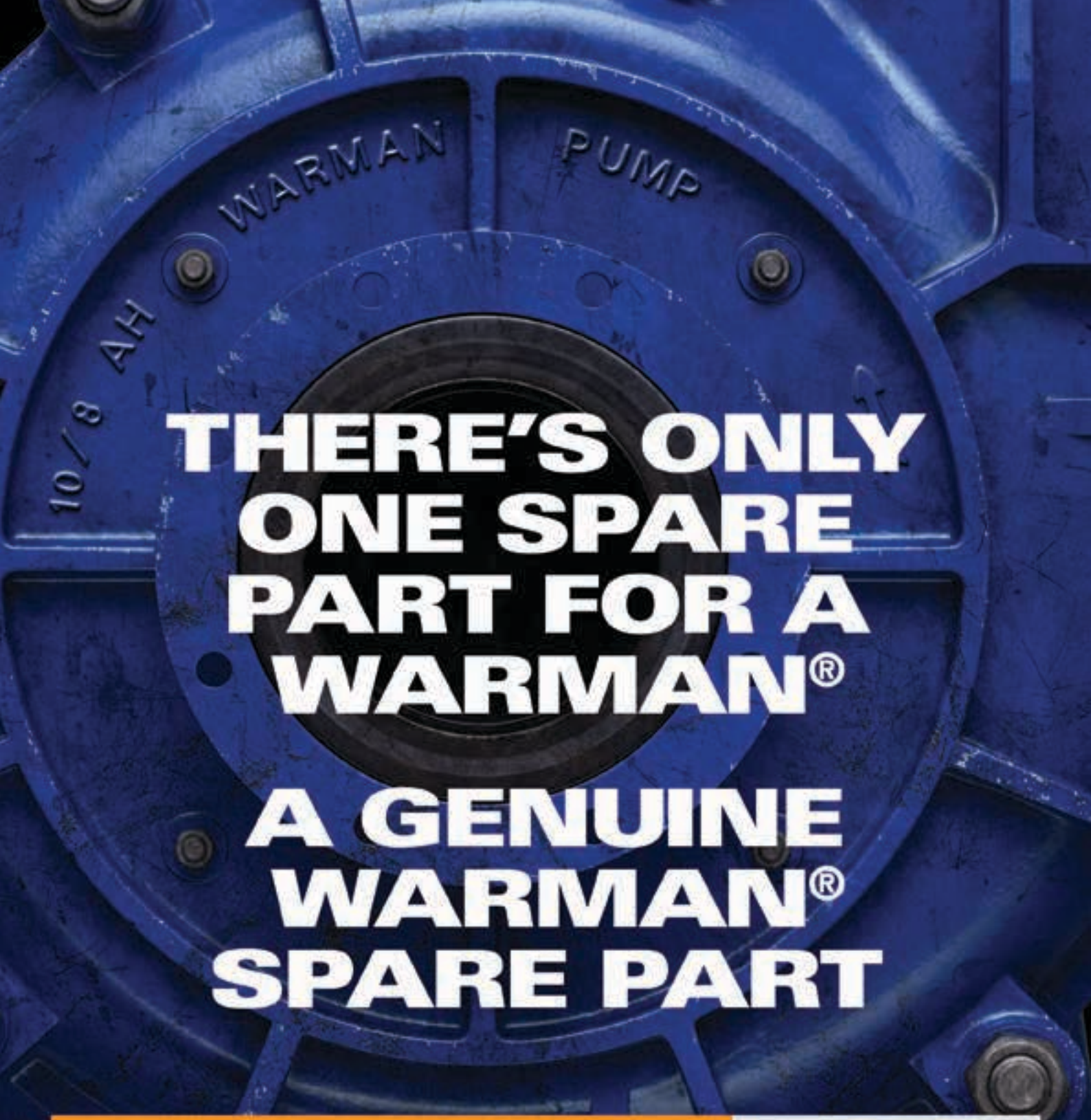
MechChem AFRICA

SEPTEMBER 2019

CROWN PUBLICATIONS

This month:



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LOCAL MANUFACTURING, PRODUCTION AND FOOD PROCESSING

INNOVATIVE ENGINEERING

REGULARS

Localisation offers growth and long-term value

Peter Middleton

COMMENT

A South African Market Insight (SAMI) report on the South African manufacturing industry notes that from 20% in 1994, manufacturing is now contributing under 14% to South Africa's economy. The reasons? South African companies and overseas OEMs operating in South Africa are importing more manufactured goods, leading to less demand for those locally produced.

The solution, the article advises, is to focus on improving our 'buy proudly South African' message and to make local consumers aware of the fact that buying goods manufactured outside of South Africa leads to joblessness. Rather than increasing import tariffs, the piece suggests that "South Africans just need to be more aware of the origins of the goods they are buying and demand more locally produced or sourced goods."

South Africa's manufacturing facilities are running well below their capacity. The second quarter 2019 estimate of production under-utilisation is 18.7%, largely due to a lack of demand (62.2%) but also due to skilled (5.5%) and unskilled (1%) labour shortages. "… with one fifth of production capacity lying idle, one cannot help but wonder about the underlying health of the South African economy," suggests SAMI.

Mining is another of our shrinking economic sectors. From contributing 21% of GDP In 1980, it had fallen to below 8% by 2018. Yet we have the world's fifth largest mining sector and reserves with an estimated value of R20.3-trillion. The sector boasts high levels of technical and production expertise, comprehensive research and development capabilities and world-class primary processing facilities for gold, platinum, steel, stainless steel and aluminium. Surely another sector operating below its potential capacity?

This month's article from local OEM, Kwatani, highlights the interaction between these two sectors. Uncertainty in the mining sector has a direct knock on effect on the manufacturing sector, particularly on local manufacturers of mining equipment.

It is, therefore, heartening to hear how the localisation of manufacturing is being welcomed and adopted by South African OEMs such as Kwatani. "Localisation has become a massive drive in the mining industry because the new charter has published guidelines for local content that mining-rights holders must achieve," says Kwatani CEO, Kim Schoepflin.

Kwatani and several other OEMs are actively engaging with the DTI on ways to accurately verify the true value of locally manufactured content in every piece of equipment purchased by a mine or manufactured by a local OEM. They are striving to agree on systems so that verification can be done without massive disruption or additional costs.

"Without a clearly defined stock coding system for all inputs, we can't easily establish a broadly accepted system to certify the local content value from local manufacturers and suppliers," argues Schoepflin, later adding "at end of the day, these are simply challenges we have to face."

A local manufacturer of customised equipment that is purpose-designed and manufactured to meet the screening and feeding needs of specific minerals at specific local mines, Kwatani offers world-class products and services based in its own IP. Schoepflin is confident that, no matter what system emerges, Kwatani will remain one of the few OEMs able to achieve exceptionally high local content values.

Mayhew-Ridges, the company's COO highlights the company's research and development, laboratory testing, engineering and design capabilities, which are all local and worthy contributors towards local content percentages.

Kwatani is also proactive about local purchasing and support for its local suppliers. From a quality perspective, Mayhew-Ridges says the company has implemented a rigorous supplier vetting process to reduce the risk of introducing component quality issues and to assist its supply chain to better meet global quality standards. "A container of poor quality castings from overseas can be hugely problematic with respect to reputation and mitigation costs," says Schoepflin.

A 2018 article from the Chartered Quality Institute (CQI) in the UK entitled 'Quality and profitability' points to the findings of a survey into manufacturers' attitudes to quality conducted by the Professional division of Miele. This survey found that 78% of British manufacturers believe quality is key to delivering business growth, and nearly half of the respondents rated product quality as more important than price.

Schoepflin says: "The total cost of ownership is what really matters and, as our history proves, one of our custom designs will be much more efficient and cost-effective over the equipment lifetime than a cheaper off-the-shelf, misfit."

South Africa has the capacity, talent and experience to restore the GDP contribution levels of our manufacturing and mining industries. To do so we need to support local manufacturing, raise product quality, reduce total costs of ownership and ensure the broader value we create in terms of growth, jobs and improved standards of living is taken into account when determining local content value and whenever a cheap import is under consideration. ❑

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EMVAfrica – harnessing the power of three

EMVAfrica has recently been awarded Level 2 B-BBEE status by harnessing the power of three – joining three companies together to implement a game-changing brand strategy that focuses on availability of stock, service excellence and fit-for-purpose solutions. Director Graham Whitty talks to *MechChem Africa*.

A simpler, more focused and streamlined brand strategy has propelled EMVAfrica to Level 2 B-BBEE status by focusing on the company's strengths as a supplier of valves, stainless steel and specialised alloys.

Consolidating Energy Engineered Products, E-Metals Cape, and Multi Alloys, under a single identity was the first step to EMVAfrica's success by leveraging each of the company's strengths expertise and experience.

According to Whitty, EMVAfrica's progression from its 2018 Level 3 to Level 2 B-BBEE status can be credited to improvements in three main areas, namely management control, training and procurement.

With respect to management control, ongoing meaningful training, mentoring and career development programmes have resulted in advancements in the group's management control area, which has seen new managers moving into leadership positions.

Aligning to these objectives, 2017 saw the company sign a BEE ownership agreement with Edwin Bogopa of Metsana Engineering who has been working with EMVAfrica for several years and joined the fold as a shareholder and non-executive director. In the same year, long time employees Anesh Prithilall and Rowena Suneerchand, both senior managers, were awarded a shareholding in the company in recognition of exceptional talent within the group.

"We believe in creating a work environment that encourages learning, mentorship and growth. Given the ages of Prithilall and Suneerchand, and their experience and commitment to the company, they both represent the next generation of leaders in the business. Our view as EMVAfrica is that B-BBEE transactions need to be around people whom we know and trust," explains Whitty.

"We recently employed a new branch manager in our Cape Town branch, Justin Orwin, whose appointment also speaks highly of our commitment to employing the best people to add value to the business."

Whitty points out that as a relatively small business, EMVAfrica has always been highly successful in supporting unemployed people through learnerships. "In most cases people who do learnerships with us get absorbed into the business and become full time employees. We run some bursary programmes and an extensive training programme where at least 30% of our staff is involved with some sort of external formal training," he says. "Allied to that, we assist our staff with the education of their children."

The EMVAfrica team.

A pneumatically actuatored ball valve used for automated process control.

By aligning to transformation initiatives, the company is able to position itself as a diversely representative and fair place to work. "The development of our employees, our BEE partners as well as our shareholders has been a key part of the industrial group's success and will remain a core focus in line with our B-BBEE growth goals," Whitty says.

"With its newly acquired B-BBEE status, EMVAfrica's continued efforts in backing other transformed businesses have resulted in a boosted procurement score, which also adds value for customers who are now able to score 125% of their procurement spend with us towards their own rating.

"Our significant investment in transformation is leading the way for a progressive and sustainable future. By endeavouring to constantly do more and be better in all aspects of our business, we are reaping the rewards of ongoing efforts and are able to share these achievements with our customers," says Whitty.

He explains that the rating is significant on two levels. One is greater responsibilities in terms of transformation and second, the new rating positively affects the commercial success of EMVAfrica as the higher the status, the greater the company's competitive edge.

EMVAfrica believes that the more effort that goes into transformation and the sooner it happens, the better it is for the economy. "We have endeavoured to emphasise transformation in the workplace because, in the long term, transformation is about the economy and our business survival. While the value of our new Level 2 B-BBEE rating is difficult to quantify, given the current economic climate, we believe that it is, without doubt, considerable," affirms Whitty.

The 3S approach

Whilst the B-BBEE rating itself marginally changes EMVAfrica's operations, it also spurs

Stainless steel pipe for corrosive process applications.

Heat exchanger tubes used in oil refineries, chemical plants, pulp and paper mills.

the company to continue to implement its game-changing 3S approach: stock, service and solutions.

Availability of stock

With respect to stock, Whitty notes that making product available is key to the EMVAfrica offering, especially with regard to specialised products. "We are a stock and distribution business and as 'simple' as that model may seem, EMVAfrica has had to understand what our clients' needs are and make sure we can meet them.

"We deal with a range of niche and specialised materials that sometimes require supply from overseas stockists. It takes a lot of research and years in the industry to know what the industry uses, what is worth stocking, what is going to add value to customers and what is going to be considered a good investment in terms of product offering.

"With the more specialised alloys – highly corrosion resistant alloys and high heat resisting alloys – there is not always much stock available from competitors, and over the years we have become known through our subsidiary business, Multi Alloys, as a reliable stockist of these materials," Whitty explains.

The business started building itself around holding stock, and that began to translate to the more common products such as regular stainless steels. Because these materials come from big overseas mills with long lead times, EMVAfrica works hard and puts effort, thought and technology into planning its stock, getting reliable suppliers and offering reliable lead times.

The company has also digitalised the warehouse by using a software product that helps analyse and accurately forecast stock movement. "The software goes back in time to look at historic trends and averages. It uses clever algorithms to help predict future forecasts and future use. It also helps us identify poor performing stock so we can get rid of it and put our resources into the stock that people need. This allows us to be more efficient," Whitty tells *MechChem Africa*.

Service excellence

In order to meet the service demands for industries such as mining, petrochemical production, water treatment, power generation and original equipment manufacture, EMVAfrica has had to focus its portfolio to make it more appealing to consumers and to potential investors.

Whitty says EMVAfrica cannot justify having a mill or holding vast amounts of stock of less common items because there is not enough local demand for specialised products owing to the size of the South African industrial economy. The vast majority of EMVAfrica's output – if it were to start manufacturing – would have to be exported, leaving the company to compete in a market that already relies on the bigger economies like Europe and Asia, and their established mills.

"This is why we stick to what our economy and industry needs, while aligning ourselves with trusted overseas suppliers. This translates into good investments and good service," he says.

South Africa does have one stainless steel mill, owned by a big international conglomerate, and majority of its production is exported. Whitty points out, however, this is only in one form of product, unlike EMVAfrica, which offers product in diverse forms.

"Over the years, we have made our product offering more focused and streamlined, stocking what industry needs. If we don't have a specific product, we have the option to offer it from a trusted overseas supplier. Our turnaround time is usually 24 hrs for local delivery of products."

Fit-for-purpose solutions

EMVAfrica has built an experienced team of people who know the company's product and its supply chain. "If we don't have it on the floor and it's not locally available, we can offer it from around the world. This may sound like a simple thing to do, but in reality, sourcing and moving our products around the world is not always simple.

Logistically, sourcing our kind of products can be very difficult. A lot of them are very heavy, very long, and very bulky. We have built a strong relationship with SCT Supply Chain Solutions, who do our freight forwarding, air and sea freight from around the world. SCT is a key partner. The company understands our products, our customers and the logistical difficulties presented when trying to move metals around the world," explains Whitty. "So, it is our supply chain coupled with the vast experience of our employees that translates into great solutions."

This holistic outlook on being a stock, service and solutions orientated business has put EMVAfrica at an advantage, according to Whitty. "We are not a volume business, we are about value, while most players in our industry are about volume. They like to focus on what's on their own floor or what they might be able to buy and trade.

"If one looks at the overall stainless-steel industry, EMVAfrica is small because the vast majority of the market's tonnage is flat product such as sheet and plate, which comes from the local mill. EMVAfrica's approach to value rather than volume is highlighted by its subsidiary Multi Alloys which competes in sheet and plate, but only in the very specialised grades sold in lower volumes, but for higher value. In addition EMVAfrica is a sizable stockist of other engineering stainless steel products such as round bar, and process materials such as pipe, fittings, and valves. In these products the company is able to focus its efforts towards niches where we can become leaders in our offering and deliver value to our customers through the 3S approach to stock, service and solutions.

"A good example of this is our ENERGY-Valves division which has become a leader in the supply of stainless-steel valves and actuation services" Whitty concludes. ❑

Annual SAIChE KZN Research

The 11th Annual SAIChE research day took place on the 28th of August 2019 at Mangosuthu University of Technology, Umlazi, Durban, South Africa.

For the first time in the past 11 years, the Annual SAIChE research day was not held at the University of KwaZulu-Natal. According to the KZN SAIChE IChemE chairperson, Dr David Lokhat, the purpose of this move was to encourage the participation of other Universities within the KwaZulu-Natal region in branch activities.

This year's event was organised by Professor Babatunde Bakare of Mangosuthu University of technology with Dr Matthew Lasich and Mr Nivaar Brijmohan serving as judges, while Dr Samuel Iwarere chaired the event. A total of 31 participants attended this year's event, which involved a review process and a call for abstracts sent out on various forums.

The abstracts were reviewed and assessed by the judges and it was on the basis of their assessment that a decision was made as to who would be invited to give oral presentations and who would give a poster presentation.

Fifteen abstracts were submitted for review from UKZN, DUT, MUT and Umgeni Water. There were ten oral presentations and five poster presentations at this year's event. The winner of the oral presentation category was Omolara Felecia Afolabi, a PhD student at Durban University of Technology, who presented a paper entitled, *Competitive adsorption of Pb (II) and Cu (II) from wastewater using banana peel: modelling and optimisation study*.

The first runner up was Emmanuel Tetteh a PhD student from Durban University of Technology who presented a paper entitled, *Evaluation of magnetic coagulant for industrial wastewater treatment*. The third place was a tie between Sphesihle Mtsweni a PhD student at DUT and a gap lecturer at Mangosuthu University of Technology and Edward Kwaku Armah a PhD student at Durban University of Technology who respectively presented papers entitled, *Prediction of turbidity reduction from roughing filter treating domestic greywater using artificial neural network and Anaerobic co-digestion of sugarcane bagasse and corn silage with industrial wastewater for biogas production*.

The winner of the poster presentation category was EO Ezugbe, a PhD student from Durban University of Technology who presented a poster entitled *Removal of COD and SO_4^{2-} from Oil Refinery Wastewater using a Photo-Catalytic System – Comparing TiO_2 and Zeolite Efficiencies*.

MechChem Africa congratulates winners and participants alike. ❑

Seen at the 11th Annual SAIChE research day are, from left: Nivaar Brijmohan, event judge; Samuel Iwarere, chairperson; Matthew Lasich, second judge; David Lokhat, SAIChE IChemE Chairman; and Babatunde Bakare, event organiser from Mangosuthu University of Technology.

SAIChE IChemE members from UKZN, DUT, MUT and Umgeni water presented ten oral and five poster presentations for this year's event.

A total of 31 participants attended this year's event, which involved a review process and a call for abstracts sent out on various forums.

SACEC 2020 planning advances

SAIChE IChemE is inviting participation in the SACEC 2020 congress being hosted next year. SACEC stands for the South African Chemical Engineering Congress and it will take place at Wits University from 1 to 3 July 2020. The event is open to chemical engineers and affiliates from around the world with a variety of accommodation options available close to the venue.

SACEC 2020 will offer insights into how pioneering science, technologies and leading practices are shaping chemical engineering. By connecting professionals from various sectors, SACEC 2020 will showcase how chemical engineers are responding to tomorrow's challenges in unique and novel ways.

The theme of the 2020 Congress is: 'Entering the Anthropocene'.

The 21st century is likely to be the most profound for humankind. As we hurtle forward, there are clear signs that never before have we had so much impact on our planet. As engineers and scientists our contribution to that impact is more profound than average.

Our theme for this congress, Entering the Anthropocene, provides a forum to consider implications and possibilities of this century. How will we utilise our skills in the Anthropocene period, to continue to improve the lives of all, whilst being cognisant of and reducing our impact?

The submission deadline for abstracts has now been extended to Monday, 30 September 2019 and both presentation and poster slots are still available. Abstracts of around 200 words can be submitted online at www.sacec2020.co.za under one of the following categories:

- Environmental Process Engineering
- Metallurgical Process Engineering & Coal Technology
- Reaction Engineering
- Separation Technologies
- Chemical Engineering Education
- Process and Material Synthesis
- Fluorine Chemistry
- Other

The congress will be CPD accredited and the proceedings will be fully peer-reviewed, will have an ISSN and will conform to all DOHET requirements for accreditation.

Keynote speakers for the Congress include Philippe Tanguy, Chief Executive Officer of Polytechnique Montréal; Rovani Sigamoney, Assistant Programme Specialist for the UNESCO Engineering Initiative; and Dr Niall MacDowell, Faculty of Natural Sciences, Centre for Environmental Policy, Imperial College – London.

There are also opportunities to become a SACEC 2020 sponsor or exhibitor. Those interested in sponsoring or exhibiting at SACEC 2020 can contact the organising committee who will gladly explain which opportunities are still available.

For more information please contact the SACEC2020 Organising Committee at www.sacec2020.co.za or email info@sacec2020.co.za.

The theme for the 2020 SACEC congress, 'Entering the Anthropocene', provides a forum to consider implications and possibilities of this century

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SACEC 2020 JOHANNESBURG

SAIChE IChemE

1-3 July 2020

ABOUT SACEC 2020

The 21st century is likely to be the most profound for humankind. As we hurtle forward, there are clear signs that never before have we had so much impact on our planet.

As engineers and scientists our contribution to that impact is more profound than average. Our theme for this congress, Entering the Anthropocene, provides a forum to consider the possibilities of this century.

How will we utilise our skills in the Anthropocene period, to continue to improve the lives of all, whilst being cognisant of and reducing our impact?

DEAR RESEARCHER,

We are seeking technical content for The South African Chemical Engineering Congress 2020 (SACEC 2020) which takes place on 1 – 3 July 2020 at the University of the Witwatersrand, Johannesburg. Both presenting and poster slots are available. The deadline for submitting abstracts is **Monday September 30, 2019.**

The congress will be CPD accredited. The proceedings will be fully peer-reviewed, will have an ISSN and will conform to all DOHET requirements for accreditation.

Register and submit your 200-word abstract at **www.sacec2020.co.za**

SACEC 2020 aims to bring engineers and scientists from around the world together in the hopes of creating real-world solutions to global issues.

ABOUT SAICHE ICHEME

SAIChE IChemE is a professional society in South Africa dedicated to advancing the science and the practice of chemical engineering.

Our aim is to promote high standards in the profession by enhancing the professional competence of its members.

SACEC 2020 Organising Committee
www.sacec2020.co.za | info@sacec2020.co.za

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

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Not just any pump will do for a filter press

The role of a filter press in recovering valuable saleable product makes it an important consideration for a mine operator, and just as important is the selection of the most appropriate pump for this application. Weir Minerals Africa has the expertise to advise on the best selection and offers a wide range of suitable pumps. Marnus Koorts, product manager for slurry pumps at Weir Minerals Africa explains.

As a mission-critical system in the mineral concentration process, the filter press demands a carefully selected pump to ensure optimal performance and uptime.

According to Marnus Koorts, product manager for slurry pumps at Weir Minerals Africa, the role of a filter press in recovering valuable saleable product is an important consideration for a mine operator. The high pressures associated with operating a filter press, however, often lead the pump to underperform.

"The operation of a filter press involves a wide spectrum of pressure and flow conditions within each cycle," Koorts says. "This ranges from high-flow, low-pressure conditions when slurry is initially being pumped into the press, to low-flow and high-pressure when full."

He emphasises that it is not enough to simply specify a pump for the average of this range of conditions. Rather, it is vital to establish the minimum and maximum values on the spectrum and to specify accordingly.

"Filter presses in the market can demand pressures of up to 45 bar," he says. "In many cases, therefore, the application requires high-pressure pumps such as the Warman AHPP high pressure range. Where lower pressure requirements are present, the newer technology of the Warman WBH could be used as it is generally a more efficient pump with longer wear life of spare parts."

Failure of the pump to deliver enough pressure to the filter results in the solid-liquid separation process being inefficient. The selection of the right size of pump is therefore an important starting point in ensuring optimal operation.

With decades of experience in this field, Weir Minerals Africa has developed the expertise to advise on the best selection. It also offers a wide range of pumps suitable filter press use.

Another key aspect of the customer's selection, Koorts says, is the choice of sealing arrangement. This aspect of the pump can often lead to issues in the plant, when valuable product is lost through leakage.

"An expeller seal is not usually recommended, as the pressure it needs to generate to seal the pump is generally not sufficient for filter press applications," he says.

The stuffing box option can be used under certain conditions. However, the pressure of the surface water needs to be higher than the pressure inside the pump. This means that it would usually only be suitable for a low-pressure pump on a low-pressure filter press.

"When the filter press requires a higher pressure, then the plant will have to provide a water line with a higher pressure to feed the gland, or it will not seal properly," he says.

The preferred sealing option is a mechanical seal. While more costly, the mechanical seal can offer the customer substantial savings by preventing product being lost and downtime being incurred. "While the benefits of a mechanical seal far outweigh its cost, it must be properly installed by a specialist," Koorts warns. "It is a specialised piece of equipment and we see plenty that fail due to incorrect installation."

A further consideration is the level of corrosive trace elements in the slurry. This can lead to rapid corrosion of mild steel pumps, and many applications require stainless steel options.

Comprehensive technical backup needs to underpin each step in this process, emphasises Koorts. For Weir Minerals Africa, this begins with its high quality local manufacturing process. This integrated process includes foundries for casting components, through to local componentry manufacture and assembly capability.

"This quality control and capacity feeds

The local manufacturing process at Weir Minerals includes foundry and assembly capacity for producing slurry pumps.

The new Warman WBH slurry pump with streamlined impeller inlet handles the most difficult slurries.

Technical backup for the slurry pump range is readily available through the extensive branch network throughout the region.

Pressure tests are conducted on slurry and dewatering pumps to ensure the quality of Weir Minerals' locally manufactured products.

into our spares availability and service exchanges for refurbished pumps," he says. "The result is quick supply through our strategically located branch network with 12 offices in South Africa and eight through the rest of Africa." ❑

Warman upgrade for world's largest platinum mine

Anglo American Platinum's Mogalakwena Mine was able to increase throughput and reduce energy consumption in its secondary mill circuit with the installation of a Warman® MCR® 450 pump. The pump solution, equipped with a rubber lining and metal impeller, was provided by Weir Minerals Africa.

The mine, near Mokopane in Limpopo province, is the world's largest open pit platinum mine with among the lowest operating costs. In line with the mine's focus on productivity, Weir Minerals Africa proposed this pump solution as it offered a higher volumetric capacity in anticipation of future increases in throughput.

The larger impeller of the Warman® MCR® pump allows lower pump speeds and consequently less wear. The rubber liner of the Warman® MCR® pump is lighter and the hydraulic design has improved efficiency and wear characteristics. This allowed the mine to raise its production target from 600 000 to 700 000 dry tonnes per month.

The replacement pumps were retrofitted to the existing footprint, without disturbing existing motors, gearbox drives or pipework. On-site Weir Minerals Africa technicians were deployed during the commissioning phase. Once installed, the MCR® 450 pumped milled ore at a rate of 4 400 m^3 per hour, shifting 760 000 dry tonnes per month.

Online for 78.9% of the plant's operational time, the pump was able to deliver significant savings through lower power consumption. After 3 000 hours in operation, the Warman® MCR® 450 pump was examined to evaluate the wear rate of the hydraulic components. Localised wear was evident on some of the components, and the mine decided to continue running the pump to its point of imminent failure. The improved wear life will result in a significant saving for the customer.

The independent study conducted after the initial installation confirmed the pump's improved performance. The study also recommended converting all mill discharge pumps at the operation to Warman® MCR® 450 pumps, to maximise pump performance and reduce energy consumption.

Based on the mine's satisfaction with the way the pump met its objectives, it has placed an order for three Warman® MCR® 450 pump conversion kits to retrofit the remaining Warman® AH® 20/18 RE pumps installed in the secondary mill circuit. ❑

A Warman MCR 450 installed at Mogalakwena Mine. The MCR 450 runs at lower speeds resulting in lower wear rates on the parts.

Ingersoll Rand appoints BMG as ARO® Pro series distributor

ARO air-operated diaphragm pumps are designed to pump virtually any type of liquid – from clean, light to medium viscosity fluids, to highly corrosive and abrasive fluids – with ease.

ARO Pro Series air-operated diaphragm pumps – 2 inch sanitary model.

ARO Pro Series air-operated diaphragm pumps – Classic style model.

"The ARO Pro series range is suitable for general industrial and OEM installation applications in diverse industries, including chemical & petrochemical, manufacturing, energy, pharmaceutical, mining, oil & gas and water & wastewater sectors," says Joe Pinheiro, BMG's national product manager for pumps.

"Notable features include a seal-less, self-priming design, with low material shear and minimal maintenance requirements. The portable pumps are easy-to-install and can transfer large particles as well as run dry, without damaging the pump."

Most ARO diaphragm pumps are ATEX certified (CE Ex11 2GD X), enabling safe use in potentially explosive areas. This feature makes them ideal for underground applications, such as dewatering.

"ARO pumps allow users to vary the flow outlet and discharge pressure to as low as 1 litre per minute, up to 1 040 litres per minute for larger sizes and to adjust fluid pressure up to 123 psi (8.5 bar) by using an air filter/regulator and a needle valve.

"The air-operated diaphragm pump air motors, which are lubrication-free, have positive sealing characteristics and make use of a specially-designed unbalanced air valve to prevent stalling issues associated with operation at low pressures. Exhaust valves divert cold air away from components that are prone to ice build-up," adds Pinheiro.

ARO Pro Series air-operated diaphragm pumps – metallic 3 inch model.

ARO Pro Series air-operated diaphragm pumps – non-metallic 2 inch model.

Metallic and non-metallic air-operated diaphragm pumps are available from BMG in various materials and porting configurations to suit numerous applications, including transfer, loading/unloading/filling, re-circulation, system flushing and batching/blending in many industries.

The metallic diaphragm pumps are manufactured in Aluminium, Stainless Steel, Cast Iron and Hastelloy, while non-metallic units are available in Polypropylene, Acetal and PVDF. A full range of internal materials, such as Nitrile, Santoprene, PTFE, Hytrel and Neoprene are also offered.

ARO Pro Series air-operated diaphragm pumps - drum pump.

***Right:** ARO Pro Series air-operated diaphragm pumps – 3 to 1 ratio.*

"All ARO fluid handling products have been engineered to deliver performance and serviceability, enabling users to achieve the best total cost of ownership," Pinheiro concludes.

A range of speciality pumps is also available from BMG, including stainless steel sanitary pumps (FDA approved), 3:1 high-pressure pumps, submersible diaphragm pumps, air driven submersible pumps, anti-freeze blending pumps and UL-approved fuel transfer pumps.

BMG supports this range with a technical advisory service to ensure the selection of the most suitable pump for every application. The company also supplies a full range of ARO diaphragm pump parts and accessories for standard repair and maintenance requirements. ❑

High-head dewatering saves the day at Lesotho mine

It's business as usual at a mining operation in Lesotho, thanks to the quick delivery of a rapid dewatering solution by Integrated Pump Rental.

A Sykes Xtra High Head dewatering pump provided reliable dewatering to a mine in Lesotho.

A constant flow of water into the Lesotho mine's pit area demanded that water be urgently and reliably pumped out. A fuel-efficient Sykes Xtra High Head pump set was chosen for the job, pumping the water into a 200 mm HDPE line with a head of 127 metres, into a holding dam.

According to Integrated Pump Rental's Andre Strydom, time was of the essence. "We secured this dewatering contract because of our quick and effective response," says Strydom. "The Sykes XH150 unit was on site and commissioned just 24 hours after receiving the call from the customer."

Strydom highlights that as mines and quarries become deeper, conditions require a suitable solution, like the Sykes XH150. With an automatic priming and solids handling capacity, it is designed to dewater more efficiently and effectively.

The pump included a 'snore' feature, which accommodates fluctuating suction levels. In these conditions, the pump will snore until the liquid is available for the pump to fully re-prime itself automatically.

"The unit has one of the best shaft stiffness ratios of any automatic priming pump on the market," he says. "Sykes engineers have ensured that the enormous pressures and heads associated with such performance do not compromise seal integrity through shaft flexing."

All pump models have the ability to operate unattended at high discharge heads. The pumps can be primed with long suction hoses and can manage suction lifts of up to nine metres.

"Designed for robust and reliable performance with high volumes of water, Sykes pumps have an established reputation for the fast and effective control and removal of sub-surface water. The units can even run dry for extended periods owing to the oil bath mechanical seal assembly."

"We strive to go that 'extra mile' for our clients. Our service levels and experience made the whole operation smooth and effortless," Strydom concludes. ❑

Equipped with automatic priming and solids handling capability, the Sykes Xtra High Head pump is ideal for harsh dewatering applications.

KREBS® pumps excel in Africa

KREBS® slurry pumps have become leaders in mill discharge applications in Africa, with the latest Ultimate Mill Discharge (UMD) pump leading the way in these heavy-duty applications.

"West African gold mines and the copper operations in Zambia and Democratic Republic of Congo are among the areas where the UDM pump dominate," says Andre Hall, FLSmidth regional product line manager – pumps, cyclones and valves. "Their popularity," he says, "is based on their long wear life and high efficiency.

"Ghana is a particular success story for our UMD pumps," Hall adds. "'Nearly all the gold mines there use our pumps to discharge slurry from their mills."

The KREBS UMD is popular at these mines largely because it lowers the total cost of ownership due to the millMax™ proprietary design that eliminates inefficient recirculation and grinding of slurry within the pump.

Prior to the millMAX wear ring design, slurry pumps experienced two major problems: mechanical grinding of solids between the suction liner and impeller, and flow recirculating back to the impeller eye on the suction side. Both of these problems decrease pump life and increase power consumption.

The wear ring stops recirculation by closing the suction-side gap, while still allowing for a large clearance between the impeller and the suction liner, eliminating the grinding of solids. Adjusting the wear ring while the pump is running restores performance and provides longer wear life and higher continuous efficiency, in all, lowering the total cost of ownership.

"The UMD's casing symmetry also means less inventory for customers," Hall says. "Mines that have pumps rotating in both left-hand and right-hand orientations must stock different casings, liners and impellers, adding to the operational costs." The advantage of the UMD is that it uses the same casing, suction liner, wear ring and back liner. This reduces overall net working capital.

The KREBS gravelMAX™ pumps continue to do well in Mpumalanga's coal sector, where 14 of these pumps recently replaced competitor units on a single site. Commonly applied in a cyclone feed application within the dense medium separation (DMS) circuit, the pump's wider passage allows pumping of larger solids.

"We are also active in iron ore in South Africa with pumps in the DMS circuit," Hall says. "A Lesotho diamond mine also operates KREBS pumps, which have demonstrated a four-fold increase in wear life compared to a competitor's previous units."

A KREBS UMD centrifugal slurry pump.

The KREBS millMAX pumps in series.

The KREBS gravelMAX pump, designed for coal processing applications.

A KREBS vMAX vertical cantilever pump.

As global leaders in sump pumps, FLSmidth dominates with the vMAX™ range, which features a recessed impeller design allowing the pumps to run dry. When the sump has been emptied of slurry, the recessed impeller allows the slurry to return safely down the discharge pipe without contacting the impeller, ensuring that it does not vibrate when dry.

Another recent innovation in the KREBS slurryMAX™ range of pumps is being introduced to the African market after an enthusiastic response in the US and Australia. With multiple liner and impeller material options, the slurryMAX split-case pump can handle the majority of applications for any plant across multiple industries.

FLSmidth KREBS pumps are designed using vast experience in pumping technology, to meet the challenges with throughput, downtime, wear life and overall efficiency. The complete slurry pumping solutions optimise performance, maximise wear life and efficiency, and lower operating costs. ❑

Changing lives in our communities

A community in Mpumalanga now has access to proper clinic services, with clean running water and a secure environment, thanks to funding from KSB Pumps and Valves.

At the reopening of the Nthoroane Clinic were KSB Pumps and Valves' Grant Glennistor, Gerald Surjoobhalee and Patience Kotyi (far right), with Sister Thangithi Mazibuko, who is in charge of six clinics in the district.

As part of the pump manufacturer's corporate social investment (CSI), KSB Pumps and Valves decided to get behind the Nthoroane Clinic to assist with the upgrade of its facilities. The upgrades included the connection of the clinic's main water tank to internal facilities; the construction of a new main entrance with boom gates; car ports for 10 vehicles; handrails for the entrance and the lavatories for people with disabilities; paving and painting of lavatories and the construction of a new guard house.

According to Gerald Surjoobhalee, KSB Pumps and Valves' commercial manager for the service department, and one of the drivers of the project, the company provided both funding and project management for the project. This ensured direct involvement throughout the process and provided a window into the many milestones along the way. Equally rewarding was the development of local suppliers, contractors and labour who received appropriate training and gained valuable experience through direct exposure to the fundamentals of project management.

Perfect choice

The project was undertaken after KSB Germany directly supplied four new HDC 6/8N pumps and a further nine REL oil pumps to Eskom. Since KSB was the sole OEM for these products, the manufacturer wanted to give something back to the local community through its CSI efforts. This led to a decision to reinvest a percentage of the order value back into the community of Grootvlei.

"Nthoroane clinic was the perfect choice for our CSI contribution as the clinic was in desperate need of repair. Once the decision was made, we sprang into action and started work in October last year. By May this year all work had been wrapped up and the community has since been enjoying the benefits of their own labour.

"Together with Eskom, we have brought much needed relief to the community and have learned that collaboration between state owned enterprises and suppliers can help build better business relationships and contribute towards healthier and happier communities," concludes Gerald. ❑

Former EBH Namibia Namdock kicks off new era with superb rig repair success

EBH Namibia has rebranded, changing its name to Namdock. The objective: to be the preferred marine repair partner on the West African coast, building on its new status and past success.

With its underlying ethos of integrity and service excellence, embodied in the tagline *'Our Strength is Local'*, the past 20 months have been strategically momentous ones for EBH Namibia, turned Namdock. Formerly having South African shareholding, the company has moved to become a wholly Namibian-owned company, with 100% of the shareholding jointly held by the EBH Consortium and the Namibian Ports Authority (Namport).

The company began the year with a major repair project from Sapura Energy, to reactivate the SKD Jaya semi-submersible tender-assist drilling rig, after the vessel had been cold-stacked offshore Trinidad for the past few years.

A four-man EBHN team flew to Trinidad to assess the scope of work needed on the SKD Jaya; after which the rig was transported to Walvis Bay on the semi-submersible heavy-lift vessel, the Hua Hai Long from the Gulf of Paria.

Reactivating a rig such as this carries a considerable amount of complexity. At 94 m long, 36 m wide and more than 20 m high, it is a very large structure. The main power units comprised six Caterpillar diesels, with further power supplied by two 2 000 kVA generators; while the two cranes on its superstructure have 170 foot and 140 foot booms respectively.

The Namdock team was charged not only with restoring this vessel to a seaworthy condition, but had to ensure that it was safe and fully compliant with maritime legislation. To do this required adhering to a scope of work that involved a range of disciplines from rigging, fabrication, electrical and mechanical work, to carpentry and painting.

"Even though the rig had a skeleton crew on board maintaining it, in the tropical maritime environment, a certain amount of deterioration was inevitable," explains EBH Namibia project manager, William Diamond, who was responsible for managing the SKD project.

To complete the scope of work, the EBHN team had to examine the SKD Jaya and then carry out maintenance, replacement or repair as required.

"Having high levels of expertise in all these different areas makes us highly competitive in the international ship repair arena," says Diamond, who explains that the work involved some 17 different 'sub-projects' – such as ensuring that the accommodation and catering facilities were all in good order – as the rig would have as many as 160 workers on board at one time.

Other tasks for the project included:

- The refurbishing and testing of drilling equipment.
- Checking the operability of all lighting, signal and fire safety equipment.
- The removal/rehabilitation of the anchors and anchor wires.

- Removal and load testing of the deck crane cables.
- Servicing and repairing the engines, generators and heat exchangers.
- Calibrating the fog and weather monitoring systems.
- Replacing all anodes.

"The future safety of the SKD Jaya crew is critically important, so we oversaw the re-certification of the life boats, the servicing and load testing of all davits, and the replacement and drop-testing of the helideck perimeter netting," Diamond emphasises.

In addition to the above, further tasks included:

- The removal and lab testing of the blow-out preventer test pump.
- Overhauling all valves on the rig.
- Assisting RigNet technicians with all satellite antenna connections.
- Supplying and reinstalling radio survey and satellite compass equipment.

A winning combination of service and performance

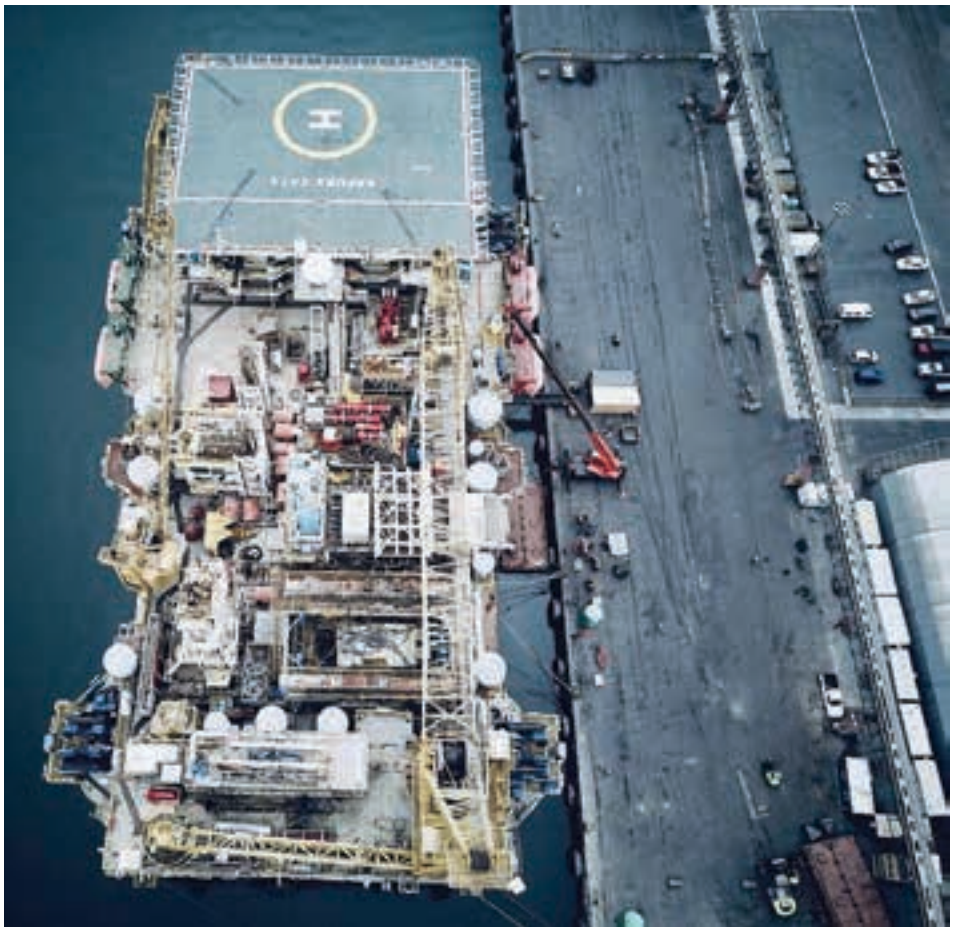
One of the projects' main challenges was offloading a very large item of drilling equipment as the quayside was never designed to handle a piece of equipment that size. To avoid damage to the quayside and Sapura Energy's equipment, the item was offloaded directly onto two unsynchronised flatbed units, which then successfully transported it – with great care – to a destination where it could be repaired.

According to Namdock, this assignment illustrates the company's ability to subcontract out specialist functions and see these through to completion. In addition, it also demonstrated the company's excellent project management and problem-solving ability as, with a project of this scale, there are often unforeseen circumstances that need to be managed correctly.

"The company's long history of unrivalled experience and expertise, as well as our streamlined processes and procedures, means we were ideally placed to provide the highest standard of service in line with the clients' requirements," asserts EBHN acting CEO Heritha Nankole Muyoba.

"The day before handover, we carried out our final inspection and found that everything was to our satisfaction. We were impressed because EBHN needed to use the services of a number of subcontractors and managed this aspect exceptionally well. What was most pleasing was, the entire project was completed without any incidents. Considering the number of people, the hours worked, and the challenges we faced, this was a truly notable achievement.

"We anticipate that this rig project is the first of a number that will provide Namdock, as well as our relevant stakeholders – and the Walvis Bay community, with strong sustainable revenue into the future," she concludes. ❑



Aerial view of the SKD Jaya moored in Namibia.

Det-Tronics partners with HMA

HMA South Africa has been a recognised leader in fire and gas safety solutions for over 40 years, and is now set to make inroads into both the local and Sub-Saharan African market, according to Mark Hall, sales manager for HMA Instrumentation.

Complete fire and gas safety solutions that provide detection, notification, and mitigation in a range of industries are now available from HMA South Africa, thanks to an exclusive distributorship with Det-Tronics of the US.

The Australia-based HMA Group comprises divisions for materials handling, wear solutions, power generation, geotechnical, and instrumentation. The South African subsidiary was established in 2016 when Uretech, a local manufacturer of polyurethane products such as wear liners for the mining industry, entered into an agreement with the HMA Group to have its product range distributed internationally. In turn, the HMA Group's wide product range is now available in Africa for the first time.

The latest addition to HMA South Africa's portfolio is the Det-Tronics agency, with Dieter Spangenberg appointed as product manager from the beginning of July. "We have had a highly successful relationship with Det-Tronics for the past 20 years in both Australia and New Zealand, accumulating extensive product and application experience and expertise over that period," says Jeremy Moore, operations manager for HMA Instrumentation.

As a global leader in flame detection, Det-Tronics' solutions are based on performance (coverage, field of view, and range), reliability (superior protection of people, products, and property), and technology (patented signal processing and precision optics). The advanced detection means fires can be detected using UV, UVIR, IR or MIR technology.

The partnership has culminated in the South African distributorship, which will be used as a springboard to target the burgeoning oil and gas industry on the continent.

"Our local customers will have full access to our international knowledge, which will naturally extend to aftermarket support and technical back-up," adds Nathan Morris, product manager for HMA Instrumentation. Critical spares and common product items will be held locally, while application-specific technology will be imported directly.

"All Det-Tronics detectors pass rigorous flame testing, including exposure to multiple fuel sources and at varying ranges, both on and off axis. Skilled engineers also simulate specific applications to ensure uncompromising safety and performance," Hall highlights.

The Det-Tronics eagle quantum premier safety system controller.

The Det-Tronics x3301 features patented detection algorithms optics and signal processing.

Leading products include the X3301 multi-spectrum infrared flame detector, a benchmark unit approved for a range of hydrocarbon fires, with best-in-class flame detection coverage and false alarm rejection. Performance-approved at 81 m for a 0.3 m x 0.3 m n-Heptane fire, the X3301 features patented detection algorithms, optics, and signal-processing.

The Det-Tronics X3301 multi-spectrum infrared flame detector has proven technology for fast detection of invisible hydrogen flames and methanol, while the X5200 ultraviolet/infrared flame detector leverages state-of-the-art UV and IR technology to detect fires. This high-speed, versatile detector is ideal for specialised applications.

The X9800 infrared flame detector offers quick fire technology for high-speed detection in areas with infrared sources. The X2200 ultraviolet flame detector combines an ultraviolet sensor and advanced algorithm for rapid detection and false alarm immunity.

The Det-Tronics Eagle Quantum Premier (EQP) safety system combines gas and flame detection with extinguishing agent release capability in a single integrated solution.

The full Det-Tronics' product range and service offering covers flame detection, gas detection, suppression equipment, control equipment, HMI programming, custom engineering, project management, system integration, factory approval testing, formal training, and commissioning, field service, and technical support.

Det-Tronics fire and gas safety solutions installation.

All Det-Tronics detectors pass rigorous flame testing including exposure to multiple fuel sources and at varying ranges.

Applications and industries include aircraft hangars, automotive, chemical, fuel storage, LNG terminals, munitions, offshore platforms, petrochemical plants, pipeline compressor stations, refineries, semi-conductors, transport loading racks, and turbine enclosures, among others

International certification includes SIL 2 for safety compliance, performance-certified to FM 3260, EN 54 and VNIPO in response to a variety of fuel sources, and NFPA 72 compliant LON output for safety system integration. ❑

Energas supplies skid-mounted HPCMs to Mozambican client

Leading supplier of high-end and specialised equipment to the oil and gas industries in Africa, Energas Technologies has supplied high-pressure customer metering solutions to a customer in Mozambique.

Energas specialises in the supply of complete skid-mounted HPCMs (high-pressure customer metering stations) for natural gas. The skid-mounted stations are designed, shop fabricated and assembled, fully tested and packaged before transported to site.

The skid includes filtration, pressure reduction, over-pressure protection and

Implementing Liquefied Natural Gas with Coega as the Hub

The Coega Development Corporation (CDC) welcomed the budget vote speech delivered by Minister of Mineral Resources and Energy, Gwede Mantashe. In particular, the CDC welcomed the Minister's outlook on "exploring more economical options to bring natural gas into the South African market."

In 2008, the Department of Energy identified the Coega Special Economic Zone (SEZ) as one of the preferred locations for the gas to power project which is valued in excess of R25 billion. In his 2019 Budget speech, Minister Mantashe further acknowledged Coega as an ideal hub for the importation of Liquefied Natural Gas (LNG).

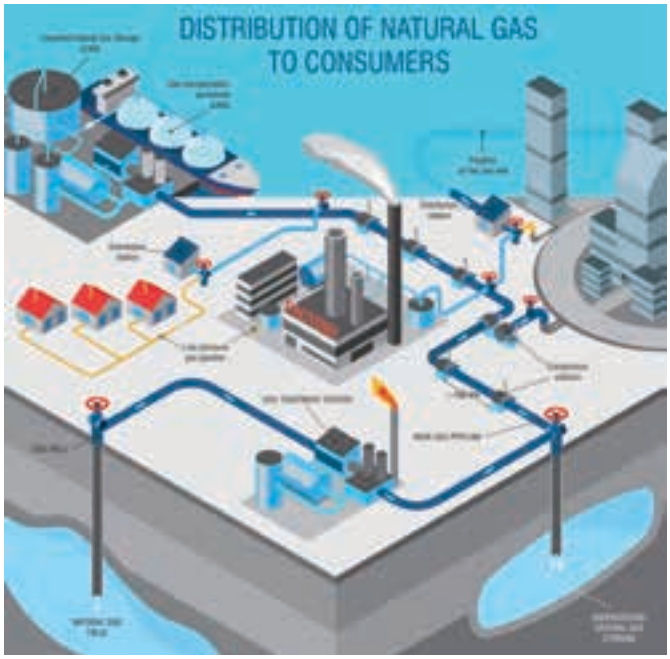
"The CDC`s extensive work over the years to prepare the region for gas readiness is a step towards achieving the government`s objectives in growing the South African Energy sector," says Dr. Ayanda Vilakazi, CDC's head of marketing and communications.

"CDC's efforts to create global appeal through investment promotion activities complement the National government's attempt to explore sustainable economic measures to bring natural gas into South Africa, in order to cater for the increased demand for access to affordable energy sources."

Located in the bustling Nelson Mandela Bay Metropolitan Municipality, the Coega SEZ is an ideal location to unlock South Africa's natural gas economy, notes CDC energy sector manager, Sandisiwe Ncemane. "To advance the vision of the SEZ, we at the CDC continue to work hand in hand with the Eastern Cape Province, other state organs as well as the private sector," she continues.

The CDC is home to successful energy projects worth over R4 billion. These include the Dedisa Power Peaking plant (investment value: R3.5 billion), DCD Wind Towers (investment value: R310 million) and a R1 million 48 kW solar array powering the Coega Development Corporation's business centre.

In his 2019/20 Economic Development, Environmental Affairs & Tourism policy address held on the 4th of July 2019, MEC Mlungisi Mvoko, reiterated the value and outcomes achieved through collaborating with the CDC in unlocking economic activities within the Energy Sector in the Eastern Cape, stating, "Coega has a proven track-record in megaprojects".



Above: Gas industry info graphic explains how the gas gets from the field to consumers.

Right: Clean Energy Fuels Natural Gas Station. Clean Energy distributes Compressed natural gas (CNG) and Liquefied Natural Gas.

Optimistic about future prospects for renewable energy in the province, he said, "We look forward to the release of the national Integrated Resource Plan later this year, which will set out the roadmap for the energy generation new-build programme.

"In addition to gas, we will continue to establish our potential in the fuel sector, by pursuing the development of an oil refinery at the Coega SEZ, as well as biofuels production and processing across the province," Mvoko concluded. ❑

metering. The station supplied to Mozambique will reduce the pressure from 55 bar (inlet line pressure) down to 1 to 3 bar (outlet pressure to the user) within one stage of pressure reduction. The station has a single run and has a flow capacity of 200 Sm^3/h.

A second run can be added for redundancy if required. The station includes the skid frame, piping, insulation joints, pressure regulator valve, slam-shut valve, pressure relief valves, gauges and isolation valves. The station is designed according to ASME B31.8 (gas transmission and distribution piping systems).

Natural gas, as an alternative energy source to electricity, diesel, coal or LPG is a reliable, clean, safe and affordable solution for industrial users requiring energy for heating processes. Natural gas can be supplied via a pipeline network or by means of compressed natural gas cylinders to users not close to a pipeline. ❑

Fast payback on steam cogeneration

Fast payback on steam turbine cogeneration systems makes this technology an attractive option across numerous industries. This is according to Zest WEG Group's Leandro Magro, who says that any industry with a boiler installed has cogeneration potential using a steam turbine.

Fast payback on steam turbine cogeneration systems is often an attractive option, says Leandro Magro, manager steam turbines at Zest WEG Group, who explains that any industry with a boiler installed has the potential for cogeneration using a steam turbine. "The electricity cost savings usually pay back the investment in less than three years, but this payback period can be further reduced depending on the applicable electricity price tariff in effect," he says.

Power plants, sugar mills, pulp and paper mills, steel mills, petrochemicals, oil and gas installations, food and beverage manufacturing operations and many other industries, including commercial and institutional facilities, use steam turbines for electricity production or to drive mechanical equipment such as compressors, fans, mills and blowers.

When used for the production of electricity, the steam turbine is coupled to a generator, which is commonly referred to as a steam turbo generator set. Magro says that typically, industrial steam turbine models start from a 30 kW capacity and go up to 150 MW. "These turbines can operate at a very low steam pressure (5.0 bar or less) or a high steam pressure of up to 140 bar, and with saturated or superheated steam at up to 540 °C," he says.

"The operational availability of an industrial steam turbine should be about 98%; however a proper maintenance programme is essential, not only for prolonging the life of the equipment but also to ensure the correct operation of the turbine," Magro says.

The best way to achieve this is to enter into a service contract with the OEM who will recommend an appropriate maintenance and service programme. A new steam turbo generator set could be installed in the plant to operate in parallel with the pressure reducing valve, so when maintenance is required on either the valve or turbine, the processes that require steam would not need to be stopped.

"Steam turbine cogeneration is not only suitable for large installations but can play a vital role in medium and small applications, saving the end-user a significant amount in energy costs over the expected life span of the system which, depending on design, can vary from 20 to 30 years," Magro concludes. ❑

A backpressure steam turbo generator running with saturated steam, producing 100 kWh electricity to the plant.

A turbo generator installed in a paper mill in South Africa.

Regulating motor efficiency will help stabilise SA's supply

South Africa could go a long way to cut the risk of future load-shedding by adopting a minimum efficiency performance standard (MEPS) for electric motors. This is the opinion of Fanie Steyn of Zest WEG Group, who maintains that an MEPS would significantly reduce peak power demand on the national grid.

"If the 150 000 low voltage motors entering the country each year were IE3 rated instead of IE1, the national grid could be relieved of about 195-million kWh in a single year," says Steyn.

According to Fanie Steyn, manager of rotating machines at Zest WEG Group, a minimum efficiency performance standard (MEPS) for electric motors would significantly reduce the peak power demand on the national grid. Importantly, the step could be made at no cost to government and would also bring substantial savings to industry's electrical energy costs.

"The MEPS would phase out the least-efficient electric motor classes by setting a minimum standard for the efficiency of motors imported and sold in South Africa," he says. "The essential challenge now is that about 280 000 electric motors are imported each year, many of which are low efficiency motors rated at IE1 level as standard."

Steyn highlights the great strides recently achieved in the efficiency of electric motors. Energy savings of between 2.1% and 12.4%, depending on the individual power rating, can be made by converting from a standard efficiency IE1 motor to a premium efficiency IE3 motor. The capital cost differential is slight and is quickly recouped through lower operating costs.

"It is estimated that as much as 30% of all energy produced globally is consumed by electric motors," he says. "It is therefore easy to see why improving motor efficiencies has a huge impact on national energy consumption," Steyn points out.

It is significant that more than 42 countries already have MEPS in place. These standards apply mostly to three-phase low voltage motors in power capacities from 0.75 kW to 375 kW. The MEPS is applied at import stage, so the process would be handled in the conventional manner by customs agencies.

"If the 150 000 low voltage motors entering the country each year were IE3 rated instead of IE1, the national grid could be relieved of about 195-million kWh in a single year," says Steyn. "This accumulates to almost three billion kWh over the next five years."

He adds that this would also mean lower carbon emissions from power stations. South Africa has committed to reduce these emissions by signing the Paris Agreement in 2016.

"Implementing MEPS will have significant benefits for everyone," Steyn concludes.

The Zest WEG Group, a subsidiary of leading Brazilian motor and controls manufacturer WEG, has a strong commitment to contributing to the development of the African region, and has been servicing the continent for more than 37 years. ❑

It is estimated that as much as 30% of all energy produced globally is consumed by electric motors, and therefore easy to see why improving motor efficiencies has a huge impact on national energy consumption.

Achieving greater energy efficiency with Thermal Solar

By Nicole Viljoen, project manager at Energas Technologies

South Africa's location enables it to harness the sun, one of the most reliable and abundant natural resources. With the current energy situation and ever-increasing electricity costs, we are forced to evaluate our energy consumption and implement more efficient and cost-effective solutions.

Two common ways to collect energy from the sun are through a thermal solar collector, to gather the sun's heat, and a photovoltaic (PV) solar system, which converts the sun's energy into electricity. In the case of solar thermal, the conversion efficiency is much higher than PV.

Both have their own advantages, however. Solar thermal panels cost a fraction of what PV panels cost per square metre while, although PV is more expensive and less efficient, the electricity generated from PV can be used for more than just heating water.

Into detail

A thermal solar system can provide approximately 60% of the energy required each year for heating domestic hot water (DHW). The key element of a thermal system is the solar thermal collector, which absorbs solar radiation from the sunlight. The purpose of the collector is to efficiently convert the sunlight into heat. The heat is transmitted to a fluid, which transports the heat to the heat exchanger via pumps with minimum heat loss. The exchanger transfers the heat into the geyser. The distance between the collector and the geyser should be as short as possible to minimise heat loss.

300-Vs are 581 mm long and 605 mm wide, with the smaller-capacity model measuring 1189 mm in height and the larger-capacity model 1 409 mm.

There are two main types of solar thermal collectors available. The first, an evacuated-tube collector is made of parallel glass tubes, each containing two glass tubes. Between the two glass tubes there is a vacuum that allows small heat loss. The absorber is included in a tube. The second type is the flat-plate collector which comprises an insulated box with a glass or plastic cover on the top and a solar absorber located at the bottom. In comparison, evacuated-tube collectors are more expensive than flat-plate collectors; however, they can achieve higher efficiencies.

Achieving optimum heat yield

The integration of solar thermal systems requires precisely matched individual components to achieve optimum heat yield and to keep costs under control. This must be supported by the right system engineering. Solar water heating systems almost always require a backup system for cloudy days and times of increased demand and therefore most solar water heaters require a well-insulated storage tank or DHW cylinder. Dual mode DHW cylinders work to heat the DHW with separate indirect coils that are connected directly to the solar thermal system. DHW is also heated by a boiler via an indirect coil arranged in the upper section of the cylinder.

The demand for hot water varies considerably from household to household. The number of occupants has to be taken into account, as well as their bathing and showering habits.

For example, if three members of a family set off for work and school at the same time, lots of hot water needs to be continuously available for the shower in a short space of time. Those who prefer a bath will also want to have enough hot water to fill the tub. The DHW cylinder should also be able to provide sufficient water if hot water is drawn from more than one outlet at the same time, in apartment blocks for example.

Vitocell DHW cylinders fulfil these requirements in every respect and can also meet every aspiration where equipment levels are concerned. In all instances, the installation of a solar thermal system is recommended to save energy and heat the water without cost.

Energas' Thermal range

Energas offers Viessmann's Solar Thermal range. Installers and end-users are urged to recognise the role of hot water storage in optimising environmentally-friendly installations. Viessmann has introduced two new floor-standing Vitocell 300-V DHW cylinders, with capacities of 160 and 200 litres, and are twice as energy efficient in terms of standby losses as the industry norm.

Both new versions of the Vitocell 300-V replace the previous A rated models, and both are suitable for domestic installations with boiler outputs up to 80 kW. Higher DHW demands can be accommodated by combining several Vitocell 300-V cylinders into cylinder banks with common headers.

The 300-V's exceptional heat retention is made possible by using a highly-effective vacuum panel insulation as well as the efficient Polyurethane hard foam. Heat losses are merely 0,7 kWh per 24 hours for the 160-litre model and 0,75 kWh per 24 hours for the 200-litre model.

The new 300-V combines unmatched energy efficiency with high performance. The indirect heating coil is larger than in most common cylinders and drawn all the way down to the cylinder floor to heat the entire water content. Heat-up time from 10 to 60 degrees is just 20 minutes for the 160-litre cylinder and 24 minutes for the 200-litre cylinder.

The low pressure-drop of the heating coil, at only 15 millibars, is approximately 35% lower than a typical competitor cylinder. This negates the requirement for oversizing the

circulating pump; specifying a smaller pump will save electricity. Maximum hot water flow rates are 24 and 34 litres per minute respectively.

The 300-V's insulation package can be removed for easy handling. Transportation and installation are also made easy by the 300-V's low weight and compact dimensions. Both 300-Vs are 581 mm long and 605 mm wide, with the smaller-capacity model measuring 1189 mm in height and the larger-capacity model 1 409 mm.

Regardless of the size of your home, how many people live there and how much hot water they use, the Vitocell range will have the right cylinder for your DHW heating system. ❑

The new floor-standing Vitocell 300-V DHW cylinders, with capacities of 160 and 200 litres.

New sonic industrial imager

COMTEST has announced Fluke's new ii900, a handheld sonic industrial imager that enables maintenance teams to quickly and accurately locate air, steam, gas and vacuum leaks in compressed air systems. Using SoundSight™ technology - an intuitive interface - allows technicians to isolate the sound frequency of the leak to filter out background noise. In a matter of hours, the team can inspect the entire plant, even during peak operations.

Leak identification is simple, a SoundMap™ is displayed in colour over a visual image of the equipment allowing for fast visual location. With the visual image, it is easy to scan a large area quickly and identify leaks from a distance.

The Fluke ii900 finds application in manufacturing: aerospace, automotive, glass, machinery, instrumentation and appliances, plastic and rubber, mining and mineral processing, and in process manufacturing: cement, chemical processing, food and beverage, and pulp, paper and wood.

The ii900 enables users to do more with existing air compressors, for example:

- Delays the capital expense of purchasing an additional compressor
- Ensures proper air pressure to pneumatic equipment
- Lowers energy costs (optimization of compressed air budget)
- Reduces leak detection time
- Improves reliability on the production line. ❑

Ian Fraser, Managing Director of the RTS Africa Group.

Leak detection system prevents boilers 'going down the tubes'

South Africa's national power supplier continues to contend with various complex challenges - including boiler maintenance issues caused by, amongst other factors, boiler tube leaks. RTS gives some industry solutions for a common problem.

It is reported by US-based organisation, the Electric Power Research Institute (EPRI), that power generation plants in the US and Europe have, 'on average, around 6% loss of plant availability due to boiler tube leaks' – a major loss factor for these facilities.

In South Africa, industrial solutions provider RTS Africa Technologies has an effective solution to the challenge of boiler tube leaks. This is in the form of a boiler tube leak detection system from UK-based principal Procon Engineering, a global leader in the field of acoustic leak detection, which invented the technology and introduced it to the world in 1974.

With more than 250 installations in over 20 countries worldwide, Procon Engineering can proudly claim more experience and success than any other company in the field. This is according to Ian Fraser, managing director of the RTS Africa Group.

He explains that the benefits of the early detection of boiler tube leaks include increased operating profit, personnel safety, availability and tube life.

"In addition, early tube leak detection means unscheduled outages can be avoided or at least reduced; as can repair costs and secondary damage, with the attendant reduction in financial penalties and insurance costs," he adds.

Commenting on how the technology works, Fraser says that Procon manufactures specialised 'microphones' – which bear little resemblance to conventional audio microphones. These detect the very particular noise made by steam leaking from a boiler tube.

"The sound of a boiler tube leak has a particular frequency that Procon microphones are selectively able to detect. In itself, this is quite a technical feat, as the firebox of a boiler is a fairly noisy environment," he advises.

The microphones are installed at the end of long steel tubes, which target specific points in the boiler tube system. As high levels of soot are usually present in boiler fireboxes, as an option, the Procon acoustic detectors can also be fitted with an air pulse system that clears the soot deposited in the tubes.

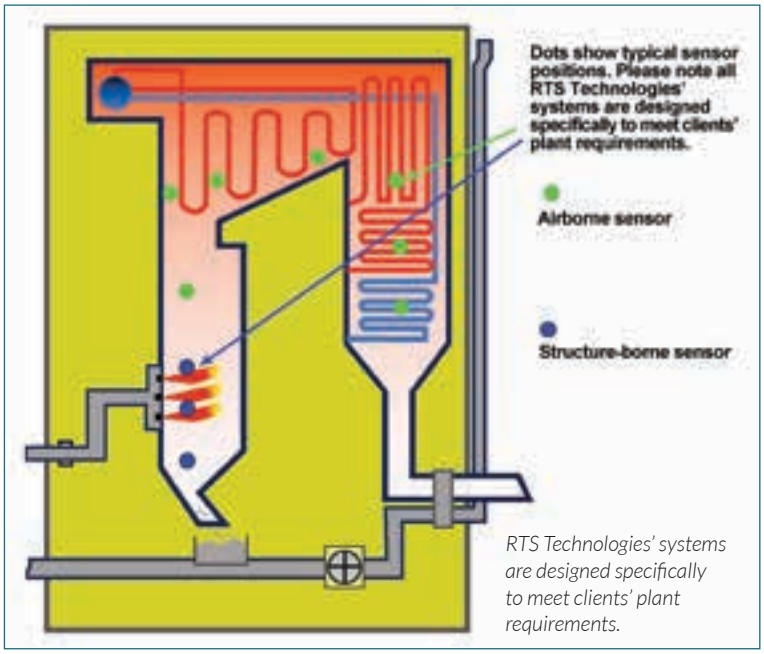
The Procon leak detection system can detect small leaks before they become catastrophic failures. This is of operational importance. "A leak in a boiler tube can start as small as a pinhole - and remain an undetected problem for an extended period of time. But, eventually, the size of this hole will grow to a point where the growing diameter of the orifice leads to a major tube burst. When such an incident happens, there can also be expensive secondary damage inside the boiler," Fraser explains.

A further key advantage of the Procon system lies in the number of microphones installed in a boiler. For example, a typical power station might have as many as 24 Procon acoustic devices installed in a boiler. The output from the Procon microphones is fed into an IT- controlled display – each microphone being represented by a bar on the display. This shows the sound levels from each microphone inside the firebox. For record-keeping purposes and system analysis, it is possible to print out the data from a Procon system.

When the leak occurs, the microphone nearest to the leak will display an elevated bar level. What is particularly useful is that other microphones in the area will also pick up the noise.

"Power station technicians are then able to look at the computer display and - judging from the varying sound levels from the microphones – predict with some precision where the leak is occurring," he says.

For boiler maintenance teams, this is most helpful, as even during physical inspections of the inside of a boiler and its tubes, a pinhole size leak can be difficult to detect visually. However, with the evidence from the Procon system in hand, technicians are aware that there is a leak and can search for it until it is found in the shortest possible time.



RTS Technologies' systems are designed specifically to meet clients' plant requirements.

What the Procon detection system also allows is for power station technicians to assess the seriousness of a particular leak. Depending on their assessment of the extent of the leak, it is possible to plan a scheduled boiler maintenance shutdown so the impact of the downtime is minimised.

In South Africa, Medupi and Kusile power stations both employ Procon tube leak detection systems; and RTS Africa installed a complete Procon system on the six boilers at Arnot power station some years ago.

"Compared to the cost of a boiler failure in a major power station, the cost of the Procon system is minimal," continues Fraser, adding the proviso that the system becomes increasingly cost-effective on larger boilers of 200 MW capacity and more.

"The Procon system has been designed not only to serve power stations; but also the host of boilers used in the broad spectrum of industry," Fraser explains. "With boilers that might service manufacturing or production environments, prevention of major failures will also assist in the avoidance of punitive financial penalties, and ultimately bring about a marked improvement in the company's bottom line," he concludes. ❑

Voith launches on-site machining and service tools capabilities

Voith plant in Witfield, Boksburg, South Africa.

The line boring application is part of the on-site machining services of Voith in Southern Africa.

Technology group Voith is strengthening its hydropower service portfolio for Southern Africa. On 15th August 2019, the company introduced its on-site machining and service tools capabilities to customers, business partners and authorities during an official launch event in Boksburg, South Africa.

The new services include the refurbishment of plant components in installed or independent state by linear and circular milling as well as drilling, boring and welding. The portable on-site machining equipment ensures increased plant up-time and safety. Cutting assembly, dismantling and transport costs for the refurbishment and maintenance of plant equipment are reduced to a minimum.

"In the last two years, we have built up an extensive range of on-site machining and repair services through the acquisition of equipment and the training of new staff. Now, we can provide cost-effective workshop-quality machining for the largest and smallest on-site machining projects in Southern Africa", says Anton Harris, head of service and managing director of Voith Hydro in South Africa. "Besides use in the hydropower sector, the equipment is also applicable to all fields of processing industry in Africa, such as the oil and gas or the mining industry. For hydropower plants, the Voith range of services is amplified to assessments, trouble shooting, repair and assembly services – along the whole life cycle of an operating plant."

The on-site machining equipment is stored in sea freight containers on the Voith company premises in South Africa. From there, the equipment is ready to be transported on the road or on the seaway to any location in Southern Africa.

Overview of Voith's on-site machining equipment

For a whole range of different boring, drilling and facing applications, there are three heavy-duty line boring machines, which can be equipped with different heads and with an orbital welding machine for welding and reprofiling applications.

The linear mill is a bed-type milling machine for universal use in a fast and accurate way. Together with the adjustable head mounting options for angular milling and the different tooling options, a wide range of milling jobs can be fulfilled.

Voith's circular mill is equipped with an incremental drive and can be set up for the machining of large internal diameters and flanges.

While the circular mill comes in a customised container with removable roof and door header, the linear mill and the line boring machines are delivered in steel boxes or, depending on the application, in a container. For repairs and installations, a fully equipped tool container is also available.

About the Voith Group

The Voith Group is a global technology company. With its broad portfolio of systems, products, services and digital applications, Voith sets standards in the markets of energy, oil & gas, paper, raw materials and transport & automotive. Founded in 1867, the company today has more than 19 000 employees, sales of €4.2 billion and locations in over 60 countries worldwide and is one of the larger family-owned companies in Europe.

The linear mill is a bed-type milling machine for universal use in a fast and accurate way.

The Group Division Voith Hydro is part of the Voith Group and a leading full-line supplier as well as trusted partner for equipping hydropower plants. Voith develops customised, long-term solutions and services for large and small hydro plants all over the world. Its portfolio of products and services covers the entire life cycle and all major components for large and small hydro plants, from generators, turbines, pumps and automation systems, through to spare parts, maintenance and training services, and digital solutions for intelligent hydropower. ❑

Boost for Ermelo recycling project

Motivated by a strong desire to clean up the environment, while also fighting unemployment, hunger and the threat of drugs in her community, Johanna Leshabane launched the Bophelo Recycling project in 2007.

Recycling in Ermelo has been given a major boost, following a R500 000 donation of equipment and infrastructure.

While the project started out relatively small, the power of partnerships has seen it grow to the point where it now employs two full-time staff members and three freelancers who have raised collection volumes to over 40 tonnes per year.

The business recently received a further boost when national industry body, PET Recycling Company (PETCO), and PETCO member and polymer producer Safripol handed over supporting infrastructure worth R500 000 to further Leshabane's vision.

The joint contribution included, among other things, a shipping container, electricity supply, trailer, roofing structure, trolleys, signage, fencing and branding, as well as training and mentoring support.

"This is just the tip of the iceberg," Leshabane said. "I see a future in which, instead of transporting our collected waste to Gauteng, recycling plants will rise throughout Mpumalanga, offering employment to youngsters who have ideas and visions the older generation may not have thought of."

The recycling idea came to Leshabane on visits to Johannesburg and Pretoria, where people were meaningfully employed keeping the streets clean.

"Ermelo, by comparison, was a disgrace, but what to do? I was employed full time and had neither the time nor the means to tackle the problem."

Nevertheless, she began the groundwork and approached the local municipality to identify land on which her project could be born. That partnership has continued to bear fruit, with both parties working together to educate the next generation through recycling awareness in schools.

Next came a blessing in disguise when Leshabane's employers asked her to accept relocation or take a retrenchment package.

"I opted for the package. Something inside me told me that the lump sum I would receive would open recycling doors for me. I could create a better future for myself and the environment as well as creating jobs in my community."

But it was when the partnership with PETCO was forged in 2017 that Leshabane enjoyed her first real 'wow' moment. She also approached local businessman, Gerhard Pieterse, who saw the opportunity to support his community by allowing her to trade rent-free on one of his business properties.

"At last, I was going somewhere. They were going to help me create jobs and put food on the table," said Leshabane.

Another partnership was unveiled when a joint initiative aimed at unlocking meaningful strategies to address waste reduction was launched.

Stakeholders from PETCO, Safripol, the Ermelo municipality, Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, Gert Sibande District Municipality, and the South African Local Government Association were represented at the function.

PETCO's Belinda Booker (centre) and KAP Chemicals (Safripol) chief executive officer Leigh Pollard hand over new equipment to Johanna Leshabane (left).

Explaining what this partnership means, PETCO collections and training project manager Belinda Booker said partnerships between government, business and industry were key to unlocking meaningful strategies to address waste reduction in South Africa.

"We have begun partnering with government departments, conducting training and workshops for officials as well as SMMEs and co-operatives.

"We also sponsor projects like Bophelo with equipment to grow and sustain their businesses, thereby stimulating job creation, alleviating poverty, and promoting a cleaner environment and development in our country. By growing these SMMEs we increase the quality and quantity of their PET collections, which assists PETCO in achieving our recycling targets."

Booker said it was great to see members like Safripol taking their extending producer responsibility seriously by supporting small business models, especially in rural areas where waste management was not well serviced or a priority.

"This is our first direct support towards an operation like this. Safripol is strongly committed to our environment and we believe it is very important for us to use all avenues to address the prevention of plastic pollution in our beautiful country.

"We believe that this initiative is the beginning of a journey for us and other key stakeholders. With the help of PETCO, we will develop the path forward as and when it requires expertise and collaboration," concluded Safripol's technology and innovation executive Gert Claasen. ❑

Petco announces SA's 2019 recycling champions

On the back of its recent announcement of a 6% year-on-year increase in the recycling of PET plastic bottles, national industry body the PET Recycling Company (PETCO) has unveiled its 2019 recycling champions – people and organisations making strides in sustainability at grassroots level across South Africa.

The annual awards were made across 11 categories, with Western Cape winners scooping nine awards, followed by Gauteng with two, and one each from the Northern Cape, Eastern Cape and Limpopo. Recipients varied from a nine-year-old eco warrior to a recycler who overcame three fires on her premises, and an award-winning consumer journalist.

PETCO chief executive officer Cheri Scholtz said the organisation's greatest asset was, "the remarkable network of partners we work with every day".

Scholtz said the 98 649 tonnes of PET plastic bottles recycled in 2018 had only been achieved through their collective dedication and effort, enabling PETCO to expand its collection network, build relationships with recyclers, and seek new opportunities to develop and support entrepreneurs.

"We are therefore delighted to be able to recognise and celebrate the significant efforts made by our 14 worthy winners towards the recycling of post-consumer PET in South Africa."

CATEGORY: Waste Reduction Youth Warrior

WINNERS:

Rocco Antonio Da Silva, The Future Kids Club (Cape Town, Western Cape)

Nine-year-old Rocco started the club to create awareness and get the youth in his area to commit to participating in monthly beach and community clean-ups. Over the past 14 months, members have collected in excess of 950 kg of rubbish off a local 400 m stretch of beach.

Rotondwa Musitha, Trash Converters (Limpopo)

Musitha, 24, is a business school graduate who started her recycling business after her research showed that just 2% of all recyclable material in Limpopo was being recycled, creating a gap in the market for waste buy-back centres. Working on foot, she and her three employees collect approximately eight to 11 tonnes of waste per month.

CATEGORY: Top Woman in Recycling

WINNER:

Jocelyn van der Ross, Green Spot Recycling (Franschhoek, Western Cape)

Jocelyn van der Ross started Green Spot Recycling with two employees in 2005, and today has 15 staff collecting and sorting over six tonnes of PET plastic bottles a month.

CATEGORY: Media Spotlight

WINNER:

Wendy Knowler (Cape Town, Western Cape)

Award-winning consumer journalist Wendy Knowler has been recognised for her role in shedding light on the importance of conscious consumption and recycling. The award recognises her attempts to create awareness about recycling issues; dispel myths; and motivate consumers to do their bit.

CATEGORY: Excellence in Academia

WINNERS:

Takunda Chitaka, University of Cape Town (Cape Town, Western Cape)

Chitaka is in the fourth year of her PhD studies, and was nominated for her work on the nature of the plastics found on Cape Town beaches. Her studies are dedicated to better understanding the nature of the problem of plastics in our coastal environments, and how solutions based on the principles of life-cycle management could be developed for moving the plastics economy forward.

Melanie Samson, University of the Witwatersrand (Johannesburg, Gauteng)

Samson works closely with informal reclaimers who see themselves as the last line of defence before the rubbish hits landfills. According to the CSIR, informal reclaimers save municipalities up to R748-million a year in landfill space.

CATEGORY: PET-trepreneur of the Year

WINNERS:

Makhabisi Recycling and Trading Co (Boksburg, Gauteng)

Boksburg-based Makhabisi Recycling and Trading was founded by Anna Hartebeest in 2007 and has been reducing landfill, creating community awareness, and providing much-needed employment ever since.

Nzima Recycle Centre (Humansdorp, Eastern Cape)

Owners, Tommy and Jeanine Glad, founded Nzima in 2006. The business employs 14 people and handles 20 tonnes of PET plastic bottles per month.

CATEGORY: Local Authority Recycling Innovation

WINNER:

Drakenstein Municipality (Paarl, Western Cape)

Drakenstein Municipality has transformed the Wellington landfill site from a crime hotspot into a safe, thriving recycling concern, providing a source of income for 30 entrepreneurs.

CATEGORY: Recycling Partnership Gamechanger

WINNER:

Fair Cape Dairies (Cape Town)

Fair Cape Dairies embarked on an 18-month research project to find suppliers that could help keep the shelf life constant in a bottle that could be recycled. Today, their clear bottle is not only recyclable, but is also made with 50% recycled PET (rPET).

CATEGORY: Recycled Product of the Year

WINNER:

Corruseal (Cape Town, Western Cape)

As a national manufacturer and supplier of packaging to a wide range of industries, Corruseal made the decision to use only locally sourced and recycled polyethylene terephthalate (rPET) strapping.

CATEGORY: Best Community Breakthrough Initiative

WINNER:

Angels Resource Centre (De Aar, Northern Cape)

Eddie Kampher set up a recycling opportunity for under-resourced communities in the Northern Cape. His Waste to Art programme teaches people how to sort, clean, bale and even create functional furniture and art. A total of 30 entrepreneurs, who were previously homeless or unemployed, are now selling to local buy-back centres and earning a monthly income.

CATEGORY: Public Campaign of the Year

WINNER:

Thrive (Hout Bay, Western Cape)

Thrive was founded in 2004 and works with local schools to adopt more sustainable practices, and rewards the greenest schools for their efforts. It also connects them with buy-back businesses for the collection of recyclables separated by the students, which allows the school to generate additional income.

CATEGORY: CEO Special Award

WINNER:

John Kieser, Environmental Manager, Plastics SA (Cape Town, Western Cape)

Kieser is a conservationist with a specific interest in marine debris pollution, leading beach and community clean-ups across South Africa. For him, the critical component is teaching poor people that plastics have economic value and illustrating how they can earn a living by selling to buy-back centres and working in recycling. ❑

Recycling used oil – fuelling the economy and protecting the environment

Recycling used oil not only protects the environment, but also creates cost efficient products, such as burner fuel for furnaces, for our economy.

The ROSE (Recycling Oil Saves the Environment) Foundation, responsible for driving the recycling of used oil in South Africa for the past 25 years, describes the used oil recycling industry as a thriving success story on many levels.

Approximately 350 million litres of new lubricant oil is sold in South Africa every year – a combination of locally manufactured, as well as imported lubes. Of all the oil that is sold, an estimated 150 million litres becomes used oil, of which 120 million litres is collectable for recycling.

Retrieving and recycling this product has proven to be a lucrative enterprise that creates a circular economy and protects the environment.

"Used oil is full of contaminants that are dangerous to the environment and as such it is classified as a hazardous substance that must be disposed of responsibly through a recycling process. One litre of used oil can contaminate one million litres of water if it seeps into our water catchments," explains Bubele Nyiba, CEO of the ROSE Foundation.

"Recycling used oil not only protects the environment, but also creates cost efficient products, such as burner fuel for furnaces, for our economy.

"Most used oil in South Africa is partially processed to remove certain impurities then recycled into burner fuel. Many industries in South Africa use burner fuel in furnaces and kilns during the manufacturing and production of their products. If these manufacturers used only virgin burner fuel rather than recycled products, the cost of production would escalate dramatically – and this cost would naturally be passed onto the consumer."

Nyiba lists a few of the industries that use kilns and furnaces: "Tyre, cement, tile and brick manufacturers; commercial bakeries' distilleries; fruit canneries; jam factories and diesel-powered electricity plants, are a few examples of businesses that use burner fuels in their production processes. So when you buy bread, and the jam to put on it, or change your car tyres, or do home renovations - you are reaping the benefits of a lower cost to customer product, because the manufacturer used cheaper recycled burner fuels made out of used oil," says Nyiba.

The ROSE Foundation has championed the responsible collection of over 1.5 billion litres of used oil in South Africa since its inception 25 years ago. "ROSE has proved that recycling protects the environment, creates widespread employment opportunities and has a knock-on financial benefit for many. All recycling models need to be sustainable and need to work towards a circular economy to be viable in the long term," concludes Nyiba. ❑

The ROSE Foundation has championed the responsible collection of over 1.5 billion litres of used oil in South Africa since its inception 25 years ago.

Stringent new environmental rules target the petrochemical industry

With environmental protection topping the global agenda and the South African Government continually introducing new regulations, producers and handlers of hazardous waste face a period of adjustment and investment to ensure they are compliant, while the waste sector is having to re-think the waste chain in partnership with its clients.

"One of the ways in which this thinking is reframing our attitude towards waste is the need to build an integrated waste cycle – commonly referred to as the 'circular economy'," says Johan van den Berg, managing director of Averda, a leading integrated waste management company with decades of experience in safely handling the most hazardous of waste.

He adds that a successful circular economy designs, manufactures, uses and reuses products for as long as possible. And the ideal scenario is for only truly spent items to be discarded as waste.

This endeavour is taking on greater urgency with the introduction of new proscriptions that prohibit the disposal of hydrocarbon-based materials at local landfill sites.

This could have far-reaching consequences for producers within the petrochemical industry, as significant investment will be needed to ensure their liquid waste is correctly processed.

"The new regulations should be applauded for helping to improve how all waste, but particularly liquid hazardous waste is handled," van den Berg says.

"The more stringent measures will undoubtedly reduce the threat of waste seeping into the natural environment, but in the short term this will require investment to get facilities to the necessary standards."

There are, however, a number of positives to be taken from this new regulatory environment. For one, certain liquid waste can be converted, after processing, into speciality fuels that are of interest to other sectors – such as manufacturing plants that are looking for alternatives to replace the coal used within kilns.

Producing such fuel from waste is no small feat and requires considerable investment to do so in ways that comply with the new Waste Classification and Management Regulations.This is precisely what Averda has done to ensure that selected hazardous waste facilities are able to receive, store and blend hazardous waste sludge (liquids and solids) to produce fuel by-products with the new blending facility.

These high-tech factories are where all liquid waste is blended and transformed into special fuels. "Currently, options like refuse-derived fuel and anaerobic digestion are only available in selected regions, whereas bio-drying and gasification are not available at all," van den Berg says.

"Investing in compliance will drive vital funds into an industry that is plagued by under-pricing – increasing the ability for waste experts to invest in much-needed alternative technologies.

"Our Vlakfontein high-hazardous-class landfill site in the Vaal Triangle is an example of the design and engineering required to meet the standards set in the regulations."

Built at a cost of R250 million, the site has the capacity for six cells that will offer 6.5 million cubic metres of landfill capacity. This will be home to a high-tech blending facility able to process Averda's clients' waste responsibly and to the high standards set in the new regulations. ❑

Population growth presents key opportunity to reinvigorate the waste sector

The UN has estimated that the global population will near 11.3 billion by 2060. Populations in Africa are expected to experience just as much exponential growth. What does this mean for the amount of waste being generated in Africa – do we have what it takes to manage it effectively and what needs to be done to ensure that we don't run into a waste crisis?

With the continent expected to reach a population level of over 2.5 billion by 2050, representing 26% of the world's total population by that time, Kate Stubbs, Director of business development and marketing at Interwaste, says there is no doubt that such growing populations allude to a serious challenge that threatens future resilience and environmental sustainability.

"Whilst growing figures mean solid opportunities for investors and businesses – where Africa hosts the fastest growing consumer market in the world – for the waste sector, it means serious intervention, innovation and management is needed if we hope to see a positive outcome," says Stubbs.

Stubbs further explains that if we consider the world's cities generate 2.01 billion tonnes of solid waste – equating to approximately 0.74 kilograms per person per day– and that annual waste generation is expected to increase by 70% from 2016 levels to 3.40 billion tonnes in 2050, then it's evident that if we continue on the same waste trajectory and mentality we are heading towards an unprecedented waste crisis.

With landfills across the globe already over-capacitated, it is critical for government and corporate South Africa to implement drastic changes wherever possible to divert waste from landfill and make better use of the waste that is generated.

"Looking at this, we have to decide on the most strategic approach to best manage resources and waste and, more importantly, turn waste into a sustainable resource, creating alternatives from existing waste streams to reduce and reuse," says Stubbs.

The circular economy

In Africa we are witnessing a relatively new but emerging concept that promises to address the challenge of waste in an overpopulated world – The Circular Economy.

This model aims to strip out all unnecessary waste materials, energy losses and related carbon emissions across supply chains and – through innovation – promotes closing these gaps to allow materials, energy and resources to be 'fed' back into the cycle. It aims to achieve a more sustainable eco-cycle through long-term design and planning, maintenance, repair, reuse, remanufacturing, refurbishing, recycling and upcycling.

"On a continent that has so much entrepreneurial spirit, as we grow, this model offers significant opportunities to truly deliver on more inclusive economic growth. In fact, through a circular economy we will even start seeing new business streams – driven by innovative ideas," continues Stubbs.

From an industry perspective, we are already starting to witness some strong movement in this direction. Reprocessing industries with a focus on reuse, recycle and repurpose are resulting in businesses taking cognisance of how they make their products sustainably – either through what they put in, or what can be extracted from their waste.

In addition, in cases where recycling and reusing is not possible, there is much innovation in the safe destruction and waste-to-energy space, in waste-to-energy plants, for example.

This is why the local legislation banning of all liquid waste from landfill signals a massive shift in South African waste legislation and places significant importance on the effective management of such waste by waste producers and the waste industry alike. The question is – is South Africa ready to manage this and what is it going to take to do so?

Coping with waste legislation

Over the past several years, new legislation has been developed to improve the disposal of waste to landfill, and more importantly, encourage industry to seek alternative and sustainable solutions. One of the most recent significant developments has been the Department of Environment, Forestry and Fisheries (DEFF) placing a ban on all forms of liquid waste, as well as hazardous waste with a calorific value of >20 MJ/kg from landfill disposal effective as of 23rd August 2019.

With additional waste streams shifting towards this prohibition on an annual basis, it becomes essential that our industry not only embrace this legislation, but also take the necessary steps to comply. These prohibitions seek opportunities for alternative and more sustainable waste management solutions and create a more efficient waste economy in South Africa," says Stubbs.

New liquid waste regulations

Previous regulations state that hazardous liquid waste with high calorific values >20 MJ/kg – such as refinery waste, chemical processed paint waste, hydrocarbon contaminated liquids, sludges and chemical solvents – ought to have been progressively banned from landfills as from August 2017. However, today all liquid wastes will be banned from landfill, as will reactive wastes, recyclable waste oils, whole waste tyres, lamps, lead acid batteries, and waste with a calorific value >20 MJ/kg, amongst others.

Section 5 (1) (a - u), as well as Section 5 (2) (a – c), of the *National Norms and Standards for the Disposal of Waste to Landfill* (GN R 636 of 23 August 2013) provides for a non-exhaustive list of waste types that are prohibited from disposal to landfill in South Africa. The prohibitions and restrictions are indicative of our Government's increasing focus to drive the diversion of waste from landfill through reasonable legislation and other means.

"On a continent that has so much entrepreneurial spirit, as we grow, this model offers significant opportunities to truly deliver on more inclusive economic growth. In fact, through a circular economy we will even start seeing new business streams – driven by innovative ideas," says Stubbs.

Encouraging Innovation

"To best manage the new regulations, it is central for waste producers to understand that not only is there ample room for innovation in this space but there are successful innovations already in practice that are driving legislative compliance," continues Stubbs.

Currently, solutions exist for hazardous liquid waste to be repurposed into an alternative fuel source for energy production. Furthermore, there is an opportunity to start looking at some of these liquid waste streams as valuable resources that can be used to add value into our economy, reducing our dependence of fossil fuels, and be used to re-create alternative products with value.

"While many businesses may not yet have prepared for this new legislative framework, there are already available solutions targeted towards complying with the legislation," says Stubbs.

"Interwaste has spent much time considering and planning for the impact of pending and potential legislation, ahead of implementation, to ensure we are prepared and have developed sustainable solutions that meet the needs of sound compliance, for our clients. We have also developed significant capacity over the years for the treatment, recycling and/or recovery of qualifying wastes at our licensed waste management facilities through the recycling of qualifying liquid and hazardous sludge wastes (with CV > 0 MJ/kg) through our waste blending platform in Germiston, Gauteng, which produces a waste derived fuel (WDF) for use as an industrial fuel."

Waste management is one of the critical elements of sustainable development primarily because sound waste management practices contribute to sustainability. Legislation regulating waste management is an important instrument in the control of environmental hazards to health and creates a reformative system such as the circular economy model which supports integration, as well as innovation, within the waste industry, feeding back into the cycle through long-term design and planning, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling. This offers new business streams and new industries the opportunity to grow.

"As government aims for a circular economy and improving our environmental standards as a country, there will no doubt be further stringent legislation down the line and it is up to us as waste companies to take a proactive approach by seeking relevant investment and technology development opportunities for alternative waste disposal solutions, not only to meet legislative requirements but, very importantly, to find solutions that are commercially viable and provide the producer with environmentally sound alternatives," concludes Stubbs. ❑

Changing the face of cleaning in South Africa

i-team South Africa is ready to 'Inquire, Innovate and Inspire', and change the face of the South African cleaning industry with its 4D REAL Clean approach.

i-team, with the global backing of developers, designs high-end cleaning machines, products and utilities, ranging from scrubber dryers, vacuum cleaners and gum removers, to lighting solutions, microfibre pads and all-in-one cleaning islands. The company has changed the cleaning perspective and outlook on a global scale.

"We can assist in all market sectors with our 4D REAL (Reduce Expenses and Liabilities) Clean approach," explains Henry Posthumus, Ambassador i-team South Africa.

In terms of product offering, the company's main focus in South Africa is its flagship scrubber dryer, i-mop. This relatively compact machine solves problems of floor cleaning systems by combining the flexibility of a floor mop with the power and speed of an industrial scrubber drier. The i-mop family comprises three models – the i-mop Lite, the i-mop XL and the i-mop XXL.

The range cleans up to 70% faster than conventional wet mopping and is easy to use in small areas that don't need an auto scrubber. The i-mop and its ability to get right to the edge and under obstacles means a virtual elimination of manual operations that are required to supplement conventional machine scrubbing.

Outlining i-team's competitive edge, Posthumus says, "We believe in the philosophy of People, Planet and Profit, where we bring the fun back into cleaning and, in the process, save clients money. We look at the total cost of ownership and in the end i-mop doesn't cost, it pays."

To achieve its ambitious target of making up 30% of the South African scrubber dryer market in the next three years, i-team South Africa has partnered with two leading players in the South African cleaning industry. "In Goscor Cleaning Equipment and ITS, we have two major role players in the cleaning industry as our main distributor partners. They will service the whole country, while i-team SA will focus on niche markets in South Africa," says Posthumus. ❑

The i-mop is lightweight, easy to manoeuvre covers more floor area than traditional wet-mopping in the same amount of time.

The proudly South African

MechChem Africa visits the manufacturing facilities of vibrating screen and feeder design and manufacturing specialist, Kwatani, and talks to the company's CEO, Kim Schoepflin and COO, Kenny Mayhew-Ridges.

The publication of the new mining charter last year, has given a clear idea of what the South African Government wants from suppliers into the industry. "Localisation has become a massive drive in the South African mining industry because the new charter has published guidelines for local content that mining-rights holders must achieve," begins Schoepflin.

"While we welcome the initiative in principle, a system for accurately verifying the true value of locally manufactured content in every piece of equipment purchased by a mine or manufactured by a local OEM such as ourselves has not yet been developed or agreed. Anyone can claim to be local and neither the DTI nor SABS has yet managed to get a handle on exactly how to calculate accurate local content values," she adds.

"Let's take a piece of steel, for example," Schoepflin argues. "One has to take at least three steps back to see where its value comes from. Do we go back to where the iron ore was mined? Where it was processed into steel and rolled into bars? Where the screen grid that we might purchase as an input material was manufactured? The history of all this added value has to be accurately recorded to get any real sense of how much of that value originates in South Africa," she tells *MechChem Africa*.

"Without a clearly defined stock coding system for all inputs, we can't easily establish a broadly accepted system to certify the local content value from local manufacturers and suppliers," she argues.

Along with a few other local OEMs, Kwatani is providing input to the DTI as part of a working committee to establish these systems so that it can be done without massive disruption or additional costs. "Coding systems are problematic. Different products and component classes have to be established and categorised and this is a huge task," she says.

"Big companies," adds Mayhew-Ridges, "particularly those that export, tend to have product categorisation in place, but we need to agree on a system that is fair to local manufacturers. Smelters have been withdrawing from South Africa, for example, and if there are no smelters for the castings we need, how can we be penalised for not smelting the steel locally? We find we have to bring castings into the country before adding value. What portion was local and what wasn't?"

"These issues are holding things up a bit, but at the end of the day, they are simply challenges we have to face. At Kwatani, we are at the forefront of ensuring that our needs and the full extent of our local contribution is recognised and accounted for," Schoepflin tells *MechChem Africa*.

Kwatani, she continues, is a local manufacturer of customised equipment that is purpose-designed and manufactured to meet the screening and feeding needs of specific minerals at specific local mines. "There are many variables, so our involvement starts before the design stage and goes through to beyond the operational phases of a project. It is in all of our interests to ensure the real needs of our mines are met.

"We are confident, no matter what verification system emerges, that we will end up as the only local OEM of vibrating screens able to achieve exceptionally high local content values – in excess of 80% by value," Schoepflin reveals.

Mayhew-Ridges continues: "Research and development, laboratory testing, engineering and design are all done locally, while competitor OEMs are mostly foreign-owned and/or manufacture under license from foreign-owned OEMs. No other company of our calibre can supply vibrating equipment based on local intellectual property (IP) and manufactured to the benchmarked global standards we adopt," he says.

"In addition, we are 51% black women-owned, and the women are active in the business, sitting on the committee of OEMs providing the DTI with the insight we need to successfully comply with the new charter," adds Schoepflin.

In addition to manufacturing locally, Kwatani is also proactive about local purchasing wherever possible. "Apart from our unbalanced drives, which have to be manufactured overseas, we are actively engaged in supplier

The assembly floor at Kwatani's Kempton Park facility covered with an array of products on order from gearboxes to motors and screens.

vibrating equipment manufacturer

A Kwatani double deck screen order being finalised for dispatch on the shop floor.

The shot blasting process ready to commence in Kwatani's purpose-built booth. Even the paint specifications come with certificates.

development and support. South Africa does not yet have a local bearing manufacturing industry or the capacity to manufacture vibrating motors to the quality we require, but the designs are ours and we own the IP," says Mayhew Ridges, adding that this is another area Kwatani feels should be taken into account when verifying local added value.

"Many components used in our systems are not convenient for us to manufacture ourselves, such as polyurethane (PU) panels, for example. In sourcing these components, we prefer to support local people and we do not shave input costs by importing low quality materials," Schoepflin continues.

"We see our suppliers as part of our family. Almost all of them have become long-term partners and most are within a 10 km radius of our Spartan facilities. We monitor our suppliers carefully so as to support them in providing exactly what we need in terms of quality and service. This makes us reluctant to switch suppliers as it is a substantial process to get a supplier vetted to our standards. We are happy to switch where we can, but end quality can never be compromised," she explains.

Describing the recent addition of a local foundry as the supplier of housings for Kwatani's exciter gearboxes, Mayhew-Ridges says that three Kwatani EXCO members visited the site as part of the vetting process. "Our head of quality and all those involved in the exciter manufacturing process, including those on the machining side, were involved in developing the castings we needed, which are manufactured in spheroidised cast iron so the metallurgy has to be right. We were there to ensure the processes used and the quality procedures were in place – a test of every melt has to be conducted and the results recorded, for example," he informs *MechChem Africa*.

"While we can often get work done more economically overseas, we prefer to keep control of the process to lower our risks," says Schoepflin. "A container of poor quality castings can be hugely problematic with respect to reputation and mitigation costs," she points out.

She says that when buying an expensive process-critical piece of equipment where downtime directly affects production volumes, one needs a supplier that is not simply ISO 9001:2015 certified.

Quality management standards are not designed to pick up individual quality issues

Specialised welding is an integral part of the fabrication and assembly process at Kwatani.

on a piece of equipment so in addition to its ISO 9001:2015 certification, Kwatani does extensive testing on its screens and its feeders and their individual components. "We do magnetic particle testing on our welds, for example, and we use third-party inspection personnel to independently verify the structural integrity of our systems. Each system is fully certified according to our quality certification programmes (QCPs) and even the paint specifications come with certificates," Mayhew-Ridges notes.

"Every manufacturing and testing step is traceable back to the person responsible and every non-conformance and the procedure adopted to overcome it is drawn to the attention of senior management. This helps us to resolve issues quickly and, if systemic, we permanently adjust our processes to prevent reoccurrences," he says.

"We will not give a process guarantee unless we believe the equipment we have supplied can do the job. We frequently find ourselves in competition with companies supplying, for example, a screen we believe to be inadequate for the job. A larger and more robust unit that can reliably perform at the higher G-force required is likely to be more expensive, but at times cost-sensitive projects based solely on minimising capex will seldom take this into account.

"When looking at critical vibrating equipment such as screens and feeders, the total cost of ownership is what really matters and, as our history proves, one of our custom designs will be much more efficient and cost-effective over the equipment lifetime than a cheaper off-the shelf, misfit," Schoepflin concludes. ❑

Black industrialist company takes off in composites industry

A R50 million composites manufacturing facility owned by BFG Africa was recently opened in Germiston, Gauteng and is expected to boost Africa-wide environment-friendly composite fibreglass design and manufacturing.

The 9 500m^2 factory, the first of its kind in South Africa, produces materials made of fibre-reinforced plastic (FRP) for applications across the infrastructure, mining, automotive, transport and architectural sectors. The materials are particularly durable, lightweight and environmentally friendly.

BFG Africa is the pan-African subsidiary of one of the largest and oldest diversified composites manufacturers in the world, BFG International. The company is majority black-owned, with 51% acquired in June 2018 by the Mergence group, a diversified financial services group founded in 2014.

"Currently 27 people are employed by BFG Africa, 18 of whom underwent extensive training in Bahrain. The company is well positioned to benefit from the roll-out of transport infrastructure and rolling-stock (interiors and claddings), renewable energy projects (composite-based wind turbines), and automotive projects, "says Dr Samer Aljishi, Group President of BFG International.

As an initial contract, entered into with the Gibela Rail Transport Consortium, BFG Africa will clad the interiors of a fleet of 600 commuter trains that will be supplied to the Passenger Rail Agency of SA (PRASA) over a 10-year period. The first delivery on this project was met in May 2019.

BFG Africa is also working on an affordable emergency housing solution, whereby lightweight collapsible structures can be transported and erected within hours to disaster areas.

"The factory is regarded as one of the best of its kind in the world, with state-of-the-art equipment, including several specialised presses. The manufacturing processes include tooling, open contact moulding, resin transfer moulding, painting, SMC material production, SMC press moulding, vacuum infusion, assembly and product integration," says MD of BFG Africa, Arshad Gove.

"Composites fibreglass has replaced conventional materials in locomotive, buildings and specialised applications. As a 'material of the future' it has an imprint in many developed nations and we are excited to be leading the charge with applications in Africa in areas of architecture, rail & transport, wind energy and housing, amongst others," adds Gove.

Did you know composites are green?

- Composite manufacturing consumes very little energy and thus has a low carbon footprint.
- Composite manufacturing does not generate any greenhouse gases or fluorocarbons.
- Composites use glass made from silica, which is an abundant natural material, as a key component.
- Composites are the preferred material among architects, designers and developers due to a higher degree of flexibility, a higher durability and lower life cycle cost than traditional materials used. ❑

The factory is regarded as one of the best of its kind in the world, with state-of-the-art equipment, including several specialised presses.

SAISC leads steel industry towards female future

It has been said that a country that does not fully exploit the potential of women is only using half the nation's intellectual capacity. With the Women in Steel event, the SAISC seeks to show its commitment to encouraging women to be proactive and contribute to the industry and the global market.

This year's Women in Steel event had all levels of the industry attending, from shop floor level all the way up to management.

"The steel industry, like many other 'heavy' industries is still seen as male-dominated, even though we have many women in different professional capacities and roles doing great things in steel. The Southern African Institute of Steel Construction (SAISC) is determined to challenge the perception that the steel industry is a club for men alone," says SAISC CEO, Paolo Trinchero. "We need to acknowledge and celebrate our talented and capable women in steel," he asserts.

SAISC has a vision of 50% female representation on its board and is proud to lead the way with its first female Chairwoman, Nicolette Skjoldhammer. The inclusion of women, SAISC believes, is a catalyst for change and will ultimately boost industry transformation and growth.

"The event is a great opportunity where women can connect with and inspire each other, share vital skills and tips on expanding their influence within the sector, and advocate for greater career success," explains SAISC corporate marketing and events manager Liezel Weber.

"The first Women in Steel event was held last year, where we had over 80 women join us – the response was amazing. This year's event was no different and we had the support of our first-ever event sponsors, Stewarts and Lloyds and ProRoof, who are just as passionate about this event as we are," she adds.

As part of its 2019 marketing campaign, the SAISC has adopted the slogan 'See Yourself in Steel'.

"For the steel ecosystem to thrive, everyone has to step up and new ideas and ways of doing things need to be embraced. There are no small roles. We believe that the SAISC's drive to encourage and foster more inclusive representation throughout the steel sector is integral to positioning the entire industry for success," says SAISC marketing manager, Denise Sherman.

"In an industry context, 'See Yourself in Steel' is about recognising and being proud of the part you play in the story of South African steel, and our Women in Steel event speaks to and links directly with that messaging," she concludes.

The speakers at this year's event included women with direct industry experience, who have carved their way into leadership roles in a male-dominated industry. They provided insights to women in the industry, about how to stand out and get a seat at the 'table'. ❑

AVK Academy gains traction in Africa

The Academy, the training arm of AVK Southern Africa, has taken the Group's training into Africa. With training on Basic Valve Fundamentals and Advanced Valves recently concluded at Mulonga Water and Sewerage Company in Zambia, the Academy is now looking into making training appointments in Lesotho, Mozambique and Botswana for the remaining year. Training in Malawi is planned for 2020.

Each training module, which consists of two days comprehensive training, is ECSA-accredited (Engineering Council of SA) and worth two CPD points for candidates who achieve the 85% pass rate or higher. The Valves Fundamentals Course provides an introduction to essential knowledge of valves in both theory and practice; while the Advanced Valves Course provides greater insight into principles and practices that address the theories of fluid pressure, fluid flow and field applications.

"There are some fundamental differences between local training and training in Africa," explains Academy facilitator Roelf Frauendorf. "When conducting training locally, candidates have time for practical experience between the Fundamentals and Advanced courses, whereas overborder, the courses run back-to-back." He adds that another difference in training, which also impacts local companies opting to have training at their premises, is the lack of the practical aspect.

The AVK Academy Course graduates from Mulonga Water and Sewerage Company pictured with Academy Facilitator Roelf Frauendorf (back left).

The Academy's facilities include a flow lab which demonstrates the flow of water through a series of valves. Being onsite, candidates physically handle the valves on which they are trained. Frauendorf says that for offsite training, in lieu of available equipment, more discussion is given to the practical aspects of the course. "We include a lot more visuals and spend more time on typical examples," Frauendorf explains. "Many of these result in in-depth discussions with no time restrictions. The resultant interactive Q&As often lead to other discussions on the subject. Upon course completion, all externally trained candidates are as competent with AVK's product range as those who come to the Academy."

Beyond completion of the training programme, AVK Academy personnel continue to provide their knowledge and advice when required.

www.avkvalves.co.za

An acquisition with good chemistry

Already a market leader in separation and mixing technology, Sulzer has further extended its petrochemical process capability with the purchase of the US-headquartered specialist, GTC Technology. The move adds a range of licensed technologies and additional engineering resources to Sulzer's existing process plant design, construction and commissioning capabilities, to provide an outstanding offering to process industries worldwide.

The acquisition holds the potential for Sulzer to consolidate its already industry-leading role in process technologies.

With this significant acquisition, Sulzer Chemtech is consolidating its role as a petrochemical process technology provider. Adding to the company's capacity to design and deliver a broad range of offerings from refinery column internals to complete bioplastic (PLA) production plants, the new expanded business increases Sulzer's capability into much wider territory. The complementary scope of GTC's expertise pushes Sulzer Chemtech further into technology licensing for the refinery and petrochemical industry, including complete engineering packages, proprietary equipment, and the supply of chemical solvents and catalysts.

The reliable performance of refinery and petrochemical plant facilities is vital to an industry that is determined by global fluctuations in crude prices. Strategic investment is critical in overall profitability as an efficient plant can offset extreme market deviations. Finding trusted partners to supply dependable technology in any part of the world is essential to refiners and petrochemical companies.

www.sulzer.com

Grating and handrailing beat corrosion in wastewater industry

Wastewater travelling through sewer lines can become anaerobic or septic as a result of the metabolic processes of microbes commonly found in the wastewater. Specific sulphate-reducing bacteria thrive in these conditions and generate hydrogen sulphide (H_2S) as a by-product of their respiration.

H_2S has a low solubility in wastewater and when it escapes from the wastewater and moves into the air, it is easily recognised by its characteristic offensive, rotten egg odour. It can also be responsible for severe corrosion problems and toxic conditions within wastewater conveyance and treatment facilities.

Andrew Mentis produces a range of corrosion-resistant floor gratings as well as handrailing systems in galvanised, 304 stainless steel and 3CR12 options that are ideally suited to the extreme conditions found in wastewater treatment plants. The Mentis grating is engineered to suit situations where strength to weight ratio is important, such as wastewater treatment plants, while the Mentis handrailing product is designed for optimum safety.

Lance Quinlan, national technical sales consultant at Andrew Mentis, explains that the water and wastewater industry often creates a slippery environment for operators and technicians. "Vapours, water and chemicals create slick underfoot and handhold conditions near large machinery and tanks," he says.

"Weakened handrailing and floor grating, caused by corrosion and damp, can result in slips, trips or falls, so safety is paramount in this type of environment.

"In addition, replacing broken or corroded handrailing or floor grating results in unnecessary downtime which can impact negatively on productivity," Quinlan adds.

Mentis' Rectagrid RS40 40/40 floor grating is manufactured using a pressure locking system pioneered by the company. The locking characteristics guarantee the structural integrity of the product and further enhance its integrity in a corrosive environment.

Mentis stainless steel tubular handrailing is reputed for its corrosion and stain resistance qualities. The stanchion base plates are designed to allow moisture to drain from the stanchion itself, adding further credence to its corrosion-resistant benefits. ***www.mentis.co.za***

Mentis floor grating and handrailing meet the arduous requirements in the WWTW sector.

ATI acquires De Beers' training campus in Kimberley

The Artisan Training Institute (ATI) has recently acquired the De Beers' technical training campus (DBTTC) in a transaction that will bring new economic activity to the Northern Cape province.

As one of the leading technical training institutions in South Africa, ATI is strongly positioned to develop the DBTTC, ensuring an increase in the throughput of trained artisans in the region, and the future operation of the facility.

Sean Jones, managing director of ATI, says the acquisition of the new campus will play a critical role in reigniting opportunities for youth in the Northern Cape.

"We are delighted that the De Beers group has put its trust in ATI to continue the excellent track record of producing skilled artisans at an internationally accredited level at the campus," says Jones.

ATI has been working closely with government and private sector partners to expand its technical training offering to create new pathways for youth entering the job market. Subsequently, the institute has outlined plans to implement youth development initiatives as part of the transaction.

ATI plans to roll out the IRM programme at the Kimberley facility.

ATI has successfully piloted a mid-level skills programme for Harambee, a leading non-profit organisation focusing on creating livelihoods for youth. The Installation Repair and Maintenance (IRM) programme bridges the gap between engineering theory and work readiness. ATI plans to roll out the IRM programme at the Kimberley facility.

"This approach creates new revenue streams for the centre, making use of some of the vacant workshops and bolstering its corporate social responsibility commitments within the Northern Cape," says Jones.

The 34 hectare campus area comprises an electrical, fitting and turning, plater, diesel mechanic and control, and instrumentation section that can accommodate up to 240 learners. The facility can also provide student lodging in a 1.9 hectare accommodation section.

Since 2008, ATI has qualified more than 17 000 artisans in various engineering trades. Its vision is to be the leading technical training provider for aspiring artisans in the engineering sector, broadening its services across South Africa, and Sub-Saharan Africa.

"The acquisition of the De Beers technical training campus brings us another leap forward in fulfilling our promise of providing quality technical skills development at an international standard across South Africa. It adds substantially to our current training capacity that includes a campus in Gauteng and Kwa-Zulu Natal," Jones concludes.

Fast Facts

The training facility is an accredited provider with the following institutions:

- QCTO and National Artisan Moderating Body (NAMB) – Artisan Skills Development Provider and Trade Testing Centre for the country
- South African Marine Safety Authority – Engineering Marine Cadet workshop programme
- ISO 9001/2015 certification – Quality assurance

The following SETAs are utilised:

Mining Qualification Authority (MQA), Energy and Water Sector Education and Training Authority (EWSETA), the Manufacturing, Engineering and Related Services Sector Education and Training Authority (merSETA) and the Local Government Sector Education and Training Authority (LGSETA)

The training facility comprises workshops that provide training in the following trades:

Auto Electrician, Diesel Mechanic, Electrician, Fitter and Turner, Fitter including Machining, Instrument Mechanician, Millwright, Plater Welder/Boilermaker.

sjones@artisantraining.co.za

Compact IR camera with industrial accessories

COMTEST – local representative of global leader in infrared camera technologies, Optris – has announced an addition to the IR Compact Line, the Xi 80 and Xi 400, now with new industrial accessories for use in rough conditions. The system has a modular design and as a result, the water-cooled housing, the air purge unit and the shutter can be used individually or combined.

The shutter mechanism protects the high-quality IR camera optics

The stainless-steel shutter is generally used to protect the optics from contamination and foreign objects. This is particularly important when the infrared camera measures upwards and the measurement objects are above it, such as in the glass industry. With a response time of just 100 ms, the IR camera is optimally protected from falling broken glass. Furthermore, the shutter can be used in intermittent processes so that the optics are exposed to environmental conditions only during the measurement process.

The stainless-steel shutter is generally used to protect the optics from contamination and foreign objects

Temperature measurement in rough conditions

A stainless-steel, water-cooled housing and an air purge collar made of anodised aluminum are available so that the compact infrared camera can be used in rough conditions in the industry. Cooling allows for use in hot environments up to 250°C. The air purge unit protects against air particles and prevents condensation on the optics. It can be screwed on in 4 positions, allowing the air flow to be customised for the application. Integrated into the air purge unit is a silicone window that can be replaced without complex assembly steps if it suffers mechanical damage.

sales@instrotech.co.za

Autobax celebrates 50 years of business

Autobax, which was established in 1969 as a modest engine parts agency selling mainly pistons, was the first acquisition of Arnold Goldstone, CEO of Invicta Holdings Limited in 1995.

It now forms part of the Engineering Solutions Group (ESG) business segment of Invicta Holdings and has expanded its operation significantly, to become a leading supplier of automotive products and services to vehicle manufacturers and the automotive aftermarket in sub-Saharan Africa, explains John Black, managing director, Autobax.

"Autobax, which has been the preferred Gates service provider locally for over 35 years and the sole country-wide distributor of the Gates range of automotive timing components, is also the exclusive kit packer for Timken products.

"The company's extensive range of quality-branded automotive parts encompasses oil pumps, timing chain, bearings and allied products – supplied by leading manufacturers, including MRK, NTN, Europart, STC and NSK," he adds.

An exciting development for Autobax was the introduction in May this year of the latest APG brand, AGRI PARTS GLOBAL. This specialist range augments the company's world-class offering to the agricultural market, both locally and internationally. ***www.autobax.co.za***

Quality-branded automotive parts include oil pumps, timing chain, bearings and allied products, supplied by leading manufacturers, including MRK, NTN, Europart, STC and NSK.

Responsible investing for BMG

The Engineering Solutions Group (ESG) of Invicta Holdings has incorporated Gem Tool – previously part of the Mandirk Group – into its engineering consumables division, BMG.

This development is a positive move for both companies and for the tools and equipment business, which will benefit from the combined services of two streamlined organisations.

"As part of this re-structure programme, all Gem Tool customer and supplier trading activities will be integrated into BMG in Pretoria," says Wynton Robinson, national sales manager at the Mandirk Group. "The Gem Tool team is excited to be part of BMG. We are confident that with access to BMG's central support functions, including engineering, technical expertise and manufacturing skills, we can further improve our service to our loyal customer base.

The Gem Tool product range and associated technical expertise are a natural contribution to the BMG offering. Complementary products include specialised tools and testers, lifting equipment and certification, welding consumables, PPE, specialised locks and lockout devices, machine tools for workshops and associated blading, cutting and grinding tips. The Gem Tool sales team will also transition into BMG Pretoria to ensure continuity for customers.

www.bmgworld.net

Upside down bandsaw for 3D-printed titanium shafts

To save time and costs during the production of aircraft components, Airbus Helicopters, which is headquartered in Bavaria, has recently turned to additive manufacturing. After manufacturing the titanium components in a 3D printer, the next step is to separate them from their baseplates, which is done using a fully automatic KASTOwin amc bandsaw.

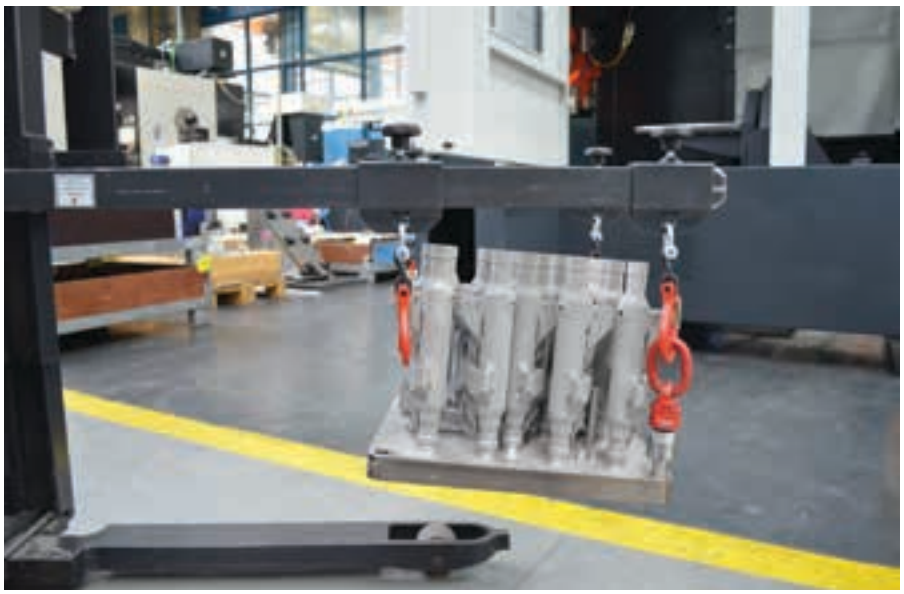
There is barely any other sector that takes the issue of lightweight construction as seriously as the aviation industry – and with good reason. Every gram that can be trimmed off an aircraft's weight helps achieve considerable long-term fuel savings. This benefits both airlines and manufacturers, who are able to compete for orders by offering ever more lightweight constructions. However, aircraft components not only have to be light; they also have to be stable and absolutely reliable. That is why special high-tech materials and innovative manufacturing methods are becoming increasingly widespread in their production.

Airbus Helicopters is also consistently searching for innovative lightweight construction solutions. The company, which has its head office in Donauwörth in Bavaria, is part of the Airbus Group, Europe's largest aviation and aerospace company. The site, which has a workforce of approximately 7 000 employees, not only develops and produces a range of helicopter models such as the H135 and H145, it also specialises in the manufacture of aircraft doors. In Donauwörth, Airbus Helicopters manufactures more than 4 000 passenger and cargo doors every year.

Layer by layer: manufacturing 3D-printed components

Recently, Airbus has been using an additive manufacturing process to produce shafts for locking these doors. The titanium components are created in a 3D printer, which applies layer after layer of the powdery input material to a baseplate measuring 400×400 mm. The fact that the walls of the shaft are so thin and that the component's geometry is complex makes this manufacturing method particularly suitable. It cuts production costs as well as work and effort, which is most important since 16 of these components are installed in every A350. The 3D-printing process enables total saving of slightly more than 4.0 kg per aircraft.

When the printing of the components is finished, they must be separated from the baseplate, which is also made of titanium. To perform this process, Airbus has invested in the KASTOwin amc fully automatic bandsaw. The KASTO machine has been in operation in Donauwörth since October 2018. What makes it so special? It has been specifically designed for the machining of additively manufactured parts, most notably, separating the parts from the base plate.



After 3-D printing, the base plates, together with the additively manufactured shafts, are transported to the bandsaw using an electric forklift truck.

The titanium plates and components are then placed on the rotating clamping mechanism and attached using thick screws.

Sawing upside down prevents damage

An employee uses an electric lift truck to remove the baseplate and shafts, which can weigh up to 40 kg, from the 3D printer before transporting the workpiece to the saw and placing it on the clamping mechanism. Here, the plate is fastened in place extremely securely with thick screws and the machine is sealed so no fine dust can escape.

What happens next is rather unusual: the entire mechanism rotates through 180° in preparation for the sawing operation. The components are therefore sawn upside down. This concept offers considerable advantages for additive manufacturing. While being cut, the parts cannot topple over or buckle, which prevents damage that could lead to time-intensive rework and expensive scrap levels.

Before the sawing operation begins, the employee measures the thickness of the clamped baseplate and enters this using the job wizard of the machine's AdvancedControl control system. The saw, which is equipped with a high-precision ball screw spindle drive, then moves to the exact height required. Because the plates can be reused many times and are ground flat again after each operation, they become thinner the more they are used.

The intelligent control system makes it possible to saw the parts precisely to the corresponding dimensions for each individual operation. This reduces reworking effort and saves material – a cost factor that cannot be underestimated when working with a material such as titanium.

Fully sealed enclosure protects users

When cutting is complete, the shafts fall into a container specially provided for this purpose.

It is padded to prevent damage. The operator the shafts through a flap so they can be passed onto the next machining step.

The KASTOwin amc bandsaw is fully enclosed to prevent ambient air from becoming contaminated with tiny particles, which are detrimental to health and may arise during the machining of additively manufactured components. The machine also comes ready to be connected to an extraction system. It therefore complies with the most exacting requirements regarding occupational safety and operator protection.

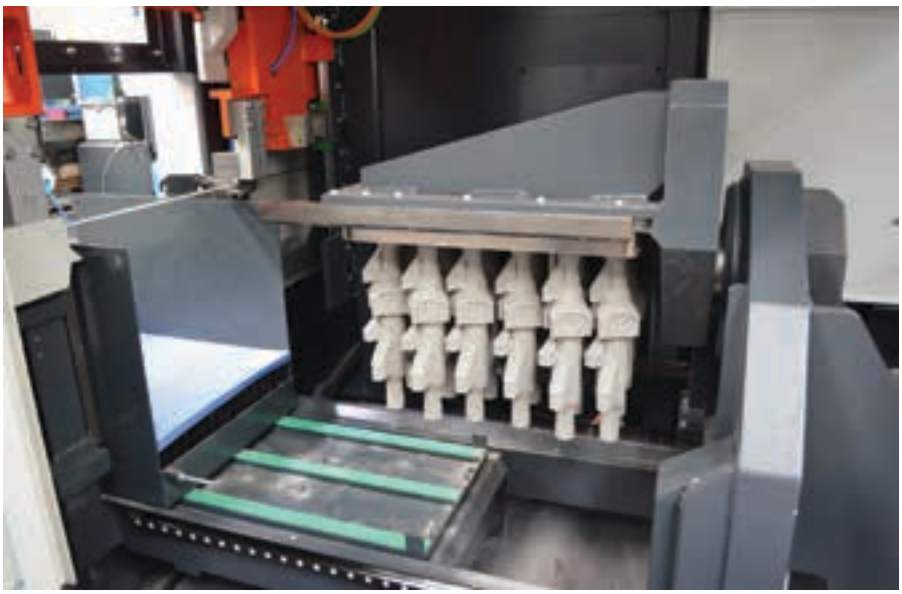
Before opting for the KASTO machine, Airbus's decision-makers conducted a number of trial cuts at the saw technology specialist's premises at Achern in Baden-Wuerttemberg and were very impressed by the results. Sawing the titanium plates proved to be significantly more cost-efficient than alternative machining methods such as milling or electrical discharge cutting.

Compared to other plant and machinery in the giant factory hall, the KASTOwin is also extremely compact and space-saving. It is easy to use and is appreciated for its short cutting times and the outstanding results it achieves.

For Airbus, the changeover to the 3D printing process and the acquisition of the KASTOwin amc have already paid for themselves: The shafts, which are now widely used to lock aircraft doors, are between 45% and 25% more economical to manufacture than conventional components.

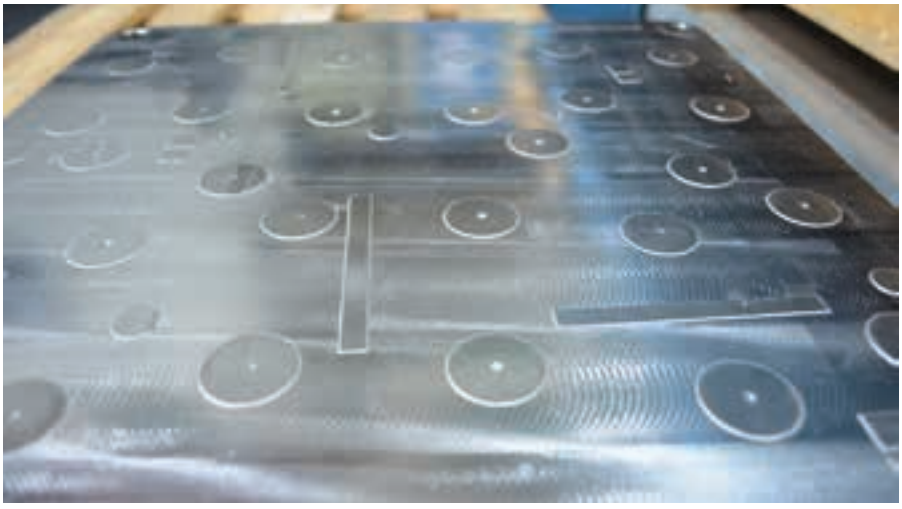
Airbus Helicopters currently manufactures approximately 2 200 of these titanium components at its factory in Donauwörth. The additive manufacturing of other components is also planned for the future – meaning that the KASTO saw will play an even more prominent role in the production process. ❑

Photos courtesy: KASTO Maschinenbau GmbH & Co. KG.



Sawing is performed using the KASTOwin amc with the workpieces upside down. This prevents damage to the expensive components from toppling or buckling while being cut.

The operator measures the thickness of the clamped baseplate and enters its exact value using the AdvancedControl's job wizard. The top part of the saw, which is equipped with a high-precision ball screw spindle drive, then moves to the exact height required for cutting.



The titanium baseplates are reused many times, becoming thinner with each use. The accuracy of the KASTOwin amc bandsaw enables the titanium shaft components from the 3D printer to be separated from their baseplate with minimum waste while avoiding any damage to the expensive components and maximising the life of each baseplate.

Smallest personal computer developed by South African innovators

Two young South African innovators have set their sights on disrupting modern day computing by building the world's first personal computer (PC) with virtual input and output peripherals.

In a move set to enhance the mobility and usability of computing devices in areas where connectivity is an issue and electricity supply is limited, two South African innovators have created a PC that does not require a physical keyboard, mouse or monitor.

Necessitated by the need to digitalise and improve accessibility of technological gadgets in rural areas, Luyanda Vappie from the Eastern Cape and Motsholane Sebola from Limpopo came up with the idea two years ago.

The device, called Prism, is a world first in that it is a personal computer that has a virtual keyboard and mouse as well as a virtual screen. Prism aims to enhance digital skills by improving the accessibility of digital literacy tools.

A small compact unit that produces around 2 Ghz of processing power, the PC has bluetooth, wireless, LAN and a battery that lasts about two hours. The on-board memory is 64 GB and is extendable by SD Card to 200+GB.

Vappie and Sebola grew up with particular interests in software engineering, systems development and business analysis. They both studied Information Technology at university level where they had visions of becoming the best technology developers in the country, making smart technologies accessible to ordinary South Africans.

"It has always been our dream to improve our country, especially the rural communities. Technologies need to be usable and accessible in areas where electricity is limited," says Vappie.

He adds that Prism will change the way people think about computers. "It is portable and can be used anywhere and at any time. Our aim is to deploy it at schools in areas with low connectivity and ensure that the curriculum is available offline," he says.

"We have several models that include tooling, up-skilling and employment of local resources to support devices deployed at schools. We are excited to contribute to the realisation of the United Nations Sustainable Goal for Quality Education and have been invited to speak at a United Nations conference on how technology can contribute to the Quality Education SDG," says Vappie.

Sebola adds that Prism represents the future of computing, saying that the fourth industrial revolution presents an opportunity for young people to be innovative.

Luyanda Vappie from the Eastern Cape and Motsholane Sebola from Limpopo came up with the idea two years ago.

"What we have essentially done is create virtualised components for input and output devices and in a compact unit that can be used anywhere. An all in one solution that incorporates virtual input peripherals and display in a single convenient package, it is highly interactive and usable in urban and rural environments."

The duo's future plan is to successfully commercialise the product and build a manufacturing facility in South Africa that will create more engineering jobs for young people, especially those in the rural areas. The two now own a company called Root Tech, an African original equipment manufacturer (OEM) based in Johannesburg and working in the consumer electronics market. ❑

Innovations and know-how for optimised processes for deburring and surface finishes

At the Deburring EXPO from 8 to 10 October 2019, over 170 exhibitors will present innovative and advanced technologies, products and services for these quality-critical production steps. This range of exhibitors is complemented by an attractive frame programme with theme parks, research pavilions and a bilingual expert forum.

"This concentration of technologies, services and providers in a focused framework enables visitors to have a kind of overview that would not be possible at any other fair," says Hartmut Herdin, CEO of fairXperts GmbH & Co. KG and organiser of the Deburring EXPO.

Over recent years, deburring and surface finishes have become critical factors for quality and a company's competitiveness. An indicator of this is that providers of these solutions are becoming benchmark partners for production companies that are involved comparatively early in the product development phase or optimisation process.

Industry get-together presentation of numerous innovations

This is evident when you look at the large number of new and advanced technologies, products and processes that will be shown in all exhibition areas at the Deburring EXPO this year. "These include innovative machines for fully-automated deburring and cleaning of components within a single process – for high-pressure water processes as well as for ultrasonic, or dry with CO_2snow. Visitors can also expect novelties in the areas of electro-chemical (ECM) and thermal deburring machines (TEM), as well as the deburring and processing of thin and thick metal sheets.

Work steps in the process chain of metal sheet deburring

The highlights of this year's Deburring EXPO include the theme park process chain metal sheet deburring. In this event space, which was jointly initiated by experts and market leaders in the industry, various technologies and downstream processes are shown in addition to the production steps such as degreasing, removal of oxide layers, deburring, chamfering and surface finishing, originally attributed to metal sheet deburring. "All steps of this process chain will be demonstrated live on a sample part. This makes the theme park a unique performance show we have never seen before", adds Hartmut Herdin.

Deburring EXPO
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