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- Production potential for lithium and tantalum concentrates at Uis
- From opencast to underground mining: a journey based on long-term relationships





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90 T



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At a time when the mining sector is seeking to ramp up production amid a favourable commodity cycle, uptime is a parameter of significance. Leveraging its fortified new regional structure, an expanded dealer network and the full-fledged Astec Johannesburg manufacturing facility, Astec Industries Africa and Middle East is positioned to deliver significant uptime and value for mines. See story on page 10





Munesu Shoko

Has coal been consigned to history?

In pledges made at the recently-ended COP26 climate summit, more than 40 countries committed to shift away from coal, including major coal-using nations such as Poland, Vietnam and Chile. Notably, major international banks also committed to effectively end all international public financing of new unabated coal power by the end of 2021.

In addition, at least 25 countries and public finance institutions committed to ending international public support for the unabated fossil fuel energy sector by the end of 2022. Collectively, notes the United Nations Climate Change, this could shift an estimated US\$17,8-billion a year in public support out of fossil fuels and into the clean energy transition.

Under the coal pledge, there is an agreement to phase out coal power in the 2030s for major economies, and the 2040s for developing nations. After this pledge, has coal been consigned to history, as countries, banks and organisations agree to move away from the single biggest contributor to climate change? There is certainly a growing consensus among the progressive nations that the end of coal is in sight. But is it?

There are many unanswered questions – the biggest is the list of countries missing from this fire-storm of coal commitments – including the United States, China and India. Additionally, none of these commitments are binding, which means that there is no big stick to force countries to comply.

Managing the move away from coal is not that simple. There are two aspects to the phase-out of coal in the power sector, which is the biggest consumer of the resource: halting the construction of new plants and managing the decline in emissions from existing assets.

The former is the easier to achieve. According to the International Energy Agency (IEA), there are no new investment decisions for the construction of coal-fired power in developed nations, but as much as 200 GW of new power stations have received the go-ahead and are set for completion by 2030 in Asia, mainly in China, India and Southeast Asia. A further 215 GW worth of new power stations has been approved in other developing countries. These are due for construction by 2030.

Delivering emissions reductions from the existing fleet of coal-fired plants is an even more crucial component of climate action, but a much trickier challenge for public policy. Given the dependence of a number of countries and regions on coal, the closure or repurposing of coal mines and power plants could have significant economic and social consequences.

A report by the EIA notes that coal-dependent regions are often highly specialised ‘mono-industry’ areas, where the economy and the local identity are closely tied to the coal value chain. Managing closures appropriately and successfully depends on planning for the impacts on affected workers and communities, and on the repurposing and reclamation of affected land. This is likely to entail long-term engagement by many different parts of government, as well as local businesses.

To provide context, India’s stance in its last-minute push to downgrade the coal language at this year’s climate talks was driven by the need to balance phasing out fossil fuels with meeting growing energy needs, a situation that many developing countries find themselves in.

The request to change a provision in the final text of COP 26, from a “phase out” of coal to a “phase down,” was not necessarily an idea that came just from India. China and several other emerging economies also pushed for it. But it highlights the challenges facing countries that are seeking to reduce emissions while also bringing power and quality of life improvements to growing populations.

For India, and developing nations at large, the ability to reap the benefits of fossil fuels in the way that the United States and other industrialised economies did as they were growing is a matter of fair play. That’s something India’s environment minister and lead climate negotiator Bhupender Yadav stressed in his remarks at COP26.

“How can anyone expect that developing countries can make promises about phasing out coal and fossil fuel subsidies?” he asked. “Developing countries have still to deal with their development agendas and poverty eradication.”

There is no single blueprint for managing the phase-out of coal-fired generation because a great deal inevitably depends on local circumstances and priorities. Transitions require a range of financial mechanisms that are tailored to each country’s unique situation. In South Africa, for example, domestic and international stakeholders are considering a multi-faceted strategic and financial approach to help Eskom, the state-owned utility, to shift to renewables, reduce its debt load and ensure a just transition for coal miners and workers.

While the recent US\$8,5-billion pledge by the US, UK, France, Germany and the EU to help SA transition to renewable energy and end its reliance on coal is a welcome development, coal will remain part of the energy mix for the foreseeable future. ■

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Favourable iron ore prices drive half-year results for Afrimat

In its interim results for the six months ended 31 August 2021, Afrimat, a leading mid-tier open-pit mining company providing industrial minerals, bulk commodities and construction materials, delivered exceptional results on the back of favourable iron ore prices, which translated into strong operating cash flows.

Afrimat CEO Andries van Heerden says

he is pleased with the group's ongoing excellent performance. "We are really now in a very healthy financial position, and able to accelerate growth as a result. We also have assets with excellent competitive advantages across the group, which we've been building over several years in line with our diversification strategy. But more than that, as a company built and forged in

South Africa, we are proud to have a deep-seated focus on delivering more than just financial results to the benefit of all our stakeholders, including our shareholders, our people and the communities in which we operate."

Revenue increased by 55,4% from R1,6-billion to R2,4-billion, culminating in an increase in operating profit of 65,0% from R353,1-million to R582,8-million. The operating profit margin improved from 22,7% to 24,1%, with HEPS going up 60,5% from 183,9 cents to 295,1 cents, representing a compound annual growth (CAGR) rate from 2017 – 2021 of 30,2%.

The group's balance sheet is robust, with a net cash position. Afrimat ended the period with net cash flows from operating activities of R806,5-million, an increase of 141,7% from the comparative 2020 period. This represents a CAGR of 60% (2017 – 2021). "Given the strong cash generated from operations of close to R1 billion, borrowings were significantly reduced, which places the group in this net positive cash position," says Van Heerden.

Van Heerden adds that all three segments of the group experienced robust growth compared to the previous corresponding period, considering the effects of the hard-lockdown levels imposed to limit the spread of COVID-19 in the previous period.

"Although the pandemic remains an important part of our strategic management, the disruption in mid-June related to the third wave was countered by main-



Afrimat's Demaneng mine.

Akobo Minerals continues to intersect visible gold in Ethiopia

Despite the announcement of the State of Emergency in Ethiopia (3 November 2021), Akobo Minerals is continuing its operations with the completion of a successful hole which has intersected around 10 m of core with visible gold on 5 November (hole SEDD55).

Akobo Minerals has an organisation comprising highly qualified Ethiopian staff and is not reliant on the physical presence of expatriates. From 2016 to 2018, a similar State of Emergency was in place in Ethiopia and the COVID-19 pandemic has also posed a challenge to exploration operations. Nevertheless Akobo Minerals has successfully continued exploration throughout both previous periods.

The company has not experienced any change in its ability to operate at the Akobo project or in Addis Ababa and the majority of plans are unaffected. Akobo Minerals is currently drilling at the Segele project and Joru projects simultaneously.

To complement the drilling, surface exploration is underway in the areas surrounding the Segele project with the intention of identifying new targets. Work on the mining studies is also ongoing with social baseline study in progress at the project. Desk studies are continuing apace with cost assessments of processing plant requirements and contract mining. The company is in the process of engaging geotechnical consultants and mine waste specialists. ■



Visible gold in hole SEDD55 between 170,6 - 171 m.

taining the measures established by management to manage and minimise the spread of the virus, as well as a safe operating environment for our employees.”

He adds that all operating units are strategically positioned to deliver outstanding service to the group’s customers, whilst acting as an efficient hedge against volatile local business conditions.

“Our transition through conscious diversification has resulted in a varied product range, made up of Construction Materials consisting of aggregates and concrete-based products, Industrial Minerals consisting of limestone, dolomite and silica, and Bulk Commodities consisting of iron ore and anthracite.”

The Bulk Commodities segment, comprising the Demaneng and Jenkins iron ore mines, and the Nkomati anthracite mine, delivered an excellent contribution to the group results, with an increase of 39,3% in operating profit to R453,7-million, compared to R325,8-million in the prior period. This was mainly due to the favourable international iron ore pricing during the reporting period. ■

Helen Cai joins Barrick board

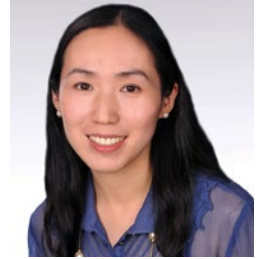
Barrick Gold Corporation (NYSE:GOLD) (TSX:ABX) has announced the appointment of Helen Cai to its board as an independent director. Cai is a finance and investment professional with close to two decades of experience. After graduating from Massachusetts Institute of Technology (MIT), she worked firstly with Goldman Sachs Group (GS) in the United States and then with China International Capital Corporation (CICC) in the Greater China region until spring 2021.

When covering the American natural resources sector in New York with GS as an equity research analyst, Cai was highly ranked by StarMine. Subsequently, she followed the US technology sector. At CICC, as a managing director, she expanded her scope, from metals and mining and basic material, to advanced manufacturing and tech-enabled industry upgrades. Cai was ranked as best analyst by Institutional Investor and Asia Money in their China Research Sector Polls for multiple years. The cross-border financing and M&A trac-

tions she led at CICC also won various awards from Asia Money and The Asset.

She is a Chartered Financial Analyst and Chartered Alternative Investment Analyst and was educated at Tsinghua University in China and MIT in the US, with two master’s degrees from MIT and multiple fellowship awards.

Executive chairman John Thornton says Cai is extensively versed in equity markets and all aspects of corporate finance, from strategic planning to M&A transactions. “Her experience in both the American and Chinese capital markets will bring a unique perspective to the Board, particularly given China’s position as a leading producer and consumer of gold, and the biggest driver of copper demand in the world. Our strategic partnership with Chinese mining companies in Argentina and Papua New Guinea sets a good precedent for effective collaboration in future,” he says. ■



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Metallurgical test work complete at Giyani's K.Hill project in Botswana

Giyani Metals Corp. (TSXV:EMM, GR:A2DUU8), developer of the K.Hill manganese oxide project (the K.Hill Project) in Botswana, has given an update on its operational and commercial activities.

Optimised metallurgical test work and final process flowsheet design, as part of the FS on the K.Hill Project, has been completed by Mintek in South Africa. This phase of the testwork does not include crystallisation. A specialist engineering firm has been engaged to undertake crystallisation testwork with a view to finalising the process flowsheet for the FS and the demonstration plant.

Once the process flowsheet is finalised, Giyani will proceed to contracting an engineering firm for the construction of the demonstration plant. Following a peer review of the process flowsheet, it is anticipated that the design-build contract for the demonstration plant will be signed with the objective for the plant to be operational in H1 2022.

Elsewhere, Otse is the site of two historic mine workings, namely Otse North and Otse South. Giyani is conducting the

first exploration drilling at these sites with a planned 56-hole RC drilling campaign, following up on targets identified with an induced polarisation survey. To date, 26 RC holes have been completed at Otse South, proximate to historic mine workings and defined by a chargeability anomaly trending northwest-southeast.

Nearly all holes drilled to date have shown visible mineralization, confirmed by portable x-ray fluorescence (pXRF) analysis. From the holes analysed so far, the best results include:

A further 12 holes will be drilled at the southern target, before the two drill rigs move to Otse North, also proximate to the historic workings. The campaign is expected to be completed in the next six weeks.

Otse is located approximately 40 km east of the K.Hill Project and is connected by a well-maintained, sealed road network. Any future production from Otse can easily be trucked to the location of the proposed process plant adjacent to the K.Hill Project.

Giyani has been in discussions with a number of OEMs and other potential off-

takers and trading groups with regards to potential binding product purchase agreements. Giyani's operations in Botswana have the potential to supply in excess of 100 000 tonnes of high purity manganese sulphate monohydrate (HPMSM) for the manufacture of lithium-ion battery cathodes.

Currently, Giyani is engaging directly with a leading global automobile OEM on material evaluation, including the delivery of representative samples. The company has also signed a non-disclosure agreement with a major prospective European producer of battery cathodes for further product information sharing.

"As we increase the size and quality of our resource, the metallurgical testwork by Mintek is now completed, paving the way for the finalisation of the process flowsheet and the start of construction of the demonstration plant. The demonstration plant will produce around 250 kg per day of final HPMSM product to share with potential customers for preliminary product testing and we are already assembling interested parties," says Robin Birchall, CEO of Giyani. ■

Duncan Wanblad appointed Anglo American chief executive

Anglo American plc has appointed Duncan Wanblad as chief executive, with effect from Anglo American's AGM on 19 April 2022. Wanblad, who will also join the Board of Anglo American as an executive director on the same date, succeeds Mark Cutifani who will retire as chief executive and step down from the board at the AGM after nine years in the role.

Commenting on Wanblad's appointment, Stuart Chambers, chairman of Anglo American, says: "Duncan Wanblad is the standout and natural successor to Mark Cutifani, bringing his 30 years of international mining experience and deep understanding of Anglo American, its culture and its context. In both executive and non-executive roles spanning most of Anglo American's businesses, Duncan has been integral to shaping the strong competitive position of the company today. Following a rigorous global process to identify Mark's successor, including those on our internal succession plan, the Board felt that Duncan is uniquely qualified to take Anglo American on the next phase of improvement and to deliver what is one of the industry's leading

growth stories. On behalf of the Board, we congratulate Duncan on his appointment as chief executive."

Duncan Wanblad says of his appointment: "I am honoured that the board has given me the opportunity to lead this great company and our wonderful colleagues around the world. Having started my career underground as a junior engineer, I have never lost sight of what it takes to produce the metals and minerals that are ever more vital to support our life on this planet. Our responsibility to do so safely and sustainably, including meeting our employees' and stakeholders' expectations of us, has never been greater. Through the way we work, the technologies we are deploying to drive us towards our sustainability goals, and the breadth of opportunities I can see, we are determined to live up to that promise."

Reflecting on his tenure as chief executive, Mark Cutifani says: "There has been no greater privilege for me than leading Anglo American and our incredible people. Together, we have transformed our competitive position and led the way towards a very different future for mining – a safer,



Duncan Wanblad will take over as Anglo American chief executive, with effect from 19 April 2022.

smarter future that delivers enduring value for all our stakeholders. By delivering our promises, we have established the credibility and capabilities that are the foundation for Anglo American's next phase of growth. I can think of no better leader than Duncan to pick up the baton and pursue the many opportunities that lie ahead for our business." ■

Northam acquires a 32,8% interest in RBPlat

Northam Platinum Holdings Limited has today announced its acquisition of a 32,8% interest in Royal Bafokeng Platinum Limited (RBPlat) (excluding treasury shares) from a wholly owned subsidiary of Royal Bafokeng Holdings Proprietary Limited (Royal Bafokeng Holdings or RBH or RBH Group), for R17-billion, representing R180,50 per RBPlat share.

In addition, a call and put option arrangement has been entered into with the RBH Group whereby Northam may increase its interest in RBPlat to 33,3% in aggregate. The initial exercise price in respect of the put and call options is R135 per RBPlat share.

RBH will further endeavour to procure that one of its wholly-owned subsidiaries enters into an agreement with Northam whereby Northam could increase its interest in RBPlat up to 34,9%, pursuant to an additional call and put option arrangement. Such agreement will also cater for a

right of first refusal in favour of Northam in respect of all remaining RBPlat shares held by the RBH Group, representing a further 1,2% interest in RBPlat. The RBH Group's total interest in RBPlat currently amounts to 36,1%, excluding treasury shares.

The R17-billion purchase consideration for the 32,8% interest in RBPlat will be settled by Northam issuing 34 399 725 Northam shares to the RBH Group, with the balance of R8,6-billion to be settled in cash. R3-billion will be paid upfront, R4-billion will be deferred to no later than 30 April 2022 and the remaining R1,6-billion will be deferred to no later than 30 September 2022.

As a result of the transaction, the RBH Group will obtain a strategic 8,7% shareholding in Northam. The deferred portion of the cash consideration and the option consideration will escalate at a nominal annual rate of 12% compounded quarterly until the settlement thereof. Any distribu-

tions received in respect of the RBPlat shares which are subject to the options, will be deducted from the exercise price of the options.

Paul Dunne, Northam Holdings' CEO, comments:

"The transaction concluded with Royal Bafokeng Holdings gives Northam a strategically important shareholding in RBPlat, creating significant long-term optionality for Northam. It aligns perfectly with our long-term growth, sustainability and diversification strategy and the introduction of Royal Bafokeng Holdings as a significant shareholder further strengthens our empowerment credentials. We are excited about the long-term value creation potential and the inherent optionality the transaction presents," says Dunne. ■



Paul Dunne, CEO of Northam Holdings.

Mining licence granted for Kodal's Bougouni Lithium Project

Mineral exploration and development company Kodal Minerals has been granted a mining licence for its flagship Bougouni Lithium Project in Mali. The project is now fully permitted for development with the previous approval of the Environmental and Social Impact Assessment (ESIA) in November 2019.

Permis d'Exploitation number No2021-0774/PM-RM has been granted to Kodal Minerals' Mali subsidiary company, Future Minerals SARL, and is valid for an initial 12-year term and renewable in 10-year blocks until all resources mined. The Mining Licence is granted under the 2019 Mining Code and extends over 97,2 km² covering the proposed open-pit mining and processing operation at Bougouni.

As a next step, Kodal has commenced a programme of work to update the Feasibility Study announced in January 2020 ahead of securing funding for mine development and construction.

Bernard Aylward, CEO of Kodal Minerals, comments: "The granting of the Mining Licence for Bougouni has come at a great time for Kodal with the increasing global focus on battery metals and the

recognition of potential supply deficits highlighting the value of our fully permitted Bougouni Lithium Project.

"We announced our Feasibility Study in January 2020 and the programme of work we are currently undertaking will lead to an updated Feasibility Study that is expected to support a Decision to Mine. Our initial study highlighted very robust fundamentals, but the world of battery metals has shifted significantly in this time, and during 2021 alone, we have seen lithium prices and demand surge. The timing of Kodal's permitting and potential development timeline highlight how well positioned our Bougouni project is to capitalise on the widely forecast lithium hydroxide and lithium carbonate shortages which are expected by 2023.

"We are looking forward to the construction phase of this project and we are confident of achieving support to finance the capital required for our target of development of the first lithium mine in Mali. I look forward to providing further updates on our progress in due course." ■



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De Beers helps build stronger communities

For decades, De Beers Group has put considerable resources into improving the socio-economic status of communities surrounding its mines and operations with its efforts meeting with considerable success.

It is now taking its community engagement to the next level with ambitious and measurable goals having been set for the next decade as part of the Building Forever initiative, which has 'Partnering for Thriving Communities' as one of its four core pillars.

Building Forever builds on many past

successes for De Beers, including a World First HIV/AIDS health programme at its diamond mines in Botswana, launched in 2001. According to Dr Tshepo Sedibe, Health Lead for the De Beers Group, the programme – which includes free anti-retroviral treatment for employees and their 'dependants' – has resulted in the mortality rate from AIDS amongst employees reducing from 31 % to just 0,1 %.

Another outcome is that De Beers in 2019 marked more than 10 years of no babies being born with HIV to HIV-positive mothers.

De Beers' experience with AIDS and HIV has also contributed to it making a highly effective response to the COVID-19 pandemic. "When the pandemic started, we rapidly took measures to protect our internal employees and our contractors but it rapidly became apparent that we needed to take our efforts into the communities," says Nerys John, head of Social Impact at De Beers.

"Personal Protective Equipment (PPE) and sanitation became of utmost importance in the schools and hospitals in our host communities in order to prevent transmission. As things developed, we then adapted our approach to include the provision of testing, intensive care unit beds, oxygen and isolation centres."

Given that mines eventually close and that when this happens communities can lose their main source of livelihoods, De



Nerys John, head of Social Impact at De Beers.

Beers places major emphasis on providing community members with skills that will allow them to support themselves after mining operations cease. Nowhere is this more apparent than at De Beers' Venetia mine in South Africa's Limpopo Province.

"We have several socio-economic initiatives running in the Venetia area but one of the most significant is the supplier development programme which is designed to promote local procurement," says Greg Petersen, De Beers Group manager – Socio-economic Development.

"We have already appointed more than 50 suppliers in terms of the programme. The biggest of these is the bus company we use to transport employees from the Musina and Blouberg areas to the mine. We have worked to ensure that communities have a stake in the company and indeed it is now 40 % owned by community members." ■



Dr Tshepo Sedibe, Health lead for the De Beers Group.

Updated mineral resource estimate at Sanankoro Gold Project

Cora Gold Limited, the West African focused gold company, has announced an updated Mineral Resource Estimate (MRE) prepared by CSA Global (UK) Ltd in accordance with the JORC Code (2012 Edition) for the Sanankoro Gold Project in Southern Mali. The updated MRE follows the recently completed 43 000 m drilling campaign at Sanankoro which focussed on mineral resource growth and upgrading existing mineral resources to higher confidence categories.

There is a +200% increase in total ounces from maiden MRE in December 2019 and significant upgrade to Indicated category using a 0,4g/t cut off and a US\$1 800/oz optimised pit shell. The company reports a pit constrained MRE of 21,9-million tonnes at 1,15 grams per tonne (g/t) gold (Au) for a total of 809,3 thousand ounces (koz) of Au.

The MRE is based on about 7,5 km surface expression of the total 33 linear km strike length of the potential mineralised zones identified in the 2018 Exploration Target of up to 2 Moz potential within 100 m of surface at Sanankoro (SRK, 2018). There are multiple higher grade ore shoots within the deposits which offer the potential for higher grade production in early years of mining.

Work on the DFS is gaining momentum following appointment of consultants and completion is expected in H1 2022.

Bert Monro, CEO of Cora, comments: "I am delighted with the updated Mineral Resource Estimate at Sanankoro which has exceeded our expectations from the start of the drill programme and is a major step in our development plan, which is focussed on delivering a DFS during H1 2022. Not

only has the total Mineral Resource been expanded by over 200% from our maiden Mineral Resource but there has also been an excellent conversion from Inferred to Indicated Mineral Resources. Furthermore, nearly all of the MRE mineralisation is in the oxide and transitional zones and is in line with the company's strategy of delivering an open pit, free digging, high-recovery gold mine at Sanankoro."

"In September 2021 the company signed a revised term sheet with Lionhead for US\$25-million project finance to support the development of the Sanankoro Gold Project on completion of the DFS in 2022. This Mineral Resource update is the first step towards delivering that strategy and the company is extremely pleased to be moving towards a construction decision." ■

Hummingbird implements World Gold Council's RGMPs

In line with Hummingbird Resources plc's (AIM: HUM) path towards World Gold Council's (WGC) Responsible Gold Mining Principles (RGMPs) conformance, the company has successfully received an external audited assurance report highlighting Year Two implementation and progress towards full conformance in 2022.

Launched by the WGC in September 2019, the RGMPs provide a sustainable reporting framework that supports international best practice in addressing key environmental, social and governance (ESG) requirements as to what constitutes responsible gold mining via 10 umbrella principles and 51 detailed principles.

Member companies have up to three years to fully comply with the RGMPs and are required to obtain annual external assurance on their performance and conformance.

Aligned with adherence to the RGMPs, the company has successfully received an independent limited assurance audit report highlighting Year Two conformance.

Throughout the Year Two self-assessment and audit process at its head office and operating site, many of the company's existing policies, procedures, practices, training programmes and ongoing commitments are consistent with the RGMP requirements, including ethical conduct, safety and health, working with communities and environmental stewardship.

As part of the Year Two internal assessment, the company completed a Gap Analysis to identify those policies, standards and activities which are already conformed with and those that require further additional work to achieve the September 2022 full conformance deadline.

Hummingbird is committed to operating responsibly for the benefit of all stakeholders and remains on track to achieve full WGC RGMPs conformance by the September 2022 deadline.

Chief strategy and ESG officer Edward Montgomery, comments: "Adopting the WGC RGMPs is a key part of Hummingbird's strategy for building a long term, sustain-

able mining company. Meeting these requirements demonstrates a high standard of ESG performance, which is essential for the Company's social licence to operate in the countries and communities we engage with and work in," Montgomery.

"As a result of the auditing process, the company have benchmarked, and in some cases improved, our practices, which include systems and policies related to the full spectrum of ESG requirements for the business. Implementing the RGMPs enables Hummingbird to evidence a greater level of accountability and transparency, in line with the increasing expectations of our stakeholders.

"We are pleased with the progress made so far and the steps being taken to improve our management systems and responsible business protocols and practices." ■



Edward Montgomery, chief strategy and ESG officer at Hummingbird Resources.

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Astec's enhanced support and local boost uptime for mines

At a time when the mining sector is seeking to ramp up production amid a favourable commodity cycle, uptime is a parameter of significance. Leveraging its fortified new regional structure, an expanded dealer network and the full-fledged Astec Johannesburg manufacturing facility, Astec Industries Africa and Middle East (AME) is positioned to deliver significant uptime and value for mines, writes *Munesu Shoko*.

To take advantage of the prospect of a new mining super-cycle, mining companies are ramping up production. Uptime is crucial to tapping into this 'commodity bull run'. With an enhanced sales and aftermarket support structure – reinforced by the newly-created regional structure and new dealer partnerships – Astec Industries Inc. has placed uptime at the heart of its latest strategy in sales region AME.

Astec Industries Inc. created a new International Business division in 2020 as part of its international expansion strategy, with regional sales organisations established to improve customer interaction and support of the complete range of Astec products.

Astec Industries AME, as one of the newly-created regional sales organisations, is responsible for business relationships in Africa, the Middle East and Central Asia. The AME offices are based in Elandsfontein, Johannesburg, with regional sales managers positioned strategically within the region to support the expanded dealer network and customers.

The issue of local procurement has been attracting more attention in the mining industry in recent years. Leveraging the capabilities of the local Astec Johannesburg manufacturing facilities, mines

operating in South Africa, for example, can meet their local procurement requirements.

"Our Astec Johannesburg manufacturing facility falls in line with the Mining Charter requirements for local manufacturing," comments Johan Goosen, MD of Astec Industries AME. "It also benefits local mining by helping it to meet local procurement targets." The Johannesburg manufacturing facility is integrated into the complete Astec supply chain to be able to supply most product offerings from this factory.

Local manufacture also reduces procurement costs, increases supply chain resilience and reduces lead times for mines, especially at a time when the coronavirus pandemic has wreaked havoc to the global supply chain.

Strong dealer network

The recent appointment of additional dealers further benefits customers by enhancing the supply, distribution, support and after-sales service of Astec's Material Solutions product range across the region.

Through Astec Industries AME, Astec has entered into a strategic dealer partnership with Unatrac, a division of Egypt-headquartered Mantrac Group, one of the largest and most popular Caterpillar dealers in the world. The group, founded in the 1950s, has established itself as a reputable distributor and service provider of industry-leading brands and premium products.

"Teaming up with Unatrac, part of Mantrac, a reputable capital equipment group in the region, demonstrates Astec's commitment to meeting, if not exceeding, the expectations of our customers in the region,"



Astec AME has made a significant investment in a solar energy plant at its Astec Johannesburg manufacturing facility.



manufacturing capabilities



says Vinesh Surajlall, Director – Material Solutions, at Astec Africa Middle East.

As part of the distribution agreement, Unatrac will offer sales and support services in several African counties, including Nigeria, Ghana, Sierra Leone, Liberia, Kenya, Tanzania, Uganda, Ethiopia, Djibouti and Egypt. Additionally, the company is responsible for Iraq, as well as the Ural and Volga regions in Russia. In addition to its technical ability and experience, Unatrac will leverage its in-depth knowledge of these markets and well-established in-country partners across its territories.

Earlier this year, Astec, through Astec Industries AME, appointed French company, Aramine, as the official dealer of Astec Materials Solutions products in several strategic countries in West Africa (Mauritania, Mali, Senegal, Guinea, Ivory Coast, Burkina Faso, Benin, Togo and Niger) and the Maghreb (Algeria, Tunisia and Morocco). Astec has had a longstanding partnership with Aramine which, until this year, has only been limited to Astec's range of rock breaker and boom systems.

In addition to its recognised expertise and technical service, Aramine relies on its subsidiaries and partners in the region and is doing its utmost to strengthen the presence of Astec Industries in the countries concerned by this agreement.

"With the expansion of the Astec portfolio distributed by Aramine, this is an important evolution in our commercial relations, as we

collaborate in very active and demanding markets in West Africa and the Maghreb. With this partnership, we are developing a new customer proximity offer, combining expertise, services and quality products," says Surajlall.

Astec Industries AME has several other dealers in other territories (see Fig. 1). To support these dealers and customers, Astec Industries AME has appointed several regional sales managers operating across the region, thus creating a strong aftersales regime to offer unparalleled customer support.

Expanded product range

A key benefit for the mining sector is the expanded product range from a single supplier. Under the Material Solutions portfolio, Astec Industries AME offers crushing units (portable, track-mounted jaw crushers, cone crushers and vertical shaft impactors);

The Astec Johannesburg manufacturing facility falls in line with the Mining Charter requirements for local manufacturing.

In line with its continuous improvement approach, Astec has upgraded spray booths at its Johannesburg manufacturing facility to meet world-class standards.





An Astec vertical shaft impactor.

screening units (portable and track-mounted, high-frequency screens, horizontal screens, incline screens, scalper screens and combos); materials handling equipment (stackers, conveyors and feed systems); washing and classifying plants; rock breaking equipment (hydraulic breakers, demolition, construction and mining attachments) and mobile equipment (utility vehicles, scalars and mobile rock breakers).

“The Material Solutions business is able to offer equipment and solutions that help our customers in the mining sector perform better, safer and achieve maximum return on their investment,” says Surajlall. “Within our Material Solutions portfolio, we are able to offer a complete, world-class line of rock breaker systems, crushers, screens, conveyors, washing and classifying equipment.”

Astec’s modular plant options support the more popular range of machinery offered by the company. Key design criteria include well designed structural support for crushers and screens; proper feed and removal of material and ease of maintenance on site. All modules have the option of packing

into open top containers for shipment. Established designs and costs provide ease of plant layouts and tendering, as well as rapid deployment and erection on site. Standardisation ensures accurate lead times even when units are not supplied ex-stock.

Astec’s tracked stockpiling conveyors, tracked radial stockpiling conveyors and tracked telescopic conveyors reduce the need for haulage on-site and are ideal for crushing and screening applications. The company offers the widest range of tracked and tracked radial stockpiling conveyors in the industry: lengths from 15 m to 31m, tonnages of 100 tph up to 1 500 tph and lump sizes up to 300 mm. Astec’s heavy duty tracked telescopic conveyor units offer greater mobility and flexibility across a range of applications including stockpiling,

variable length link conveyor and truck loading.

The ability to screen, sort and segregate material efficiently and quickly is vital to every quarry operation’s overall profitability. With that in mind, Astec offers robust, versatile and efficient screens, from horizontal and inclined to high-frequency screens. “Our high frequency screens operate at 3 600 rpm and above, maximising screen efficiency and production. The Astec high-frequency screens offer ideal gradation control for reclaiming fines in both wet and dry applications. A unique rotary tensioning system provides the quickest screen media changes in the market, up to 50% faster than competitive models,” says Surajlall.

Astec’s horizontal screens deliver high productivity and efficiency in a low-profile package. The low screen height allows for operation in height-restricted areas and for maximum portability. The triple-shaft design employs an oval motion stroke pattern that generates a more aggressive screening action, reducing plugging and blinding while providing extended bearing life. Multiple configurations are available for a wide range of applications, from fine screening to heavy scalping.

Environmental drive

Given the rise in electricity costs and a global focus on renewable energy, Astec AME has made a significant investment in a solar energy plant at its Astec Johannesburg manufacturing facility. This investment, says Goosen, is consistent with the company’s mission to improve sustainability, produce durable and environmentally friendly products. The 400 kW peak installation will result in a saving of approximately 650 MWh per annum.

“In line with its continuous improvement approach, we have upgraded spray booths at our Johannesburg manufacturing facility to meet world-class standards,” concludes Goosen. ■

Key takeaways

- ❑ With an enhanced sales and aftermarket support structure – reinforced by the newly-created regional structure and new dealer partnerships – Astec Industries Inc. has placed uptime at the heart of its latest strategy in sales region AME
- ❑ Leveraging the capabilities of the local Astec Johannesburg manufacturing facilities, mines operating in South Africa can meet their local procurement requirements
- ❑ Through Astec Industries AME, Astec has entered into a strategic dealer partnership with Unatrac, a division of Egypt-headquartered Mantrac Group, one of the largest and most popular Caterpillar dealers in the world
- ❑ Given the rise in electricity costs and a global focus on renewable energy, Astec AME has made a significant investment in a solar energy plant at its Astec Johannesburg manufacturing facility

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Singida Gold Project on track for first

Construction at Shanta Gold's Singida Gold Project in Tanzania remains on track for first production in early 2023, with key construction milestones achieved thus far. CEO Eric Zurrin tells *Modern Mining* that reaching the production landmark will propel the company into an over 100 000 oz per year producer in the near term, while maintaining an attractive cost base. *By Munesu Shoko.*

Having commenced construction late last year at its Singida Gold Project in central Tanzania, East Africa-focused gold producer and explorer, Shanta Gold (AIM: SHG), has announced that the project continues to progress on schedule.

Commenting on some of the milestones of note thus far, CEO Eric Zurrin says open-pit mining operations commenced at the Gold Tree pit on September 15 this year, with the company recording its first successful open-pit blast on October 15, 2021. Meanwhile, stockpiling of ore is underway.

In addition, the tailings storage facility dam design has been completed, with all permits received and approval granted by the regulators to commence construction. Key infrastructure such as bulk power, water, buildings and fencing are progressing on track.

The crushing circuit, designed and manufactured by the Metso Outotec Group, has been completed. Shipment started in September, with site delivery expected in November and December 2021.



Eric Zurrin, CEO of Shanta Gold.

“The crushing circuit is a modular crushing and screening plant. We selected this option as it is the same type of plant we use at our flagship producing asset, New Luika, and we aim to leverage our operational and technical know-how to replicate success across our entire portfolio of assets. The mill is designed at 360 000 tonnes per annum (tpa). The crushing plant capacity is 150 tph or 1,1-million tpa, which provides spare capacity to double the milling capacity without affecting the crusher,” explains Zurrin.

Meanwhile, manufacturing of the grinding & gravity circuit mill is ongoing. Manufactured by NCP in

Community investment initiatives have commenced, including the upgrading of roads and surrounding infrastructure.



production in early 2023

South Africa, the mill's site civil works are scheduled to commence in December 2021, while site installation is planned for May 2022.

However, prior to commencing production, the company is aiming to finalise the contract awards for the remaining plant equipment, finalise tenders for processing plant equipment, obtain Mining Commission approval for contract awards and install slurry pumps and gensets to support TANESCO bulk power.

"Reaching the production milestone in early 2023 will transform Shanta from a single asset producer to a 100 000 oz per annum producer with a diversified revenue stream across two operations, further de-risking our business and placing us in a strong position to maintain our sustainable dividend and fund the highly promising West Kenya asset," says Zurrin.

Shanta has an established operational track record, with defined ore resources on the New Luika and Singida projects in Tanzania, with reserves of 666 koz grading 3 g/t, and exploration licences covering approximately 1 100 km² in the country. Alongside New Luika and Singida, Shanta also owns the West Kenya Project in Kenya with defined high grade resources and licences covering approximately 1 162 km².

Grade control drilling

Meanwhile, strong results from the grade control drilling programme have further increased confidence in



the strength of the production profile at Singida.

"Our grade control drilling programme is a core driver of value for the project – it increases our confidence in the quality and grade of the ore. The results thus far have been highly encouraging, reaffirming the strength of the asset's production profile, particularly for the first 18 – 24 months of production," says Zurrin.

The grade control RC holes at Singida were drilled at an inclined angle of minus 53° with hole depth ranging from 10 m to a maximum of 46 m. Infill

Construction of major infrastructure is forging ahead.

Strong results from the grade control drilling programme further increase confidence in the strength of the production profile at Singida.





Key infrastructure such as bulk power, water and buildings are progressing on track.

grade control RC holes were drilled to cover a spacing of 15 m along the strike and 10 m along the dip and a vertical depth of 20 m was covered during the programme.

The true widths of mineralisation are estimated to be approximately 85 – 90% of the intercept of RC down hole length. All results are based on 1 m composite samples of RC drilling, Au assays values based on fire assay analysis of a 50 gm at New Luika Site Laboratory.

A total of 1 515 m of grade control drilling has been completed as part of phase one drilling programme including:

- ❑ Hole SGTGC3: 11 m @ 6,64 Au g/t from 10 m
- ❑ Hole SGTGC7: 10 m @ 6,8 Au g/t from 16 m
- ❑ Hole SGTGC12: 14 m @ 8,68 Au g/t from 16 m
 - Including 1 m @ 20,60 g/t from 24 m and 1 m @ 47,60 g/t from 26 m

Hole SGTGC20: 8 m @ 24,89 Au g/t from 22 m

- Including 1 m @ 10,12 g/t from 24m and 1m @ 182,90 g/t

A total of 95 RC grade control holes have been

drilled to date with assay results from 45 holes received thus far. The reported intercepts have widths greater than or equal to 4 m and grade greater than 3,3 g/t. The updated reserves at Gold Tree deposit are expected in Q1 2022.

Singida is hosted in a greenstone deposit, lending itself well to upside exploration potential. Future exploration will target the extension of reserves and will be funded by cash flow from production at Singida.

Social impact

The company says it is extremely proud of the social impact that its projects deliver, and strives to prioritise individuals from the local community in its recruitment process. At New Luika, 99,5% of Shanta's workforce is Tanzanian, and now at Singida, 100% of its employees and contractors on site (210) are Tanzanian nationals.

Additionally, both assets are led by Tanzanian-only management teams. The company has nearly doubled its team in the last year, and all new hires are Tanzanian. The recent appointment of Tanzanian GM, Jiten Divecha, who has 20 years' experience, including previously as operations manager for Barrick Group in Tanzania, is testimony to this local hiring approach.

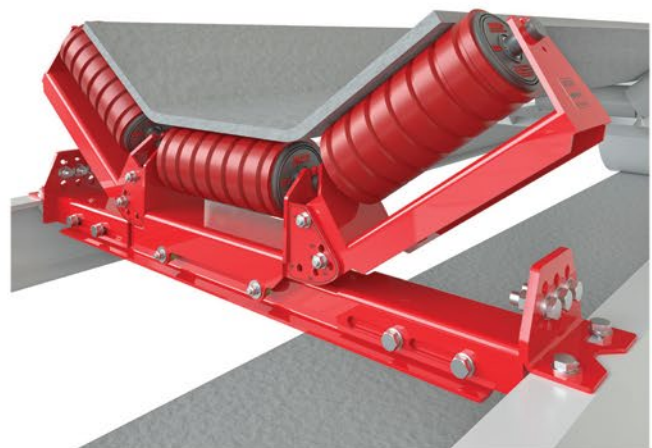
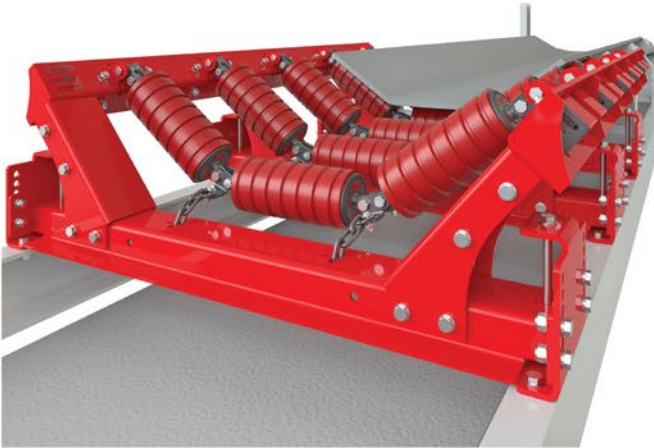
"We look forward to continuing to support communities through our investment in the region," says Zurrin, who says community investment initiatives have commenced, including the upgrading of roads and surrounding infrastructure, as well as the launch of schools in surrounding villages.

On the safety front, the project has maintained a strong health and safety track record with zero LTIs since commencement of construction. ■

Key takeaways

- ❑ Construction at Shanta Gold's Singida Gold Project in Tanzania remains on track for first production in early 2023, with key project milestones achieved thus far
- ❑ Open-pit mining operations commenced at the Gold Tree pit on September 15 this year
- ❑ The company recorded its first successful opencast blast on October 15, 2021
- ❑ The crushing circuit, designed and manufactured by the Metso Outotec Group, has been completed – shipment started in September, with site delivery expected in November and December 2021

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Production potential for lithium and tantalum concentrates at Uis

Following a by-product and metallurgical process development programme, AfriTin Mining reports that metallurgical test work results have confirmed the production potential of separate saleable lithium and tantalum concentrates from its current tin concentrate product at Uis Tin Mine. By *Munesu Shoko*.

AfriTin Mining Limited (AIM: ATM), an African tech-metals mining company with a portfolio of mining and exploration assets in Namibia in tin, lithium and tantalum, with its flagship asset, the Uis Tin Mine in Namibia, has provided an update on its by-product and metallurgical process development programme.

Density-based lithium beneficiation test work has achieved petalite concentrate grades in excess of 4% Li_2O and within contaminant specifications for a typical saleable technical grade petalite product. Consequently, the company will proceed with the design and procurement of pilot lithium beneficiation facility.

In addition, test work has been successful in producing a high-grade, saleable specification tantalum concentrate (>24% Ta_2O_5) and the company will proceed with the implementation of a tantalum concentrating circuit.

Transforming overall project economics

Anthony Viljoen, CEO of AfriTin, says the metallurgical test work results confirm the production potential



Anthony Viljoen, CEO of AfriTin Mining Limited.

of separate saleable lithium and tantalum concentrates. Implementation of these by-product streams, he adds, could substantially transform the overall economics and unit cost of production for the current Phase 1 facility.

“More importantly, it provides an outstanding





platform for the future large-scale Phase 2 facility with a planned production capacity of more than eight times the current facility. By implementing the pilot phase development of these separate elements, the company aims to take advantage of the burgeoning technology metals market by fast tracking the by-product streams into production,” says Viljoen.

“We are encouraged by the rapid progress on our metallurgical test work programme in support of our goal of becoming a major player in the tech-metal mining sector,” he adds.

The company has embarked on an aggressive strategy to maximise returns by producing by-products and maximising processing throughput. The programmes to develop separate tantalum and lithium concentrate by-products are advancing to the piloting phase.

Lithium by-product development

Lithium oxide at Uis occurs primarily as the mineral petalite in the ore which is treated by the current processing facility. The occurrence of petalite is consistent throughout the mineral resource. The company aims to produce a premium technical grade petalite concentrate. Although petalite contains comparatively less lithium than the more common spodumene (petalite has a theoretical limit of 4,9% Li_2O), the low contaminant levels of technical grade petalite makes it suitable for the glass and ceramics market, therefore attracting a premium to the typical chemical grade spodumene concentrate.

A technical grade petalite concentrate typically contains a minimum of 4% Li_2O , a maximum of 0,05% Fe_2O_3 and alkali metal compounds ($\text{Na}_2\text{O} + \text{K}_2\text{O}$) of

less than 1%. The company is also investigating possible offtake routes in the battery materials market.

Test work to date focused on processing several samples from the current plant feed and discard streams to produce petalite concentrates. Dense Medium Separation (DMS) test work on laboratory scale as well as piloting scale has achieved an upgrade in Li_2O of four times and higher, with several samples producing grades above 4% Li_2O and contaminant levels within technical grade specifications. The test work has been expanded to include milling and flotation as a method of further upgrade and maximising recovery of Li_2O .

The company will proceed with the design and procurement for a pilot petalite concentration plant. The process flow design of a petalite concentration circuit is planned as a combination of density separation, flotation and magnetic separation methods. The circuit will be fed with coarse discard material from the first stage of DMS in the current processing plant on a batch basis. The facility will have a processing capacity of 20 tonnes per hour (tph) and is intended as a pilot for an integrated full-scale petalite concentrate circuit (120 tph).

The pilot plant is expected to cost £2,2-million, consisting of CAPEX and operating costs over the course of the pilot campaign. The plant will be funded from existing cash reserves. The company plans to operate the plant for an initial period of 6 months, generating bulk product sales for the purpose of establishing a long-term offtake agreement. Results from this pilot will inform a bankable feasibility study for the integrated full-scale circuit. AfriTin is engaging with possible EPCM partners for the implementation of the pilot plant by Q2 of 2022, to

Test work to date focused on processing several samples from the current plant feed.



AfriTin is encouraged by the rapid progress on its metallurgical test work programme.

be followed by the implementation of the full-scale petalite concentrate circuit.

Tantalum by-product development

Tantalum at Uis occurs primarily within Columbite Group Minerals (CGM) which have a similar density

to the tin bearing mineral cassiterite and is currently recovered as part of the tin concentrate. At present, the company does not receive a credit for the contained tantalum within the tin concentrate. Therefore, the aim is to separate the tantalum bearing minerals from the tin concentrate and create a by-product at a typical saleable grade of 20% Ta₂O₅.

Magnetic separation is a proven technology for the separation of Ta-bearing CGM from non-magnetic minerals such as Cassiterite. Following the initial focus on wet magnetic separation techniques, recent work investigated dry magnetic separation techniques. Production of concentrates containing in excess

of 24% Ta₂O₅ was achieved from separate samples submitted to two independent service providers using similar processing strategies and equipment.

Based on the results, the company will proceed with the implementation of a pilot beneficiation circuit to further process the currently produced tin concentrate employing dry screening and a high intensity dry electromagnetic separation to produce a separate tantalum concentrate. The circuit has an estimated capital cost of £300 000 and will be funded from existing cash reserves. Construction of the circuit will be managed by AfriTin's in-house engineering team.

The pilot tantalum separation circuit will treat the entire stream of currently produced tin concentrate. The company expects to progress seamlessly from the pilot phase to the final circuit configuration through process optimisation over a period of six months. ■

Key takeaways

- ❑ Metallurgical test work results at Uis Tin Mine have confirmed production potential of separate saleable lithium and tantalum concentrates
- ❑ Density-based lithium beneficiation test work has achieved petalite concentrate grades in excess of 4% Li₂O and within contaminant specifications for a typical saleable technical grade petalite product
- ❑ Test work has been successful in producing a high-grade, saleable specification tantalum concentrate (>24% Ta₂O₅)
- ❑ The pilot lithium beneficiation plant is expected to cost £2,2-million, consisting of CAPEX and operating costs over the course of the pilot campaign



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From opencast to underground mining: a

Fortune 500 company Fluor speaks to *Modern Mining* about the global trend among the mining companies to migrate from opencast mining to underground as open pit resources become depleted and replacement resources are required; the importance of strong partnerships in the mining industry and the vital nature of long-term relationships of trust between the engineering and construction firm and its clients. By *Mark Botha*.

Global engineering and construction firm Fluor entered the underground mining project space in South Africa in 2019, following a trend in its client base to move predominantly opencast mines to underground operations. This was in addition to engineering, procurement, and construction management (EPCM) services already offered in the bulk mine infrastructure and processing value chain.

The company, which constitutes three business groups – Energy Solutions, Urban Solutions and Mission Solutions – employs some 44 000 people around the world.

According to Charl Klopper, Executive Director and Global Underground Mining Lead in Fluor SA's Urban Solutions business group, a current trend in the industry is for open pit reserves to become depleted or less economic to mine, forcing the company's clients to migrate underground, so swapping high-volume, low-grade opencast ore for higher grade but low-volume ore brought to surface.

"Going underground is a big trend in mining today," he says. "Clients typically start off in an



Charl Klopper, executive director and Global Underground Mining lead in Fluor SA's Urban Solutions business group.

opencast environment but these mines tend to become too deep, meaning that they have to transition from surface beneficiation to underground mining. When the stripping ratio becomes out of kilter and you're stripping more waste than recovering ore, the economics dictate that the mine should go underground in the near to medium-term future."

He says that, to design and build a mine costing billions of dollars, "you place that project in the hands of someone you trust, with whom you have a relationship and who has the technical expertise and experience to do the work."

A conscious decision was therefore taken to engage clients with whom Fluor had already established relationships of trust.

Dishaba platinum mine in South Africa.



journey based on long-term relationships



“We looked at our strengths and at how to build on and leverage those strengths. We have been building mining projects for a century and much of the surface infrastructure at mines is already being built by Fluor.”

He says the company had been designing and building underground crushers and conveying systems for many years and that the new add-ons to its already established portfolio included aspects such as portal, decline and mine design and scheduling, material handling such as trucks, conveyor belts, railways, crushers, mineral sizers, as well as bulk services both on surface and underground.

Partnering with renowned brands in the industry was key to providing the full spectrum of underground projects design capabilities. These include, for example, ventilation and refrigeration subject matter experts (SMEs) and vertical shaft headframe, winders and shaft infrastructure SMEs who are well-known and trusted by Fluor and its clients.

“Fluor has a wide range of supply chain technology partners whom we have worked with for decades on mining projects and with whom we partner to bring the best value to our clients for their specific needs.”

The company’s first underground mining project award in South Africa came in early 2020, a platinum project involving the design of two vertical raise bore shafts equipped with ventilation and refrigeration systems, as well as the surface and underground infrastructure to support the ventilation shafts.

Klopper says Fluor’s strategy is to “get into the game” as early as possible, to engage the client in the concept and pre-feasibility phases, deliver well and demonstrate its technical capability and partnerships of choice. Taking the project life cycles through the various phases can result in a relationship of many years.

“Our local business structure is built around our projects, our relationships and our portfolio, which currently includes platinum, iron ore, bauxite, diamonds and copper projects.”

Fluor’s current project portfolio includes several underground mining projects around the world, five of which are South Africa based.

Mine of the future

The mine of the future, says Klopper, is built not only on safe and sustainable mining but also in line with environment, social and governance requirements, which have become part of the global license to operate.

“It starts with the ore body in the ground; what infrastructure is needed to access it; what

Tumela platinum mine in South Africa.

Jwaneng diamond mine in Botswana.





Mogalakwena platinum mine in South Africa.

adjustments are needed from an engineering perspective (ventilation design, water, power and others); how to deplete the ore body, turn out tonnes and grades at what cost and, ultimately, return on stakeholder investment.

“We extend our relationships with the client

through all levels – the project level, executive sponsor level and the corporate level. With some of our clients, we meet monthly. This includes executive sponsor relationship meetings convened monthly or even weekly through steering committees.”

He says the company currently has a strong portfolio of clients who can provide it with a pipeline of ongoing work going forward.

Commodity demand

Klopper says Fluor’s market development team did a lot of work around the trends in the market.

“The industry needs to respond to a high demand for commodities that are key to energy transition. The world needs mined resources in much larger quantities, but those easy to access deposits will be depleted in the foreseeable future. Many operations are transitioning from open pit to underground, and Fluor is readily equipped to dig deeper and develop the best options for underground operations.”

He says the accelerating need driven by the energy transition is a huge opportunity for the industry, but requires a solid strategy in project development, as well as investment capital to bring assets into production.

Sustainable energy sources are key to decarbonisation and Fluor has been playing in this field for years, having built numerous wind and solar farms in the past. The company is currently developing sophisticated hydrogen technologies.

“Bringing that prior experience to the mining industry was a matter of leveraging what Fluor already does,” says Klopper. “We prefer to take the entire journey along with our clients to understand the risk profile of the project. Then, to develop a risk model based on the client’s needs so that our integrated team delivers the project effectively.

“As we go through the pre-feasibility and feasibility studies, passing through stage gates is an important process to ensure project delivery safely, on budget and on schedule.”

Haul truck turntable

In 2018, Fluor collaborated with Australian Turntable Company to produce haul truck turntables for use both above and below ground. These turntables, which can be relocated on site, allow haul trucks to turn by up to 360° without having to reverse, so shortening unloading time by some 30%. Other applications that benefit include maintenance workshops; tyre changeover and refuelling stations; washdown areas; delivery docks and chute discharge points. More information: <http://bit.ly/3071BgK>



Key takeaways

- ❑ A current trend in the industry is for more mines to transition from open pit to underground mining as reserves become depleted, forcing clients to invest in underground projects
- ❑ To design and build a mine costing billions of dollars, “you place that project in the hands of someone you trust, with whom you have a relationship and who has the technical expertise and experience to do the work”
- ❑ The Fluor strategy is to help clients build a better world and assist in delivering solutions in the ongoing global clean energy transition.
- ❑ No matter which underground equipment and systems are selected, flawless digital integration among all assets is needed
- ❑ Strategies for the underground mine are planned years in advance

Innovations

Partnerships with technology companies already at the forefront in designing the backbone or DNA of the digital mine of the future are key to designing future-ready underground mines.

“No matter which underground equipment and systems are selected, flawless digital integration among all assets is needed.

“Strategies for the underground mine are planned years in advance. The mine of the future is conceptualised at the pre-feasibility stage to address how trackless and mechanised mining will operate and deliver sustainable production. We also look at aspects such as remote-controlled vehicles, communication and centralised control rooms, ventilation on demand and rapid charging of battery vehicles.” ■

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ESG – a make-or-break matter for mining

There is a common understanding that environmental, social and governance (ESG) represents one of the mining industry’s most significant opportunities for long-term value creation, building trust and sustainable growth. Miners need to engage with their stakeholders and start to ‘bake’ ESG into the core of their strategies. By *Munesu Shoko*.

There was a time when a public stance on ESG issues was a public relations tactic. However, in today’s rapidly changing business climate, attention to ESG issues is becoming critical to long-term competitive success.

The PwC 2021 Global Investor ESG Survey notes that companies failing to act on ESG issues risk losing investors. ESG factors increasingly drive investment strategies, and new research from PwC finds ESG has now become a make-or-break consideration for leading investors globally.

Almost half of investors surveyed, 49%, express willingness to divest from companies that are not taking sufficient action on ESG issues. More than half, 59%, also say lack of action on ESG issues makes it likely they would vote against an executive pay agreement, while fully a third say they have already taken this action. A large majority, 79%, say the way a company manages ESG risks and opportunities is an important factor in their investment decision making.

In its latest report, *ESG in Mining the Framework*, GlobalData notes that mining executives now have a choice: let ESG issues run them out of business



ESG factors are increasingly drive investment strategies.

or use it as an opportunity to become tomorrow’s leaders.

The leading data and analytics company notes that companies need to act immediately and decisively so every mining company becomes a leader in ESG, including outlining a comprehensive ESG action plan and creating a dedicated sustainability team to deliver these outcomes.

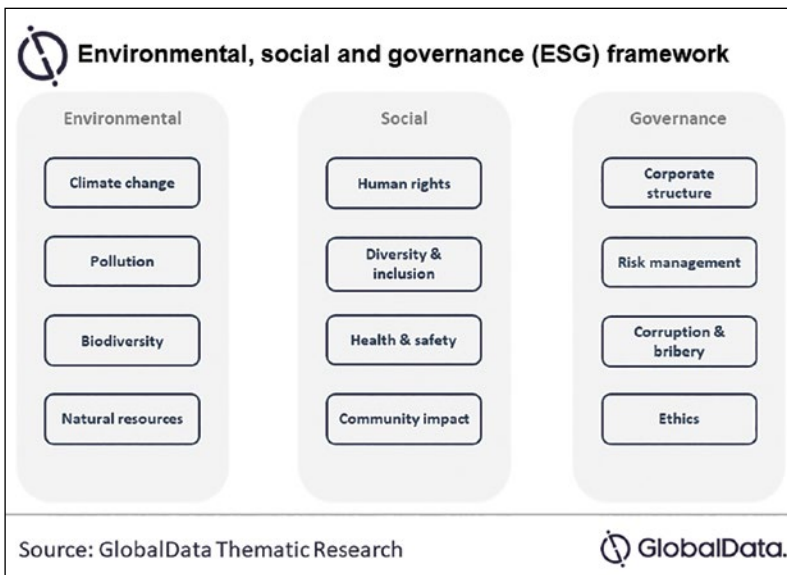
Holistic approach

GlobalData’s ESG framework outlines that companies must take a holistic approach to sustainability that addresses all three of its major aspects: environmental, social and governance.

“ESG issues are the most important of this decade – with citizens, governments, regulators and the media demanding action from corporations to address these challenges. Mining companies must perform well in all of the 12 aspects of GlobalData’s ESG framework: being a laggard in any one of these will hurt brand reputation and, ultimately, profits,” says Luke Gowland, analyst at GlobalData.

“It is easy to find examples of lacklustre governance in mining but much harder to find exemplary case studies. Companies that perform poorly in environmental and social issues likely do so due to poor governance. In the wake of COVID-19, corporate boards need to ensure their company performs financially while keeping ESG at the top of the agenda,” adds Gowland.

Corporate boards must have diverse representation to achieve this or risk facing voting action from their shareholders. By appointing a more diverse range of directors to a board and empowering





them, a company is more likely to be in tune with its employee base, a broad range of stakeholders, and society.

GloalData notes that early engagement with all stakeholders, including employees, shareholders and local communities is key for mining companies to excel at ESG.

Investors have their say

The PwC 2021 *Global Investor ESG Survey* captures the views of 325 investors from around the world, primarily active asset managers and analysts with investment firms, investment banks or brokerage firms. An additional 40 in-depth interviews were conducted globally with investors and analysts having more than a combined US\$11,6-trillion assets under management.

While most investors are likely to take action if companies are not doing enough to address ESG issues, most also say that they don't want a company's action on ESG to significantly, if at all, impact their investment returns. The vast majority, 81%, said they would accept no more than one percentage point less in investment returns for pursuit of ESG goals; nearly half, (49%), were unwilling to accept any reduction in returns.

James Chalmers, global assurance leader, PwC UK, says: "Our research shows investors are simultaneously focused on short-term results as well as the longer-term societal issues that can create both risks and opportunities for their investments. It is clear that investors expect ESG to be an integral part of corporate strategy. That includes making expenditures to address ESG issues, while clearly communicating



Jayne Mammatt, ESG Africa leader for PwC Africa.



Garyn Rapson of Webber Wentzel.



Webber Wentzel's Merlita Kennedy.



Tobia Serongoane of Webber Wentzel.

the rationale and benefits to the business strategy. If investors don't see that commitment, they won't hesitate to take action and that can include divesting their position in a company and taking their clients' money elsewhere."

Reporting matters

Investors increasingly want to hear more from companies about their ESG-related commitments – 83% surveyed by PwC said it is important that ESG reporting provide detailed information about progress toward ESG goals.

Greater engagement with investors, says PwC, is critical, along with transparent, trustworthy reporting. It is concerning that only one third of investors surveyed, on average, think that the quality of ESG reporting they are seeing is good. Investors gain greater confidence in ESG reporting that has been assured – 79% of those surveyed by PwC said they place more trust in ESG information that has been assured, and 75% think it's important that reported ESG-related metrics are independently assured.

A consistent set of metrics for measuring ESG performance would be of significant benefit to investors, according to the PwC survey. Nearly three-quarters (74%) said their decision-making would be

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better informed if companies applied a single set of ESG reporting standards, and a similar number (73%) say it's important to be able to compare ESG performance across companies.

"In Africa and beyond, we believe organisations must integrate ESG considerations into their corporate and investment initiatives and activities, as well as internalise ESG holistically, to build trust and ensure long-term sustainability, agility and competitiveness. Stakeholders increasingly expect organisations to communicate and deliver convincing and measurable strategies on material ESG matters," says Jayne Mammatt, ESG Africa leader for PwC Africa.

Renitha Dwarika, PwC Africa reporting lead, says: "The survey highlights the need for a single set of globally aligned sustainability reporting standards to improve consistency and comparability. In the absence of this, ESG investors and other stakeholders are extremely challenged in evaluating ESG matters. Companies need to focus on incorporating ESG standards, taking into account international frameworks and other benchmarks for performance while ensuring consistency and visibility of the treatment of ESG matters within the financial statements. When you tell investors and other stakeholders how you plan to reset your strategy, reimagine your reporting, reinvent your operations, and drive toward new outcomes, you build trust while creating sustainable value for the long term."

Climate is the leading ESG consideration for investors surveyed in the PwC report, with reducing Scope 1 and 2 greenhouse gas (GHG) emissions being the most cited (by 65%) ESG issue for companies to prioritise. What's more, 82% of investors said it is important that ESG reporting explains the rationale for environmental commitments, along with detailed plans on how to reach them. Ensuring worker health and safety (44%) and improving workforce and executive diversity, equity and inclusion (37%) are other priority ESG considerations identified.

According to the investors surveyed by PwC, ESG strategy starts at the top. A high percentage of investors (82%) said ESG needs to be embedded in the corporate strategy, and by a wide margin (66%) respondents said they are most confident ESG issues are being addressed if someone in the C-suite is accountable. More than half of those respondents (53%) think it should be the CEO.

Litigation looms

In a recent thought leadership article, Merlita Kennedy, Garyn Rapson and Tobia Serongoane of Webber Wentzel, note that ESG-related litigation is looming large for mining, oil and gas companies.

In the near future, says the Webber Wentzel experts, companies operating in the mining, oil and gas sectors are likely to feel the brunt of the increasing prominence of ESG issues and the recalibration of societal norms towards sustainability.

In South Africa, the energy sector is adapting to significant change and market turbulence. At the same time, it is in the cross-hairs of political, legislative and judicial scrutiny, as attention turns to corporate performance in the context of sustainability and climate impact.

For example, in the coal sector, government faces a difficult task in managing the just transition away from Eskom's coal-powered generation, given that the country was at one point the world's fifth-biggest coal producer, the provision of electricity to the citizens of SA is a duty of government and, in the words of the Minister of Mineral Resources and Energy: "We are not a developed economy, we do not have all alternative sources".

However, notes Webber Wentzel, coal is a significant contributor



to greenhouse gas emissions and climate change and the country's reliance on coal for electricity is unsustainable.

SA courts uphold ESG principles

The recent rulings on EarthLife Africa Johannesburg v Minister of Environmental Affairs and Others, relating to the Thabametsi Power Project, and the High Court's setting aside of the environmental approval for the Khanyisa coal-fired power station, show that South Africa's courts have taken a strict approach towards upholding the requirement for regulatory approvals to meet the requirements of the Constitution and the Bill of Rights.

In doing so, the courts have taken a robust prospective approach to the environmental aspect of ESG. What remains to be seen is ESG-related Social and Governance litigation and how courts will deal with those issues in the context of ESG.

"We expect test "S" and "G" cases to be brought in the near future. From the company observation, the willingness of courts to embrace new arguments and establish new precedents in climate change litigation should be closely monitored and balanced against the rights and protections already afforded by both domestic and international law, given that such claims could be a precursor for action against private sector parties," says Webber Wentzel's Merlita Kennedy.

"A balance must also be struck between ESG and the economy. Without an economy to fund ESG

initiatives and to support a government in regulating ESG, ESG becomes nothing more than a buzzword ultimately, companies, including state-owned entities, should maintain a cautious approach to ESG and should involve legal counsel at every step of the way," adds Webber Wentzel's Garyn Rapson.

"Companies should involve legal counsel (1) when attempting to comply with their ESG requirements with a specific view to avoid disputes; (2) when ESG-related disputes are foreseen or threatened, to manage such risk; (3) when ESG-related disputes are brought to the attention of such companies with a view to resolving such disputes; and, most importantly, (4) when an ESG-related dispute has been resolved, in order to ensure that such a dispute never recurs," concludes Tobia Serongoane of Webber Wentzel. ■

Companies failing to act on ESG issues risk losing investors.

Talking points

- ❑ The PwC 2021 Global Investor ESG Survey notes that companies failing to act on ESG issues risk losing investors
- ❑ GlobalData notes that mining executives now have a choice: either let ESG issues run them out of business or use them as an opportunity to become tomorrow's leaders
- ❑ Early engagement with all stakeholders, including employees, shareholders and local communities is key for mining companies to excel at ESG
- ❑ Webber Wentzel advises that ESG-related litigation is looming large for mining, oil and gas companies



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A perspective on the future of work and

The Sibanye-Stillwater Digital Mining Laboratory (DigiMine) and the Wits Mining Institute (WMI) at the University of Witwatersrand hosted the annual DigiMine seminar in September 2021 with the theme, 'A perspective on the future of work and mining – post COVID-19'. *Mark Botha* attended the event and filed this report.

In this year's presentation, former director of the Wits Mining Institute (WMI), visiting professor emeritus FT (Fred) Cawood, focused on two issues, "Looking at the future of mining" and "Preparing for the future of work (FoW) – technology is now 'normal'".

The former subject, he says, shows how the world has changed since the advent of the COVID-19 pandemic: "In the mining industry some three to five years ago, technology was all but the 'go-to topic' of discussion in many conversations whereas today, we live in a world where technology has become normal." He says there is no longer a debate over whether technology has a role to play, as the "machines have already arrived".

"Now, with the 'normalisation' of technology, we must deal with the next wave, where machines are becoming smart. The conversation is now more about automation and artificial intelligence (AI)."

Methodology

Cawood's research is based on a methodology whereby issues facing the mining industry were identified and the underlying trends analysed and used as a basis for the identification of future trends in the industry. Future scenarios were then developed, based on each trend, and evaluated to determine whether they pose risks or present opportunities to the mining industry.

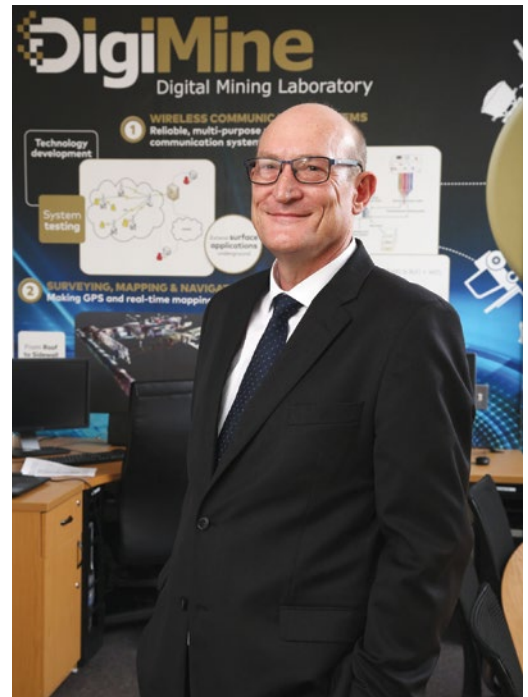
"Where we deal with risk," says Cawood, "a risk management exercise will take place. Conversely, in the case of opportunities, ways are devised to tap into the opportunities and to take advantage of them."

Issues facing the mining industry

He says the mining industry faces more issues beyond its control this year than in 2020.

"With the issues grouped into issues of business (including financial and mining operational matters), sustainability, political (including sovereign, legal and geopolitical matters), and then some cross-cutting matters that impact on all categories, we looked at matters over which mining companies have control, and at those that fall outside their control."

He says that, in 2020, companies were still able to control around half the issues highlighted by his study while, this year, the number of issues beyond



Visiting Professor Emeritus Fred Cawood.

the industry's control surpasses those within its control. This is the first year this has happened and the focus is now on influencing the trends for a better outcome.

Issues for 2021 include the COVID-19 pandemic and vaccine rollouts, which are very important in terms of returning to some semblance of the world of work (WoW) we knew before the outbreak. Data on local mining communities, too, is of importance as these communities are where mines' workforces are sourced from. Technology can play a significant role in helping mines to 'work around' the COVID-19 virus.

Regulatory environments, automation and potentially unacceptable or high-risk artificial intelligence (AI) are other issues faced by the industry this year. In terms of AI, Cawood says the industry must define what forms of AI are acceptable. South African mining must develop its own AI policy – and the Draft EU Regulations on AI can give direction. In addition, An ethical code of conduct for AI creators must set standards before AI develops too far. The issue of AI ethics is just as important as cyber security.

Another threat to the mining industry in 2021 are illegal mining and black markets, which pose significant risk for supply chains and cross-border movement of goods and mineral products. He says supply chains have been under strain since the COVID-19 outbreak, especially for companies with longer supply chains who are now faced with problems regarding imports.

"This raises questions about local manufacturing

mining post COVID-19



The Wits DigiMine lifesize mining stope panel.

and the procurement of local services to reduce the supply chain post-COVID-19.”

He says governments around the world are gaining control over all sectors of the economy – not only mining operations. This has wide-ranging implications for mining in terms of increased taxes, allowable deductions for income tax purposes, resource nationalism and other issues where governments would prefer greater authority.

“This can be seen in the United Nations Conference on Trade and Development (UNCTAD) statistics. There was an increase of around 30% in mining agreements where the state had a bigger say and more control over the agreements in 2021.”

Youth disillusionment, too, has increased over the past year since the COVID-19 outbreak as young people feel dissatisfied and are losing patience because they have no entry into the world of work.

Cawood also points to a miss-match between the growth in population and that of job opportunities in Africa, creating a problem for the future in terms of employing the youth.

Issue analysis

He says analysis of these issues is done to ascertain where innovation is required. Innovation required at the moment relates to structural changes in the economy. These changes fall either within or without the control of mining companies. Climate change and environmental, social, & governance (ESG) management are examples of changes over which

mining companies have gained more control over the years. Decarbonisation in mining, which is growing in importance within the industry, impacts what, where and how we mine.

“Interesting about this issue,” says Cawood, “is that it fell outside the control of mining houses a few years ago. However, it has come under companies’ control through lobbying and partnerships, among others, and companies have started to change their investment portfolios to reduce their carbon footprints.

The world of work (WoW) remains beyond companies’ control as it can be impacted by a number of factors including the announcement by government of another hard lockdown to combat COVID-19 at any moment. These issues require innovation to convince government that the mining industry is capable of working responsibly and safely in terms of curbing the spread of the virus.

Trend analysis

The issues that fall within companies’ control are divided into three groups: investment and business; technological innovation, and ESG & climate change. In terms of investment and business, companies are faced by growing economic, technological and reputational pressures. The cost of mining is also rising, especially for companies with longer supply chains. Added to these is the fact that mining becomes more difficult and complicated as we mine deeper.

Investment portfolios made volatile by the



The Wits DigiMine control room.

constant fluctuations in commodity prices should be optimised.

“It requires hard work to create a relatively steady portfolio,” says Cawood. “This can be seen in how companies’ investment portfolios have been altered to incorporate new ‘21st century metals’ for example.”

A major trend under technological innovation is that the discussion has moved from whether to employ technology on site to fast-tracking technology deployment and the integration of data sources and decision-making for AI.

In terms of ESG and climate change, it is becoming more difficult for mining companies to earn their social licence to practice and to find agreements with communities that will guarantee political stability at the mine level.

“The clock is ticking for achieving the 2030 agenda for sustainable development,” says Cawood. He says the United Nations sustainable development goals have implications for industry and the International Council on Mining and Metals (ICMM) has developed guidelines for companies to follow.

“Mining companies have introduced strategies at executive level to achieve these sustainable development goals. The pressure is mounting to reduce greenhouse gas emissions and greater transparency is needed in terms of ESG spend and tax revenue reporting by mining companies.”

Future of work: trends

Trends under the future of work (FoW) include a more crowded world of work (WoW); growing youth disillusionment and a growing divide between blue and white-collar workers.

A more crowded WoW post-COVID-19 poses new challenges to individuals seeking employment. This situation is created by a mismatch between population and jobs growth. Cawood notes that the world population is currently growing at 1,2%. In Africa, this figure is at 2,5% while, in South Africa, the population grows at some 1,3% year on year.

The increase in available jobs does not match this population growth. While the growth rate in terms of available jobs in some African countries is quite high,

at over 5%, that figure for South Africa is less than 1%.

In the future, we can expect a workplace populated by older people and a solution must be found to strike a balance between people remaining in the workplace for longer and younger people entering the employment market.

The risks include the fact that no professional bodies or ethical standards exist for some of the ‘younger’ professions such as the creators of AI, who are not registered with professional councils.

“There are no prescribed ethical considerations for the creators of AI apart from individual companies’ ethical values. We must be on the lookout for companies with questionable business practices who move into the AI space and produce unacceptable AI,” says Cawood.

The opportunities in terms of a crowded world of work include the creation of jobs by growing the economy through policies that will make investors in the country more comfortable.

“We can also promote new business establishment in regional industrial zones and work with professional bodies to develop standards and allow for multidisciplinary overlaps.”

In terms of the FoW and growing youth disillusionment, the African population is young and COVID-19 has restricted equal access to quality education. We can therefore expect more early drop-outs among students because not all people have the discipline and resources required to work online.

Stronger worker representation will create a further barrier to new entrants into the job market as worker unions tend to protect their existing members.

The risk posed by youth disillusionment is a growing number of educated, unemployed youth in the future. These people will be angered by a system that ‘lets them down’.

The growing divide between blue and white-collar workers is exacerbated by the fact that 4IR skills are flexible and international while the market for blue collar skills is inflexible and local.

We can therefore expect better skills mobility for white-collar workers with digital skills. There will be resentment, with a wedge driven between the interests of workers and managers, especially in labour-intensive industries. Workers may also be displaced by automation.

The risk here is therefore that humans who are not prepared for the FoW will lose their workplace viability and the opportunities include making skills building for workplace mobility a way of life, and embracing flexible, continuous learning for workplace viability and future readiness.

Post-COVID-19 return

The study highlights some pointers in terms of health and safety, workspace and workplace, and skills for workplace readiness.

Pointers in terms of health and safety include preparing for employee health checks to determine how employees have been affected by the pandemic in terms of wellbeing, mental health and depression. The industry must also have protocols in place for COVID-19 testing, social distancing and quarantining.

“The mining industry is accustomed to managing diseases such as malaria, HIV, and Ebola outbreaks in West Africa, so the concept of risk management in an infectious disease environment is not strange to this industry. It is, however, strange to other sectors of the economy that deal with the mining industry,” says Cawood.

A pointer in terms of workspace versus workplace is the preparation of connected workspaces allowing workplace staff to work with staff in remote workspaces.

“We can only break rock at the mine face, which means there will be people at the rockface while technical teams and other personnel work remotely on the same shift. These teams must find a way to collaborate.

“We must promote flexible workspaces as opposed to workplace desks. We must also create virtual teams with more flexible work options and create a ‘workspace mindset’, where work is done from anywhere.”

Pointers on skills for workplace readiness include supporting community education and skills development programmes to provide the youth with the skills needed to enter the world of work.

The industry should also introduce new learning and development programmes aligned with the new WoW and strategy plans for workplace readiness; calibrate existing skills requirements with the new WoW and partner with training, education and professional bodies for a just and ethical transition into the new WoW. ■

Key takeaways

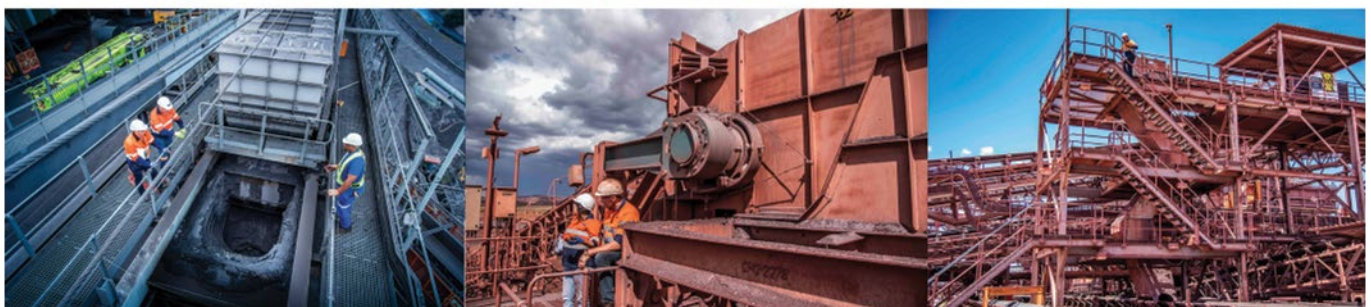
- ❑ This year, the number of issues beyond the industry’s control surpasses those within its control
- ❑ Other threats in 2021 are illegal mining and black markets, which pose risk for real-time supply chains and cross-border movement
- ❑ Innovation required at the moment relates to structural changes in the economy
- ❑ Decarbonisation fell without the control of mining houses a few years ago but has come under companies’ control through lobbying and partnerships
- ❑ Trends under the future of work include a more crowded world of work, growing youth disillusionment and a growing divide between blue and white-collar workers

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Newmont and Caterpillar in strategic alliance to achieve zero emissions

Newmont Corporation (NYSE: NEM, TSX: NGT), the world's largest gold mining company, has announced a strategic alliance with Caterpillar Inc. to deliver a fully connected, automated, zero carbon emitting, end-to-end mining system. Together, they will collaborate to create a safer, more productive mine and substantially support Newmont in reaching their 2030 greenhouse gas (GHG) emissions reduction targets of more than 30%, with an ultimate goal of being net zero carbon by 2050.

"A year ago, Newmont announced industry-leading emission reduction targets because we understand the human contribution to climate change. We followed with a commitment to invest US\$500-million over five years to identify pathways forward as we firmly believe that we must make bold, lasting commitments to achieve the necessary change for a bright, healthy future," says Tom Palmer, president and

CEO of Newmont Corporation.

"Today, we furthered that commitment by announcing a new strategic alliance with Caterpillar to address climate change by fundamentally changing the mining industry through the rapid development and implementation of a comprehensive all-electric autonomous mining system to achieve zero emissions mining."

Building pathways to decarbonisation is essential for the future of mining. Newmont's surface and underground mining fleets are responsible for approximately 40% of the company's carbon emissions. Building a new model for surface and underground mining is critical to delivering on Newmont's emissions reduction targets.

Newmont will also be supporting Caterpillar's validation of evolving features and functionality within the MineStar suite to be deployed across Newmont's surface and underground assets globally.

This deployment facilitates centralised production and asset management.

"Caterpillar is committed to providing transformational advancements in safety, sustainability and technology," says Jim Umpleby, chairman and CEO of Caterpillar Inc. "We share Newmont's dedication to a reduced-

carbon future, and we're honoured to work together on this industry leading effort."

Under the agreement, Newmont plans to provide a preliminary investment of US\$100-million as the companies set initial automation and electrification goals for surface and underground mining infrastructures and haulage fleets at Newmont's Cripple Creek and Victor (CC&V) mine in Colorado, United States and Tanami mine in Northern Territory, Australia.

The first goal is to introduce an automated haulage fleet of up to 16 vehicles at CC&V planned through 2023, with a transition to haulage fleet electrification and implementation of Caterpillar's advanced electrification and infrastructure system with delivery of a test fleet in 2026. Actions include validating first-of-a-kind battery electric haulage technology in the years prior to full production of autonomous electric haulage equipment.

Secondly, Caterpillar will develop its first battery electric zero-emissions underground truck to be deployed at Tanami by 2026. The deployment includes a fleet of up to 10 battery electric underground haul trucks, supported by Caterpillar's advanced electrification and infrastructure system. This includes first-of-a-kind battery electric haulage technology for underground mining in 2024, the introduction of battery autonomous technology in 2025, with full deployment in 2026. ■



Newmont and Caterpillar executives.

TOMRA Mining holds second successful seminar on sensor-based sorting

Experienced industry leaders joined TOMRA Mining's experts as guest speakers in a seminar designed to provide a solid, pragmatic grounding on sensor-based sorting. The event highlighted the important role of sensor-based sorting technologies in green mining and their potential to unlock significant value in mining projects, as well as the possibilities of digitalization for supporting customers and managing connected equipment.

TOMRA Mining's seminar on sustainable mining solutions through sensor-based sorting covered a wide range of topics, starting with an introduction to the various sorting technologies, and including different applications, test work, design and economic considerations. Every topic was backed up with practical examples from case studies of ore sorting projects. The presentations gave

rise to interesting discussions about the state of the art of sensor-based sorting in mining today and its potential for the future as the industry transitions to green mining.

The seminar highlighted the value of considering these technologies in the first phases of preliminary feasibility. Jordan Rutledge, area sales manager at TOMRA, explains: "Sensor-based sorting should be considered in the flowsheet from the beginning and evaluated in pre-feasibility studies to see if it is suitable for the project and will add value to the plant. In many cases sorting works really well and, as we continue to go towards a green economy, the use of our resources is vitally important. In order to make the best use of them, sorting plays a critical role."

The seminar attracted around 40 participants from across Canada. They included

representatives from operator mining companies such as Agnico Eagle, Capstone Mining and Cheetah Resources; from laboratories such as testing and certification company SGS and the Saskatchewan Research Council (SRC); from engineering companies such as DRA Global, Primero, CIMA and Halyard; as well as students from the University of Toronto.

This was the first live event in almost two years for many of the participants, who appreciated the opportunity to meet face to face with their peers, as Justin Taylor, president and CEO of Halyard Inc. expresses: "I think live events offer a much deeper look and a different dimension into how people can communicate and connect. Part of the experience is learning about things and the other half is interacting with people, building networks and relationships." ■

BME launches AXXIS Titanium

Safe and efficient blasting has taken a momentous step forward with Omnia Group company BME's launch of AXXIS Titanium, one of the world's most advanced electronic blast detonation systems.

BME MD of the SADC region Ralf Hennecke has hailed AXXIS Titanium as a significant advance for the company's ever-evolving technology offering, securing BME's position among the global leaders in electronic delay detonator (EDD) design.

"Our release of AXXIS Titanium raises the bar globally for the electronic detonator market," says Hennecke. "This flagship product reflects our continued focus on digital advancement on mines, and is designed to seamlessly integrate with BME's software systems and hand-held digital tools."

AXXIS Titanium improves safety levels and manufacturing quality through enhanced communication with the detonator during manufacturing to avoid defects. Performance is raised through the increased blast duration per detonator, more units per blasting box and precise firing accuracy.

"Most importantly, the AXXIS Titanium system was built for the blaster and blast engineers who work with the product every day," he says. "The robustness of the wire, the easy-to-use interface and the improved integration will improve efficiency in terms of time, data and reporting."

As the latest generation of BME's popular and well-proven AXXIS system, AXXIS Titanium takes blasting safety and flexibility to a new level, according to Tinus Brits, BME's Global product manager for AXXIS. BME has over the decades

made regular advances in the performance, safety and reliability of this innovative solution, says Brits.

"This latest iteration builds on the achievements of the AXXIS GII model and raises the bar in many of the features that have served our customers so well," he says. "These include further refinements in safety, accuracy, flexibility, ease of use and speed in preparing each blast."

Safety remains the watchword, with the incorporation of a Swiss-designed application-specific integrated circuit (ASIC) chip in the BME detonators, delivering several added benefits. The ASIC gives the system more internal safety gates against stray current and lightning, enhancing safety levels and allowing for inherently safe logging and testing.

"A unique innovation is our use of dual capacitors and dual voltage, allowing us to conduct low voltage logging to avoid any chance of detonation," he says. Blasts are initiated by a robust, encrypted blast command ensuring that detonators all receive their respective commands and fire as planned. He emphasises that the detonator will only react if it receives the correct, encrypted firing sequence from the blasting equipment, not from any other source.

"We have developed AXXIS Titanium to be resistant to electro-magnetic pulses (EMPs) caused by the blast, which can affect the accuracy of detonators or even cause them to fail," he says. "Our intensive tests in conjunction with the Council for Scientific and Industrial Research (CSIR) showed that our detonators can withstand a significant EMP without any impact on their timing." ■



AXXIS Titanium allows mines to program blasts of up to 35 seconds long for larger and more complex.



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TOMORROW'S TECHNOLOGY TODAY

Booyco Engineering expands HVAC services in mining

Booyco Engineering, specialist in robust, custom-engineered air-conditioning systems, is now driving the expansion of its service offering in the mining sector following the proven success of its products in this demanding industry.

The company has been a leader in



A Booyco Engineering HVAC system being installed on a mining vehicle.

heating, ventilation and air-conditioning (HVAC) solutions for decades, supplying extensively to the rail, defence and mining industries. Booyco Engineering managing director Brenton Spies says the expansion of its mining footprint will help mines improve their vehicle uptime while further enhancing health and safety performance.

“Keeping mine vehicle operators cool in the heat of a mining site is crucial to health, safety and operational efficiency,” says Spies. “Standard air-conditioning systems, however, seldom stand the test of time, leading to unexpected failure and unplanned downtime.”

Among the factors causing early failure are hotter-than-average ambient temperatures, high dust levels, heavy vibrations, shocks from uneven mine haul roads and long operating hours. Grant Miller, Booyco Engineering’s executive director, points to the danger of drivers working in an overheated cab, should an air-conditioning system fail.

“This is not only a danger to the health of the driver, but could affect other workers and infrastructure on the mine if the cab conditions cause the vehicle to be driven unsafely,” says Miller. “Fortunately, many countries including South Africa apply regulations to ensure safe working conditions – so an operator could be entitled to cease

work if the cab becomes over-heated.”

The result is that a machine could stand idle, waiting for repairs to the air-conditioning unit while costing hundreds of thousands in lost production for the mine. He says there are two aspects to avoiding this risk: installing fit-for-purpose HVAC equipment on mining vehicles; and applying a regular and high quality maintenance schedule.

“This is where Booyco Engineering has proved itself to our mining customers,” says Miller. “We engineer the HVAC solution to suit the miner or contractor’s application, and we ensure that the equipment is well maintained.”

The company’s design and support capability has been developed over more than 35 years, employing the latest software and specialised tools in its 3,000 m² Meadowdale facility. Its technical support services allow customers to rely on Booyco Engineering for a planned maintenance programme for their HVAC systems.

“Few mining operations have the skills to conduct this specialised work professionally on a regular basis,” says Spies. “Where the mine is large enough to warrant an on-site technician or team, we can put that in place as part of a maintenance contract to ensure that all HVAC systems continue performing optimally.” ■

Major milestone for IMDEX’s BLASTDOG

Leading global mining-tech company IMDEX has announced a major milestone for IMDEX BLASTDOG, its breakthrough

drill and blast technology.

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

It has been developed in collaboration with Universal Field Robots and tested at mines in Queensland, Western Australia, Chile and Nevada.

At a recent industry event, IMDEX said BLASTDOG would move from engineering development to commercial prototype by the end of the year.

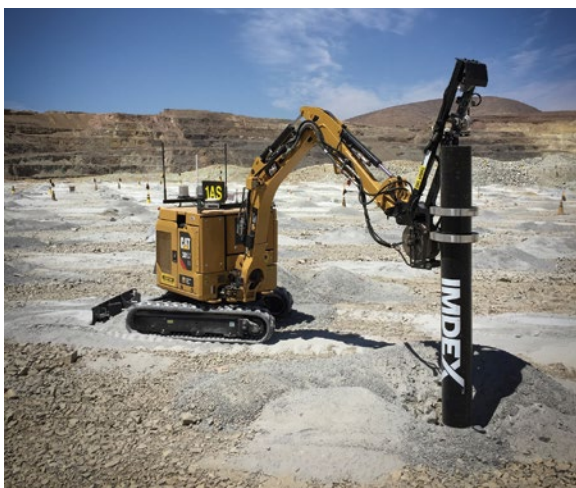
Progress was outlined to representatives from development partners from METS Ignited, as well as other mining sector executives.

IMDEX says there is already strong industry interest in BLASTDOG because of its capacity to deliver reliable, real-time data that will enable critical mine planning decisions to be made earlier, introducing greater efficiencies throughout the mining value chain.

IMDEX CEO Paul House says no other technology has the capacity to produce the same data and provide as large an impact on downstream processes, including enhancing productivity.

“It has the capacity to improve productivity, efficiency and safety and is part of IMDEX’s internet of geosensing initiative and will significantly increase mine to mill efficiency,” says House.

“Moving to a commercial prototype is a significant development. We will work with prospective clients to ensure that when it is released IMDEX BLASTDOG will deliver the results, efficiencies and safety that will be its trademark.” ■



BLASTDOG will move from engineering development to commercial prototype by the end of the year.

Maptek Geology challenge winner solves data complexity problem

Maptek has announced the inaugural Maptek Geology Challenge winner as Henry Dillon, senior geologist with global consultants, Golder, a member of WSP.

Dillon, who works in Christchurch, New Zealand, applied a combination of Maptek geology tools to model complex shallow surface geology beneath a proposed engineering structure.

“Our key problem was how to use all the data in the boreholes to model all the geologies and still get the low and high density sands in the right places throughout those drillholes,” Dillon says.

“The answer was to assign and use numeric values and combine the data with soil behaviour types and shear wave velocities to control the geological model.”

Dillon applied Maptek Vulcan, Vulcan GeologyCore, Data Analyser and DomainMCF for the challenge, which had to be completed over one week earlier this year.

“DomainMCF handled complicated interfingering of sandy and silty materials and modelled sand-gravel interactions, generating the complex lithological interactions expected from braided river systems,” Dillon says.

Speed is a known benefit of DomainMCF and proved to be the case for the Christchurch study.

“We were able to construct a reason-



Winners of the 2021 Maptek Geology Challenge Henry Dillon, Golder (left) with Reece Stewart, Anglo American (top right) and Matt Green, Evolution Mining (lower right).

able lithological model from drillhole and cone penetrometer test data for an area of known geological complexity. We sent 193 000 data points to DomainMCF and received our model after 13 minutes and 6 seconds!” Dillon comments.

As well as displaying an innovative approach to geotechnical assessment of performance and design for the foundation of a future structure, Dillon provided invaluable feedback for improving the integrated modelling solution for all users.

“DomainMCF has targeted the mining industry, but many other industries find traditional modelling processes to be equally

time consuming - we can spread the benefit,” Dillon says.

The challenge was launched as part of Maptek Connect, a 24 hour online conference delivered in May. Maptek provided access to various software tools that participants could apply to a geology-related application of their choice, with an emphasis on innovation.

Dillon’s reward was a cash prize and DomainMCF hours for Golder, which he plans to assign to development projects that would benefit from the simple workflow approach that quickly produces an accurate geological model from a dataset. ■

High-precision, accurate sampling for mines and their customers

Innovation in Multotec’s proven hammer samplers allows two consecutive samples to be taken from the product stream in quick succession, ensuring two sets of accurate results – one for the mine and one for the customer.

“A single sample increment cannot simply be divided into roughly two equal parts,” says Refilwe Makgae, senior application engineer at Multotec. “This can result in up to five of the nine sampling errors occurring in a single step.”

She emphasises that each consecutive increment must instead be carefully diverted to its own bin, so that successive increments do not contaminate each other. Multotec has therefore developed a reliable flopper gate that is easy to operate and gives feedback about the flopper positioning.

“This ensures that a good seal is achieved, preventing sample cross-contamination,” says Makgae. “For existing operations where this new requirement is imposed, this innovation can be easily retrofitted.”

She notes that high levels of precision in sampling can only be achieved with fine design tolerances for each application. For this purpose, Multotec has developed software integration mod-

els across AutoCAD Inventor and programming code, to automate parts of the design. This process uses pre-programmed design logic and interpolates from the company’s data library which covers a worldwide footprint of over 800 hammer samplers in the field. ■



Multotec has a worldwide footprint of over 800 hammer samplers in the field.

Zest WEG'S MV switchboard minimises downtime for Gauteng gold miner

Zest WEG has supplied one of its locally manufactured MTW05 Medium Voltage (MV) switchboards to a gold producer in Gauteng. The changeout was carefully coordinated to minimise disruption to the customer's plant.

According to Zest WEG executive Bevan Richards, the choice was based on the panels' compact dimensions, safety features and internal arc classification. With a 17,5 kV voltage rating, basic insulation level (BIL) of 95 kV and a fault level rating of 31,5 kA, the switchboard also has a high internal arc

classification of 31,5 kA BF ALR 1sec.

"The changeout was facilitated by an extension of the substation to allow both the existing panel and our new MTW05 MV panel to be accommodated in the same room," says Richards. "This allowed for our panel to be installed and energised, so that loads could be moved from the existing panel to the new panel at opportune moments."

The customer was able to complete the termination of cables from the national utility, from the standby generator set and

from numerous feeder overhead lines in this phased approach. This avoided hours of downtime, Richards explains, which would have cost the customer dearly in terms of lost production. The job was conducted after detailed engagement with mine management, to arrive at an optimal solution within the operational demands of the plant.

"The project consisted of numerous phases, including the addition of a MV power factor correction (PFC) system," he says. "With the plant planning a number of upgrades, the new state-of-the-art panel provides a safer solution that will accommodate all the required modifications and extensions going forward."

The order included the supply of a battery tripping unit (BTU), a cabinet for tools and equipment, and a new distribution board, as well as the completion of internal control cabling. Zest WEG also supplied, installed and commissioned a fire suppression system inside the MV substation and PFC room.

"Another element of our solution was to give the customer enhanced monitoring capacity, by fitting the incoming panel with a power quality meter with GPS and GPRS capability," says Richards. "This allows for the off-site monitoring and recording of power quality and energy consumption, so they can pick up any spikes in the grid supply that might expose the plant to damage in the long term and determine the cause of power outages." ■



Zest WEG supplied a locally manufactured MTW05 Medium Voltage switchboard to a gold producer in Gauteng.

Metso Outotec launches hybrid Crossover feeder

Metso Outotec is launching the Crossover feeder, which is a hybrid feeding solution suitable for a wide range of greenfield and brownfield applications. Thanks to its innovative modular belt-over-apron design, the Metso Outotec Crossover feeder is said to deliver unmatched levels of availability and reliability for bulk material transportation at lower overall costs.

"We are very excited to announce the launch of the Crossover feeder. It was developed to provide a flexible and economical solution in a wide range of applications where belt and apron feeders are not the optimal fit," says Brian Bookamy, Director, bulk materials handling at Metso Outotec.

The Crossover feeder design features a reduced height of up to 50% as compared to

conventional feeding technology. This lower height requirement provides an opportunity for CAPEX savings by decreasing the excavation and civil works required. For retrofit applications, the reduced height profile allows the Crossover feeder economically replace existing feeders, including apron and/or belt feeders by lowering modification costs.

The Crossover feeder complements Metso Outotec's versatile feeding solutions portfolio, which also includes Apron feeders and Belt feeders, enabling Metso Outotec to provide our customers with the best feeding solutions to maximise performance and productivity. All Metso Outotec feeding solutions feature optimal design and dependable components to handle any

duty in mining. Support through the comprehensive services network enables easy maintainability and minimal downtime.

The Metso Outotec Apron feeders are suitable for both light and heavy-duty applications and consist of a pre-engineered range that makes sizing and selection simple. They are best suited for feed to a primary gyratory or jaw crusher, primary gyratory discharge, secondary and tertiary stockpile reclaims, and railcar dumper discharge.

The customisable Metso Outotec Belt feeders provide a reliable solution for material transport especially in large, high-capacity installations. The optimal applications range from light- to medium-duty for tertiary, reclaim and concentrate, and filter cake discharge, as well as railcar dumpers in lighter duty. ■

Effective liquid spill clean-up for mines

A completely natural, mineral product, Gunge Sponge, is playing a major role where outdated methods such as sawdust fall short. Produced by South African manufacturer Pratley, Gunge Sponge is an ideal product for cleaning up any liquid spills, including petrol, diesel, oil, sewage and other hazardous liquid material.

The use of sawdust to clean-up any oil spills is sometimes still prevalent. However, it is dangerous to clean up a flammable material using another flammable material, and in many cases is actually prohibited by local bylaws. "It exacerbates the problem as the disposal and storage of the used sawdust poses a potential fire risk," comments Pratley marketing director Eldon Kruger. In addition, when using outdated clean-up materials like sawdust, soap or solvent is still required to mop up any excess fuel or oil.

Gunge Sponge Clean-Up Powder is produced from a mineral known as Clinoptilolite, which is processed by Pratley. The mineral is unique in the sense that it is highly absorbent and will absorb all liquids like oils and fuels. In addition, and due to the cationic properties of the product, it is also highly effective in eliminating odours, as in the case of sewage spills.

Simply sprinkle Gunge Sponge on any oil or fuel spill and it will immediately absorb all of the liquid, leaving a completely clean and dry surface. "Customers are always amazed at how quickly and effectively a spill can be cleaned up, leaving a dry and clean floor. We can truly say that there is nothing else on the market that can clean up a spill as effectively," says Kruger.

It is imperative for mine employees to be trained in spill procedures and plans. Pratley Sales Representatives personally go out to mines to demonstrate the use of Gunge Sponge, and also to highlight the risk of using outdated methods to clean up oil and fuel spills.

"The growth of Gunge Sponge has increased exponentially, as we have a lot of mines currently using the product to control their oil and fuel spills, both underground and in surface work areas," highlights Kruger. The product is also used extensively in fuel-filling and storage

areas in underground mines in particular.

This spike in growth is attributed to the fact that more and more mines are becoming aware of the dangers associated with oil and fuel spills, as well as the legal implications of using the wrong methods. Oil spills not only result in environmental issues, but can also pose a risk of personnel slipping and injury.

Gunge Sponge is sold in 12 kg bags, and Pratley has a quantity-based discount structure in place. "Due to recent increased demand from mines, we have boosted our production and stock levels in our stores," reveals Kruger. ■



Several mines use Gunge Sponge to control oil and fuel spills underground and in surface work areas.

Why predicting chute life is so important

Measuring the wear life of a transfer chute is no simple matter, as many different components need to be tracked. However, the benefits of doing this add directly to the bottom line through improved uptime.

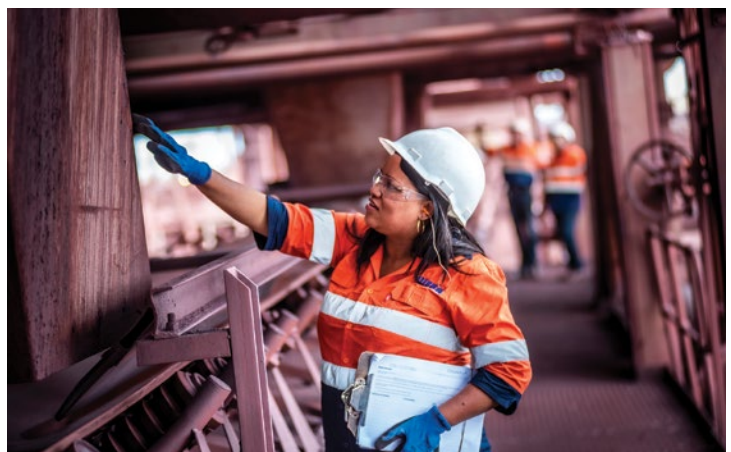
Isak Potgieter, ISO systems manager at Weba Chute Systems, highlights how the company's customised reliability model can capture key wear indicators for each chute – and calculate how much longer each liner, lip or other component will last.

"By feeding the model the right data – including wear measurements taken during regular inspections – plant operators gain valuable insight into wear patterns," says Potgieter. "This information can be used to predict which components need replacing, and when."

This allows the necessary planning to be done, such as ordering the required parts to be ready on site for the next maintenance opportunity. This preventative maintenance ensures that there are no unexpected stoppages – with the related disruption and lost production time.

"Our ability to accurately predict the lifespan of the components inside our chutes streamlines the whole maintenance process," he says. "We use this reliability tool extensively on all our maintenance contracts, but even those customers without such contracts can still request the service from us."

With reliability modelling, customers can receive a monthly report that will provide a timescale of when maintenance is needed on each of the wear parts within every chute. The complexity of the model reflects the differential wear levels in parts of the chute where impacts vary – so that owners can focus on areas of highest wear. ■



Weba Chute Systems' customised reliability model can capture key wear indicators for each chute.

Net Zero by 2050 – Does that make coal a dying investment?

South Africa has 200 years of coal reserves. But, because of global warming and climate change, COP26 is striving to achieve the total eradication of fossil fuels as an energy resource by 2050, Net Zero 2050 being the marshalling call. And, they are quite serious. Will this leave coal as a dead investment? Perhaps not!

The world's average annual global temperature is about 1° Celsius hotter than pre-industrial levels, and scientists predict that this will increase to 1.5°C by 2030. Translated, that will increase risks to health, livelihoods, food security, water supply, human security and economic growth, with Impact vectors extended to include reductions in crop yields and nutritional quality. How? Heat waves, droughts, snow storms, wildfires and floods, which are caused by our increasing global temperatures. How exactly?

The Earth's climate system is powered by radiation from the sun, of which 49% is absorbed by the Earth's surface and 20% is absorbed by the Earth's atmosphere. This absorption greatly affects the oceans. Water covers about 71% of the Earth's surface, with 97% of the Earth's water found in oceans.

These vast expanses of water greatly influence climate patterns as we have seen from the Pacific Ocean's El Niño and La Niña. These phenomena significantly alter seasonal climate conditions such as temperature and rainfall patterns – in many parts of the world, especially across Africa. These effects lead to a wide range of both good and bad impacts, mostly on agricultural production, water availability, disease outbreaks, fishery catches and so on.

As records show, over the last 50 years, the number of natural disasters increased by a factor of five. In 2020, followed closely by 2021, this number doubled. China was particularly hard hit. Floods ravaged the country, with one headline reading “half of China is under water right now!”

South Africa is the world's 14th largest emitter of greenhouse gases (GHGs) from fossil fuels. These include coal, petroleum, natural gas, oil shales, bitumen's, tar sands and heavy oils. The country's carbon dioxide (CO₂) emissions are principally due to a heavy reliance on coal. This makes South Africa responsible for roughly half of Africa's total greenhouse gas emissions with its energy-intensive economy and use of cheap, dirty coal firing power stations. Add to this the 20 times more harmful methane (CH₄) emissions from municipal landfill sites and you have a serious problem.

This has motivated the US, UK, France, Germany and the EU to strike a R130-billion deal with South Africa to accelerate its shift away from coal and towards renewable solar and wind energy, and to support coal workers and coal communities. It would seem that this money is the death knell for coal usage in South Africa.

Or is it?

One of the most fascinating things about engineers is they find solutions to a myriad of problems. Tony Stone, CEO of Energy Technology Innovators (ETI) is one such person. He looked at the future and inevitable Eskom discontinuance of coal and mapped out a sustainable and profitable alternate use for coal to produce electricity, hydrogen as a fuel source, Naphtha for use in the manufacture of laundry soaps, cleaning fluids and varnishes, heavy fuel oil for the shipping industry and low sulphur diesel, all using tried and tested green friendly technology that fully complies with the COP, USA and EU's emission regulations.

Setting out its vision for a net-zero economy, IEA modelling indicated that demand for hydrogen would need to reach 528-million t globally by the time 2050 arrives. In 2020, global consumption amounted to 87-million t. A McKinsey & Company report estimated that the hydrogen economy could generate US\$140-billion in annual revenue by 2030 and support 700 000 jobs. The study also projected that hydrogen could meet 14% of total American energy demand by 2050. Then there is the rest of the world.

Global demand for Naphtha is estimated to be worth USD 183,38 billion by 2022. Chemical feedstock was the largest application of naphtha accounting for 65% of the total market share in 2014 and is anticipated to grow at a CAGR of 7.7% over the forecast period to 2022 and beyond.

Heavy Fuel Oil is used by 60% of the approximately 60 000 ocean-bound large vessels in the world, that comprise cargo ships, cruise ships, ferries, oil tankers and bulk carriers. The fuel oil releases energy to rotate the ship propeller or the alternator by burning fuel inside the combustion chamber of the engine or to generate steam inside the boiler. The reason it is so widely used is because of its price/affordability.

ETI's innovative technology, capable of processing up to 100 tonnes of coal per hour, producing 400 MW/hr electricity, with zero nitrous oxide (N₂O) and sulphur oxide (SO₂), negligible carbon dioxide (CO₂) and hydrogen sulphide (H₂S) emissions, carries a written 25-year life-of-plant guarantee. This offers coal mine owners and investors an alternative, secure investment future for coal – a new beginning. ■

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Coal stockpile at Hunter Valley coal mine.

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