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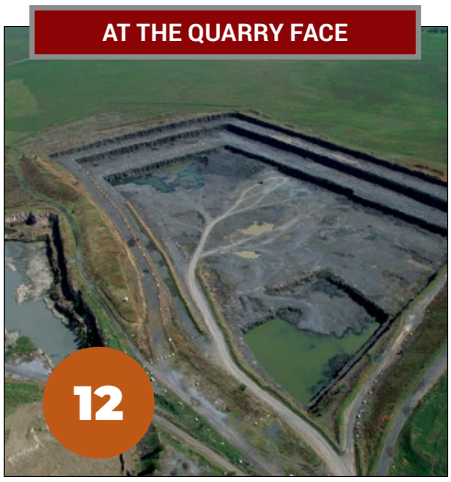

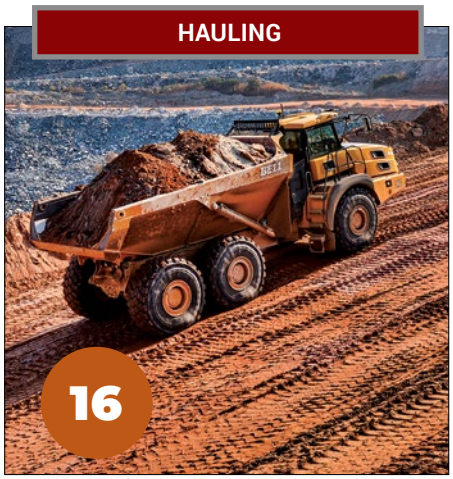

DRIVING OPTIMAL UPTIME FOR QUARRIES

ON THE COVER

For any quarry owner, uptime is a key parameter that hugely influences the bottom line. Based on this understanding, driving 'optimal uptime' is the operating mantra at Trysome Auto Electrical Engineering, and is sought in every aspect of the company's business, from offering a wide range of risk mitigating and productivity enhancing products to providing an unparalleled service regime.

AVOIDING COLLUSION IN QUARRYING AND CONSTRUCTION **PAGE 32**

HIDDEN VALUE IN SILICA SAND OPERATIONS

The forecast of the silica sand market, the potential available through use of wash plants and unlocking the value of construction and demolition (C&D) waste were the key focus areas of the seminars specifically targeted at the Middle East and Africa (MEA) region at a recent virtual symposium held by wet processing technology manufacturer CDE.

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OPERATIONAL EXCELLENCE AND SAFETY ARE TWO SIDES OF SAME COIN

The key to an improved health and safety record in the mining workplace lies with integrating safety firmly as part of operational excellence.

AROUND THE INDUSTRY

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COMMENT

PRIORITISING OPERATIONAL EFFICIENCY

The current business climate in the aggregates industry is characterised by price volatility, shrinking margins and increasing operational costs, among several other challenges relating to legislative requirements. This is exacerbated by a steady decline in aggregates demand due to the lack of meaningful construction projects.

To survive and mine profitably during such a low growth cycle, quarry owners need to capitalise on the opportunity to improve their productivity and focus on one of the factors they can control: operational efficiency.

Increasing productivity is one of the key drivers to counter diminishing profit margins as it reduces operating costs effectively. However, the emphasis should not only be on increasing output with the same input, but increasing the output while decreasing the input, and ultimately adding optimum value to current resources. Research shows that an increase in production will ultimately decrease the operation's unit cost, especially fixed costs.

One parameter that has a significant effect on unit costs in quarries is the cost of drilling and blasting. Blasting is one of the most important operations, and has a substantial technical and economic effects on any mining project. The prime aim of blasting is rock fragmentation necessary for subsequent processes such as load & haul and crushing & screening to achieve higher efficiency. Therefore, good blast design and execution are essential for successful quarry operations. Improper or poor practices in blasting can have a severely negative impact on the economics of any operation.

Unit operations such as drilling, blasting, excavation, loading, hauling, crushing and screening are interrelated variables in the total cost equation of a quarry operation. However, drilling and blasting are the first unit operations that have a significant impact on the rest of the functions. They should therefore be executed accurately. As the initial phases of the quarrying process, drilling and blasting set the scene for the efficient roll-out of loading, crushing and screening.

As you will see in this edition of *Modern Quarrying*, a relentless focus on blast-improvement practices is advancing blasting performance and decreasing operating costs at AfriSam Rooikraal Quarry. Of the various products that have come to market to improve blast performance, flyrock control and productivity, stemming plugs have probably been looked upon with some incredulity.

The operation became one of the first in South Africa to adopt Veristem stemming plugs, supplied locally by ERG Industrial. Not only does the Varistem help reduce potential safety incidents such as flyrock and vibration, but it also improves blasting performance and lowers cost. The plugs contain blast energy for longer.

Maximum blast containment means greater fragmentation and micro-fractures, with more tonnage processed at reduced cost. Following fractures created by the explosive shock waves, the Varistem improves expanding gas containment. The greater the gas containment time within the ore mass fractures, the better the fragmentation. In some cases, the Varistem has achieved up to a 25% increase in fragmentation, which in turn reduces crushing costs and increases crusher throughput. Independent studies also show that the Varistem can increase blast pattern spread by 10% or more, with the same fragmentation for major savings in drilling and explosive costs.

A key talking point here is that primitive and unplanned work, not using technology in a rational way and ignoring research and development findings can all negatively affect producers' operational efficiency. It is also important to note that operating efficiency will not be achieved by focusing on a single operational process, but by paying attention to the production value chain as a whole.

Munesu Shoko – Editor

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Upside to recent lockdowns

In an industry that never sleeps, surface mining industry association, ASPASA, has used quieter times as a result of the COVID-19 pandemic to tackle challenges that are hampering the industry while seeking opportunities for its members to thrive in tough economic times.

The once-bustling offices of the association with continuous meetings and visits across the country have all but ground to a halt, but that has not stopped the office staff and committees from rising to the challenge and finding ways to move forward.

ASPASA director, Nico Pienaar, says the restrictions on movement of people as a result of the pandemic has in many ways helped the association to streamline its work and offer better services to its members. Key aspects in the development of the industry, such as training, technical summits and webinars, as well as new communication tools have emerged that are simplifying and improving the delivery of services to its members.

For the first time, mines and quarries that are members of the association from across the country have participated in numerous live events that may well reshape the industry in the post-COVID economy. In much the same way workshops have been quickly convened to deal with emerging issues and the newest technologies are being put through their paces to serve the surface mining industries.

"Live meeting platforms such as Zoom and MS Teams have got us all in virtual rooms doing business more quickly and thoroughly than ever before. Rather than relying on small sample groups per region, these platforms now allow us to call together all stakeholders in a single meeting and engage directly with them. Meeting recordings can also be viewed later via YouTube or simply be emailed to interested parties at their convenience.

"Likewise, our workshops now reach a far wider audience in even the most remote parts of the country which was simply not possible before. High travel and accommodation costs for attendees or to host a workshop in these remote areas have effectively been eliminated, leaving no excuse for individuals not to attend."

Similarly, Pienaar says the association's various committees have enjoyed the same benefits and have actively moved to resolve issues and seek opportunities. Some examples of the achievements of the committees during the lockdown periods have included writing and testing new environmental auditing practices. ASPASA will assist mine managers to ensure that paperwork is correct and legally compliant. It is also essential that management teams know what is needed and expected to comply.

Nico Pienaar, director of ASPASA.

Construction industry can emerge stronger after COVID-19

The global pandemic has led many of the industry's top performers to restrategise their future paths and realign them with the new normal that is slowly emerging from the COVID-19 ashes.

As the country endures the third wave, it is becoming painfully obvious that there will be no return to the old ways any time soon, and that new business models will need to be developed in order to keep the industry and the country afloat in the medium to long term.

This is according to Nico Pienaar of surface mining industry association, ASPASA, whose members supply the majority of raw materials. Materials supplied by ASPASA members include sand, stone, limestone for cement, dimension stone, clay, ash and a host of others used in construction.

Pienaar says that some of the highlights to emerge from the pandemic include:

- The unlocking of several high-profile government infrastructure projects, including largescale road, rail harbours and other building contracts
- A renewed focus on training and access to a host of courses on digital platforms
- Strong upsurge in the use of technology and social media to communicate with internal and external stakeholders
- More professional dealings between parties involved in construction projects with an emphasis on terms and conditions of contracts and tighter specifications for the supply of quality products and services
- Better financial management of projects to ensure timeous payments and safeguard cashflows throughout the entire construction supply chain
- The adoption of new strategies that take into consideration the changed landscape of the South African economy
- Automation of processes in the processing and manufacture of construction materials

He says these are just some of the measures that are being taken across the industry to ensure the survival of the sector, as well as develop required infrastructure.

ASPASA members supply a host of materials used in construction.

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New material specifications for road builders

Quarrymen and miners of materials used in the construction of roads have a new set of specifications to be followed in order to supply national and provincial roads agencies as well as all metros and municipalities.

Surface mining industry association, ASPASA, has worked tirelessly with the Committee of Transport Officials (COTO) and role-players to hammer-out standards for different types of materials to be used on our roads. Crushed aggregates and sand are key components in the manufacture of this type of infrastructure and the new COTO specifications effectively replaces the previous, widely known COLTO specification.

Industry veteran and the motivating force behind ASPASA's submission to COTO, Barry Pearce, who heads up ASPASA's technical committee, says the new specifications have brought the industry together like never before and led to close cooperation between the roads agencies, engineers, materials suppliers and road contractors. Material suppliers will now have a two years trial period to implement, test, debate and refine the specifications before final acceptance.

"Now all that remains is for our ASPASA members to read the specification in its entirety, especially chapter 4 which deals directly with the supply of materials. The move from the COLTO to COTO specifications also comes with a change in sieve sizes from imperial to metric ISO sizes. That means quarries will need to make minor changes or possibly set about changing worn grizzlies and screens to match the relevant COTO sizes so as to conform to the new specification.

"The specifications also pays closer attention to the testing and acceptance of materials where they are mined and upon delivery and usage. ASPASA has long been of the opinion that acceptance needs to be conducted at the source of the material and before any further processing such as the addition of cement or binders take place.

"For now, this method of acceptance is required for materials sourced from approved borrow pits and requires engineers to test and accept crushed and stockpiled material at the borrow pit before delivery to site and further processing by the contractor. Our technical committee, however, suggests the same should apply to existing quarries with some minor adjustments where compliance with existing legislation is already in place such as HSE requirements. If this approach of approval of material is adopted, I think the COTO specification will be as near to 'perfect' as we can get it right now," says Pearce.

Barry Pearce, head of ASPASA's technical committee.

Water licences in 90 days

The Department of Water Affairs has implemented its plan for a 90-day turnaround on water use licence (WUL) applications – applying this new timeframe as of 1 April 2021.

This step is to be applauded, according to SRK Consulting environmental scientist Megan Kim Govender, although it does mean that applicants will now need to be more prepared with their submissions. The DWS announced last year a revision to its regulations on WULA procedures, reducing the targeted timeframe from 300 days. All submissions after 1 April 2021 will follow the 90-day review and decision process while applications initiated before 1 April 2021 will still follow the 300-day process.

"By speeding up the process, it is hoped that applications can be adjudicated faster, and licences issued more quickly – allowing developers to initiate projects sooner," says Govender. "However, more detailed studies and preparation must be conducted upfront to ensure a complete submission that meets all DWS requirements."

She warns that the new system may give DWS case officers less time to request information that might be unclear, incomplete or missing from the submission – in which case the whole application may be rejected. This would send applicants back to the drawing board and delay their projects.

"There will be no opportunity for the applicant to submit any missing information or refine details during the 90-days," agrees Jacky Burke, principal scientist at SRK Consulting. "Applications must contain all the necessary specialist information, design requirements and supporting information first time around."

WULA submissions must now include detailed engineering specifications, in accordance with the DWS's technical advisory notes (TANs) and design checklists, says Burke. This is in line with global best practice, which is moving toward closer integration of engineering aspects with environmental, social and governance (ESG) issues and financial sustainability in all projects.

Govender notes that the pre-application phase of the WULA will include a pre-application meeting with the DWS case officer, meetings with the DWS sub-directorates (for instream water uses and engineering designs), site visits, technical report compilation and the completion of the necessary departmental forms.

"It will be important for applicants to cover all the bases to reduce the chance of rejection."

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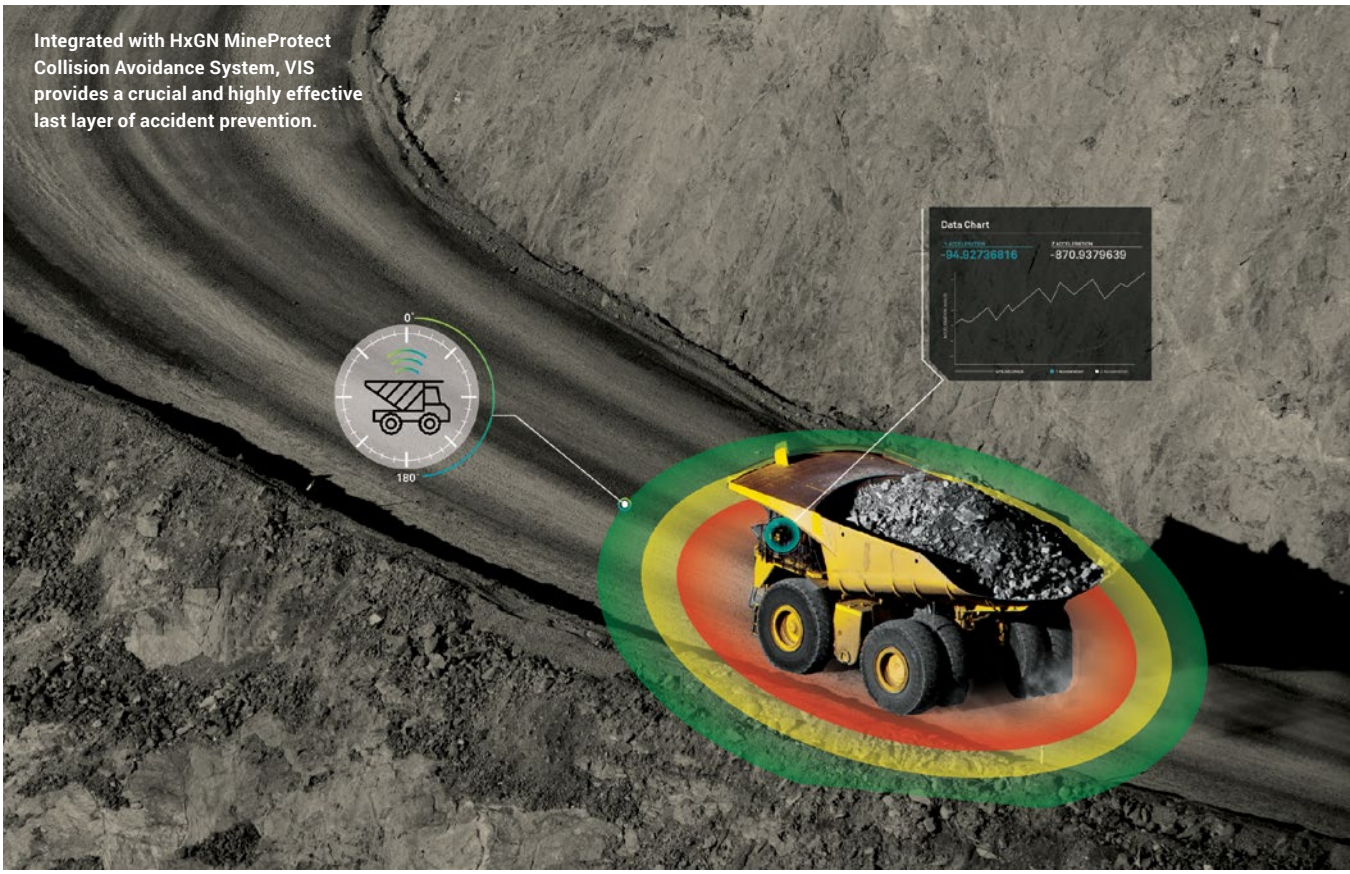


Integrated with HxGN MineProtect Collision Avoidance System, VIS provides a crucial and highly effective last layer of accident prevention.

DRIVING **OPTIMAL UPTIME FOR QUARRIES**

For any quarry owner, uptime is a key parameter that hugely influences the bottom line. Based on this understanding, driving 'optimal uptime' is the operating mantra at Trysome Auto Electrical Engineering, and is sought in every aspect of the company's business, from offering a wide range of risk mitigating and productivity-enhancing products to providing an unparalleled service regime, writes Munesu Shoko.

As the current challenging operating and economic conditions continue to put a squeeze on an already constrained construction materials market, quarry owners are well aware that maximising uptime is largely the basis on which they can survive turbulent times.

With its wide range of risk mitigating and productivity-enhancing technologies, complemented by a broad support footprint and a large team of technicians, Trysome is well-positioned to drive optimal uptime for the quarrying industry.

Established in 1991 by CEO Edwin William Smith, initially focusing on auto electrical maintenance and repairs, the company has, over the past 30 years, evolved to become the largest single-source supplier of heavy-duty auto electrical components, collision avoidance and safety systems for operators of heavy-duty automotive, earthmoving, construction, agricultural, transport, mining and quarrying machinery, all backed by an extensive fleet of associated technical services in sub-Saharan Africa.

While quality products are the starting point, Smith believes that it is the complementary services that really matter. At Trysome, there is much emphasis on speed of service to maximise uptime for customers. To execute that strategy, Smith says the fundamental prerequisite is to have the infrastructure that allows the company to respond to customers' service needs timeously.

To this end, Trysome has a strategic national and regional footprint. The company is well represented in South Africa, with its head office in Jet Park, Gauteng, as well as branches in Eastern Cape, Free State, KwaZulu-Natal (2), Mpumalanga, North West, Northern Cape and Western Cape. The South-African network is complemented by cross-border branches

The Trolex XD One is a real-time and continuous personal dust monitor worn on the body or mounted on a pole, wall or in-cab.

KEY TAKEAWAYS

With its wide range of risk mitigating and productivity-enhancing technologies, complemented by a broad support footprint and a large team of technicians, Trysome is well-positioned to drive optimal uptime for the quarrying industry

Trysome has installed over 30 000 collision avoidance systems in southern Africa to date

Trysome has recently collaborated with Walz Scale USA to bring innovative, digital solutions to the local mining and transportation industries with a big focus on real-time information monitoring

The development of the MicroFire Protection Electrical Shutdown System is yet another milestone in the company's journey

in Botswana (Gaborone, Jwaneng and Letlhakane), Mozambique and Zambia. The company also has authorised distributors in Namibia.

"Over the past 30 years, we have managed to grow the company from an auto electrical product supplier to become the total solutions provider it is today. Having started with just myself, one support guy and one service vehicle, I am glad to mention that today the company has a staff complement of more than 400 people, of which 60 – 70% are auto electricians and service technicians. This is testament to our service-centric nature, a key pillar of our strategy to drive optimal uptime for our customers," explains Smith.

Enhancing productivity

Like many other industries, the quarrying sector is at an inflection point where digital technologies have the potential to unlock new ways of enhancing productivity. The potential to achieve such a breakthrough is now coming within the industry's reach through Trysome's innovative volumetric scanning technology.

Trysome has recently collaborated with Walz Scale USA to bring innovative, digital solutions to the local mining and transportation industries with a big focus on real-time information monitoring. "Every business entity that relies on weighing," says Smith, "strives to increase production efficiency, reduce maintenance costs and maximise safety while maintaining accuracy to increase profit."

"Volume scanning," adds Smith, "is becoming the new standard in mining and quarrying as a reliable weighing system for shifting bulk materials. The mining and quarrying industries are all about efficiently transporting materials from one place to another, and accurately measuring these loads is a crucial part of improving productivity and, ultimately, the bottom line."

"Our range of volumetric scanners is ideal for the quarrying industry. Traditionally, quarries have always relied on weighbridges. Still, as the industry seeks to optimise uptime and productivity, volumetric scanners offer a more precise and quick way to get the most accurate measurements that will ultimately lead to the best outcomes and generate higher revenue," says Smith. "I believe this technology will revolutionise the bulk materials handling industry with its highly accurate measurements, load optimisation and real-time scanning and reporting."

Where accurate volume and tonnage are imperative, direct, non-contact, in-motion, volume measurement is said to be the most accurate payload measurement available. "Having more precise weight data," says Smith, "means that quarry managers can keep closer track of their payloads, obtain precise measurements of

Trysome's new flagship branch in Rustenburg.

The Walz Scanner System is becoming the new standard in mining and quarrying as a reliable in-motion weighing system for bulk materials.

incoming and outgoing materials, and maximise the load capacity of haul trucks without overloading."

The Walz Scanner System has been designed to interface directly with mine-site data infrastructure systems. The interface allows for the data to be delivered to key mine-site personnel, in real-time, for monitoring and analysis.

Passing beneath a laser, each haul truck bucket is scanned and referenced by advanced algorithms and sophisticated software, resulting in an accurate volume estimation generated by 2D load images. Using this method, load volumes can be calculated to within a proven and tested ±99%.

Collision avoidance systems

The key to improving uptime, and ultimately productivity on-site, is increasing mine safety. The general school of thought in the mining and quarrying industries is that increasing productivity and improving safety are two sides of the same coin. A safer operation is, in fact, a more productive one.

A range of risk mitigation technologies from Trysome is set to profoundly impact safety in the quarrying industry. One of the key issues in the quarrying industry at the moment is the promulgation of the mandatory use of collision avoidance systems and proximity detection systems by surface mines and quarries on trackless mobile machines, based on their own risk assessments.

Johan Momberg, key account manager at Trysome, says surface mines and quarries are under pressure to comply with the Department of Mineral Resources and Energy's regulations to keep their staff and assets safe. However, he says the regulations are not just about the implementation of collision avoidance technologies but also about performing risk assessments to determine if an operation needs to adopt these technologies. Trysome, based on its experience in this field, can help operations with their initial risk assessment and, ultimately, collision avoidance technologies if need be.

"The biggest challenge for quarries with regards to collision avoidance systems is that they don't have the capital like their bigger mine counterparts to implement these systems, which generally cost millions of rands," says Momberg. "Fortunately, the legislation provides for operations to start with risk assessments to determine if they need to implement these systems. We work closely with our customers to help them do their risk assessments, and where we cannot mitigate risk with our site administration protocols, we can provide fitting solutions to meet the specific needs of the customer."

One of the key technologies from Trysome is the HxGN MineProtect Vehicle Intervention System (VIS). It is said to be the first system to automatically recognise hazardous conditions and take control of a vehicle when an operator fails to do so. If an imminent collision is detected, VIS cuts vehicle propulsion, applies the retarder, or activates the service brakes.

Integrated with HxGN MineProtect

Johan Momberg, key account manager at Trysome (left) and CEO Edwin William Smith.

Collision Avoidance System (CAS), VIS provides a crucial and highly effective last layer of accident prevention. VIS is also said to be one of the world's few Level-9 collision avoidance technologies available.

Risk mitigating technologies

Apart from collision avoidance systems, Trysome also offers several other risk mitigation systems. Smith makes special mention of the company's Trolex air management device. The Trolex XD One is a real-time and continuous personal dust monitor worn on the body or mounted on a pole, wall or in-cab. It is a lightweight and self-contained unit that gives early warning of potential dust concentrations based on customisable STEL (Short Term Exposure Limit) and TWA (Time Weighted Average) measurements.

Another product range of note is the Sy-Klone line of cab air quality and engine pre-cleaning solutions, designed to minimise downtime for both the equipment and workers. The Sy-Klone RESPA cab air quality system is an effective filtration method for removing diesel particulate matter and respirable crystalline silica from the air in an enclosed operator cab.

A key talking point is that the Sy-Klone air quality system conforms to the new ISO 23875 international standard, says Momberg. Support of ISO 23875 recommendations is gaining traction worldwide, and one of the top five global mining companies with sites across Australia, Africa, and North America is already including ISO 23875 as a global requirement for new machines. The new ISO 23875 standard seeks to "address the fundamental design requirements that will allow for operator enclosures to perform at a level that provides sustained air quality, reducing concentrations of respirable particulate matter and carbon dioxide that are harmful to human health".

"As part of the Sy-Klone range, we also offer engine pre-cleaning solutions. Air filter life is directly related to the amount of debris ingested through an engine's air intake. Installing a Sy-Klone air precleaner as the first stage of an air intake system prevents the majority of heavier-than-air particles from entering the system. This results in longer air filter life, more efficient engine performance and decreased maintenance expenses," explains Smith.

Key milestones

Commenting on some of the company's key milestones, Momberg tells Modern Quarrying that over 30 000 collision avoidance systems have been installed in southern Africa to date. This number is expected to rise significantly in the next few years as operations continue to adopt these technologies.

The development of the MicroFire Protection Electrical Shutdown System – a personnel and asset safety-driven system which protects key assets from electrical fires and assists any fire suppression system in minimising the damage in case of a mechanical fire by shutting down the machine completely – is yet another milestone in the company's journey. The system, to be officially launched in September this year, acts as an early warning alert for operators and mine managers of a pending fire due to an electrical short.

MicroFire monitors the current being drawn from the machine and if the system's current is higher than the parameter settings, the system will send out a visual and audible alert. The operator is warned via the in-cab display, and any number of predefined individuals will receive an alert via the Telegram communication portal. The alerts will identify the error type – over-current or mechanical. A pre-set timer will begin the countdown to a complete, fail-to-safe vehicle shutdown, giving the operator enough time to pull the vehicle over and evacuate safely without any recurrent incidents.

"This product is designed to decimate any electrical current on a machine once a fire is detected. In some instances, with fire suppression systems, you find that fire reoccurs after a few seconds due to the flowing current. With MicroFire, the current is completely stopped, so there is no secondary fire that takes place. We are very proud of this product – an in-house solution developed locally and manufactured and supplied by Trysome," explains Momberg.

Smith makes special mention of the recent establishment of the ManTech division – a dedicated manufacturing department – as another significant milestone in the company's history. The department has been established to research, design, prototype, test, and manufacture new products in line with industry demand. It will also customise and modify existing products to satisfy the specific needs of each customer.

"We have also established a company in Richards Bay that manufactures heavy-duty automotive harnesses to OEM standards. Getting this operation up and running has been one of our flagship achievements in the past five years. All these initiatives aim to achieve optimal uptime for our customers by ensuring that the products and services we deliver keep customers' equipment running. Optimal uptime is the buzzword at Trysome," concludes Smith. ●

MAXIMISING COMPLIANCE AND OPERATIONAL EFFICIENCY

A relentless focus on blast-improvement practices is not only allowing AfriSam Rooikraal Quarry to mitigate the risks of having to blast within 500 m of nearby structures, but is also improving blasting performance and decreasing operating costs. Munesu Shoko was recently on site and filed this report.

Compliance by its very nature costs money, and a lot of it, which is why most quarry operators typically tend to focus squarely on planning and environmental approvals when considering their compliance obligations. Such an approach, however, is not sufficient for modern quarry operators and may subject operations to unaccounted areas of risk.

Instead, quarry operators need to take a broader view of their compliance obligations and ensure that they turn their attention towards the other types of approval that can cause them compliance issues. It is imperative that quarry operators realise that these regulations are dynamic and are located in a constantly changing space that is trending towards ever increasing compliance obligations.

One operation that has always taken a broader view to compliance is AfriSam's Rooikraal Quarry, located in Brakpan, Gauteng. In fact, the operation was the first within the AfriSam Group to acquire a licence to blast within 500 m of structures, in line with the requirements of Regulation 4.16(2) of the Mining Health and Safety Act's Explosives Regulations of 2018.

"We have always strived to be '110% compliant' – be it environmental, health and safety or quality related compliance. The compliance requirements do cost us a lot of money but also place us as a premium supplier of quality material that never compromises the safety of its people and the environment in which we operate," explains Louis Sterley, works manager at Rooikraal Quarry.

Mitigating blasting risks

Following some notable blasting incidents in the industry, the Department of Mineral Resources and Energy (DMRE) adopted the stringent Regulation 4.16(2) in 2018, which provides a minimum base line for procedures to ensure safe blasting for operations located in the proximity of structures, and for interested parties such as local communities.

The regulation states that an operation should "take reasonable measures to ensure that no blasting operations are carried out within a horizontal distance of 500 m of any public building, public throughfare, railway line, power line, any place where people congregate or any other structure, which it may be necessary to protect in order to prevent any significant risk".

This is unless a risk assessment has identified a lesser safe distance and any restrictions and conditions to be complied with or a written application is submitted to the principal inspector of mines accompanied by the following documents for approval: a sketch plan indicating the distance from the blasting area to the affected structures; the risk assessment; a proof of consultation with the owners of the affected structures, and restrictions and conditions.

An aerial view of the Rooikraal Quarry pit.

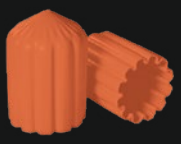
A structure of concern for Rooikraal Quarry was an 88 kVA Eskom transformer located within 500 m of the pit. Currently, it's within 260 m of the area being blasted. Other structures located within the 500 m vicinity are the operation's offices. There are also a nearby community and chicken farmers in the vicinity, but these are located about 2 – 3 km from the pit. In 2018, the operation applied for permission to blast within 500 m of these structures, and became the first operation within the AfriSam Group to be granted a written approval by the principal inspector of mines.

The application was supported by several mitigating factors that could allow the operation to blast safely within 500 m of facilities. Innovation in blast designs and stemming were central to mitigating the risks.

"We started by altering our blast designs. Back in the day, we used to opt for 89 mm diameter holes, and then went up to 98 mm, before moving up to 102 mm and eventually 115 mm. Bigger holes allow us to increase our burden

KEY TAKEAWAYS

AfriSam Rooikraal Quarry was the first within the AfriSam Group to acquire a licence to blast within 500 m of structures, in line with the requirements of Regulation 4.16(2) of the Mining Health and Safety Act's Explosives Regulations of 2018



To further reduce the likelihood of stemming ejection and flyrock, the operation became one of the first in South Africa to adopt Varistem stemming plugs

Not only does the Varistem help reduce potential safety incidents such as flyrock and vibration, but it also improves blasting performance and decreases costs

There are several secondary cost savings which result from increased fragmentation – easier rock removal, reduced secondary breakage costs, increased truck capacity and less wear on crushing equipment – all of which contribute to the cost benefit

Rooikraal was the first within the AfriSam Group to acquire a licence to blast within 500 m of structures.

The blast analysis clearly indicated that the time to stemming movement of the Varistem side of the block was multiple times longer than on the non-Varistem side of the block.

and spacing, which improves our fragment size distribution and the total cost of operation," he says.

Stemming plugs

To further reduce the likelihood of stemming ejection and flyrock, the operation became one of the first in South Africa to adopt stemming plugs. "We recently started using Varistem stemming plugs, supplied locally by ERG Industrial," says Sterley.

The stemming plugs are placed between the explosive column charge and stemming. Plugs work by creating an additional blocking effect within the drill hole when blast energy is released, directing more energy into the block and less energy upwards, out of the drill hole. Upon detonation of the explosives, the plug is forced upward into the stemming material and "locks up". The explosive gases and energy are prevented from travelling (venting) up through the drill hole.

Typically, the loss of explosive energy through stemming ejection reduces the performance of the blast. The fundamental theory promoting the use of blast-improvement and containment plugs is that they could improve the effectiveness of stemming material in the blasthole. As a result, this would better contain the explosive energy within the rock mass and yield a more controlled and efficient blast.

Of the various products that have come to market to improve blast performance, flyrock control and productivity, stemming plugs have probably been looked upon with some incredulity.

"We were initially sceptical and eventually did a test run and the results were amazing. The intent of the trial was to demonstrate the energy retention capabilities of the Varistem blast stemming plugs through conducting a split blast," explains Sterley.

The trial run indicated a massive improvement in energy retention. A key takeaway was the increase in time to stemming movement. The blast analysis clearly indicated that the time to stemming movement of the Varistem side of the block was multiple times longer than on the non-Varistem side of the block. The improvement in energy retention leads to several benefits such as reduced flyrock, improved fragmentation, and reduced vibration and noise, among others.

Improving blast performance

Not only does the Varistem help reduce potential safety incidents such as flyrock and vibration, but it also improves blasting performance and decreases costs. The plugs contain blast energy for longer.

Maximum blast containment, explains Sterley, means greater fragmentation and micro-fractures, with more tonnage processed at less cost. Following fractures created by the explosive shock waves, the Varistem improves expanding gas containment. The greater the gas containment time within the ore mass fractures, the better the fragmentation. "Getting fragmentation right is substantially cheaper than having to do secondary blasting or mechanical breakage," he says.

In some cases, Varistem has achieved up to a 25% increase in fragmentation, which in turn reduces crushing costs and increases crusher throughput. Independent studies also show that the Varistem can increase blast pattern spread by 10% or more, with the same fragmentation for major savings in drilling and explosive costs.

"There are several secondary cost savings which result from increased fragmentation – easier rock removal, reduced secondary breakage costs, increased truck capacity, and less wear on crushing equipment – all of which contribute to the cost benefit," says Sterley.

Comparison of muckpile fragmentation between a Varistem and standard blast design.

The square nature of the pit allows for particularly big blasts, which translates into massive cost savings.

He says the Varistem has offered the quarry the best of both worlds – an increase in safety and cost efficiency. "We pay a bit more in the pit, but the benefits of good fragmentation in the downstream processes are well documented," he says.

Quality product

Rooikraal Quarry mines a competent dolerite rock, which is blocky by nature when blasted. The direction of the blast is a crucial factor in achieving good fragmentation as well. This is complemented by good blast designs. The stemming cap is also proving worthwhile when blasting such a tricky rock.

Good fragmentation, with a special focus on fines, is a big focus for Rooikraal, especially given that the biggest demand driver is sand. Because of the competent nature of the rock on site, the quarry is also a big supplier to the asphalt market. Its product is sought after, with some asphalt producers coming from as far as the Free State to fetch the product. Products driving demand in this market segment are 10 mm and 20 mm road stone.

The operation produces an array of top quality material sizes, including G6 (base course); ballast (for Transnet); 7,1 mm, 22 mm and 28 mm concrete stone; 10 mm, 14 mm and 20 mm road stone, as well as crusher sand. The operation is one of the few quarries in the country that still produces 28 mm stone. This is largely produced on order and is mainly supplied to Sasol.

The square nature of the pit allows for particularly big blasts, which translates into cost savings. "We are probably one of the fortunate operations in our group that can do fairly big blasts," says Sterley. "We can blast up to a 120 000 tonnes in one go. This is facilitated by the square nature of the pit; our benches are much wider and have big reserves of material. In general, we have ample space to blast."

The pit is currently about 50 m deep and will allow for mining of two more levels to about 90 m. "We will probably be busy in the existing pit until 2027, before there is need to expand," concludes Sterley. ●

The entire range of Bell articulated haulers is powered by Mercedes Benz engines that drive greater fuel savings.

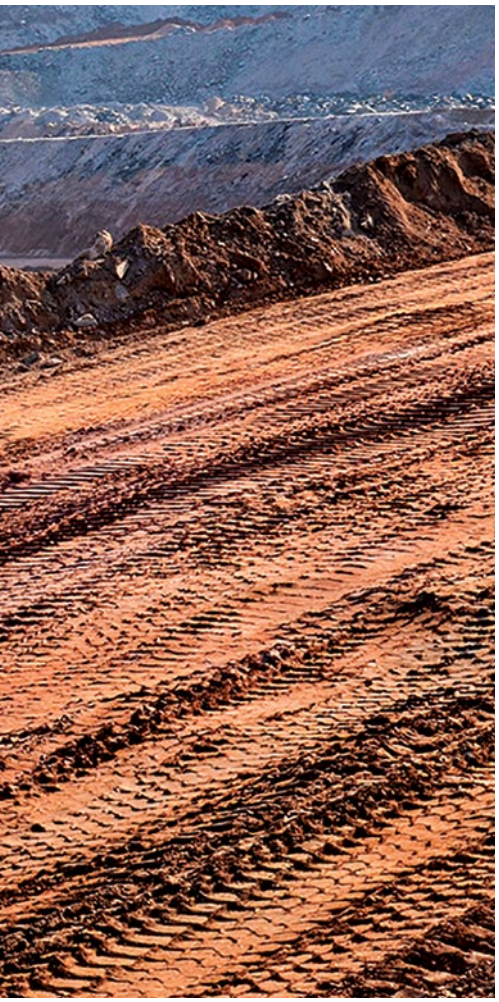
KEEPING AN EYE **ON COST PER TONNE** OF MATERIAL MOVED

To meet mining and quarrying companies' growing drive to become lowest-quartile cost producers, Bell Equipment has over the years continued to push the boundaries with a range of standard solutions on its articulated haulers that speak to increased productivity and efficiency, thus establishing the Bell ADT as one of the lowest cost-per-tonne machines on the market, writes Munesu Shoko.

Given the productivity challenges in the mining and quarrying industries, companies are under pressure to produce more efficiently. While miners can't control the whims of the world economy that shift currencies and project cycles, they can, however, control how they operate. As companies refocus on becoming lowest-quartile producers, Nick Kyriacos, product marketing manager at Bell Equipment, believes that they need to pay close attention to their cost per tonne of material moved.

Truck haulage is the most common form of materials transport in open pit mines, and if not managed properly, it can be one of the biggest cost drivers. "Cost per tonne is one of the key parameters of significance in the mining industry. It's about moving material from one point to the other at the lowest cost possible, which ultimately keeps the cost of the final product down," says Kyriacos.

Bell articulated dump trucks (ADTs) have been a pillar of the mining and quarrying industries for decades and continue to grow in importance. The company's value proposition is to offer a cost-effective and efficient haulage solution. This has been achieved through quality componentry and advancements in standard technologies that increase the efficiency and productivity of machines. According to Kyriacos, lower cost per tonne for Bell ADTs depends on four factors: the quality of the machines, efficient operation, reduced service and maintenance costs, as well as the high residual value of the machines.



KEY TAKEAWAYS

Given the productivity challenges in the quarrying industry, companies are under pressure to produce more efficiently

Lower cost per tonne for Bell ADTs hinges on four factors: the quality of the machines, efficient operation, reduced service and maintenance costs, as well as the high residual value of the machines

Burgers Equipment & Spares has established itself as the preferred supplier for a major international construction materials group

Truck haulage is the most common form of materials transport in open pit mines, and if not managed properly, it can be one of the biggest cost drivers

Bell articulated dump trucks have been a pillar of the mining sector for decades and continue to grow in importance

Scan QR code to learn more about Bell Equipment's B40E, B45E & B50E models

Capital costs

Capital equipment purchasing can significantly influence companies' economic success. The process therefore requires specific attention to not only the initial capital cost, but also to numerous other factors within the scope of capital equipment purchasing, such as life cycle costs and total cost of ownership.

It is for this reason that Bell doesn't necessarily position its ADT in the lower capital cost bracket. "The reason we don't chase lower capital cost for our ADTs is that we are more concerned about the quality of the product than the initial price. We believe in the sustainability of running the product

Bell has, over the years, introduced a number of standard features to increase the efficiency and productivity of its ADTs.

Nick Kyriacos, product marketing manager at Bell Equipment.

in the long term, and for that to happen, chasing lower capital cost is not the answer," says Kyriacos. "Focusing on the long-term picture is what brings lower cost per tonne, the real measure for an operation's financial performance; short-term capital cost is a flawed metric."

Bell ensures quality through, among others, proven drive-train and hydraulic components. The company's entire range of articulated haulers is powered by Mercedes Benz engines that drive greater fuel savings. This is complemented by an economical Allison transmission that has proven itself across applications to deliver significantly lower fuel consumption.

"Mining trucks are big-ticket equipment purchases, so guaranteeing the quality, durability and reliability of the machine is a lot more important to us than the capital cost," adds Kyriacos.

Bell Equipment offers one of the best power-to-weight ratios in the ADT industry. Through improved design and the use of high-performance steel, the company has optimised the chassis design to maintain its strength while keeping the weight as low as possible. "The smaller engine capacity with the same power-to-weight ratio means we burn less fuel to move the same tonnage," explains Kyriacos.

As the ADT reaches product maturity, the continued incremental technological advances have made a difference.

Efficient operation

Bell has over the years introduced a number of standard features to increase the efficiency and productivity of its ADTs. For example, each model benefits from the company's On-Board Weighing (OBW) system, which was first introduced in 2002.

The Bell-designed OBW system is said to be the only one that uses the three-point measurement in the articulated truck industry. The unique three-point weighing system gives an accuracy of ±2.5% in all conditions. It constantly measures payload to ensure machine productivity (how much money the machine is making) and machine utilisation. The OBW system also ensures that payload information is constantly relayed to the truck's engine and transmission system. This allows the correct gear shift pattern to be automatically selected to match the conditions the truck is working in, resulting in optimal fuel usage as well as in extended engine and transmission life.

"The biggest thing is the control factor. We believe that, as the machine goes out to work, the fleet owner must have a way to check what the crew is doing, allowing them to have the finger on the pulse. On-board weighing takes guesswork out of production and, through our Fleetm@tic® satellite-based management system, fleet owners have immediate access to the data. Through the driver identity function, they can also track the productivity of each driver per shift," explains Kyriacos.

All Bell ADTs come standard with the Bell Fleetm@tic fleet management system. Developed in 2003, the system has over the years continued to evolve. Many Bell customers take advantage of the efficiency improvements that can be achieved by using this system, which monitors productivity, machine utilisation and condition.

"Fleetm@tic has assisted us in pioneering advances in fuel consumption, per-cycle haulage and fuel consumption reporting, as well as in on-board weighing integration and payload reporting," he says.

Safety is the top focus on any jobsite and Bell has addressed this with a range of standard technologies. Bell ADTs come with Hill Assist, which ensures that the truck doesn't roll back on inclines. "When pulling away on an incline, the automatic park brake is only released when there is enough torque to prevent the machine from rolling backwards," explains Kyriacos.

Another safety feature of note is i-Tip. This tipping function automatically activates the park brake, selects neutral, tips the bin and revs the engine to give maximum productivity safely. Meanwhile, Tip Safe prevents the bin from tipping if the rear chassis is leaning over by more

than a pre-set value. With Hill Hold, available from the B30E to B60E, if the operator releases the accelerator pedal when driving uphill, the brakes will automatically apply to prevent unsafe roll-back. Brakes are automatically released when the operator accelerates again.

Commenting on the continued development of the Bell ADT, Kyriacos says that, during its infancy, the ADT concept was just about reliability. "It was during the age of big steel," he says. "We started picking up pressure from the industry, with fuel economy being one of them, and we started to work towards efficiency."

As the ADT reaches product maturity, he adds, it's the continued incremental technological advances that make a difference. For example, automation functions have also come to the fore. By the end of 2019, Bell trucks were made ready to integrate with pedestrian detection systems (PDS) and collision avoidance systems and are now autonomous-ready.

"Given that there are a number of PDS manufacturers in the country, we decided to pursue interoperability to accommodate the large number of solutions available in the market. We have installed a controller in our machines that integrates with the hardware of any one of the PDS suppliers who chooses to work with us. We have to date close to 20 suppliers in South Africa alone who are already approved to integrate with the Bell system," says Kyriacos.

Service and maintenance

Bell is constantly pushing boundaries to reduce the time it takes to service its machines and to extend the service life of components. "There is a huge amount of consideration given to the oils we use in our ADTs for us to maximise the life of each component. Being able to maximise lubricant life means that the machines are serviced less frequently, thus reducing the time spent on services," he says.

Filter capacity is another area of focus to ensure that these components are in sync with the service life of oils. "We have also paid attention to service access in the design of our machines. Our tilting cab, for example, placed us at the cutting edge of accessibility. This continues to play a big part in minimising the time spent on service and maintenance," says Kyriacos.

Bell also offers flexible warranty options that suit each customer's requirements. The company offers a maximum extended warranty of 12 000 hours/60 months. However, an almost infinite choice of hours or months is available in between, designed to meet the utilisation needs over the term of the work.

Last year, the company introduced the Bell Care Package, a service and maintenance package thoughtfully designed to meet customers' servicing needs of their assets, manage costs and increase flexibility to better respond to today's uncertain and challenging business environment. Bell Care Package is available with all new machine purchases and rentals and is further offered on machines that have already accumulated hours. It can also be topped up when the need arises.

Resale value

Residual value must be one of the principal considerations for fleet owners in their buying decisions, reasons Kyriacos. "The last leg to the cost per tonne equation is how much the fleet owner gets out of their used truck. Bell has consistently been one of the top performers in terms of the residual value of its machines," he says.

Kyriacos says any buying decision should consider what the equipment owner will realise from the sale of the asset once its useful life or lease term ends. The number of people queuing to buy Bell used machines, he adds, is a massive testimony of the industry-leading resale value of this machine.

"This is a result of a combination of factors. Bell machines have been proven to be durable assets due to the choices we have made in terms of componentry. Reduced service and maintenance also means that these machines remain cost-effective to run. A combination of these factors guarantees lower cost per tonne for our mining customers," concludes Kyriacos. ●

UNLOCKING THE HIDDEN VALUE IN SILICA SAND OPERATIONS

The forecast of the silica sand market, the potential available through use of wash plants and unlocking the value of construction and demolition (C&D) waste were the key focus areas of the seminars specifically targeted at the Middle East and Africa (MEA) region at a recent virtual symposium held by wet processing technology manufacturer CDE.

The last decade showed a fluctuation in silica sand consumptions in several industries and reached the lowest level in 2009 due to the global recession. "Due to the variety of products and the new or future developments in applications, the long-term forecast of silica sand requires nonconventional methods of production," commented Hatem Ibrahim, MD at Mineral Processing Engineering & Consulting (MPEC).

On the topic of transforming recycled products, CDE's Eunan Kelly said, "Today's customers have high expectations of the technology, they want recycled products that are comparable to virgin materials and that expectation helps drive that technology forward."

Engineering insights

These were standout sessions at CDE's recent Engineering Insights virtual symposium, which was held online from May 18 – 20. The event followed a hugely successful 2020 inaugural conference, responding to a desire for

A CDE wet processing solution for the production of high-specification silica sand products in Tunisia.

KEY TAKEAWAYS

The past decade showed a fluctuation in silica sand consumption in several industries and reached the lowest level in 2009 due to the global recession

Due to the variety of products and the new or future developments in applications, the long-term forecast of silica sand requires non-conventional methods of production

Most silica sand deposits are of good quality, starting from 80% and above. However, for producers to add value, a beneficiation and processing plant is recommended so as to reach high purity silica sand that can be used in different applications

VALUE

With its innovative wet processing technologies, CDE is supporting many companies across the MEA region to realise the hidden value in their silica operations

industry professionals to engage in global learning and networking in the absence of international tradeshows and in-person conventions.

To support the continued sharing of insights and facilitating pertinent discussions regarding the global market, CDE once again brought together industry leaders and programmed a series of dynamic and beneficial panel discussions and presentations that covered sectors including sand and aggregates, construction and demolition waste recycling, industrial sands, mining and wastewater.

Across three days, CDE experts led on the seminars that catered to the company's global audience.

CDE in MEA

At the lead seminar for the MEA region, CDE's regional manager for MEA, Ruchin Garg, and Hatem Ibrahim, MD at MPEC, discussed the challenges and opportunities in Saudi Arabia regarding maximising the silica sand market potential.

Strategically located at the crossroads of three continents – Asia, Africa and Europe – the Kingdom of Saudi Arabia is one of the world's most important commercial and trading hubs and is the largest market in Middle East-North Africa.

During the seminar, they discussed how silica sand is a low-priced product but a primary ingredient for a diversity of products. On the whole, the consumption of silica sand can be measured as indicator to the global economy's trends and circumstances. As mentioned, it is predicted that demand will in future require alternative methods of production than those currently being utilised.

"Most silica sand deposits are of good quality, starting from 80% and above. However, for producers to add value, a beneficiation and processing plant is recommended so as to reach high purity silica sand that can be used in different applications," said Garg.

CDE is currently supporting many companies across the MEA region to realise the hidden value in their operations.

In a panel discussion between Dozan Ozel, business development manager for MEA at CDE, Garg and customer Scott Watson, CEO of Kunooz Oman Holding, Watson

High-quality sand produced by CDE's wet processing solutions.

CDE is currently supporting a company in Tunisia to realise the hidden value in its operations.

detailed his experience of venturing into wet processing and the impact CDE products have had in transforming unused waste streams into valuable sand and aggregates.

Watson commented that when working for a previous employer, "Commitment from the CDE owner Tony Convery and the professionalism of the management team were key in the decision to purchase a wash plant from CDE. Being modular, the plant was easy to install and produced a high-quality sand for inhouse use in block manufacture and RMC, thus reducing our dependence on dredged sand. When we moved to another quarry within the group, being modular meant that our plant made that transition also and it is still in operation 22 years after purchase."

Watson moved to Oman in 2016 to take up position as GM of Kunooz Gypsum, followed by becoming Kunooz Oman Group COO in May 2018 and CEO in December 2019.

Here, crushed 0 – 5 mm sand accounted for 45% of production, and high powder content was limiting sales, resulting in excessive stocks. The company needed to act and offer its customer base the full range and therefore decided to invest in a wash plant. Once again, having reviewed all options, the company made the decision to purchase a CDE plant (Evowash 102 and Thickener) that is producing high quality wash sand and plaster sand, while the Thickener recovers 90% of water used – hugely important as the use of borehole water is prohibited.

The final session for the MEA market day of the virtual event involved an engaging panel discussion that explored the global, regional and local viewpoint of unlocking the value of C&D waste in MEA. Led by Ruchin Garg of CDE, the panel consisted of Eunan Kelly, CDE head of Business Development for Northern Europe, Nisrine El Hougeiri, director of Environment Division at Laceco and Ahmed Taher, GM of AL Dhafra Recycling Industries.

The panel discussed the challenges and successes of C&D waste recycling in MEA, as well as what the future looks like and how technology providers, consultants and contractors can help further drive and raise greater awareness within the region C&D waste recycling in the MEA region.

"The construction industry is one of the world's largest consumers of energy and raw materials using almost 40% of resources and 17% of freshwater reserves," commented El Hougeiri, adding that there are 120-million tonnes per year of C&D waste, approximately 55% of the total waste stream generated in the gulf region alone.

El Hougeiri stated that the public perception of recycled materials needs to change, and people need to accept recycled materials are indeed an equivalent to virgin materials in order to affect true change.

Virtual global learning

The packed three-day programme featured 16 expert discussions involving almost 50 speakers.

CDE's CEO Marc Jennings said: "In 2020, despite the global circumstances, CDE utilised its network to bring together industry leaders and professionals virtually to discuss the prevalent issues of the day. We are proud that in 2021, we were able to build upon this and host our second Engineering Insights virtual symposium.

"We have continued to facilitate global learning and our conference was once again a huge success, as 600 industry professionals registered, engaging with our event from around the world.

"Challenges in our industry such as water management, sand depletion and sustainable mining continue to dominate important conversations, and we believe it is of great importance that industry experts sustain these virtual discussions in order to aid progression, indeed as the world progresses out of the global pandemic." ●

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OPERATIONAL EXCELLENCE AND SAFETY ARE TWO SIDES OF SAME COIN

The key to an improved health and safety record in the mining workplace lies with integrating safety firmly as part of operational excellence.

This is according to Ramesh Dhoorgapersadh, GM for Safety, Health, Environment, Risk and Quality (SHERQ) at blasting and explosives leader BME, a member of the JSE-listed Omnia Group. He highlights BME's Safety for Life brand, which focuses on the triple bottom line: safety for people, the environment and the commercial sustainability of the business. The key objective is for all employees and contractors to go home in the same condition that they arrived at work, having delivered quality service and products to the customer with no harm to the environment.

"The success of implementing Safety for Life is reflected in our recordable case rate (RCR) dropping steadily in recent years to just 0,11 as at the end of 2020," says Dhoorgapersadh. "Our RCR is a good reflection of the safety culture within a business, as the downward trend over the past three years demonstrates."

BME was recognised for responsible care at the Chemical and Allied Industries Association (CAIA) Awards last year, based on its year-on-year SHE performance improvement. Several safety interventions contributed to this progress, he says, including Visual Felt Leadership, Process Safety, near miss reporting, driver awareness programmes and fatigue management to name just a few. These aligned with the Omnia Vision of zero harm and positive impact through responsible business practices.

Never-ending process

"The drive for safety is a never-ending process of analysing even minor incidents and generating fresh ideas to reinforce our Safety for Life interventions," he says. "It is also vital to report and understand 'near misses', which are valuable indicators of where we can prevent incidents before they occur."

As a leading producer of emulsion explosives, BME imbeds a range of process safety elements into its manufacturing operations, in line with global best practice for chemical industries. This focuses on asset management in ways that protect employees, the environment and the broader community.

"Moving ammonium nitrate through our value chain, for instance, demands that we constantly learn from international experience – and this helps drive our safety culture," he says.

He notes that BME also identifies the United Nations' Sustainable Developmental Goals as relevant to its safety efforts – particularly those linked to industry, innovation and infrastructure; decent work and economic growth; responsible consumption and production; and partnerships for the SDG goals.

"As an example, we launched our new Blasting Guide mobile app earlier this year as part of our continuous innovation – leveraging digital technology to allow users to rapidly calculate and check blast designs," he says.

Enhanced safety

Indeed, enhanced safety has been

Electronic detonators are inherently safe from extraneous electricity, reducing the risk of misfires.

Ramesh Dhoorgapersadh, GM for Safety, Health, Environment, Risk and Quality (SHERQ) at BME.

KEY TAKEAWAYS

BME's Safety for Life brand focuses on the triple bottom line: safety for people, the environment and the commercial sustainability of the business

The key objective is for all employees and contractors to go home in the same condition that they arrived at work, having delivered quality service and products to the customer with no harm to the environment

The success of implementing Safety for Life is reflected in BME's recordable case rate dropping steadily in recent years to just 0,11 as at the end of 2020

Enhanced safety has been a perennial consideration in the development of all BME's products and services, to ensure the safe and efficient use of explosives in the field

a perennial consideration in the development of all BME's products and services, to ensure the safe and efficient use of explosives in the field. BME's global manager for Blasting Science, D. Scott Scovira, emphasises the company's extensive use of electronic – rather than electric or non-electric – detonators for firing blastholes.

"Electric detonators have the safety concern of being susceptible to extraneous electricity and run the risk of unexpected detonation," says Scovira. "Non-electric detonators, while immune to extraneous electricity hazards except lightening, do not have detonator circuit testing capability and rely on the user to make 100% correct connections to prevent misfires."

By contrast, electronic detonators are inherently safe from extraneous electricity except for lightning, and each detonator in the blasting circuit may be checked for functionally before firing – thus reducing the risk of misfires.

He notes that, in comparison to many other ultra-hazardous occupations, field blasting professionals have an excellent long-term safety record. They have also adapted well to modern demands such as encroachment of settlements close to blasting sites like quarries, by minimising the risk of flyrock.

"Assisted by specialist technology providers like BME, quarries and mines can today employ specialised electronic and software tools that enable the field measurement of blast hole deviations and measurement of the amount rock in front of the blast holes," he says. "Actual field measurements are compared against the engineered blast design and adjustments are then made to the design to ensure a safe blast."

As BME has operated through the COVID-19 pandemic, Dhoorgapersadh points out that risk assessments have been adapted in line with company, group and customer health and safety policies, as well as Department of Labour requirements.

"All our COVID-19 interventions have worked well, with internal audits and departmental inspections confirming this on a regular basis," he says. ●

Haver & Boecker Niagara's Pulse vibration analysis program specifically monitors the health of vibrating screens.

BOOST SAFETY AND EFFICIENCY IN QUARRIES WITH DIAGNOSTIC TOOLS

A vibrating screen is the heart of a quarry. It's the deciding factor in whether or not your product meets your specifications. Deadlines and quotas might tempt producers to overload the screen while attempting to increase their bottom line. However, this contributes to downtime due to premature wear and might create a safety hazard for workers near an unbalanced screen. And just as monitoring a heart rate is an essential for optimal health, the same idea applies to a quarry operation. By Douglas Lima, service manager at Haver & Boecker Niagara.

Think of manufacturers as an operation's cardiologist, there to diagnose and remedy operating issues before they become a safety hazard or halt production altogether. They provide producers with the necessities to streamline an operation and minimise downtime or injury. And, these days, that starts with diagnostics.

Like a house-call from a doctor, onsite diagnostics enhance aggregate operations through vibration analysis service programmes without having to transport the equipment into a shop. These programmes offer producers insight on their screen's performance to achieve optimum efficiency and ensure minor operating issues don't become major hazards.

For the first time ever, manufacturers' service programs provide producers the opportunity to monitor screening performance in real time. And recently, some manufacturers advanced these systems by using wireless technology. These advancements offer a hands-off approach to analysing screening equipment by allowing operators to stand out of harm's way – from a potentially off-balanced screen – when performing diagnostics.

In addition to safety, wireless technology offers operators remote, real-time monitoring, which ensures equipment is properly maintained and running optimally. This means less risk that strain is placed on the screen or other parts of the operation to maintain production quota. The increased efficiency and enhanced safety is the healthy choice for all areas of the operation.

How it works

It all begins with a close relationship with the OEM and is enhanced by real-time equipment monitoring. Finding a key partnership where an OEM approaches the application as a solution provider rather than an equipment supplier is key to productivity and success. If your OEM isn't providing consultative advice and real-time, proactive monitoring, it might be time to

Douglas Lima, service manager at Haver & Boecker Niagara's Canada operation.

seek another solution.

A key aspect to safety is having equipment that runs at peak performance and knowing when and how to maintain it. The more time spent, fixing and maintaining the equipment heightens the risk of injury. That is where real-time monitoring comes in handy.

An advanced vibration analysis programme specifically monitors the health of vibrating screens. That real-time feedback ensures optimised screen performance and equipment durability. The hands-free system uses a wireless, industrial-grade tablet computer and eight tri-axial sensors to detect abnormalities the human eye cannot, such as a hairline crack in a side plate or an uneven or twisting motion. Even the slightest irregularities can result in diminished performance, decreased efficiency and safety risk for the operator.

Out of harm's way

The programmes use wireless accelerometers to detect any irregularities, allowing operators to stand as far as 100 m out of harm's way. Each sensor attaches to key places on a machine to send 24 channels of data to the tablet via Wi-Fi — illustrating the machine's orbit, acceleration, deviations and more.

After the sensors record the data, trained and experienced engineers review, study and interpret the results through the system's database. This provides the engineers and producer with a detailed report of any concerns that might diminish productivity or risk operator safety. If an irregularity is detected, the service team travels to complete on-site service, which keeps producers on top of preventative maintenance and ensures a safe operation that runs at maximum efficiency and lower risk. Some vibration analysis systems store each machine's historical data, which allows for quick comparison over time and easy troubleshooting.

More and more often producers rely on diagnostics for safer work environments and a streamlined operation. Its hands-off approach offers aggregate producers a healthy operation, running at peak performance, which helps them efficiently meets deadlines and produce quality product for their customers. ●

After the sensors record the data, trained and experienced engineers review, study and interpret the results through the system's database.

KEY TAKEAWAYS

Onsite diagnostics enhance aggregate operations through vibration analysis service programmes without having to transport the equipment into a shop

A key aspect to safety is having equipment that runs at peak performance and knowing when and how to maintain it

An advanced vibration analysis programme specifically monitors the health of vibrating screens

Real-time feedback ensures optimised screen performance and equipment durability

Haver & Boecker Niagara expands Pulse portfolio

Haver & Boecker Niagara has expanded its Pulse portfolio with the introduction of Pulse Condition Monitoring (Pulse CM). The technology is designed to monitor the health of vibrating screens using modern algorithms and artificial intelligence.

It provides accurate measurements and forecasts complemented by information that is easy to understand. Pulse CM is a wireless diagnostics tool that helps mineral processing operations be proactive, rather than reactive, when it comes to maintenance efforts. This leads to increased efficiency, decreased downtime and improved reliability.

Haver & Boecker Niagara will highlight Pulse CM at booth 7301 in Central Hall at MINExpo 2021, September 13 – 15, in Las Vegas.

"Haver & Boecker Niagara has a history of developing solutions to help producers increase their uptime," says Thiago Buoso, Haver & Boecker Niagara project and sales engineer. "Unexpected downtime is a huge source of lost revenue for producers, so we aim to create products and technology that prevent that. Additionally, there is a lack of reliable systems like this on the market. Pulse Condition Monitoring is the most detailed, accurate monitoring system available to customers."

Pulse Condition Monitoring is the next level in the Pulse portfolio, accompanying the company's Pulse Vibration Analysis. Similar to Pulse Vibration Analysis, the Pulse CM system analyses data to help users get the most out of their equipment. Unlike Pulse Vibration Analysis, Pulse CM uses permanently installed sensors to monitor equipment 24/7.

The system captures real time information on monitored equipment and provides alerts via e-mail when it detects the first sign of potential problems. By constantly monitoring the accelerations of the vibration screen, Pulse CM provides a forecast of the equipment's dynamic condition in intervals of 48 hours, five days, and four weeks. The system detects anomalies that will point an operation's maintenance team to specific areas of the equipment that may require attention. With consistent use, Pulse CM will accurately point out and predict critical issues and advise when to schedule maintenance, along with what to focus on during that planned downtime.

To collect all data from the body and drive components, Pulse CM is equipped with a gateway that can connect with up to 20 wireless sensors, within a radius of up to 75 m. Using a cellular signal or Wi-Fi from the plant, it will send all data to the Haver & Boecker Niagara cloud, available through the company's web app. The sensor configurations are customisable and placed on both the body and bearings of the vibrating screen. The gateway can also be positioned between two screens operating near one another.

Pulse CM is a wireless diagnostics tool that helps mineral processing operations be proactive, rather than reactive, when it comes to maintenance efforts.

Smart control of crushing plants with SPECTIVE CONNECT

The innovative digital operating concept SPECTIVE from Kleemann has optimised the control options of crushing plants in a trendsetting manner. With the SPECTIVE CONNECT extension, Kleemann goes one step further. All relevant process information and reporting are now displayed on your smartphone without having to leave the feeding device.

With its SPECTIVE operating concept, Kleemann believes it is now the sector leader with regards to user interfaces. The plant is started via the 12 inch SPECTIVE touch panel directly at the plant. The intuitive operating concept makes it easy for users to choose the necessary settings. Once it has been set, the plant then runs in automatic mode.

When a plant train is used, after initial set-up the operator can connect to the complete plant train, not just each individual plant. As a new feature in the SPECTIVE world, the radio remote controls have been integrated. Using the large radio remote control, the plants are moved from the low loader and the set-up procedure can be carried out conveniently and at a safe distance from the machine. The small radio remote control can be used to execute all relevant functions comfortably from the excavator.

Diesel fill level, average fuel consumption, average plant performance, gap setting, utilisation rate and a lot more important process data can be displayed at any time via the dashboard. In most cases, operators no longer have to leave the cabin or interrupt the ongoing process. They can detect, for example, at the smartphone that the diesel fill level is low and order fresh supplies directly from the driver's cab.

Operators can see the machine utilisation rate at a glance and therefore regulate loading. They can also receive data on the daily output already achieved and also compare it to the previous day – and a lot more. SPECTIVE CONNECT from Kleemann provides more safety for the operator, higher plant availability, higher utilisation and thus higher cost-effectiveness.

In future the operator in the cabin can obtain a plant overview of the infeed and the complete crushing plant via the camera system on the smartphone display.

In case of a malfunction, SPECTIVE CONNECT displays not only a general fault but, at the same time, the corresponding components incl. troubleshooting aids. The smartphone can be taken to the location of the fault that occurred and support the operator step by step with fault elimination.

The SPECTIVE CONNECT app automatically generates clearly arranged reports on consumption and plant performance as well as the plant usage. These reports

Pilot Crushtec renews partnership with Metso Outotec

Metso mobile jaw crusher and scalping screen working on-site.

After five successful years representing global leader Metso Outotec in southern Africa, Jet Park-based Pilot Crushtec has renewed its distributorship for another five.

Despite periods of challenging economic conditions in recent years, Pilot Crushtec has earned global accolades within the Metso Outotec distributor network. According to Francois Marais, director sales and marketing at Pilot Crushtec, the company has already won annual awards for Best Aftersales Distributor and for Best Sales Growth.

"We value this partnership with one of the world's leading brands, and have demonstrated through our solid performance the positive synergies that we leverage," says Marais. "The years from 2017 through to 2019 in particular saw exceptional growth year-on-year for both our Metso Outotec offering and our business as a whole."

He highlights that the two companies' offerings in the crushing and screening market complement each other very well, and they share a commitment to high quality products, services and support.

"For customers, the renewal of our distributorship confirms their faith in our products and strengthens their security of investment going forward," he says. "It assures the market once again that their capital investments are being well supported through our extensive parts holdings and service excellence."

The new agreement covers additional products and territories within the region, facilitating a wider offering in terms of new equipment and aftermarket aspects. According to Adam Benn, director capital sales North EMEA, Russia & CIS and Southern Africa at Metso Outotec, there was no hesitation in signing a renewal of the distribution agreement with Pilot Crushtec.

"Having just celebrated its 30th anniversary in business, Pilot Crushtec has built a strong reputation," says Benn. "This applies not only to their supply of equipment and associated services, but their experienced team's hands-on knowledge and can-do attitude to opportunities and challenges."

He emphasises Pilot Crushtec's investment in time and resources training their teams and their customer base – an effective strategy for keeping skills current and for listening to customers' development needs. With technical facilities that rank among the industry's best, the company manufactures plant locally while also offering a one-stop repair and refurbishment solution.

"Having a distribution network that is close to its customers is a fundamental part of Metso Outotec's group strategy," he says. "In addition to being well located, our distributors need to keep a good inventory of equipment and parts, which is something that Pilot Crushtec prioritises as a vital cornerstone of their business strategy."

Looking ahead to Metso Outotec's future focus, Benn says that business is returning to normal with the construction segment proving resilient with recovering activity levels.

"The short-term focus will be on continuing to strengthen our products and services, while working on developing the next generation of technology and solutions required by our customers," he says.

With its SPECTIVE operating concept, Kleemann believes it is now the sector leader in user interfaces.

can be forwarded by messenger or e-mail. This guarantees transparency in the complete process for the plant operator

SPECTIVE CONNECT from Kleemann is currently available as an option for the new jaw crushing plant MOBICAT MC 110(i) EVO2 and the new cone crushing plant MOBICONE MCO 90(i) EVO2. Further SPECTIVE machines will be equipped or retrofitted with this gradually. The App can be installed on iOS and Android smartphones.

Osborn Engineered Products unifies under new Astec Industries brand

"We made the decision to unify to make it easier for our dealers and customers to do business with us. By coming together as one organisation, we can offer greater customer service and drive innovation," explains Barry Ruffalo, president and CEO of Astec. "The rebrand enables us to build our strength together under one common name and purpose. We can better leverage our growth as one Astec team, rather than individual brands."

"This is an exciting new era for our organisation, and our team at Osborn is proud to be part of it, and to be able to offer the resulting benefits to our customers," says Johan Goosen, regional MD – Africa and Middle East. Osborn will go to market as Astec with a new logo, colour palette and website.

"Some of the brands that are familiar to our local customers include Breaker Technology (BTI), KPI-JCI and Astec Mobile Screens, Peterson, Roadtec and Telsmith. The unification of these brands is a significant part of Astec's OneASTEC business model and its growth strategy that is founded on the Simplify, Focus and Grow principles."

"Being able to leverage all the advantages that come with a recognised global brand presents exciting growth opportunities for our operations and our dealers. Our ability to offer industry-leading solutions in the entire rock to road value chain means that customers have access to Astec's complete innovation pipeline and will be well-positioned to capitalise on new products and technologies from Astec to drive their competitiveness.

The new Astec logo represents the company's purpose, which is "Built to Connect", and its vision to connect people, processes and products

The new website (www.astecindustries.com) replaces the previous subsidiary websites. Dealers, customers, suppliers and consumers can easily find information about our organisation, product offerings and other resources in one location.

Terex MP Acquires MDS International

Terex Materials Processing (MP), a global leader in materials processing equipment, has announced the purchase of MDS International (MDS), a manufacturer of heavy duty and recycling trommels, apron feeders and conveyor systems, based in Co. Monaghan, Ireland.

MDS was founded in 1995 by Liam and Una Murray, with a vision to design and develop engineering solutions to industry. Over the past 25 years MDS has built a highly skilled work force along with global distribution partners, and has a valued reputation for innovation, offering bespoke solutions to serve client needs with equipment that can withstand the harshest of environments.

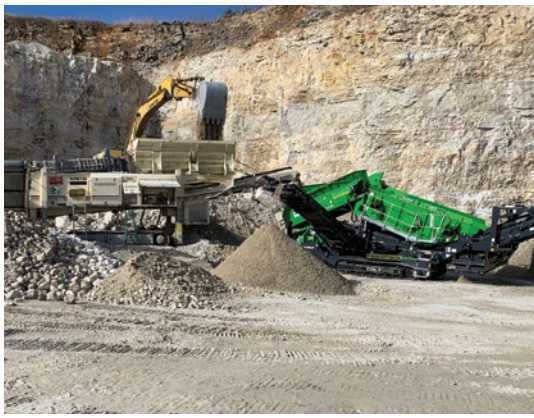
This acquisition supports Terex MP's growth strategy to expand its offering in the crushing and screening and environmental industries, with products that complement the existing portfolio. Trommels from MDS are heavy duty trommels that will enable expansion into areas of the market that Terex MP does not currently serve. Additionally, Terex MP expects strong commercial synergies from this deal, as several Terex MP distributors already carry the MDS line, while others will be new to Terex, offering the potential to develop new channel partner relationships.

MDS' 3 158 m±facility will be the first Terex location in the Republic of Ireland, which diversifies its footprint and provides access to a new labour pool. Additionally, the facility is within a short driving distance to the Terex Dungannon and Omagh sites, providing ready access to Terex MP's Northern Irish team and enabling close coordination with the resources at these facilities.

The MDS facility and its highly skilled team members will be led by Conor Hegarty, GM and business line director. Previously, Conor held the position of international sales director for Terex Ecotec, and his commercial background and product knowledge will be a huge asset as he takes leadership responsibility for MDS.

MDS will remain a standalone brand along with Terex MP's Crushing and Screening businesses including Powerscreen, Terex Finlay and EvoQuip. Terex MP will build on the momentum of MDS International's long-standing reputation, continuing to develop the brand, its product portfolio and its distribution channels.

Commenting on the announcement, Pat Brian, vice president, Mobile Crushing and Screening, Terex MP says: "The addition of MDS to our portfolio of businesses will bolster our growth and improve our product offering. The business has been well managed, is on a terrific growth trajectory, and its heavy duty trommels address a gap in our own product lines while also having a lot of synergy with what we already manufacture and distribute."



MDS International manufactures heavy duty and recycling trommels, apron feeders and conveyor systems (left), a product range that complements other Terex brands such as EvoQuip (right).

Liam Murray, co-founder of MDS International, says, "I am so proud of how MDS has grown over the past 25 years – to have a multinational company like Terex interested in our business is a testament to what we have achieved. MDS will now have the global resources of Terex to develop and grow it to new levels; I feel this is the right move for our business and team. This sale will also bring new levels of support to customers and dealers worldwide. I will always care deeply for our MDS family and will remain on board for a period of time, in order to support a smooth transition to Terex ownership."

Lafarge and Volvo Trucks join forces to accelerate women in transport

Some 10 women from KwaZulu-Natal will be selected for the pilot phase of the project.

Lafarge South Africa and Volvo Trucks South Africa have joined forces with other stakeholders to launch the AccelerateHer initiative to accelerate women-owned truck operations in the country.

Some 10 women from KwaZulu-Natal will be selected for the pilot phase of the project, with the intention to replicate and grow it in other areas of operation throughout the country in phases. This ground-breaking initiative is aimed at increasing the number of female owner-drivers rendering a service to Lafarge operations in the area.

The successful applicants will receive intensive three-year training through the Commercial Transport Academy (CTA) as part of Volvo Trucks' Iron Women heavy commercial driver training programme. The Iron Women programme, which has been running since 2019, will teach the participants how to operate trucks safely, profitably, and efficiently, enabling them to ultimately receive their commercial driver qualification.

The participants will also undergo intensive business acumen training to empower them as owner-drivers, with a focus on aspects like technology, finance, entrepreneurship, business and road transport management, as well as labour legislation and HR practices. They will also be professionally mentored throughout the programme to ensure that they have every chance of success once they gain their qualifications.

Once qualified, the new female owner-drivers will be incorporated in the Lafarge KZN operations as active operators.

"We believe that given the correct resources and support, these women-owned transport businesses have the potential to flourish and make a real change in the lives of the participants, their families and their communities," says Noriko Solomon, Aggregates and ReadyMix director at Lafarge. Moreover, the Lafarge procurement director, Kervin Ali adds, "We understand that this project is another step towards economic inclusion; building accessible, and sustainable communities for the future."

The Volvo trucks will be financed by Volvo Financial Services. "We are excited about the new doors that will open for women in transport because of this joint initiative with Lafarge South Africa," says Marcus Hörberg, Vice President of Volvo Group Southern Africa. "As a big supporter of the difference women can make in the industry, we are very proud and humbled that the Volvo Trucks Iron Women project has been able to develop and grow and make such a lasting impact in many people's lives.

AVOIDING COLLUSION IN QUARRYING AND CONSTRUCTION

Nico Pienaar, director of Aspasa.

Quarries and their construction contractor counterparts should guard against collusive behaviour in their dealings. Collusion is illegal in South Africa. It reduces the level of competition in a market. By Nico Pienaar.

The much publicised construction sector collusion in South Africa, which saw the Competition Commission fining 15 major construction firms a collective R1,46-billion for rampant collusive tendering related to projects concluded between 2006 and 2011 highlighted the importance of mitigating this type of risk.

Collusion is a non-competitive, secret and sometimes illegal agreement between rivals which attempts to disrupt the market's equilibrium. The act of collusion involves people or companies which would typically compete against one another, but who conspire to work together to gain an unfair market advantage.

Companies in the surface mining industry should guard against bid rigging. This is when suppliers illegally agree among themselves on the preferred winner of a particular bid. These agreements can take several forms such as:

- **Bid rotation –** firms agree to take it in turns to submit the lowest bid
- **Bid suppression –** one or more firms agree not to bid or withdraw their bids
- **Cover pricing –** bidders arrange for one or more of them to submit an artificially high bid, distorting the producer's impression of the competitive price

Cartel activity

Bid rigging is a type of illegal cartel activity. As well as bid rigging, business cartels can also involve other illegal practices such as sharing commercially sensitive information, fixing prices (keeping them artificially high) and dividing up markets with competitors.

Surface mines and construction directors, managers and suppliers should therefore guard against this form of cartel activity because bid rigging is illegal and there can be significant financial and personal consequences for breaking the law.

Bid rigging can inflate prices and reduce quality of service, innovation and productivity. It's an unfair practice where the end-customer can be tricked into thinking they have been offered a competitive price. In the case of public sector projects, it is the taxpayer who loses out if the bidding process includes artificially inflated bids.

Consequences of breaking the law

There are several consequences of taking part in cartel activity. Businesses can be fined a percentage of their annual turnover, while company directors can be disqualified from acting as directors or being involved in the management of a company.

In the most serious cases, individuals can face criminal prosecution, resulting in personal fines and even imprisonment. Reputational impact can be negative and long lasting and can potentially harm your chances of winning future contracts and put at risk of claims for damages from affected customers.

What you can do

Suppliers:

- Ensure you and your employees are clear on competition laws and what practices break the rules – directors should lead by example and provide staff training
- Have a good internal reporting process in place, so people feel they can speak up if they witness illegal behaviour
- Never agree to bid rigging, price fixing, market sharing or sharing competitive sensitive commercial information with rivals
- If you are approached to get involved in anti-competitive behaviour you should clearly and immediately reject the approach, report the incident internally, seek independent legal advice

Construction project directors and managers:

- Make it clear to suppliers that you are on the lookout for signs of bid rigging, price fixing or market sharing and advise you will bring any suspicions to the Competition Commissions' attention
- We recommend including a link to ASPASA's Campaign against collusion in any correspondence
- Don't take shortcuts by asking a regular supplier to source the competitive bids for a project – this may put you at risk of facilitating anti-competitive conduct
- Make any bid qualifications as broad as possible so that they can be met by the widest range of suppliers
- Shop around for suppliers when inviting bids
- Ask for bids to be broken down into as much detail as possible

If members feel that they have been involved in a business cartel, they should immediately report to ASPASA. Similarly, if one feels that they have witnessed others breaking the law, they should report it to the association. ●

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