme for Management Development (UCT BS), and Programme for Management Development (GIBS).

De Beers Group creating a better organisation

De Beers Group is strongly committed to promoting gender diversity within the mining industry. Jackie Mapiloko, Senior Communications Manager at De Beers Group Managed Operations, spoke to *Modern Mining* and emphasised the company's belief that having women in the workplace is not just about gender representation but also about creating a better organisation.

Jackie Mapiloko, Senior Communications Manager at De Beers Group Managed Operations.

Lerato Radebe has been the Vessel Manager for the mV Coral Sea since 2011.

Sherene Salmon is an Electrical Engineer at De Beers Marine.

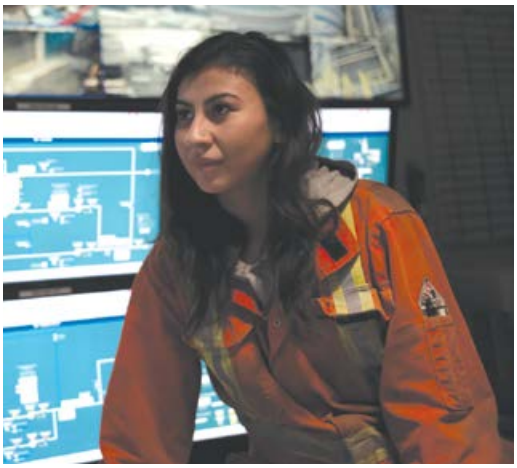
Violet Molala is the first female Section Manager for Top of Mine at Venetia Underground.

"There are some real business and societal benefits to be gained from the greater diversity of experience, skills, and insight that women present," Mapiloko says. To achieve their goals, De Beers Group implemented various initiatives and strategies some time ago, and forward-looking targets were set to enable the organisation to achieve equal opportunity and gender parity by 2030.

"Key activities to support gender parity are really about strengthening our pipeline and recognising the intersectional issues that impact women," she explains. "This includes better understanding the needs and experiences of individuals and encouraging them to feel safe to raise concerns."

De Beers Group has forged valuable partnerships with renowned organisations like UN Women and WomEng to bolster their endeavours in promoting gender diversity. Mapiloko emphasises the significance of these partnerships: "As part of our commitment to achieving gender parity in our workforce, we extended our partnership with UN Women while our partnership with WomEng focuses on supporting women and girls to pursue careers in STEM fields, expanding the programme's reach across De Beers Group's producer countries."

"We will also roll out WomEng's Emerging Leader Programme internally to help support, retain, and promote women in technical roles as we work towards achieving gender parity," Mapiloko adds.



A De Beers Group apprentice in the processing plant control room at Gahcho Kué Mine in Canada.

A female mechanical assistant signalling to a haul truck at Venetia Mine in South Africa.

feature

beyond gender representation

Within the company, De Beers Group has implemented measures to attract and retain women in various roles. The organisation has developed an inclusion and diversity policy commitment, provided unconscious bias training and offered guidance on inclusion and diversity in hiring processes.

De Beers Group recognises the significant contributions made by women in their mining operations. Mapiloko shares examples of women who have excelled within the company, including Violet Molala, Lerato Radebe, Razia Adam and Sherene Salmon. These women have demonstrated expertise, leadership, and commitment to their respective roles, positively impacting the company and furthering its goals of gender diversity and inclusion.

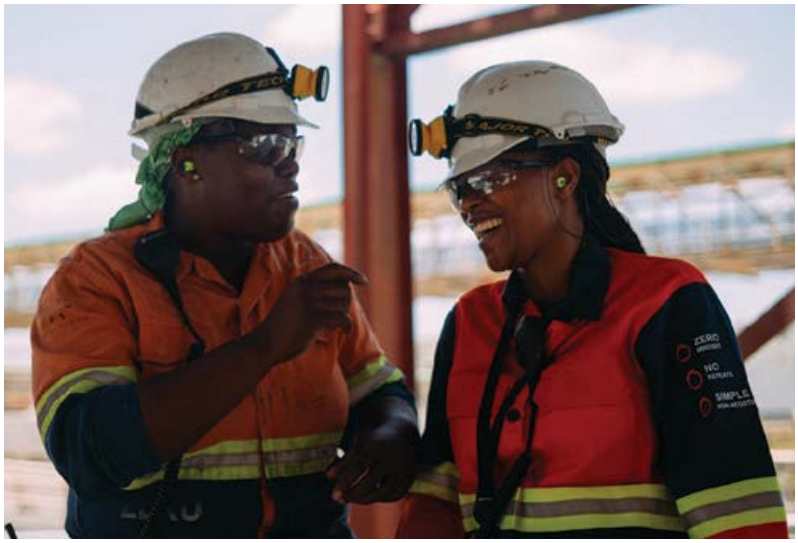
To ensure equal opportunities for career advancement, De Beers Group prioritises learnerships and learning programmes to empower their employees, especially women, with relevant skills. Additionally, the company has established a programme that identifies key female talent and provides them with board experience to broaden their knowledge of the business.

De Beers Group actively engages with schools, colleges and communities to encourage young women to consider careers in the mining industry. Here, they collaborate with WomEng to host workshops and mentoring programmes, enabling young girls to learn from women in technical roles. Through these initiatives, De Beers Group aims to provide opportunities and expose young women to potential careers in STEM fields.

To track progress in gender diversity and inclusion, De Beers Group uses metrics and key performance indicators. They participate in the HeForShe campaign and as a HeForShe Champion, the CEO of De Beers Group provides an annual progress report to the HeForShe Alliance Impact Report, ensuring accountability for their commitments.

Looking ahead, De Beers Group has set future goals and aspirations regarding gender diversity and women's representation within the mining business. They aim to focus on psychological safety, inclusive leadership and the development of action plans based on employee feedback. The company targets achieving specific representation percentages by 2025 and gender parity by 2030.

"In conclusion, De Beers Group's commitment to gender diversity and inclusion in the mining industry is evident through its initiatives, partnerships and support for women's professional growth. By promoting equal opportunities and recognising the contributions of women, as a company we strive to create a diverse and inclusive work environment while driving business excellence, Mapiloko concludes. ■



Above: Female miners in conversation at the Venetia Mine processing plant.

Left: A female environmental scientist in the laboratory at Gahcho Kué Mine in Canada.

Showcasing female talent at De Beers

Violet Molala is the first female Section Manager for Top of Mine at Venetia Underground. Her previous role as a miner overseer and experience in leading large shaft sinking projects contributed to her success. Violet's approach involves planning and executing the company's goals, driven by the motivation to see the organisation grow and achieve personal success.

Lerato Radebe has been the Vessel Manager for the mV Coral Sea since 2011. She joined De Beers in 2005 as a metallurgist and played a pivotal role in successfully transitioning the Coral Sea from sampling to a fully operational mining vessel. Lerato emphasises the importance of embracing equity and providing women of all races with opportunities to contribute diverse perspectives to the future of the business.

Razia Adam, a Research Scientist at Ignite SA, is passionate about science and engineering. She believes women bring a unique perspective and skill set to STEM and engineering, which have historically been male-dominated fields. Razia actively promotes awareness of opportunities within STEM and engineering for students from underprivileged universities.

Sherene Salmon works as an Electrical Engineer at De Beers Marine. She is part of a dynamic team providing engineering support to Debmarine Namibia's offshore mining vessels. Sherene is committed to lifelong learning and seizing opportunities. She takes pride in breaking barriers and honouring women who have paved the way, while also inspiring future generations of women.

Giving women a seat at the table

Tarynn Yatras, Head of Sales and Services - Africa Screening Solutions at Sandvik Rock Processing.

Mining has certainly seen more gender diversity in recent years, attracting significantly more women into the ranks of mines and their suppliers; now the challenge is to retain women in the sector, to grow in their roles and optimise the value they can add.

This is according to Tarynn Yatras, Head of Sales and Services – Africa Screening Solutions at Sandvik Rock Processing, who says it is clear that diversity within any organisation adds to the quality of decisions and bottom-line outcomes.

"Gender diversity is an important aspect of achieving these outcomes," says Yatras. "The mining sector has generally embraced this vision, with many companies setting targets for the future."

Sandvik Rock Processing aligns its targets with those of the global Sandvik group, whose sustainable business goals for 2030 include raising the proportion of women in managerial positions to one third. She highlights, though, that the real work is to create an environment where women actually want to work and develop their skills.

"It is a journey of developing an inclusive culture at work – where women feel valued, where they want to make a career contribution, and where they have the opportunities to grow," she explains. "This includes 'having a place at the table' to affect decisions in a meaningful and constructive way."

This involves many small but continuous interventions and initiatives, which together create the foundation for diversity starting, for instance, with the hiring process. Studies show that women – more than men – tend to avoid applying for posts if they are not fully compliant with the stated requirements, she notes. Relatively simple adjustments to the way jobs are advertised can help to attract more applications from suitably qualified women with much to offer.

"Attracting women to the sector can be challenging, as mining work is often associated with manual roles," she says. "This is becoming less of an issue as mechanisation and technology transform many mine processes."

Sandvik's bursary, internship and apprenticeship schemes help to attract young women into the business and industry. She emphasises the importance of making the workplace more conducive to women so they are retained once they have joined the ranks. This has already shown results in Sandvik's Africa Screening Solutions team, she says, where women occupy almost 50% of the managerial roles.

"In addition to my role, women also fill roles such as sales manager, central services director, human resources manager, legal manager and aftermarket sales support," she says. "Women are well represented in our sales team, which includes metallurgists and mechanical engineers; this is exciting progress which shows how we lead by example."

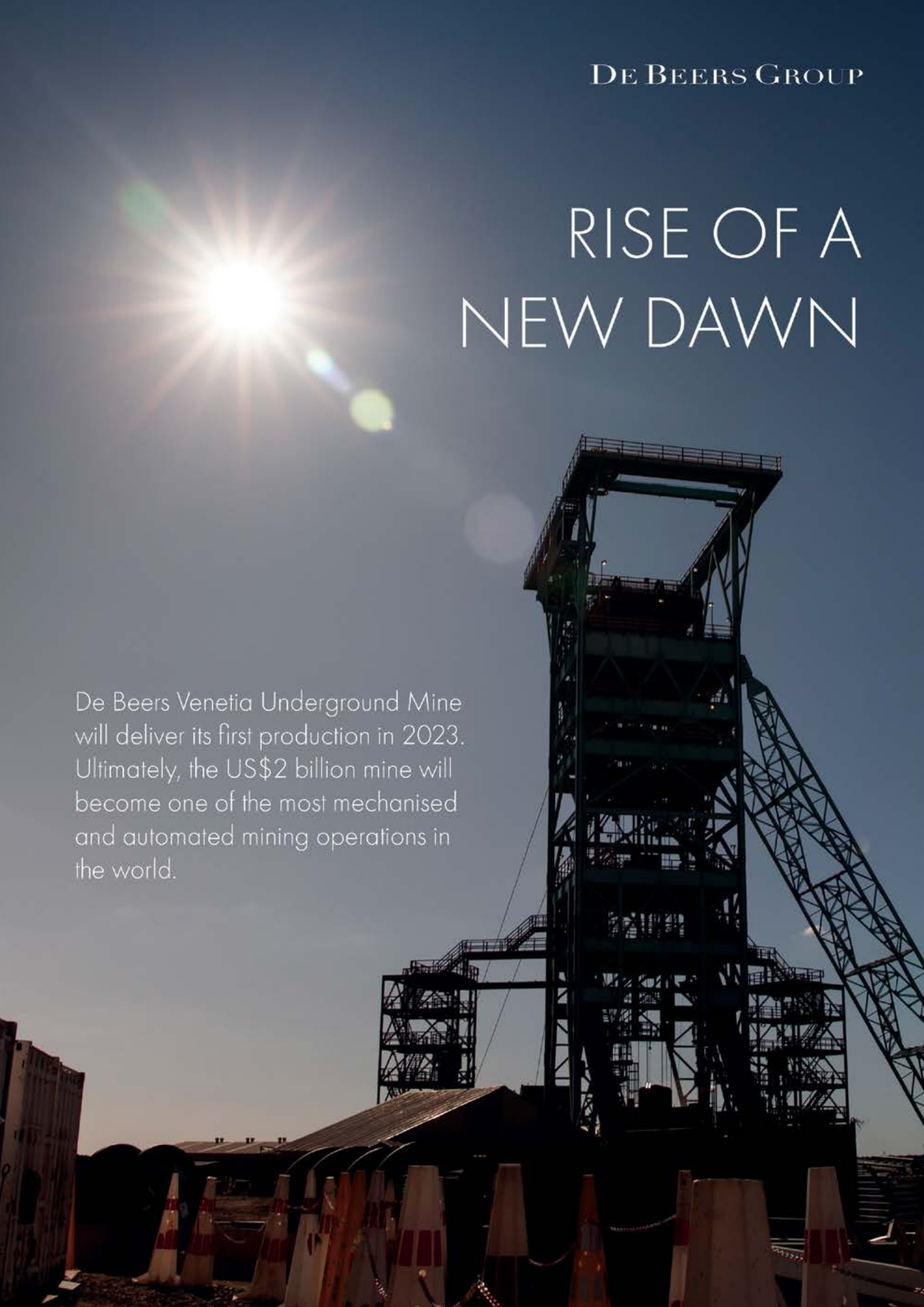
Part of the evolving work culture for better retention is to provide appropriate support for employees to balance their family roles. She notes that childcare roles are currently often more demanding for women than for men. Sandvik's approach is to find productive and flexible solutions that allow women to return to their careers after childbirth – thereby building on their experience and value to the organisation. ■

Women fill many roles at Sandvik Rock Processing - from left, Frengelina Mabotja, Sales Manager SA; Refilwe Makge, Capital Sales Engineer; Nickey Roe, Aftermarket Manager, Ntabeleng Mphahlele, Capital Sales Engineer; Minah Shezi, Aftermarket Assistant Internal Sales, and Tshililo Khameli, Aftermarket Engineer.

feature

DE BEERS GROUP

RISE OF A NEW DAWN



De Beers Venetia Underground Mine will deliver its first production in 2023. Ultimately, the US$2 billion mine will become one of the most mechanised and automated mining operations in the world.

Axis House celebrates women empowerment and leadership on Women's Day in South Africa

The Axis House Group is a leading provider of innovative chemical solutions for the mining industry to enhance mineral recovery, reduce operating costs and improve sustainability in mining operations worldwide.

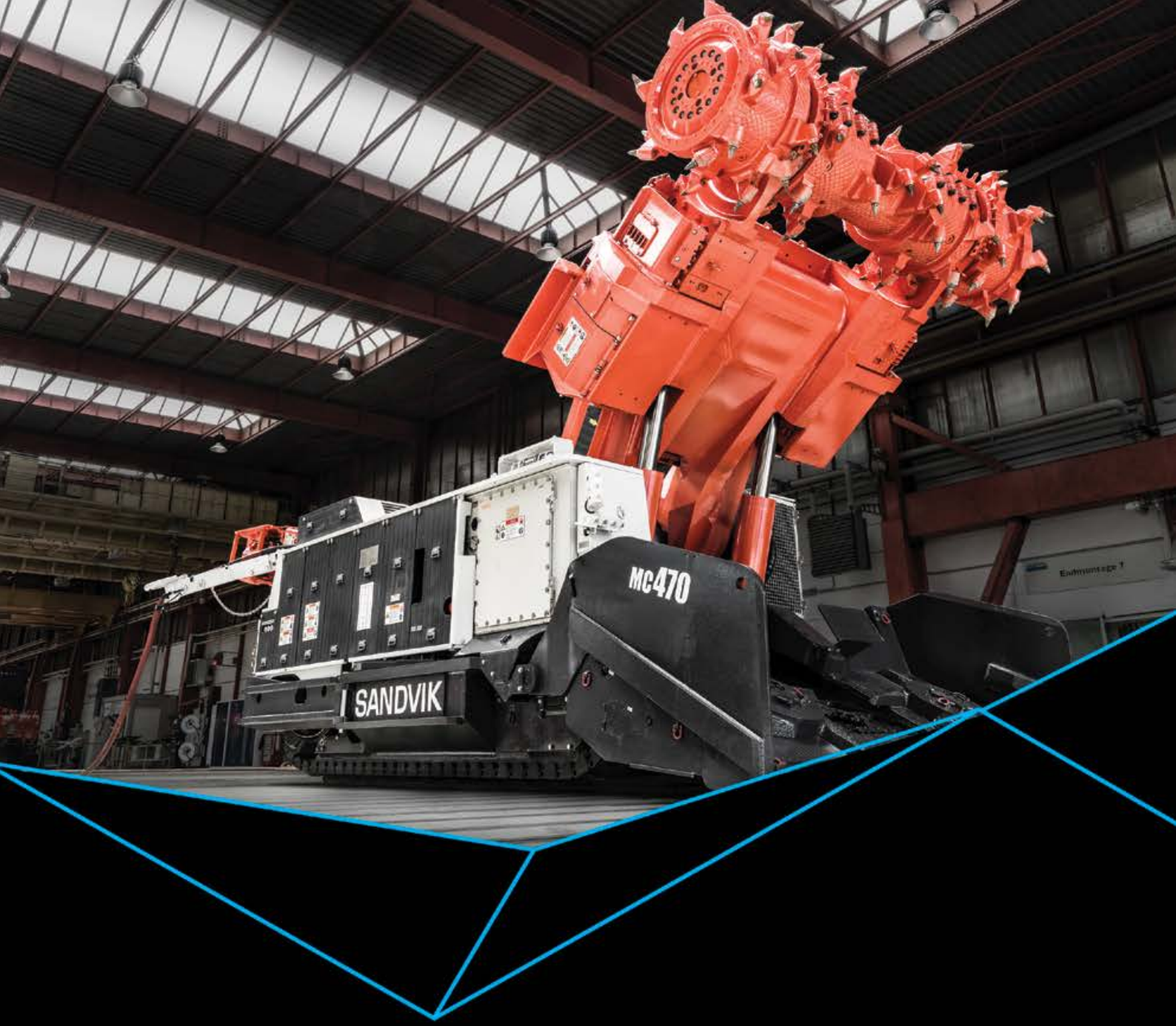
Axis House, committed to empowering women and providing them with every opportunity to excel, is proud to highlight the significant contributions and achievements of women in the company. The company is thrilled to have a majority of women in essential leadership positions, showcasing their expertise, dedication and resilience. Their leadership has been instrumental in shaping the growth and success of the company.

Axis House is committed to empowering women and providing them with every opportunity to excel.

Under the guidance of CEO, Justine Stubbs, Axis House has thrived and expanded its services, setting new industry benchmarks. Ms. Stubbs, an exceptional leader with a wealth of experience, has been instrumental in steering the Axis House Group towards achieving its goals. With a global presence and a commitment to excellence, Axis House continues to play a pivotal role in advancing the mining industry.

On the occasion of Women's Day, Axis House extends its warmest wishes to all women in South Africa. We acknowledge the immense contributions women make in every aspect of society and express our gratitude for their continued efforts and accomplishments. ■

feature



THE MECHANICS OF MINING MORE

SANDVIK MC470 CONTINUOUS MINER

With 540 kW installed cutting power for unrivaled productivity, the Sandvik MC470 continuous miner is the ideal choice for room and pillar coal mines, salt and potash mines and operations that demand the highest cutting force. The heavy machine weight supports bidirectional shear-up cutting, reducing cycle time.

The miner effectively integrates proven technologies to offer high advance rates under tough mining conditions and in restricted spaces while the low cutting speed minimizes dust generation and the high-capacity on-board filtration and suppression reduces dust exposure

LEARN MORE
ROCKTECHNOLOGY.SANDVIK

SANDVIK

Adapting and thriving: how suppliers navigate

Within the mining industry, suppliers need to be adaptable and responsive, tailoring their products and services to meet distinct application needs. Moreover, they must conform to rigorous safety standards, emphasising the demand for dependability and superior performance in their solutions.

David Claassen, Managing Director of Trafo Power Solutions.

Francois Marais, Director Sales and Marketing at Pilot Crushtec.

Sazi Madala, Marketing Manager at Zest WEG.

Modern Mining engaged with various companies across the sector to gain insights into how the evolution of the mining industry has influenced their products and services offerings, and how they successfully meet the demands of this demanding industry sector.

Zest WEG Marketing Manager, Sazi Madlala says the evolution of the mining sector has driven the organisation to innovate and enhance its product offerings, developing more robust and durable equipment to withstand the industry's harsh operating conditions, and ensuring longevity and reliability.

"In response to rising operational costs, we have focused on improving the efficiency of our products, helping mining companies lower their expenses. Moreover, to meet the demand for local production, we have increased the local content in several of our products, supporting the industry's objective of achieving higher local spend," he says.

Agreeing with the need to continuously innovate and adapt products is Steve du Toit, Sales Manager at dewatering pump specialist, IPR. "We represent global pump OEMs like Atlas Copco and Toyo, who both continue to incorporate advancements in pump technology in their products enhancing efficiency, durability and environmental sustainability. We have also developed specialised dredging solutions to address the evolving needs of mining operations, such as the increasing focus on resource recovery and water management."

Sandvik Rock Processing continually evolves its offerings covering crushing, screening, and service solutions. Tarynn Yatras, Head of Sales and Services – Africa Screening Solutions, emphasises the company's commitment to integrating the latest technology into its products and devising solutions-oriented offerings that help customers meet their production targets efficiently and cost effectively. She says the equipment is engineered to deliver high productivity and is suitable for any size-reduction challenge.

"Sandvik prioritises safety, engineering its equipment to maximise mean time between failures and minimise maintenance stops, prolonging wear part life, driving efficiency and improving safety. The company's wide expertise ranges from greenfield mining projects to expansions and multi-equipment replacement projects, while also providing key genuine components and a variety of crushing and screening wear parts," she adds.

"We have many cases of how mining has influenced our products and we believe the most important are from an aftermarket perspective. These range from offering a 5 year/10 000 EPS warranty on our equipment to our 24-hour standby spares and support service offering," says Francois Marais,

Sandvik Screens, including Kwatani and Schenck products, are high performing screens which ensure high load capacity, improved wear life and lower operating costs.

the evolution of the modern mining industry

Director Sales and Marketing at Pilot Crushtec. "We understand our clients and know the pressures they're under to produce and, as partners, we have a responsibility to ensure that our services and parts are readily available to assist in limiting downtime."

Commenting on the drive from mines to reduce carbon emissions, Marais says that Metso's latest range of mobile crushers are hybrid/dual power machines designed to embrace energy innovations and reduce emissions. "Several of these units are already operational in the field, powered by green energy sources, and there is a consistent theme of lowering diesel consumption and reducing waste across our new product range, which features LED lights to cut fuel use and direct drive on mobile crushers for further consumption reduction."

"An important evolution is the increased focus on safety combined with environmental priorities, and we support this trend through the supply of inherently safe dry-type transformers," says David Claassen, Managing Director of Trafo Power Solutions. "Further, the vision of a low carbon future demands the ramp up in production of a range of battery minerals with considerable pressure to bring projects on stream rapidly. We support this imperative through our short lead times for modular substations and other products, helping to accelerate the pace from concept stage to operation of new mines and expansion projects."

"With safety being an imperative, our pumps are designed with built-in safety features such as robust construction, reliable sealing systems, and protective mechanisms. Apart from ensuring our products meet industry standards and safety regulations, we

Above: Trafo Power Solutions supplied three specialised dry-type transformers to a gold mine.

Left: The Lokotrack® LT120E™ mobile jaw crusher, from Pilot Crushtec, is a hybrid crushing plant with e-Power which can be operated by plugging into an external network or by the 420 kVA onboard diesel generator.

Zest WEG handling the logistics to remote mining sites in Africa.

The Lokotrack® LT300HP™, from Pilot Crushtec, features the Nordberg® HP300™ cone crushing unit, which provides optimised performance, efficiency and high capacity in crushing.

also provide proper training and guidelines to customers on the safe operation and maintenance of our equipment," Du Toit says.

He explains that IPR employs stringent quality control measures throughout the production process to ensure the durability and robustness of products. High-quality materials are used, rigorous testing is conducted and advanced engineering techniques are employed by the pump OEMs.

"Additionally, we collaborate closely with customers to understand their specific requirements and customise our solutions accordingly, ensuring optimal performance and longevity in challenging mining environments," he adds.

Marais agrees that safety remains a fundamental and says the company's equipment includes many safety features. "As a basic example, our conveyors include guarding, wrap around walkways, angle iron handrails and trip wires. These may seem like small and insignificant extras but for mine safety officials they're essential to ensure site safety," he explains. "Our mobile machines come equipped with IC Units to assist in compliance for delayed start-ups, and alarms to ensure that any mobile equipment operated on mines complies with safety standards."

Quality control at Pilot Crushtec is strictly controlled and the same applies to OEMs from whom the company imports equipment. Marais says the company works very closely with its OEM partners to ensure feedback is provided from practical use of the equipment and continuous development takes place to make equipment as robust and reliable as possible.

Madlala says that, given the unique safety challenges in the mining industry, Zest WEG ensures its products adhere to the highest safety standards. "To guarantee the durability and robustness of our products, we invest in modern designs and strict quality control during the manufacturing process. With at least 2% of WEG's revenue spent on R&D, we consult various stakeholders, including those in mining, to ensure our products meet top-end requirements. Our products are also manufactured and fully tested in accordance with various international and local standards."

Commenting on the challenges of operating in Africa, Yatras says "Logistics across the African continent remain a challenge, as do energy constraints, and rising manufacturing costs are something we constantly have to focus on to ensure we are a reliable supplier."

Du Toit says IPR has a well-established logistics network and partnerships to handle the transportation of large or complex machinery to remote mining sites. "We work closely with experienced freight forwarders and logistics providers who specialise in handling heavy equipment, and this ensures our pumps and ancillary equipment are delivered safely

Sandvik Crushers combine extremely high performance with low total cost.

and efficiently to even the most remote mining locations, meeting project timelines and minimising disruptions," he says.

"Even with over four decades of experience supplying the mining industry in Africa we recognise the logistical challenges and do not by any means take them lightly," says Madlala. "We handle the logistics to remote mining sites in Africa by planning meticulously, engaging with local partners, selecting the appropriate transportation modes, ensuring proper packaging and documentation, coordinating transportation, preparing the site, providing training and support, and establishing post-delivery maintenance and support systems."

Commenting on what the future holds, Marais says that more and more of Pilot Crushtec's clients want modular solutions as opposed to spending time and resources on bespoke plants due to the length of time it takes to have something custom built, and the costs associated with these plants. "Modular plants allow for fast dispatch, installation and commissioning for clients to capitalise when prices justify it," he explains.

Du Toit says a significant industry trend that will impact IPR's business is the increasing emphasis on sustainability and environmental responsibility. "As mining companies strive for greener practices, we anticipate a growing demand for energy efficient and eco-friendly pump solutions. Additionally, we believe that the integration of digital technologies, automation and data analytics will continue to shape the industry, driving the need for smarter and more connected pumping systems."

Yatras agrees with this and says the digitalization drive and sustainability will continue to be an integral focus. "How our products can contribute to minimising climate impact and improving resource efficiency will be an increasing focus. Reducing the amount of energy and water consumed in comminution by setting up energy efficient dry comminution circuits will contribute directly to the industry's target of sustainable comminution, protecting the environment and reducing operational costs," she explains.

"There are numerous trends; however, the key trend for us is the need to apply innovation and we launched WEG Motion Fleet Management to bring more practicality and agility to the operation, maintenance and management of industrial plants," Madlala says. "This is the ideal solution to monitor and raise the availability of the industrial fleet. Based on "cloud computing" technology, asset monitoring can be followed at any time and from anywhere in the world."

Claassen says that despite the low-maintenance design, Trafo Power Solutions aids customers in closely monitoring the condition of their dry-type transformers. "This is to optimise uptime through proactive maintenance and, as part of our service offering, we are developing systems for remote monitoring of transformer performance and beyond." ■

The Atlas Copco PAC H64 diesel driven pump is ideal for high head applications.

The design of dry-type transformers from Trafo Power Solutions allows them to fit easily into any space and deliver the power needed in the mining environment.

Company expertise

- IPR plays a vital role in the mining industry by supplying various types of pumps and specialised dredging solutions. The company's products are essential for dewatering, slurry management and material recovery in mining operations, and offer the sector reliable and efficient pumping equipment that helps maintain optimal working conditions and maximises productivity in mines.
- With Pilot Crushtec's focus on aftermarket support, the company sees its role more as an advisor and partner in the industry. The company is the OEM of a range of modular and mobile crushing, screening and materials handling equipment and is the authorised distributor for a number of brands including Metso.
- Sandvik Rock Processing Solutions provides a comprehensive range of cutting-edge equipment, tools, parts, services and solutions for processing rock and minerals and that are designed to increase customer productivity and boost the bottom line. These include stationary crushers, screens and feeders (including Kwatani and Schenck products) as well as mobile crushers and screens.
- Trafo Power Solutions is a player in the low voltage (LV) and medium voltage (MV) electrical space, providing products, solutions and application engineering. Its offerings include dry-type transformers, mini substations and modular substations, also known as e-houses. Substation solutions are customised to suit specific requirements in terms of LV distribution, LV motor control centres, transformers and MV switchgear.
- Zest WEG with its comprehensive range of offerings plays a vital role in enhancing various mining processes including process automation, crushing, milling and other processing operations. This offering includes electrical equipment and solutions from power generation, transmission and distribution, control and automation, electric motors and electrical infrastructure installations.

BBE Projects to construct refrigeration plant for Northam Platinum's Zondereinde Western Extension Project

BBE Projects, a specialist in the design, engineering and construction of mine ventilation, refrigeration and cooling systems, is currently executing a turnkey project to design and construct a refrigeration plant and fan station at Northam Platinum's Zondereinde No. 3 Shaft Project.

The Zondereinde No. 3 Shaft Project, near Thabazimbi in the Limpopo Province, is platinum group metals (PGMs) miner Northam Platinum's major expansion drive that will see the construction of three new shafts on a block of ground on the Western Limb of the Bushveld Complex.

The flagship expansion project has already seen the completion of the No. 3 Shaft barrel development at a depth of 1 380 m, which will be equipped for personnel and materials handling, while another two shafts, still under construction, will handle ore and ventilation for the mine. The expansion is predicted to extend the mine's lifespan by an additional 30 years.

Andrew Branch, Director at BBE Projects, says the company was appointed to design and build the large surface refrigeration plant to chill service water and provide air cooling for the underground works, as well as an upcast fan station on the ventilation hole.

Andrew Branch, Director at BBE Projects.

Bespoke design

"Zondereinde No. 3 Shaft is currently one of the biggest projects in the South African mining industry and we are very proud to be a part of it. We are doing a tailored design for the mine, drawing on all the industry norms and our experience to give them

Northam Platinum's Zondereinde Western Extension Project 1.

Northam Platinum's Zondereinde Western Extension Project 3.

the right solutions," says Branch.

The three-year project will see BBE install ten refrigeration machines into the surface refrigeration plant, which will ultimately have up to 70 MW of cooling capacity. The company broke ground in October last year, starting with civil works for the major structures of the plant. This first phase of the project will be completed by November 2024, with work on the 12-month construction of the fan station set to start midyear this year. The second phase of the project will see additional work on the refrigeration plant, with final commissioning slated for mid-2026.

"Ventilation and cooling form an integral part of the operational plan for Northam Platinum's new block of ground. They would not be able to mine it without this new infrastructure," Branch explains.

Long association

Branch further elaborates that BBE's appointment to the project was based in part on the company's long association with Northam Platinum, with BBE having provided extensive consulting service to the mining house for many years, as well as constructing several cooling systems.

"Northam Platinum and its EPCM (Engineering, Procurement and Construction Management) contractor felt comfortable trusting us with this project, given our track record, experience and specialist skills," Branch adds.

"While the construction and technology used for this project are not unique, they are tried and trusted. Northam already has a large refrigeration plant on its existing No. 1 Shaft, and this new plant mimics that design. This is mainly for the purposes of commonality of spares and staff training."

Branch advises that no significant challenges have been encountered during the project to date, adding that the company collaborated with the mine and the EPCM to identify any potential pinch points early on, and address them. For example, the long-lead refrigeration machine equipment, that was sourced from the USA, was ordered early to give the Original Equipment Manufacturer (OEM) enough time to manufacture it, given global material shortages and a fragile supply chain.

"This is the largest single-build refrigeration plant project awarded in SA mining for a long time and BBE is delighted to have been given the opportunity to play such an integral role in the No. 3 Shaft Project," concludes Branch. ■

Kal Tire recycling facility achieves ISCC PLUS certification

Tyre manufacturer, Kal Tire's Mining Tire Group, recently received ISCC* PLUS certification verifying that its mining tyre recycling facility in Chile processes circular feedstocks.

"Kal Tire is committed to promoting a circular economy where recycled mining tyre products are given their highest and best use," says Dan Allan, senior vice president, Kal Tire's Mining Tire Group. "This ISCC PLUS certification ensures customers can confidently source our recycling facility's outputs knowing they're 100 per cent derived from waste materials."

Kal Tire's thermal conversion recycling facility.

At Kal Tire's facility in Northern Chile, end-of-life ultra-class tyres are converted to their base elements (carbon black, oil and steel) so they can be reused, instead of raw materials, in new products. The facility's thermal conversion processes use heat and friction to induce a process that sees virtually 100 per cent of the tyre reused.

The ISCC PLUS certification verifies that the Chile recycling facility meets the circular materials standards for reclaimed oil, carbon black and syngas using a mass balance chain of custody approach. ISCC is a global leader in standards development for chemically recycled sustainable materials. Kal Tire is one of just a few mining tyre recycling facilities in the world that the company is aware of, to have achieved ISCC PLUS certification for producing circular feedstocks— generating outputs that are 100 per cent ISCC PLUS compliant.

End-of-life tyres are converted to their base elements (carbon black, oil and steel).

As more and more organisations look to demonstrate the sustainability and circularity of their supply chain, Kal Tire's ISCC-certified products will provide third-party validation for customers seeking sustainable, circular materials. ■

*International Sustainability and Carbon Certification (ISCC)

Mill turns to Condra to recover lost production

Price should never be allowed to unduly influence a purchase decision. A wrong choice of capital equipment can prove costly not only in downtime and lost production, but also in unnecessarily increased expenditure when new equipment must be bought to replace the failed original. This caveat comes from Marc Kleiner, MD of crane manufacturer Condra, who says buyers should exercise caution if they notice tender appraisal paying undue attention to price rather than product capability and overall lifetime cost. He was commenting on a recent order to manufacture an overhead crane as replacement for a competitor's machine that failed inspection and load testing. The rapidly deteriorating crane is now adversely affecting production in the millhouse in which it is installed. The order for the replacement was placed by Natal Cranes, authorised Condra distributor in KwaZulu-Natal. In the same millhouse, Natal Cranes has been servicing a 10-ton Condra maintenance crane installed in 1987 on the same gantry. Condra received the order on June 6 and is committed to a delivery date of six weeks from drawing approval. The new crane will be a large machine of double-girder electric overhead design, spanning 21 metres and equipped with two hoists: a 35-ton main unit and 5ton auxiliary, delivering lifting heights of 15 and 16 metres respectively. Commenting on the order, Kleiner said the mill's need to replace a failed machine was a good illustration of lost production and additional expenditure being the direct result of a buying process where price exerted undue influence. ■

Condra supplies overhead crane as replacement for a mill.

ALCO-Safe launches newest version of ALCONTROL

The latest version of ALCONTROL Smart Connect.

Alcohol and drug testing equipment supplier, ALCO-Safe, recently launched the newest version of its workplace alcohol testing system, ALCONTROL Smart Connect. The unmanned breathalyser is mounted onto a turnstile to control entry of employees or can be mounted onto a wall as a self-test breathalyser for employees to test themselves prior to entry into their respective workplaces.

"For industries where repeated positive alcohol testing impacts work performance, and can result in job losses, voluntary alcohol testing is an important safety measure," explains Rhys Evans, MD at ALCO-Safe, "Voluntary alcohol testing is for employees who occasionally overindulge, giving them the opportunity to go home and avoid endangering themselves or their colleagues, should they experience a positive breath alcohol result."

"Where previously it was difficult to get a technician out to remote mining locations for installation, ALCONTROL is now extremely simple to install, and can be done by almost anyone with basic technical skills," Evans notes. ■

Booyco PDS opens door to digital twin technology

As mines realise the power of the 'digital twin' to help optimise surface operations, the field of Proximity Detection Systems (PDS) is set to play a central role in this technological journey. Booyco Electronics' Graeme Jardine explains how the data collected over the years through PDS now provides a valuable pathway to digital twin modelling.

"For many years, our PDS' have allowed customers to collect data on the movements of their mobile trackless machinery and their personnel. As the mining sector embraces the power of the digital twin approach, the value of this data is further enhanced as it can now be used to virtually model the optimisation options on a surface mine," he says.

Jardine explains that modelling allows the benefits of any operational improvements on a mine to be evaluated in advance of implementing them.

"Using a digital twin, mines can model a number of proposed scenarios and choose the one that is optimal for their operation," he says. To illustrate this point, he uses the example that through heat maps created via Booyco's Electronics Asset Management System (BEAMS) software suite a scenario depicting haul trucks experiencing excessive standing time waiting to be loaded. The mine can use digital twin modelling to investigate the detailed implications and costs of diverting some trucks to an added excavator or shovel. By quantifying costs and benefits more accurately, an informed decision can be made, making the best use of the available capital and resources – and positively impacting the bottom line. ■

Booyco's PDS opens door to digital twin technology.

Babcock hits the bull's eye with BULL construction equipment

Equipment supplier, Babcock, has partnered with BULL to become the exclusive supplier of BULL tractor loader backhoes (TLBs) and BULL skid steers in southern Africa. These products complement Babcock's existing construction equipment portfolio. Babcock is fully equipped to offer comprehensive construction and earth-moving solutions across all southern African industries as it meets the evolving needs of its diverse customer base.

BULL is a leading international construction equipment brand based in India and owned by the long-standing AV Group. David Vaughan, MD for Babcock's Equipment business, is excited to be providing top-class BULL TLBs and skid steers to the southern African market. He says Babcock has supplied, sold and maintained various brands of TLBs in southern Africa for over 20 years, which allowed for a natural and easy integration with BULL. "We are experts in construction equipment distribution and have in-depth technical understanding of these machines." He adds that besides the machines' superior quality, innovation and reliability, BULL's business philosophy aligns with Babcock's. "This exciting collaboration brings together Babcock's expertise in construction equipment distribution and BULL's reputation as a leading brand in the industry, offering customers in the region access to an exceptional range of machinery. With our extensive national network and unwavering commitment to exceptional support, we will ensure that BULL customers' needs are met with optimal uptime and operating effectiveness." ■

Babcock to become the exclusive supplier of BULL TLBs and BULL skid steers in southern Africa.

Hytec Fluid Technology gets new Branch Manager

Hytec Fluid Technology (HFT), a company within the Bosch Rexroth Africa Group of Companies, appointed Charles Cassell as Johannesburg Branch Manager effective 1 March 2023.

Before this promotion, Cassell's career at HFT encompassed External Sales Representative, Sales Manager and Divisional Manager respectively. Reporting to Werner Joubert, General Manager HFT, Cassell says he embraces the opportunity this promotion brings and will work strategically to promote and expand the branch. ■


Hytec Fluid Technology appoints Charles Cassell as Johannesburg Branch Manager.

Index to advertisers

John Deere's Demo programme **underpins** improved grader sales

The evolution of John Deere graders from the first grader launched in 1967 to its most recent, the technologically advanced G and GP models, have all been key in positioning John Deere amongst the world's top suppliers of motor graders. Modern Mining recently spoke to Griffiths Makgate: Construction & Forestry Sales Manager for Africa about John Deere's range of graders, their performance, and their uptake by the sectors.

According to Makgate, the function of graders is to prepare the road, angling it to allow for water run-off, and to establish deeper trenches to the sides of the road.

"These heavy-duty machines are designed to smooth a rough terrain and ensure a suitable surface for the movement of large equipment transporting ore and goods from pit to processing plant. They are precision machines that level the land to within a millimetre of the required angle."

Since the production of the first grader, the JD 570, John Deere's product range has evolved to meet industry's needs for improved performance, lower fuel consumption and increased safety.

"The JD 570 grader was equipped with a scarifier that was located at the front of the machine and, given that the safety requirements at the time were not as stringent as they are today, the unprotected cab allowed the operator to sit or stand while operating the machine. Today, the latest products are technologically advanced, containing enclosed fit-for-comfort cabs and surpassing the safety standards required by the mining sector."

The function of graders is to prepare the road, angling it to allow for water run-off.

John Deere's latest range offers some of the most innovative graders, including the 870G/GP and 872G/GP models, which come in three options – the Tandem Drive, a four-wheel drive option and the Hydrostatic six-wheel front wheel drive equipped with the latest technology, including Auto-Shift PLUS, which reduces foot movement by up to 65%; machine pre-sets to boost efficiency; and Blade Flip to streamline grading passes, amongst others.

The equipment supplier currently offers eight grader models in different configurations, including the 620G/GP ,622G/GP, 670G/GP, 672G/GP, 770G/GP, 772G/GP as well as the 870G/GP and 872G/GP models.

A selection of John Deere Graders.

Demo programmes

According to Makgate, John Deere's "intentional strategy" of providing a platform for its client-base to engage with and fully test its products, has led to an increased interest in the product range and subsequently a massive uptake of John Deere graders. In fact, 2023 is proving to be exceptional in terms of product sales.

While product demonstrations (demos) have long been part of the company's strategy, this year John Deere's suppliers have extended the hours and the reach of the demos.

"To ensure that clients get the full experience of the machines, we offer extended hours for the demos, and this has allowed customers at different sites to compare aspects such as fuel consumption and productivity, amongst others."

John Deere dealers running the demo programmes across South Africa include AFGRI, Senwes, Mascor.

DON'T JUST **SCRAPE** BY.

Level up your game with a John Deere Motor Grader.

The Evolution of John Deere Motor Grader: Blazing Trails in Innovation

Motor graders play a vital role in shaping our modern infrastructure. John Deere has long been synonymous with quality, reliability, and cutting-edge technology. Over the years, the John Deere Motor Grader has become an indispensable tool for construction and road-building projects, consistently meeting the demands of a rapidly evolving world. Let's embark on a journey through its history and witness how this machine has transformed over time.

A Legacy of Excellence

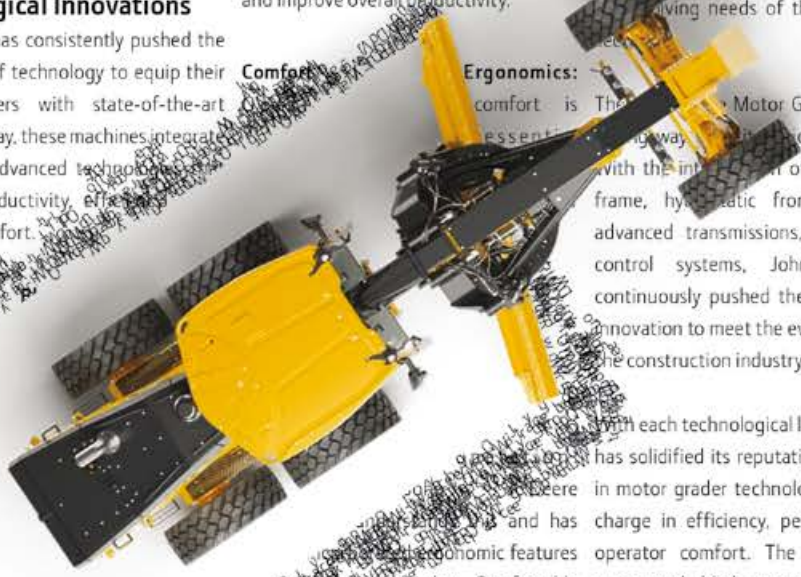
John Deere's venture into the motor grader market began in the early 1920s. Leveraging their expertise in agricultural machinery, the company recognized the need for efficient grading equipment in construction and took on the challenge. The first John Deere motor grader introduced featured a rear-mounted blade, allowing operators to achieve precise grading and leveling results.

From their inception in 1919, motor graders were strictly rigid framed, but this changed with John Deere's 570. Introduced in 1967, the 570 was the first motor grader with an articulated frame. While it worked perfectly well in wide-open, straight-ahead blading, the articulation gave it a major advantage in confined areas.

Technological Innovations

John Deere has consistently pushed the boundaries of technology to equip their motor graders with state-of-the-art features. Today, these machines integrate a range of advanced technologies to enhance productivity, efficiency, and operator comfort.

Automated Blade Control:



Telematics and Connectivity: Connectivity has transformed the way we manage and monitor machinery. John Deere's motor graders are equipped with telematics systems that provide real-time data on machine performance, fuel consumption, maintenance schedules, and more. This valuable information allows operators and fleet managers to optimize operations, reduce downtime, and improve overall productivity.

Comfort and Ergonomics: comfort is essential in the industry, and John Deere motor graders are at the forefront of this revolution. Automated blade control systems use sensors and advanced algorithms to automate blade movements, allowing for consistent and accurate grading results. This technology simplifies the operator's task while maintaining high-quality work.

ergonomic features in their motor graders. Comfortable seats, intuitive controls, and reduced noise and vibration levels ensure that operators can focus on their work without unnecessary fatigue.

Sustainability and Fuel Efficiency: In an era of increasing environmental consciousness, John Deere has prioritized sustainability in their motor graders. These machines feature efficient engines that comply with stringent emission standards, reducing their environmental impact. Additionally, advanced fuel management systems optimize fuel efficiency, lowering operating costs and reducing carbon emissions.

The Future Beckons

As technology continues to advance, John Deere remains committed to pushing the boundaries of innovation in the motor grader industry. With a rich history and a reputation for excellence, the company is well-positioned to meet the ever-evolving needs of the construction sector.

The John Deere Motor Grader has come a long way from its rigid-frame origins. With the introduction of an articulated frame, hydrostatic front-wheel drive, advanced transmissions, and precision control systems, John Deere has continuously pushed the boundaries of innovation to meet the evolving needs of the construction industry.

With each technological leap, John Deere has solidified its reputation as a pioneer in motor grader technology, leading the charge in efficiency, performance, and operator comfort. The integration of automated blade control, telematics, and connectivity has revolutionized the industry, enabling precise grading, enhanced productivity, and optimized machine performance.

As we look to the future, one can only imagine the groundbreaking innovations that lie ahead for John Deere and the motor grader industry. The commitment to technological advancements ensures that John Deere will continue to be at the forefront of the construction industry, shaping the landscapes of tomorrow.

Book a Demo.

Contact your local John Deere Dealer

JOHN DEERE

www.deere.africa | africa@johndeere.com | Customer Care: 0800 983 821 | JohnDeereAME | John Deere | John Deere Africa & Middle East


INVINCIBLE VALVES
SINCE 1982
WE CAN HANDLE THE PRESSURE. GUARANTEED.
Invincible Valves is an approved supplier to all major industries within South Africa, we maintain expertise and experience across a broad spectrum of industries and applications with a wide range of products, quality valve products and ancillary equipment
Offering a comprehensive range of local and imported valves and accessories for the mining, petro-chemical, power generation, water, sewerage and general industries, Invincible Valves is well respected for its processes and business practises and are proud to be Africa's largest stockist of Saunders & Insamcor products.
There is only one trusted name in valves – INVINCIBLE VALVES.
+27 11 822 1777 | enquiries@invalve.co.za | invalve.co.za
LEVEL 1 BBBEE
GENERAL INDUSTRY | MINING | PETRO-CHEMICAL | POWER GENERATION | WATER | SEWERAGE
If it's not INVAL®, it's not Invincible