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VEGAPULS 21: simple, non-contact level measurement

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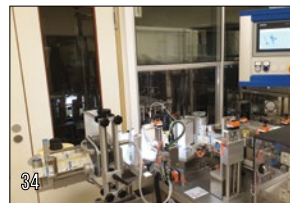
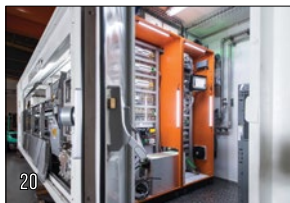
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CROWN PUBLICATIONS

Published bimonthly by
Crown Publications (Pty) Ltd
 Cnr Theunis and Sovereign Streets
 Bedford Gardens 2007
 PO Box 140, Bedfordview, 2008
 Tel: +27 11 622 4770
 e-mail: mechchemafrika@crown.co.za
 www.mechchemafrikamagazine.co.za

Editor: Peter Middleton
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 Advertising: Elmarie Stonell
 e-mail: elmaries@crown.co.za
 Design: Katlego Montsho
 Publisher: Karen Grant
 Deputy publisher: Wilhelm du Plessis
 Circulation: Brenda Grossmann

The views expressed in this journal are not necessarily those of the publisher or the editors.



Transparency You Can See
 Average circulation
 Jul to Dec 2021: 8 042

Printed by: Tandym Print, Cape Town

Front cover: VEGA Controls SA
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 www.vega.com/en-za

WATER, WASTEWATER AND PUMPING SOLUTIONS

- 6 Pumping systems 101: Advantages and pitfalls of VSDs
 TAS Online pump expert, Harry Rosen explains the scenarios where variable speed drives (VSDs) are an excellent choice for realising substantial energy saving and those where a VSD will not improve energy efficiency or pumping performance.
- 10 Locally built diesel pumps for every application
- 11 Merits of mechanical and digital dosing options
- 12 AQS: premium quality pumps for seamless onsite operations
- 13 Envirotech® pumps popularity continues in Africa

POWER TRANSMISSION, BEARINGS, BUSHES AND SEALS

- 14 Industrial conveyor chain for special applications
 BMG's comprehensive range of power transmission components incorporates ZMC industrial conveyor chains that offer dependable service in diverse applications, especially for use in food production.
- 17 CAE at Bonfiglioli: an engineering service for special needs
- 18 Customer standardises on SKF bearings and grease
- 19 Rising electricity price drives demand for higher-efficiency motors

MINERALS PROCESSING AND MATERIALS HANDLING

- 20 Ignite: Imagine the future and bring it to life
 De Beers Group Ignite™ is now a unified global innovation arm for the De Beers Group, tasked with spearheading corporate and technology innovation initiatives. *MechChem Africa* talks to Sarandos Gouvelis, head of Incubation, and Gordon Taylor, head of Commercial Technologies.
- 22 Rubber lining protects equipment against wear, but choose carefully
- 23 West Africa opportunity for pioneering cement technology
- 24 New iron ore mine added to Kwatani's footprint
- 26 Testing at Multotec improves manganese recoveries

HYDRAULIC, PNEUMATIC AND COMPRESSED AIR SOLUTIONS

- 28 Add-on CTS services for air compressors
MechChem Africa talks to Ian Ainsworth, of Atlas Copco Compressor Technique Service (CTS), about the company's advanced add-on services for value, efficiency and reliability.

POWERGEN, PETROCHEM AND SUSTAINABLE ENERGY MANAGEMENT

- 30 Zest WEG delivers its biggest mobile substation yet
 Zest WEG has custom designed and manufactured a mobile substation solution for Guinea – its biggest such mobile unit yet manufactured in South Africa. The innovative 50 MVA substation for the Utility Company of Guinea delivers both emergency and standby power.
- 32 BMG World Goes Green

AUTOMATION, PROCESS CONTROL AND CAE

- 34 FHV7 smart camera delivers reliable GMP-compliant drug labelling
 Steierl-Pharma, a pharmaceutical company from Bavaria, has modernised its labelling processes with an inspection system based on the OMRON FHV7 smart camera.
- 36 MOVI-C: the all-in-one modular drive automation solution

INNOVATIVE ENGINEERING

- 42 The Trial Reservoir: accelerating the pace of water technology adoption
 Xylem, in partnership with water consultancy Isle Utilities, has introduced an industry-first approach to funding and scaling for breakthrough water technologies. Called The Trial Reservoir, the initiative will tackle the pace of technology adoption.

REGULARS

- 2 Peter's comment: War in Europe: a major global challenge
- 4 On the cover: Compact VEGAPULS 21 overcomes chromium overflow risk:
 Laurent Roumieux of ENGIE Solutions talks about why his company chose the new VEGAPULS 21.
- 38 Products and industry news
- 44 Back page: Modular wastewater plants ideal for African Mines

War in Europe: a major global challenge

Peter Middleton

COMMENT



In my comment for the January-February issue, I quoted the WEF's Klaus Schwab's introduction to Davos 2022: "... major global challenges await us, from climate change to rebuilding trust and social cohesion. To address them, leaders will need to adopt new models, look long term, renew cooperation and act systemically," said Schwab. The very noble Davos agenda aimed to highlight and promote issues such as sustainability, governance, collaboration, impacts on our planet and the prosperity and wellbeing of employees and communities.

Then on February 24, Russia began an open military invasion of Ukraine and, while this war actually began in 2014 when Russia annexed the Crimean Peninsula from Ukraine, this escalation is disrupting the World order in ways not seen since World War II.

The destruction of Ukraine's cities: most notably Mariupol and Kherson in the South, Kharkiv in the East and the capital, Kyiv, is being broadcast to horrified viewers across the globe. City power plants, oil depots, bridges, airfields, factories and residential areas and even the decommissioned Chernobyl nuclear plant have been (and continue to be) shelled – while the outside world looks on in helpless horror.

How quickly humanity descends into mindlessly trashing our world. Apart from the personal tragedies of millions of directly affected people and the destruction of the environment that must be making the likes of Greta Thunberg weep with frustration, the economic repercussions are likely to affect almost everyone on the planet.

Due to effects of sanctions against importing Russian oil and gas on global markets, prices are soaring, which is already having an impact on the petrol prices at pumps and on fuel gas prices for those, particularly in Europe, using piped gas for heating their homes. Petrol prices in South Africa are already over R21/ℓ and are predicted to potentially hit R40/ℓ by April. In the UK, prices have already reached £1.60/ℓ – over R32/ℓ.

But Europe's dependence on directly piped Russian gas is causing even more alarm. Germany, as consequence of aversion to nuclear power and championing renewable energy, imports Russian gas to meet nearly a third of the domestic heating needs of the German population. Nord Stream II, the now complete €10-billion pipeline project to carry gas from the Russian coast near St Petersburg to Lubmin in Germany has now been 'frozen' by Germany as a result of the war. In addition, Europe as a whole has committed to reducing its dependence on gas from Russia by two-thirds by the end of 2022 – and entirely by 2030.

Meanwhile, however, there is the uncomfortable sense that the rising prices European importers are paying are helping Russia to fund its war.

Africa's response? No African country has yet declared direct support for the Russian invasion. South Africa, a member of BRICS with strong economic ties to Russia, has called for the immediate withdrawal of Russian troops from Ukraine, saying the dispute should be resolved peacefully. "Armed conflict will no doubt result in human suffering and destruction, the effects of which will not only affect Ukraine but also reverberate across the world. No country is immune to the effects of this conflict," reads the formal South African government statement.

With South African investments in Russia amounting to nearly R80-billion and Russian investments in South Africa total around R23-billion, Cyril Ramaphosa is, undoubtedly, in a difficult position. South Africa recently abstained from the UN vote condemning Russia's military invasion of Ukraine. Explaining his reasons, Ramaphosa said the resolution failed to include a call for meaningful engagement. "In a world where far too many disputes between countries are settled through the barrel of a gun, South Africa expected the UN to call for peaceful negotiations," he said.

Martin Kimani, the non-permanent member for Kenya on the UN Security Council, was a little more critical: "The territorial integrity and sovereignty of Ukraine stands breached. The charter of the United Nations continues to wilt under the relentless assault of the powerful," he said.

In terms of damage limitation, it seems more obvious than ever that the world needs to urgently reduce its dependence on oil and gas, particularly imports. New technologies such as green hydrogen could – and should – play an increasingly important role, with the levelised cost equations becoming increasingly favourable as oil and gas prices rise.

Also, though, there may well now be better business case arguments for investments into more of the African continent's oil and gas resources: to reduce our dependence on imports, volatile prices and exchange rates, and uncomfortable political compromises.

This war, like all others, will impair the quality of life for a majority of people across the world. The input costs for businesses and industrial plants will increase. We all need to tighten our belts, use more efficient technology and adopt every lean, circular and sustainable strategies we can to minimise its impact.

"Major global challenges" are certainly awaiting us!



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Compact VEGAPULS 21 overcomes chromium overflow risk



Belgian company, ENGIE Solutions, specialises in industrial wastewater treatment for reuse as drinking or process water. A large engineering company in the Liège region of Belgium asked ENGIE for help with its fluid treatment plant, which was taking care of the treatment of wastewater and other fluids from various processes.

An especially difficult challenge was the chromium-containing wastewater coming from a process for treating the surfaces of metal parts. The chromium in the chromic acid solution first had to be extracted from the wastewater before the wastewater was sent for further treatment.

Those responsible for handling chromium-containing process wastewater must take great care to prevent overflows in collecting tanks. Laurent Roumieux of Belgian water and wastewater service provider, ENGIE Solutions, talks about why his company chose the new VEGAPULS 21 compact radar level sensor to minimise this risk.

Chromium is not easy to handle because it is dangerous due to its possible effects on health and the environment. The collected chromic acid solution had been stored in a double-walled HDPE tank to prevent leakage and thus environmental damage. The plant was also looking for a reliable measuring system to accurately track the level of the aggressive chromium solution in the tank. The tank capacity needed to be used to the fullest extent, but under no circumstances could the maximum safe level be exceeded.

Until recently, ultrasonic technology was generally used for level measurement in wastewater treatment plants, basically for economic reasons. However, when VEGA launched a new sensor series based on radar measurement technology in early 2020, new perspectives opened up. The compact radar instrument VEGAPULS (Series 10, 20 and 30) are comparable with ultrasonic instruments in

terms of cost, but are much more reliable and user-friendly.

VEGAPULS 21: Ideal for safety critical applications

"I was looking for a level solution that would pose no risk to my employees," explains Laurent Roumieux, team leader at ENGIE. "Up to that point we had been using an ultrasonic measuring system, but I had installed a non-contact radar sensor on an HDPE tank filled with hydrochloric acid (HCl). My VEGA contact helped me to select the instrument and set it up. I was quite impressed because I was able to check the level just by mounting the sensor over the top of the HDPE tank. This solution was very simple and, above all, safe and worry-free. The sensor has provided reliable measurement data ever since it was put into operation."

Due to this positive experience, Roumieux



Via the VEGA Tools App, VEGAPuls21 sensors can be connected directly to smartphones. An intuitive user interface makes it easy to install, configure and put a sensor into operation. Users can then read the current level measurement and the sensor status at a glance.



Installation was simple, quick, safe and worry-free. The VEGAPuls21 was mounted on top of the cylindrical HDPE tank, without the need to make any openings in the double-walled tank.

considered installing this radar sensor on the tank holding the aggressive chromium solution. The application was not identical; in fact it was much more complex because the tank was cylindrical and double walled.

Nevertheless, due to the experience gained from the new VEGA radar measuring instruments on the HCL tank, Roumieux decided to go ahead and install a VEGAPULS 21 for the chromium application.

The VEGAPULS 21 is part of the new compact series of radar level sensors from VEGA. The beating heart of these new sensors is a radar microchip that was newly developed by VEGA and specially optimised for the requirements of level measurement. Thanks to the small design, very compact sensors are now possible.

80-GHz technology means that the radar beam can be aimed at the measured medium with pinpoint accuracy. The technology enables real level signals to be better distinguished from interfering signals. The measuring process itself thus becomes much easier and more precise than other measuring methods. No incorrect measurements arise from deposits or internal installations, such as pipes, probes or pumps, in double-walled tanks or in narrow shafts.

This means that – in contrast to ultrasonic sensors – no false signal suppression is necessary. Besides being unaffected by temperature fluctuations, vacuum or high pressures, radar sensors are, most importantly, not sensitive to build-up on the sensor. These are all factors that can often cause other types of measuring devices, such as ultrasonic level transmitters, to malfunction. What is more, radar sensors have a wide dynamic range, which guarantees reliable level measurement even if there is strong signal damping.

The installation experience

These features made the VEGAPULS 21 ideal for this application. “I didn’t need to make any openings in the double-walled tank to install the sensor. This is important for several reasons. For one thing, the measuring system is very safe because, when handling the sensor,

my staff never comes into contact with the chromium solution and thus there is no risk of an accident happening during installation,” says Roumieux, highlighting a most important advantage. “And for another thing, I didn’t need to drill holes in the tank to install a mounting flange for the sensor. This prevents damage and also eliminates the cost of fitting a suitable flange.”

Another advantage is that the new compact sensors measure right up to the edge of the container without a blocking distance. With ultrasonic sensors, on the other hand, the optimal adaptation of the sensor is made more difficult because the blocking distance is greater and the maximum range is thus reduced. This is not an issue with radar sensors – the blocking distance is much smaller and even heavily soiled sensors can deliver exact measurement values. This allows the maximum volume of the tank to be utilised.

The VEGA Tools App

For the technical team at ENGIE, the new sensor not only delivered more safety in handling, it also made installation faster. Thanks to the VEGA Tools App, which makes use of the tilt sensor integrated into smartphones, it was easy to align the radar sensor perfectly to the cylindrical tank. Technician Yannick Crouquet, who was in charge of installation and commissioning, found this application extremely practical. “It meant that I didn’t need to bring

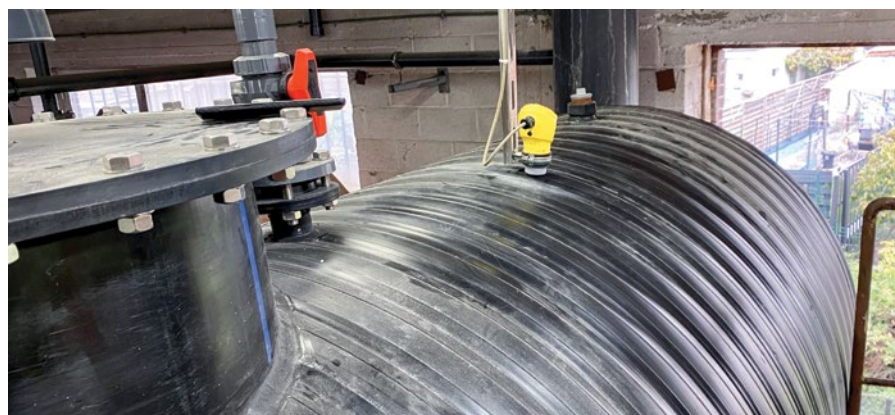
along a spirit level or a scaffold onto the tank to align the sensor.”

But Crouquet is also enthusiastic about the app for other reasons. “I can connect directly via my smartphone using the free VEGA Tools App.” Sensors that have the display/adjustment module, PLICSCOM with Bluetooth, can also be wirelessly adjusted using the app. The intuitive user interface of the app makes it easy to configure a sensor and put it into operation. What is more, the user can read the current level measurement and the sensor status at a glance. And all relevant information about the VEGA instrument can be retrieved just by entering the serial number. This makes later maintenance work much easier.

The VEGAPULS 21 is an ideal level sensing solution for the chromic acid tank, which is difficult to access because mounting and movement on the cylindrical HDPE tank should be avoided. Yannick Crouquet explains: “Thanks to the VEGA Tools application, I was able to monitor the liquid level of the tank and the signal quality of the probe remotely during the first few days of operation. After a few days of observation, I knew that the VEGAPULS21 was working and I could concentrate on other tasks again. It’s also much easier to access the parameters later and reconfigure the new level sensors, if necessary. It’s a real time saver and far less restrictive,” he says.

Looking to the future, Roumieux says that ENGIE will be gradually replacing all of its ultrasonic devices with this radar instrument, especially in applications where foam occurs – because radar is much less sensitive to foam – and also where space is very limited and the open path for a measuring beam is very narrow.

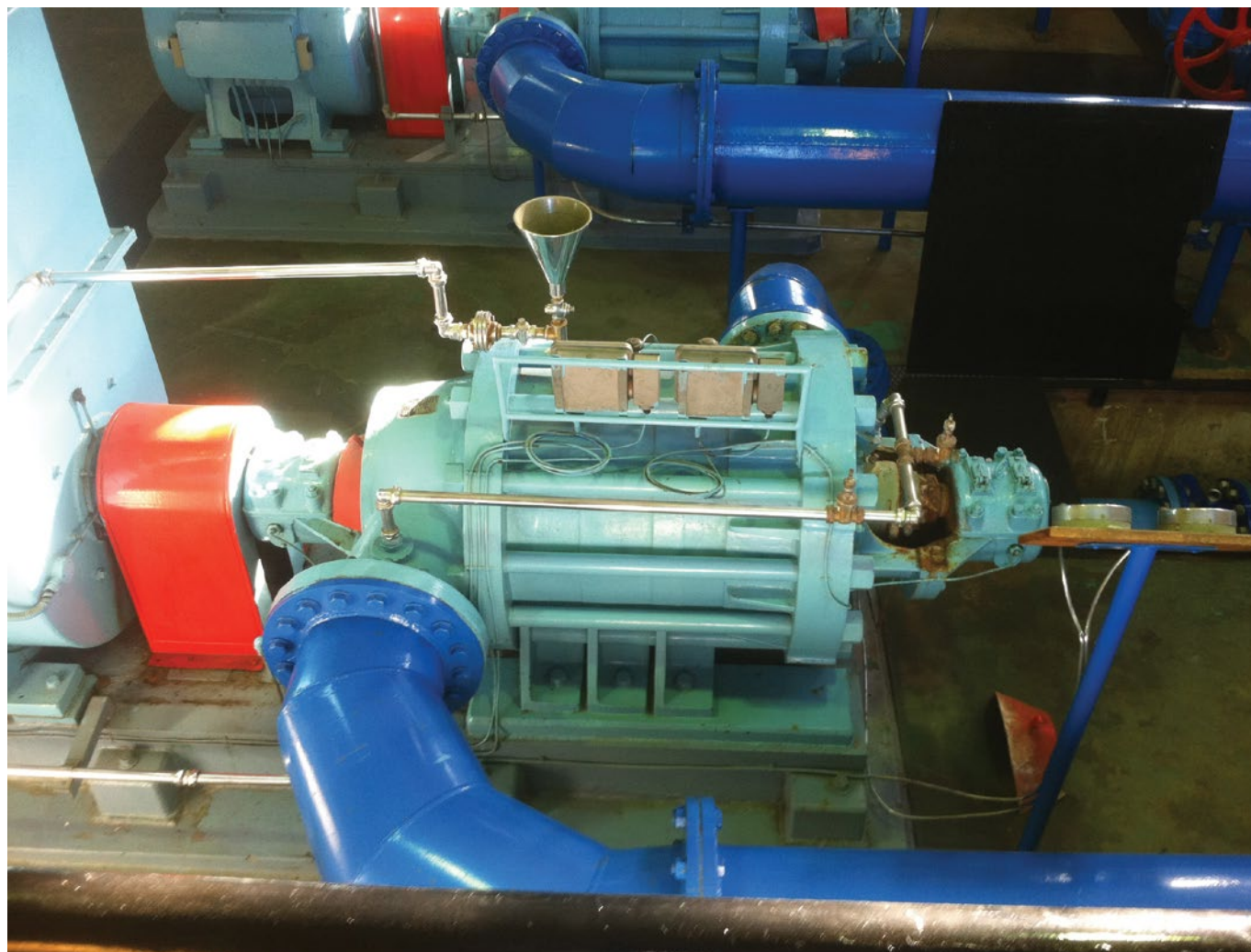
“We’re going to use this same radar model as standard for all of our installations so that we only need to keep one sensor type in stock for all level measuring applications. Then our technicians will no longer need to learn different installation routines for multiple brands,” he concludes. □



The reliability of the compact VEGAPuls21 Radar level sensor enabled the maximum volume of the cylindrical chromium-containing wastewater tank to be utilised.

Pumping systems 101: Advantages and pitfalls of VSDs

Harry Rosen, UNIDO pump expert and MD of TAS Online, uses pump and system curves from typical pumping systems to explain scenarios where variable speed drives (VSDs) are an excellent choice for realising substantial energy saving and, most importantly, those pump systems where a VSD will not improve energy efficiency or pumping performance.



A multistage mine dewatering pump delivering high pressure water to overcome a very high static head. This pumping system offers minimal friction loss, which results in a flat system curve.

Installing a variable speed drive (VSD) will not always improve the energy efficiency or performance of a pumping system. In fact, in some systems, pump performance will be compromised and energy use will increase when the pump speed is reduced.

Variable speed drives for pumping systems are not a new concept. They have long been used to control the flow in pumping system, as an alternative to stop-start pumping, throttling using a flow restricting control valve, using a bypass valve to recirculate excess flow back to the inlet or using multiple pumps in parallel. Other strategies like trimming the pump impeller or changing the V-belt pulley size to reduce the input drive speed from the motor, are of a more permanent nature and cannot react to real time changes in the system.

Superficially, using some sort of variable speed drive to reduce the flow to match demand seems to be a more efficient way of managing flow requirement from a pump. But this depends on the pumping system, most notably, the balance between the portion of system pressure that is due to friction losses and that portion needed to overcome the static head.

The affinity laws and pump system curves

According to the affinity laws for centrifugal system: reducing the pump speed by 20% will reduce the flow by 20%, but will reduce the input power by 50%. This applies to pumps and fans, where the power absorbed by a centrifugal pump varies with the cube of the pump speed. That means that small decreases in speed can significantly reduce energy use, which implies a great opportunity for installing variable speed drives (VSDs) in pumping applications.

But the fluid power delivered by a pump is governed by the system's pressure-flow relationship. The fluid power output of a pump is proportional to the head multiplied by the flow at the operating point of the system. On a pump system curve, the fluid power delivered into a system by a pump ($H \times Q$) can be 'seen' as the area of the rectangle formed by drawing a horizontal line from the pump operating point onto the pressure axis and a vertical one onto the flow axis (blue square on Figure 1). The area of this rectangle and therefore the delivered fluid power, changes with every change of the pump's operating point.

A pump's operating point or duty point depends on the real pressures and flows that the pump 'sees' due to the friction head generated in the piping network and the static head pressures associated with the whole system.

Figure 2 shows two system curves. The steep system curve, arises when there is almost no static head (height difference) to overcome and almost all of the pressure experienced by the pump will be due to flow

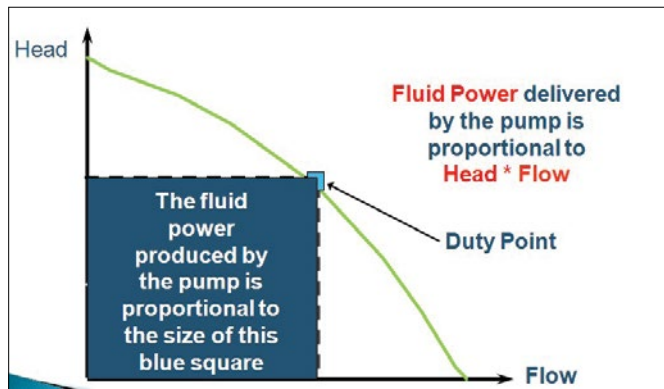


Figure 1: Fluid power output of a pump, the pressure vs flow relationship.

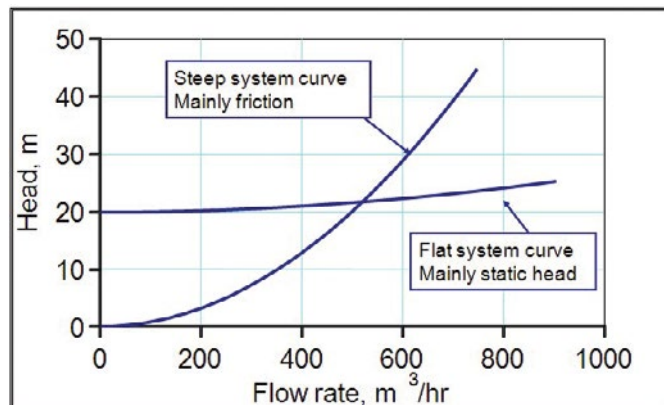


Figure 2: Types of pumping systems.

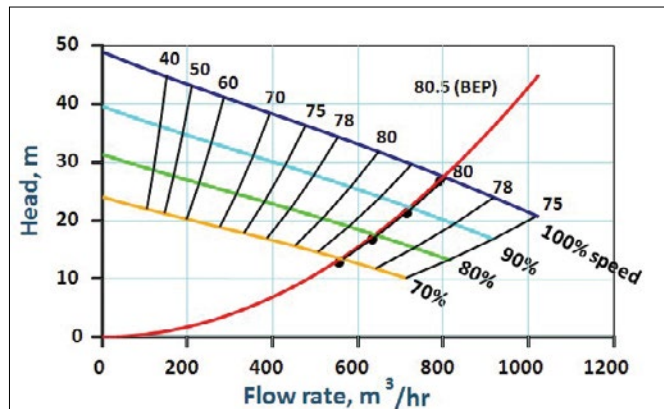


Figure 3: All-friction system with no static head and a steep system curve.

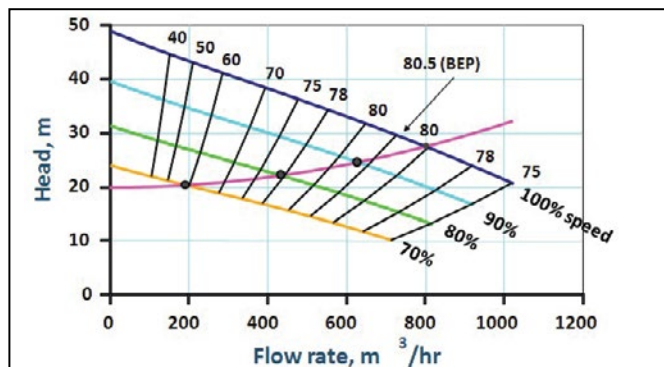


Figure 4: Static head dominated system with very low friction losses, which results in a flat system curve.

dependant friction losses. The flat system curve will arise when the friction losses are low (due to short piping distances or large pipe diameters, for example) and the fluid being lifted through a large vertical height (such as mine dewatering from the bottom of a deep mine shaft) or when the fluid is being pumped into a vessel with a high static pressure head (such as a header tank or pressurised boiler, for example.)

The all friction system with no static head is shown in Figure 3, superimposed on a family of pump curves for speeds of 70%, 80%, 90% and 100%. The operating point of the pump always falls at the intersection point of the system curve and the relevant speed-related pump curve.

In this friction-only scenario, as the speed is reduced down from 100%, the operating point moves down along the system curve. But because the static head is low, the system curve remains on or near the constant efficiency lines of the variable speed pump curve. So the pump efficiency does not change as the VSD reduces the pump speed to achieve the required flow.

More significantly, the power absorbed by the pump reduces according to the affinity laws and substantial energy savings can be achieved. It is for these systems that we talk about the cubed law of power savings

Figure 4 shows the scenario for pumping into a system with a flat friction curve – high static head and relatively low friction losses. Again, the pump must always operate where the pump and system curves intersect but in systems with mostly static head, the system curve does not follow the affinity laws and does not follow the constant efficiency curves of the pump. This means that as the speed changes, the head will not drop off significantly while the pump efficiency will reduce. The affinity laws cannot be used to calculate the energy reduction, and savings from using a VSD will be significantly reduced.

In addition, below the 70% speed curve, the pump is in danger of being dead-headed - when the pump output pressure is less than the system head pressure, flow will drop to zero, useful pump energy ($H \times Q(0)$) will drop to zero and all of the energy being consumed by the spinning impeller is being wasted.

Specific energy and the effect of VSDs

A useful index for comparing pumps in the same application involves calculating the energy (kWh) required to pump a specific volume of water, such as 1.0 Mℓ. This index, called Specific Energy (Es), provides the basis for comparing energy savings between different pumping systems with different control strategies. It can also be extended to enable the specific costs of pumping in these scenarios to be compared in R/Mℓ.

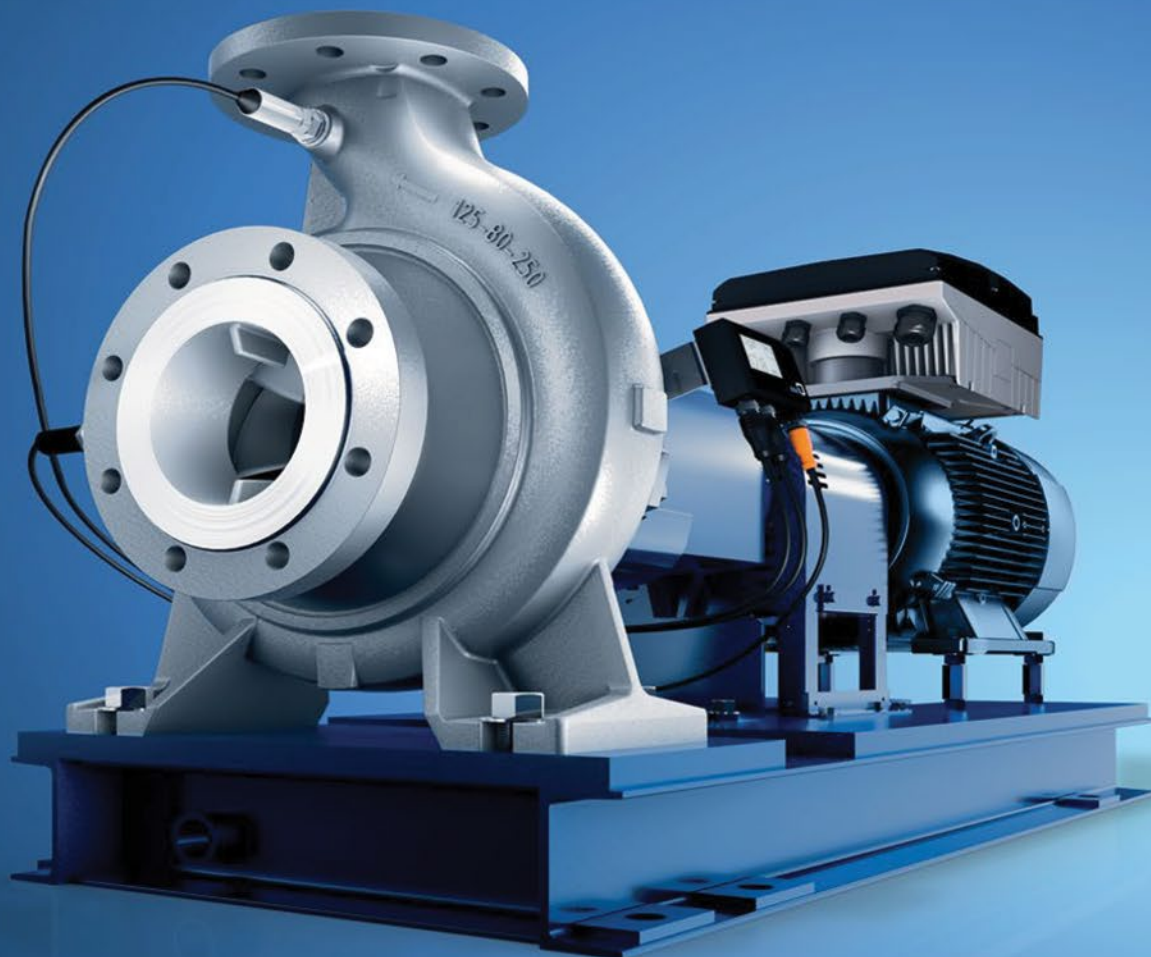
If we apply the specific energy calculation to the all-friction pump system shown in Figure 3, where the flow rate and pump speed reduced by 50% and the power drops by a factor of 8, we see that power drops from 79.5 kW to 10.4 kW, while the pump efficiency remains constant. These values are shown in Rows 1 and 2 of Table 1, along with the specific energy calculation, which reduce by a factor of nearly 4 for this scenario (Specific energy $E_s = 25\%$ of the original). What this means is the actual energy savings are around 75%

For a mixed static plus frictional head system scenario, in order to drop the flow by 50% from 800 m³/h to 400 m³/h the pump speed only drops by 21.5% and motor power drops from 79.5 to 34.6 kW. This looks like a substantial power saving until we look at the specific energy which has dropped from 99 to 87, an actual saving of only 12%. This is sure to disappoint pump operators expecting savings in line with the affinity laws.

And the situation with constant static head is even more dramatic. In this system, the speed only has to drop by about 13% for the flow to drop by half. Once again the power reduction of 43% sounds impressive but when we look at the specific energy figures in red we see that it has actually increased. In this scenario, adding a VSD has actually made our system less efficient by causing the pump to use more energy per unit of flow at the lower speed.

In addition, if the speed is dropped any further, it could force the pump to operate at the closed valve head (known as pump dead heading), which is

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	Static Head (m)	m ³ /h	Speed (%)	Power (kW)	m ³ /kWh	Es= kWh/m ³
(1) The all friction (steep) pump curve	0	800	100	79.5	10.1	0.099
	0	400	50.0	10.4	38.5	0.026
(2) A mixed static plus frictional head scenario	20	800	100	79.5	10.1	0.099
	20	400	78.5	34.6	11.6	0.087
(3) The constant static head low friction scenario	27.5	800	100	79.5	10.1	0.099
	27.5	400	86.5	44.7	8.9	0.112

Table 1: The effect of a 50% change in pump speed on the Pump Specific Energy and power drawn for three different pump curve scenarios: (1) The all-friction (steep) pump curve; (2) A mixed static plus frictional head scenario; (3) A constant static head low friction scenario. **Note:** The increase in Es (kWh/m³) for Scenario 3 when the speed reduces from 800 to 400 m³/h.

a very dangerous area in terms of the life of the pump. If a pump is operated at closed valve head for anything more than a few minutes at a time, the resultant loading on the bearings and the increased temperature of the fluid can quickly lead to bearings seizing, mechanical seals failing, shafts snapping and even the possibility of the pump casing exploding.

Conclusion

So before commissioning the installation of a VSD on an existing pumping

system, be sure first to determine the system curve and its static and friction head components. Then, by superimposing the system curve onto the family of pump curves at different speeds, have a look at how the system will respond to varying the speed.

To complete the picture, calculate the motor speed, power draw and specific energy for several different pump speeds. Only then can you be 100% sure that the VSD will deliver the benefits you expect.

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A closed loop cooling water system pumping through heat exchangers and back to pump. The net static head of this system is zero and the steep system curve is dominated by friction losses.



Steve du Toit, rental development manager at Integrated Pump Rental.

Locally built diesel pumps for every application

In addition to renting pumps, the in-house capability of Integrated Pump Rental allows it to design and build reliable, high performance diesel driven pumps locally. This gives customers a fit-for-purpose pump within a short lead time, according to the company's rental development manager, Steve du Toit.

With its local expertise and experience in custom-building diesel driven pumps, Integrated Pump Rental ensures its customers get exactly what they need with short lead times.

"Our in-house capability allows us to design and build pumps to any required specification," says Steve du Toit, rental development manager



Pumps can be built as trailer mounted units for greater mobility.

at Integrated Pump Rental. "Part of our process is to assess the application and discuss options with the customer, advising on a solution that suits both the operational requirement as well as the budget."

As the local distributor of the high quality Sykes diesel driven pump range, Integrated Pump Rental generally uses the appropriate Sykes wet end for each pump design, usually coupled to a Kirloskar diesel engine – a well-respected and popular brand. However, the brands of key components can be chosen by the customer according to preference, says Du Toit.

"We then design and construct the fuel tank and base or trailer unit, the scale of which depends on the pump's intended working conditions, mobility and fuel consumption," he says. "The material of construction must also be carefully selected, based on factors such as water acidity and abrasiveness."

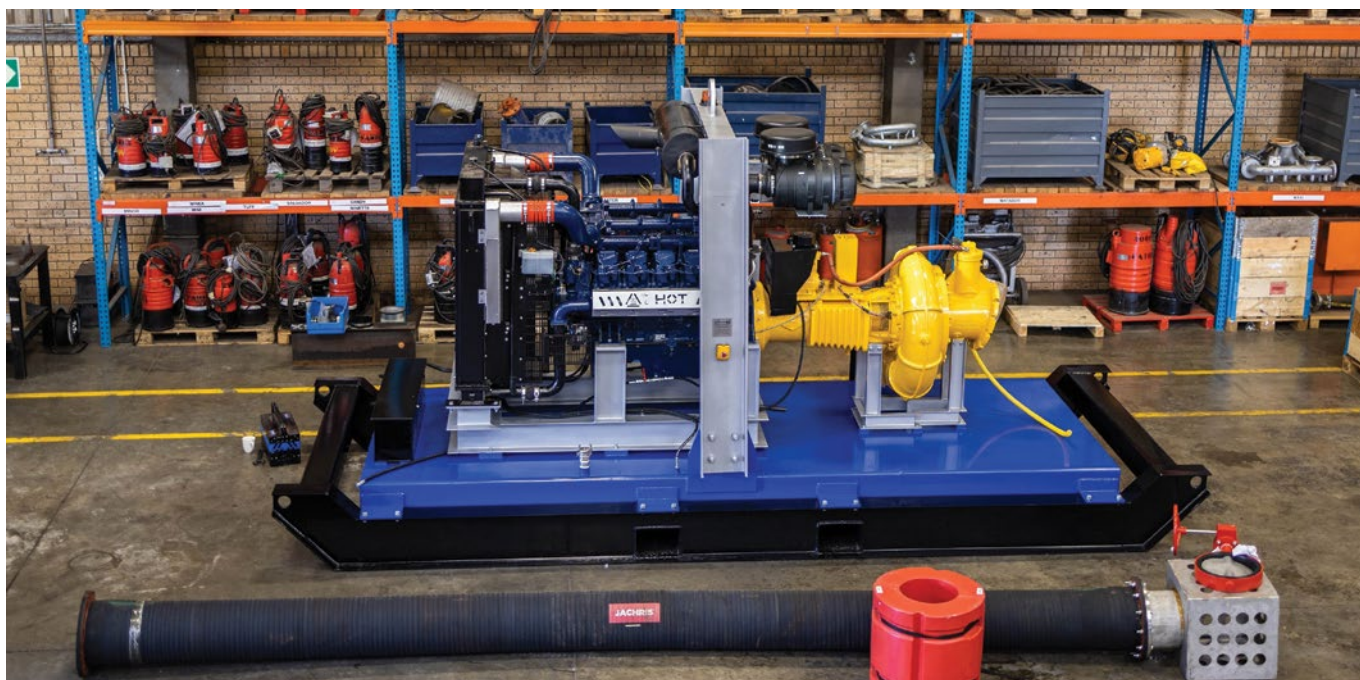
In the case of high acidity, for instance, stainless steel is the preferred material, while more abrasive applications can be better served with a coated SG iron material. The solution is put together by a team that includes qualified draughtsmen and experienced boilermakers, electricians and diesel mechanics.

"Our performance driven approach ensures that all the necessary specialists collaborate closely in turning the customer's requirement into reality," he says. "This includes hands-on involvement by top management, making for quick decisions, innovative solutions and a fast process all round."

The result is a top quality locally assembled pump that draws on readily available components and can be delivered within tight timeframes. Customers can also rely on Integrated Pump Rental's well-known service levels to ensure ongoing maintenance and optimal uptime.

"Our versatile team, combined with the wide range of Sykes pump capacities, allows us to locally build pumps for every application – from small-scale contract dewatering to large open pits on mines," he says. Du Toit notes that many of their custom-built pumps are for customers who have previously rented pumps from the company, and are impressed by the performance and reliability of those Sykes units. While diesel driven pumps are most in demand, Integrated Pump Rentals can also design pumps with electric motors, for those applications where electrical power is available on site.

www.pumprental.co.za



Integrated Pump Rental's in-house capability allows it to design and build pumps to any required specification.



Merits of mechanical and digital dosing

Dosing pumps play an important role in many industries and are available in a growing range of mechanical and digital options. Choosing the right pump starts with understanding the respective areas where mechanical and digital dosing pumps excel. Tshephang Sithole, sales engineer for water treatment at Grundfos, explains.

Dosing pumps play an important role in many industries from mining and wastewater treatment to pharmaceuticals and food production – and are available in a growing range of mechanical and digital options. “Choosing the right pump starts with understanding the respective areas where mechanical and digital dosing pumps excel,” says Tshephang Sithole, sales engineer for water treatment at global pump specialist, Grundfos. “While high flows and high pressures might be prioritised in some applications, for instance, other users need to focus on accuracy or remote-control functionality.”

Sithole points out that many industrial applications, such as water treatment plants or mining, will tend to need a robust solution that delivers large volumes of water at pressures of up to 150 bar. There are still certain automatic functions, though, depending on the configuration.

“While Grundfos’s basic range of mechanical dosing pumps requires an operator for most functions, our analogue relay (AR) range has additional features such as an automatic stop when the chemicals are depleted,” he says. “Furthermore, the D-range has servomotors to automatically set the stroke length, thereby adjusting the dosing flow.”

This is done using a 4 to 20 mA signal that can be remotely transmitted from a SCADA system or other digital input. Variable speed drives (VSDs) can also be fitted to these pumps, and the frequency can be adjusted up or down to vary the dose.

Digital dosing pumps, by contrast, come with a range of features that make them most suitable for automated plants or where higher levels of monitoring and control are required, including remote functions. Grundfos has been a pioneer of digital dosing for over 20 years. “Automation functions are particularly valuable for companies that have plants in different parts of the country,” he says. “If loadshedding leads a pump to trip, for instance, an alarm will notify the user, who can remotely reset and restart the operation.”

They are also preferred where accuracy of dosing quantities is prioritised, or where dosing volumes are very small. Some digital dosing pumps

boast turn-down ratios as low as 1:3000, and can deliver pressures of down to 0.002 bar. “They can even pick up leaks in the line, and will help prevent liquid losses by automatically alerting the operator,” he says. The automatic de-aeration function is

another valuable element in advanced digital dosing pumps, allowing them to detect and remove bubbles from a line. This is important as bubbles will impair the accuracy of dosing.

www.grundfos.com/za



Grundfos DME digital dosing pumps with pulse control were selected for a customer application that requires a pulse-based batch control function with a 940 l/h dosing rate.



A Grundfos smart digital installation facilitating accurate dosing of sodium hypochlorite at one of the major breweries in South Africa.

AQS: premium quality pumps for seamless onsite operations



“With the ever-growing demand for higher production and reliability, the need for high-quality equipment is imperative to ensure that production targets are met with minimum downtime. The correct selection of pump and materials of construction will minimise the chances of contamination and spillage during pumping operations,” begins Howard Jones, industrial sales manager for AQS Liquid Transfer/Axflow (AQS/Axflow).

“The global expansion of the AQS/Axflow product range is allowing us to address an ever larger range of markets in Southern Africa, from hygienic foods to chemical and mining markets,” he says.

Multiple types of pumps and pumping disciplines can be applied in all these applications, including peristaltic hose, rotary lobe, air-operated double diaphragm (AODD) and centrifugal pumps.

Although the initial capital outlay of these premium quality pumps can be high, the benefits of avoiding cheaper, standard products is proven in all manufacturing and high-volume pumping applications.

Correct materials of construction are also important when selecting a product for a specific industry. In the case of peristaltic hose pumps, for example, the hygienic food industry would generally require FDA & EC 1935/2004-certified hoses manufactured from FDA-approved nitrile buna rubber.

“Production of food products such as pastry, tomato puree, crushed vegetables, beverages, dairy products and confectionery requires that the pumps used meet strict hygienic standards and can handle the products with sensitivity. “Our Abaque® and Realax® peristaltic pumps are perfect for sanitary pumping of many liquids and foods. The smooth pumping action performs well with shear

Howard Jones, industrial sales manager for AQS Liquid Transfer/Axflow, talks about the wide product range of pumps the company brings into Southern Africa for the food & beverage, agricultural, mining, industrial and utility markets.

sensitive products or fluids with delicate particles,” Jones explains.

These hose pumps are available in different sizes – ranging from HD10 to HD100 – enabling them to be used for use for dosing, mixing and bulk transfer. Advantages of using peristaltic hose pumps include: self-priming; dry-run capabilities; seal-less; reversible; optional fittings available (DIN, SMS, Tri-clamp); simple to use; easy and quick hose change; food grade lubricant; ability to pump liquids containing abrasive or hard or fragile solids in suspension; and excellent reliability. Hose pumps also lend themselves to pumping extremely corrosive chemicals and explosives as they do not have mechanical seals that can leak, which would cause a safety hazard.

The air-operated double diaphragm (AODD) pump ranges available from AQS are the result of research and development based on global challenges and success stories, which have been shared with end users of these products to help streamline their operations, improve production and, ultimately, deliver better profitability.

Sandpiper®, Versamatic® and Vega® AODD pumps for the transfer of foodstuff and sauces as well as inks, paints, chemicals, resins and very aggressive compounds for industrial markets have proven to be reliable and versatile over many years, with thousands of these AODDs currently installed across the world. The AODD pumps have also been very successful

in underground mining activities for water transfer to central pumping stations. “The majority of our mines are equipped with AQS AODD pumps; this is as a result of their efficient use of compressed air and their rugged construction,” says Jones. Various materials of construction allow for a best-fit selection based on a material compatibility guide that ensures an ideal combination of materials is used for the medium being pumped. This extends the lifetime of the pump.

Many of the AQS range of different centrifugal pumps are used in pressure boosting, process water and dewatering applications, where shear sensitivity is not of concern. These allow high flows and total dynamic heads to be achieved.

In order to best serve as many markets as possible, AQS has been entrusted with the sole distribution and service rights for a large range of brands including Sandpiper, Versamatic, Vega, Realax, Andritz, NOV and a number of other brands in South Africa. “This is because of our geographical footprint and the successes that we have enjoyed over many years as well as our collaborative approach to supporting our customer base”, he explains.

“Our success, we believe, is achieved by advising on design parameters and aftermarket service requirements to ensure seamless onsite operations,” Howard Jones concludes.

www.aqsliquidtransfer.co.za



AQS has been entrusted with the sole distribution and service rights in South Africa for brands including Sandpiper, Versamatic, Vega, Realax, Andritz, NOV, and a number of others.

Envirotech® pumps' popularity continues in Africa

A favourite among Africa's miners, Weir Minerals Africa's Envirotech® range of pumps remains a popular choice on mining and industrial sites. The success of these pumps has been enhanced by leveraging the company's technology base in design, engineering, materials and linings.

Underpinning the popularity of Envirotech® pumps is Weir Minerals Africa's ongoing investment and support, as well as the pumps' integration into various pumping solutions that the company offers.

According to Marnus Koorts, general manager pumps at Weir Minerals Africa, Envirotech® pumps are especially popular in the gold mining sector, where up to 200 of them can be found on a single site. He says there are three ranges in the Envirotech® line-up, which Weir Minerals Africa acquired in 1994 and continues to develop and support.

"The Envirotech C5 range of metal pumps has always been a favourite for dirty water applications, and is widely used in mine dewatering," says Koorts. "Its high pressure capacity of 6 900 kPa makes it ideal for high head applications."

The Alpha range of Envirotech® pumps is rubber-lined to resist abrasion, while the Envirotech® ME pump with its metal expeller and the Envirotech® MG pump with a metal gland are unlined. All the ranges benefit from ongoing research and development, and are available in the various materials of construction offered by Weir Minerals Africa.

"When selecting and sizing their pumps, customers can choose from our range of metal alloys including our Ultrachrome and Hyperchrome alloys," he says. "There is also a wide range of rubber linings on offer, from our R55 premium grade elastomer to butyl rubber formulations."

The technology incorporated into Envirotech® pumps makes them a valuable part of Weir Minerals Africa's engineered-to-order solutions and pontoons, where they are integrated with other products such as Linatex® hoses and Isogate® valves. Koorts also highlights that the company's Synertrex® smart analytics platform can be applied to Envirotech® pumps, for remote monitoring of equipment health.

Among the most important aspects of the expertise that Weir Minerals Africa has applied to its Envirotech® pumps is its Wear Reduction Technology (WRT®), which imparts not only longer wear life but also higher operating efficiencies.

"Many of the Envirotech pumps are now coming out with WRT components as standard," he says. "This delivers massive value to customers, as the energy saving from the high efficiency is substantial."

In a recent highly abrasive application, the WRT® impeller in the Envirotech® pump delivered double the lifespan of a replicator's impeller. More importantly, the Envirotech® pump consumed almost a fifth less electricity each year, saving the user many times more than the value of the component itself.

"We continue to evolve and upgrade the Envirotech pump range in the same way as all our products, giving customers a modern and responsive solution to their pumping needs," he says.

The Envirotech® pump range is cast and manufactured in South Africa, and sup-

ported through the company's extensive branch footprint throughout Africa and the Middle East.

www.minerals.weir



Weir Minerals has developed the WRT technology impeller and throatbush for the Envirotech Alpha pumps.



An Envirotech rubber-lined Alpha pump operating on a gold mine.

Industrial conveyor chain for special

BMG's comprehensive range of power transmission components incorporates ZMC industrial conveyor chains that offer dependable service in diverse applications, especially for use in food production.

“BMG's ZMC conveyor solutions for the food and beverage sector extend from the processing of raw ingredients to baking, bottle washing, packaging and safe distribution,” explains Gavin Kirstein, Product Manager, BMG. “Our team of specialists advises customers at food and beverage plants to invest only in conveyor components that are manufactured in food-compliant materials – such as stainless steel – for the highly-specialised and safety-critical applications in food manufacturing and preparation.

“Advantages of stainless steel components include corrosion and thermal shock resistance, durability, resistance to powerful cleaning detergents and the ability to withstand a wide temperature range – from cooking to freezing. What's critical, is that food is unspoiled by non-toxic and easily cleaned stainless steel components.

“Stainless steel chains are also recommended because this material has low magnetic permeability and is highly resistant to both alkali and acidic environments.”

The ZMC portfolio comprises standard chains and chains for special applications,

which are manufactured in Italy to stringent quality specifications and are available from BMG in a wide range of dimensions, mechanical characteristics and geometry. These metric and imperial chains are available with solid, hollow or extended pins, with bushings, rollers or bearings mounted at the centre of the links, or with holes in the links, which are specially designed for the subsequent assembly of the necessary components.

BMG also supplies sprockets, with or without a hub, for each type of chain.

The range of ZMC chains for special applications – particularly for the food, beverage, packaging and pharmaceutical sectors – is manufactured with the appropriate combination of materials, heat treatments, surface coatings, geometry and precise dimensions to cope efficiently with complex challenges.

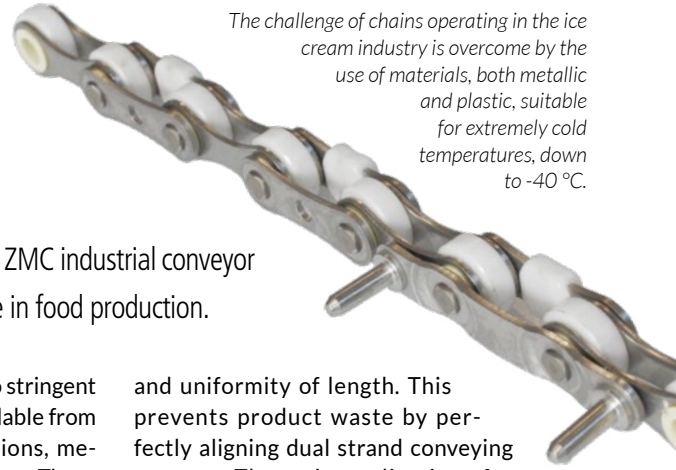
BMG specialists advise on suitable materials and coatings for specific working conditions – load, speed, temperature, humidity and contact with process fluids or steam. The company also offers a measuring service, which makes it possible to assemble the chains on the system by perfectly matching them, to ensure maximum precision

and uniformity of length. This prevents product waste by perfectly aligning dual strand conveying systems. The main applications for ZMC Stainless Steel conveyor chains in the agri-food industry are in machines used to select fruit and vegetables according to size and weight and for processing and packaging products.

Bakery proofers are an integral part of the industrial process to produce numerous bakery products, including bread, crackers, breadsticks, rusks, pizza, biscuits and sweets. Depending on the size and characteristics of the product and specific performance requirements, the proofer can be developed in various ways, using vertical and horizontal stainless steel conveyors to carry the trays, baking tins or slats, on which the products to be leavened are carried.

Fundamental parameters for the design of these system include speed, transported load, temperature and other environmental conditions, as well as scheduled maintenance. With the choice of various materials, including stainless steels of various types, heat treatments, coatings and special com-

The challenge of chains operating in the ice cream industry is overcome by the use of materials, both metallic and plastic, suitable for extremely cold temperatures, down to -40 °C.



BMG's ZMC bakery proofer chain is typically used for vertical and horizontal stainless steel conveyors carrying the trays, baking tins or slats.

ponents, including bushings and bearings, it is possible to produce chains capable of working at temperatures of up to 500 °C.

The main configurations for food baking ovens with conveyor chains are horizontal wire net or slats. In wire net ovens, the chains are generally produced with hollow pins, while for the slats, a wide range of chains with attachments has been developed – some of which have protruding pins and outboard rollers. In this sector, ZMC's self-lubricating Mecasec® technology, can be used at up to 250 °C.

BMG recommends ZMC 50 mm pitch chain with protruding pins used in peeling machines in the canning industry. Other designs of recommended chain for this sector include hollow pins and protruding pins.

Bottle washer chains require high strength and long wear life without lubrication. For part of the bottle washing process

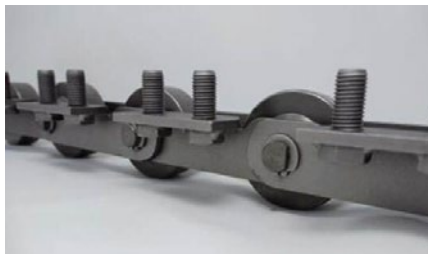
the chain works immersed in water with diluted detergent and is often polluted by abrasive elements, like dust and paper residues, from the glass bottles.

For high efficiency in bottle washing systems, BMG specialists recommend the use of high-performance stainless steel chains. ZMC bottle washer chains are available with attachments that have welded internal screws for securely fixing the crossbars on which

bottles are transported. Other applications for ZMC chain are for conveyors in complex assembly lines in automotive manufacturing plants, cement production and in timber and sugar mills.

BMG's Power Transmission division also supplies and supports other leading brands of chains, including Fenner, Tsubaki, Webb and Rexnord.

www.bmgworld.net



For the bottle washing process, the chain works immersed in water with diluted detergent and is often polluted by abrasive elements from the glass bottles.



Tsubaki 'Match and Tag' service for high accuracy in paired chain

Modern machinery often requires chains of precisely the same length to be used in pairs or other multiples. For these applications, BMG recommends Tsubaki 'Match & Tag' chains, which guarantee a maximum chain length difference of 0.50 mm, independent of the total chain length. Advanced Tsubaki chain length measurement technology ensures smooth, accurate and reliable machine actuation.

"When chains are required to run in parallel for conveyance purposes, it is critical that these chains have minimal difference in length. If non-matched chains are used, the consequences can be challenging, with errors, twisting and slippage occurring during operation. These problems occur because the chain length has not been checked link by link," explains Gavin Kirstein, Business Unit Manager, Power Transmission division, BMG.

"Difficulties are exacerbated as chains wear and deteriorate with use and although re-tensioning chains does provide temporary improvement, repeated re-tensioning reduces chain life considerably. This results in lower productivity, unnecessary downtime, premature component replacement and consequent expenses.

"Although industry standards relating to the manufacture of chain components set a tolerance for the accuracy of length, regulations do not cover the assembly of components into complete chains. This means there is a possibility that a significant error will accumulate if a chain length includes several links that are only just within tolerance. Some manufacturers address this

by sorting their components into two or three classes of greater accuracy, but the possibility of accumulated errors remains.

"To alleviate these problems, Tsubaki pre-stretched chains are supplied by BMG in matched-length pairs, that are tagged for easy identification and accurate installation. Our 'Match & Tag' service guarantees that paired chains are the same length to within a tolerance of 0.50 mm, by measuring and matching each individual component of the chain. For high-accuracy, Tsubaki sets tight tolerances on the physical dimensions of each chain part.

"After assembly of a complete chain length, the 'Match & Tag' process begins by accurately checking the length. Subsequently, the chain lengths are matched and tagged together into pairs – or larger groups if required. As a result, these chains offer higher productivity, smoother operation, a cleaner manufacturing environment, minimal downtime and extended service life." BMG's Tsubaki 'Match & Tag' service is available for chains that comprise BS single pitch sizes RS08B to RS32B, ANSI single pitch sizes RS40 to RS100 (including the Heavy-Duty Series) and ANSI double pitch sizes RF2040 to RF2100 (R-roller, S-roller, HP).

Typical applications for 'Match & Tag' chains include packaging machines and for lifting functions, for example, in accumulator towers used in the steel industry and carpet manufacturing.

In a recent project, BMG was approached by a supplier of milk and dairy products, to solve the problem of cartons

falling during packaging and contaminating filling machines. Specialists identified the cause as chains with special attachments, that were not running synchronised. After the installation of two strands of Tsubaki RS2008B-SS-ATK 'Match & Tag' chain, these machines are now running smoothly, with no disruptions or downtime.

BMG's national branch network offers a technical advisory service on correct chain selection – a critical factor in any power transmission system. For specific applications, chains with special materials, coatings and lubrications are available nationally and to meet exact requirements, chains are supplied in any lengths.

www.bmgworld.net



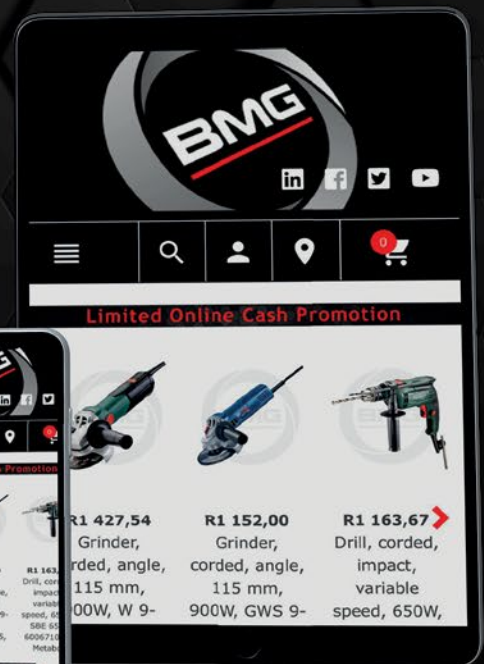
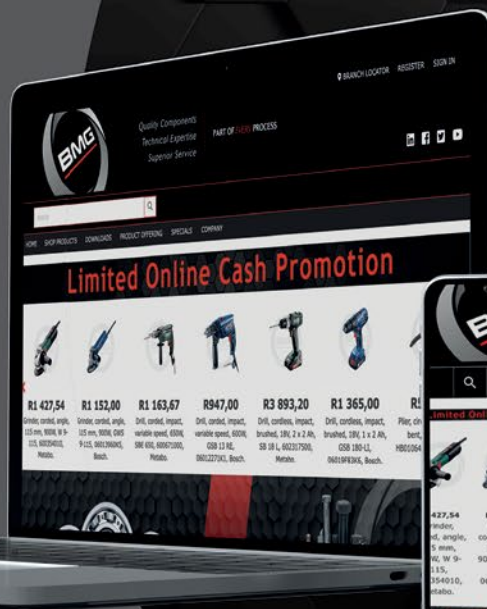
BMG's Tsubaki 'Match & Tag' chains offer high productivity, smooth operation, a clean manufacturing environment, minimal downtime and extended service life.

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CAE at Bonfiglioli: an engineering service for special needs

Bonfiglioli South Africa's Customer Applications Engineering Department (CAE) has been introduced to offer special services to local customers for the development of engineered gearboxes, drives and motion control solutions.



Bonfiglioli South Africa's Customer Applications Engineering Department offers custom-engineered solutions from simple to complex.

Bonfiglioli South Africa is a prominent player in the Southern African power transmission market. Its industrial drives set industry standards ranging from the smallest materials handling conveyors through to multi drive conveyor belts operating in arctic conditions. Covering industries such as food & beverage, materials handling, mining, wastewater treatment, recycling and more. Bonfiglioli products have proven to be adaptable to just about any application or condition.

The CAE Department

In order to ensure that each special request is engineered to withstand operating conditions, Bonfiglioli South Africa's Customer Applications Engineering (CAE) Department was established to translate customer requirements into design deliverables.

Customisations can be simple, such as a particular paint requirement; but more complex solutions often include special base-plates, braking systems, couplings, additional cooling, hydraulic motors, specialised seals or electronic sensors for integration into customer plant control systems.

In all these special cases, Bonfiglioli SA can rely on skilled engineers within the CAE department to solve customer challenges.

Whenever required, though, the Italian R&D department can be consulted, ensuring that global best practices and the latest technology are included in designs. With access to the most sophisticated CAD and FEA software available in the industry, along with additional computational software, Bonfiglioli can produce customised solutions that best fit business, application and industrial needs in terms of costs, efficiency, performance and reliability.

These software tools allow Bonfiglioli to generate substantial modifications to their standard solutions, where stress and modal analyses are used to ensure that the design meets the required specifications.

As an example of a recent, the Bonfiglioli South Africa CAE team successfully completed a large project where significant alteration had to be made to the gearboxes to accommodate the extreme environment. The site was in an isolated part of the world where the temperature range was over 100 °C between the arctic winter and blazing summer conditions.

For the expansion of this site, Bonfiglioli South Africa supplied multiple drives, which included an innovative electrically driven cooling solution that can be activated when required, while allowing heaters to work

optimally during the colder months. This approach enabled a compact and competitive solution to be supplied without having to oversize the drive.

Motion and Robotics Department

The structure and approach of the CAE Department is mirrored by Bonfiglioli's local Motion and Robotics Department, which takes a hands on approach to solving the control issues of customer drive applications. Within this department, Bonfiglioli personnel have access to various proprietary tools that help them to integrate electric motors with VSDs and PLC controllers to deliver customised drive and motion control solutions. This can be achieved through the use of hardwired control or one of the many industrial communication protocols such as Modbus TCP, Profinet, EtherCAT and other common standards.

Examples include balancing the speed of drives through a master and slave arrangement, using the available analogue inputs and outputs to transfer data between the drives. The Motion and Robotics division also has extensive experience in adapting drives for dynamic braking, which is typically used in applications such as industrial doors where the integrated solutions approach can be used to maximum effect.

The After-sales and Repairs Department

However hardy and long lasting an installed drive system is, there comes a time where servicing will be required. Bonfiglioli South Africa has a well-established team that is capable of refurbishing a gearbox to its as-new condition. Refurbishments and repairs are a cost effective way to ensure uptime and availability of customers' plant.

Using current company best practices and investment in industry inspection norms, each component can be verified for its fitness for service, which enables Bonfiglioli to deliver cost effective refurbished or repaired equipment with generous warranties.

Bonfiglioli has a relentless commitment to excellence, innovation and sustainability. The company creates, distributes and services the world-class power transmission and drive solutions that keep the world in motion.

www.bonfiglioli.com/south_africa/en

Customer standardises on SKF bearings and grease

The professionalism and thoroughness of SKF South Africa's Authorised Distributor, Bearing Services Springs, during a basic lubrication inspection, has resulted in the supply of lubrication solutions, grease, and SKF bearings to a leading building materials manufacturing customer.

“While we were assisting with on-site demonstrations of our Mapro products at the customer's request, we identified a number of lubrication issues,” explains SKF Product Manager for Maintenance Products, Eddie Martens. “In addition to the fact that lubrication was not being carried out reliably on their equipment, we also discovered that up to nine different types of grease were being used.”

The team from Bearing Services Springs immediately recommended that the customer standardise its grease, which would be more cost effective and logistically savvy. “We also suggested the use of SKF System 24 as the best lubrication solution since it offers a host of time- and cost-saving advantages,” says Melissa Verster, Branch Manager at Bearing Services Springs.

The System 24 LAGD and TLSD lubricators can be adjusted to ensure that the correct quantity of lubricant is carried to the required lubrication points in a pre-determined time. This gives the customer accurate control over the amount of lubricant supplied. “Moreover, the amount of lubricant required is reduced and so too is wastage,

which is also an environmental benefit,” notes Verster.

“We are extremely pleased that on top of the fact that the customer is using System 24 and now only stocking SKF bearings, it also took our advice to standardise on SKF LGWA 2 and LGHQ 2 grease,” continues Verster. She adds that the Bearing Services Springs team is in the process of setting up consignment stock for the customer and that it has been presented with a large RFQ for the supply of SKF power

transmission products, including chain and sprockets. “The customer is so satisfied with our product and service solutions that it has requested us to duplicate these successes at another of its plants South of Johannesburg,” discloses Verster. “Planning is already in place to commence with a CNA-Lube and also on the cards is a Fan solution focused on optimising Rotating Equipment Performance (REP) as well as training for our customer's staff.”

www.skf.com



Through SKF SA's Authorised Distributor, Bearing Services Springs, a leading building materials manufacturer has standardised on SKF LGWA 2 grease and SKF bearings.

Easy-fit heavy-duty HFS seals protect bearings

SKF's HFS radial shaft seals, which protect large bearings in demanding applications, are easy to retrofit and are available as stock items to allow fast replacement.

SKF's new HFS radial shaft seals protect large bearings from contamination in industries such as metals, mining and pulp & paper. Typical applications include heavy-duty gearboxes and drives, construction machinery and mining equipment.

Aimed at maintenance, repair and operations (MRO) staff, the fabric-reinforced rubber seals are easy to retrofit and are typically available as stock products, which makes for more efficient maintenance.

Popular seal sizes are available as stock

items, meaning that replacement parts can be delivered very quickly. HFS seals can easily be interchanged with other commonly used rubber fabric seals on the market. In addition to stock sizes, customised dimensions are available.

The seals also provide a number of sustainability benefits to customers. For instance, they help protect against loss of lubricant, while also saving resources by replacing large metal labyrinths. The extra protection helps to extend bearing life and promotes the use

of remanufacturing. The main sealing lip of HFS seals has a garter spring that provides the appropriate radial load against the shaft. All HFS seals can be equipped with lubrication grooves, which allow re-greasing between the sealing lips in back-to-back or tandem installations of two seals.

As well as being made to SKF's exacting standards, backed by test rig screenings, the seals have 100% traceability and SKF engineering support is widely available.

www.skf.com

Rising electricity price drives demand for higher-efficiency motors

With electricity prices increasing rapidly, the justification for adopting more efficient motors is that much greater. Bearings International (BI) BU leader for Motors and Drives, Stephen Bekker, explains.

To achieve improved efficiency and reduce the impact on rising prices, electric motors are designed to run cooler, which prolongs the insulation lifespan for added reliability. Although most First World and many local end users specify higher-efficiency motors, the South African market still largely opts for cheaper IE1 motors, which are cheaper to buy but more expensive to run.

"The bulk of South African low-voltage (LV) motor purchases are driven by price," notes Bearings International (BI) Business Unit Leader: Motors and Drives Stephen Bekker. On average, the initial capital outlay constitutes less than 5% of the cost of a motor over its lifespan. A small percentage is maintenance, while most of the running cost is the electricity consumption. The payback is generally under two years, with the average motor lifespan of ten to 15 years or more translating into an eightfold sav-

ing on the initial capital outlay. BI is an ABB Channel Partner for low-voltage LV motors. "ABB is regarded as one of the largest motor manufacturers in the world, if not the largest. It is a premium product known worldwide for its reliability and design," says Bekker. BI provides comprehensive support for ABB LV motors from sales to stock, technical support, application support and spares.

BI stocks the ABB IE1 and IE3 motor ranges, with IE4 and IE5 motors available ex-factory. The complete offering ranges from 0.55 kW to 355 kW and higher if requested. However, BI concentrates on the 15 kW to 250 kW four-pole motor range, believed to make up 75% of total IE3 motor sales.

"We have found that ABB motors are installed in many countries across Africa, so our aim is to make the LV units more accessible in terms of end-user sales. We are seeing more

of a demand in South Africa from an OEM and project specification perspective," adds Bekker.

Locally, mining has always proven a lucrative sector for BI. With high commodity prices and projects coming back online after delays due to COVID-19, this industry is a key focus for BI going forward. Other growth sectors include sugar, pulp and paper, food and beverage, and water and wastewater.

"ABB's extensive range allows us to offer high-quality solutions to all industries," stresses Bekker. BI has grown the Motors & Drives team from two people to a team of five with a sixth position still open. The Team includes a Product Development Leader, two Business Development Leaders and an electric motor technical expert. "Our plan is to train up technical support within BI, as well offer customer training," Bekker concludes.

www.bearings.co.za



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Ignite: Imagine the future and bring it to life

De Beers Group Ignite™ is now a unified global innovation arm for the De Beers Group, tasked with spearheading corporate and technology innovation initiatives. *MechChem Africa* talks to Sarandos Gouvelis, head of Incubation, along with Gordon Taylor, head of Commercial Technologies, about this holistic approach to innovation and some of their ongoing successes.

De Beers Group Ignite™, which integrates the De Beers South African and United Kingdom technology and innovation teams, is now one of the Group's core innovation arms, engaging in the full spectrum of innovation activities from ideation and fundamental research, incubation and commercialising of technologies to developing ecosystems, partnerships and corporate ventures.

"Under the De Beers Group Technologies South Africa banner we have long been engaged in the development and commercialisation of technologies for upstream mining operations. You may remember our XRT diamond scanning, sampling and sorting system; or our RhoVol advanced density profiling and sorting system for determining the density of an ore sample by measurement of the mass and volume of the sample on an individual particle basis," begins Gordon Taylor, who is now the head of Commercial Technologies for De Beers' IGNITE team.

"De Beers also operated a sister organisation in Maidenhead, UK, which, like us, developed proprietary diamond technology:



for sorting and grading diamonds according to size, quality and value, for example; and for the downstream marketing and retail side," he tells *MechChem Africa*.

Following a strategic review in 2019, De Beers recognised the synergy between these two technology groups and the advantages of establishing a new and global innovation platform to improve the overall impact of its innovation initiatives, Taylor adds.

Expanding on this, Sarandos Gouvelis, now the head of Ignite Incubation, says a much wider set of synergies was also recognised. "We were operating geographically separate



technology units and standalone hubs that were looking at specific problems such as robotics and technologies in the polishing industries. Then there was a corporate team of about five people who were developing De Beers' corporate innovation approach, how we approached new business models across the value chain as well as new technology ideas and projects that might result in new businesses, ecosystems and ventures," he continues.

"The outcome of the review was a decision to bring the global De Beers Group closer together from an innovation perspective,



The XRT Coarse Concentrator Plus incorporates an on-belt detection x-ray transmission sorter.

merging all the separated units and using technology and our corporate innovation framework to innovate in an integrated way across all aspects of our diamond business," Sarandos explains.

"This resulted in De Beers Group Ignite, which brings together the disparate hubs, technologies, research, science, innovation, business intelligence, product supply, etc, into a much more coherent overall entity that stretches all the way from ideation to implementation," he tells *MechChem Africa*.

"Ignite enables us to leverage our internal resources and look outwards into the world to get better ideas from academia, industry, other start-ups and carry these into new technology and business models. The approach enables us to merge our deep diamond knowledge, our technical expertise, our ability to create relevant cutting edge technology and instrumentation with our globally connected diamond business networks," he says.

Data and the IIoT

"While there's a lot of innovation in the equipment we develop, innovation also involves data and how we can use it to establish connections to look at better efficiencies, better effectiveness and better performance from the systems we use across the value chain," Gouvelis continues.

This involves looking at the broader resource management level, trying to manage and monitor production levels with much faster cycle times and to deal with operational problems more quickly.

"Superficially, this is about looking at process and machine performance, but at its core, it has to be about people. Any digital strategy has to start all the way at the bottom. It has to change people's lives and the way our operators engage in the diamond business, from the mine to the jeweller," argues Sarandos Gouvelis.

"While we do lots of condition monitoring, the innovations go beyond this. We are extracting data from the ore that we're processing, for example, and by analysing this additional data, we can make better predictive decisions about downstream processes," continues Taylor.

"With our x-ray transmission (XRT) diamond sorting technology, for example, there's a lot of extra information that we know is useful upstream. We have worked quite hard to make sure we can extract more of this information, to enable the size and shape of the diamonds and ore to be simultaneously measured during the sorting process, for example, which could ultimately lead to a greater degree of understanding and control of upstream mining and comminution processes.

Natural diamonds, Taylor explains, tend to have a set of unique characteristics that

can be categorised using various optical technologies, on a batch or individual basis. "From phosphorescence and unique laser-induced luminescence spectra data, we have created a diamond database system capable of uniquely identifying our diamonds," he says.

Gouvelis adds that the technology is already being used to identify synthetically manufactured or artificially modified diamonds in a mix of natural diamond stock. "It is very important for the security of our value chain, the protection of our markets and consumer confidence to be able to prove that the diamonds we sell are 100% pure, natural and untreated," he says.

"Customers are also becoming more interested in the origin of a diamond, not only where it comes from but the history of its journey through the supply chain. We are moving to being able to provide this story through the use of our technology and our digital backbone," he informs *MechChem Africa*.

Onboard the Benguela Gem

One of the latest deployments of De Beers XRT technology is for De Beers Marine Namibia onboard its custom-built diamond recovery vessel, The Benguela Gem. "The original core function of our XRT machines is to sample the size and frequency distribution of diamonds in the ore being mined," Taylor explains. "On the Benguela Gem, a gravel slurry is pumped off the seabed and transported onto the ship. Following dewatering, screening, density separation and x-ray recovery processes, the resultant diamond bearing gravel stream is passed through the XRT scanner, which immediately audits the size frequency distribution of the diamonds in the sample. Using this information the operational team can make real-time decisions concerning the mining or processing efficiency.

"This maximises the recovery potential of the process, adding significant amounts of value to De Beers Marine Namibia's operational efficiency," he adds.

The Benguela Gem will mine and 'can' diamond-enriched gravel for transportation to on-land sorting stations. "Ultimately, however, the XRT scanners will be set up as re-concentrators so that final diamond sorting can take start to take place as part of the process flow of the onboard mining operation," Taylor informs *MechChem Africa*.

Another technology with potential on the analytics side of Ignite's offering is RhoVol, De Beers' automatic densimetric analysis system that uses proprietary image processing to determine the volume of individual particles in a sample before measuring the mass of the same particle. "These two measurements en-



The RhoVol is a densimetric measurement system that determines the density of an ore sample in real time.

able us to calculate the density of the particles and build up a complete profile of the sample. The system can also use this information to sort a sample according to exact particle densities," Taylor explains.

"Our commercial machines can accurately process particles of 3.0 mm and above and Kumba Iron Ore has been using this system for several years to optimise the performance of the dense medium separation units.

"The next trajectory of this particular technology is to reduce the size range so we can process and analyse gravels in the size range of 1.0 to 3.0 mm. We have now developed a prototype system that goes from 1.0 to 8.0 mm, which covers the majority of the gravel size distribution passing through dense media separation processes. This enables the ideal ore separation density set-point to be adjusted in pseudo real time, helping to continuously predict and adjust plant settings for optimum recovery," he notes.

"From an innovation perspective, we are very conscious of environmental perspectives and the need to support De Beers 'Building Forever' initiatives. Ignite's new core vision is to purposely ask if we are doing good in the world. We want to leave the world in a better state than we found it, so all our operations and processes need to be contributing to reduced energy and water usage, smaller physical footprints and movement towards the circular economy.

"Ignite brings all of our forward looking initiatives together to deliver on the unified De Beers vision and purpose – and we love what we do, because it's seriously cool," Gouvelis concludes. □

Rubber lining protects equipment against wear, but choose carefully

Mines are well aware of the significant cost savings that can be achieved by using rubber to increase the wear life of equipment. However, selecting the right product for the application is vital. Yatheen Budhu, product manager for rubber products, hoses and spools at Weir Minerals Africa, explains.

Rubber lining is a highly skilled process which – when done correctly with the correct type and thickness of rubber – can contribute considerably to the life and profitability of a plant. Perhaps the first issue to clarify is that there is no single lab test to provide a definitive answer, according to Yatheen Budhu, product manager rubber products, hoses and spools at Weir Minerals Africa.

“The industry standard test for rubber materials is the ISO 4649 dry abrasion test; however most wearing materials on a mine exist in a wet environment,” says Budhu. “For this reason, our Weir Minerals specialists developed a modified version of the ISO 4649 test, the Wet Abrasion Resistance Index (Wet ARI) test, which can be used for wet abrasion testing and is better matched to what actually happens on the mine.

“The test was developed specifically to replicate wet slurry wear conditions for elastomers and, over many years of testing, has become the standard by which we can predict the wear, not only of our rubber but also that of our competitors, which enables us to rank them side by side,” he explains.

Yatheen Budhu makes the point that the same wear material – such as slurries, sand or aggregate – will behave differently in varying conditions. For this reason, Weir Minerals’

Wear Testing Programme includes unique tests such as the Weir Coriolis test, which is particularly suited for mill pumps, and the Wet ARI test.

“The range of options can seem overwhelming, but it is vital to select the right material for the job,” he emphasises. “Getting this wrong means shorter wear life and raises the risk of premature failures that could lead to unplanned stoppages for maintenance,” he warns.

Budhu highlights the proven ability of natural rubber to withstand abrasion, especially when its composition is close to the natural latex found in the rubber tree. This is where Weir Mineral’s innovative manufacturing process makes all the difference. “Each additional step in the production of rubber can damage its molecular chains and compromise the raw natural rubber’s excellent abrasion resistance,” he explains. “Through our unique liquid phase compounding process, we ensure that our premium rubber retains the essential properties of raw natural rubber and this allows it to deliver excellent wear life.”

After almost a century of successful operation in both industrial and mining applications, Linatex® rubber is renowned for reducing long term wear caused by fine particles, including the wet and abrasive conditions in mining. It is especially suitable for low angle applications



and its use includes the lining of pumps, piping, hoses, chutes, valves and tanks.

Where coarser materials are involved, Weir Minerals offers its Linard® range of natural rubber compounds. This material combines high flexibility with excellent resistance to cutting, says Budhu. Linard® compounds also resist deformation while providing anti-stick properties.

“The choice of liner solutions goes beyond natural rubber to include synthetic rubbers,” he says. “The latter are formulated to be used where corrosive chemicals and high temperatures become a factor.” For these applications, Weir Minerals developed its Linagard® range of synthetic rubbers. These can withstand the effects of leaching acids and hydrocarbons, as well as slurries which are hotter than 70°C.

“Rubber lining is a highly skilled process which, when done correctly with the correct type and thickness of rubber, can contribute considerably to the life and profitability of a plant,” Budhu concludes.

www.minerals.weir



Left: Linatex premium rubber retains the essential properties of raw natural rubber and delivers excellent wear life. Linatex rubber lining can be done at the Weir Minerals facilities or on a customer site. Right: The Linatex compounds are suitable for low-angle applications and are used in pumps, piping, hoses, chutes, valves and tanks.

West Africa opportunity for pioneering cement technology

With its range of equipment forging sustainability gains in the cement sector, FLSmidth is receiving global attention for its role in Europe's first full-scale clay calcination installation in France. With suitable clays being readily found in Africa – including West Africa – there is scope for cement production there to take another step towards zero emissions.

The cement sector in West Africa could make exciting use of clay calcination technology to reduce carbon emissions and energy consumption in cement production, in line with the industry's sustainability goals.

As a leader in clay calcination, FLSmidth offers its technology to replace a portion of clinker with environmentally friendly calcined clay, thereby cutting carbon dioxide emissions compared to conventional cement production.

According to Deon de Kock, FLSmidth President for sub-Saharan Africa, Middle East and South Asia, clay calcination is one of three

main areas of technology advancement in cement that the company is currently pursuing. In terms of the company's MissionZero pledge, it is committed to enable FLSmidth customers to run cement production at zero emissions by the year 2030.

"In addition to clay calcination, we are focused on enabling the replacement of fossil fuels with alternative fuel sources, and on enhancing carbon capture in cement plants," says De Kock. "Our current involvement in Europe's first full-scale clay calcination installation has raised interest globally, and we look forward to applying this technology in our Africa, Middle East and South Asian region."

The cement sector has had a difficult few years, says De Kock, having to deal with a challenging economic climate while under pressure to meet ever-more stringent environmental regulations and expectations.

Sridhar Shanmugha Sundaram, FLSmidth Vice President for Cement in Sub-Saharan Africa, Middle East and South Africa, highlights that FLSmidth's new flash calciner system can produce a highly reactive clay that increases the clinker substitution by up to 40% in the final product.

"Addressing the bottom-line issue, this solution also brings energy savings as calcined clay activates at a much lower temperature than clinker – with required temperatures of 750 to 850 °C instead of 1 400 to 1 500 °C," Shanmugha Sundaram says. "This means lower costs to generate the necessary power."

He notes the process can deliver significant fuel and power savings of 30% and 40% respectively, when comparing the operating cost of making a tonne of clay versus a tonne of clinker. While a traditional 'ordinary Portland cement' (OPC) contains 95% clinker and 5% gypsum, 'green' cement can contain as little as 50% clinker – with 30% activated clay, 15% limestone and 5% gypsum. This has a dramatic impact on the plant's carbon footprint, reducing CO₂ emissions per tonne of cement by 40%.

In addition to FLSmidth's strong presence in South Africa is its Ghana office where a 13-strong team of local people is committed to developing local expertise and capacity in the West African region. According to Joseph Appiah-Kubi, General Manager of FLSmidth in Ghana, the company's corporate social responsibility programme includes a graduate scheme to empower Ghanaians, transfer skills and provide opportunities in the economy to young graduates.

"This year we have had our first cohort of graduates working with us as part of the government's compulsory National Service Scheme," he says. "We will also soon be receiving our first cohort of graduate trainees – those who have finished one year at service engineering school and are coming to us to learn. This gives young people vital experience in the workplace to improve their employability in the market," says Appiah-Kubi.

www.flsmidth.com



The colour comparison with and without FLSmidth's new flash calciner technology.



FLSmidth is receiving global attention for its role in Europe's first full-scale clay calcination installation in France.



Jan Schoepflin, general manager sales and service at Kwatani.



Frengelina Mabotja, Kwatani's head of sales for SADC.

South Africa-based vibrating screen and feeder specialist, Kwatani, will soon add another installation to its extensive footprint in the Northern Cape, this time for a Greenfields expansion for a new customer in the iron ore mining segment.

"We have over 1 000 screens, grizzlies and feeders in this important mining region, giving us a market share of about 95% of heavy-duty screening applications there," says Jan Schoepflin, Kwatani's general manager for sales and service. "With our well-established branch in Kathu, we are also able to assure our new customer of quick and highly competent service levels."

The characteristics of iron ore demand mechanically robust screening equipment and Kwatani has built a name for itself in these applications, according to metallurgist Frengelina Mabotja, Kwatani's head of sales for SADC. "Our equipment is engineered for tonnage and continuous throughput, without compromising efficiencies."

Kwatani's scope of work on the 700 t/h dry processing plant includes a 1.5 m wide grizzly screen to remove fines from the run-of-mine material before it reports for secondary crushing and a 1.5 m single deck scalping screen. The company will also install two 2.4 m wide, double-deck sizing screens to separate material after secondary crushing, and five feeders to draw material from bins and stockpiles

New iron ore mine added to Kwatani's footprint

Another robust screening solution from specialist local manufacturer Kwatani will soon be installed at an iron ore mine in the Northern Cape, where its equipment dominates the heavy-duty screen market. The customer will also have the benefit of being closely supported by Kwatani's regional branch in Kathu.

onto conveyor belts for feeding into the downstream process.

"Our niche expertise allowed us once again to offer high performance sizing screens customised for this unique dry-sizing application, which optimises material separation and delivers the customer's required cut size," says Mabotja. "Our solution also maximises efficiency and ensures mechanical reliability for continuous and economical production."

She highlights the depth of in-house experience – from both a metallurgical and mechanical approach – that allows Kwatani to assist the decision-making of customers on equipment choice and specifications. With 47 years in the vibrating screen and feeder business, the company can bring its myriad lessons in the field to bear on each project.

"Through the work of our design team, supported by our manufacturing and testing facilities, we have ensured that the solution will be fit for purpose and reliable," she says. "The customer was also able to regularly visit our 17 000 m² local manufacturing operation in Kempton Park to see how we work, to check on fabrica-

tion progress and to witness the testing process," says Mabotja.

This level of engagement with customers builds their confidence in Kwatani's ability, as they can experience first-hand the systematic, quality-controlled approach to design and manufacturing in the company's extensive ISO 9001:2015-certified.

The equipment was completed on a tight deadline of eight to 12 weeks, for delivery by year-end in line with the customer's timeframe.

"Our fully-equipped branch in the Northern Cape, staffed by specialists with decades of mining experience, will oversee the installation and commissioning of the equipment," says Mabotja. "Our team will also schedule regular site visits to monitor the equipment's performance and condition, and advise on maintenance requirements."

To underpin the reliable operation of all equipment supplied, Kwatani will also provide training for the customer's maintenance personnel in the basic maintenance routines required.

www.kwatani.co.za



A selection of Kwatani screens including a grizzly, a double deck screen and feeders, all destined for a customer in the iron ore mining industry.

DE BEERS GROUP

IGNITE™

Save valuable time on analyzing samples required for process plant optimization

In today's demand driven world, accurate data is required to make informed decisions in less time. Ensure your plant is optimized to operate at maximum efficiency by using leading edge technology designed to deliver rapid results.

The **RhoVol** instrument is a densiometric measuring system that provides rapid on-site information on the density distribution of ore samples.

The combination of information derived from the diverse data set range provides the necessary information for decision making, on-site, within an hour.

Additional sample information includes weight, volume, flatness, elongation, and compactness on an individual particle by particle basis.

Batch samples are autonomously treated with the results presented on the screen and available in spread sheet formats on a particle-by-particle basis for easy analysis.



Features

High speed analysis

- Representative results within an hour

2 Models available

- Fines unit (-8mm +3mm)
- and Coarse unit (-25mm +8mm)

Safe, easy to use, globally supported

- Minimal training required
- No consumables
- No toxic heavy liquids required
- Small sample size requirement [typically 1000 particles]
- Digital Screen Display and Data Export to Excel
- Treats all material types and shapes

For more information contact De Beers Group Ignite™
E-mail: contactignite@debeersgroup.com
<https://ignite.debeersgroup.com>





Faan Borman, Multotec technology manager for Research and Development.

Using its extensive in-house testing facility for material from a South African manganese producer, Multotec has defined a solution that will upgrade the quality of saleable concentrate while reducing the content of manganese in tailings. According to Faan Borman, technology manager for research and development in Multotec's technology division, the customer had specific targets it wanted to reach. These targets aim to optimise revenue from recovered minerals and improve environmental performance, as a level of more than 10% manganese

Testing at Multotec improves manganese recoveries

Better mineral recoveries are being achieved during test work at Multotec's in-house testing facility, proving that revenues can be improved and tailings reduced by applying a combination of different technologies. In a recent project for a manganese producer, the company has demonstrated how well its ultra-fine spiral concentrator and magnetic separator work in conjunction.



Better recoveries were achieved during test work using the spiral concentrators together with the wet high-intensity magnetic separator (WHIMS) at Multotec's in-house test facility.

in the tailings would require the tailings dump to be classified as hazardous.

"The test work we conducted was to improve recovery of ultra-fine material from

the thickener underflow," says Borman. "The financial benefit of better recoveries is to produce a richer concentrate, but it is also to reduce the metal content in tailings – so that it will not be regarded as hazardous waste." Two sets of test work were designed and conducted. In the first set, stockpile material with a metal grade of 16% was tested using Multotec's UX7 ultra-fine spiral concentrator for the roughing and scavenging phases, while its SC21 five-turn spiral was used for the cleaning stage. This allowed the target saleable grade of 32% to be achieved, he says, but there was still some work to be done to reach the tailings target grade.

"This required some out-of-the-box thinking for the second set of tests, where we ran the material over the wet high-intensity magnetic separator (WHIMS) with a vertical ring," he says. "At the highest intensity, this was able to downgrade the spiral tailings material from 13 to 14% right down to 7% manganese – a significant improvement."

He highlighted that for process plants to achieve the most viable solutions they must optimise the use of cost effective equipment and strategies. Given the higher cost of applying WHIMS technology, the testing procedure using spirals

Wet High Intensity Magnetic Separators (WHIMS)

Wet High Intensity Magnetic Separators (WHIMS) from Multotec combine magnetism, matrix rotation and gravity to paramagnetic materials. Applications include heavy minerals, ilmenite, manganese and iron ore (haematite) beneficiation; PGM upgrading; as well as manganese recovery from slimes dams. This offers innovative new approaches and technology for solving paramagnetic minerals separation processes that are as efficient as they are cost-effective.

Magnetic separators that use permanent magnets can only generate fields of low intensity. These work well in removing ferrous tramp but not fine paramagnetic particles. High intensity magnetic separators focus on the separation of very fine particles that are paramagnetic.

A current is passed through a coil, which creates a magnetic field. This

magnetises the yoke and finally the matrix ring. The paramagnetic matrix material behaves like a magnet and attracts the fines. The ring is rinsed when it is out of the magnetic field and all the magnetic particles are carried into a magnetised launder within the rinse water. This technology also employs unparalleled high gradients to allow recovery of fine material down to 15 µm.

WHIMS was specially adapted by Multotec to accommodate the demands of the African environment. This has resulted in highly specialised magnetic separation equipment that complements and enhances Multotec's existing solutions offering.

WHIMS is ideal for Ilmenite recovery and Silica sand cleaning and for the recovery of fine, weakly magnetic minerals from slurries.

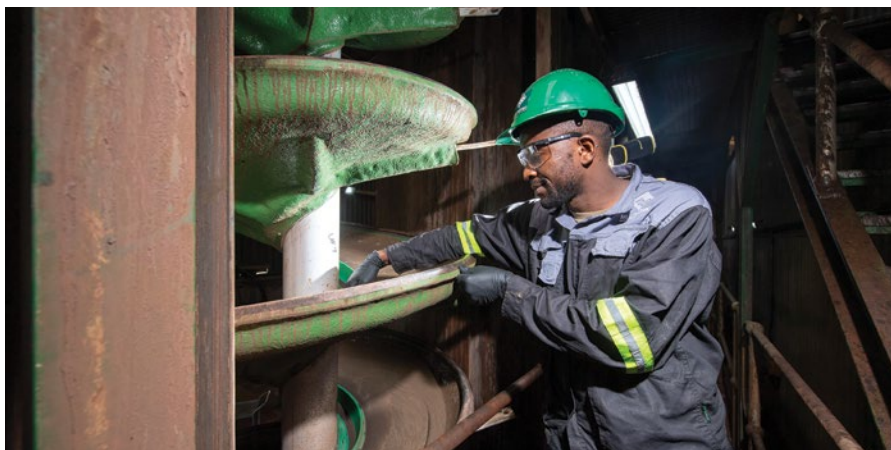
www.multotec.com

was able to remove gangue minerals and reduce the volume of bulk material before being treated by the WHIMS.

"Another benefit of this process was that about a third of the material sent to the WHIMS in this process could be returned to the spiral circuit for further upgrade to meet specifications," he notes. "This considerably reduces tailings volumes, potentially cutting down the footprint of the tailings storage facility and extending its lifespan."

Bornman says that the cost of managing tailings facilities in a compliant manner, and the tightening regulations and policies on tailings dams, are encouraging a trend to re-process them. Technology improvements in metal recovery over the years now makes these re-treatment efforts commercially attractive.

"We have had considerable success



Manganese stockpile material was tested using the Multotec UX7 ultra-fine spiral concentrator for roughing and scavenging phases, and the Multotec SC21 five-turn spiral for the cleaning phase.

in applying the spirals together with the WHIMS, as it is key to ensure sufficient bulk reduction up front," he says. "The process can be applied across a range of

commodities, and we have also seen good results in minerals including chrome, iron ore, lithium and mineral sands."

www.multotec.com

Bulk bag discharger with integral conditioner and bag dump station

Flexicon's new BULK-OUT® BFC Bulk Bag Discharging System promotes the flow of bulk solid materials that have solidified during storage and shipment, automatically discharging the material while allowing manual additions of ingredients from sacks, drums and other containers.

A cantilevered I-beam with electric hoist and trolley lowers a bag lifting frame to floor level for rapid attachment of the bag to patented Z-CLIP™ bag strap holders. It then hoists and rolls the bag into the safety frame, eliminating the need for a forklift.

The integral conditioner consists of two hydraulically-actuated rams with specially contoured conditioning plates that press opposing sides of the bulk bag. A Human-Machine-Interface (HMI) housed in a NEMA 4 (IP 56) enclosure controls the stroke and number of ram actuations. The electric hoist can be used to raise and lower the bag for conditioning at varying heights.

For bulk bag discharging, the bag outlet spout is pulled through an iris valve mounted on top of the dust hood over the hopper. Once the bag outlet is secured and the iris valve is closed, the bag spout drawstrings can be untied, the dust-tight, snap-action access door closed, and the valve slowly released, reducing uncontrolled bursts of material into the hopper and dust into the plant environment.

For manual dumping in conjunction with, or independent of, bulk bag discharging, the operator raises the hinged door and adds the material from smaller capacity

containers through a coarse screen into the hopper. A fold-down support tray serves as a bag rest.

The hopper can be configured to connect to pneumatic or mechanical conveyors, or directly to downstream process equipment. The discharger can also be configured for weigh batch discharging with the addition of load cells and a programmable controller.

Models are available in carbon steel with durable industrial coating with stainless steel material-contact points, or in all stain-

less steel finished to industrial, food, dairy or pharmaceutical standards.

Flexicon also manufactures other configurations of bulk bag dischargers, bulk bag conditioners, and bag dump stations as well as flexible screw conveyors, tubular cable conveyors, pneumatic conveying systems, bulk bag fillers, drum/box/container tippers, drum fillers, weigh batching and blending systems, and engineered plant-wide bulk handling systems with automated controls.

www.flexicon.co.za



Flexicon's BULK-OUT® BFC Bulk Bag Discharger with integral Bulk Bag Conditioner and Bag Dump Station conditions materials prone to solidifying during shipment or storage.



Add-on CTS services for air compressors

MechChem Africa talks to Ian Ainsworth, Business Line Manager for Atlas Copco Compressor Technique Service (CTS), about the company's advanced add-on services for helping clients to get the best possible value, efficiency and reliability from their compressed air.

“For us at Atlas Copco, after sales service has always been critical, no-matter how sophisticated the compressor solution turns out to be. We are now in a position to offer Atlas Copco Tier 1, Tier 2 and premium Tier 3 Atlas Copco compressors, which, on a lifecycle cost basis, can compete with any of our competitors at all levels,” begins Ian Ainsworth, the Business Line Manager for Atlas Copco CTS in South Africa.

“Many customers seeking a simple air compressor are tempted to buy the lowest-cost import they can find, without considering after sales service, spares availability or the reliability repercussions. Within months, we find owners of these systems requesting

spares and repair services from us, while their asset sits idle, interrupting income generating production,” he argues.

He says that Atlas Copco does have economical Tier 1 compressor solutions in its range, for use by SMEs or for non-essential use by larger industries. “But for every compressor we supply, we make sure that spares and after sales support is available to enable us to respond to and overcome any compressor problem a client may experience in one of our units,” Ainsworth assures.

Generally for Tier 1 clients, however, high performance, energy efficiency and continuous uptime are not critical factors, he continues, but for Tier 3 clients whose production depends on a reliable and continuously available supply of compressed air, the importance of a quality and reactive service offering is much better understood.

“At this level, everything we now sell is connectable for data collection and use to analyse

performance and to better manage energy use, uptime and equipment life,” he says.

SMARTLINK: Atlas Copco's advanced compressor monitoring solution

“We often find compressor rooms in South Africa where the compressors are all running but nobody is looking after the equipment. When the essential seven bars of compressed air for the company's operations fails, only then does anyone start to look for a key to open the locked room,” Ainsworth tells *MechChem Africa*.

Without connectivity, maintenance personnel have to rely on regular visits to the compressor room to check the status of their equipment and a logbook is needed to keep track of running hours and service requirements.

To help make this easier for clients, Atlas Copco has introduced SMARTLINK, which can be fitted to most Atlas Copco compressors to automatically gather and analyse data from operating compressors.

“SMARTLINK offers operators full transparency about the condition and health of the equipment supplying process air to the plant. As well as providing alarms in advance of a potential breakdown, SMARTLINK minimises the administrative burden on maintenance technicians, giving them better day-to-day efficiency and replacing the need for regular status checks,” he points out.

Atlas Copco CTS offers several levels of service using SMARTLINK. At the basic levels, SMARTLINK offers an easy and quick way to access the online service log book, and request quotes for parts and additional repair services. It is a direct replacement for routine status checks and record keeping.

“We can also offer SMARTLINK as an uptime service, which will alert an operations or maintenance manager via a text message whenever an alarm is triggered that requires urgent attention. Not only can this prevent a breakdown, but it enables us gather information about installed systems to help schedule necessary maintenance and to plan that maintenance so our technicians arrive with the spares needed and can get systems up and running as fast as possible,” he adds.

Ainsworth also notes that CTS in South



Through an Atlas Copco AIRPlan contract, a new modern compressed air solution can be installed without the client having to find any upfront Capex to fund the investment.

Africa has recently employed an energy consultant to focus on energy recovery systems and identify ways of helping users of Atlas Copco systems to reduce their energy bills.

In the context of SMARTLINK, this puts Atlas Copco CTS in South Africa on the path to using SMARTLINK to monitor and report on the energy efficiency of customers' compressor rooms. "In a compressor room with four machines, for example, we will regularly find that all four are set to run all the time. But two machines can often deliver the total air demand, so the other two can be switched off. This immediately halves the amount of energy being used.

"By adding smart controllers, we can ensure that the right number of compressors are on, which minimises energy losses while still delivering the exact amount of air needed at any time," he explains.

Ainsworth emphasises that these services are not one-size-fits-all offerings. "We visit customers to do an audit about how well their needs match the currently installed equipment. We can then produce a report that analyses the benefits of making changes – installing additional controllers, energy recovery systems or SMARTLINK, for example, while detailing the lifecycle costs and energy savings benefits that can be achieved," he says.

AIRnet: Atlas Copco's modular piping systems

Air leaks on compressed air systems are the most common source of energy losses. In addition, leaks from the compressed air piping can result in contamination of the pipe network, which is particularly problematic when dry, oil-free or high purity air is needed downstream.

Atlas Copco's AIRnet provides a compressed air piping distribution solution from start to finish. "We are able to offer a range of lightweight and modular piping systems that is also easy to modify and expand, without having to interrupt ongoing operations," Ainsworth informs *MechChem Africa*.

The AIRnet offering includes piping options in aluminium, the standard for many industrial applications; stainless steel, which is used to ensure 100% oil-free air delivery in production environments such as pharma, health, food and beverage; and polyamide, a cost effective piping system that is ideal for delivering air to pneumatic tools.

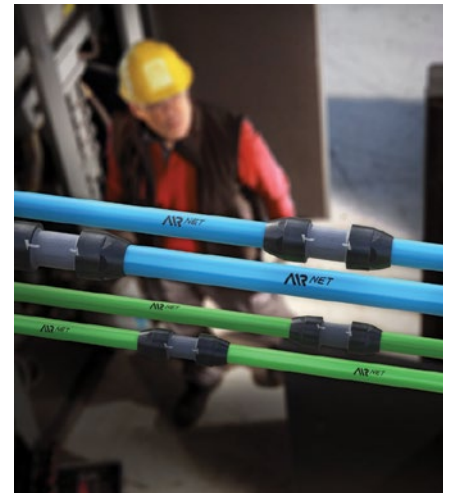
"These systems help our clients to get the best value from their compressed air installations, reducing pressure losses, contamination, leaks and inefficiency," he points out.

AIRPlan: a new way of financing infrastructure

Persuading people to invest in optimisation initiatives in today's constrained economic



AIRnet piping is available in aluminium, the standard for many industrial applications; stainless steel, for environments such as pharma, health, food and beverage; and polyamide, which is ideal for delivering air to pneumatic tools. Right: Atlas Copco's AIRnet provides a compressed air piping distribution solution from start to finish.



environment is not easy, suggests Ainsworth. "People are struggling to keep their doors open right now, so it is difficult for them to invest for the long term." This has caused a general shift away from having large capital expenditure budgets (Capex) to allow companies to focus instead on sustaining their operations from the operating expenses (Opex) budget.

"We have introduced AIRPlan to accommodate anyone with a maintenance budget that cannot justify the Capex to buy the solution that best meets their operational needs," says Ainsworth.

Through an Atlas Copco AIRPlan contract, a brand new modern compressed air solution with all the monitoring and control technology to keep it running efficiently can be installed on the shop floor without the client having to find any upfront Capex to fund the investment.

AIRPlan is an industrial lease-type agreement that covers the investment and the servicing of the equipment over a two to three

year period. Atlas Copco funds the purchase and the client signs a lease agreement and service plan with regular monthly payments. "This allows the equipment to be funded from OPex, the idea being to increase uptime and improve reliability while not burdening clients with agonising investment decisions," he explains.

"Clients can bypass the ordering delays that always arise though Capex decision making processes and bureaucracy, while immediately benefiting from the better production and, in the long term, from energy efficiency savings and reduced downtime," he says.

"We believe it is important to educate customers in the advantages of fit-for-purpose solutions that offer the best compromise between the investment costs, the long-term running costs and the production losses associated with extended downtime. And with AIRPlan, the difficult investment cost decision is taken out of the equation. It's a win-win, for the short-term and the long-term," Ainsworth concludes. □



SMARTLINK can be fitted to most Atlas Copco compressors to automatically gather and analyse data from operating compressors.

Zest WEG delivers its biggest mobile substation yet

Leveraging its considerable in-house expertise and local manufacturing capability, Zest WEG has custom designed and manufactured a mobile substation solution for Guinea – its biggest such mobile unit yet manufactured in South Africa. The innovative 50 MVA substation will perform a range of duties for the Utility Company of Guinea, including providing emergency and standby power.



The largest mobile substation built to date by Zest WEG in South Africa is designed for minimum installation time, to be suitable for both temporary or permanent installations and to be used in a range of applications.

Leveraging its considerable in-house expertise and local manufacturing capability, Zest WEG recently custom designed and manufactured one of the largest mobile substations ever built in South Africa.

The 50 MVA mobile substation – destined for Guinea – includes a dual voltage rated mobile transformer produced by WEG in Brazil, according to Bernard Mitton, engineering team leader for integrated solutions at Zest WEG. The substation will be commissioned in 2022.

“This is a full turnkey project procured by Robustrade in Dubai for the Utility Company of Guinea, called Electricité De Guinée,” says Mitton. “Our in-house team co-ordinated the electrical, civil and mechanical designs, as well as the engineering solutions for the customer.”

The full project includes three trailers of equipment, and allows the end-user to step down power from the main national grid at various geographic points as required. High voltage power is tapped from existing overhead lines with a specifically designed and manufactured tee-off solution connecting the supply into the mobile substation, where it is stepped down from 110 kV or 60 kV to 20 kV or 30 kV depending on requirements.

“From the 50 MVA mobile substation, the supply is then distributed to a 30 or 20 kV mobile switching station, containing an

incomer and five feeders,” Mitton explains. “Mini-substations can be fed directly, or a cable can feed to a junction box in the field, usually where there is an existing cable in the ground.”

As part of the project, Zest WEG designed and supplied a cable reel trailer with all the power and control cabling needed for the mobile transformer and mobile switching station. Included on this trailer are 30 kV field junction boxes to assist with the cable

connection between exiting cables already installed and the supply cables from the mobile switching station. These boxes allow for up to three feeder cable connections. The advantage of this design, he notes, is that the junction box becomes a termination point. The termination ends of the on-site cable do not need to be redone, and all that is necessary is a bolt-on connection.

“This mobile substation solution is suitable for both temporary and permanent installa-



New technologies such as hybrid circuit breakers have been employed, along with disconnectors, earthing switches, ring-type current transformers, inductive voltage transformers and surge arresters.

tions, so it can be used in a range of applications," Mitton says. "For emergencies, it can replace an existing substation transformer in the event of failure, and for standby applications it can handle temporary overloads at substations."

It can also be put to use during routine maintenance, to manage the loads of existing substations being maintained, repaired or inspected. This minimises the delay in taking out the unit due to load and other system constraints. The mobile substation can even be used to provide power for large project sites or mining sites of high importance.

Mitton highlights that the design and construction of solutions for mobile applications, including mobile generators, is one of Zest WEG's strengths. The expertise and capability within the business allow these units to be custom-designed to suit customer requirements. In fact, none of the mobile solutions provided to date has been identical.

"We have acquired valuable experience from many years of designing, manufacturing and supplying mobile solutions in modular configurable designs – mainly for Africa and Latin America," he says. "These are not off-the-shelf products, but are custom-engineered solutions to technically comply with user specifications, integral requirements, the operational environment, logistical requirements and the safety of the operating personnel."

The mobile substation for Guinea includes innovative design features such as the integration of several functions into a compact, modular design. New technologies such as hybrid circuit breakers have been employed, along with disconnectors, earthing switches, ring-type current transformers, inductive voltage transformers and surge arresters.



The high voltage is stepped down from 110 kV or 60 kV to 20 kV or 30 kV, depending on requirements, by a dual rated mobile transformer designed and manufactured by Zest WEG.

"All the functionalities are included in a single prefabricated solution, while space requirements for switchgear bays are reduced through high integration of components," says Mitton. "The substation's transformer was specifically designed and manufactured by WEG in Brazil for mobile applications."

Other special features include bushings made of composite silicon rubber, as well as an advanced mechanical and electrical safety interlock system. The modular design simplifies on-site installation, as all equipment has been pre-fabricated, pre-wired and pre-tested before shipping.

"This enhances the reliability of the solution, which translates into high availability and less maintenance," he says. "It also simplifies the transport, logistics and commissioning."

The order for the mobile sub-station was

placed just before the COVID-19 lockdown in early 2020, so the project had to be managed under challenging conditions. The factory acceptance testing of key components, for instance, could not be done in person due to travel restrictions – so this was successfully done through virtual platforms across different time zones.

"All in all, we embraced the new communication technologies and proved once again that we could deliver to customer requirements even under unprecedented conditions," Mitton says.

"Being able to meet the stringent requirements of Electricité De Guinée, through close collaboration with the Robustrade team, ensured the project was a success, proving this solution suitable for use across the region," he concludes.

www.zestweg.com

Redstone CSP achieves first debt draw down

The 100 MW Redstone power tower concentrated solar power (CSP) project has achieved its first debt drawdown on the largest renewable energy investment in South Africa to date.

The African Development Bank acted as the Mandated Lead Arranger (MLA) and Coordinating Bank for the total R11.6-billion investment, with its own commitment of R2.306-billion. The project has also secured financing from international and South African financial institutions, including ABSA, CDC Group, DBSA, the DEG from Germany and the FMO from The Netherlands, Investec, Nedbank, Sanlam, and the IDC.

Redstone is led by ACWA Power, a leading Saudi developer, investor and operator

of power generation, water desalination and hydrogen plants in 12 countries, which is also the lead shareholder in Redstone. Co-shareholders include the Central Energy Fund, Pele Green Energy and the local community.

Located in the Northern Cape Province of South Africa, the Redstone project will be equipped with a 12-hour thermal storage system that will deliver clean and reliable electricity to nearly 200 000 households round the clock. The construction for the project is currently in its ninth month, with engineering works over 58% completed.

The tower foundation for the project, a key construction milestone, has now been completed with the commencement of operations scheduled for Q4 of 2023.

Redstone CSP will offset an estimated 440 metric tons of CO₂ emissions per year while also providing value-adding ancillary services to Eskom. The project is certified under the Climate Bonds Standard and Certification Scheme and aligned with the goals of the Paris Climate Agreement, which seeks to limit global warming to under 2.0°C, while efficiently delivering clean energy to the national grid.

The project will reach close to 44% local content on procurement during the construction period; create more than 2 000 construction jobs at its peak, with about 400 from the local community; and will create approximately 100 permanent direct jobs during the operating period.

www.afdb.org

BMG World Goes Green

In the first phase of its three-phase solar project, BMG has commissioned a 450 kW solar plant at BMG World, the company's central distribution and manufacturing site and head office in Johannesburg.

“The first phase of BMG's new solar plant, which was installed by Emergent Energy, a specialist provider of green energy solutions, forms part of the company's three-phase solar project,” explains Darryn Wright, Group Marketing Executive, Engineering Solutions Group (ESG). “This renewable energy initiative will contribute to BMG's commitment to enhancing an eco-friendly environment by reducing the carbon footprint of its largest site. This installation will also significantly lower electricity costs at BMG World.

“Emergent Energy has entered into a Power Purchase Agreement (PPA) with BMG, effectively becoming a supplier of electricity to the company. The cost of each unit of electricity supplied is substantially lower than local council tariffs, thus giving BMG a substantial saving. These savings are likely to increase in time, as the council tariffs increase.

“Photovoltaic (PV) modules – which use daylight, not direct sunlight to generate electricity – are gaining popularity globally as a form of renewable energy that is clean, emission-free, sustainable, safe and cost efficient. Planning for a solar system formed part of the major extension to BMG World in 2015. The new warehouse was designed to accommodate solar panels, but was also aligned to ensure maximum solar panel efficiency.

Key reasons for transitioning to solar are fourfold, notes Wright:

- Reducing the carbon footprint of BMG's distribution site and head office.



BMG has commissioned a 450 kW solar plant at BMG World, the company's central distribution and manufacturing site and head office, in central Johannesburg.

- Lowering energy costs, especially as Eskom tariffs have been consistently increasing above the CPI rate.
- Deteriorating infrastructure in central Johannesburg, which has led to more and lengthy power outages and thus increased running costs.
- The inconvenience of regular loadshedding due to Eskom's challenges to meet demand, which result in increased costs through running generators to ensure reliability of our supply-chain.

“BMG's conversion to green energy is be-

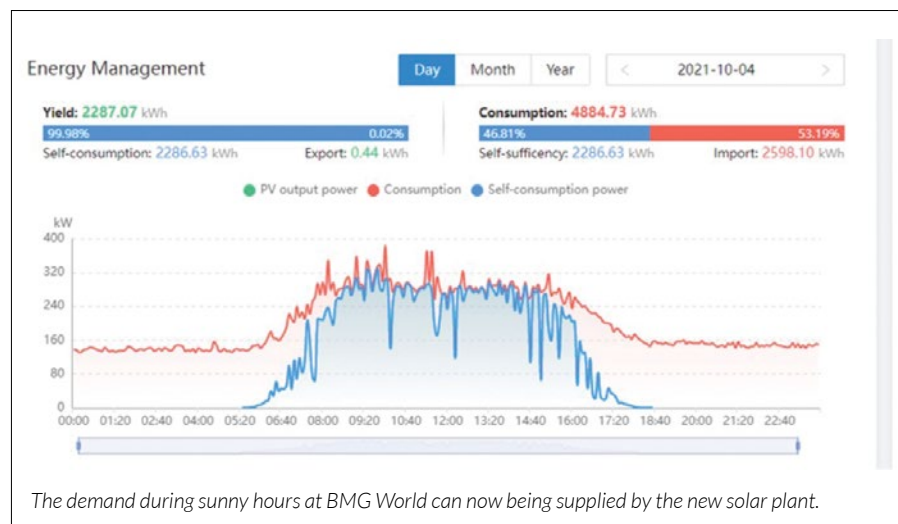
ing implemented in a phased approach. Phase 1, now completed, will allow BMG to run the main distribution facility and reception building on solar,” he continues.

Phase 1 comprises 1 000 Longi PV panels, six Huawei inverters that convert the dc generated into useable ac power, and an Eaton integration system, which integrates and controls the power from the onsite generated solar system, the inbound council supply and the backup diesel generators to best meet demand.

In Phase 2, more solar panels will be installed on the BMG World structure and on the adjacent Fluid Technology and Mechanical Drives buildings. This project, which is expected to be completed by the second quarter of 2022, will mean that the entire BMG World campus will be running off solar during normal working hours.

Phase 3 will see further panels being erected on the new warehouse building, with the possibility of feeding this power back into the grid. This phase can only be implemented once legislation and local council bylaws permit. The agreement is currently under review and will potentially allow power generated by BMG World's solar system to be fed to other BMG branches in the greater Johannesburg area.

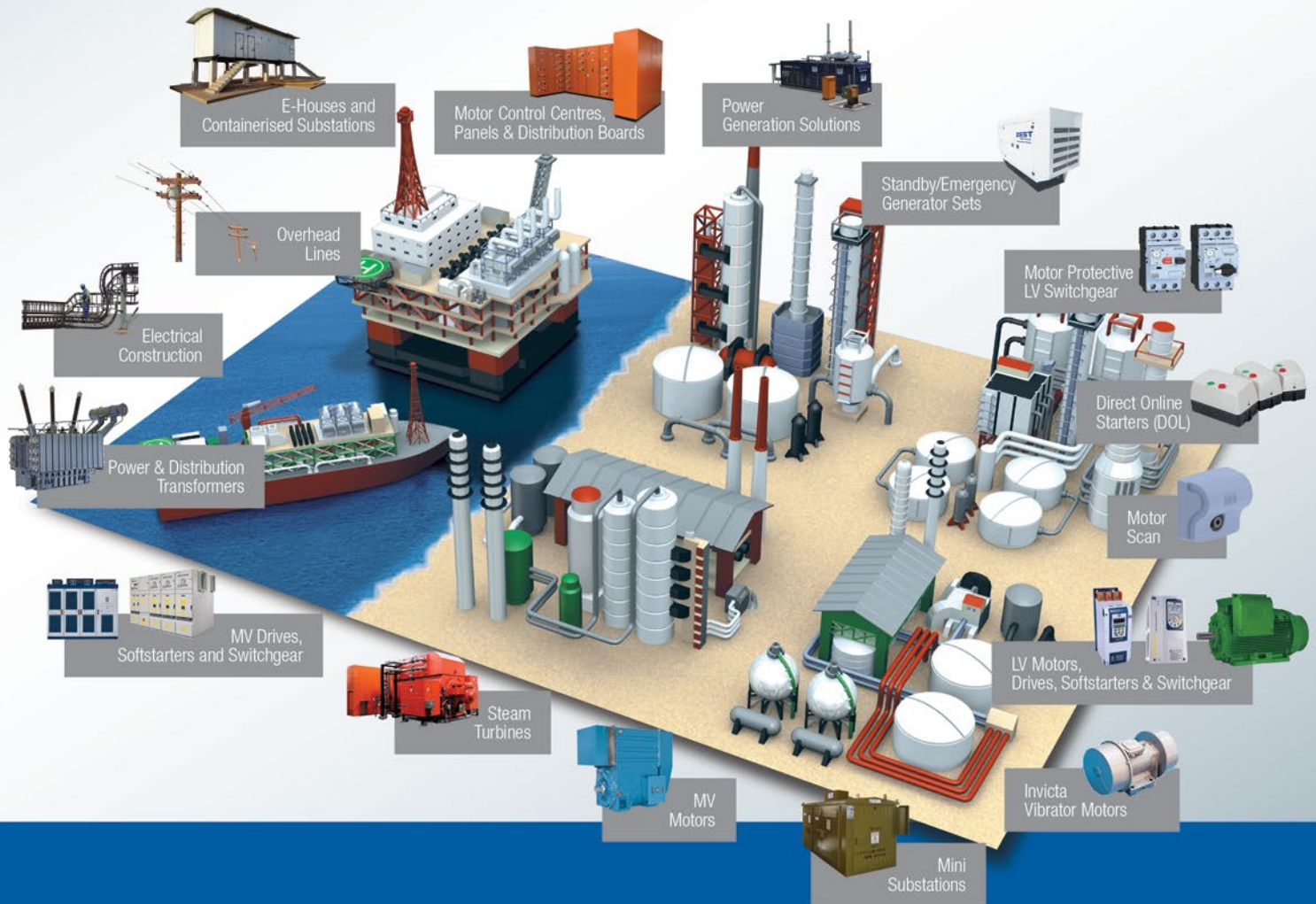
www.bmgworld.net



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ZEST

WEG Group

FHV7 smart camera delivers reliable GMP-compliant drug labelling

Steierl-Pharma, a pharmaceutical company from Bavaria in Germany that specialises in naturopathy, has modernised and optimised its labelling processes with an inspection system based on the OMRON FHV7 smart camera. Steierl-Pharma's MD, Steffen Wegner, tells the story.

Hardly any other industry is subject to the high quality requirements and legal regulations as those of pharmaceutical companies. This applies to active ingredients, production and storage as well as to the labelling process. The labels must be robust and stick reliably for the usability period of the drug, which can be up to five years. Labels carry important information including the name of the drug, the active ingredients and the manufacturer, along with variable data such as expiration date, lot number and serialisation information.

Establishing a valid labelling process is therefore key. At the same time, the processes should also be as efficient, fast, and sustainable as possible.

Steierl-Pharma relies on the support of OMRON automation experts in this regard. By using a new labelling system with smart camera technology, Steierl-Pharma can now reliably label its pharmaceuticals at high process speeds. The labels are printed with variable data on batch designation, expiration

date and, if required, the dispensing notice: "Sample not for sale".

Steierl-Pharma is a medium-sized pharmaceutical company in the field of naturopathy and produces liquid doses of its medicines in cylindrical glass containers. Company products include: medicines for the musculoskeletal system; for lowering blood pressure; for relieving migraines; for skin diseases; or for treating flu-like infections.

The producer has the legally required manufacturing license for medicinal products as well as Good Manufacturing Practices (GMP) certification, so as to guarantee process integrity in drug production and conformity with applicable regulations. When it comes to filling and packaging medicines, Steierl-Pharma uses a production line designed for around 3 600 units per hour.

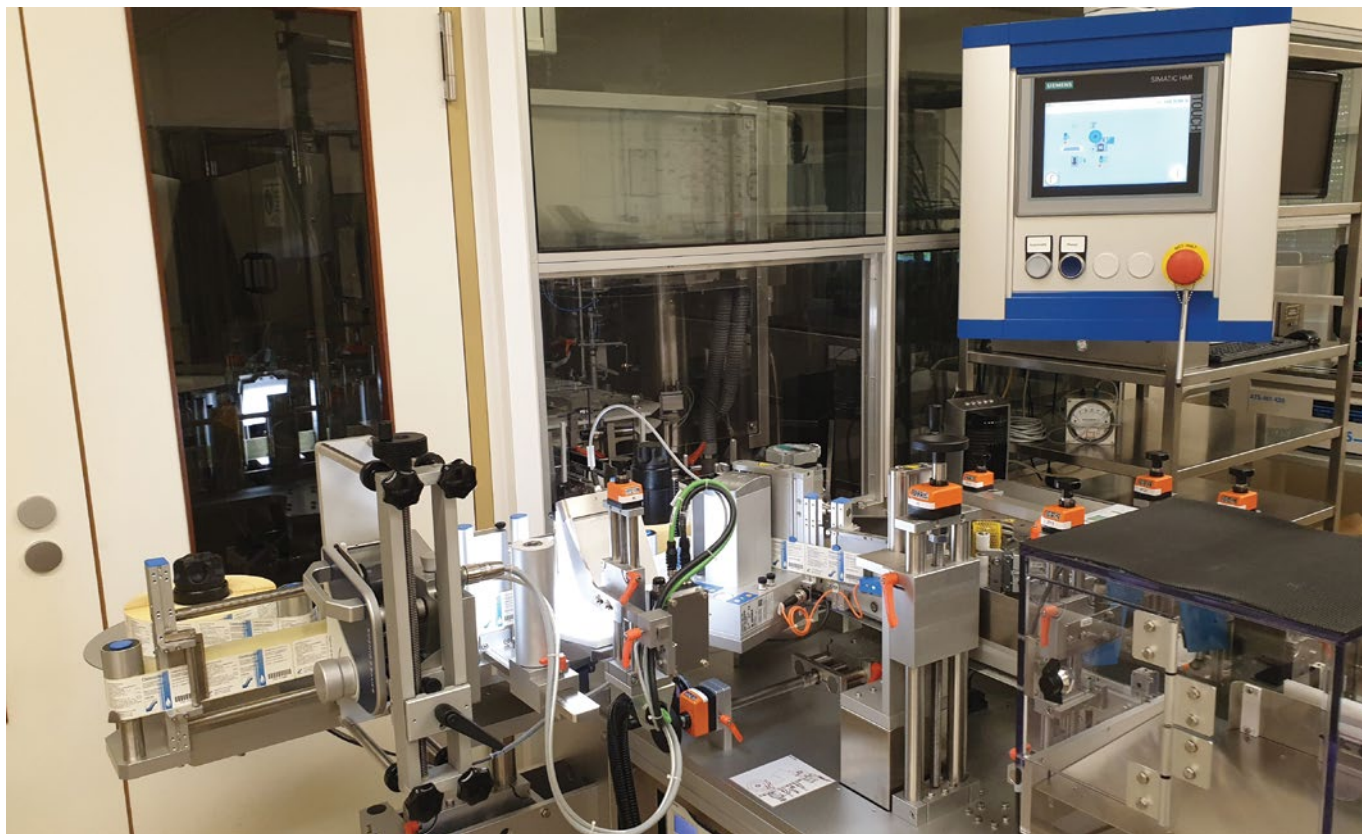
This line consists of a filling and capping machine, a labeller and a packaging machine. The line ensures a continuous and seamless process consisting of filling and closing the bottles with a dropper insert and a screw cap.

The closed bottles then leave the cleanroom and enter the labeller, where they are labelled and then packed at the packaging machine into a folding box together with an information leaflet.

Unintentional machine stops and read errors

In 2019, a project team at Steierl-Pharma began to consider a replacement for an older labelling machine. "The labelling machine used until then already had a smart camera-based inspection system to check the identity of the label and the variable data – batch name and expiration date. This, however, had two drawbacks: first, labels were repeatedly misread as bad labels, and second, bad units were not rejected, even when the labelling process was stopped.

This meant that when the machine stopped, the bottles backed up into the filling machine, while the packaging machine ran empty. "So we had a 'bottleneck' in our process," reports Wegner. He continues: "That's why we worked



Steierl-Pharma production line consists of a filling and capping machine, a labeller and a packaging machine.

with the manufacturer, HERMA, to find a suitable inspection system. The focus here was on high reliability and pricing." The company's aim was to develop a labelling machine that, on one hand met the high requirements of the GMP area, but on the other hand, ran without interruption during regular operation.

One of the central criteria was that the new inspection system should work particularly precisely – bad labels with errors such as an incorrect or illegible barcode, or a batch or expiry date error should be detected reliably.

Steierl-Pharma wanted a high level of specificity – the system should only detect actual bad units and then eject them from the process. In addition, with an output of around 60 labels per minute, the inspection system has a time window in the range of milliseconds for the complex inspection tasks.

The OMRON FHV7 smart camera

The central component here is the inspection system. Wegner explains: "We decided on the OMRON FHV7 smart camera after an onsite test on our label material, which was supported by an OMRON application engineer. We were supported by OMRON throughout the entire development process, all the way up to commissioning and qualification of the machine."

With the help of the FHV7, the HERMA labelling machine at Steierl-Pharma checks the identity of the label generated from the pharmaceutical code and verifies the batch numbers and expiration dates via OCV (Optical Character Validation) for compliance with the specifications.

The FHV7 series smart camera provides illumination and image processing functionality for enhanced visual inspections. Due to its world-first multi-colour light and a powerful

high-resolution 12-megapixel camera, only a single FHV7 camera is needed to perform high-precision visual inspections of the production line.

During the performance qualification the project managers involved were surprised by the extremely high specificity of the FHV7. "We could not believe how extremely reliable the OMRON FHV7 inspection system could be. As part of challenge testing, we deliberately introduced mislabels, all of which were reliably detected – and with a throughput of several 10 000-label batches, not a single good label was incorrectly read as a bad label," reports Wegner.

Even single faulty product label can cause a lot of trouble in the GMP environment. By using the new camera such situations do not occur, and machine outages caused by the incorrect reading of an accurately labelled bottle are prevented.

Another advantage of the OMRON camera is the software, which is intuitive and does not require lengthy training. "I really like the option of a customisable user interface, and so do the users. There is only one window in which, for example, the target code, batch designation and expiration date can be entered. Code verification and OCV can also be performed. It's all very clear and simple," explains Wegner.

The software runs on any current Windows system and communicates directly with the FHV7 via the local network. Wegner also praises the high inspection speed of the OMRON system, "The complex individual inspection of a label takes just 80 milliseconds, that's impressively fast."

Inspection system and support

"We are very satisfied with the new labeller and especially OMRON's inspection technol-



The OMRON FHV7 smart camera can reliably perform the complex individual inspection of each label in just 80 milliseconds.

ogy. In a highly regulated environment such as the pharmaceutical industry, manufacturers must be able to rely fully on the technology that is used, while also being able to successfully complete the qualification. This is the case with us; the cooperation with the sales and application team was and remains excellent," MD Steffen Wegner sums up.

Since the company has had such a good experience with OMRON, it is planning to convert another existing packaging machine to OMRON inspection technology in the near future.

www.industrial.omron.co.za

New GEMÜ position indicators and combi switchboxes

Valve manufacturer GEMÜ is expanding its product range for automation components in the processing industry. The new electrical position indicators GEMÜ 1240, 1241 and 1242 and the combi switchboxes GEMÜ 4240, 4241 and 4242 ensure reliable recording of valve-end positions to form the basis for successful process automation – even in potentially explosive areas.

An integrated sensor on the new range of GEMÜ electrical position indicators and combi switchboxes records the end position of process valves and transmits it to the plant control system via a signal. With combi switchboxes, the process valve can also be actuated with the integrated pilot valve.

The process valve and automation components are optimally adapted to each other. The entire system is preset

and tested, saving users' time and effort for logistics, installation and documentation. The new electrical position indicators and combi switchboxes can be combined with single-acting or double-acting linear actuators or quarter turn actuators and are therefore suitable for diaphragm, globe and diaphragm globe valves as well as for ball valves and butterfly valves. Users can benefit from designs with simple proximity switches or microswitches, but GEMÜ also offers programmable solutions with 24 V, AS-Interface, DeviceNet and IO-Link interfaces for modern process automation.

Designs with ATEX, IECEx or NEC approvals are available for potentially explosive areas. As a result, users can achieve reliable monitoring of the installed valves, especially for plants with strict safety or

quality requirements. GEMÜ also supports customers during the automation of their plants in external process environments.

www.gemu-group.com



The new range of GEMÜ electrical position indicators and combi switchboxes record end positions of process valves and transmit them to plant control systems.

MOVI-C: the all-in-one modular drive automation solution



MAXOLUTION engineer Dylan Enslin of SEW EURODRIVE SA introduces the new MOVI-C® range of drive automation solutions, which is now available in South Africa and will soon be one of the key product lines to be locally assembled in the company's Aeroton premises in Johannesburg.

With a long history of developing drive-train and motion control solutions for processing and production applications, SEW-EURODRIVE's new MOVI-C® suite of modular products solidifies the company's claim to be an all-in-one provider of drive automation solutions.

"Globally, starting from simple motion control using our SEW-motors, gearboxes, gearmotors and inverters/variable speed drives (VSDs), we have steadily become a competitive automation provider. With the upgraded MOVI-C range, we can now offer better than ever capabilities to control the speed, acceleration, position and torque of multiple motor-driven axes of control systems – with excellent resolution," explains Dylan Enslin, SEW EURODRIVE's MAXOLUTION engineer.

"In addition, the accepted safety norms to meet industrial regulations have all been embedded into the MOVI-C's modular suite of products, which includes a complete range of VSDs, controllers (PLCs),

digital interfaces (IOs), software and programming solutions, along with the gearmotors and servomotors that physically move modern automated machines," he continues.

Describing the modular nature of the offering, Enslin says that fit-for-purpose solutions can be implemented for single- or multi-axis applications; for particularly complex motion control applications; and for customised machines such as robots or factory production lines. "MOVI-C® is ideal for optimising or expanding existing automation systems or for rapidly implementing new automation projects where flexibility, rapid deployment and cost-effectiveness are key," he says, adding that the range offers everything needed from a single supplier.

The end-to-end MOVI-C solution from SEW-EURODRIVE includes planning, commissioning, operation and diagnostics software; all of the electronic drive control and monitoring devices; and all the mechanical drives and gearmotors. This enables the system components to be fully integrated to achieve the machine control required and the range offers complete freedom when it comes to the communication – from PROFINET and Industrial Ethernet to Modbus.

Find the right drive technology

The MOVI-C modules that make up a system are designed to directly suit drive automation applications from simple to very complex. The SEW range includes gear units for standard and servo applications that come in different sizes and with different outputs, speeds, torques,

designs and varied finishes, all combined with asynchronous or synchronous (servo) motors. Linear motors, electric cylinders, brakes, built-

in encoders and diagnostic units provide the finishing touches for this wide-ranging portfolio.

"For single-axis automation such as conveying," Enslin explains, "MOVI-C® inverter technology or the newly developed MOVIDRIVE application inverters can be coupled with MOVIMOT® flexible mechatronic drive systems. These can be connected to a higher-level master MOVI-C® CONTROLLER via a fieldbus interface. Alternatively, the MOVI-C master controller can be used to directly synchronise all of the MOVIGEAR® systems on the conveying line, which each have its own built-in VSD," he says.

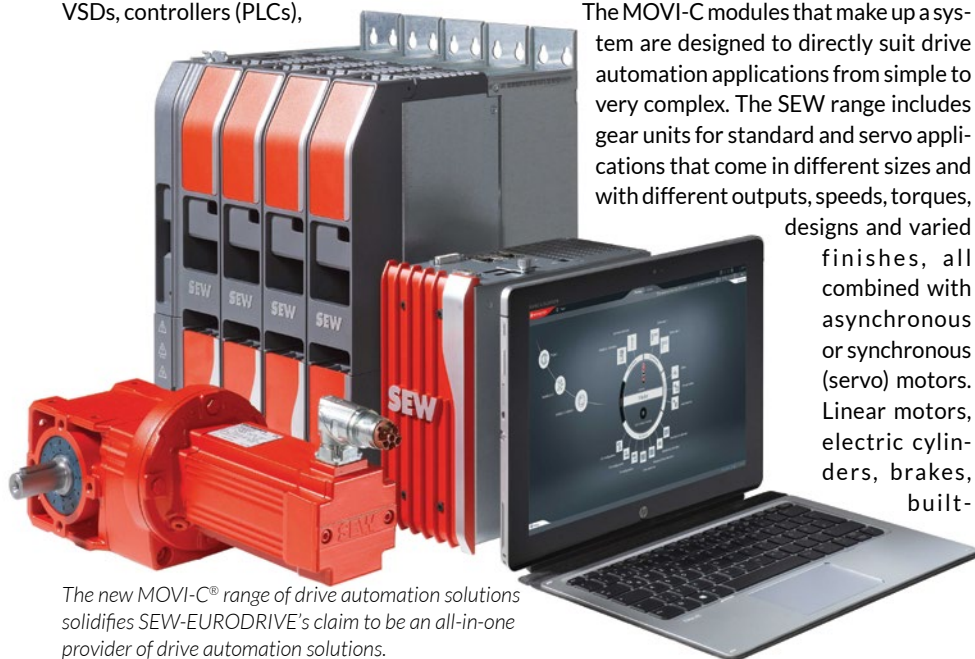
For programming the VSDs, he says that predefined MOVIKIT® software modules enable parameters to be entered via a graphical interface to quickly and easily set up the output motion control required. Each axis can be controlled individually via the network controller and data is stored on a memory card in the integrated or decentralised VSD units.

"There are many applications for single-axis automation solutions, from mixers, pumps and fans to a host of conveying and product transfer operations where regulation of the speed, acceleration and torque of the drive motor may all come into play.

He describes a simple nut fastening machine for an assembly plant. "Initially, the speed can be high to reduce the time it takes to thread the screw onto the stud. But as soon as the nut begins to tighten, the system switches over to torque control, stopping the motor as soon as the pre-programmed ideal torque is reached," Enslin explains.

For motion control involving multiple decentralised axes, such as multiple column hoists, robots and manipulators with auxiliary axes, each axis will typically be driven by its own MOVIMOT® mechatronic drive system, with all the necessary decentralised peripherals such as position and speed sensors. These will be linked to a MOVI-C® CONTROLLER via EtherCAT® or SBusPLUS to achieve real time synchronisation.

The MOVI-C® CONTROLLER may also receive setpoint updates for single-axis or coordinated positions/motions from a higher-level master controller via the fieldbus.



The new MOVI-C® range of drive automation solutions solidifies SEW-EURODRIVE's claim to be an all-in-one provider of drive automation solutions.

Predefined MOVIKIT® software modules can again be used to implement the motion control drive functions for many kinematic scenarios that cover a large percentage of typical automation requirements – and if needed, new kinematic functions can be custom-written by SEW-EURODRIVE.

“For higher level and customised programming, we have MOVISUITE® engineering software, which runs on a laptop and covers commissioning and all aspects of the motion control in operation as well as diagnostics,” Enslin points out. “The MOVISUITE® user interface is easy to follow, intuitive and self-explanatory and all the components in a MOVI-C® automation system, from inverters and controllers to motors, gear units and drive systems, can be configured, commissioned and monitored, end-to-end, using this software,” he says.

For module automation, such as packing and processing machines and complex transportation tasks, all the drive functions for the motion control topology are available. Graphical editors can be incorporated to manage drive functions and the automation tasks can be managed and allocated from a higher-level master MOVI-C CONTROLLER, or implemented in part or in full via MOVIKIT.

EtherCAT® devices can also be integrated, either centrally or decentralised, along with the MOVIGEAR, MOVIDRIVE or MOVIMOT drives and inverters, while the use of MOVISUITE engineering software makes programming quicker and simpler.

“Our MOVI-C is available with the EtherCAT CiA 402 Common interface, which is used by many leading global OEMs for their VSD Interfaces. This is a standard interface for communication between controllers, VSDs and other connected devices. It gives our new MOVI-C range plug-and-play compatibility with other drives and PLCs on customers’ sites, enabling us to swap out existing drives for MOVIDRIVES or to retrofit or extend a drive automation system without having to replace all the system components,” says Enslin.

The common EtherCAT protocol also enables motion-slave type applications to be implemented using MOVI-C devices. These involve series-integrated machines on a production line, with numerous axes and kinematic calculation being performed by higher-level PLC controllers.

The CiA402 profile enables MOVIDRIVE®, MOVIMOT® and MOVIGEAR® systems to be connected directly to a controller via the integrated EtherCAT interface. This makes integration into higher-level controllers particularly quick and easy because extensive conversion work is not required.

On the energy efficiency side, Enslin notes the particular advantage of decentralised drive solutions using the MOVIMOT gear-motor with its built in inverter. “On a long conveyor with 45 gearmotors, the control panel can be a kilometre away from the furthest gearmotor, so if the MOVIDRIVE VSDs are all in that panel, the VSD power losses are significantly higher. With the mechatronic

MOVIMOT units, these losses are significantly reduced.

“Energy efficiency can be further improved by adopting our new IE5 servo gear units, which not only offer the highest efficiency available, but their speed can also be very accurately controlled without the need for encoder feedback,” Enslin says.

As with many SEW-EURODRIVE solutions, the MOVI-C modular range has been developed for easy customisation of customer-specific automation needs. “We are currently bringing in component stock to assemble MOVI-C units at our new Aeroton facility. We have built a clean electronics assembly area behind closed doors with copper grounding and anti-static mats to assemble our VSDs. Movigears and Servo Motors, which are currently only assembled Cape Town, will also be assembled and repaired on the main floor of the new Johannesburg facility. The assembly rooms are antistatic, dust free electronic assembly rooms.

“Because a large portion of our product range was developed in cooperation with one of Germany’s prestigious automotive OEMs, we are listed as one of their global best-practice suppliers. We are already quoting on systems for a local assembly plant here in South Africa and we hope this success will trigger enquiries from many more local systems’ integrators and plant automators,” concludes Enslin.

www.sew.co.za



The MOVI-C® range of VSDs and controllers will be built in the new factory in Aeroton, behind closed doors in a clean electronics assembly area with copper grounding and anti-static mats.

After-market service solutions deliver low cost of ownership



Brian Bower and Jacob Makola from Atlas Copco Power Technique attend to a customer's equipment maintenance requirements.

Atlas Copco Power Technique's professional and comprehensive after-market service solutions help to optimise machine and equipment performance, boosting productivity and production for ultimate business profitability. "Our service solutions incorporate general maintenance and repairs to all Atlas Copco mobile equipment including pumps, compressors and light towers," says Business Line Manager for Power Technique's Service Division, Douw van Schalkwyk. "Alongside complete and/or partial rebuilding of portable equipment components, our portfolio also extends to operator training focusing on general maintenance procedures."

"We understand how important low total cost of ownership (TCO) is for our customers, irrespective of their application in sectors such as water well and exploration drilling, mining, quarrying and construction," continues Van Schalkwyk. "There really is only one way for customers to achieve low TCO and that is by adopting regular service and maintenance

plans carried out by qualified OEM technicians using OE parts."

Van Schalkwyk stresses that service quality is just as important as regular maintenance: who is performing the service and how is it being carried out? In terms of the 'who', Atlas Copco advises customers to appoint only OEMs to service their machines. "As an OEM, Atlas Copco must follow global requirements and adhere to international rules and standards. This compels us to create a pool of highly trained, highly skilled product specialists who know the products inside out," he says.

Addressing the 'how', Van Schalkwyk highlights the importance of following the OEM's recommended service intervals and using only OE parts. "A preventative maintenance culture will help to reduce the risk of component failure and the resultant unplanned, costly stoppages, subsequently increasing machine availability and extending life cycles."

Citing high pressure compressors as a good example of why OE parts are so important, Van Schalkwyk explains that sub-standard parts are known to fail under high pressure and, in many cases, result in an internal fire. Moreover, in the event of a warranty issue, the customer, having followed the OEM's recommended service intervals, can depend on the OEM for an immediate response. "We, as the OEM, will carry the consequential damages resulting from the failed part. Failure to follow OEM requirements, however, will result in claims being declined, leaving the customer with down time and repair-related costs," he warns.

www.atlascopcogroup.com

African-born solar smart PV geyser

Electrolux South Africa and PowerOptimal have announced the Elon Smart Water Solution, the world's first smart geyser with integrated solar PV capability. With improved efficiency, the locally designed solution reduces cost and risk across the entire hot water and services value chain.

"We are excited about this new smart and environmentally sensitive water heating solution as we believe it will revolutionise the installation, customer experience, maintenance and cost of geysers for property developers, insurers and households alike. Once the Elon Smart Water Solution is widely implemented in the region, the demand will grow because businesses and consumers will quickly reap the environmental, maintenance and financial benefits," says Murray Crow, Managing Director at Electrolux South Africa.

He adds: "We aim to become a global sustainability leader in our product lines; our company constantly seeks solutions that help shape living for the better. The smart hot water solution exemplifies the Electrolux Group's ambition to reduce the carbon footprint of our products and our operations overall."

Through its sustainability framework, For the Better 2030, Electrolux is committed to becoming climate neutral across the value chain and globally works at reaching its climate targets. Since 2015, the company has reported a 70% reduction in absolute CO₂ emissions from operations. The brand aims to develop products and services that enable people to save energy, water, and resources every day while helping to foster a more circular economy.

poweroptimal.com

www.electrolux.com

TLT-Turbo Africa accelerates growth and reach

TLT-Turbo Africa has secured orders from six major new clients in the copper, platinum and gold sectors for the supply of mining ventilation equipment. These include clients based in Australia, USA and Kazakhstan. The contracts continue TLT-Turbo Africa's successful two-decade record of delivering advanced, efficient and high-performance surface, underground and auxiliary mining ventilation solutions for Africa and across the world.

Closer to home, TLT-Turbo Africa has retained 20 clients in mining, minerals processing and the automotive industry – pre-dominantly based in the sub-Saharan

region. "These clients return to us based on the performance of our products and the ways in which they have enhanced their operations and reduced their operational costs. This, coupled with our service delivery track record, continuous customer engagement and competitive pricing has helped us to secure returning revenue from clients who have become more like partners to us over the years," comments Vusi Madlopha, TLT-Turbo Africa head of sales and business development.

TLT-Turbo Africa MD, Christo Gelderblom's vision is to position the company as a global supplier of air movement

technology. "Over the past few years, TLT-Turbo Africa has invested in the research and development needed to advance our technology and enhance our customer consultation and care culture. We have listened to our clients and the faith they have in us is echoed in the respect we have for their expertise and input," he says.

In addition to continuous enhancement of its existing mine ventilation offering, TLT-Turbo Africa is enhancing its product offering to include mechanical vapour recompression and evaporation technologies for industrial process plants.

www.tlt-turbo.africa

Bosch Rexroth Africa empowers DRC-based partner

In its commitment to provide ongoing support and training to its partners across Africa, Bosch Rexroth Africa Development facilitated training to its distributor NAMA Consulting in the Democratic Republic of Congo (DRC). The training included an introduction to Bosch Rexroth company, Häglunds Drive Systems, as well as its product portfolio and applications. This session, was presented by Häglunds Sales Engineer, Akis Muepu.

An additional objective of the training was to expand the scope of supply that can be achieved through the Bosch Rexroth Group of Companies to end users in the DRC. The training enables NAMA Consulting to identify future projects and to supply a complete service to its customers.

Bosch Rexroth Africa Development assisted with the communication and planning of the session, which was conducted in French. "We designed the training session with the objective of sharing knowledge with the NAMA team, specifically on hydraulic drives and Häglunds prod-



Bosch Rexroth Africa Development (BRAD) recently facilitated Häglunds Drive Systems training for its distribution partner in the Democratic Republic of Congo (DRC), NAMA Consulting.

ucts," explains Craig Walkden, Systems Sales Technician at Hytec South Africa. "The training not only develops partner skills but ensures a productive and effective partnership with the Bosch Rexroth Group," he elaborates.

NAMA Consulting is the Authorised Distributor of Bosch Rexroth SA Group hydraulic, pneumatic and automation products in the DRC. Bosch Rexroth Africa Development, formerly Hytec Services Africa, is a Bosch Rexroth SA Group Company.

www.boschrexroth.africa

Conceptainer: it's all in the packaging

Conceptainer specialises in the custom-design and local manufacture of labelling, packaging, transport and storage solutions for many industries, including the automotive sector. These high-performance products comprise labelling, storage and packaging products, that encompass collapsible thrift bins, spillage boxes, label holders, pallet-free bulk bags, repair tape and anti-static poly propylene corrugated board. "Our team works closely with customers throughout Africa, in automotive, mining, food and beverage, warehousing and freight and we customise our products to suit specific requirements and to efficiently overcome packaging challenges," explains Ken Mouritzen of Conceptainer.

"Conceptainer's flexible systems are suitable for customers in the automotive industry, who either need to ship components great distances or deliver parts locally. It is critical that goods and products are easy to identify and locate and that they are correctly stored and securely packaged for transporting. "Our turnkey industrial packaging solutions have been developed to protect product integrity and for reliable stock control, while ensuring efficient handling, stacking and storage," Mouritzen assures.

www.conceptainer.com



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Shumani diversifies into port-handling equipment in KZN



Shumani Industrial Equipment MD Victor Nemukula.

The largest black-owned and managed industrial equipment supplier in South Africa, Shumani, aims to become a significant player in the provision of port equipment. While currently based in Gauteng,

Shumani has seen growth in Durban over the past two years. "Due to this growth in our business in KwaZulu-Natal, we are on the lookout for premises to house our staff and equipment. We believe Durban is the next growth area for us after Johannesburg," says MD Victor Nemukula.

Shumani supplies port equipment to Transnet Freight Rail and Transnet Port Operations on a short-term rental basis. "This has been particularly good for us. As our first major client, it has enabled us to offer a comprehensive service for this market segment," continues Nemukula. Since Transnet operates under the Public Finance Management Act, it issues a request for proposals every three months, which requires that Shumani submit fresh bids.

"The past 12 months have been excit-

ing. We were able to show significant growth and keep our existing customers. We were also able to diversify the business by making inroads into the port-handling, mining, and construction sectors, among others," highlights Nemukula.

Shumani is an appointed dealer for all Goscor Group companies that import industrial equipment for the South African market. It supplies world-class equipment across the breadth of the industrial and construction sectors. Brands on offer include Bendi, Crown, Kalmar and Doosan in the forklift market; along with construction equipment brands such as Bobcat, Sany, HPower, Weima, Luthian, Ozen and Sullair. In the cleaning equipment segment, Shumani offers Tennant, Genie, Sentinel and HighPoint cleaning brands.

www.shumani-industrial.co.za

€1.2-million committed to SA's youth

Through an MoU between the South African Department of Higher Education (DHET) and Schneider Electric, and a bilateral agreement between Schneider Electric and the French Development Agency (AFD), these three parties have partnered to invest in South Africa's energy sector.

The agreements focus on creating training opportunities for South Africa's youth based on five key objectives: training 10 000 people on energy-related subjects before

2027; training of trainers; capacity building for the practical skill requirements of trade testing; the rollout of digital education programmes through the Schneider Electric Academy; and support for South African entrepreneurs in the energy space. A total of €1.2 million euros has been allocated to this programme by AFD, Schneider Electric and the Schneider Electric Foundation.

"Young people are our future, and we must give them the skills and the opportunity to access successful careers," said

Zanelle Dalglish, Director of Sustainable Development and Academy, Schneider Electric Anglophone Cluster. "We want to collaborate to equip as many South Africans as possible with the knowledge and expertise to enable access to the economy from the energy sector.

"They are the people who will accelerate our energy transition to green, renewable energy sources and we are grateful for the support from the AFD and the Schneider Electric Foundation to expand our programmes," she says.

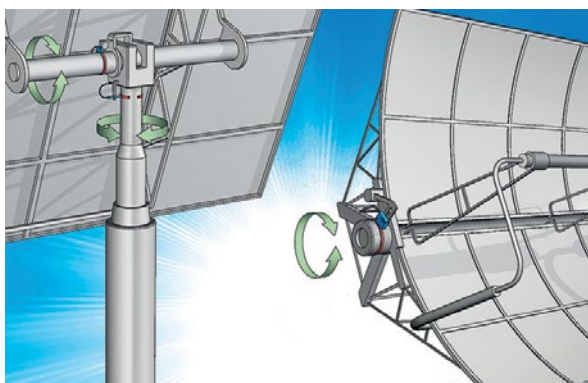
www.se.com/en

Measurement technology for sun-tracking systems

In solar-thermal power plants, sensors are used for precise measurement of angle and position to enable the system to capture the maximum amount of sunlight. The downstream control system receives the required feedback of position from the sensors, then adjusts the actual value to the corresponding setpoint.

The required angle or setpoint is stored in the controller depending on the time of day and consequently the solar altitude angle. The collectors can assume any position and consequently follow sun movement very accurately.

INSTROTECH, the instrumentation and process control specialist that represents SIKO in the local market, is proud to offer SIKO sensors that excel in this industry due to durable, long-lasting and climate-resistant technology.



SIKO's sun-tracking products from INSTROTECH include translation modules, inclinometers and magnetic sensors.

Many years of research and experience have enabled the company to develop reliable measurement technologies for position detection of photovoltaic panels, solar mirrors and parabolic modules.

The benefits of using SIKO sun-tracking measurement technology on solar power

plants include:

- Optimal efficiency thanks to high repeatability.
- Wear-free and low-maintenance.
- Simple and inexpensive mounting.
- Climate- and UV-resistant from -40 to 85 °C
- Incremental or absolute options are available.
- Open or integrated
- Absolute angular accuracy of up to 0.05°.

SIKO is a system supplier in position detection, working with customers to provide customer-specific solutions and ensuring best efficiency at low process costs. The company's sun-tracking products include SIKO translation modules, ASA510H; SIKO inclinometers, IK360; and SIKO Magnetic sensors, MSA501 and MSK5000.

www.instrotech.co.za



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The Trial Reservoir: accelerating the pace of water technology adoption

Xylem, in partnership with water consultancy Isle Utilities, has introduced an industry-first approach to funding and scaling for breakthrough water technologies. Called The Trial Reservoir, the initiative will tackle one of the major sticking points in the industry's transformation: the pace of technology adoption. Piers Clark, the founder and chairman of Isle Utilities, and Sivan Zamir, head of Xylem Innovation Labs, explain.

Across the global water sector, new partnerships are sparking innovation and helping to fast-track solutions to the world's most urgent water challenges. "At Xylem, our innovation ecosystem is at the heart of how we solve water; we are constantly exploring new ways to join the dots between stakeholders and forge creative alliances across the sector," says Sivan Zamir, head of Xylem Innovation Labs.

"Our new partnership with water consultancy Isle Utilities will tackle one of the major sticking points in our industry's transformation: the pace of technology adoption. Through The Trial Reservoir's innovative approach to funding, we hope to scale up the breakthrough water technologies we know can help to solve current challenges," says Zamir.

Piers Clark of Isle Utilities continues: "With the launch of The Trial Reservoir, we're aiming to get to the heart of a problem that impacts the whole of the water sector – the fact that adoption of technology is simply taking too long. Technology trials and pilots are usually a precursor to deployment but, time and time again, we see trials that deliver on their objectives but fail to

move to full-scale implementation, whether because of process complexity, cost or other factors.

Even the most innovative utilities risk becoming caught in this cycle of trials without ever embedding the technologies in their day-to-day operations. The Trial Reservoir will change that. It brings together all the players needed to take new technologies to market – utilities, investors, start-ups, non-profits – helping to overcome the barrier of who pays for the trial and more clearly defining the path and processes to expedite adoption.

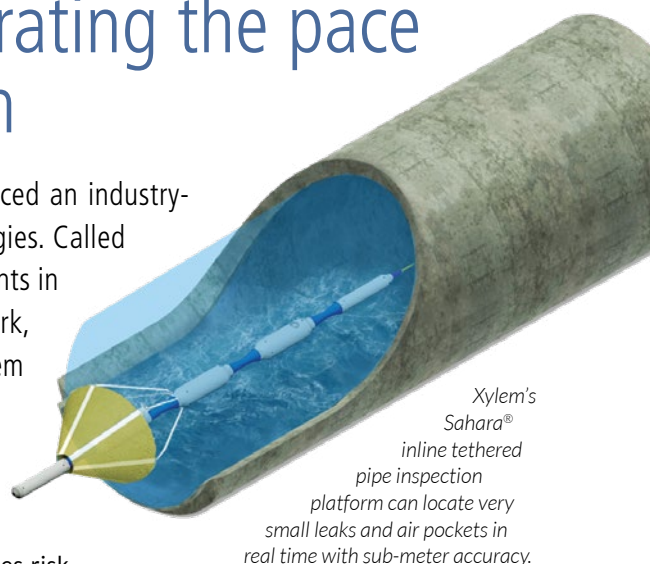
Clark says that The Trial Reservoir works by giving water technology innovators access to capital for pilot projects and embedding best practices throughout the process. The model makes a pool of funding available to early-stage technology companies, giving them the capacity to undertake trial deployments with water utilities. The 'reservoir' of funding will be replenished from the proceeds of commercial contracts, when the trials move to full deployments. If trials do not move to commercialisation, the cost is borne by The Trial Reservoir, thereby reducing the burden on the vendor.

By removing financial uncertainty and

putting in place protocols to streamline the process, utilities and innovators can focus on the job at hand – solving a community's water challenges and getting new water technologies proven in the marketplace.

Xylem is a founding sponsor of the initiative along with other leading water sector partners. This marks another exciting move to strengthen the innovation ecosystem, and one that's close to my heart, continues Clark. "As a founding member of two water technology companies, I've experienced first-hand the challenges of bringing new technologies to market. In fact, that's a big part of the reason I joined Xylem to lead Xylem Innovation Labs, which creates partnerships with start-ups and technology companies to equip water system operators around the world with cutting-edge technologies," he says.

As a global water technology leader with a 16 000-strong team solving challenges across the water cycle, Xylem has a unique opportunity to bring stakeholders together to overcome barriers, such as financing, that



Through the Trial Reservoir's innovative approach to funding, Xylem hopes to scale up breakthrough water technologies to solve current challenges.

often serve as a bottlenecks in streamlining the adoption of new technologies.

From droughts to flooding, we're seeing examples of escalating water challenges driven by climate change every day, all underscoring the need to move faster in the race to secure water. The good news is that amazing innovation is happening across the sector to tackle challenges such as water accessibility, affordability and resilience to climate impacts. There is also innovation happening in financing and business models, and The Trial Reservoir is among those initiatives setting up the industry to bring these new technologies to the market more quickly and with greater certainty.

The fact is that bringing new technologies to market is not incumbent on any one party, it's an ecosystem problem that can only be solved by bringing all players together. The Trial Reservoir is an opportunity to do that. Isle Utilities, as the third-party consultant or broker, brings a level of objectivity to help broker the process, which brings confidence to the municipalities and lowers the financial risk to technology companies.

What type of innovations can we expect to see? "The Trial Reservoir is open to technology vendors around the world, actively supporting trials in high, medium and low-income countries. The only requirement is that the technology being tested must help reduce the carbon footprint of the water system, be that a municipal utility

or an industrial or commercial water user," responds Clark.

"We've hit the ground running since The Trial Reservoir launched and we already have over 45 technology companies from around the world – North America, Europe and Africa – working through the application process. We're seeing a good spread of technologies, from leakage solutions to decentralised water treatment technologies," he adds.

Sivan Zamir continues: "The Trial Reservoir is focused initially on technologies that support the decarbonisation of water infrastructure. Innovation and new approaches to water management will be essential for cities and communities to solve their increasing water challenges and decrease their carbon footprint. We're already seeing significant momentum in the water industry's effort towards net-zero emissions, but the reality is that to deliver on our net-zero commitments, we need to smooth the path for water operators. That means ensuring operators have ready access to the innovations – both existing and new – that can get them to net zero quickly and affordably," he says.

Clark sees The Trial Reservoir as a win-win for technology vendors and utilities alike. It provides the tech companies with access to trial funding, it enables water utilities to adopt technology with minimal financial risk, and it ensures

best practice is adopted during trial programmes that benefit both parties. The potential ramp up in the pace of adoption is game-changing.

There is incredible innovation happening in all corners of the water sector, says Zamir. The Trial Reservoir is an opportunity to ensure that more entrepreneurs can get their technologies into the marketplace at lower risk, and that utilities can confidently embed these solutions to solve pressing water challenges and support their net-zero targets.

Extracted from an online article published on Xylem's Making Waves.

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Modular wastewater plants ideal for African Mines

Local water and wastewater treatment EPC contractor, WEC Projects, along with mineral processing plant specialist, Multotec, have joined forces to develop a customised modular solution to remove toxic arsenic from the wastewater of a mine in Mali, West Africa. Wayne Taljaard, managing director of WEC Projects reveals more.

WEC Projects, in conjunction with its partner Multotec, has designed and custom engineered a wastewater treatment plant for a gold mine in Mali, West Africa. The plant, used to remove arsenic from the mine's wastewater stream, incorporates a modular design which simplifies the logistics and reduces the costs of transport and installation.

The international mine operator is a client of Multotec, a local engineering company specialising in mineral processing plant design and installation. The company approached WEC Projects, a local EPC contractor in the water and wastewater treatment industry, to jointly develop a customised solution to remove toxic arsenic from the mine's wastewater. A multi-stage removal system was required to meet the strict standards for the mine's discharge. However, the system also required a modular design to simplify transportation, installation and commissioning of the plant.

Says Wayne Taljaard, managing director of WEC Projects: "The mining industry in Africa presents some unique challenges, not the least of which are the remote locations of many of the mining sites and the difficulties experienced in getting staff and equipment to places where road, power and water infrastructure is often lacking. Hence the requirement by Multotec for a modular solution that would allow for rapid transport to site and simpler installation and commissioning.

"The COVID-19 pandemic added to the difficulties for us and the client, causing delays that reduced the time frame for delivery," Taljaard adds.

In the treatment process, the mine's wastewater undergoes primary solid/water separation using coagulation and flocculation in the primary clarifier. From there it enters a two-stage chemical precipitation and secondary clarification process to reduce the arsenic levels. The final stage sees the sludge undergo dewatering before disposal. The treated water, although not potable, is then reused by the mine as process water.

The plant has a processing capacity of 150 m³/h and is capable of reducing the arsenic levels from around 13 mg/l to less than 0.1 mg/l.

"The project incorporates a number of unique features in addition to its modular design, including nine custom-designed, proprietary lamella clarifiers and a multi-stage arsenic removal process capable of treating the

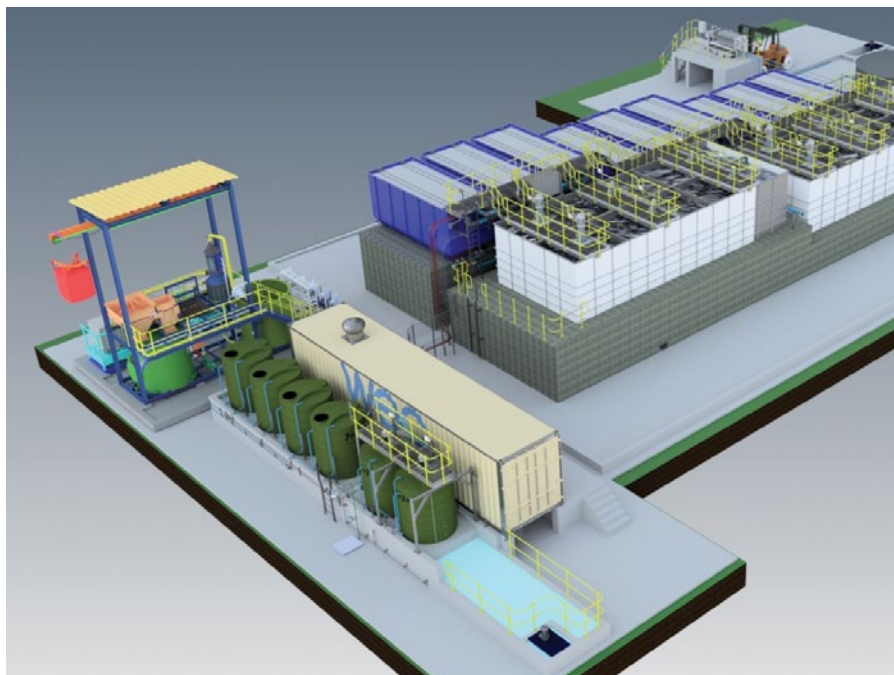
wastewater to the mine's discharge standards," he says.

WEC has completed projects in South Africa, in 24 African countries and as far afield as Eritrea, Oman and Australia. The company offers innovative turnkey solutions designed to meet client requirements including environmentally compatible solutions requiring renew-

able energy, water reuse, resource recovery, sludge beneficiation and zero liquid discharge.

"Our ability to provide a customised and modular solution for Multotec underscores our ability as a major player in the industry, both in South Africa as well as across the continent," Taljaard concludes.

www.wecprojects.com



A 3D model of the modular wastewater treatment plant designed to remove arsenic from the mine's wastewater stream.



WEC Projects custom-engineered a modular wastewater treatment plant for a gold mine in Mali, West Africa.

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