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QUARTER 1 – 2021

NEW ASTEC REGIONAL STRUCTURE A BENEFIT FOR THE AGGREGATES SECTOR

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Astec Industries Inc.'s recent group restructuring, which saw the establishment of several regional businesses, of which Astec Industries Africa and Middle East is one, delivers further benefits for aggregates customers operating in the region through an expanded product range and enhanced support structures.

GUNNING FOR A SIZEABLE SHARE OF THE AFRICAN CRUSHING AND SCREENING MARKET

With its roots firmly entrenched in the waste industry, Egelquip – a machine sales and plant hire company operating throughout Africa – is expanding its reach into the crushing and screening industry following two key dealership agreements with ALLU and ROCO.

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AT THE DRILLING EDGE

Drilling as the first unit operation in quarrying has a significant bearing on the cost-effective execution of downstream operations. The development, advancement and utilisation of innovative technologies in the drilling sector are therefore important for the quarrying industry to operate cost-effectively.

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COMMENT

READYING FOR BUSINESS RECOVERY IN 2021

The South African construction industry began 2020 with some hope for growth – and then COVID-19 hit. Despite the challenges that have resulted, there are reasons to be optimistic this year. While the pandemic's impact on the 2021 construction market is on everyone's mind, some major changes in demand for construction materials might present opportunities for the quarrying sector.

One of the key trends in recent years has been the growth of small to medium construction companies, at the expense of the "big boys". Consequently, quarries had to adjust to doing business with the smaller contractors. This is in line with the country's new approach to packaging construction projects into smaller lots to allow small to medium contractors to benefit from the country's infrastructure build programme.

Things have changed significantly in the industry over the past few years. The local construction industry has traditionally been dominated by the "Big Five". Today, the complete opposite is true. Though many of the big construction contractors may talk tongue in cheek about the small players, they have just been blown out of the water, with the exception of a few. These demographic changes have reshaped the contracting fraternity and sizes of projects.

It's a different market altogether, which changes aggregates companies' strategy and risk profile. For example, a couple of years ago, quarrying companies had huge debtors with huge credit limits; today much of their business is on a cash basis, as "bakkie brigades" have become major customers.

So, what does the future hold for construction material suppliers? It is important to understand that there are new factors that are driving the market and new things that are becoming more important. It is all about strategic management; looking at the current environment and where the company wants to be, identifying opportunities and threats to the business. It's all about considering these factors and playing the game over time.

From an infrastructure rollout perspective, it is encouraging to note government's efforts to enhance infrastructure projects, with further growth expected in the construction industry in the country. The South African National Roads Agency Limited (Sanral), for example, is ready to implement R30-billion worth of construction projects as part of President Cyril Ramaphosa's call for "shovel-ready" infrastructure development projects to unlock South Africa's economy.

The roads agency has a portfolio of shovel-ready projects which would be implemented during the course of the 2020/21 financial year and beyond. In the current financial year, Sanral has advertised 278 maintenance, operations and construction projects worth approximately R30,2-billion. So far 136 projects to the value of R7,3-billion have been awarded. Furthermore, the road agency plans to roll out over 200 additional road infrastructure projects across all nine provinces of South Africa.

In conclusion, here is some perspective to ring in the new year: "2020 – bad; 2021 – good." That's the takeaway from construction observers looking ahead to 2021, even as the bleakness of the pandemic surges and economic challenges in the country continue to weigh on our minds. ●

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Astec's modular plant options support the more popular range of machinery offered by the company.

NEW ASTEC REGIONAL STRUCTURE A BENEFIT FOR THE AGGREGATES SECTOR

Astec Industries Inc.'s recent group restructuring, which saw the establishment of several regional businesses, of which Astec Industries Africa and Middle East is one, delivers benefits for aggregates customers operating in the region through an expanded product range and enhanced support structures, writes Munesu Shoko.

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

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

"We look forward to contributing to the continued growth of our customers' businesses through the enhanced structure, optimised product range and support structures throughout the Astec Industries organisations," explains Vinesh Surajlall, director – Material Solutions, Astec Industries AME.

Expanded product range

A key benefit for the aggregates sector is the expanded product range from a single supplier. Under the Material Solutions portfolio, Astec Industries AME offers crushing units (portable, track mounted, jaw crushers, cone crushers and vertical shaft impactors); screening units (portable and track-mounted, high frequency screens, horizontal screens, incline screens, scalper screens and combos); materials handling equipment (stackers, con-

Astec's high frequency screens operate at 3 600 rpm and above, maximising screen efficiency and production.

KEY TAKEAWAYS

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Within its Material Solutions portfolio, Astec is able to offer a complete line of rock breaker systems, crushers, screens, conveyors, washing and classifying equipment

veyors, and feed systems); washing and classifying plants; rock breaking equipment (hydraulic breakers, demolition, construction and mining attachments); and mobile equipment (utility vehicles, scalers and mobile rock breakers).

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

With a full range of Astec rock breaking equipment, the Material Solutions business can help aggregates operations deal with clogs, bridging and the subsequent downtime. Astec's breaker systems provide operations with a tool to break down oversize material at the crusher, thus enhancing productivity.

Astec offers a wide range of crushing equipment that's engineered with the highest standards of safety,

The new structure allows Astec Industries Africa and Middle East to add a range of washing and classifying plants to its stable.

productivity and ease of maintenance for mining, aggregates, crushed stone production and recycling applications. The crusher range includes portable, track mounted, jaw crushers, cone crushers and vertical shaft impactors (VSIs). A full range of VSI crushers has been added to the Material Solutions product offering. The VSI has the advantage of fracturing stone through impact, which typically creates a more cubical product versus the cleavage fracture from a compression crusher.

Astec's modular plant options support the more popular range of machinery offered by the company. Key design criteria include well designed structural support for crushers and screens; proper feed and removal of material; and ease of maintenance on site. All modules have the option of packing into open top containers for shipment. Established designs and costs provide ease of plant layouts and tender purposes, as well as rapid deployment and erection on site. Standardisation ensures accurate lead times even when units are not supplied ex-stock.

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

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

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

Strong support footprint

Astec Industries AME is currently establishing a dynamic dealer network. The dealers in the region are strategically selected for their capability, customer centric values and organisational stability to ensure that the company covers the region adequately to be able to provide greater sales and service support to its customers.

To support the dealers and customers, Astec Industries AME has several regional sales managers operating across the region. The idea is to create a strong aftersales regime to offer unparalleled support to the customer, says Surajlall.

The Astec range of equipment has made its mark around the world, operating successfully in the most challenging environments. "We serve our regional business through our global manufacturing facilities and have one of the largest, most modern manufacturing facilities in South Africa. Our dedicated service and spares department and our highly qualified field service personnel ensure seamless aftersales service and global coverage. We are committed to the Voice of our Customer, and we strive to constantly improve and innovate to meet and exceed our customers' needs," concludes Surajlall. ●

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Zimbabwean growth is supported by PPC's recent investment into its US$85-million, 700 000 tonne per year mill in Harare.

BASKING IN THE GLORY OF AFRICAN INVESTMENTS

The plight of South Africa's cement producers has in recent years been a tale of two fortunes – better prospects across the rest of Africa and an uphill struggle at home. For PPC Ltd, South Africa's largest cement producer, the decision to invest in capacity building projects in Zimbabwe, the DRC, Ethiopia and Rwanda in recent years is proving to be worthwhile. The company's international business is providing a portfolio effect that is offsetting a weaker performance in the domestic South African market. By Munesu Shoko.

At the start of the decade, PPC Ltd embarked on an African expansion programme with the aim to generate a big chunk of its turnover elsewhere on the continent. In fact, the company had a target to grow revenues outside its home market of South Africa from 23% in 2015 to 40% by 2017, a feat well accomplished. The strategic aspiration, however, has always been to become a major African cement producer.

Having commissioned capacity building projects in strategic markets of Zimbabwe, Ethiopia, Rwanda and the Democratic Republic of Congo (DRC) some few years ago, PPC today is basking in the glory of its forward-thinking investments as these markets have become an integral part of the company's overall business. Judging by PPC's financial results for the year ended 31 March 2020, the tough operating conditions experienced in the home market were offset by resilient performances in markets outside South Africa.

The cement industry in South Africa has been in dire straits in recent years, largely due to unprecedentedly low levels of demand as a result of slow economic growth, which has forced producers to halve their capacities in some instances. The situation has been exacerbated by the influx of cheap, substandard cement imports, as well as third-party cement blenders thriving on deliberately

PPC commissioned its CIMERWA plant in August 2015.

flouting standards to undercut prices. Amid these tough trading conditions, the COVID-19 pandemic struck during the last month of PPC's financial year in March, with dire consequences.

To provide context, PPC Cement South Africa and Botswana saw a decline in revenue of 11% to R4,8-billion, delivering 36% lower EBITDA. Cement volumes were 15% to 20% lower in a market predicted to have contracted by around 7% to 10%. Imports and blender activity further impacted the competitive landscape, with cement imports increasing by 36% to 1,3-million tonnes for the period. Overall, group revenue for FY20 was slightly lower at R10,2-billion, largely due to a reduced contribution from the South African cement business.

Resilient Zimbabwe

In an environment where the South African business struggled, the international operations had to come in and support the group, says Mokate Ramafoko, MD – PPC International. To provide context, he says the bulk of the R1,6-billion total group EBITDA was generated from markets

KEY TAKEAWAYS

Judging by PPC's financial results for the year ended 31 March 2020, the tough operating conditions experienced in the home market were offset by resilient performances in markets outside South Africa

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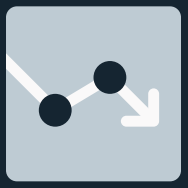
The bulk of the R1,6-billion total group EBITDA was generated from markets outside South Africa



While PPC's cement volumes in Zimbabwe declined by 15% to 20% in a market that contracted by a similar margin, revenue increased 29% to R1,9-billion, while EBITDA grew by 53% to R707-million, contributing almost 70% of group EBITDA

The modernised 600 000 tonne per year CIMERWA plant is strategically located, positioning the company at the centre of Rwanda's inland growth.

A key driver of the cement market in Rwanda is a deliberate move by the government to roll out infrastructure projects.

outside South Africa.

"If you look at the segmental analysis of our results for FY20, you will see that out of the R1,6-billion total EBITDA, approximately R1-billion was generated from our international markets. The bulk of it actually came from our Zimbabwe business, followed by Rwanda and the DRC," explains Ramafoko.

While PPC's cement volumes in Zimbabwe declined by 15% to 20% in a market that contracted by a similar margin, revenue increased 29% to R1,9-billion, while EBITDA grew by 53% to R707-million, contributing almost 70% of group EBITDA. Commenting on why Zimbabwe is seemingly resilient in the face of tough economic conditions prevailing in the country, Ramafoko says the revenue increase was buoyed by stable realised prices and cost reduction.

"One of the key factors driving our international business is stable pricing in some of these markets. Apart from Ethiopia, which is very similar to South Africa in terms of cement pricing, the other three countries – Zimbabwe, Rwanda and the DRC – are boosted by good cement prices, although we have much lower utilisation," explains Ramafoko.

Apart from pricing, Ramafoko says these businesses are in developing markets. For example, while trading conditions in Zimbabwe continue to be impacted by the hyperinflationary environment, unstable power supply and shortage of foreign currency, PPC continues to secure large infrastructure projects in hard currency.

In terms of projects, PPC Zimbabwe is supplying almost 80% of the government projects underway in the country. For example, the company supplied the Gwai-Shangani dam project, where at least US$122-million has already been spent under the Public Sector Investment Programme to address perennial water challenges in Bulawayo, Zimbabwe's second largest city. The project was initially scheduled to be completed in December 2021, but is now stalled by the outbreak of COVID-19.

Elsewhere, PPC is also supplying the Zimbabwe government's 600 MW Hwange Power Station expansion project. The US$1,5-billion project, being carried out by Chinese firm Sinohydro, entails the addition of two power generating units, units 7 and 8, to the existing six units that were commissioned between 1983 and 1987.

PPC, adds Ramafoko, is also supplying the Beit Bridge-Harare-Chirundu road project. The 971 km project involves the dualisation, upgrading and tolling of the country's major highway. The estimated completion date is 2022 and the projected total project cost is US$2,7-billion.

"One of our key strengths is that we are competitive in the specialised cement and application space in Zimbabwe. We have seen strong growth from our bulk sector, where we are involved with sectors such as tile-making and brick manufacturing. It has always been our focus to grow the bulk sector, which bodes well for our growth. We have also built key relationships with construction and mining companies. Mining is a new market developing for us in Zimbabwe, given the amount of investment going into this sector in the country," says Ramafoko.

The Zimbabwean growth is supported by PPC's recent investment into its US$85-million, 700 000 tonne per year mill in Harare. Commissioned at the end of 2016, the Harare plant was by far the biggest capital project in the history of PPC Zimbabwe, representing PPC Ltd's vote of confidence in the future of the country.

Opportunity abounds in the DRC

Elsewhere in the DRC, PPC Barnet achieved revenue growth of 5% to R607-million on the back of higher pricing and translation gains, and generated EBITDA of R94-million in a market that is projected to have seen an overall increase in demand of 4% to 8%.

Commenting on the state of the market, Ramafoko says despite the current challenges related to continued cement imports, the country offers a lot of opportunity. To make the most of the prospects, PPC Barnet commissioned its US$280-million, 1-million tonne per year plant at the end of 2016.

"The DRC used to operate with only one cement plant, despite the vastness of the country, with a population of approximately 90-million people. The DRC has traditionally had a short supply of cement, relying on imports. In the south, for example, the bulk of the cement was imported from Zambia," he says.

The DRC is vast and blessed with natural resources, which can be a driver for economic growth. Ramafoko believes the infrastructural gap in the country will drive cement demand. "The DRC, under the new administration of President Félix Tshisekedi, is prioritising infrastructure development to ease the movement of people and goods in the country. To give an idea, travelling between the capital Kinshasa and Lubumbashi or Goma by road is a mission impossible. The only way to connect these three major cities is by air," he says. "Upgrading infrastructure will play a critical role in the DRC's quest to diversify its economy and reduce poverty. It will also be an important source of growth on its own."

Rwanda's robust cement demand

In Rwanda, where PPC achieved revenue growth of 6% to R936-million, Ramafoko says robust cement demand was driven by large infrastructure projects, growth in the retail market and export demand from the eastern DRC. "A key driver of the cement market in Rwanda is a deliberate move by the government to roll out infrastructure projects. Rwanda understands the importance of infrastructure in the development of a competitive private sector. To this end the government continues to invest heavily in infrastructure," he says.

Pre-COVID-19, Rwanda and Ethiopia were among the fastest growing countries in the world. Ramafoko says the two countries have been the "shining armours" of Africa in terms of economic growth. As a country, Rwanda also understands the importance of the ease of doing business. "There is a push to drive ease of doing business, which has made the country attractive to foreign investment," he says.

PPC commissioned its CIMERWA plant in August 2015, the only integrated cement producer in the country. The modernised 600 000 tonne per year CIMERWA plant is strategically located, positioning the company at the centre of Rwanda's inland growth.

Infrastructure drive in Ethiopia

Elsewhere in Ethiopia – where PPC commissioned its 1,4-million tonne per year plant at a capital cost of US$180-million in 2017 – the government has announced a massive infrastructure drive to the tune of US$2-billion, says Ramafoko. The construction industry in the country, he says, is growing and offering better prospects for the cement market through the various ongoing mega projects.

Mokate Ramafoko, MD – PPC International.

Ethiopia is aiming to become self-sufficient when it comes to power generation. The country has done a lot in terms of hydro power development, says Ramafoko. A case in point is the GERD project, which has been under construction since 2011. Located in the Benishangul-Gumuz Region of Ethiopia, about 15 km east of the border with Sudan, the 6 450 MW dam will be the largest hydroelectric power plant in Africa when completed, as well as the seventh largest in the world.

Another project of note currently underway in the country is the 752,7 km Ethiopia-Djibouti railway modernisation project, also known as the Addis Ababa-Djibouti Railway, the first modern electrified railway line in East Africa. It is jointly owned by the governments of Ethiopia and Djibouti.

Apart from these mega projects, Ramafoko says there is generally a lot of infrastructure development activity in the capital, Addis Ababa, driven by the renewal of the inner city and several housing projects in response to urbanisation. "Ethiopia is also generally less industrialised than most of its peers, and the government has been calling for industrial partners to invest in the country to increase local manufacturing in order to reduce imports. Together, these factors have been contributing to cement demand in the country," concludes Ramafoko. ●

BME's AXXIS Initiation system has been behind some of the world's largest surface blasts.

UNPACKING THE DIGITAL REVOLUTION IN BLASTING

The COVID-19 situation has created major challenges for the mining sector worldwide and has highlighted that digital production is more important than ever when it comes to gaining a competitive edge. Consequently, BME reports increased enquiries for its digital blasting tools as mines seek to take advantage of digital technologies to react to current and future challenges with the required degree of flexibility. By Munesu Shoko.

The days of trying to convince mining executives of the imperative of a comprehensive digitalisation roadmap may well and truly be over. There doesn't appear to be a mine owner or manager in the world who doesn't appreciate the immense value, efficiencies and competitiveness that can be unlocked by fully harnessing the power of digital tools.

One area in the mining cycle where the power of digital is proving its worth is in blasting. Tinus Brits, global product manager – AXXIS at BME, says mines and quarries in the SADC region, and Africa at large, are looking for innovation and technology to promote sustainability.

"We have seen a big move towards electronic detonators in the African mining sector," he says. "A big drive is the testability of the product. With electronic detonators you know immediately what is going on – you can detect possible misfiring in the range and can easily detect which detonators are not responding. We have therefore seen most mines moving over to electronic detonation."

Brits also notes a big drive for data at mines. The data, he reasons, has always been available, but now more than ever, mines are realising the value that can be driven from the large amounts of data at

The digital revolution optimises the full blasting cycle, from planning through to initiation and analysis.

The free Android Blasting Guide application enables users to rapidly calculate and check blast designs.

their disposal. "Previously," he says, "data was never really shared between the customer and explosives supplier. There is now a big drive to make data available to all parties for informed decisions when it comes to blasting patterns and blocks."

D. Scott Scovira, global manager Blasting Science at BME, agrees, saying that the behaviour and discipline of mining houses has changed in recent years. Previously, in the late 1990s, he says, mines were very much paper driven, and operations personnel largely ran mines at the expense of engineering teams.

"Mines traditionally tend to be heavily driven by operations, and every time you introduce more work processes, they are often met with resistance. Fortunately, mine management has seen the value of big data and now it's being driven from top-down, rather than from bottom-up," says Scovira.

Scovira adds that traditionally the drill and blast function in most mines was regarded as an entry level position and was not considered a sophisticated role. "The viewpoint is changing," he says "as people realise that the entire mining cycle, the physical part of it, starts with drill and blast, and has a huge impact on fragmentation, which has a big effect on downstream operations such as load and haul as well as crusher throughput."

More experienced and knowledgeable people are thus being brought in to fill in these roles. To help facilitate that, leading blasting companies like BME are at the forefront of a digital revolution, offering digital tools to help optimise the full blasting cycle, from planning through to initiation and analysis.

Digital innovation

Over the years BME has developed a suite of digital technologies to help mines with improved blast planning, initiation and analysis. The company has always been synonymous with innovation. Formed in 1984 as a supplier of bulk emulsion explosives, BME was the first explosives company to introduce dual salt cold emulsion technology into South African open-cast mines.

In 1987, the company became part of the JSE-listed Omnia Group, and today is one of the leading suppliers of emulsions and initiating explosives in Africa. In addition to emulsion explosives, BME has developed

KEY TAKEAWAYS

BME reports increased interest in its digital blasting tools as mines and quarries seek to take advantage of digital technologies to react to current and future challenges with the required degree of flexibility

Electronic initiation has become increasingly popular due to its reliability, accuracy and flexibility, making blasting more predictable and allowing for larger and more cost-effective blasts

In recent years, BME has continuously invested in its software development team and also adopted a development framework to streamline the development process and releasing of features and products in a shorter timeframe without jeopardising the quality of work

BME reports an increased need for real-time data to drive short interval control in execution, reduce variability and shorten planning cycles

BME's emulsion plants produce, optimum quality emulsion to enhance the blasting process.

cutting-edge products and services at every stage in the explosives supply chain. Its main innovations in recent years comprise the AXXIS electronic initiation system, its BLASTMAP blast planning software, its XPLOLOG blast recording system and, more recently, the Blasting Guide app.

Electronic initiation, says Brits, has become increasingly popular due to its reliability, accuracy and flexibility, making blasting more predictable and allowing for larger and more cost-effective blasts. BME's AXXIS is a fully programmable, accurate and easy-to-use electronic delay detonator system. It is said to be one of the safest initiation systems available.

With safety in mind, AXXIS offers full two-way communication between the blasting box and detonators. During detonator logging, there is no direct communication with the detonators. Using the AXXIS system, you can programme AXXIS detonators to fire accurately at any time between zero and 15 000 ms at one millisecond intervals. You can fire up to 600 detonators from one AXXIS Blasting Box.

BME's AXXIS system – which has built a strong customer base in the mining sectors of Africa and even beyond, mainly Australia – has been behind the world's largest surface blasts, measured by the number of electronic detonators fired in a single blast. At Zambia's Kansanshi mine – the largest copper mine in Africa – 7 401 electronic delay detonators were successfully initiated in one blast using AXXIS.

Recently, the company broke the South African record for the largest electronic detonator blast, initiating 3 780 detonators in a single blast at a manganese mine near Hotazel in the Northern Cape. The latest record was once again achieved using the company's popular AXXIS GII electronic detonation system.

BME's BLASTMAP, a software tool for designing blast timing for use with XPLOLOG and AXXIS, ushered in a new era in blast planning. It is a powerful and modern software that allows design of the blasts from hole layouts to charge quantities, deck charging and blast timing.

Christiaan Liebenberg, software product manager at BME, explains that the desktop application allows for importation of survey data of the block geometry, holes and surface, as well as virtually creating a blast and pattern of holes, adding explosive and rock types. With BLASTMAP, one can also view a blast design in 3D with full 360° rendering, create charge and timing designs based on actual hole positions and calculate costs and quantities based on actual drilling information.

"You can also create your blast designs and share the file with another user that has the BLASTMAP software installed, allowing them to view, make corrections and sign off the blast. "The blast design file exports directly from BLASTMAP into BME's XPLOLOG system, allowing users to view, edit and sync planned with actual data captured to a cloud solution for XPLOLOG users to access the data from anywhere. The integration of data allows you to use the powerful blasting simulation and prediction modules in BLASTMAP to further analyse and improve blast outcomes on real data."

"Real-time data over local networks (GSM/WIFI) mean that the process can be monitored remotely and dipping, priming, charging and stemming procedures can be efficiently coordinated. This technology digitises the pre-blast process, reducing human error, increasing efficiency and ensuring reliable results," adds Liebenberg.

Continuous development

Historically, says Liebenberg, BME's software solutions were developed according to a specific customer request. Thus, these products – BLASTMAP, XPLOLOG and BME Blasting Guide – were previously developed in isolation.

In recent years, BME has continuously invested in its software development team and also adopted a development framework to streamline the development process and releasing of existing product features and new products in a shorter timeframe without jeopardising the quality of work.

"We continue to invest in our software team," explains Liebenberg. "Our strategy in the medium term, in terms of technology development, is to improve the existing offerings. The aim is to improve on user experience, to add new innovative features in response to current customer needs, improve application performance to reach optimal productivity and also to use data to make informed decisions, monitor blast progress and react to alerts that need immediate attention."

A case in point, as far as continued improvement of offerings is concerned, is the recent enhancement of the BLASTMAP blast planning tool with an added burden relief timing module. As an enabling tool for AXXIS electronic initiation system, BLASTMAP now has a powerful burden relief feature that gives the blaster better control over the shape and movement of the blasted rock muckpile. Burden relief, explains Scovira, is fundamental to good blast design, as the blaster needs to shape the muckpile to optimise the efficiency of the excavation fleet.

The new feature augments a range of BLASTMAP tools that have added value to BME's customers for many years, integrating with BME's AXXIS and XPLOLOG systems. AXXIS allows blast technicians to programme a detonator with the desired time delay, while XPLOLOG allows users to view, capture and sync drill and blast data to a cloud solution for real-time access to preparation progress on the blast block.

Another recent development from BME is the free Blasting Guide application for Android mobile devices, enabling users to rapidly calculate and

BME has developed cutting-edge products, services and solutions for every stage in the explosives supply chain.

check blast designs. Available for download from the Google Play Store, the new BME Blasting Guide mobile app replaces traditional paper booklets carried and referenced by in-field users. It includes a blast design calculator, quick calculators and prediction calculators. Other app features include surface blast design rules of thumb, environmental guidelines, a table of common rock properties and a BME contact directory per country.

The app runs both metric and imperial unit measurements, making it useful across the globe. "The new app is an integral part of BME's pioneering approach to harnessing the power of digital technology in the blasting sector," says Liebenberg. "The platform gives our Blasting Guide a mobility and ease of use that makes a blasting engineer's job easier and more productive."

In the near future, BME will also roll out its AXXIS TITANIUM, said to be the most advanced electronic blast initiation system in the world. The system, an upgrade of the current AXXIS GII, is undergoing final trials in South Africa, with a 100% success rate to date. A total of 60 blasts have been undertaken to date using this system. At the time of writing, the system was expected to be launched in late 2020 as a successor to the company's GII version.

"The upgraded system has achieved trial certification from the first phase of testing, receiving a six-month trial period confirming that it is safe to use," says Brits. "Trials are proceeding under the control of BME, so that we can build up a history of performance data – which to date has been faultless."

Data is king

The key improvements in BME's digital offerings have been driven by the increased need for blasting data by mining management. "From an integration point of view, our products have traditionally been built in isolation. We are starting to integrate our technology offerings to allow these products to talk to one another. From stage one of the blast cycle to the very end, data needs to keep flowing," says Liebenberg.

Brits says while data has always been there, the COVID-19 scenario has fast-tracked the mining sector's need for digital systems to improve every part of the operations. "Data has always been there, but my view is that it was never properly understood by the mine," he says.

Liebenberg says there is greater need for real-time data to drive short interval control in execution, reduce variability and shorten planning cycles. He also notes that there is an increased need for reporting and analysis of historical data and insight gained from analysing trends, patterns and opportunities for improvement learned from previous blasts. Future insight is also derived from historical analysis to improve planning and predict future outcomes using analytics.

While there has been plenty of data, interpretation has always been a concern. In its new re-development work for XPLOLOG, BME is offering the user a new customised reporting feature as the answer to the interpretation concern.

"As part of our new XPLOLOG re-development, we are giving the customer an option to select the data they want to see and how they want to see it; whether online, in PDF format, or email. The idea is to also integrate with the customer's data, pushing the drill and blast data into their environment."

Scovira says integrated data platforms support all processes at the mine. Therefore, BME is currently working with several third-party mining software providers. "We have been open-minded and so have our partners. This allows our products to communicate with each other. That has been a key focus in the past decade, to get everything to talk to each other so that there is a continuous flow of data from design through to review."

Supporting mines during COVID-19

COVID-19 has further reiterated the significance of digital blasting systems in mines. "We have actually seen an increase in requests for quotations for our software-based tools. As many people work remotely, the need to transform to digital tools has never been this high," says Liebenberg.

Scovira says the mining sector, like many other industries, is seeking to operate and function differently. Before COVID-19, many of the things were done face to face, not necessarily because they had to, but because that was the way work was done, says Scovira. "The methodology of working is now changing, becoming more data and analysis sharing driven. In the long term, I am sure some positive technology advances will come out of this. We are in a period of transformation."

In conclusion, Brits believes the future of mining is digital, where electronic detonators and related digital tools will take centre stage. "I think electronic detonators will further develop. For instance, there is talk of wireless detonators already being developed in the market. BME is also exploring such tools. That's where the future is heading," says Brits.

Liebenberg is of the view that to support sustainable mining "semi-autonomous technology is the future," he says. "Automation by its very nature takes people out of harm's way, avoids human error and also facilitates the upskilling of people. It doesn't necessarily have to replace people, but has to create new opportunities for people to grow."

"This is a period of gap filling in mining. One of the gaps available, for example, is how do you load drill holes with explosives autonomously? That's an area currently receiving greater attention," concludes Scovira. ●

GUNNING FOR A SIZEABLE SHARE OF THE AFRICAN CRUSHING AND SCREENING MARKET

With its roots firmly entrenched in the waste industry, Egelquip – a machine sales and plant hire company operating throughout Africa – is expanding its reach into the crushing and screening industry following two key dealership agreements with ALLU and ROCO. Group CEO Brendan Geoghegan, who took over the reins in May last year, believes that the company is ready to challenge for a sizeable share of the competitive crushing and screening industry in southern Africa. By Munesu Shoko.

Egelquip is historically a waste solutions company established in 2013 by Kieron Geoghegan as a 'new version' of his original business, Conquip Plant Hire, which began trading in 1983, before being sold off to one of South Africa's leading waste companies, EnviroServ. Conquip was at one point the biggest owner of compaction equipment in South Africa. When the business was sold off, Geoghegan decided to start a modern version of the highly successful Conquip Plant Hire, which led to the formation of Egelquip.

Egelquip was created with the intention to embrace an evolving business environment. In 2016, the company expanded its scope to include machinery distribution following a dealership agreement with Finnish company, Tana, for the supply of mostly landfill compactors and shredders. Through its Finnish links with Tana, the company was offered the ALLU agency for southern Africa in 2018, a brand which CEO Brendan Geoghegan deems to offers the greatest growth opportunity for Egelquip. The 2020 appointment as the ROCO dealer for southern Africa further gives Egelquip a footprint into new territories such as quarrying, opencast mining and recycling of demolition waste.

Having been in charge of Egelquip's DRC ventures for the past five years, Brendan returned to South Africa in 2020 to take over from his father Kieron as Group CEO. Brendan believes that with the ALLU and ROCO offerings in the stable, coupled with the service capabilities that the company is already renowned for, Egelquip is ready to challenge for a sizeable share of the market in the southern African crushing and screening space.

Challenging the status quo

The crushing and screening sector in Africa, whether in quarrying or mining, is generally conservative, with many players in this space loyal to certain brands that they have operated for many years. The market is also stubborn for sticking to what it believes are the proven ways of doing things, principally driven by a mindset that says "this is what we use here". Brendan says that Egelquip has done its homework and is ready to challenge the status quo, through offering what he believes are efficient solutions for better crushing and screening economics.

A case in point is the ALLU offering, which he says will help businesses transform the way they have always worked by turning any tool carrier – excavator, wheeled loader or skid-steer loader – into a multifunctional tool that can screen, crush, mix, aerate, pulverise and load, all in a one-step process. Typical applications for the ALLU Transformer range include pipeline padding, recycling and processing

Part of Egelquip's ROCO offering are two scalping screens.

Egelquip believes that ALLU offers the greatest growth opportunity for the company.

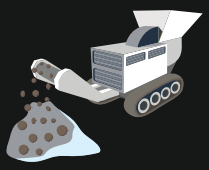
of demolition waste. At quarries, these attachments can also be deployed to process waste material for haul road maintenance, for instance.

ALLU dealership

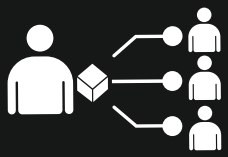
Egelquip was appointed the ALLU dealer in southern Africa in 2019. The company supplies a comprehensive range of ALLU Transformer and Processor attachments across the region, and in conjunction with ALLU, provides full aftermarket care, spare parts and dedicated customer service. The ALLU Processor is a power mixer attachment which converts any excavator into a powerful and versatile mixing tool capable of penetrating and effectively mixing a variety of difficult materials. Materials suited for the attachment range from clay, silt, peat, sludge and sediment, to dredged material and contaminated soil.

"From the onset we were intrigued by the innovativeness of the ALLU product range, especially the Transformer series. While it fits well into our traditional landfill space, it also opens up a whole new business area for us in the aggregates crushing and screening sector," he says.

KEY TAKEAWAYS



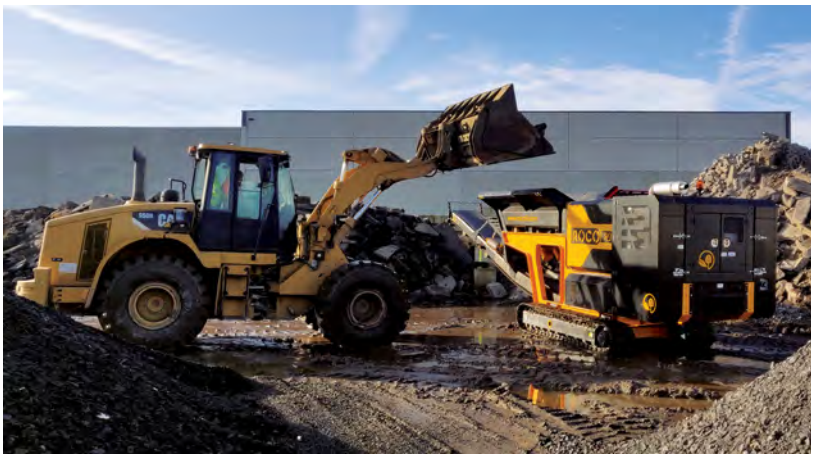
Egelquip is expanding its reach into the crushing and screening industry following two key dealership agreements with ALLU and ROCO



Egelquip was appointed the ALLU dealer in southern Africa in 2019 to supply a comprehensive range of ALLU Transformer and Processor attachments across the region

The ROCO offering allows Egelquip to compete in the mainstream crushing and screening space against some of the established brands

Egelquip's initial ROCO product offering will include two jaw crushers, two scalping screens and three different sized stackers



The ROCO range gives Egelquip a footprint into the crushing and screening industry.

The ALLU Transformer working in a quarrying application.

Brendan Geoghegan, Group CEO at Egelquip.

Egelquip has already brought in a few ALLU units, which have been deployed on a pipeline project for one of the state-owned enterprises in South Africa. To further prove concept, the company will bring demo units at the start of 2021. "We will bring in two ALLU buckets, one for a mining application in the coal space, and another for a screening application in the pipeline industry," he says.

Brendan believes that the ALLU offering disrupts what is regarded as the norm, especially in the pipeline industry. "Traditionally, you would dig out material using an excavator, which is then loaded onto a tipper, before being hauled to a screen, where it's processed. You then have to reload the material onto the tipper after processing and bring it back to the trench for backfilling using an excavator. With the ALLU bucket, we can cut out all the re-handling expenses as one is able to process the material straight from the trench and backfill immediately," he says.

ROCO offering

Commenting on the ROCO offering, Brendan says the equipment allows Egelquip to compete in the mainstream crushing and screening space against some of the established brands. Officially launched in 2018, ROCO is the latest sister company to the Ballytrain Group.

Based in Northern Ireland, known as the home of crushing and screening, ROCO leverages the Ballytrain Group's 40 years' experience in the crushing and screening industry. After building a global customer base through supplying used crushing and screening equipment to over 90 countries, the group made the decision to develop purpose-built machinery from the ground up, incorporating the significant experience within the Ballytrain team.

Egelquip's initial ROCO product offering will comprise two jaw crushers, two scalping screens and three different sized stackers. "This will provide us with a comprehensive range of equipment that is able to service various industries and different size operators. With ROCO, we are targeting recycling, quarrying, waste and mining industries," he says.

Future focus

"Having built a solid foundation in the waste industry as one of the clear market leaders, we at Egelquip look forward to our growth and expansion into the crushing and screening space. Our core focus has always been unrivalled customer support and we are confident that we have delivered this to our existing customers in the waste industry. Our next challenge is expanding this reliable service offering to the crushing and screening industry where we hope to disrupt the current status quo and provide our new customers with reliable, productive and efficient equipment, coupled with our excellent technical support."

Egelquip has also partnered with a specialised asset finance house and together the two entities will be able to provide the market with flexible and innovative finance options on all ROCO and ALLU equipment. "This, we believe, will provide our customers with the capital and tools crucial to running profitable operations."

Looking ahead, Brendan is positive that 2021 will be a year of growth for Egelquip, following a tough year in 2020. "We have done enough legwork in 2020 and we believe we have already laid a good foundation for ROCO. Some of our existing clients have already shown interest and we are excited about the future."

Brendan is thrilled by the recent global Dealer of the Year award from Tana for 2019, which he says is testimony to the company's service capabilities. "We are honoured to be recognised for our excellent service among all the Tana dealers worldwide. This award further confirms that service is our key strength as a company. We believe that every product is as good as its support, and we don't pay lip service when it comes to customer experience. We want our ALLU and ROCO customers to enjoy the same service with which we have looked after any other brand in our stable," concludes Brendan. ●

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Sandvik's Leopard DI650i intelligent down-the-hole surface drill rig is designed for demanding high-capacity production drilling applications in surface mining, as well as large-scale quarry applications.

AT THE DRILLING EDGE

Drilling as the first unit operation in quarrying has a significant bearing on the cost-effective execution of downstream operations. The development, advancement and utilisation of innovative technologies in the drilling sector are therefore important for the quarrying industry to operate cost-effectively, which is why drilling OEMs are championining technological advancement in all forms.
By Munesu Shoko.

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 is the first unit operation that has a significant impact on the rest of the functions, thus it should be executed accurately.

As the initial phase of the quarrying process, says Vanessa Hardy, business line manager surface drills, Sandvik Mining and Rock Solutions, the drilling function sets the scene for the efficient roll-out of blasting, loading, crushing and screening phases.

"If the drilling is not done accurately at the start of this process, there is an increased risk to production, including safety issues, delays and higher costs. Failing to deliver on any of these issues can even lead to reputational risk. Getting the basics right is vital, from the correct selection of drill rigs to the bench preparation and levelling of equipment," explains Hardy.

A key enabler to effective drilling in recent years has been the continuous rollout of new technologies that have and are changing the face of this function in the quarrying and mining sectors. In this changing world where much of the traditional and accepted ways of working are being questioned, Kevin Govender, area sales manager – Surface Division at Epiroc South Africa, believes that automation technology will solve many of the challenges facing quarrying operations.

Leading the way

One of the areas where automation technologies have matured is in rock drilling. Sandvik is one of the leading OEMs in this area. With its iSeries range of intelligent drill rigs, the company has put tremendous focus on safety, efficiency and productivity while reducing operating costs. There is also plenty of flexibility for the customer to choose the level of automation that suits them, says Hardy.

"Where the customer still wants an operator in the cab, there are various one-touch buttons to improve performance and accuracy. For instance, this allows the rig to level itself before operation, to bring the drill up into a drilling position or to collar the drill. The operator can also set, store and recall a number of operating 'recipes' for drilling, which the machine will automatically implement at

Epiroc's SmartROC MK II series is available in three different beam sizes to carry 5 m, 6 m and 8 m pipes and has the capacity to drill down to a depth of 56 m.

KEY TAKEAWAYS

As the initial phase of the quarrying process, the drilling function sets the scene for the efficient roll-out of blasting, loading, crushing and screening phases

One of the areas where automation technologies have matured is in rock drilling

With its iSeries range of intelligent drill rigs, Sandvik has put tremendous focus on safety, efficiency and productivity

Epiroc is one of the OEMs that has rolled out an extensive portfolio of automation innovations as part of a continuous drive to make rock excavation safer, more efficient and productive

the push of a button. These recipes will apply a certain predefined combination of rotations, pressures and other variables to optimise results," she says.

Automation, adds Hardy, has also opened doors for remote working, where the options range from an operator standing on the bench within line-of-sight of the rig, to operating from a control room which can be many kilometres away from site. "The key advantage is to enhance operator comfort and safety while getting optimal performance from the machine. The range of sensors and automatic settings – which allow the machine to operate at its best – also protect the equipment from being pushed too hard. This, in turn, reduces maintenance costs and lowers total cost of ownership," she adds.

Enter SmartROC MK II

With automation technologies taking centre stage in the drilling sector, Epiroc is one of the OEMs that has responded with an extensive portfolio of automation innovations as part of a continuous drive to make rock excavation safer, more efficient and productive. The new SmartROC MK II range of drill rigs is a typical case in point, with machine automation covering the full spectrum of drill rig functionality, from automatic hole navigation to rod handling and control. Epiroc South Africa has recently brought to market the first three units of the SmartROC MK II drill rig range, which comes with an automation-ready platform and an array of smart features.

The new SmartROC MK II is a radical upgrade of Epiroc's predecessor range. A major talking point, explains Rodney Keogh, product manager – Surface Division at Epiroc South Africa, is the rig's automation-ready platform, which includes the new Auto Feed Fold feature.

Commenting on some of the key feature upgrades, Keogh makes special mention of the Auto Feed Fold. With the press of a button, Auto Feed Fold enables the operator to fold the feed for tramming or position it for drilling. This, he says, also comes in handy when operating one or more drill rigs remotely using Epiroc's BenchREMOTE system.

"The system performs a single action to place the feed into a tramming position or raise it into a position ready for drilling. This saves time and prevents damage to the drill rig cabin during operations and transport. This function is a great help to an operator when running one or more drill rigs remotely," he says.

Another key feature upgrade is the Extra Long Feed (XLF), an 8 m drill rod variant. While the predecessor was available in two feed sizes to carry 5 m and 6 m pipes and the capacity to drill up to a depth of

The DX900 drill rig can be operated remotely within line-of-sight to enhance operator comfort and safety while getting optimal performance from the machine.

55,5 m, the SmartROC MK II series is available in three different feed sizes to carry 5 m, 6 m and 8 m pipes respectively and has the capacity to drill down to a depth of 56 m. "When using 8-m pipes, it is possible to drill 16-m production holes with just one rod change," explains Keogh.

The added power of the hammer enables the SmartROC MK II to drill holes from 110 to 229 mm in diameter, compared with the predecessor's capacity to drill holes from 110 to 203 mm. Thanks to the intelligent control of compressor load and engine rpm, the SmartROC MK II series not only helps to optimise the blasting process with improved fragmentation, but also cuts an already low fuel consumption by a further 20% compared to the same size FlexiROC rig model.

In addition, the rig range offers multi-function joysticks and adjustable speed tramming to further improve operator comfort and make trailer loading safer and easier. "On the old machine we had a couple of levers and press button functions with each controlling one or two functions. With the new machine, there are only two multifunction control joysticks controlling all the functions, allowing us to do away with many press button functions, thus improving machine operability and ultimately productivity," explains Keogh.

In addition, the updated SmartROC series is equipped with an efficient hydraulic system that reduces fuel burn and works with fewer pumps and hoses than the previous versions. There is a 55% reduction in hydraulic oil volume. "On the predecessor we used to run a 600-litre hydraulic oil system, which has been reduced to 270 litres on the new SmartROC MK II. This translates into reduced running costs for the machine owner," adds Keogh.

More developments

Developments in the areas of planning and design of blasts, drill monitoring, drillhole deviation and drill machine navigation systems have also taken centre stage in the drilling sector.

According to Hardy, the ability to load drill plans into Sandvik's drill rigs' onboard systems – which can be done using Wi-Fi or USB – has been an important development for customer efficiency and productivity. With this level of automation, she says, one operator can manage three drill rigs on a pattern at the same time. The operator monitors at fleet level and takes control only when required, while onboard automation functions minimise the risk of human error.

"For added safety, geo-fencing technology creates virtual barriers between the rigs to prevent any contact or accidents. Our customers using these features in southern Africa have seen improved penetration rates alongside better fuel consumption, as the rigs are constantly adjusting their performance for optimal efficiency," says Hardy.

Important operating features such as auto-collaring and auto-alignment, adds Hardy, help to prevent drillhole deviation, making for quality blasts and streamlining downstream processing. The intelligent collaring sequence makes sure the hole start is perfect, while the iTorque drilling control system ensures optimum drilling parameters for different rock conditions.

"To enhance Sandvik's fleet data monitoring capabilities for our surface drill rigs, we have SanRemo Mobile – a connectivity solution using mobile phones or tablet devices. This application uses Bluetooth connectivity to exchange fleet management and drilling data to and from the mobile device in vicinity of the drill rig. This allows users to monitor drilling, download reports and share data with colleagues," explains Hardy.

Meanwhile, the foundation of Epiroc's SmartROC MK II, as the name suggests, is an array of smart features to deliver high-quality blast holes with accuracy and precision. Autonomous drilling capabilities of the rig employ already existing technologies developed by Epiroc, such as Rod Handling System (RHS), Hole Navigation System (HNS) and Auto Positioning (AutoPOS), among others. Another crucial factor is the scalability of the Rig Control System (RCS).

The Hole Navigation System (HNS), for instance, guides the rig to exactly the right location on the ground and eliminates the need for manual marking on the benches, explains Keogh. "With HNS, the rig automatically locates the position of each hole with pinpoint accuracy and drills it to the correct inclination and depth by automatically adding rods and removing the rods when programmed depth has been drilled. As a result, the pattern needs no adjusting and gets drilled as planned," he says.

"HNS works with GPS satellite coordinates (with the assistance of a base station) to guide the drill to the exact location for drilling each hole. It ensures that all holes are drilled to the correct depth and at the correct angle according to the drill plan, improving precision and reducing non-drilling time. HNS removes the need to manually mark and survey hole positions, which greatly improves efficiency and safety on the bench," adds Govender.

Process automation deals with the automation of workflows and

The updated SmartROC series is equipped with an efficient hydraulic system that reduces fuel burn and works with fewer pumps and hoses than the previous versions.

covers a range of essential tools for planning drilling operations and collecting performance data. These include Measure While Drilling (MWD), a monitoring tool that enables drillers to collect relative rock hardness data.

Meanwhile, Auto Positioning, which works as semi-automatic aligning of a rig feed, reduces time and improves accuracy of rig positioning. "This smart feature significantly contributes to the quality of drill plan execution and further blasting, resulting in better quality rock fragmentation, which affects all other downstream operations such as load and haul and crushing and screening," explains Govender.

Rig Remote Access (RRA) enables two-way communication between the drill rig and the RRA server using the site wireless network. The RRA server detects when a drill rig is connected to an access point and then sends and/or retrieves data. "Traditionally, blasting companies designed their blast pattern on their software in the comfort of their offices and then downloaded it onto a memory stick and then drive to site to download the pattern on the drill rig. With RRA, you can design your pattern on your computer and send it to the machine wirelessly," and this is also available on the MK I variant as well, explains Keogh.

Another smart feature of note is the TeleREMOTE, a product designed to control the company's SmartROC drill rigs from a remote location. TeleREMOTE has been designed to address the need for increased safety, efficiency and productivity. "The smart product enables the operator to access and run multiple rigs from a control centre located inside an office environment," explains Keogh.

Remotely operating drills is the fastest growing trend to optimise drilling operations. With that in mind, the Epiroc BenchREMOTE remote operator station enables operators to control multiple SmartROC surface drill rigs from a distance.

The system allows for a single operator to operate up to three drill rigs at once, while allowing them to store information of up to 10 drill rigs. The operator can perform all of the same drilling functions that can be executed in the cab, with communication between the BenchREMOTE and remote rigs ensured via closed and secured wireless networks. The solution also supports geofencing for added safety.

"Our BenchREMOTE system is an example of how automation technology helps reduce safety incidents on site by keeping people out of harm's way. It allows operators to control the rig from up to 100 m line of sight or 40 m on an elevation using the exact same console and without causing any delay to operations," says Govender.

Meanwhile, Epiroc's Certiq telematics solution gathers, compares and communicates vital equipment information through a user-friendly web portal. Certiq also records information for later use in training, assessment and planning. It is a key component in a comprehensive solution to optimise workflow and enhance monitoring and management of the drill rigs.

Uptake

The quarrying industry in many countries worldwide has been enthusiastic in embracing automation technologies in surface drill rigs. "We expect to see growing interest in these features among quarry customers in sub-Saharan Africa, as many of them already have Sandvik drill rigs which can accommodate the added technology," says Hardy.

For centuries, quarrying, and mining at large, have been generally regarded as tough industries. Now that reputation is fast losing relevance as new technologies like automation change the status quo. Govender is of the view that technology is evolving constantly and operations are starting to embrace remote operation of equipment.

"This technology results in significant fuel savings, increased productivity and cost savings on consumables. With the touch of a button, an operator can troubleshoot any problems that may arise on the drill rig. Smart operations also take operators out of harm's way by allowing them to operate machines remotely when drilling on dangerous areas of the bench," says Govender.

Looking to the future, Hardy says the automation journey is not a straightforward process, and the pace will vary between industry sectors. "The future requires considerable organisational and cultural change to accommodate the technological advancements that have already taken place. A key driver of these changes will certainly be operator safety, and the priority of removing people from potentially hazardous areas. One thing is clear, though; the move towards autonomous drilling will be more and more difficult to resist, especially as more users see the productivity and cost-saving benefits," concludes Hardy. ●

Manufacturers design and build vibrating screens as a total system. The weight of the parts, required running speed and amplitude are all taken into consideration when balancing the machine.

EXAMINING THE LIFETIME COSTS OF FABRICATED PARTS FOR VIBRATING SCREENS

One of the ways operation managers naturally presume to increase profits in a mining or aggregates operation is to cut costs. Parts are often an area that production managers eye as a way to save money, but it's important to look beyond the price and understand the part that a component is playing in the performance of a vibrating screen and long-term productivity. By Duncan High, processing equipment technology division manager, Haver & Boecker Niagara.

The original equipment manufacturer can offer an in-depth knowledge of an operation's vibrating screen along with accountability and fast, reliable problem solving.

Operation managers need to be sure they are choosing the most reliable parts for their equipment. They need to consider the knowledge, experience and resources required to manufacture the part, the potential hazards of using a fabricated version and the value of having the support of the original equipment manufacturer (OEM). Here is a look at the difference between the two and how those differences can impact production.

OEM expertise

Consider the difference between fabricated and OEM components. Fabrication shops have come a long way and are often able to produce quality components, but

KEY TAKEAWAYS

- **Operation managers need to be sure they are choosing the most reliable parts for their equipment**
- **Fabrication shops have come a long way and are often able to produce quality components, but some equipment, such as vibrating screens, need such a precise tolerance that a fabricated part might not work correctly no matter how closely it resembles the OEM version**
- **Only a machine's manufacturer has the precise equipment drawings, measurements, plus/minus tolerances, material composition and know-how on what needs to be heat-tempered**
- **While at first a fabricated component seems to make sense because it can often cost less than an OEM part, those savings are often short term**

Imperfections in fabricated shaft components can lead to excessive heat, resulting in bearing failure and premature wear of other components.

Fabricated tension rails, if not built to OEM tolerances, may not correctly tension screen media. This could lead to broken screens and thousands of dollars in new screen media and downtime before the operator realises the problem.

some equipment, such as vibrating screens, need such a precise tolerance that a fabricated part might not work correctly no matter how closely it resembles the OEM version.

Only a machine's manufacturer has the precise equipment drawings, measurements, plus/minus tolerances, material composition and know-how on what needs to be heat-tempered. This means only the manufacturer can produce a component that fits those fine-tuned parameters. Even a reputable fabrication shop with capabilities similar to that of the OEM has to rely on reverse engineering and guesswork to fashion a replacement. The part may look identical, but if it's even a little off it could cause problems.

A vibrating screen isn't so much a machine as a complete system where every component works in tandem to accomplish a specific goal. If an operation screens 1 200 t per hour, for example, a manufacturer designs parts with different strength and rigidity than they would for a 200-t-per-hour application. This customisation ensures the entire system runs to the proper g-force and is strong enough to resist the forces of the material running over the screen.

The weight of the parts, the required running speed plus amplitude are all taken into consideration when balancing the screen. If an operation chooses to fabricate a side plate and the weight is wrong, for example, it could impact the machine's balance. This could lead to improper motion in the vibrating screen causing poor stratification of material, lower bearing life, or premature breakage of body components due to improper operation. In the end, this leads to unscheduled downtime, contaminated product, or the required tons per hour not being produced.

Call for backup

Custom fabrication shops can't offer the support benefits of the original equipment manufacturer. OEMs usually have the infrastructure to ensure fast, efficient problem solving. If there is a problem with a part, the OEM will take full responsibility, quickly assess the situation and send a replacement almost immediately. Most parts shops don't have the resources for a quick, precise turn-around if the part doesn't work right, and there is no guarantee the replacement fabricated part will be correct.

In addition, working with an OEM means having a support team that understands an operation, its production and equipment. They know what parts will wear quickly and what parts need to be on hand to limit downtime. They often offer OEM supplier agreements that ensure they will have critical parts in stock for immediate delivery, limiting or eliminating extended downtimes.

OEMs' focus on vibrating screens also brings an in-depth product knowledge that's rare elsewhere. Some manufacturer's certified technicians test machines as a system before each leaves the factory, and they run the same tests once the vibrating screen has been commissioned to ensure results are identical.

They use this information to make sure every component is running at OEM standards, and the machine plus components are backed by a strong warranty programme. Not only do some manufacturers offer warranties on new equipment purchases, some guarantee parts for up to a year if an operation uses OEM certified technicians and parts and performs regular maintenance. Any fabricated parts introduced to a machine during a warranty period will void the entire machine warranty.

Fabricated parts' hidden price tag

While at first a fabricated component seems to make sense because it can often cost less than an OEM part, those savings are often short term. Minor imperfections in the part or lower tolerances for the stress placed on the machine can cause the component to fail prematurely, resulting in additional replacement costs on top of unscheduled maintenance. Even while the part is functioning, it often adversely affects the production of the machine, diminishing the throughput and limiting profit potential.

But the potential damage from an imperfect part doesn't stop there. Those imperfections could start a chain reaction that leads to the damage of a series of other parts. This is especially true for

Duncan High, processing equipment technology division manager, Haver & Boecker Niagara.

shaft components, which form the heart of a vibrating screen. For example, if the shaft shoulders are not machined within the OEM tolerances, an operation could see problems within hours of operation. This slight difference in size can cause the shaft assembly stack up to be too tight or too loose, leading to excessive heat and or wear of the shaft components. This can cause bearing failure or premature breakage of shaft components or body components.

This chain reaction of issues could result in maintenance costs far greater than the price of the fabricated component, but the cost is compounded by the fact that rarely is the heart of the problem diagnosed on the first pass. Most operators miss the true cause of the problem and begin fixing the symptoms – a cracked panel, a cross member or sections of screen media. Then the damage is destined to repeat and those parts must be replaced again. These symptoms might become obvious within 48 hours; while the root cause might take a month before it's realised. By the time technicians find the issue, the cost of the initial part fix could be greatly multiplied and could be much higher than what the OEM counterpart would have cost.

Take tension rails, for example. A customer might wonder why his screen media is breaking after just a week of use, where before it lasted a month or more. An OEM representative visits the site and finds the operation has been buying tension rails from a local fabrication shop to save money. The tension rails looked right but were not tensioning the screen media properly across the screen deck, causing the sections to break. What saved the operation a few bucks up front on new tension rails cost them thousands of dollars in screen media and downtime for change-outs. In addition, if the faulty part caused the vibrating screen to operate incorrectly, there is a good chance that the stratification didn't occur correctly and that materials may have to be rescreened or discarded.

If operators do notice a problem soon after installing a fabricated part, they can prevent further damage by shutting the machine down quickly. However, this still results in costly downtime, as mechanics order parts and make repairs. Any time the vibrating screen can't run will bite into profits, particularly for operations in the midst of production season or a mining operation, where a few hours of lost time can result in tens of thousands of dollars of profit losses. This cost alone would quickly offset any savings from choosing fabricated parts.

Stick with the OEM

While it's good business practice to find ways to save money, site managers should not compromise on the quality of vital equipment. The risks of expensive repairs and time wasted are just too high.

Choose carefully when looking at replacement parts. While fabricated components are usually cheaper and may appear to work correctly, any variance could cause damage and downtime down the line. Continue to work with the original equipment manufacturer to guarantee a supply of reliable parts and the backing of a company with the resources to solve problems quickly. The right choice means more uptime, more profits and the assurance that a part will only make a machine run better. ●

THE BASICS OF SELECTING AN IDEAL CONVEYOR BELT

A conveyor belt failure can bring an aggregates operation to a standstill, which is frustrating because the cost of downtime is expensive. Trucks hauling product can't unload, and the conveyors are forced to stop and wait until the belt is repaired or replaced. By Mike Schroeder, product specialist at WCCO Belting.

Many believe that belt failure is part of the cost of doing business, but it doesn't have to be. Conveyor belting can be engineered with optimal technologies to support your application and equipment design. Working with an experienced belting manufacturer can help with increased performance and system efficiency to boost your bottom line.

Through the lens of one of the world's leading manufacturers of custom rubber belting products, here are a few considerations for preventing downtime and determining belt specifications when you are designing and operating a conveyor system.

All belts are not created equal

Conveyor belts are typically an afterthought, often regarded as just another component part. The reality is, the belt is the essence of the conveyor system. Although the physical differences from one belt to the next can be indecipherable to the untrained eye, the right belt will make or, quite literally, break your operation.

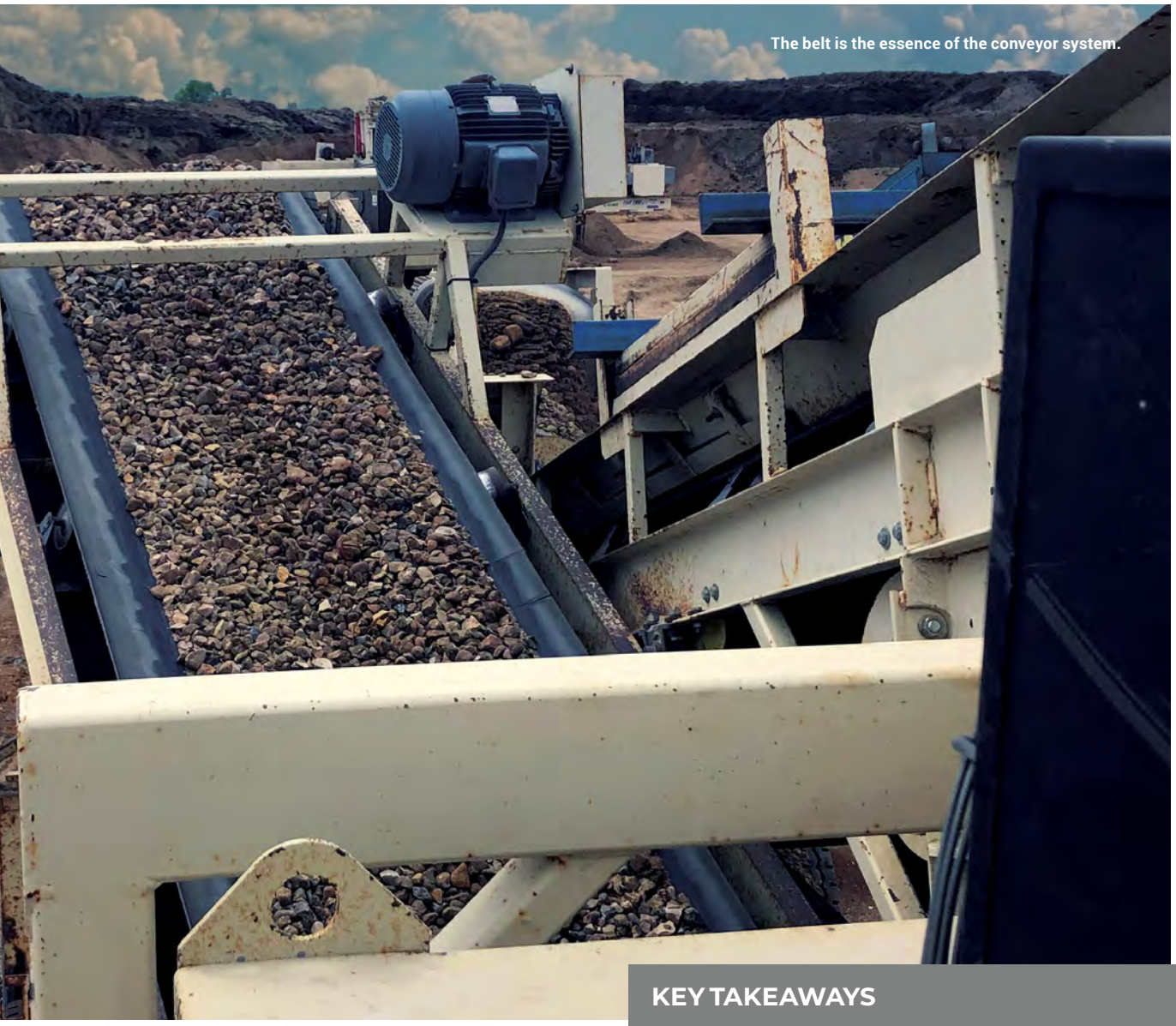
Similar to how the right set of tyres will improve the performance of a car with increased gas mileage, improved traction control, better handling and a smoother ride, having the right belt will improve the performance of your conveyor system. The right belt will reduce downtime, repairs and energy consumption, while improving capacity and equipment efficiency.

A bit of desk research can help purchasing managers identify experienced manufacturers with service-friendly reputations to guide you through the belt decision-making process. If you are involved with the product development and manufacturing of aggregate conveyor equipment, working with qualified belting experts early in your design process can improve the function of your future conveyor system. For maintenance personnel, no one understands the pain of downtime better than you. Belting experts can help you analyse the issues to support the problem-solving process.

Enlist a belting industry expert

When you speak to a belting expert, don't be surprised if the first discussion doesn't involve belting at all. If they are trying to provide you with a genuine product solution, they will want to learn about your conveyor system and application. A belt that works well in the logging industry may not work as well in the aggregate industry. A belt in the aggregate industry likely would be overkill in the agricultural industry. The same holds true when comparing one type of conveyor to another within the same industry.

A good supplier will want to define the factors or features of the conveyor system that will impact the performance of the conveyor belt. To determine friction force, they might ask what the belt will be running on, or to understand roller



The belt is the essence of the conveyor system.

resistance they will ask about your roller/pulley sizes. These factors significantly impact energy consumption and drag build-up during operation. They will also want to understand your impact levels, incline angles, take-up distance, transition distance (for troughed conveyors), tensioning mechanisms and return rollers. Every factor requires a specific approach when selecting the right belt to benefit the performance of your conveyor system.

For example, a conveyor system designed with return rollers operating at an angle greater than 30° will require rubber cleats or a cleat pattern design to successfully move product. However, if the return roller diameter and distance are not considered during belt selection, the cleats will interfere with the return rollers and produce “cleat chatter”. Cleat chatter occurs when the cleat or cleat pattern is encountering the return rollers, causing unwanted interference and affecting the function of the belt. If left unchecked, it can lead to early cleat and/or cleat pattern failure and excess wear on rollers and bearings.

If this level of detail seems overwhelming, invite the supplier for a visit and give them the opportunity to explore your equipment first-hand. You could also

KEY TAKEAWAYS

- Working with an experienced belting manufacturer can help with increased performance and system efficiency to boost your bottom line
- Similar to how the right set of tyres will improve the performance of a car with increased gas mileage, improved traction control, better handling and a smoother ride, having the right belt will improve the performance of the conveyor system
- Puncture resistance, for example, is a leading cause of belt failure. It occurs when the belt carcass is punctured, or pierced, which leads to tear propagation, and ultimately, downtime for belt repair or replacement
- Belt properties can be modified to complement the specific requirements of the application and conveyor system

A good supplier will want to define the factors or features of the conveyor system that will impact the performance of the conveyor belt.

put the belting professionals in touch with your operations team to let them talk specifics. In the end, this will be a win-win for all parties. The purchasing team develops a relationship with an industry expert and high value supplier, the product development team can improve performance of the belt and conveyor system to reduce total cost of ownership, the maintenance team will drive uptime, and the belting supplier is rewarded by customer satisfaction and the growth of a new business relationship.

Determine the operating requirements

A major misconception in belt selection is tensile strength. Tensile rating is the working tension and breaking strength of the belt in the longitudinal direction. While having the correct working tension is important, many believe a higher tensile rating results in a stronger belt. Ironically, just like a belt lacking strength is an issue for your operation, a belt that has been overdesigned can also cause damage to the conveyor, reduce efficiency of the system, and increase the risk of premature belt failure, leading to downtime.

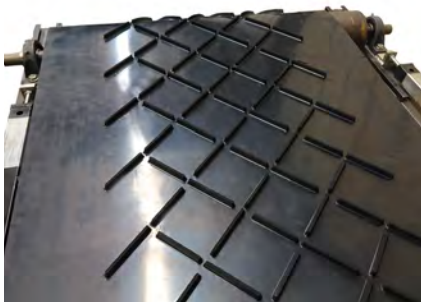
A belt with a high tensile rating typically comes with a higher price because it's a heavier, thicker belt. In an application like mining, where your conveyor is of an extended length, a high tensile rating is critical. However, in light industrial markets like aggregate, logging, mobile crushing and recycling, the tensile rating isn't as much of an application requirement. In fact, a heavier belt will create more drag on the conveyor that will lead to higher amp draw, more energy consumption and a higher cost to operate. The increased stiffness due to the thicker, heavier belt will increase rolling resistance on the pulleys and bearing, causing more maintenance and repairs. The entire system will run at a much lower efficiency, and the wear and tear on the unit will be expedited.

To tell the truth, belt failure due to lack of tensile strength is rare. Why not exchange the tensile strength you don't need – which could be hindering your operation – for features that could resolve your application's frequent failure modes?

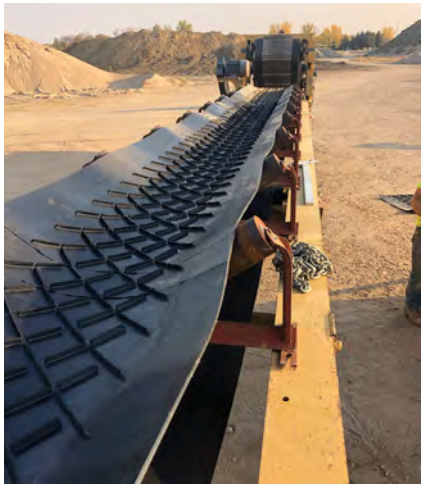
Puncture resistance, for example, is a leading cause of belt failure. It occurs when the belt carcass is punctured, or pierced, which leads to tear propagation, and ultimately, downtime for belt repair or replacement. Another leading cause of belt failure, hook retention, refers to the strength of the location where your belt ends are connected. An investment in this specification can prevent your lacing or fasteners from ripping out of the belt, causing a broken splice. Tensile rating has little to no effect on these types of failures.

Belt properties can be modified to complement the specific requirements of your application and conveyor system. It may be possible to achieve increased performance with a lower cost product, which makes working with a qualified supplier a cost-effective decision in more ways than one.

In the end, conveyor belt technology is a science. To run a successful operation, go beyond picking a belt out of a catalogue. Work with a qualified belting supplier who can help you determine the belt specifications critical to your application and conveyor system, which can prevent costly downtime and improve your total cost of ownership. ●



If the return roller diameter and distance are not considered during belt selection, the cleats will interfere with the return rollers and produce cleat chatter.



The right belt will reduce downtime, repairs and energy consumption, while improving capacity and equipment efficiency.

Mike Schroeder, product specialist at WCCO Belting.

New compact dust suppression design delivers better mobility

As effective dust control continues to gain priority across a wide range of industries, a new equipment design has been engineered to provide an unmatched level of mobility and performance, delivering effective particle suppression for new and existing applications.

With a throw of 30 m, the adjustable elevation angle and user-defined oscillation allow precise aiming of a powerful dust-capturing mist, which is comprised of millions of droplets per minute in the range of 50 – 200 microns, proven to be the most efficient size for most project needs.

The DustBoss Atom from BossTek is a true innovation in mobile dust suppression, a fan-less, self-contained design that incorporates remote control and 4G LTE telematics technologies as standard equipment to deliver an unprecedented combination of suppression and monitoring. The compact, diesel-powered unit fits in the back of a pickup truck, so it can be quickly positioned and relocated to address dust-generating activity directly at the source. It also has fork lift pockets on the front and back.

"After more than 15 years of designing purpose-built dust suppression equipment in a variety of sizes and styles, we found that some companies expressed a desired for a smaller, more manoeuvrable unit, with a lower price point," says BossTek VP of sales Mike Lewis.

"The machine is well suited to demolition projects, recycling operations, transfer stations, bulk material processing, ports/shipping applications, quarrying/crushing, biomass handling, concrete curing and even indoor operations where significant air movement may be undesirable."

The Atom features a Kohler KD440 power plant – a 9,1 hp air-cooled engine that meets Tier-IV Final emissions standards and complies with California CARB requirements. A unique air filtration system increases performance and lengthens service intervals, even in dusty environments.

Its integrated fuel injection system and overhead cam design are coupled with a cast iron cylinder liner for consistent, reliable service. The engine and pump subassembly is secured by four isolation mounts that minimize vibration transfer to the frame. The high-impact stainless steel nozzle features a quick disconnect for easy replacement.

The DustBoss Atom from BossTek is a true innovation in mobile dust suppression.

"In addition to its compact size, what really sets this unit apart from other designs is the built-in communications features," Lewis continues.

"The hand-held remote controls virtually every function, and the telematics provide a web-based platform to monitor status and streamline service and support," concludes Lewis. ●

New brand identity for McCloskey International's washing division

Due to a dynamic expansion and the re-alignment of McCloskey International's washing division, the business has announced a new brand identity that will support the evolution of this business unit and re-emphasise its commitment to the wet processing sector. The business will move forward under the new brand of MWS Equipment.

The professional profile of the washing division has grown and evolved over the past five years, and the new brand and alignment reflects a commitment to the future and to customers who seek leading edge products and services to grow their business, the company says.

In order to position the brand for long-term success within its market, MWS Equipment will operate as an independent business unit of Metso Outotec, extending the brand's reach in delivering world class products and service globally.

The strategy is driven by partnership with organisations around the world at a regional level that are best suited to deliver tailored solutions and ongoing service to our customers.

The new design and colour scheme reflects the brand's maturation and evolution as an industry leader for not only its product offerings but also the impressive network it has built over the past few years.

Ben Frettsome, product line manager, MWS Equipment, says: "I am delighted with how our business has progressed in recent years. We have repositioned our route to market along with increasing our design and manufacturing capabilities. With the strength and depth in our leadership team, we are now aligning our brand to allow for the next chapter of our development and growth."

Fundamental to maintaining the reputation and trust the company has built within the industry, MWS Equipment's strategy is to partner with companies that have the expertise and specialised capabilities in application, installation and aftermarket support of wet processing equipment in order to deliver not just a product but a long term solution to the customer.

This continues to be driven by the design and engineering of smarter washing solutions that help customers build profitable and sustainable organisations.

Toni Laaksonen, senior vice president, McCloskey International, says, "The new brand identity is an exciting milestone. We continue to invest in our business through delivering industry leading products and adding maximum value to our customer experience."

Ben Frettsome adds: "We are delighted to announce our new identity. The rebranding of MWS has been in development for some time and will now allow for the business to partner with the best suited organisations across the world. ●

NEW ENVIRONMENTAL AUDIT PROGRAMME FOR SURFACE MINERS

Surface mining industry association, ASPASA, is completely redeveloping its environmental audit system. The association seeks to introduce a new system that is more user friendly and better aligned with the requirements of smaller scale surface miners.

Rather than ISO, tick-box or strict legal type audits, the latest incarnation of environmental audits is being developed by mine and quarry managers from within the association's membership. It relies on inclusive methods, and focusses on remedying rather than punishing participants and in this way aims to encourage members to confront issues rather than disguising them or sweeping them under the carpet.

"We as managers want to feel it is our programme, we want it to help and guide us and be practical to implement and manage the requirements. Simultaneously, it must also ensure we are doing the right thing and are legally compliant and must cover all aspects of environmental management on our type of mines. The old audits have stood us in good stead for many years, but now it is time for change," says Nico Pienaar, director of ASPASA.

Pioneering work

The association pioneered the idea of a compulsory environmental audit system known as the About Face Audit Programme more than 30 years ago. Since then it has won local and international acclaim for its programmes and is regarded as a global leader ensuring environmental management of its members.

The About Face programme rapidly cleaned-up the act of quarrying and smaller-scale surface mining, which until then, suffered a bad reputation for scarring landscapes, waterways and rendering tracts of land unusable for future generations.

As a result, the association currently enjoys a vibrant and growing membership and enjoys close relationships with the Department of Mineral Resources and Energy (DMRE), the Mineral Council South Africa, as well as other Government departments and industry bodies concerned with mining and environmental affairs.

Changing requirements

"When we started we had little information to work on; it was complicated and experts were scarce. The scope of environmental management is wide and finding a person who knows everything about environmental affairs is near impossible.

"As a result, then director of ASPASA, Sir Rupert Bromley, obtained permission to use the American National Sand, Stone, Gravel Associations (NSSGA) programme. This programme was focused on the beautification of an area that was seen by the public and was therefore called 'The About Face USA'. ASPASA then called its programme 'About Face RSA', but it was decided that in South Africa the focus would be more on what goes on inside the mining area rather than just the beautification.

"With little information to bas eon, the compilation of audit requirements and checks were left to the auditors, who decided how they wanted it done. These initially pushed ISO requirements, then later moved to a more industry-focussed 'tick-box' type approach. The last auditor we had was a legal person, who pushed legal compliance in the audits," says Pienaar.

Nico Pienaar, director of ASPASA.

Latest thinking

"All of these focus areas were good for the industry, and added value. Now we are going into the Fourth Industrial Revolution and yes, we need to relook at how we do things. Then came COVID-19, everything stopped, and no audits were done for the remainder of 2020. During this period some new ideas have been thought about. Some consultation was done, as it was felt that some changes are needed to run this programme better.

"The new audits will incorporate the latest thinking and research as well as harness all the available tools to ensure that each and every aspect of environmental management is covered and that the audits are easy to follow, fair, transparent and in line with all legal and other requirements. Auditors will also be trained to adopt clear communication techniques and to guide and assist members where required," adds Pienaar.

Mine managers, environmental specialists and role players in the industry can contribute to the success of the programme by contacting ASPASA. ●

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