

# MINING *Africa* MAGAZINE

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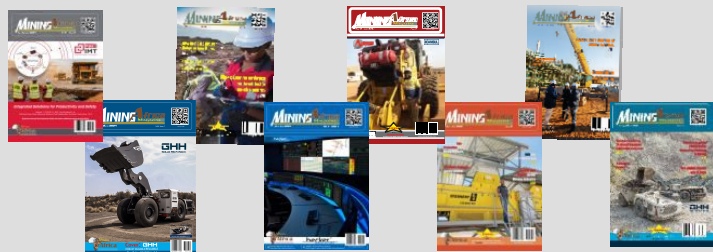
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## Editor's Note

**M**ining Africa Magazine is a marketplace, a communication hub and news source for advancing mining Industry businesses in the region.

Abundant resources, an advanced mining sector, robust financial systems, a progressive legal framework are the gateway to African markets.

A robust mining sector is broadly understood as a fundamental path to economic growth and development. The key boon of mining is that it absorbs large swaths of workers and places them into productive and decent paying jobs.

Throughout history, this exact recipe has transformed the United States, United Kingdom, France, Japan, and Germany into some of the world's wealthiest nations.

In this issue, you will find articles covering a wide range of topics, from technological advancements to sustainability initiatives. Our team has worked diligently to provide you with valuable and informative content that we hope will enrich your understanding of the mining sector.

We examine the role of technology in addressing some of the challenges faced by the African mining industry, such as improving productivity, reducing environmental impact, and ensuring the safety of workers. We highlight case studies and

success stories from mining companies that have embraced technology to achieve operational excellence and sustainable growth.

Furthermore, we explore the potential of technology to unlock new opportunities for African mining. With the increasing demand for minerals and metals driven by the global transition to clean energy and the rise of electric vehicles, technology can play a crucial role in identifying and extracting these resources responsibly and efficiently.

As we look to the future, we believe that technology will continue to be a game-changer for African mining. By embracing innovation and investing in technological advancements, mining companies can enhance their competitiveness, reduce costs, improve safety, and contribute to the sustainable development of the continent.

As always, we welcome your feedback and suggestions for future issues. Your input is invaluable to us as we strive to deliver content that is relevant and engaging to our readers.

Thank you to all our authors, subscribers and advertisers for helping to shape not only this edition, but also the very fabric of the magazine.

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# Eliminating downtime: building reliable power for mining operations in Africa

**A**frica's mining sector requires power reliability as a matter of survival, making it critical that companies invest in solutions that deliver longevity and reliability, says Johan Helberg, Head of Sales, Africa at Aggreko

According to the International Monetary Fund, global demand for critical minerals is set to increase significantly. For nickel, demand will double between 2022 and 2050, cobalt will triple, and lithium will increase tenfold says the International Energy Agency – and sub-Saharan Africa has an estimated 30% of these minerals in reserves. The region has immense potential, but realising the potential requires reliable energy solutions, particularly as mining operations across the continent continue to grapple with unstable power grids, rising energy costs, and increased pressure to meet sustainability goals.

As the Boston Consulting Group pointed out in its 2024 Africa Mining Outlook analysis, mining is not an easy business but its complexity is compounded by energy instability, demand for cleaner energy supplies, and costs.

The impact of unreliable energy on the mining sector is extensive. Energy supply shortages have a direct impact on a mining organisation's bottom line as companies have to invest in alternative solutions and failovers that can cost upwards of 30% of their total cash operating costs. The industry is reliant on continuous operations to remain profitable which makes reliable power crucial to remaining operational and financially stable. A study undertaken by Nelson Mandela University in South Africa, for example, found that loadshedding has a long-term negative impact on mining equity returns and impacts on stock viability for international investors.

The cost of energy unreliability makes a compelling case for hybrid energy solutions



designed to not just mitigate the risks but to provide mining organisations with the tools they need to build resilient power

infrastructure. These hybrid systems combine traditional power sources with renewable energy and battery storage to create robust



energy platforms that ensure mines can maintain operations even when the grid fails. By blending multiple energy sources, they offer immediate fail-over energy provision within a single, intelligent system that prioritises both reliability and efficiency.

Hybrid also allows companies to distance themselves from the complexities that continue to plague power management, generation and infrastructure on the continent. Regulatory and policy uncertainty is affecting approvals and generating uncertainty when it comes to establishing independent power solutions, and there remain financial and infrastructural challenges that inhibit investment and growth.

The effectiveness of hybrid systems lies in three key pillars. The first is that hybrid systems offer mining organisations redundancy through multiple power sources. When one fails, others can compensate which ensures continuous operations and reduced risks and costs. This is particularly useful in remote mining locations where grid connections are weak or non-existent. The second is that these systems incorporate battery storage technology which acts as a buffer against power fluctuations while providing immediate access to power on demand. Battery storage systems have the added benefit of improving overall plant efficiencies while reducing fuel consumption and maintaining power quality. This technology can help mining operations prioritise stable power supply during peak demand periods or when renewable sources are temporarily unavailable. Finally, hybrid brings a new level of scalability and flexibility to operations. These are critical when considering how rapidly a mine's power needs can change thanks to both internal and external factors. Modern hybrid systems offer mines the ability to adjust and scale energy provision and structure according to demand and to create a power infrastructure that fits their operations as they evolve.

However, implementing an effective hybrid solution needs to be strategic and well-engineered, finding the optimal balance

between sustainability, cost and reliability. This balance is particularly important within the African context where operational challenges can be more pronounced due to infrastructure limitations and operating in rural locations. Success means customising each hybrid solution to meet the unique power requirements, environmental conditions and operational constraints of each mining operation, and to partner with an energy provider that understands these constraints and knows how to develop relevant, tailored solutions.

The financial aspect of hybrid systems is also important. While the initial investment appears to be costly, the long-term benefits across operational stability, reduced downtime and reliable output can outweigh these. There are financing solutions that have evolved to support the sector in its move towards sustainable and reliable energy as well. The Build Own Operate Maintain (BOOM) model, for example, is a modern financing option that allows for the mining company to access reliable power without substantial upfront capital expenditure.

Aggreko's hybrid solutions seamlessly integrate cutting-edge solar power and battery technology with traditional fuels like

diesel, offering a blend of low emissions and high reliability. These systems are designed to prioritise solar power, maximising efficiency and minimizing environmental impact. During periods of high sunlight, batteries store solar energy to be used throughout the day, while generators automatically step in only when solar power is insufficient to prevent disruptions. Aggreko's advanced diesel and gas generators are engineered to minimise pollutants, ensuring that emissions remain as low as possible when in use. An intelligent energy management control system oversees the entire process, guaranteeing uninterrupted energy supply while reducing fuel costs and carbon emissions.

Looking ahead, the adoption of hybrid energy systems in African mining operations will become increasingly attractive to companies as the technology continues to evolve and costs come down. These hybrid solutions offer a practical solution to the ongoing power reliability challenge and enable mining companies to maintain continuous operations and build the resilience they need to thrive. The key to success lies in choosing the right energy partner who has deep industry expertise and a proven track record in implementing hybrid solutions in challenging environments.







## Academy pumps out the next generation of experts

KSB Pumps and Valves has invested in a specialised training centre designed to equip internal and branch staff, as well as certified partners with in-depth knowledge of KSB products and systems. Clients are also catered for with provision of 1<sup>st</sup> line maintenance and operator training

According to Craig Hawkins, who heads up the SupremeServ Academy the initiative was started due to the growing need for skills development across KSB's service value chain particularly in support of the company's broad pump portfolio.

"Our academy is designed to arm our people and partners with the knowledge and skills needed to successfully repair, maintain, install and fault-find KSB products and related equipment. It also aims to ensure that end-users are educated in how to operate our pumps efficiently and reliably," says Craig.

He explains that the training offered at the SupremeServ Academy has been created to suit a wide audience including artisans, technicians, engineers, sales teams, certified service partners and clients. It encompasses

over 280 training modules, covering everything from basic pump theory, pump selection and industry-specific applications to model-specific maintenance, value-added products like Pump-Guard and even site installation and set-up simulation training.

These modules vary in duration ranging from one-day sessions to week-long courses and offer a blend of theoretical and interactive content depending on the needs of participants. While the Academy is currently not a profit generating centre, course costs are structured to cover facilitator fees,



training materials and related travel or accommodation expenses particularly when sessions are delivered off-site.

"Knowledge is power and by completing our courses our staff improve their skillsets and meet personal development goals. Certification also assures our clients that our work is being carried out by qualified professionals," Craig adds.

He continues that training is mainly held at the company's Jet Park-based facility, where a well-equipped lecture room accommodates

up to 16 participants. The room features a Clevertouch screen, individual workstations, display models of pumps, components and amenities including tea, coffee and light meals.

Although still in its early stages the academy has already hosted several successful courses including SAPMA's advanced pump training and API standards overview. Upcoming sessions designed for specific industry personnel such as for boiler water circulating pumps for our energy partners, are already scheduled.

Phase two of the Academy, which is currently underway, will include a dedicated practical workshop at KSB's SupremeServ Jet Park centre allowing for hands-on training and product familiarisation. These sessions are tailored to needs and will also benefit field service teams who support critical installations such as power stations, water reticulation, Petro-chemical, paper industry as well as other industry sectors. Internal training is coordinated through department heads, while its clients typically make contact via sales or contracts/projects teams, or directly through SupremeServ.



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## Leading the way to the all-electric mine

**D**ecarbonising the mining sector requires more than just new technology; it demands a structured methodology, collaborative partnerships, backed by an integrated suite of technology solutions. ABB eMine™ provides a strong portfolio of Electrification and Automation solutions, consulting, partnerships and technology applications to support Mining operations to accelerate achieving their goals related to reduced emissions, operational cost savings and superior efficiency.

ABB eMine™ also enables mine operators to plan, monitor, and control their operations with greater precision using solutions containing short interval control (SIC) functionalities, ultimately optimizing the use of resources and improving efficiency.

“Our eMine™ portfolio empowers miners to rapidly succeed in their all-electric transformation journey,” says Martin van Zyl, Sales Manager, Process Industries at ABB.

ABB's eMine™ solutions are gaining traction globally, with different regions prioritising different aspects of the technology. In

underground mining markets, battery FastCharge solutions are attracting considerable interest, while ABB's digital Short Interval Control (SIC) system has revolutionised efficiency in underground operations. Meanwhile, in countries such as Canada, Australia and South Africa, interest in Trolley Assist solutions is rapidly increasing.

### Modular and Scalable Solutions for the Future

A major advantage of ABB eMine™ is its modular and scalable design, allowing mining companies to implement electrification strategies at their own pace. ABB supports clients in developing multi-year roadmaps that align with operational lifecycles, starting with quick wins and progressing toward broader, long-term transformations.

In addition, ABB offers tailored services such as remote monitoring, predictive maintenance, and system upgrades to maximise equipment performance throughout a mine's lifecycle. Advanced digital mining services enable real-time data collection and analysis, allowing for predictive interventions that shift

maintenance strategies from reactive to proactive.

“We are committed to creating sustainable progress for both current and future generations by supporting our mining clients through their energy transition,” says van Zyl. He emphasizes that full electrification will not simply happen overnight. Instead, an intentional plan to partner with Technology leadership teams such as ABB eMine™ will accelerate the journey towards Real Progress.

### Regional Adaptations and Case Studies

One notable implementation of ABB eMine™ is at the Boliden Aitik Copper Mine in Sweden, located 100 km above the Arctic Circle. The mine's hybrid trucks are equipped with onboard electrical systems that connect to a trolley line, significantly reducing CO<sub>2</sub> emissions and improving fuel efficiency. This infrastructure is expected to help Boliden transport up to 70 million tons of rock annually while cutting greenhouse gas emissions from transportation by up to 80% along the electrified routes.



In another example, ABB delivered a complete open-pit Trolley Assist solution to Copper Mountain Mining Corporation in British Columbia, Canada. As the first such installation in North America in decades, the project demonstrates the region's shift toward mine electrification. ABB designed the overhead catenary system (OCS) infrastructure and delivered a rectifier substation providing over 12 MW of DC power. The trolley control system was integrated into the ABB Ability™ distributed control system (DCS) platform for seamless monitoring of operations and energy consumption.

### Strategic Implementation Through

#### Collaboration

Early-stage involvement is crucial for effective electrification, as it enables comprehensive technology, economic, regulatory, and geographic assessments. ABB's approach involves conducting comparative simulation studies to gain insights into each mining operation and providing guidance for strategic project decisions.

Furthermore, ABB fosters collaborative partnerships with technology providers, investors, service providers, consultants, EPC/EPCMs, and OEMs to enhance electrification systems based on real

operational data. By leveraging these partnerships, ABB ensures that its eMine™ solutions are tailored to the specific challenges and opportunities of each mining operation.

As the mining industry continues its shift towards sustainability, ABB remains a key partner in helping mines transition to an all-electric future through innovation, expertise, and a commitment to long-term progress.



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# The lube kitchen part 6: dispersant additives – the crowd-controller in engine oil

By Steven Lumleyk

As part of the ongoing discussion around different oil additives with condition monitoring specialist company, WearCheck, this time, the focus is on how dispersant additives function and why they make great crowd-controllers at social events.

What are they?	Polymeric alkylthiophosphonates and alkylsuccinimides, organic complexes containing nitrogen compounds.
What do they do?	Keep insoluble soot dispersed in the oil.
How do they do it?	Insolubles are bonded by polar attraction to dispersant molecules, which prevents them from agglomerating.

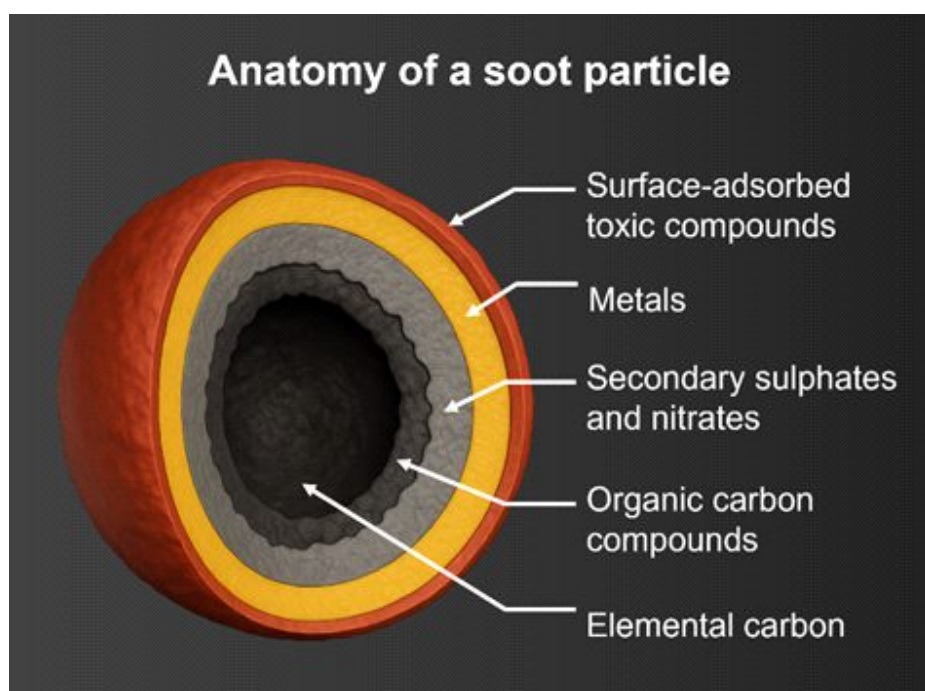
Whenever I think of dispersant additives, an image of a night-club bouncer comes to mind. I know this might seem like a stretch of the imagination, but humour me. Among their many duties, night-club bouncers are also responsible for crowd control in their place of entertainment. Crowd control involves defusing potentially volatile situations by dispersing (keeping apart) club-going patrons who might otherwise want to “agglomerate” into a brawl.

Similarly, the function of a dispersant additive is to disperse undesirable elements like soot particles, that might otherwise want to agglomerate into larger particles.

In this respect, dispersant additives and night-club bouncers display a high degree of commonality – they discourage agglomeration through the process of dispersion.

Unlike night-club bouncers, however, our dispersant additive utilises some pretty nifty chemistry - so let's take a look at how this additive controls crowds of soot particles in oil.

Dispersants are non-metallic, ashless cleaning agents that inhibit sludge-formation by keeping insoluble contaminants, like soot, dispersed in the oil and preventing them from coating metal surfaces. They are also mainly



found in engine oils.

So, why all the fuss about soot particles agglomerating? Well, soot particles are sub-micron in size when formed, but with progressive fuel usage, large quantities of these particles are continually deposited in the oil, and will eventually agglomerate into larger particles which can cause all manner of evils.

Increasing concentration of soot contamination can cause sludge formation, higher operating temperatures, loss of anti-wear performance and increased viscosity. Added to this, the additional soot-loading increases the strain on the dispersant's ability to function optimally.

With many engine manufacturers looking to extend oil-drain intervals, controlling soot agglomeration has become even more of an arduous task for this additive, as longer oil-drain intervals mean more soot-loading of the oil. If soot is not adequately dispersed by the engine oil, it can cause sludge to form on rocker and front engine covers, bearings to fail, valve bridges and fuel-injection links to wear, and filters to plug.

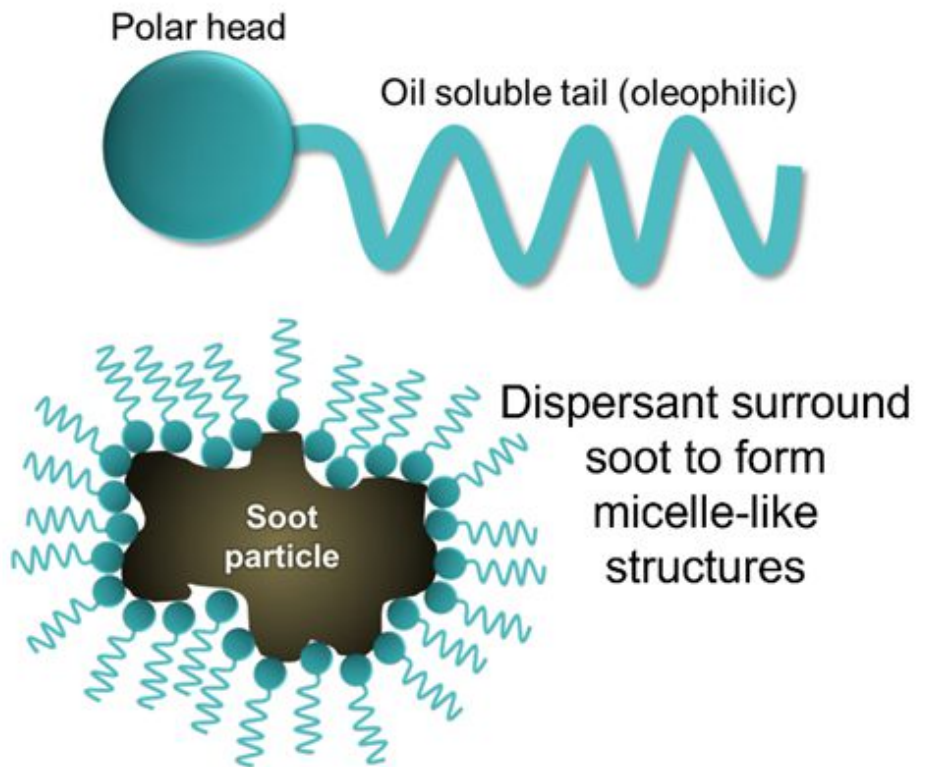
The durability of the oil and additive system in relation to the ability to disperse soot and maintain a regime of reduced wear, has led to significant changes in additive formulation in recent years and, as such, lubricant blenders



have had to increase the treat rate of this additive. These days, dispersants are typically one of the major components of fully formulated engine oils, making up between 30 and 60 percent of the total additive package.

Now for the nifty chemistry part of how this additive works its magic - dispersant additives work by enveloping the soot particle in a single layer. The polar head of the dispersant molecule clings to the particle, directing the additive's "oleophilic" tail outward to dissolve into the oil. This causes the soot particles to be suspended in the oil, prohibiting them from agglomerating with other soot particles or depositing onto component surfaces.

In the next instalment of the lube series, we introduce you to a whole new class of fascinating lubricant additives – bulk property chemical additives, starting with detergents. Please visit [www.wearcheck.co.za](http://www.wearcheck.co.za) or email [marketing@wearcheck.co.za](mailto:marketing@wearcheck.co.za) for more information.



## Mining runs on precision and the pursuit of productivity

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Martin employees safely install an air cannon flow solution on a transfer chute with regular clogging issues.

## Industry Insight from Martin Engineering's New Australian Managing Director

**M**artin Engineering, the global leader in belt conveyor and bulk material flow technology, announced the hiring of Darren Gilbert as Managing Director of the Australian Business unit. A native of Newcastle, Australia, Mr. Gilbert brings a combination of international experience, extensive industry knowledge, and an understanding of Australia's bulk handling market and its people.

This key appointment follows a major expansion of Martin Engineering's operations in Australia, which includes establishing two manufacturing facilities. One location is in Yatala in the east, and a pending location is in Perth in the west, with plans to expand field teams in both areas. Mr. Gilbert will help ensure that Martin's best-in-class standards for products and services are delivered to customers consistently as per the company's Absolutely No Excuses, Problem Solved Guarantee.

Over the past 30+ years, Mr. Gilbert has

worked for German, Australian, and Chinese companies with a significant global presence, such as Rema Tip Top, VLI, and Continental. Recently, he led divisions in China and India, mainly focusing on selling conveyor components and establishing service teams.

We asked him to offer some insights into the Australian market, the future of bulk handling on the continent, and the obstacles bulk handlers face across mining, quarries, cement, ports, agriculture, and sugar.

Insights into the Australian Bulk Handling Market

Q - What are some things about the Australian bulk handling market that stands out from others you've worked in?

Gilbert - The main standout is the ongoing need for production efficiency, driving significant advancements in automation and AI technology. All material handling sectors in Australia face unique challenges, such as our regulatory environment and commodity

diversity. Martin is committed to innovation and ensuring all our sites implement efficient and safe systems of work by fostering a genuine culture of care.

Q - What was one thing you learned working outside of Australia that will benefit Martin's operations and customers in the Australian market?

Gilbert - I've learned the importance of providing a complete solution to improve operational performance instead of just quick fixes or band-aids without follow-up. Our value proposition focuses on efficiency, safety, superior engineering, and understanding how each component interacts within the entire system. I'm excited to bring this detail-oriented approach to customers across Australia

Q - You have deep insight into several facets of industrial equipment manufacturing. What are your overall goals for Martin's future in Australia?



Gilbert - The goal is to introduce and educate both current and prospective customers about the benefits our professional service teams provide in each location. We intend to emphasize how we can enhance the product and service touchpoints throughout the life cycle of each system. Our premium engineering reporting and analytics will significantly add to our value proposition and enable our customers to remain competitive.

Thoughts on the Future and Workplace Safety

Q - What have you seen as a growing trend/issue in belt conveyor bulk handling?

Gilbert - The shortage of skilled labour to install and service components properly is a significant problem. Customers want to reduce risk by limiting the number of contractors providing product and service support onsite. As a result, the expectation is to install and maintain your product range quickly and efficiently. Martin has a global team of experts and comprehensive training programs through the Foundations™ books, courses, and online Learning Center, which we use for internal staff and offer to customers around the world. These ensure our teams deliver the outcomes customers expect in a proficient and safe manner, as well as enhancing the knowledge and training of customers' staff.

Q - One of the core principles on which Martin was founded is safety. How has workplace and equipment safety influenced your career?

Gilbert - Walking onto a jobsite, the correct safe work attitude is revealed to me by how the work area and environment are maintained. When I discuss tasks and the employees' understanding of the procedures, risks, and control measures, I discover their competency. Martin Foundations™ training helps drive change, ensuring proper installation and maintenance, and ultimately celebrating the success of safe outcomes as a team.

A safe workplace is not an option, it's

essential. It's everyone's responsibility to ensure both our own safety and that of others. Recognizing and managing risk is fundamental to our approach. As leaders, we must promote education, ensure compliance, and foster belief in our safety systems. I've witnessed how poor safety can impact individuals and businesses, as well as the excitement and motivation when everyone is committed. That's why I'm so passionate about it.

Q - You'll be visiting numerous sites and meeting a lot of new customers. Please offer any personal thoughts or insights about yourself that you feel might help introduce you to them before you meet them in person.

Gilbert - Being approachable and solution-oriented has helped me build long-lasting relationships worldwide. My approach is

holistic, providing customers with results that ensure their operations are cleaner, safer, and more productive. Building enduring relationships with customers and anticipating their needs are strengths I highly value.

#### Conclusion

The Australian market has enjoyed Martin Engineering products since 1978. After establishing an office in 2017, it has grown to become the country's top bulk-handling service and solutions provider. Using a "factory direct" model, customers receive reliable product fulfillment, faster response times, and hands-on service from local experts. By adding Mr. Gilbert to the Martin Engineering team, the company is confident that its stellar reputation for superior solutions will thrive and grow.



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The Martin Engineering team in Yatala, Australia



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Martin provides on-site in-person training, as well as the largest free online conveyor training platform in the industry.





*John Stiff,  
partner and  
principal engineering geologist  
at SRK Consulting (South Africa)*



*Hennie Booyens,  
principal geotechnical engineer  
at SRK Consulting (South Africa)*



*Basetsana Mmileng,  
senior engineering geologist  
at SRK Consulting (South Africa)*

## Protecting infrastructure against the risks of dolomite ground

**S**inkholes and subsidence in areas underlain by dolomite rock continue to pose considerable risks to infrastructure, requiring that developers carefully assess geological stability before designing any building or civil engineering works.

According to John Stiff, partner and principal engineering geologist at SRK Consulting (South Africa), dolomite-related risks have been particularly high in areas of South Africa where mining has taken place – due to the extensive dewatering that typically accompanies mining activities.

“Groundwater fills the cavities within dolomite rock, exerting hydrostatic pressure that helps stabilise these voids,” said Stiff. “When groundwater is removed during dewatering, this pressure is reduced, making the ground more prone to instability.”

Equally, however, dolomite-related risks to infrastructure occur in non-mining areas due

to the gradual dissolution of dolomite rock through geological time by slightly acidic rainwater.

“In Gauteng province, for instance, parts of Soweto, West Rand, East Rand and Centurion are underlain by dolomite,” he explained. “Development in these areas has been plagued by sinkholes and subsidence, leading to significant damage. In mining areas, this risk can be magnified where tailings dams are operated of these ground conditions.”

### History of sinkholes

The country has in fact lost many lives in accidents caused by sinkholes. Among the well-known cases was a tragedy in December 1962 at West Driefontein Mine on Johannesburg’s West Rand, when a three-storey crusher plant fell into a sinkhole – killing all 29 people in the building. Two years later, a family of five along with their live-in domestic worker were killed when a 100 m wide sinkhole swallowed their home in Carletonville.

“In response to these disasters, South Africa introduced stringent regulations and standards to manage the risks associated with infrastructure and development on dolomitic ground,” he said. “These include the current South African National Standards (SANS) 1936, which provide guidelines for geotechnical investigations, risk assessment and mitigation measures.”

The risks associated with dolomite are not confined to South Africa. As SRK’s experts have observed, regions such as the Katanga Copperbelt in the Democratic Republic of Congo (DRC) and parts of the Northern Cape also face similar challenges due to the widespread presence of dolomite rock. Rapid infrastructure development in mining countries like the DRC underscores the importance of effective risk management strategies.

### Early identification

Ensuring the safety of human life and preventing damage to infrastructure starts with thorough geotechnical investigations of



the area where developments are planned, according to Basetsana Mmileng, senior engineering geologist at SRK Consulting (South Africa).

“Preventative measures include a dolomite risk management strategy, conducted in accordance with the standards and regulations,” said Mmileng. “This is a proactive way to mitigate the risk of these incidents occurring, and ensuring that your land use and infrastructure design is suitable for these conditions.”

Techniques such as gravity surveys are used to identify anomalies in the subsurface, indicating voids or weak zones. Hennie Booyens, principal geotechnical engineer at SRK Consulting (South Africa), highlighted the importance of integrating findings from geophysical surveys with detailed drilling programmes. Percussion or rotary core drilling is employed to investigate the site in more detail, and to gain a comprehensive understanding of site conditions. This approach allows the investigation team to identify potential hazards early, said Booyens, and to guide the development of tailored solutions.

Tailings storage facilities (TSFs) represent mining infrastructure which is particularly vulnerable in the context of dolomitic ground, said Stiff, because they contain such large volumes of water.

#### **Instability, contamination**

“If you have concentrations of water – either in the pipes delivering tailings product or even in the separation of water in the TSF itself – this can cause problems by leaking into the substrate,” he said. “Sinkholes can form directly underneath the tailings dam, leading to structural instability, groundwater contamination or, in severe cases, dam wall failure.”

For these reasons, Booyens emphasised that the basin of a tailings dam is a critical area for investigation prior to construction.

“The liner under a tailings dam, while effective to a degree, has limitations and cannot fully mitigate the risks posed by

unstable dolomitic ground,” he explained. “If you have sinkhole formation in the basin of the facility, there's only so much strain that the liner can accommodate before it ruptures and water and tailings starts seeping into the substrate and groundwater.”

These factors further demonstrate why careful site characterisation and risk assessment are vital to ensure the long-term stability of these facilities. Mmileng added that risks extend beyond the TSF itself. “It is also crucial to understand what this failure would mean to surrounding infrastructure,” she said. “For example, if there's a ventilation shaft system nearby, subsidence in the TSF could cause damage to these facilities as well.”

#### **Key skill sets**

SRK Consulting's long history of involvement in dolomite investigations, and the depth of expertise it has developed in this field, are demonstrated by having certified Level 4 dolomite specialists in its ranks.

“Recognised for their expertise and contributions to the field, a Level 4 dolomite specialist has over 10 years of experience in dolomite investigations and risk management,” said Mmileng. “They can assess and manage risks, characterise sites and ensure compliance with the standards.”

Investigations are most effectively conducted

by multidisciplinary teams, with a key collaboration between engineering geologists and geotechnical engineers.

“Engineering geologists characterise the karst conditions on the site, while the engineers design the solutions and mitigating measures that help prevent failures and safeguard the structures,” said Stiff.

The company also boasts its own in-house geophysicists, which sets the company apart. This facilitates the ground characterisation phase with gravity or resistivity surveys, ensuring a detailed understanding of subsurface conditions.

“The analysis of geophysical data is only as good as the interpretation, which is handled by our skilled in-house team,” he said. “This streamlines the accurate identification of anomalies during the early stages of a project – which in turn helps with the design of targeted interventions, saving time and costs in the long run.”

He added that expertise in groundwater management is also vital to the team.

“One of the critical factors is the groundwater – not only because it is at risk of pollution, but because groundwater is a key factor in the stability of the ground,” he explained. “If the underground dolomitic cavities are water-filled, the risk of subsidence is mitigated.”



*Sinkholes and subsidence in areas underlain by dolomite rock continue to pose considerable risks to infrastructure*





## GLOBALMINING100 REVEALS POWER SHIFTS IN THE \$950 BILLION MINING SECTOR

by Richard Roberts

**T**he world's 100 largest mining companies sold a staggering \$946.4 billion worth of minerals and metals in 2024 and were collectively valued at \$1.83 trillion as of June 2025, according to GLOBALmining100, a new landmark report by Mining Beacon.

The GLOBALmining100 is part of Mining Beacon's ongoing series of in-depth industry reports. As the global news and research platform of Beacon Events—organisers of the International Mining and Resources Conference + Expo (IMARC) in Australia and Resourcing Tomorrow in the UK—Mining Beacon delivers insight at the intersection of market intelligence and strategic industry shifts.

This latest report offers a compelling snapshot of the evolving global materials sector, highlighting a profound shift in the industry's centre of gravity. It charts a mining landscape increasingly defined by geopolitical disruption, decarbonisation imperatives, and the rise of a new generation of market players.

According to the report, higher average copper and gold prices helped offset softer thermal coal and iron ore markets, which collectively produced \$946.4 billion of minerals and metals in 2024 versus \$925.56 billion in 2023.

Copper at \$173.81 billion and gold at \$131.81 billion were two of top three minerals and metal revenue generators for the Top 100 in 2024. Thermal coal (\$131.97 billion) and iron ore (\$130.65 billion) were other major income generators for the world's leading miners, along with bauxite, alumina and

aluminium at a combined \$85.83 billion. Canadian oil sands majors mined and sold \$54 billion of the energy commodity last year.

The Mining Beacon Top 100 also produced and sold circa-\$145 billion worth of coking coal, zinc, nickel, silver, lithium, uranium, rare earth elements, platinum group metals and fertiliser minerals in 2024.

The exclusive June 2025 GLOBALmining100 report provides a unique snapshot of an international primary materials supply industry that has assumed elevated geopolitical, economic and social importance post-COVID on the back of military conflicts, trade sanctions and wars, and surging energy transition demand for certain minerals and metals.

AI-led technology sector demand for energy, electrification and other critical materials has also intensified the spotlight on a global primary mining and metals industry largely still prospering on major mineral discoveries and province builds of yesteryear.

There are 11 companies in the Top 100 global miners born before 1900, including six of the top 50, and the average age of the Top 100 is 53. The average age of the top 50 companies is 60.

There are six Gen Alpha companies in the Top 100 global miners and 30 companies overall born this century.

The key generational shift in global mining in the past three decades has been the integration and growth of China-based international mining and metals heavyweights. The average age of the nine

Chinese companies in the top 50 is 29. In the Top 100, 14 Chinese companies have an average age of 28.

Overall, the Mining Beacon Top 100 global miners are headquartered in Canada (25), Australia (18), China (12) and USA (12), South Africa (6), Russia (4) and England (4), India (3) and Indonesia (3), and Sweden (2) and Chile (2).

Ninety-six of the Top 100 are stock-exchange-listed companies. They had a combined market value of \$1.836 trillion as of June 20, 2025, with the top 50 worth \$1.48 trillion at that time.

The GLOBALmining100 ranking is based on 2024 minerals and metals revenues, not public market values. Revenue numbers do not include trading and other non-mining income.

The Top 100 global miners had 2,561,141 people working at their sites at the end of 2024 and they reported 397 fatalities in total in the past two years (205 in 2024).

Four of the Mining Beacon Top 100 global miners had female CEOs at the end of 2024.

"The GLOBALmining100 shows how both legacy giants and rising players are reshaping the mining landscape not just by what they produce, but how and where they operate," said Richard Roberts, Editorial Director, Mining Beacon.

Access the full report now at [www.miningbeacon.com](http://www.miningbeacon.com).



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# Hexagon Hails Landmark Australian Mine System Integration

by Richard Roberts,

**W**hitehaven Coal says results of a successful field integration of Hexagon operator alertness and vehicle collision avoidance technologies represent a “significant step forward in operational safety and data-driven learning” for the industry.

“Whitehaven has concluded a successful trial that integrated Hexagon's OAS and CAS technologies, providing a step forward in vehicle interaction and collision awareness learnings,” the Australian coal mining heavyweight said in a statement to mark Hexagon's market release of its Operator Alertness System (OAS) 7.5, used in the Whitehaven trial.

Swedish measurement and automation technology leader Hexagon says the Whitehaven field deployment on an entire mine fleet over more than 10,000 cumulative operating hours demonstrated the robustness and efficiency of OAS 7.5. “The integration worked with exceptional processing efficiency – averaging just 5.8 seconds for event videos to be remotely available for review – all with minimal network impact due to advancements in

edge-based video data handling,” the company said.

OAS 7.5 builds on Hexagon's existing OAS, described by the company as an “integrated fatigue and distraction management solution that helps operators of heavy and light vehicles, above and below the surface, to maintain the level of attention necessary for long hours and monotonous tasks”.

The latest iteration integrates operator alertness monitoring with Hexagon's CAS 10 collision avoidance system to automatically capture and display video of CAS 10 predicted collision events and give safety personnel a “real-time window into critical events and operator performance”.

“OAS 7.5 reaffirms Hexagon's commitment to delivering industry-leading safety solutions that support customers in achieving their zero-harm goals,” Hexagon's Mining division executive vice-president, Dave Goddard, said. “We continue to collaborate with partners and mining leaders globally to refine these technologies and set new standards for operational excellence.”

Whitehaven Coal talked about “genuine

collaboration” being a foundation of its successful project.

Its work with Hexagon marks another significant mining-sector milestone for the technology company, which recently hailed “transformative results” of its first underground OAS deployment with metals producer MMG at Rosebery in Tasmania.

Again, both parties hailed real collaboration as a vital enabler of not only improved underground operator fatigue management and safety outcomes but also the cultural and process change management steps required to rapidly release benefits of cutting-edge technology at, in this case, a circa-90-year-old mine.

“The OAS system has been so good for us,” Rosebery safety manager Wendy Hodgetts said. “The relationship we've had with Hexagon [has] been very open and I think early support was critical to the successful implementation of this engineering control into our workforce and into our trucks.”

The “engineering control” at Rosebery is

advanced OAS sensor technology and machine-learning algorithms that actively monitor operators' alertness levels. When signs of distraction, drowsiness or microsleeps are detected operators receive real-time notifications which the mine operator believes providing a crucial layer of protection during demanding 12-hour shifts.

Beyond detecting fatigue events, MMG worked with its supplier to foster a culture of proactive operator fatigue management to improve safety and operations.

Results have been documented in various forums but in the first three months of OAS use at Rosebery, validated operator eye closure events reportedly dropped by 65%.

The percentage of moderate or critical events decreased from 40% to 15%, which Hexagon says highlights the role of culture and change management.

The longer-term trend has been even more encouraging. Hexagon says 25% of the 1375 events recorded in the first three months were classified as moderate or critical. In the same three months a year later 10% of 653 recorded events were judged higher severity, representing a 53% overall reduction in events and an 81% drop in severity.

Adjustments to mine crew rotations and break times, new fatigue break facilities, hard-won operator trust in how camera footage and fatigue events were managed and employees generally feeling more

supported on fatigue reduction measures are all credited with helping to adjust the safety culture at the mine.

"The deployment of Hexagon OAS is providing valuable data for our operation and making a difference in the safety of MMG's workers," Rosebery general manager Steve Scott has said

"We recognise that with long shifts fatigue can become a hazard and this technology enables us to continually assess and address the fatigue risk of our underground truck operators objectively, in real time."

Hexagon is a lead sponsor of IMARC 2025 at ICC Sydney from October 21-23.

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# SANDVIK CEO HAILS SURFACE DRILLING TECHNOLOGY

by Richard Roberts

CEO Stefan Widing has described [Sandvik](#)'s new AutoMine Surface Fleet solution as an important step in the company's strategic efforts to grow in surface mining.

The underground mining equipment and technology major introduced AutoMine Surface Fleet in the first half of this year. Widing was speaking on Sandvik's June quarter and first-half results call.

"We have introduced a new important solution with AutoMine Surface Fleet," he said.

Sandvik introduced its AutoMine automation system for underground mining equipment in 2004. The company says operators can manage a larger number of Sandvik surface i-series drill rigs from any connected site location with AutoMine Surface Fleet.

"The new solution delivers unprecedented flexibility while reducing downtime and improving productivity during shift changes," the manufacturer says.

Sandvik Mining surface automation product line manager Severi Eerola said recently the new system was fully compatible with Sandvik's AutoMine Universal Station, allowing the operation of both boom and rotary drills even in challenging rock and weather conditions.

"This ensures every shift can be run at optimal performance, regardless of the conditions, by providing a fully integrated solution that allows mining operations to run continuously and efficiently, even during blast breaks."

AutoMine Surface Fleet also leveraged AutoCycle capabilities for continuous rig operation with minimal human intervention, automating processes such as stabilising, precise positioning, collaring, drilling, reliable pipe handling, hole finishing and tramming to the next hole.

"With AutoMine Surface Fleet, operators can manage individual autonomous rigs and oversee the entire bench, providing accurate

positioning, automated drilling and obstacle detection for safe and efficient operations," Eerola said.

Extensive field tests at Boliden AB's Kevitsa multi-metal openpit mine in northern Finland had demonstrated the technology's operational benefits.

"The geological conditions at Kevitsa are highly complex, with mixed mineralogy, ductile rock and seasonal challenges such as water and frost, all of which affect equipment performance and drilling capacity," Boliden Kevitsa's drilling development manager Juha Ranta said.

"The AutoMine Surface Fleet solution has enabled us to optimise our operations under these demanding conditions. The ability for operators to seamlessly switch to remote control, along with the strong aftermarket support from Sandvik, has been instrumental in maintaining high performance."

Sandvik is a platinum sponsor of [IMARC 2025](#) at ICC Sydney from October 21-23.



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# TIME TO TAKE A CLOSER LOOK AT HYBRID MINING SYSTEMS: WORLEY

by Richard Roberts

Leading global engineering group Worley has again put its weight behind in-pit crushing and conveying (IPCC) systems as a sustainable mining solution, now also highlighting the role of “a rising star in sustainable mining” in a possible hybrid approach.

“IPCC systems have been in operation for years, with several mining companies adopting them to reduce reliance on trucks and improve efficiency,” says Nicholas Russell, principal mechanical engineer with the Australian Securities Exchange-listed Worley.

“Their key benefit lies in using conveyors for material transport, which is more energy efficient.

“By replacing trucks, IPCC systems significantly reduce fuel use and emissions.”

Apart from IPCC's generally hefty upfront capital requirements, Russell says the extent to which operations can be fully “truckless” is likely to vary. In many cases hybrid solutions that combine IPCC and a smaller truck fleet might provide “the best balance between sustainability and operational flexibility”, he says.

While still seen to be in its infancy, battery-electric haul truck (BEHT) technology is highlighted by Worley as a further promising advance in the industry's efforts to reduce emissions.

Senior associate technical consultant Renee Frenette says electric-powered trucks shape as a direct replacement for diesel-powered units, promising cleaner and quieter options. “As the technology matures it's expected to become more widely adopted across the sector,” she says.

Frenette says current BEHT models are significantly smaller than units required for



large-scale mining operations, with original equipment manufacturers estimating larger-capacity BE trucks will be available between 2027 and 2030. However, smaller vehicles might still have a key role in a practical solution for many mining sites.

“A hybrid model might involve using IPCC to handle most of the material transport while a smaller fleet of BEHT or hybrid trucks is used in areas requiring more flexibility or where IPCC is not feasible,” Russell says.

The approach reduced truck dependency and associated emissions while leveraging the continuous material flow and efficiency of the IPCC system for improved material handling, he said.

In the short term combining both technologies could provide operational flexibility and scalability that a truckless system couldn't offer, with each technology offering different route capabilities.

“For example, [for] the upper burden in a strip mine trucks can travel straight across the pit, whereas IPCC typically needs to go around it. Conversely for deep pits IPCC generally take a steeper, more direct route,” Russell says.

Worley says a hybrid solution is currently being studied in Morocco where IPCC is being considered for one material type and BEHT for the remaining operation.

“This solution allows the mine to benefit from an overall reduced fleet size, lessening the risk of supply constraints before 2030,” Frenette says.

In China small BEHT fleets were already in use alongside IPCC installations while in Australia “many miners ... are conducting desktop studies to assess the feasibility of IPCC concepts”.

Russell says countries such as Saudi Arabia and other parts of the Middle East are also exploring both technologies as part of their broader efforts to expand their mining sectors and adopt more sustainable practices.

“As environmental regulations tighten, these regions are becoming key hotspots for the adoption of both IPCC and BEHT,” he says.

[Worley](#) is a gold sponsor of [Resourcing Tomorrow 2025](#) in London from December 2-4.

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## Zutari appoints new CEO for Africa

**E**ngineering consultancy [Zutari](#) has appointed **Tlhabeli Christopher (TC) Ralebitso** as Chief Executive Officer: Africa, effective 1 July 2025. This appointment marks a further significant step forward in Zutari's journey to strengthen its leadership team and sharpen its regional focus across Africa. He will report directly to Group CEO **Teddy Daka**.

TC brings a rare blend of engineering, investment, and executive leadership expertise that spans nearly three decades, with a proven track record in infrastructure, telecommunications, data science, and strategic investments.

He holds a Bachelor of Engineering in Mechanical Engineering and began his career in engineering roles at Eskom and South African Breweries. His early exposure to the operational side of infrastructure was complemented by leadership roles in strategy and venture capital.

TC's corporate leadership journey includes a distinguished decade at Vodacom Group,

where he held various executive positions, including Group Executive for Mergers & Acquisitions, Investor Relations, and Managing Director of Vodacom Ventures. He led several landmark transactions and strategic initiatives that shaped Vodacom's evolution beyond mobile services.

In 2017, he transitioned into entrepreneurship and established Ralco Investments, where he led strategic investments across multiple sectors. He established Vulatel, a telecommunications infrastructure company built through the acquisition and integration of Plessey South Africa and Gio Construction.

Under his leadership, Vulatel grew its workforce, secured major clients across the telecoms sector, and attracted significant investment partnerships, including a R1.4 billion infrastructure venture with Helios Towers Africa.

Beyond telecoms, TC has also directed investments in healthcare infrastructure and

industrial gases across the SADC region. His work with Consuweld has directly contributed to improved access to medical oxygen in underserved regions through projects in Lesotho, Eswatini, Mozambique, Malawi, the DRC, and Zambia. His leadership positioned Consuweld as a trusted partner to global health organisations and national governments.

In addition to his executive responsibilities, TC has served as a non-executive director and advisor to Business Science Corporation, a data science and analytics firm, and continues to champion innovation and entrepreneurship through various strategic ventures.

"TC's appointment reinforces Zutari's commitment to 'Engineering Impact' in Africa through strong leadership, client-centric innovation, and deep regional understanding. His passion for building resilient, future-fit infrastructure aligns with our vision of co-creating sustainable solutions across Africa and the Middle East," concludes Teddy.

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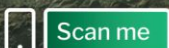
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# BARRICK'S LUMWANA A 'GROWING FORCE IN AFRICAN COPPER'

by Richard Roberts

**B**arrick Mining Corp CEO Mark Bristow says the company's major Lumwana copper operation in Zambia, the focus of a US\$2 billion expansion, is becoming a "flagship for sustainable copper mining".

Bristow said this week at the site that six years after Barrick reviewed Lumwana as underperforming and high-cost it was being transformed into a growing force in African copper.

"With this expansion gaining momentum Lumwana is on course to join the world's list of large and strategically important copper mines and a powerful driver of growth for both Zambia and Barrick," he said.

Barrick is doubling 100%-owned Lumwana's annual copper production to 240,000 tonnes per annum via its Super Pit opencut development, taking annual material movement to 240 million tonnes per annum, and expanded 52Mtpa processing plant. It expects to achieve the elevated mining and processing rates by the end of 2028.

Lumwana has current proven and probable reserves of 1.6 billion tonnes grading 0.52% for 8.3Mt contained copper.

Bristow said infrastructure upgrades — including a new power transmission framework developed in partnership with ZESCO — were progressing to support both the mine and the wider region.

In the past six years Lumwana had contributed more than \$4 billion to the Zambian economy through taxes, royalties, procurement and wages. More than \$3.4 billion had been spent with Zambian suppliers, representing 79% of its total procurement. About 98% of the current plus-3000 direct workforce are Zambian nationals,

with nearly half drawn from nearby communities.

Barrack says Lumwana's expansion is driving development of the Manyama township and industrial supplier park as part of an integrated development plan aligned with Zambia's Mining and Minerals 2031 policy. A new regional airstrip is expected to be completed by the end of the year and a TEVETA-accredited training centre will be launched to expand Zambia's mining skills base.

"The mine is also advancing one of the country's most ambitious environmental and carbon initiatives with the development of a REDD+ forest conservation program in collaboration with local chiefdoms and the Forestry Department," the company says. "Covering up to 300,000 hectares, the project is designed to generate future carbon credits while supporting sustainable livelihoods,

biodiversity and land stewardship."

Bristow said Lumwana showed how a world-class mine could help build an industrial ecosystem while safeguarding the environment and expanding economic activity.

"We're not just expanding a mine, we're strengthening a partnership," he said.

"Our teams are actively exploring further growth opportunities across the Zambian copperbelt, building on our recently signed memorandum of understanding with the Government of Zambia. Together, we're laying the foundation for lasting economic and social development that will endure long after mining ends."

Mark Bristow is a keynote speaker at this year's Resourcing Tomorrow 2025 conference in London from December 2-4.

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# Caterpillar and Luck Stone celebrate one million tons hauled autonomously at Bull Run Quarry

- o Caterpillar and Luck Stone announce a significant milestone in their ongoing collaboration of one million tons autonomously hauled
- o The achievement marks a first for Caterpillar in the aggregates industry
- o Reaching the one million tons hauled autonomously milestone confirms that autonomous haulage can deliver consistent, repeatable performance



Caterpillar, Inc. (NYSE:CAT) and Luck Stone, the nation's largest family-owned and operated producer of crushed stone, sand and gravel, announced a significant milestone in their ongoing collaboration: **one million tons autonomously hauled** at Luck Stone's Bull Run Quarry in Chantilly, Virginia.

The achievement marks a first for Caterpillar in the aggregates industry and underscores the success of Caterpillar's autonomous haulage system (AHS) in a quarry environment. The milestone demonstrates the safety and productivity of autonomy beyond traditional large mining applications.

"This milestone is a powerful demonstration of what's possible when we collaborate with our customers to deliver solutions for their critical needs. Reaching one million tons hauled autonomously at Bull Run shows that autonomy isn't just for mining – it's scalable, reliable, and ready to transform the aggregates industry. We're proud to collaborate with Luck Stone to lead that transformation," said Denise Johnson, group president, Resource Industries, Caterpillar.

"This autonomous journey with Caterpillar has been one of the most powerful and transformative projects in our 100-year history. What once felt like a dream at our Bull Run site is now a reality – thanks to the trust, collaboration, and shared commitment between our teams.

"Reaching the one million tons hauled milestone has engaged every part of our

operation, from training and mine planning to operating efficiency and teamwork, proving that this technology can work, and work well, in a quarry environment. Most importantly, it's creating opportunities for our associates to grow, lead, and be part of something groundbreaking.

"At Luck Stone, our mission is to ignite human potential, and this project is an example of what's possible when people, purpose, and progress come together. We're grateful to Caterpillar and confident that operators across the country will have a similar experience," commented Charlie Luck, president and CEO, Luck Companies.

## A strategic relationship built on innovation

The collaboration between Caterpillar and Luck Stone began with a shared vision to transform quarry operations through cutting-edge technology. Bull Run Quarry became the first site in the aggregates industry to deploy Caterpillar's autonomous Cat® 777 trucks, supported by a full autonomy technology stack and site integration services.

Since the initial deployment, the collaboration has focused on validating autonomy along with the people and processes in conditions that are typical in quarry operations but distinct from mining.

**Why one million tons matters** Reaching the one million tons hauled autonomously milestone confirms that autonomous haulage can deliver consistent, repeatable performance. It also signals how autonomous solutions will address skilled labor shortages,

improve site safety, increase operational efficiency, and upskill quarry employees to run autonomy.

## Strategic alignment with customer back innovation

This milestone aligns with Caterpillar's enterprise strategy in several key areas:

**Customer Back Solutions:** Luck Stone's operational insights helped shape the deployment and refinement of the AHS.

**Productivity:** Autonomous trucks have demonstrated improved cycle consistency and reduced idle time.

**Safety:** Removing operators from the cab reduces exposure to potential hazards and enhances site control.

**Sustainability:** Autonomy enables more efficient fuel use and supports emissions reduction goals.

**Looking ahead** Caterpillar and Luck Stone continue to explore opportunities to expand autonomy across additional sites and applications. The success at Bull Run sets a precedent for the broader aggregates industry and reinforces the companies' commitment to innovation and operational excellence.

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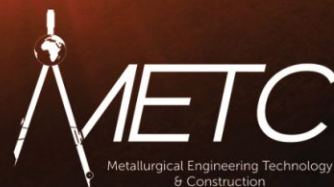


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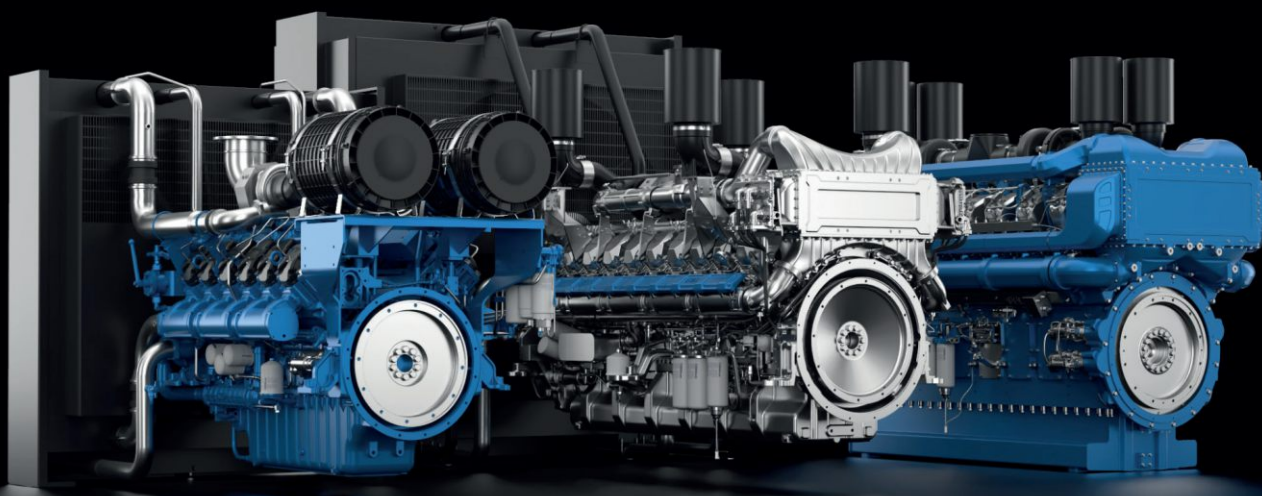
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