

## THIS MONTH:

- First ever refuse-derived fuel plant in SA
- The African Energy Indaba: for Africa by Africans
- State-of-the art pumps for Sishen's modular pump station
- Automated and connected water solutions for rural Africa

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## Designation, manufacturing and export support



I attended a press briefing at the South African Capital Equipment Export Council (SACEEC) offices in Benoni earlier this month. The Valve and Actuator Manufacturers Cluster of South Africa (VAMCOSA), one of four manufacturing cluster associations supported by SACEEC, issued a statement about the recently revised Instruction Note for the designation of valves and actuators.

A letter sent by the office of the National Treasury of South Africa to accounting officers of all national departments and constitutional institutions; all municipalities and municipal entities; all schedule 2 and 3 public entities and senior officials of provincial treasuries, outlines a new set of procurement rules for the purchase of valve products and actuators.

With the title *'Invitation and evaluation of bids based on a stipulated minimum threshold for local production and content for valve products and actuators,'* National Treasury sets out to regulate the procurement of valves and actuators, which have been designated as a sector for local production and content.

Very clearly stipulated is a local production and content threshold of 70% for all valves and actuators – manual and pneumatic. The detail in the letter attempts to block the loopholes of past attempts to promote localisation: by specifying all of the different types of valves with all of their different names; identifying the formula that has to be used to calculate the local production percentage; and explicitly forbidding 'averaging', which makes the regulation applicable to every individual valve and actuator product.

"When it comes to the valves industry in South Africa, every direct job leads to seven more jobs in upstream and downstream industries," says VAMCOSA's champion, Mark Wilson – at foundries and forge shops, with steel merchants, for coating, corrosion protection and thermal spraying as well as with fastener manufacturers and suppliers, for example. He urges private enterprises, which are not bound by the legislation, to also support the designation process and local manufacturing.

Also addressing the meeting was SACEEC's CEO, Chris Beyers, representing all of the associated manufacturing clusters. SACEEC, he says, provides a facilitating role in assisting the capital equipment sector companies to grow their businesses through exporting. "We are the voice of the sector to government and the rest of the industry on export matters. We provide critical and timely information to enhance members' ability to make sound business and management decisions."

SACEEC assists its members to access global markets through national pavilions, exhibitions, outward selling and inward buying missions, all targeted to relevant customers.

Describing some of the problems local manufacturers face, Wilson says that South African SOCs typically have to pay a percentage of the purchase value before imported goods will be shipped. If the order is placed locally, however, manufacturers are only paid 30 days after delivery to site, and a percentage may also be withheld until the project is completed, which can take years. Not many local companies have the resources to sustain this burden.

In addition, he says that foreign countries, through their EXIM banks, will often finance imports for projects into South Africa, but the EXIM banks will specify that 70% or more of the order value has to be placed in the financing country. This counters attempts to promote local manufacturing.

Citing research done by the National Tooling Initiative Programme (NTIP), Beyers says that the average age of toolmakers in South Africa is now above 58 years. Established under the auspices of the dti and the Tooling Association of South Africa (TASA), the NTIP was set up to implement a turnaround strategy for South Africa's distressed tooling industry. The aim of the initiative was to enable government and industry to cooperate on the large-scale interventions required to rehabilitate the South African tool, die and mouldmaking (TDM) sector and to embark on a robust rehabilitation programme to put the local industry on a firm trajectory to international competitiveness.

"We are losing skills and competitiveness," says Beyers, highlighting the dire need for modern and directly relevant artisan and exporter training programmes, which has become a new priority for the SACEEC. Initiatives include cooperation with the TVET colleges, under the leadership of the NTIP to give school-aged learners some career insight and scarce-skills training.

There is a mountain of work still to be done to overcome our skills deficit. But all this work will be pointless unless the manufacturing industries survive to employ the people we train.

We cannot continue to favour cheap imports over local manufacturing jobs. Better legislation will undoubtedly help, but unless we are all willing to make cost sacrifices by supporting high-quality locally manufactured goods over cheaper imports, the prospects for South African manufacturing and employment look bleak indeed.

And unless we protect our local manufacturing industries, South Africa will forever be known as an exporter of cheap fruit and wine.

*Peter Middleton*

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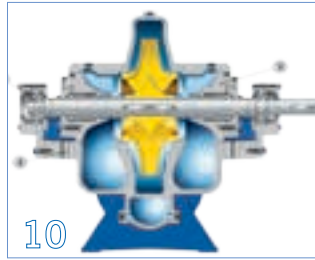
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## ON THE COVER



### Smart solutions and the Synertrex initiative

*MechTech* talks to Lungile Mdlazi, condition-monitoring engineer; Christian Stehle, engineering development manager; Rui Gomes, slurry pump product manager; and Kobus Steyn, valves product manager about Weir Minerals' new Synertrex™ initiative to further improve production efficiencies and reliability and to reduce costs of ownership.

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# Smart solutions and the Synertrex initiative

*MechTech* talks to Lungile Mdlazi, condition-monitoring engineer; Christian Stehle, engineering development manager; Rui Gomes, slurry pump product manager; and Kobus Steyn, valves product manager (below) about Weir Minerals' new Synertrex™ initiative to further improve production efficiencies and reliability and to reduce costs of ownership.



**W**eir Minerals' campaign to improve production efficiency and lower total ownership costs in the mining industry has long been based on optimising wear life and maintainability of its equipment. In an extension to this approach, the company has now launched its Synertrex™ condition monitoring, process efficiency and production optimisation initiative, under the recently formed Mechatronics development team.

"As an organisation, we are constantly striving to develop long-term partnerships with our customers across our whole product range," begins Gomes. "These are difficult times for the mining industry and customers are looking for ever-better performance margins at lowest possible costs per ton.

"There has been industry-wide restructuring and downsizing, further contributing to the skills drain, so the mining industry has become increasingly interested in leveraging the skills available to them to address shortcomings and to seek out ways of improving productivity and further reducing costs," he tells *MechTech*.

Valves product manager, Kobus Steyn, cites the success of Weir Minerals' Isogate®, BDK® and Delta Industrial™ valves ranges as examples supporting this argument. "We are the OEM for these valves and are on a continuous quest to reduce total costs of ownership (TCOs)," he says, pointing out that replacement

sleeves for Weir Minerals' Isogate knife gate valves come in at between 5.0% and 10% of the replacement cost of a valve, making this product far more economical than competing 'throw-away' valves.

"In addition, our pinch valves with Linatex® premium rubber will outlast competing valves by four to five times," he says before introducing some recent success stories, based on Weir Minerals' willingness to form partnerships with customers to solve their specific problems.

"One of our Isogate mechanical pinch valves has been successfully installed in the uranium industry," he reveals. "High frequency sleeve failures of the existing competitor's pinch valve led to unacceptable unplanned down time on a key production unit in the beneficiation circuit of the uranium mill," says Steyn.

The sleeve was housed within the valve casing, which made trouble shooting for process operators difficult. The change-out frequency was fortnightly, at best, when used with slurry of scrubbed calcrete conglomerates and silicates (SG 1.85) with a top size of 20 mm.

The Weir Minerals Isogate pinch valve with a Linatex rubber sleeve was chosen as a replacement. "Some modifications were required to accommodate a local actuator and positioner, but we were confident that Linatex rubber's proven exceptionally long wear life would significantly reduce the frequency of failures," Steyn says.

Sleeve change-out frequency de-

creased to once every 10-12 weeks, a five- to six-fold improvement. "This is a significant improvement in reliability and ultimately unit availability. Also, the valve design is such that damaged or abraded sleeves can be easily and quickly identified," reported the operational metallurgist.

As a further example of the company's ability to solve problems, Isogate knife gate slurry valves being used in a very abrasive ferrosilicon (FeSi) application near Kimberley, South Africa, were modified to overcome FeSi build-up in the valve body.

"These distribution box valves were installed horizontally, which is not a good position for these valves in any application. And while the original Isogate WS series valves were fitted with fail-to-safe accumulator tanks with a standard flushing system, this was inefficient for keeping the valve seats clean.

Following input from the Weir Minerals' global valve team, the flushing system was re-engineered to include two new flushing ports near the top of the valve body, with constant flushing water supplied to the seats. "This new flushing system is proving very effective in cleaning out the FeSi, with no problems reported to date. The customer is happy with our valve product and our problem solving ability," Steyn reports.

## Synertrex: remote performance and condition monitoring

For the past three years, Weir Minerals has been developing a Mechatronics system called Synertrex™ that will eventually cut across all Weir product lines. "Weir Minerals' design centre of origin (DCO) for vibrating screens is based in South Africa and services the rest of the globe. We are directly responsible for developing the Synertrex module for our screening products," says Stehle.

"At the moment, Synertrex for hydrocyclones, slurry pumps and rubber hoses is deployed in Australia, North America and Canada and all of these, along with our locally developed screens module, are being deployed in South Africa," he adds.

The current focus is condition monitoring, Mdlazi explains: "We are striving to develop a purpose-built, process specific equipment condition monitoring system for each piece of Weir equipment. These, we believe, will be superior to the generic add-on systems available to the market, because we are able to embed

our equipment design knowledge and expertise in analysis algorithms to produce robust equipment and process specific performance classifiers,” he explains.

Continuous condition monitoring of specific mining processes, according to Mdlazi, is relatively rare. Process and equipment monitoring is mostly based on irregular or periodic manual inspections that have been found to be somewhat ineffective in picking up or predicting incipient equipment failure. “Imminent failure can easily be missed unless each asset is automatically and continuously being monitored,” he suggests.

Describing how Synertrex monitoring systems work, he says that each machine is connected to its own monitoring module, which collects vibration, temperature, flow, pressure and wear data along with process specific process performance indicators. “All of this data is sent via a local Wi-Fi network to be collated and analysed onsite. Associated analysis software algorithms embedded into the system are used to trend equipment condition and deterioration and to trigger alarms should the signatures be outside those of normally operating machines,” he says.

The system also includes enterprise-level or big-data connectivity. Using ADSL, satellite or 3G/4G Internet protocols, all of the results from the site can be uploaded to the Internet and remotely accessed via ERPs (enterprise resource planning systems) or other dedicated software applications.

“This system is designed for clients that require more from their equipment, to enable them to reliably minimise maintenance costs, improve uptime and reduce their total costs of ownership,” Mdlazi tells *MechTech*.

“We are increasingly being asked to guarantee the performance numbers and lifetime claims of our equipment. Our Synertrex system will allow us to collect credible data about machines operating in each different environment. In addition to helping us improve our designs, monitoring allows us to proactively intervene where equipment is not performing optimally in order to avoid downtime and redress performance issues,” adds Stehle.

“This is also an ideal tool to support our service contract offerings. When Weir Minerals’ takes on service responsibilities, we do so at a fixed cost to the customer and penalties apply for excessive



*Weir Minerals’ Isando-based engineering department is the DCO for Enduron vibrating screens.*



*The new Warman WBH slurry pump.*



*A Linatex-lined Isogate mechanical pinch valve.*

downtime. It is therefore in our direct interest to track a machine’s condition to maximise productivity and uptime for our clients and reduce risk to us,” explains Stehle.

“Ultimately, we want to go beyond condition monitoring and, in the long term, use the principles of the ‘Internet of Things’ and ‘big data analytics’, to develop predictive algorithms that can optimise and control plant performance – by analysing the ongoing performance of individual machines, identifying bottlenecks and under capacity and setting each machine’s individual output for maximum capacity at lowest total costs, for example,” says Mdlazi.

Turning attention to the potential use of Synertrex systems for slurry pumps, Gomes points out that a pump’s efficiency falls as the impeller and the throat bush wear. “This knowledge can be incorporated via Synertrex to predict

the best time to refurbish a pump, based on minimising the TCO,” he explains.

“The industry has developed ways of compensating for production losses as a pump wears by increasing the pump speed using variable speed drives (VSDs). By monitoring these aspects, it is possible to determine how well the pump is performing and how quickly it is wearing. This is directly useable for optimising predictive maintenance schedules, for example,” Gomes tells *MechTech*.

“The Synertrex development will enable us to gather life and efficiency data for a host of different applications and environments. In addition, we will be able to use reliable real-time data to perform just-in-time maintenance, instead of having to risk failure by leaving a pump running too long or wasting significant amounts of wear life by changing out the impellers and throatbushes too early,” Gomes concludes. □



## SA at the forefront of PV and battery technology

According to Powermode MD, Jack Ward, there is burgeoning interest in rooftop solar photovoltaic (PV) power solutions for domestic, commercial and industrial applications in South

Africa as consumers reduce their reliance on Eskom. Several developments are helping to drive this trend.

First among these is the introduction of utility grid-connected, hybrid solar PV power systems capable of functioning as back-up rather than complementary power sources in the event of a power outage. These systems can operate in three modes: linked to the electricity grid (grid-tied); as grid-tied units with battery backup (in a hybrid configuration); or as a stand-alone hybrid unit.

South Africa's Soltra Energy also released an innovative solution to provide businesses with more effective energy returns from rooftop solar systems.

Conventional wisdom maintains that solar PV panels should be orientated towards the north in the southern hemisphere to allow for the most efficient power generation. But in mid-2015, an iterative evaluation of a PV application for a Johannesburg-based company proved that an east-west orientation of solar panels could be more advantageous.

South Africa has also seen a major step up in battery storage technology in 2015. Routine load shedding and power outages has exposed one of the Achilles heels of standby power devices, the shortened lifespan of batteries when subjected to full depletion on a regular basis.

Last year, the market witnessed the launch of the SA-designed 'long-run' battery pack geared to obviate this problem. Brought to market by Powermode, which offers a market-first, three-year guarantee with its offering, the Q-on LR battery system is based on 'smart' technology

built into the battery pack. This includes a computerised battery balancing harness that automatically reports – via a 'cloud-based' portal – on a range of parameters associated with individual batteries in the pack.

Perhaps one of SA's more memorable advances in the power provisioning field in 2015 was bringing a locally-designed 'power wall' lithium-ion battery pack solution to market ahead of US manufacturer Tesla. Like its American counterpart, the SA-manufactured Soltra Energy Wall is designed to store excess energy, whether it is derived from the Eskom grid, from solar panels or a combination of both, as found in increasingly common hybrid systems.

The space-saving unit represents a leap forward in battery storage and is expected to boost the acceptance of rooftop solar PV plus battery solutions in 2016 and beyond, giving SA consumers greater control over their energy usage.

[www.powermode.co.za](http://www.powermode.co.za)

## Edinburgh Medal for science awarded to South African

The 2016 Edinburgh Medal will be jointly awarded to Kevin Govender (right) from the Cape Town-based Office of Astronomy for Development and the International

Astronomical Union (IAU) on Wednesday 30 March at the 2016 Edinburgh International Science Festival, to recognise their wide-reaching contributions to

science. It is the first time in its history that this award goes to a South African.



It is awarded jointly for the creation and practical establishment of the IAU Office of Astronomy for Development, which integrates the pursuit of scientific knowledge with social development for and with those most in need. The office, launched in 2011 by the Minister of Science and Technology, Naledi Pandor, is hosted at the South African Astronomical Observatory in Cape Town, South Africa, in partnership with the National Research Foundation and the South African Department of Science and Technology. Under the pioneering stewardship of its first director, Kevin Govender, the Office of Astronomy for Development (OAD) has successfully harnessed astronomy in the service of global education and capacity building. The OAD was established as part of the IAU's decadal strategic plan 'Astronomy for Development', which was initiated and driven within the IAU by the renowned astronomer, George Miley.

Kevin Govender and president of the IAU, Silvia Torres Peimbert, will give the Edinburgh Medal address: 'Astronomy for a Better World' as part of the 2016 Edinburgh International Science Festival.

[www.iau.org](http://www.iau.org)

## Global recognition for machinery company

Atlas Copco, a leading provider of sustainable productivity solutions, was again recognised as the world's most sustainable machinery company by the prestigious annual Global 100 list.

The list, presented at the World Economic Forum in Davos, Switzerland, ranks companies that prove they are increasing productivity while using less resources. Atlas Copco is ranked 34<sup>th</sup> overall, and is the only company in the machinery industry included on the list. It is the tenth time that Atlas Copco appears on the list.

"Providing customers with the most innovative, energy efficient, safe and ergonomic products is a key part of our business model," said Mala Chakraborti, Atlas Copco's vice-president, corporate responsibility. "Integrating sustainability in our operations generates great value for industry and society."

Atlas Copco's innovative, energy-saving products include its variable-speed compressors, a technology that the Group pioneered in 1994, that enables compressors to run only at the speed necessary, cutting energy consumption. In 2013, Atlas Copco launched the patented VSD+ technology, which slashes energy use by more than half

compared with traditional compressors. This groundbreaking compressor has received an overwhelmingly positive customer response.

Atlas Copco is also listed in the Dow Jones Sustainability Europe Index for 2015/2016, and is ranked number 11 globally in the Newsweek Green Rankings, one of the world's foremost rankings on corporate sustainability.

[www.atlascopco.co.za](http://www.atlascopco.co.za)



In 2013, Atlas Copco launched the patented VSD+ technology, which slashes energy use by more than half compared with traditional compressors.



## Semi-automatic press enhances spiral flight offering

Brudan Engineering (Pty) Ltd was established in 1957 as a structural steel engineering and fabrication company and, like many others in this field, it fabricated sectional screw conveyor flighting for diverse industries.

Sectional flighting is fabricated in time-honoured tradition by producing blanks from the desired material (sometimes called donuts) and then forming the blanks into a helix. These helices are then joined together and attached to a pipe or shaft to form an auger or an internal screw conveyor. This process has remained roughly unchanged since Archimedes' time, although Archimedes attached the flight to the outside casing for lifting water out of the Nile.

In November of 1968, due to increased demand from the agricultural sector, the company imported a flight-forming machine from the UK, which produced continuously rolled flight called helicoid flighting. Continuously rolled flight is faster and more economical to produce than sectional flighting and, although it has a thinner outside edge, it is used extensively in numerous industries, as it is easy to replace and more readily available.

In 1972, the company changed its name from Brudan Engineering to Bruton Spiralfite, but remained in Germiston, a manufacturing hub in South Africa.

In 2007 the company purchased a second continuous-flight rolling machine



*Bruton Spiralfight's new state-of-the-art forming press allows the company to offer diverse materials such as Hardex™ in various flight sizes; from 1 200 mm outside diameter in thicknesses from 16 mm to 25 mm.*

with the ability to roll smaller flights and impart a thicker outside edge. The Dura Edge™ flights give an approximate 30% increase in the thickness of the outer edge as compared to standard rolled flights and, therefore, offer greater wear resistance.

In response to a request from various quarters for larger and thicker sectional flights in more wear resistant material, the company purchased a new semi-automatic press in 2015. This flight forming press is state-of-the-art and allows the company to offer diverse materials such as Hardex™ in various flight sizes; from 1 200 mm outside diameter in thicknesses from 16 mm to 25 mm for mild steel. Fabrication times are greatly reduced due to the automated setup the machine employs and the accuracy of the flights is greatly enhanced.

[www.bruntonspiral.co.za](http://www.bruntonspiral.co.za)

## The CSP-fuel Stirling hybrid solution for base-load

A recent study, 'A hybrid solution with concentrated solar power (CSP) and fuel for base-load mining operations', analyses the fit of Stirling hybrid solutions for the mining industry. The Stirling engine-based solution combines solar with gas or diesel in an integrated system as a single energy source. The CSP-solar component it relies on makes it particularly appealing for extremely sunny regions, such as mining regions where irradiation is high.

Stirling Hybrid solutions are an attractive alternative to diesel gensets. If the solar irradiation is high, then CSP plant can generate the total output power. If the solar irradiation is not at its maximum, then heat that is needed for the highly efficient Stirling engine can also be produced by various secondary fuel types. This makes the fully integrated system ready for base-load applications

needed for mining. A variety of fuels can be used; natural gas, CNG, LNG, LPG, biogas, industrial off gas, coal methane gas or even diesel. And a combination of CSP and biogas is 100% renewable energy generation.

In combined mining and metal processing, plant off-gas that otherwise would be flared can be used in Ripasso Stirling Hybrid solutions. This has extremely positive consequences on sustainability and costs. Further, the non-renewable gas types are still cleaner than diesel or heavy fuel oil, especially if the high efficiency of the new hybrid solution is taken into consideration.

The Stirling engine itself operates combustion free, which has many advantages regarding maintenance and operation of the power plant.

[www.ripassoenergy.com](http://www.ripassoenergy.com)

## In brief

**Ballast water treatment (BWT)** specialist Optimarin is continuing its strong start to the year, with the news that its Optimarin Ballast System (OBS) has been selected for nine Sinopacific Shipbuilding Group AHTS vessels. The contract win comes on the back of a recent ten unit order from Atlantis Tankers and the firm's first foray into the fishing sector, with Fisherman's Finest's America's Finest trawler.

**Passat Energy** has successfully commissioned a 220 kWp rooftop solar power plant of 880 solar panels of 250 W each at **TW Profile Services** in Boksburg. TW Profile Services has been in operation since 1994 and has successfully grown into one of the largest service centres in the laser cutting and profile cutting industry in South Africa, specialising in plasma cutting, guillotine cutting, rolling and bending.

**Harding** has been awarded contracts for nine FF1200 freefall lifeboat systems complete with davits on **Heerema Offshore Services BV's** semi submersible crane vessel, Sleipnir. The vessel will be built by Sembcorp Marine at its flagship Tuas Boulevard Yard in Singapore.

Marais Nel has been re-appointed as the managing director of **Ingersoll Rand South Africa** and country leader: Compression Technologies and Services from 1 February, 2016. Nel's Ingersoll Rand experience includes a five-year period as regional sales and marketing manager from 2007 to 2012, before serving as South African managing director from 2012 to 2014.

Clive Hitchcock has been appointed CEO, **Fibertex South Africa**. Fibertex – local manufacturers and suppliers of geosynthetic products – offers solutions to mining, civil engineering, construction, waste and environmental fields, as well as to industrial sectors, including automotive, filtration, furniture and flooring.

The AES group has appointed Leapeetswe 'Papi' Molotsane as non-executive director to the board of **AES South Africa**. Molotsane's role will be to help identify strategic direction for continued growth. He is an experienced corporate director, having been involved in a wide range of industries ranging from logistics to manufacturing.

A self-driving Mercedes-Benz E-Class has been showcased at the 2016 Detroit motor show, marking the beginning of a new phase in automotive development: "For Mercedes, as the inventor of the automobile, it was always clear that the next great revolution in mobility would be the self-driving car," notes Dieter Zetsche, of **Daimler AG** and head of **Mercedes-Benz Cars**. "We at Mercedes were the ones who once turned the vision of mobility without a horse into reality. Now it's time for us to offer the possibility of managing without a driver as well."

# The African Energy Indaba:

*MechTech* reports on the recently held Energy Indaba, with its focus on regional integration between clusters of African countries.

“**T**he Energy Indaba strives to give people from all over the world the opportunity to work with us. We recognise that we need to develop solutions for ourselves, but by drawing on the knowledge and expertise of people from every other continent. As Africans, we understand the context of Africa and its people. We need to take the initiative; in conceiving solutions and then developing them to best meet specific local needs,” said the Indaba’s steering committee chairperson, Brian Statham, during the welcome.

“African people are looking to us as energy leaders on the continent to drive energy development on the continent. And energy is fundamental to development in general. Without energy, there can be no healthcare, sanitation, education, commerce or enterprise. If we fail to deliver, we will be held accountable, not only on the energy delivery issue, but for the general delivery of services in a host of other areas,” Stratham warned, adding, “we have a unique opportunity to deliver and a fundamental responsibility to all the citizens of our continent.”

In the context of a stretched global economy, Stratham says that the energy challenge remains an imperative. “We need to create a sense of excitement about Africa, so that people will want come to the continent. Africa has a way of allowing people to grow and feel inspired. It gives people a sense that they are delivering and profiting, not only in the monetary sense, but in the sense of feeling richer having contributed to an important cause,” Stratham suggests.

## Keynote address: Wolsey Barnard

Apologising for having to replace South Africa’s Energy Minister, Tina Joemat-Pettersson, “who has to attend the state-of-the-nation debate in Parliament”, Barnard suggests that it is impossible to deal with energy without first exploring both Africa’s energy potential and international developments.

Most notably, he lifts out Goal Number 7 of the Sustainable Development Goals of the United Nations Development Programme (UNDP): To ensure access

to affordable, reliable, sustainable and modern energy for all. “South African policies such as the Industrial Policy Action Plan (IPAP) are informed by the UNDP’s Sustainable Development Goals,” Barnard points out, “with industrial growth and sustainable energy development at its heart.”

He says that the number of people with poor access to electricity is, in fact, not declining. Current projections suggest that there will still be over 600-million people without electricity in sub-Saharan Africa by 2030. Most of these, he points out, will be living in rural communities, which generally do not benefit from large regional infrastructure developments.

“Micro-distribution networks are, therefore, a very good idea and we need to be encouraging bigger increases in investment in these technologies,” Barnard suggests. Many small projects together eventually form big investments, “which are needed for energy access growth to catch up with population growth,” he suggested.

Addressing large-scale energy infrastructure, he says that, while Africa has been making progress in overcoming its infrastructure deficit, “this is not enough” and energy and transport infrastructure was lagging. “Infrastructure development is expensive and to grow Africa’s infrastructure, we need regional co-operation,” he says adding, “we need to pool resources, integrate and cooperate. Africa is, in fact, a small market. There are 48 countries in sub-Saharan Africa and we consume the same amount of electricity as Spain – only 3.0 % of the world’s energy,” he argues. “We have to move as a region to eradicate our energy deficit,” he informed delegates.

Referring to the need to diversify the energy mix, Barnard notes the impact the current drought is having on countries dependent on hydroelectric power, most notably, Zimbabwe and Zambia. “For access, we need to engage in large energy projects, but for energy reliability, we also need to move away from single source technologies and towards a broad mix of generation technologies,” Barnard suggests.



He cites nearly 7 000 MW of renewable energy from 92 approved REIPPP projects in South Africa, an investment of about R93-billion. “This is important,” he says, not so much because of the amount of generation, but because it enhances the technology mix.

Also, projects such as these are examples of how the energy sector can be opened up to the private sector. “There is a huge opportunity for private investors to help address our security of supply issues and the Energy Indaba offers the opportunity for constructive engagement in order unblock Africa’s energy potential,” says Barnard.

## Regional cooperation and the ZiZaBoNa project

Gustav Frey, president of the World Energy Council opened the first discussion forum, which focused on regional integration.

Setting the scene, Frey highlights two recent global milestones. During the 2015 G20 Summit, energy was a key focus among world leaders for first time ever. And at the COP21 climate change meeting in Paris, 195 countries committed to using cleaner energy resources to reduce carbon emissions in order to obviate the worst effects of global warming.

Highlighting the plight of the 620-million people in sub-Saharan Africa without electricity, 86% of whom live in rural

# for Africa by Africans



**Above:** The ZZZaBoNa regional transmission project involves a 330 kV transmission line to interconnect the grids of Zimbabwe, Zambia, Botswana and Namibia. This will allow wheeling of power between the countries for better reliability. **Right:** Of the 620-million people in sub-Saharan Africa without electricity, 86% live in rural communities. Frey suggests that large regional projects may not help these people and that “micro-distribution networks are therefore a very good idea.” **Left:** Zambia relies on hydropower for virtually all of its electricity generation, more than 90% of which is produced by just three major dams – Kafue Gorge, Kariba (shown here) and Victoria Falls.

communities, Frey says that regional integration may not be the solution for rural people, which have to be part of the solution. “But regional integration is essential to get large projects moving!” he insists, adding that one or two critical projects need to succeed to drive the growth of regional cooperation.

Regional project cooperation however requires a transmission infrastructure to allow different nations to benefit from generation investments. In East Africa, for example, major projects have become gridlocked, because the transmission infrastructure is too weak to allow for wheeling of the power across the region.

In the SADC region, the ZZZaBoNa (Zimbabwe, Zambia, Botswana, Namibia) regional transmission project aims to overcome this problem. The project involves a 330 kV Interconnector line to link the grids of all four countries. It was originally conceived to enable the wheeling of power from north to south or vice versa via the Caprivi Link – and the revised project components now include a direct line from Livingstone to Zambezi together with a radial connection from Victoria Falls to Pandamatenga.

Pressed by Frey during the forum, Zambia’s Energy and Water Development Minister, Dora Siliya, and Zimbabwe Energy and Power Development Minister, Samuel Undenge, agreed to move this project forward as a priority. As well as

easing congestion, on the existing north-south transmission corridor from South Africa to Zimbabwe, the US\$220-million investment would support the transfer of 600 MW of electricity, mostly from existing and future hydroelectric plants in Zambia and Zimbabwe.

Zimbabwe and Zambia, according to Siliya, also remain keen on the development of the 2 400 MW Batoka Gorge Hydro Scheme on the Zambesi downstream of the Victoria falls, for which private investment of US\$5-billion is being sought.

## Nuclear parting SA’s energy mix

“Nobody in nuclear is saying that we should only be focusing on nuclear; we are saying that South Africa needs an energy mix where nuclear forms part of that mix. We are saying that South Africa needs an optimum mix and we must not put all our eggs into one basket,” says Knox Msebenzi, managing director for the Nuclear Industry Association of South Africa (NIASA).

He says that nuclear power development brings with it the opportunity for South Africa to become skilled and competent as a nation in certain technological developments that aren’t found with other forms of energy. Spinoff benefits to having a thriving nuclear industry include the opportunity to increase the already successful nuclear medicines industry.

“Another benefit of nuclear is that, unlike renewables, nuclear power is reliable and can be dispersed no matter what the weather conditions. It provides base-load power to the grid, whereas renewables are far less reliable in terms of capacity

factors. Base-load coal has the disadvantage of high carbon emissions and, while gas also provides base load power, our domestic supplies are not yet exploited,” Msebenzi adds

With respect to the cost of base-load fuel, gas is the most expensive, followed by coal. Nuclear fuel is, in fact, the least expensive,” he says.

Msebenzi agrees that all technologies have potential risks. Safety is therefore paramount. “The National Nuclear Regulator is a very active and robust regulator. The safety of South Africa’s nuclear power plants is governed by legislation, which is governed by the nuclear regulator. Safety comes first, but we cannot let the fears of what happened elsewhere stop us from advancing as a nation,” he urges.

Msebenzi admits that a nuclear build programme will be capital intensive; which is why it is critical to get the right funding with low interest rates. “The financing model is critical. Government’s Renewable Energy Independent Power Producer’s Procurement Programme is a world class one with excellent financing models, and so can the nuclear build programme be.”

“There is a school of thought that estimates that 70% (by value) of the nuclear build programme can be sourced locally. This will reinvigorate the nuclear industry, boost skills, create whole new industries and, therefore, create employment.

“And the nuclear build programme can also be viewed as a regional power project that will see South Africa supplying cheap electrical power beyond our borders,” Msebenzi concludes. □

# State-of-the art pumps for Sishen's modular pump station

Following the delivery of a first-of-a-kind modular pumping plant to Sishen earlier this year – a system constructed, tested and commissioned under factory conditions in Efficient Engineering's Germiston workshops – *MechTech* talks to KSB's Gideon Rochér (right) about the pumps used for the installation and his company's local offering.



**F**or KSB, this project dates back to February 19, 2015, when we were approached by Chris van Aardt of Efficient Engineering, who had been sent pump specifications from consulting engineering company, Aurecon. After some telephone conversations, emails and meetings, we came to a suitable pump specification for the duty and elevation required for the Sishen site," begins Rochér.

With Sishen's open pit getting ever deeper, an additional dewatering pump station was required to provide an additional flow of around 1 800 m<sup>3</sup>/h into a 40 m head. Water from the mine's iron ore pit is pumped into a reservoir and then gravity fed into the Vaal Gamagara municipal system.

"Four pumps were specified, each with a nominal flow capacity of 600 m<sup>3</sup>/h, giving a total flow capacity of some 2 400 m<sup>3</sup>/h into the 40 m head. This is quite substantial," Rochér suggests. "Along with my mentor at that time, Louis Opperman, who was a stalwart of South Africa's pumps industry, we looked at supplying two larger pumps to the project to meet the required flow.

"We were surprised at how much more expensive it would have been to go this route. By the time the costs for the larger pumps, motors and switchgear were factored in, it would have been 25% more expensive to use two pumps instead of the four originally specified," he tells *MechTech*.

The pump model chosen for the project was the KSB Omega 200-420 A. "These are each capable of pumping above the 600 m<sup>3</sup>/h (167 l/s) requirements. They have a 200 mm discharge, impellers with a 420 mm diameter and an A-hydraulic impeller, which signified the highest duty and efficiency hydraulic selection for this impeller size," Rochér explains.

KSB Omega pumps have axially split casings with an in-line design. Notable features include: a short distance between bearings on a correspondingly short shaft; a compact joint flange with long, pre-stressed bolts to ensure leak-tight operation; a counter-rotation feature using identical internal components; and a self-aligning upper casing for easy mounting.

The high-performance computer optimised impeller is designed for double entry – flow enters the impeller from both sides simultaneously to minimise axial thrust – and the vane passages offer excellent hydraulic characteristics. A large impeller eye area and a swirl-free, low energy loss inlet also aid smooth and quiet running.

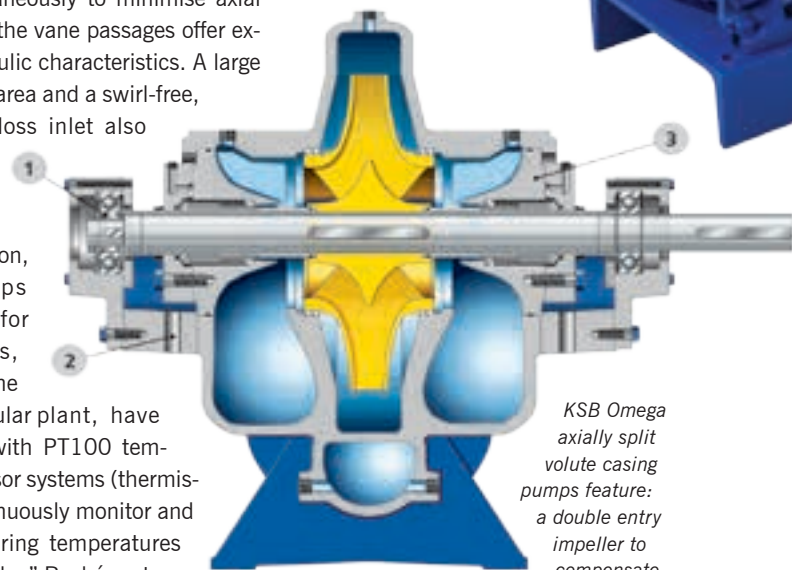
"In addition, these pumps use sealed for life bearings, which, for the Sishen modular plant, have been fitted with PT100 temperature sensor systems (thermistors) to continuously monitor and transmit bearing temperatures to the controller," Rochér notes.

For additional longevity and corrosion protection, Rochér informs us, the cast volutes of the pumps for Sishen's modular pump station were specified with 400 µm glass flake linings. "This is a polyamine cured epoxy coating reinforced with glass flakes. It forms a hydrophobic surface that, as well as resisting erosion and corrosion, significantly reduces hydraulic/friction losses in the pump," he explains, adding that the internal components of these Omega pumps – impellers, shafts, seals and wear rings – "are all made from 316 stainless steel."

From a service perspective, shorter

shafts offer better rigidity for reduced vibration. Assembly is also adjustment-free, with quick and easy assembly/dismantling of the rotor components due to the elastically pre-stressed mountings.

Cartex 70 mm mechanical seals, supplied by Dutch company, EagleBurgmann, were fitted to each of the pumps, which were then mounted on base plates and coupled via Fennaflex



*KSB Omega axially split volute casing pumps feature: a double entry impeller to compensate*

*for axial forces, reducing the load on the maintenance-free bearings (1); solid bearing brackets, a short and rigid shaft and pre-loaded bearings for lower vibration and extended operating lives of bearings, seals and couplings (2); the self-centring upper part of the casing and spring-loaded rotor enable cover and rotor assembly without any adjustments (3).*

F120H flexible couplings to 110 kW IE2 motors from Zest WEG.

"At best efficiency, the pumps absorb 79 kW each running off VSDs at 1 270 rpm. This creates the room to increase the flow rate when the demand arises, without taking the system too far

away from ideal operating conditions,” Roch r suggests.

The pumps were fully assembled by KSB in Shanghai and then shipped here for customisation at KSB’s Germiston facility in Gauteng. “We fitted the mechanical seals, then assembled and aligned the pumps, couplings and motors on skids before delivering them around the corner to Efficient Engineering, ready



*KSB ETAnorm water pumps, a standardised range designed for energy efficiency and easy customisation, are manufactured in South Africa. The range is further supported by KSB’s PumpDrive® VSDs, PumpMeter® monitoring systems and its SuPremE® high efficiency motors.*

for fitment into the ‘module building’. Our own service technicians were also on hand for commissioning and acceptance testing, which was completed before shipment to site.

This is a key advantage of the modular approach. State-of-the-art equipment can be integrated and tested under factory conditions at a convenient location – and all relevant specialists can attend. Only when everyone is happy does the module get shipped to site. Once there, the pump station is ready to run as soon as it is anchored to its plinth and its piping and power connections are made.

“I am proud to have played a part in this development. It is an honour to be associated with pioneering projects such as these and to be chosen to provide the pumping technology, service and support needed by the mine,” Roch r tells *MechTech*.

### **KSB’s South African offering**

“KSB started out in South Africa supplying pumps for farmers. Agrico was the



*Four KSB Omega 200-420 A pumps were specified for Sishen’s modular pump station, each with a nominal flow capacity of 600 m<sup>3</sup>/h, giving a total flow capacity of some 2 400 m<sup>3</sup>/h into the 40 m head.*

first distributor of our pumps and we are still supplying them and the whole agricultural market. We have, therefore, always been under pressure to produce pumps that are very robust,” he relates.

The company’s local manufacturing facility focuses mainly on the production of its ETAnorm water pumps, a standardised range designed for energy efficiency and easy customisation. “As well as for agriculture, these pumps are widely used in HVAC systems for circulating chilled and hot water (at up to 140 °C),” says Roch r. “They are very robust and relatively quiet, making them suitable for use in dusty environments and in buildings, where noise is unacceptable.”

“ETAnorm pumps are fully compliant with emerging energy regulations, such as the European Directive ErP2015, and the single stage pumps are rated at 16 bar. We have always manufactured KSB ETA pumps here, but we switched to the new standardised ETAnorm range in 2013. The new offering is suitable for numerous high-flow clearwater and wastewater applications, depending on solids content and the pH of the water,” he says

Accompanying the KSB and ETAnorm range for enhanced energy efficiency are the company’s PumpDrive® VSDs, PumpMeter® monitoring systems and its SuPremE® high efficiency motors.

“But there is no such thing as a universal pump,” he adds. “A pump always needs to be matched to its application.”

On the mining side, KSB owns the US-based slurry pump manufacturer GIW Industries. This range includes slurry pumps for mining, suction dredgers and the oil sands industry. “These are long-life pumps made from wear resistant white iron (Gasite), developed by KSB, which gives the units a long service life despite arduous conditions,” Roch r explains.

Also locally manufactured are the company’s LCV vertical spindle slurry pumps and its KWP range for the wastewater industry. The LCC range is suitable for acid and mine dewatering and seawater applications. These are available with LCC-M (metal) and LCC-R (rubber) impellers. “And for ATEX applications, a mag-drive RPH pump solution is also available.

“But this is only the tip of the complete offering. We have access to a full range of sophisticated offerings from our global parent for mining, industrial, energy, building services as well as all water and wastewater applications. In addition, we can offer monitoring, process automation and software solutions, which are becoming increasingly important in South Africa.

“Long term, we take responsibility for our product, no matter where they end up. I believe we are the best at what we do. With our pumping expertise and manufacturing experience, we are able to customise our pumps to get the best possible operating point and efficiency for the targeted applications,” Roch r concludes. □

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# Valves and enhanced fluid technology services

Wayne Holton, fluid technology manager at BMG and Willie Lamprecht, the company's national product manager for valves (right), talk about BMG's approach to fluid technology services and some of the company's special valve offerings.



**B**MG's strategy to enhance its fluid technology services to meet growing market demand encompasses the introduction of new products that incorporate the latest developments in design technologies, materials and coatings.

The company's expansion programme in the fluid technology sector also involves increasing stockholdings through more than 140 BMG branches and a wide distribution network in South Africa and across its borders into Swaziland, Zambia, Botswana, Mozambique, Namibia and Tanzania.

"BMG boosts its fluid technology services with dependable technical support to ensure optimum safety, efficiency and extended service life of every system, even in corrosive environments. With broad technical capabilities, the team is able to solve problems in applications where conventional components have failed after short periods of service," says Wayne Holton, fluid technology manager, BMG.

"BMG's fluid technology services also cover project engineering and consulting, cylinder design and manufacture, training, repair and testing, as well as onsite container services."

The company's extensive range of components for fluid technology systems and general industrial applications, includes valves, hydraulic hoses and fittings, accumulators, cylinders, heat exchangers, hydraulic motors and hydraulic plumbing, as well as pumps and reservoir accessories.

"Compact butterfly valves, with good flow characteristics and low maintenance requirements, are important components in BMG's extensive range of valves for industrial flow control," says Willie Lamprecht, national product manager valves, BMG.

An advantage of using quarter-turn butterfly valves rather than any other type of valve, is the simple, wafer-shaped design, with fewer parts, for easy repair

and minimal maintenance.

Although butterfly valves and ball valves both offer quarter-turn actuation, the benefit of butterfly valves is when they are actuated pneumatically, they open and close very quickly. The rotational disc in butterfly valves is lighter than a ball and these butterfly valves require less structural support than a ball valve of the same diameter.

Unlike a ball valve, the disc of butterfly valves is always present in the passageway within the flow. This means a pressure drop is induced in the flow, regardless of the position of the valve. Ball valves should only be used for isolation, whereas butterfly valves can be safely used for isolation and control of flow.



*Compact with good flow characteristics and low maintenance requirements, Desponia centric butterfly valves with elastomer liners are designed for safe and reliable regulation of liquids and gases in diverse industries.*

BMG's Desponia centric butterfly valves (DN 25-1600) with an elastomer liner, are designed for safe and reliable regulation of liquids and gases in diverse industries. This range has a maximum working pressure of 16 bar and an

operating temperature range of between -20 °C and 140 °C, depending in the material used.

Bianca-centric butterfly valves (DN 32-900), with an on/off and control service, have durable plastomer liners suitable for aggressive and corrosive fluids. These high performance valves have a 16 bar maximum working pressure and an operating temperature range of between -20 °C and 200 °C depending on working conditions.

Special ATEX valves are also available in this range, which are suitable for use in explosive atmospheres.

Other valves available from BMG include seated, knife and wedge gate valves, as well as ball type check valves, thermoplastic, diaphragm, pinch and angle seat valves.

BMG's fluid technology range is suitable for reliable performance in diverse industries, including mining, refining, power generation, iron and steel, materials handling, food and beverage, pharmaceutical, paper and pulp, chemical, sugar and automotive. □



*Bianca centric butterfly valves, whilst compact and reliable, have a durable plastomer liner suitable for aggressive and corrosive fluids.*



# Proper maintenance via a multi-faceted service strategy

AESPUMP's sales and marketing director, Neil Britz, talks about the company's multi-faceted service strategy, centred on delivering a trouble-free customer experience.

The stagnating economy and a depressed oil price are combining to shift the emphasis from capital purchases to implementing a strategy of effective maintenance of machinery already installed at South Africa's petrochemical refineries and chemical plants.

One company well positioned to supply effective maintenance and operational support is AESPUMP, the authorised channel partner and service provider for Sundyne, Sunflo, Ansimag and HMD pumps and compressors.

The company offers a multi-faceted service strategy, which sales and marketing director Neil Britz explains is centred on delivering a trouble-free customer experience.

"A big part of the service offering is effective management of the equipment lifecycle, because the process environ-

ment in which the equipment resides will inevitably experience changes due to different operating demands," explains Britz.

Industry compliance, changes in standards and in the process itself are typical examples that can cause a chain reaction, with potentially adverse effects on key efficiency drivers. "The result can be increased power consumption, suction or discharge recirculation, temperature

*"A big part of the service offering is effective management of the equipment lifecycle, because the process environment in which the equipment resides will inevitably experience changes due to different operating demands."*

rise and/or cavitation," warns Britz.

AESPUMP's answer to these problems is a re-rating service geared to ensuring that any installed Sundyne pumps or compressors are operating at best efficiencies.

"We accomplish the re-rating on site, without disrupting the process piping or installation," says Britz, "and the preventative maintenance service includes replacement of worn parts such as bearings, seals, O-rings and oil filters.

"The sequence that we follow is to review the original design conditions and define the current plant operating conditions, after which we re-rate the engineering selection to achieve a new performance, specify the new parts required, install them, carry out an operational performance test and then re-start the pump or compressor within the process itself.

"The customer is given a revised expected performance curve, a revised specification sheet and an up-

dated bill of materials for the records," Britz adds.

Uptime assurance and off-site service support are two other important elements of the AESPUMP service offering.

Uptime assurance is a continuous improvement programme that integrates on-site service offerings for Sundyne products, while the off-site service programme provides for servicing of pumps and compressors at AESPUMP's fully equipped workshops.

On-site service is greatly assisted by Sundyne's reliability assurance kits, or RAKs, which are portable service packs containing essential service parts for pumps and compressors, including all design technical data, drawings and parts lists.

The kits focus on maintaining gearboxes and wet ends, and contain either a standard inventory or one customised with content matched to the unique serial numbers of individual Sundyne machines.

They represent progress beyond the traditional approach to spare parts and maintenance. Sundyne's thinking is that the kits will ensure that the end user has the exact parts needed for planned production shutdowns, maintenance or critical repairs, providing a cost effective means to keep the pump or compressor operating at peak efficiency while maintaining the warranty.

All service kits are conveniently packaged in carrying cases that can be re-ordered using a single part number linked to the original equipment serial number, eliminating the need for the end user to track dozens of numbers in the company's ERP system.

Typical RAK contents cover the recommended spare parts lists for a Sundyne LMV/BMP pump, a Sunflo pump or a Sundyne LMC/BMC compressor, including the output seal, breather, bearings, a bearing plate, anti-rotation plate and an optional lubrication pump. Each kit includes specification sheets and performance curves.

Cases are self-sealing to minimise contamination and corrosion, and used parts are re-stocked using kit refills. □



On-site service is greatly assisted by Sundyne's reliability assurance kits, or RAKs.



## AES Group companies win Level 4 BEE certification

Sister companies AESSEAL and AESPUMP are to expand their apprenticeship programmes to ensure retention of Level 4 BEE certification, recently re-assessed upwards from Level 5.

**A**ESSEAL and AESPUMP, which together employ some 110 people, have seven active apprentices undergoing alternate terms of theoretical training at Dinyane Education in Secunda, while on-the-job mentorship at the company's Secunda workshops ensures a steady stream of qualified fitters and turners after completion of the two-year course.

An annual intake of between three and five apprentices ensures programme continuity, and AES group management believes that the programme is already delivering returns on the investment made in it.

Commenting on the progress of this programme, AES general manager and company secretary, Craig Murray, says he believes the training of apprentices and their integration into the Group's workforce will prove to be the ultimate manner in which to grow South Africa's skills base. At the same time, it will help companies to meet the government's recently revised black economic empowerment targets in the medium term.

The amended regulations issued under the Preferential Procurement Policy Framework Act of 2000 have resulted in substantial reconfiguring of the BEE certification codes, shifting emphasis away from mere BEE compliance towards BEE strategy and true company empowerment.

"The AES Group's own target compliance will also be helped by ongoing sponsorship of black undergraduates studying towards their bachelor's degrees in commerce and finance," Murray adds.

"Our highly rated apprenticeship programme has been at the heart of our recent upgrade to Level 4 accreditation," explains Murray, "but we want to expand it further because we believe that this emphasis on skills development will, over time, lead to a self-correction of the key pillar of black ownership."

Murray believes that

the new codes, although hard work, "are positive in that companies will have to make real changes in order to maintain or improve their BEE ratings".

Although the pillars of the new codes remain substantially the same (ownership; skills development; enterprise and supplier development incorporating preferential procurement), the targets have changed, and companies that fail to achieve the new targets will be scored at lower BEE ratings.

"The enterprise and supplier development criteria has changed dramatically, and will lead to every large enterprise applying individual and carefully considered strategies to each and every key supplier," suggests Murray.

"This means that we will ourselves be under scrutiny by our own key customers, and it is, therefore, our intention to comply to our utmost ability. It is inevitable that the BEE portion of any tender will carry considerably more weight under the new codes."

As an example of the changes, Murray explains that the new codes award only five points for spending as much as 80% of a procurement spend with suppliers in possession of a BEE certificate, whereas the old codes awarded between 12 and 15 points for a lower 70% procurement spend with BEE certificated suppliers.

"This is unless new suppliers are iden-

tified," Murray continued, "because more points can be won by broadening the base and procuring a greater proportion of one's spend from black-owned qualifying small enterprises, or from exempt microenterprises."

"So one cannot simply carry on with a business-as-usual approach. Among other initiatives, a revised procurement strategy will be needed if a company is to avoid dropping up to three levels on the scale by doing nothing," warns Murray.

Murray acknowledges that enterprise and supplier development will represent a challenge for AES, because the required ramping-up of local production capability will be difficult to achieve for any company that imports a finished, custom-engineered product.

"But it's not impossible. The apprenticeship programme will rectify the skills shortage over time, and we are already well into the process of identifying components that lend themselves to local manufacture and assembly.

"Further, we will continue with our sponsorships and donations programme, which stretches from Hospice to a significant commitment to the Edward Daniels Charitable Trust, and includes the supply of mathematics textbooks into primary schools," Murray adds.

"The new codes demand a clear strategy if one is going to remain sufficiently competitive as a key supplier to customers who are themselves under pressure to maintain their own BEE ratings," Murray concludes. □



An AES apprentice at the group's Secunda workshops. "Our highly rated apprenticeship programme has been at the heart of our recent upgrade to Level 4 accreditation," according to AES general manager and company secretary Craig Murray.

# Oxy-Dep: increasing the efficiency of

Air Products' oxygen-based technologies provide effective solutions to increase treatment capacity of existing water treatment plants. This according to Sachin Kulkarni (right), national sales manager, bulk at Air Products South Africa.

Companies around the world are facing increasing pressure to reduce their environmental impact and re-examine their long-term sustainability. To this end, many companies are seeking solutions to effective wastewater treatment. This is in line with the worldwide trend towards zero liquid discharge (ZLD), which encourages industries to adopt wastewater technologies to assist in the drive towards water recycling and reducing water wastage.

In a country such as South Africa, where water is a precious resource that needs to be carefully managed, effective wastewater technologies have become an imperative, which cannot be ignored, says Air Products' Sachin Kulkarni.

"The drive towards effective water usage is not only an environmental concern, but has become a strong business

imperative as well," he says. "While legislation is in place regarding waste water management, it is the business community that is driving demand for new technology. The market is actively seeking water treatment solutions in order to become sustainable in the long term."

Air Products, a manufacturer and distributor of a wide range of industrial gases and chemicals, has a proud track record of being at the forefront of continuous improvement in technological innovation, and providing effective solutions to specific industrial problems. The company has introduced a number of technologies to address wastewater treatment issues to global industry, notably oxygen and ozone technologies.

"Waste water technologies must have economic benefits to the company. In other words, they must be cost-effective



in addition to being environmentally-friendly," Kulkarni notes. "Air Products is continually looking for ways to optimise wastewater treatment facilities through improved oxygen-based technologies, which bring direct benefits to the user."

Air Products works with original equipment manufacturers (OEMs), environmental organisations as well as end-users to tailor-make solutions to specific problems with regards to the treatment of wastewater, such as high biological oxygen demand (BOD) or high chemical oxygen demand (COD). In this field, the company has worked closely with companies in the global food processing, paper and pulp, tanneries and distilleries industries.

"The key to the efficient use of oxygen includes the design of the wastewater plant, the equipment used to transfer gaseous oxygen into the liquid effluent, and an intimate understanding of the biological process," says Kulkarni.

One of the technologies that Air Products has introduced in order to optimise wastewater processing and address BOD is oxy-Dep<sup>®</sup>, a biological wastewater treatment process that uses pure oxygen instead of air.

"While air plays an important role in industrial wastewater treatment, it cannot always do the job alone. Treatment methods that use oxygen-based technology to purify and neutralise wastewater are gaining popularity in the industry," says Kulkarni.

The use of high purity (HP) oxygen has particular application in wastewater treatment facilities in cases where the



Wastewater aeration using oxygen versus air significantly lowers VOC emissions by reducing gas stripping. Air Products' Oxy-Dep range of technologies provide efficient oxygenation (usually >90% oxygen transfer efficiency), where high loads exist. Oxy-Dep also provides a reduction in odours, surface foaming, aerosols and VOCs, as well as improved sludge settling and dewatering, either when retrofitted or in a purpose-built activated sludge plant. Inset: Traditional aeration (using air) associated with significantly more surface foaming.

# wastewater treatment

eration basin reaches its limit in terms of load.

“All wastewater plants have a limited capacity – and if the plant exceeds its capacity for wastewater, due to seasonal demands, for instance, the introduction of HP oxygen technology can serve to augment the capacity of the basin in the short term. This is a highly cost-effective alternative to expanding an existing plant’s infrastructure,” notes Kulkarni.

“Moreover,” he adds, “the use of oxygen-based technology eliminates wasted energy in terms of separating oxygen from nitrogen in normal aeration processes. Using high-pressure (HP) oxygen also achieves faster oxygen mass transfer rates into water, as compared to air aeration transfer rates. Greater oxygen solubility enhances and assists the development of microorganisms in effluent or sludge.”

Oxy-Dep® offers treatment plants a highly efficient oxygen dissolution system, which incorporates a side-stream

injector to deliver oxygen in the form of very fine bubbles to an activated sludge process, with minimal power consumption.

“This technology is ideal when space is too limited for the installation of a new or additional plant, as it effectively increases the treatment capacity of the existing plant. This has important implications in minimising the need for large capital expenditure,” Kulkarni emphasises.

Other specialist solutions offered by Air Products to address specific wastewater-related problems include ozone technology, which the company provides not only for water treatment but also for cyanide destruction in the mining industry; and carbon dioxide, which the company supplies to water-treatment companies for pH balancing.

Looking beyond wastewater treatment and purification, Kulkarni notes that aquaculture, as one of the fastest growing food-producing sectors, represents

further opportunities for the introduction of oxygen technology.

Air Products develops and designs its oxygen-based technologies in line with changing markets and industry demand for optimising efficiencies and minimising environmental impact.

“While oxygen processes for the biological treatment of wastewater are not new technology, there is scope for increased application of these technologies in the current environment. The watchwords in industry are ‘reuse’ and ‘recycle’ – especially in the context of water scarcity in South Africa.

“Although oxy-Dep® provides recognised benefits when compared to conventional aeration methods, it is not the final word in wastewater treatment. Air Products is making ongoing advances in the field through its research and development efforts, to gain a deeper understanding of the role of oxygen in the biological and water treatment processes.

This will enable us to further assist our customers in industries with specific needs and to also address ever-present environmental demands going forward,” Kulkarni concludes. □

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# YASKAWA

# SlurrySucker optimises water storage

**S**ediment in process ponds and reservoirs is a serious concern, especially with the current drought conditions that are afflicting South Africa. Lee Vine, managing director of Integrated Pump Rental, says severely silted up process water dams and ponds negatively impact the water storage capacities on a plant or mine, which impacts all downstream processes.

“Use of water resources needs to be optimised and a greater focus must be directed to desilting water storage facilities. We have started to see this happening and there is increased interest from the market for our SlurrySucker,” he says.

Launched less than a year ago, the innovative SlurrySucker Dredge Unit is capable of extracting high tonnages of silt and built-up sediments at a fraction of the cost required to shut down downstream and upstream processes to clean out the different types of water storage facilities.

Available on either short or long-term hire contracts, or as an outright purchase, the SlurrySucker is simple to use and two standard units are available. The SlurrySucker Mini is capable of extracting 120 m<sup>3</sup> per hour of slurry/water mixture, equating to 30 to 40 dry tons per hour, while the larger SlurrySucker Maxi will remove 70 to 80 dry tons per hour. The SlurrySucker Mini has a 100 mm discharge and the SlurrySucker Maxi has a 150 mm discharge.

The SlurrySucker Dredge Units are manufactured using locally produced com-



**Left:** The innovative SlurrySucker Dredge Unit is capable of extracting high tonnages of silt and built-up sediments at a fraction of the cost required to shut down downstream and upstream storage facilities.

**Right:** Lee Vine, managing director of Integrated Pump Rental, says there is an increased interest from the market for the SlurrySucker Dredge Unit.



ponents and incorporate pumps from the respected Grindex slurry and dewatering range. During development of the innovative dredging system, use was made of computational fluid dynamics (CFD) to optimise and validate the design. “This gives customers absolute peace of mind, as does the track record of the units which are currently in operation,” Vine says.

Engineered as a robust, compact dredging unit, the SlurrySucker Dredge Unit can be easily transported on a standard road trailer, making it simple to move from pond to pond on a mine site. The units are engineered to be operated by a single person and, where the necessary manpower is not freely available, Integrated Pump Rental undertakes pond or dam cleaning on a turnkey contract basis.

Vine says that Integrated Pump Rental has the necessary technical skill to ensure that pump selection matches the dredging operation requirement, and it could include either Grindex dewatering

pumps, where agitation of the slurry is required, or Grindex slurry pumps where there is a need to remove slurry from ponds or dams.

Another very significant advantage is that the SlurrySucker Dredge Unit can be used on plastic lined dams without any damage to liners. This is very important from an environmental perspective as there is no risk of the liner being cut and water leaking out.

Integrated Pump Rental offers a full pump rental services that includes Grindex submersible drainage and dewatering pumps, diesel-driven pumps and accessories. In addition, value-add services such as dam cleaning and pontoons, pump flotation modules and pipe floats are available. All products used by Integrated Pump Rental are ISO 9001 certified. Full technical advice on the most suitable pump for specific applications is provided by its experienced team. □

## Procurement of locally manufactured valves and actuators strengthened

**T**he Valve and Actuator Manufacturers Cluster of South Africa (VAMCOSA) is pleased to announce that on 11 February 2016, National Treasury published the updated Instruction Note stipulating the minimum threshold for local production and content for valve products and actuators.

The updated Instruction Note provides clarity on topics such as how local content should be calculated and what constitutes local content, whilst at the same time provides some protection for major suppliers such as foundries, forge shops, and steel/stainless steel suppliers.

Clarification regarding how the 70% local content is made up includes the use of locally produced and certified castings, forging and fabrication as well as verifiable manufacturing activities such as machin-

ing, drilling, coating, assembly and testing.

Further, the averaging-out of local content, either across any number of valves, gearboxes and actuator combinations or by combining locally made and imported valves or other items, is not permitted. Each individual valve, manual actuator or pneumatic actuator is subject to the minimum 70% local content threshold.

In addition, the valve type list has been updated to include the ‘also known as’ or ‘AKA’ names of valves. For example, a check valve is also known as a non-return valve or reflux valve or tilting disk valve and so on. This is to curb the number of state-owned-entities, departments, including municipalities as well as contractors working with state-spend, assuming that by changing the name of the valve in the tender

or request for information process can allow the designation process to be by-passed.

“In the valves industry in South Africa, every direct job leads to seven more jobs in upstream and downstream industries – at foundries and forge shops, with steel merchants, for coating, corrosion protection and thermal spraying as well as with fastener manufacturers and suppliers, for example,” says VAMCOSA’s Mark Wilson.

“And while only state-owned companies such as Eskom and Transnet and government entities such as Municipalities and Water Boards are bound by designation, for the good of us all, we are urging all of private enterprises – mines and mining houses, petrochemical companies and industries – to support the designation process and local manufacturing,” he concludes. □

# Firstever refuse-derived fuel plant in SA

Waste management specialist, Interwaste, has launched South Africa's first refuse-derived fuel (RDF) plant at its Germiston depot. *MechTech* attends the launch and reports.

Interwaste – a leading local waste management business – has announced the launch of South Africa's first refuse-derived fuel (RDF) plant. The plant aims at reducing waste to landfill and pioneering general, industrial and municipal waste to alternative fuels, ensuring less reliance on South Africa's vital resources – resources that are carbon intensive. The company expects to see 36 t/a of waste converted to alternative fuel for use in the South African manufacturing sector.

"In line with global best practice, Interwaste continually invests in innovative solutions that have the most environmentally sound waste management opportunity at its core – solutions that make us market leaders and place us in a favourable position within the competitive waste management environment," says Allan Willcocks, CEO at Interwaste. "It is with this in mind, and with a strong focus on aiding our customers to reduce operational expenses, while acting responsibly towards the environment, that we commissioned the RDF plant, which is another market first since the business opened 25 years ago."

The plant, which was imported in 2015, is located in a facility built by Interwaste at the company's Germiston depot. It is currently producing a solid recovered fuel to European specified standards, which is equivalent to A-Grade coal.

"Through the commissioning of such

solutions, companies are able to lessen their reliance on fossil fuels that have a high environmental impact, including acid mine drainage and reject coal waste and dust, for example. By using RDF, not only are businesses able to drastically improve their emissions profile but they are able to pay back their investment within five years, because the fuel is substantially more economical," continues Willcocks.

Prior to the implementation of the local plant, Interwaste underwent stringent environmental compliance procedures to ensure all due process was followed and that the facility would operate with a valid licence and the correct environmental authority approvals – which are critical in ensuring sound business practices.

The company has also pioneered the production of alternative fuels within the hazardous waste environment, ensuring that hazardous waste can be diverted from landfill, where such waste is not only expensive to landfill but toxic to the environment if not managed correctly.

"Locally, the playing fields have changed. The implementation of new and pending legislation is forcing companies to move to 21<sup>st</sup> century solutions, solutions that offer real opportunity for environmental preservation. From an Interwaste perspective, the provision of these fuels has not only opened up in excess of 100 jobs within the sector, but has created a solid platform from which to protect the environment. This is a criti-



Mike Nicholls, Interwaste's technical services director.

cal constitutional imperative in line with changing legislation," states Willcocks.

"However, we are not in this alone. It is up to corporate South Africa to understand the benefits of such solutions to their bottom line and to the environment, in order for us to make the change we want to see. We are positive about the impact of such market innovation and look forward to very exciting times with regards to RDF," says Willcocks.

Presenting the technology at a launch event earlier this year, Mike Nicholls, Interwaste's technical services director, says that prior to establishing the local system, best practices in Europe were visited and evaluated.

RDF, according to Nicholls, is dry industrial waste, which Interwaste sources locally by onsite sorting of suitable waste from targeted industries such as



A view of the RDF processing plant for 'fluff'. Non-recyclable plastic waste is loaded onto a feeding platform before being passed through a primary and then a secondary shredder. The fluff is then bailed ready for transportation to a power station, kiln or industrial burner.



**Above:** A fluff bail at the end of the RDF plant line.

**Left:** Many waste materials, such as wood, cardboard and non-recyclable plastic materials can be dried, compressed and pelletized, sometimes with the aid of a binder such as wax, to make solid RDF pellets.



furniture manufacturers and generators of non-recyclable plastic waste. Possible uses for the fuel include power stations, the cement industry, gasification/pyrolysis plants and dedicated RDF combustion facilities. "RDF is particularly well suited to the cement industry, since particulate emissions from the fuel tends to be encapsulated in the end product during the calcining process," says Nicholls. Calcining is the decomposition of calcium carbonate (limestone) in a rotating kiln to form calcium oxide (lime) during the cement making process.

Properties of the RDF fuel produced by Interwaste include: very high temperature flame (2 000 °C); low residence time (below 5.0 seconds); inherent gas cleaning, particularly in the case of cement kilns; and almost no ash production.

Two forms of RDF fuel can be produced. From wood-based waste, extruded logs and pellets are produced for use as solid fuel. From plastic waste, however, a fuel called 'fluff' is produced by shredding and baling the pre-sorted plastic waste.

Nicholls says that Interwaste can now offer a solid waste RDF with high calorific value, diverting industrial waste to save landfill space. "We are now able to recover the energy value in waste that would otherwise be wasted, for use as a

substitute fuel for valuable fossil-based resources and reducing net greenhouse gas emissions," he says.

The energy generated from RDF is considered to be green energy and could therefore be eligible for carbon credits and exempted from the Carbon Tax. "Its use is in line with the Department of

Environmental Affairs' waste recovery objectives and qualifies as a contributor to the green economy.

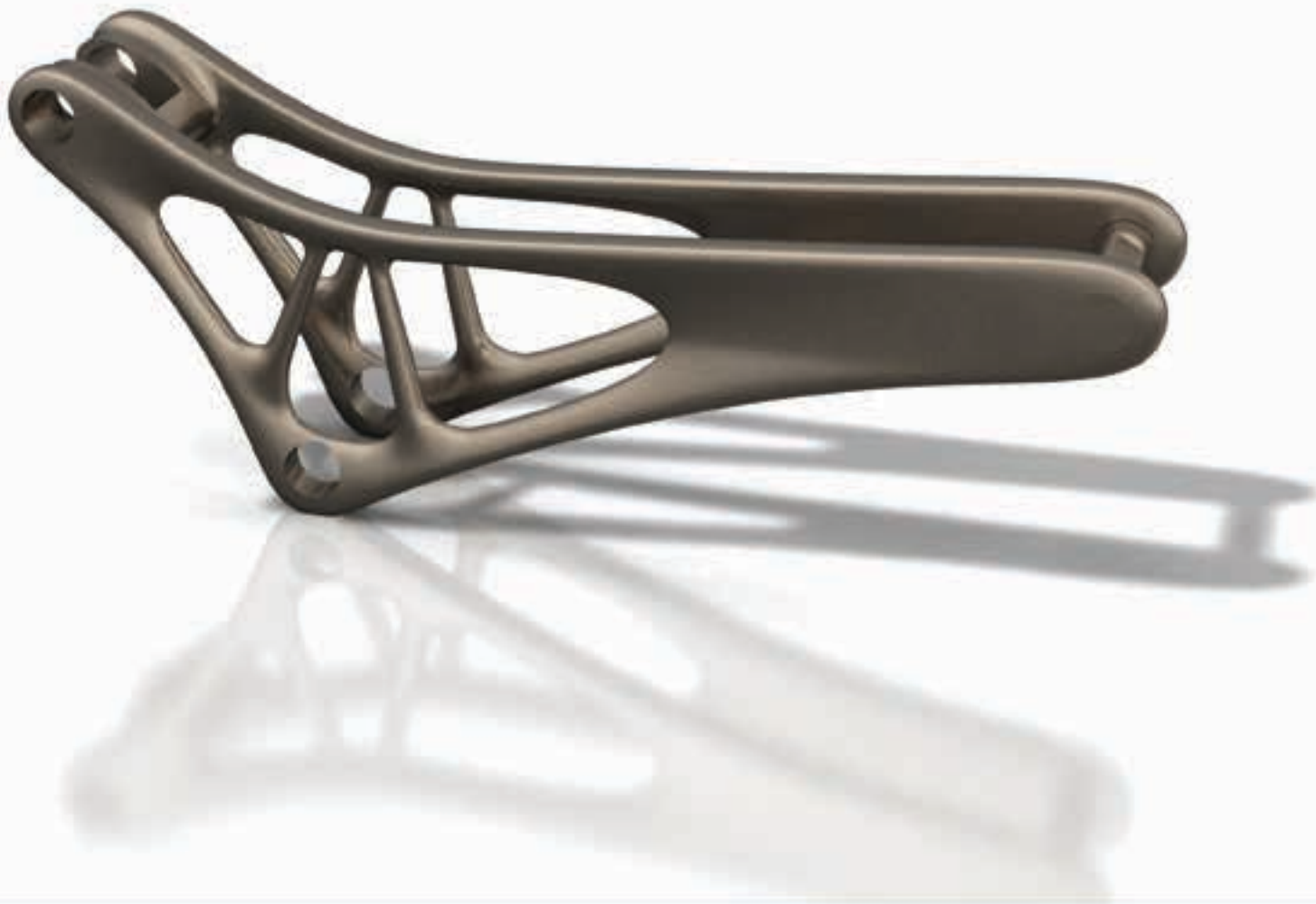
"Available as a dense solid fuel or as 'fluff' for direct injection into burners, RDF offers a high degree of flexibility with respect to calorific value; the potential for zero waste to landfill; a significantly lower ash content than conventional fuels such as coal; along with reduced particulate emissions," he concludes.

Interwaste is a leading environmental solutions management company in South Africa and the SADC region, offering holistic environmental solutions ranging from legal compliance, technical services, on-site management services, resource recovery, solid and liquid waste treatment, waste commodity trading, waste logistics, waste disposal and facilities management. □

SRF Characteristic	Units	SRF 1	SRF 2	SRF 3	Average
Net Calorific Value (NCV)	MJ/kg	31	24	23	26
Moisture Content	(wt/wt) %	1	2	2	2
Ash Content	(wt/wt) %	12	9	20	13
Volatile Matter	(wt/wt) %	88	78	81	82
Carbon	(wt/wt) %	62	48	53	54
Fuel Reactivity	(%/min/K)	3	4	5	4
Chlorine Content	(wt/wt) %	<0.2	<0.2	<0.2	<0.2
Sulphur Content	(wt/wt) %	0.9	1.4	0.2	1
Nitrogen Content	(wt/wt) %	0.2	0.6	0.4	0.4
Mercury Content	mg/MJ	<0.02	<0.02	<0.06	<0.06
Cadmium + Thallium content	mg/MJ	<0.2	<0.2	<0.2	<0.2
Sum of heavy metals	mg/MJ	<30	<30	<30	<30

Interwaste (Solid Recovered Fuels) SRF analysis results. Refuse derived fuels from these waste materials are clean burning with have high calorific value.

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# Generator sets a lifeline to Ghana hospital

Cummins PowerGen leader, Meshach Kwegyir-Aggrey, talks about the backup power generation solution chosen for the Ghana District Hospital Programme.

In order to invigorate healthcare across Ghana, the country's Ministry of Health, together with a private partner, has invested US\$175-million in the Ghana District Hospital Programme, which involves the construction of six new state-of-the-art district hospitals across the country. But the unreliable power supply is a major threat to the success of the programme, driving the installation of Cummins back-up diesel generator sets at each site.

Kwegyir-Aggrey points out that the company's scope of work is to supply, install and commission a total of 12 Cummins C700 D5 power boxes for the Ghana District Hospital Programme, which started in 2014 and is due for completion by end-2016. Kwegyir-Aggrey notes that the original request was for each hospital to have a single 1 400 kVA standby solution.

"We were able to convince the client to opt for two synchronised 700 kVA standby units, which offer greater fuel efficiency and lower maintenance costs, thanks to our advanced masterless load demand (MLD) technology, which enables smartly adapting power generation to match varying load demand.

MLD capable generators allow sharing of information among paralleled generator sets. Another specific design requirement for this project is a noise level of 63 dB at 1.0 mm, and continuous operation of 100% of the genset rating for one hour," he explains.

Dodowa District Hospital in the Shai-Osudoku District of the Greater Accra region was the first to be completed, and was officially opened in December 2015. It features two Cummins C700 D5 synchronised units that have a single

16 000 ℓ external bulk fuel tank, with parallel fuel line piping systems. The other five district hospitals, all due for completion by end-2016, will feature identical back-up power generation solutions from Cummins.

Project manager, Alfred Otoo, says that the greatest challenge to date has been delays in construction. "This has caused a number of logistical problems. We have, however, been able to overcome these by re-scheduling the delivery timelines of the generators, in addition to providing storage for the generators when and where necessary."

According to Kwegyir-Aggrey, Cummins was selected as the back-up power solutions provider to the project, due to its reputation for being an international market-leader. "We have an unrivalled track record worldwide, and were selected even though our competitors presented competitive offers. Although we also offer competitive pricing, it was the aftermarket proposal and factory support that ultimately won the deal."

The comprehensive after-sales service agreement includes a 12-month renewable after sales maintenance contract for each hospital. Kwegyir-Aggrey states that the contract is for routine maintenance, inspection and repair work. "Cummins is providing a solution to meet the specific needs of the customer and it is also providing value to the customer through industry-leading technology that ensures reliable and efficient fuel consumption."

Kwegyir-Aggrey asserts that this project emphasises Cummins' commitment to the Ghanaian market. "Cummins has established a permanent presence in the country in order to support the local economy by providing reliable back-up



One of the containerised Cummins C700 D5 units for the Ghana District Hospital Programme. **Below:** the 700 kVA standby units offer greater fuel efficiency and lower maintenance costs.



power generation solutions to critical sectors that include health, education, finance and telecommunications," he concludes.

Following the completion of the Dodowa District Hospital in the Shai-Osudoku District of the Greater Accra Region, similar hospitals are being constructed in Fomena and Kumawu in the Ashanti Region; Sekondi in the Western Region; Abetifi in the Eastern Region and Garu in the Upper East Region. Additional upgrades are being made to the Takoradi European Hospital, where construction of staff accommodation is underway.

Each hospital will have 120 beds, dedicated medical staff, ultra-modern operating theatres, maternity and paediatric wards, modern and local public health and traditional medicine programmes. □

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# The RMG 5020 gas pressure regulator

Energas Technologies, leading supplier of high-end and specialised equipment to the oil and gas industries in southern Africa, has launched the Honeywell RMG 5020 gas pressure regulator, “to meet the need for ever-increasing operational excellence”. Laetitia Botha, product engineer for Energas Technologies, explains.

In today’s natural gas industry, it is imperative for pilot-operated gas regulators to provide reliable performance in applications ranging from gas distribution systems to gas-fired power plants and processing facilities, as well as commercial and industrial gas services. As an innovative company geared to adapt its offering to clients, Energas Technologies carries Honeywell’s RMG 5020 gas pressure regulator as a solution for gas pressure reduction in municipal distribution, gas transmission as well as industrial plant applications. “The RMG 5020 features state-of-the-art external pilot operation for accurate and safe control of outlet pressure and represents the benchmark for dependable performance in this sector,” comments Botha.

The new regulator from Honeywell offers precise and reliable pressure reductions for a host of operations in the gas sector. “The RMG 5020 improves on existing technologies with its precision grid plate design, versatile flow options and wide operational pressure range. The regulator also boasts easy in-line service and maintenance capability,” notes Botha, adding, “designed simply for longevity, users can enjoy a range of benefits, including: a small number of moving parts; high sensitivity and accuracy; precise control of set outlet pressure; ability to handle flow variation; low maintenance requirements; and low differential pressure requirements.”

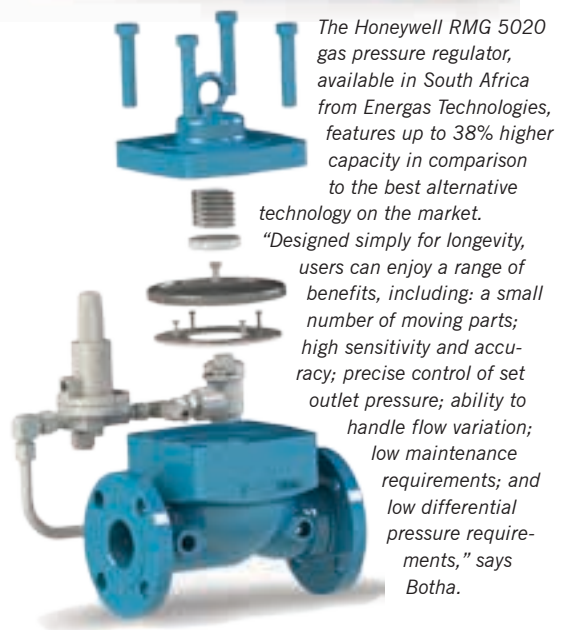
In fuel-gas processes and commercial or industrial service applications, the RMG 5020 maintains a precise reduced outlet pressure, whilst ensuring downstream demand flow. “This is a tough, reliable piece of equipment that delivers smooth operation, tight shut-off, and a long life. Its ruggedness contributes to overall efficiency and the bottom line, through a reduction in the total cost of ownership, excellent working efficiency, its ability to meet individual operational requirements and improve reliability under all conditions,” says Botha.

“These advantages are underpinned by three important aspects: low cost, improved uptime and reduced risk.”

In terms of keeping costs to a minimum, the RMG 5020 is made to drive down maintenance and repair costs at gas facilities. It is specifically configured for convenient in-line service, keeping long-term ownership costs low. The RMG 5020’s design means that failures are rare and routine instrument repairs are easy to perform when necessary, making unexpected shutdowns or operational interruptions on site due to device malfunctions a thing of the past. Through Energas Technologies, Honeywell experts and certified technicians work alongside customers on all facets of product and application planning for gas pressure installations, assisting with start-up, commissioning, on-site technical support and dependable spare part assistance.

The Honeywell RMG 5020 carries best-in-class features that make it a staple in Energas Technologies’ gas regulation offering. It has excellent regulating accuracy, even at low flow and during start-up phase, its precise slotted grid plate design minimises noise emissions and is also available with reduced flow options. The convenient top-entry configuration reduces maintenance requirements and the regulator is compact, which makes for convenient space saving. The pilot/filter is completely pre-mounted, making installation easy and the reduced number of internal parts ensures quiet operation.

“With its optimised flow characteristics, the regulator boasts up to 38% higher capacity in comparison to the best alternative technology on the market. This feature allows for downsizing of the regulator and low differential pressure equipment. The regulator is also less affected by extreme operational temperatures as compared to competitor products and the integral pilot provides



*The Honeywell RMG 5020 gas pressure regulator, available in South Africa from Energas Technologies, features up to 38% higher capacity in comparison to the best alternative technology on the market.*

*“Designed simply for longevity, users can enjoy a range of benefits, including: a small number of moving parts; high sensitivity and accuracy; precise control of set outlet pressure; ability to handle flow variation; low maintenance requirements; and low differential pressure requirements,” says Botha.*

reliability under all conditions – for inlet pressures up to 100 bar and for outlet pressures up to 40 bar. Overall, the high stability and functionality of the regulator mean less downtime, more efficient operation and operational cost saving.”

“As leading suppliers to the oil and gas industries in Southern Africa, it is Energas Technologies’ mandate to deliver only best-in-class products to clients in this competitive industry. We also go to great lengths to ensure that the products we supply are underpinned by top-notch professional support. With the Honeywell RMG 5020, we have the best of both worlds and are delighted to pass this reliable package on to the southern African gas sector,” Botha concludes. □

# Automated and connected water

Festo is combining measurement, control and regulation technology with pneumatic actuators and valve terminal blocks, along with its Aquatronics training capability, to supply customised automation solutions for water and wastewater treatment. *MechTech* talks to Durban-based industry segment specialist for water & wastewater at Festo, Strini Perumal (right).



“Globally we have been automating water treatment plants for many years, and for the past few years we have been growing our water offering in the southern and South African market,” begins Perumal. “A key focus for us is providing complete turnkey solutions for municipalities, water utilities and industrial treatment plants,” he adds.

“South Africa has many manual systems where operators need to open and closer valves using wheels and levers. Festo provides fully automated systems, which offer much better control of water or wastewater treatment processes and deliver better and more consistent water quality. Equally important, though, is maintenance and these systems have built-in diagnostics and are designed for easy plug-and-play maintenance,” he tells *MechTech*.

“In partnership with water infrastructure contractors, we provide turnkey installation packages for water service providers with all media valves, pneumatic actuators, controls and up to the SCADA and software for the main control room – and we are able to optimise an automation solution regardless of the plant’s size or location,” Perumal assures.

Describing the needs of a typical municipal treatment plant for potable water, he says that water is generally pumped into the plant from a river into a raw water reservoir. From there it is first chemically treated (pre-chlorination) to minimise algae growth, before being aerated for the removal of dissolved solids.

The water is then treated with clarifying agents or flocculants, which cause tiny dispersed particles called colloids to coagulate onto larger ones. “The treated water is then slowly mixed before being passed into a clarifier tank where the heavier particles sink, forming a sludge at the bottom of the tank, while the clear water is tapped off over a weir at the top.

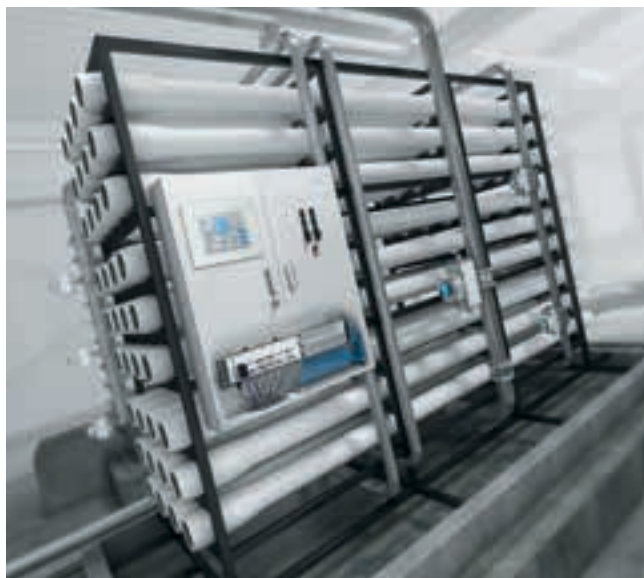
The clear water then passes into filter beds, typically gravity-fed sand beds that remove the remaining fine solid particles. “Between cycles, though, these beds are cleaned via a backwash process,” Perumal points out. The filtered water is again dosed to remove any remaining bacteria and transferred to storage reservoirs as potable water.

“At every stage of this process, valves are used to control the process flow. Valve actuators open and close these valves. This used to be done manually but we are now able to automate every

part of the process, from level control to dosing management and back purging,” Perumal explains.

There are two technologies available for automating valve actuation: electrical or pneumatic actuation. “Based on extensive research by Festo, we have found pneumatic actuation to be far more economical than electrical. Pneumatic systems need a compressor, air driers and filtration units, which have to be piped through to the valves and actuators, while electrical systems only need power. But electrical systems are more expensive and they need specialised technicians to manage them. They also need more complicated programming, since they are continuously variable devices,” he says, adding that, “pneumatic valve actuators are much easier to manage. All they need are two air lines into each valve.”

Perumal argues that cost comparisons need to be evaluated over time. “While it is often assumed that pneumatic actua-



**Above:** Nader Imani, head of business field education (left), demonstrates one of Festo’s Aquatronics learning systems, which are available for water and wastewater management training from basic to advanced levels.

**Left:** The dynamic automated skid from Festo demonstrates the company’s water industry automation expertise and product range.

# solutions for rural Africa

tion systems use a lot of compressed air, this is not really the case. Once a valve has been opened, it stays open without consuming additional air, so very little is actually consumed. We use compressed air storage tanks across the plant and, once these have reached system pressure, the supply compressor can shut down.

“But the air that is used needs to be properly cleaned and dried. In the past, we have found that operators haven’t been properly draining and cleaning out filters. This causes condensation to accumulate in the airlines, which eventually damages the actuators,” he explains.

“In response, we have automated the draining of the filters on the compressors. This enables operators to realise even better long-term cost savings. Instead of having to send a technician to drain the filters, we have automatic dump valves on timers that will ensure that these filters are adequately drained,” he adds.

Festo has an agreement with compressor suppliers to incorporate these dryers as part of an integrated compressor solution. “Also, with these compressors, we offer maintenance contracts to service compressors during warranty periods,” he says.

On a component level, Festo offers an extensive range of valves and actuators with unique features to improve product life. “On butterfly valves, for example, the rubber seats can leak. A traditional valve, which is often controlling the flow of dirty or chemically dosed water, fluid can leak through the valve stem and into the actuator itself, eventually causing damage and shortening the valve life.

“Festo has a safety relief system on its actuators to automatically purge any leakage, safeguarding the actuator and prolonging its life,” Perumal says, adding that these particular valves can operate for between 20 and 50 million cycles. “Festo also provides service kits for all of its actuators and service agreements can be also be adopted to further improve reliability.”

A cornerstone of lowering costs is the simplicity and maintainability of pneumatic systems over electrical equivalents. “We believe that pneumatics offers better solutions for South Africa in terms of long term operational and maintenance costs, largely due to the system’s simplicity.

“Conventionally, where a pneumatic



*By using valve terminal block technology in decentralised Festo panels, the complexity of systems and the amount of piping and cabling can be significantly reduced.*

valve was connected to an actuator, each valve would have its air supply and electrical power and control cabling routed back via a thick conduit through junction boxes to a centralised filter bank and back to the main control room. Now, we can use valve terminal block technology in decentralised Festo panels to significantly reduce the complexity and amount of piping and cabling,” Perumal says.

“From a decentralised panel, which includes its own filter unit, we can control a number of nearby valves. And between the panel and the valve actuators, we need only connect one pneumatic pipe and an electrical feedback cable.

“Communication between each distributed panel and the centralised SCADA control system is achieved via Fieldbus connectivity such as Profibus, Ethernet or DeviceNet or any other single cable protocol. This system also enables self-diagnostics. If a coil, valve or actuator fails to reach the position required, this is immediately diagnosed and an alarm signal is sent to the main SCADA to direct the operator to the problem point. So faultfinding is easy and more immediate, significantly reducing downtime,” he tells *MechTech*.

Valve terminal blocks consist of all the solenoids, pneumatic valves and input/output signal sensor – ultrasonic level sensors, temperatures probes, valve position sensors, etc. The sensors are all wired into the valve terminal block in the distributed panel, from where ‘intelligent signals’ are sent to the central controller. And the distributed panels are IP65 protected from dust, moisture and sunlight.

“Panels are easy to access. LEDs are used to detect problems and, to replace a single valve-slice of a terminal block, all you need to do is to isolate the main pres-



*In response to the need to drain the compressed air lines regularly to prevent pneumatic actuators from absorbing damp and corroding. Festo now installs automatic dump valves on timers that will ensure that the filters are timely and adequately drained.*

sure into the panel, remove two screws on the faulty terminal and replace it with a new one,” says Perumal.

Festo is currently involved with a rural project that involves remote monitoring and control. “At a water treatment plant in northern KwaZulu-Natal, we are installing an automated plant and SCADA system that will allow the water treatment plant and the pump station to be managed from one central point. Using the CPX-MPA valve terminal block, which has its own built-in PLC and wireless communication system, operators have full control functionality and faultfinding capability from the remote control and monitoring office.

In addition, for small rural treatment plants using borehole water, for example, Festo has a solution for containerised water treatment. “These systems have all the required water treatment processes packaged into a transportable container. This removes the need for any civil construction onsite, making it an ideal rural solution, particularly if coupled with remote control and monitoring,” suggests Perumal.

“We are a complete solutions provider in the automatic water treatment space.” He concludes: “This is a differentiator for us. We even offer operator training courses at several different levels through the globally developed Aquatronics courses.” □

# VTT's robot innovation and 3D printing research

The quick-control system developed by VTT Technical Research Centre of Finland slashes the programming time for industrial robots, enabling the increased use of automation for short production runs or single-item products. In addition, the non-profit multidisciplinary R&D organisation is participating in a 3D printing research project targeting on-demand printing of spare parts.

**V**TT has developed a control system for the industrial robots used for manufacturing of single-item products that substantially cuts the set-up and programming time for the robot. Thanks to the new innovations, the time required for programming a robot can now be counted in minutes, while traditional programming methods could take an hour or more.

"The new solution significantly enhances the efficiency of productive operations and opens up new opportunities for utilising robots," says Tapio Heikkilä, principal scientist at VTT.

Unique features of the new control system include, for example, the use of two force/torque sensors, while traditionally, robotic systems have one or none. The purpose of a force/torque sensor is to recognise the pressure on the tool. In the VTT solution, one sensor is attached to a wireless control stick (joystick) through which the robot can be steered through the operation by an operator.

The control stick and the robot control system operate simultaneously in real time, making it possible for a human controller to work in the same working space with the robot, controlling/adapting the robot's movements via the control stick.

"The interactive solution makes it possible to take advantage of a human's observation capacity for carrying out the required task," Heikkilä explains.

Thanks to the interactive system, the teaching of new tasks and continuous paths to the robot, as well as direct control of the robot become much faster than before. This is particularly useful in the manufacturing of test pieces and single-item products because heavy objects or entire assembly processes can be accomplished in a flexible manner.

With a traditional robot solution, the robot's work path is programmed

slowly, one point at a time, and the robot unvaryingly repeats the predefined task. Reprogramming and even minor variations in such factors as the locations of the items being handled cause immediate errors.

## Ideal for the Internet era

This is a solution for the Internet era. Quick programming of robots and human-robot interaction will become an ever more important feature of the industrial Internet of Things, especially where flexible production and short runs are essential competitive advantages for companies. Traditional hard automation meets such requirements quite poorly.

"When the customer has a versatile range of single-item products to process, efficient partial automation may be a competitive solution," Heikkilä points out. The solution is suited to tasks requiring a high level of expertise, where the robot does the hard work and the people do the brainwork.

The new solution also enables service models to become more common via the industrial Internet. The data measured from the sensors of the robot can be stored on a cloud server, which makes it possible to run different analyses as a remote service. The robot's performance can also be monitored in real time through the Internet.

The control solution developed can be applied to any robots with an open control interface. In practice, this applies to several major robot manufacturers. The solution was developed as part of the HEPHESTOS project within the 7<sup>th</sup> EU Framework Programme, and, in addition to robot manufacturers, VTT expects it be of interest to all robot using industries and system suppliers.

The three-year HEPHESTOS project that ended in October, 2015 involved nine research organisations and com-



*The VTT Technical Research Centre in Tampere, Finland, where, as part of the HEPHESTOS project, an interactive robot solution has been developed to enable an operator, using a control stick, to work simultaneously with an industrial robot.*

panies from six countries: Fraunhofer IPK, Easy-Robot and ME Messsysteme from Germany; Universidad Politecnica de Madrid from Spain; G-Robots from Hungary; Universiteit I Agder from Norway; Comau Robotics from Italy; and Jot Automation and VTT from Finland.

## Spare parts into data and on demand 3D printing

Aalto University, together with the VTT Technical Research Centre of Finland, have launched a research project focusing on digital spare parts in collaboration with 13 companies. The project studies new operating and earnings models, current and future technological potential, and builds preconditions for a functional network.

The purpose of the project is to promote the transition from traditional production chains of spare parts to a dynamic network model that generates added value by means of digitisation. The spare parts and any relevant information would be transferred and stored in digital format. These parts would then be manufactured using 3D printing, on demand and, usually, close to the end user's premises.

In the industrial sector, the market for 3D printed spare parts is still undeveloped, and there are no functional networks concentrating exclusively on spare parts. There are various associated challenges and development needs, such as: guaranteeing the operational reliability of critical parts; materials offerings; issues related to data security; digitisation of big and complex parts;



and most critically, the creation of a functional service chain.

Big production plants maintain large inventories, where large numbers of spare parts may wait for long periods of time before being taken into use. "In companies such as marine and energy power solutions specialist, Wärtsilä, the capital tied up in materials and equipment may amount to hundreds of millions of euros. If we could release, say 5.0% of this capital by means of digitisation, the impact would be substantial," says Jarno Salonen, business development manager at Wärtsilä, which is one of the companies participating in the project.

"We expect the project to create new international business opportunities," says Tomi Kalpio, who is one of the main



**Above:** Through facilities such as the HILLA shared R&D environments (SRE) VTT makes state-of-the-art tools such as 3D printing machines available to SME's and start-ups.

**Right:** The interactive solution takes advantage of a human's observation capacity to help the robot carrying out the required task.



owners and founders of 3DTech Oy, a company that has already carried out trials on 3D printed spare parts.

The project of about €1.4-million is part of Tekes' Industrial Internet programme. The two-year project launched at the beginning of 2016 is funded by Tekes and the participating research organisations and companies: 3D Online Factory Ltd, 3DTech Oy, AM Finland Oy, Hetitec Oy, Kone Corporation, Laserle Oy, Materflow Oy, Multiprint 3D Oy, Patria

Aviation Oy, Raute Corporation, Rolls-Royce Oy Ab, Sacotec Components Oy and Wärtsilä Finland Oy.

The Federation of Finnish Technology Industries functions as the co-operation partner for the project. The first joint effort will be the open interactive workshop (in Finnish) for companies to be held on April 8, 2016, where the organisers present the content and goals of the project and the companies involved are invited to highlight their own views. □

## Stainless steel safety hinge solution

The Leuze S420 safety hinge switch unites the safety switch and door hinge functions in a single component. This stainless steel safety hinge switch, available from Countapulse Controls, offers an ideal solution for mechanically and hygienically challenging applications such as the food and beverage, pharmaceutical and cosmetics industries.

There are numerous applications for these high quality safety hinge switches. An example would be for the position monitoring of hard guards such as protective hoods that can rotate by means of a monitoring switch – without guard interlocking – integrated into the hinge. The switch does not require an external actuator, which means it is also suitable for use in environments with high dust concentration levels or with heavy particle loads.

Fault-free function is ensured, even with warped or misaligned doors, by means of a repeatable switching angle alignment setting. The actuator is integrated into the

housing, while electrical connection is by means of a cable or an M 12 plug, with optional cable entry from above, below, from the wall or mounting side. This allows for the monitoring of all types of doors, hoods and flaps. The safety hinge switch has an opening angle of up to 180° that can be adjusted as many times as needed.

The Leuze S420 stainless steel switch offers optimum cleaning options even with high pressure cleaning, thanks to a wall side cable outlet, a high-grade surface with a roughness of less than 0.8 µm and an IP 67 or IP 69 K level of protection. In addition, covered tamper proof screws reduce the risk of contamination.

This safety hinge switch is also recommended for the wood product industry in situations where high availability is critical under dust and particle loads. Through the six-point bolting of the joint, even heavy doors can be guarded reliably and with extended service intervals. Users can select from device versions featuring contact

blocks or safety related switching outputs (OSSDs). This makes it possible to have a series connection of 32 devices without compromising the safety level.

Countapulse Controls has over 40 years' experience in specialist sensing technology and offers reliable, efficient and application appropriate sensing, control and motion detection solutions.

The Leuze S420 stainless steel switch from Countapulse Controls is ideal for industries where strict cleanliness and hygienic control are critical.



# New water tractors for Alexandria Port Authority

The Egyptian port of Alexandria, one of the world's most important trade ports, has placed orders for a total of four additional port tugs, equipped with Voith Schneider Propellers (VSPs), which will be manufactured at two Egyptian shipyards.

**F**our new Voith Water Tractors (VWTs) have been purchased to further complement the Alexandria Port Authority's existing fleet of nine VWTs.

"The specification of the new vessels was based on a study conducted by Voith," confirms Derain Pillay, the company's vice-president: power, oil & gas. This study ultimately resulted in the Port Authority requiring conventional port tugs in two sizes.

Two VWTs with a bollard pull of 40 t are each equipped with two VSP 26R5/195-2 systems. The vessels, with a length of 29 m and a beam of 9.5 m, reach speeds of 13 knots. The remaining two VWTs have a bollard pull of 50 t. These are propelled by two VSP 28R5/210-2, ensuring safe and reliable manoeuvring in port. With a length of 35 m and a beam of 11.5 m, they are also designed for a speed of 13 knots.

"Manoeuvrability, robustness and reliability have been, and continue to be, the key reasons for us deciding in favour of the proven Voith VSP propulsion concept," says Admiral Abdelkader Darwish, head of the Alexandria Port Authority.

VWTs have been deployed in the port since 1989. The first of the new VSPs were shipped to Egypt at the end of 2015, well in time for the new port tugs to be launched by the end of 2016.

Voith Schneider propellers have a circular array of vertical blades in the shape of hydrofoils protruding from the bottom of the ship. Each blade can be rotated around a vertical axis via an internal gear, which changes the angle of attack of the blades in sync with the rotation of the plate. So each blade can provide thrust in any direction as the array of blades is rotated.

To change direction, therefore, the Voith-Schneider propeller only requires the pattern of orientation of the vertical blades to be changed. This provides a drive that can be directed in any direction and thus does away with the need for a rudder. This is highly efficient and enables an almost instantaneous change of direction, making these drives ideal for fireboats and tugboats where manoeuvrability is essential.

Alexandria itself is a metropolis of about four million inhabitants. Located on the western end of the Nile Delta, the



*Voith Schneider radial propellers with turbo fins provide Voith water tractors (VWTs) with the power, manoeuvrability, robustness and reliability necessary to ensure that vessels reach their destinations safely.*

port handles container and cruise vessels bound for the Suez Canal. Following the opening of the Suez Canal expansion in August 2015, Egypt is anticipating a significant increase in transiting vessels.

It is not only the number of ships using the Suez Canal every day that the Port Authority expects to rise: the register tonnage of the vessels is also forecast to increase significantly. This was the result of the initial study conducted by Voith on behalf of the Alexandria Port Authority. □



*Voith Water Tractors with Voith Schneider propellers have been deployed at the Port of Alexandria since 1989.*



# Fishing breakthrough with America's Finest trawler

**B**allast water treatment (BWT) specialist Optimarin has landed its first ever contract in the fishing segment. The Norwegian firm will now supply its soon to be USCG-approved Optimarin Ballast System (OBS) for the Skipsteknisk-designed America's Finest.

Seattle-based Fisherman's Finest will own and operate the 80 m long stern trawler, which is currently being completed at Washington State's Dakota Creek Industries yard.

America's Finest, a ST-116XL design, has been hailed as Skipsteknisk's most environmentally friendly vessel to date. It combines a highly-efficient DNV GL classed +1A1 Ice 1B hull, reducing resistance in both ice and the open water, with the ability to tow, process and freeze its white- and ground fish catch at sea. Its operational area will span the North Pacific, Gulf of Alaska and Bering Sea.

"This is a genuinely exciting contract for Optimarin, marking a breakthrough into a sector with attractive growth potential and a need for proven environmental performance," comments Optimarin CEO Tore Andersen.

"America's Finest lives up to its name and will lead the way in standards for the entire Bering Sea fleet. Our system is the perfect match, with proven reliability, effectiveness and – thanks to its UV (ultra-violet) nature, where no chemicals

are produced or discharged – our water treatment system has impeccable environmental credentials."

Andersen notes that OBS' imminent USCG approval, the first of its kind for a UV based unit, also played a key role in its selection: "USCG compliance was absolutely essential for a vessel with this kind of operational footprint. The power of the UV lamps in the OBS, boasting a capacity of 35 kW, ensures these systems meet USCG's strict FDA/CFMDA criteria, eliminating all potentially invasive marine organisms in ballast water.

"OBS satisfied USCG's comprehensive marine water tests in 2015, with full approval now expected in autumn this year. This, along with our vast experience of providing flexible, reliable and easy to install technology, is a key selling point for any owner looking to trade in US waters."

Optimarin has now sold over 370 of its systems to ship owners across the world, with more than 270 installed, over 60 of which are retrofits. Its worldwide engineering agreements with Goltens and Zeppelin Power Systems ensure it offers its technology where and when it's needed, meeting all individual client requirements.

The new system is scheduled for delivery and installation onboard America's Finest in April this year. Alongside its high-efficiency and advanced BWT so-



*Optimarin's modular ballast water treatment (BWT) systems, which utilise filtration and high doses of UV irradiation to efficiently deactivate marine organisms, is now installed in over 210 vessels worldwide.*

lution, the vessel offers accommodation for 49 people, hospital facilities, and is completely insulated to protect crew from the harsh conditions of its northern operating areas.

Other ship-owners that have chosen OBS include Saga Shipholding, MOL, Grieg Shipping Group, Gulf Offshore, Farstad Shipping, NYK, Nor Line, and Evergreen Marine Corp, amongst others. The system is fully approved by IMO and certified through DNV GL, Lloyd's, Bureau Veritas, MLIT Japan, and American Bureau of Shipping. □

## Drives for China's first hybrid rail vehicles

**T**he Changchun Railway Vehicles Company (CRC) of China is planning to build 30 hybrid rail vehicles featuring RailPack 400DE drive systems from Voith Turbo. Each three-part vehicle will have two of these systems, both with a 375 kW diesel engine and a 345 kW generator. The first three RailPack 400DEs have undergone comprehensive testing at CRC's own test ring in Changchun and at Beijing Jiaotong University. The rail vehicle itself is expected to be tested and approved by the China Railway Corporation, the country's national railway operator, in 2017.

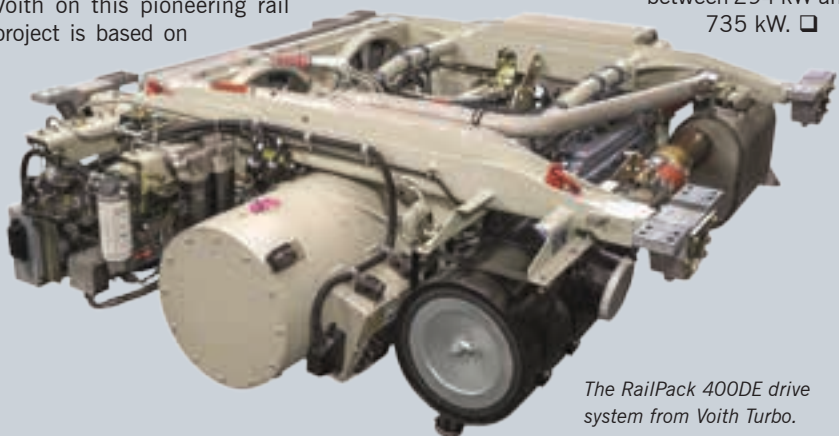
"This is an absolute first for China," says Roland Aeugle, rail functional head. The hybrid rail vehicles are to be used in those city suburbs with only partial electrification. The RailPack 400DE will come into play here, while the operator will be able to switch to electrical drive outside these areas, with the added benefit of zero emissions.

The hybrid vehicles can reach a top speed of 120 km/h with the diesel-electric drive. The RailPack 400DEs also feature a quick-switch system from electric to diesel-electric drive. In addition, the Voith drive system can handle extreme temperatures, down to -40°C.

"The cooperation between CRC and Voith on this pioneering rail project is based on

Voith's readiness to use existing tried-and-tested technology to develop customer-specific solutions," Aeugle says.

Voith RailPacks are drive systems for use in single-segment and multi-segment diesel railcars for commuter, regional, national and intercity services. They can be supplied as diesel-mechanical, diesel-hydraulic and diesel-hydraulic models. They are available with engine performance specifications of between 294 kW and 735 kW. □



*The RailPack 400DE drive system from Voith Turbo.*

## New regional centre for commercial vehicles

A new Daimler Regional Centre for Southern Africa (RCSA), responsible for sales and after-sales of Mercedes-Benz trucks and buses, FUSO trucks and buses, Freightliner trucks, Western Star trucks and Mercedes-Benz vans, has opened in Pretoria, South Africa.

**M**ercedes-Benz South Africa (MBSA), along with its brand divisions Daimler Trucks & Buses and Mercedes-Benz Vans, is strengthening its drive for excellence and customer dedication with the opening of its Regional Centre Southern Africa (RCSA). RCSA will be responsible for Daimler's full commercial vehicles portfolio in the region, the full offering of Mercedes-Benz vans, heavy-duty Mercedes-Benz trucks and buses as well as the uniquely suited truck and bus products from FUSO. The Regional Centre Southern Africa will be in charge of South Africa, Namibia, Botswana, Zimbabwe, Mozambique, Malawi, Zambia, Lesotho and Swaziland.

"Opening our new Regional Centre

Southern Africa, we are able to respond faster to our commercial vehicle customers. This will help us to further tap the growth potential of this emerging region," says Wolfgang Bernhard, member of the board of management of Daimler AG responsible for Daimler trucks and buses.

Based in Pretoria, South Africa, RCSA will be a catalyst in ensuring highly efficient business processes and an even higher level of customer satisfaction. MBSA and its parent company Daimler AG are confident that the new centre is poised to provide excellence and, ultimately, competitive advantage to the growing number of southern Africa-based customers through superior products and value offerings.

Says Kobus van Zyl, executive direc-

tor of Daimler Trucks & Buses Southern Africa: "Having a stronger presence in the southern African markets means that we are able to react faster and be in touch more frequently with our commercial vehicle customers and the various general distributors in the respective countries. The RCSA provides further opportunities for all our commercial vehicle endeavours, including sales, after-sales, marketing, client services and parts."

Southern Africa is a promising growth region. In line with the global outlook, the region is facing a tough economic cycle but is still expected to grow at a rate of 3.75% in 2016. Improved external prospects and domestic policy improvements will support gradually stronger growth rates from 2017, with the regional average back up to more than 4.5% annually during 2018-2020. Moreover, southern Africa possesses large reserves of untapped natural commodities such as copper, oil and gas. In 2015, Daimler sold approximately 5 500 trucks and buses in the region.

The RCSA is the third of six regional centres being opened for Daimler's commercial vehicles business around the world. The Regional Centre for East, Central, and West Africa has started operations from Nairobi, Kenya, while the first regional centre was opened in October 2015 in Dubai as Daimler Commercial Vehicles Middle East North Africa (DCV MENA). □



The fleet of Mercedes-Benz buses for George. Based in Pretoria, South Africa, RCSA will be a catalyst for ensuring "highly efficient business processes and an even higher level of customer satisfaction".

### Innovative pressure testing and flushing technology

**M**etric Automotive Engineering has introduced innovative technology to guarantee the cleanliness of coolers and eliminate secondary failures.

This pressure testing and flushing system can be implemented on any type of cooler, whether for engine oil, transmission oil, hydraulic oil, intercoolers or radiators. "Until the introduction of this technology, pressure testing and flushing have been undertaken using ultrasonic cleaning processes. The primary disadvantage of ultrasonic cleaning technology is that the flow through the cooler is uni-directional, which results in the particles becoming lodged in the cooler," says Andrew Yorke, operations director at Metric Automotive Engineering.

"It makes absolutely no sense to spend money on rebuilding a complete component and then reinstalling a cooler that is not perfectly clean. In general, we find that

once the component starts operating and reaches a specific temperature, debris will be released and the customer could then experience a secondary failure," he says.

The new technology being applied by Metric Automotive Engineering uses a flushing fluid that runs at 85 °C. This temperature causes expansion within the cooler and opens it up to free any debris that is trapped. The system operates at 3.0 bar pressure, which cannot be achieved with ultrasonic cleaning.

"Most significant is that this technology has a bi-directional flow, whereby the fluid flows in one direction for three seconds and then the flow is reversed for one second. This alternating cycle continues for a user-determined period of time. This reverse flow creates hydraulic shock, which dislodges trapped particles and produces superior cleaning efficiencies," Yorke points out.

In addition, the return line passes over a 10 µm filter that enables visual checking to ensure that all debris has been cleared and the lines are completely clean. "Adding flexibility is the ability to test both in situ as well as on components that have already been stripped from the engine or vehicle," Yorke concludes. □



The return line passes over a 10 µm filter that enables visual checking to ensure that all debris has been cleared and the lines are completely clean. Shown here is a view of the final flush of the screen filter.

## Modular terminal tractors for distribution and logistics centres

New to BLT SA's range of materials handling equipment are Capacity Sabre 9 terminal tractors, which are coupled with trailers to safely move heavyweight trailered cargo through container terminals, across docks and over airport runways.

Capacity modular terminal tractors, which can be customised for many handling tasks, are ideally suited for demanding operations in distribution and logistics centres, warehouses, container and intermodal facilities, as well as for light industrial handling.

"Critical challenges facing the logistics sector include efficient cargo handling solutions that reduce operating costs, improve productivity and enhance safety of operations," says Charity Gumede, marketing director for BLT SA. "Capacity terminal tractors ensure faster handling times, reduce on-site congestion and minimise demurrage costs for trucks waiting to be loaded and unloaded. By positioning trailers at discharge ramps, the road truck is able to transport further loads, instead of having to wait for a trailer or container to be discharged.

"In port operations, terminal tractors move trailers to and from vessels and storage areas to speed up operations, thus increasing operational efficiency," Gumede explains.

Capacity Sabre 9 terminal tractors have a robust frame construction and precise manufacturing tolerances, ideally suited to rigorous applications. This series has been designed with a 30% faster actuation of the boom than previous models. The advantage of this is reduced coupling times, which enables quicker drive-aways. A lower, tapered skid ramp minimises trip outs of the cab and for increased operator safety, there is a lower step height and new sight line designs for improved visibility.

Other features include torque ratings of 990 Nm@1 500 rpm and reduced emissions for enhanced environmental protection. The latest technology in fuel savings significantly decreases operational and maintenance costs. Components are easily accessible for efficient ground level serviceability.

Built-in onboard diagnostics enable operators to easily monitor the machine's service status. Numerous service checks

can be performed at ground level, which ensures more uptime for each machine.

The synchronised seat and cab suspension tuning for smooth operation, an efficient HVAC airflow and a newly designed dashboard with elevated instrumentation reduce driver fatigue and optimise productivity.



BLT SA's Capacity Sabre 9 terminal tractors are designed for demanding operations in distribution and logistics centres, warehouses, container and intermodal facilities, as well as for light industrial handling. They are seen here in use for logging operations.

### Volvo FH trucks for the McLaren-Honda F1 team

Volvo Trucks was recently announced as an official supplier of trucks and haulage to the McLaren-Honda Formula 1 team. The partnership will see McLaren-Honda take delivery of a brand new fleet of 24 state-of-the-art Volvo FH Series trucks for the duration of the four-year agreement to provide transport solutions and logistics support for both the race team and hospitality operations.

The McLaren-Honda team will enter the 2016 FIA Formula 1 World Championship with, arguably, the best driver pairing in the sport: world champions Fernando Alonso; and Jenson Button. They will drive the McLaren-Honda MP4-31.

The 24 Volvo FH 13-litre, 540 hp trucks of three different specifications will be used, including standard height, extra low, and top of the range, to cater for the ever-changing logistical requirements of the team at grand prix locations all over Europe.

This is the first time that a heavy goods vehicle has used Volvo's i-Shift automated gearbox matched to the new Dual Clutch, which offers unrivalled driveability in its

Capacity tractors enhance BLT SA's extensive range of equipment, which includes Taylor container handlers and reach stackers, Meclift variable reach trucks and Mobicon mobile container handling systems. The company is also the exclusive distributor in Africa for the Samson range of bulk handling equipment, which encompasses material and boom feeders for loading and high capacity stockpiling, link conveyors and grab hoppers, as well as mobile shiploaders.

BLT SA works closely with customers to ensure all equipment meets performance and safety requirements. The company's support service encompasses a technical advisory and original spare parts facility. □

class. The vehicle also features independent suspension with rack and pinion steering, features that have

The Volvo FH Series boast the latest fuel saving i-See gradient technology and engines that meet the Euro-6 emissions standard, reducing environmental impact in line with the McLaren-Honda's status as the only Formula 1 operation to be awarded the FIA's Environmental Award for the Achievement of Excellence.

The FH Series is also the world's safest Volvo product, equipped with the strongest-ever Volvo cab, driver support systems, redesigned aerodynamic mirrors, improved instrument display and dynamic headlights.

Jonathan Neale, chief operating officer of McLaren Technology Group, says: "As well as looking for on-track efficiencies, as part of McLaren's sustainability commitments we also look for improvements off it too. That's why we're very proud to partner with Volvo Trucks, which is renowned for its innovative and high-performance heavy goods transport solutions." □

## Quality diesel engine parts reduce downtime and maintenance costs

"While many service providers stake their hard earned reputations on extending the life of a machine, there are those who are less ethical and see an opportunity to make a larger profit. Add to this scenario that some buyers within larger organisation may not actually understand the long term ramifications of using sub-standard replacement parts," says Andrew Yorke, director at Metric

Automotive Engineering.

"Essentially, we continue to see the weighing up of short term versus long term viability with respect to the choice of component supplier. Where the person responsible for purchasing the essential replacement parts decides to cut costs to the bone and purchases spurious parts that may save costs in the short term, it could result in complete engine failure with the high associated costs thereof," he explains. "And we are not even touching on the costs resulting from the unplanned downtime or the possible safety issues."

Metric Automotive Engineering is the authorised distributor for IPD Parts in southern Africa and Yorke is quick to explain that these are engineered replacement parts that are manufactured in the IPD Parts ISO 9001:2000 accredited quality controlled environment. "USA-based IPD Parts has more than 50 years' of engineering and manufacturing experience and this certainly shows in the quality of the final products."

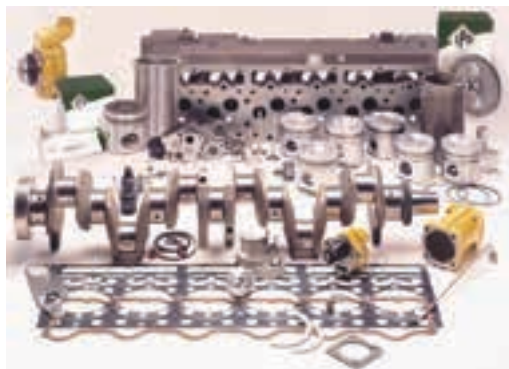
One example of innovation in the

IPD Parts range includes the Multilayer Steel (MLS) cylinder head gasket sets for Caterpillar® C13 engines, which feature a graphite mating surface treatment. Yorke explains that the additional thickness on the head gasket compensates for the fact that when an engine's major components are overhauled they are skimmed and height is lost on the block, which a critical dimension.

Another example is the Caterpillar C9, C13 and C15 crankshafts. These follow on from IPD Part's successful crankshafts for older generation Cat® engines such as the 3306, 3406 and 3408.

Making life easier for customers rebuilding the latest generation Caterpillar engines, the IPD Style1-2-3™ gasket sets allow customers to simply order one part number and receive one box, with everything contained within that single box. Another advantage is that the components are packaged according to substructure, which means the parts are packaged accordingly for the water and oil pump, for example.

[www.metricauto.co.za](http://www.metricauto.co.za)



Metric Automotive Engineering is the authorised distributor of IPD Parts in southern Africa. These are engineered replacement parts that are manufactured in the IPD Parts ISO 9001:2000 accredited quality controlled environment.

## Strip curtains stop cold air in its tracks

Apex General Purpose Strip Curtains are an inexpensive way to cover a door opening and prevent the ingress of hot or cold air, dust and other pollutants, while still allowing easy passage for both personnel and vehicles. The product is ideal for installation in small, medium and large openings.

Manufactured from specially formulated PVC material that does not become brittle with use, Apex General Purpose Strip Curtains are transparent for optimum visibility and safety. This is an important factor when both people and vehicles use the same entrances and exits.

This locally manufactured strip curtaining product is best known for its patented Balledge® design which, while providing an effective thermal seal, parts easily under pressure to allow people and goods to move through unhindered.

Wim Dessing, managing director of Apex Strip Curtains & Doors, says that the Balledge design ensures that the individual strips do not snag or scratch goods or people moving through the opening. This feature also strengthens the strips, ensuring a longer life even in the harshest applications.

Apex Strip Curtains are generally used to prevent the ingress of hot or cold air, depending on the season, and this is considered important, as comfortable employees are more productive. This, Dessing says, is especially true when hot air is trapped in a warehouse or manufacturing facility causing excessive heat build-up.

Apex Strip Curtains & Doors was the first company to locally manufacture general purpose strip curtaining in South Africa.

[www.apexstrip.co.za](http://www.apexstrip.co.za)



Apex General Purpose Strip Curtains are transparent for optimum visibility and safety. They are best known their patented Balledge® design, which provides an effective thermal seal.

## EPD certificates for door closers and guide rails

ASSA ABLOY recently received Environmental Product Declaration (EPD) certificates for its range of concealed Cam-Motion® door closers (DC860) and guide rails (G462), once again affirming the environmental smartness of its products.

These two product ranges offer aesthetic, efficient and safe solutions to meet a wide range of door opening applications across diverse market segments. This latest certification follows close on the heels of EPD certification of ASSA ABLOY's DC700 and DC500 door

closers in Q4 2014/Q1 2015.

"An EPD is a standardised way of quantifying the environmental impact of a building, product or system based on life-cycle assessment," explains ASSA ABLOY South Africa's vice president – commercial sales, Quintin Boukan. "EPDs form the basis for building assessment on an ecological basis, which is currently laid down in the new European Standard, 'Sustainability of buildings'".

ASSA ABLOY units have a typical life time of 15 to 20 years.

[www.assaabloy.co.za](http://www.assaabloy.co.za)

## Increased safety with new Diamec Smart series

Atlas Copco is introducing core-drilling rigs that eliminate many of the hazardous operations for mines involved in underground core drilling.

The risk of handling inner tubes and drill rods while extracting core samples, is a well-known problem for drillers around the world. Despite safety regulations, accidents with severe injuries still occur.

Atlas Copco's Diamec Smart core drilling rigs have an advanced control system that enables automatic functions such as drilling, adding and removing rods. By using the unique rod handler, the operator can perform the work from a safe distance. All adding and removal of in-the-hole (ITH) equipment is done automatically.

The automatic functions not only increase the safety for the operators, they also improve the working environment and increase the productivity. A 3.0 m inner tube with core samples can weigh about 100 kg and the handling is heavy and hazardous. The rod handler eliminates operator fatigue and helps to keep pace for an entire shift.

Martin Sommers, vice-president for marketing – exploration equipment at Atlas Copco, explains: "There is an increasing focus on safety within the mining industry and the new Diamec Smart series sets a new standard for



*Automatic functions on the Diamec Smart increase operator safety, improve working environment and increase productivity.*

underground core drilling rigs. Customers who have tried automatic drilling and rod handling never want to go back to the old way of drilling."

The new improved control system on the Diamec Smart is based on the rig control system (RCS) that is used for all drilling rigs from the mining and rock excavation business area at Atlas Copco. More than 20 important improvements have been made in both hardware and software compared to the previous control system, making it even more robust and reliable.

[www.atlascopcogroup.com](http://www.atlascopcogroup.com)

## Low-profile bulk bag filler

Flexicon Africa has introduced a new rear-post bulk bag filler that features a patented Swing-Down™ fill head that pivots to the operator at floor level for safe, ergonomic spout connections; and a low-profile loading deck that allows removal of filled bags using a pallet jack.

The cantilevered fill head pivots downward to a vertical orientation that places the inflatable bag spout seal, inflator button, and four bag loop latches within arm's length of an operator standing on the plant floor, eliminating the need to climb steps, strain or risk injury associated with overhead connections to conventional fill heads.

Once the operator connects the bag straps and activates the inflatable bag spout collar, the filler automatically pivots the fill head to horizontal, inflates the bag to remove creases, and activates a flow control inlet valve or feed conveyor. As load cells register the gain in weight, the controller raises and vibrates the loading



deck at programmed intervals to densify material and promote flow into bottom corners of the bag. Once the bag reaches its target weight, the controller automatically stops the flow of incoming material, deflates the bag spout collar and releases the bag straps, allowing the filled bag to be removed using a pallet jack or forklift.

A patented mechanism automatically resets the latch after releasing the bag

## RAM timing belts rebranded ContiTech

From January 2016, RAM timing belts have been discontinued in South Africa and will be replaced with ContiTech timing belts sourced from Hanover in Germany. It is envisaged that the phase out of the RAM timing belts and the phase in of the ContiTech timing belts will take about three months, with the equivalent ContiTech range extended to meet market needs.

"The major benefit of introducing ContiTech is that all of the timing belts are already OEM-approved by all major vehicle manufacturers," explains Colin Preddy, general manager: automotive, Veyance Technologies. "This gives the workshops, fitment centres and the consumer peace of mind that all ContiTech belts have been manufactured to the highest possible quality specification and have been designed to meet all OE requirements." ContiTech timing belts do not have a limited kilometre warranty and are designed to meet or exceed the service intervals as specified by the vehicle manufacturers for any specific vehicle.

ContiTech timing belts will have full merchandising, racking and after-sales and marketing support at all of the major distributors of automotive spares in South Africa.

"Timing belts are one of the most critical components in an internal combustion engine," Preddy continues. "It's especially important to provide belts with high resistance to elongation, degradation and wear caused by high temperatures and other under-bonnet operating conditions, to ensure optimal engine timing and performance."

ContiTech timing belts are reinforced with a temperature-resistant polyamide fabric backing, which also increases the wear resistance of the edges.

In 2015, ContiTech, a division of Continental AG, purchased Veyance Technologies.

[www.veyance.co.za](http://www.veyance.co.za)



loops, and repositions it as the fill head pivots into a vertical position, enabling the latch to receive bag loops inserted by an operator and to re-latch automatically.

The filler is constructed of carbon steel with a durable industrial coating, with product contact surfaces of stainless steel finished to sanitary or industrial standards, and is offered with mechanical or pneumatic conveyors to source material from upstream process equipment or storage vessels.

Also offered are patented Twin-Centrepost™ bulk bag fillers for low capacity applications and/or compliance with USDA Dairy standards.

[www.flexicon.co.za](http://www.flexicon.co.za)



## Riding economic turbulence in sub-Saharan Africa

Barry Elliott, MD of Rockwell Automation SA

In the current low-spend environment, our attitude needs to shift towards how can we do more with what we have. How can we maximise our business efficiency, without increasing resource expenditure?

Despite low oil prices, depressed commodities and poor exchange rates, Rockwell Automation sub-Saharan Africa – and indeed Rockwell Automation EMEA – achieved growth in the last financial year, mainly due to our consumer industries and strong growth in heavy industries.

The need now is to enhance the elements that contribute to our positive performance to allow us to continue to ride these turbulent currents.

We should always look at how we can do things better. Organisations improve by constantly analysing each process to see whether it's being done optimally. We need good ideas that question the way things are done and consider how they might be improved.

Good ideas come from everywhere and everyone; they're not the sole jurisdiction of any executive body. At Rockwell Automation sub-Saharan Africa, I want to instil a culture of entrepreneurship, where each employee constantly acts in an entrepreneurial manner – all with a view to maximising the potential of our

human and corporate resources.

As a paradigm, entrepreneurship attempts to empower each employee to make active contributions that enhance the efficiency of all our available resources, at all levels of the organisation. Why should the formulation of strategy be limited to a small nucleus of people? Why can't we use the brain trust of the entire organisation to consider what can be done better in our company?

This needn't be limited just to project execution; it might be a productivity saver that is aimed at, for instance, reducing our water consumption.

Our sub-Saharan Africa head office has just moved into a new, purpose-built facility that will see our Johannesburg staff under the same roof for the first time. I believe this space will play an important part in facilitating structures that achieve an organisation of entrepreneurs.

An important part of building this ethos lies in recognition. We need to recognise our own achievements and the role that each and every employee plays in creating these successes.

Often when landing projects, we are so happy to see a resolution when it finally comes, that we forget to reflect on the hard work that went into securing a successful bid. That's unacceptable. We need to stop and reflect on how much time, effort and tenacity it took. Every success deserves a proper celebration. I'm certain that if we work on our recognition systems, our people's performance will improve.

A cornerstone of our current strategy for maintaining a healthy business revolves around the development of partnerships. You need to team up with companies that can strengthen your value propositions (and vice versa).

If we can offer only a certain segment within a potential project, we need to actively seek a partner that can provide the rest of the solution. While neither of us could tackle the project individually, but by cooperating, we could provide a far more attractive and competitive bid.

As a solutions provider that typically targets segments of larger projects, innovative, flexible and open-minded approaches to opportunities are paramount. This may require flexibility in how we can package tailored solutions to a local market. Paying constant attention to

local megatrends and industrial requirements is key, but so is how to respond to these by tailoring technology combinations – and finances – in innovative ways that address the client's specified requirements.

As we sail forward in the stormy waters of 2016, with these principles in mind, I'm positive we can continue to achieve growth and increase our market share.

[www.rockwellautomation.com/EN\\_ZA](http://www.rockwellautomation.com/EN_ZA)

### Industry diary

#### April 2016

##### Piping Systems

11-14 April, Johannesburg  
2KG Training  
Phindi Mbedzi  
phindi@2kg.co.za

##### Mechanical Seals: Chris Carmody

19-20 April, Durban  
2KG Training  
Phindi Mbedzi  
phindi@2kg.co.za

#### May 2016

##### Pump Guy: Larry Bachus

9-12 May, Johannesburg  
16-19 May, Secunda  
2KG Training  
Phindi Mbedzi  
phindi@2kg.co.za

##### Copperbelt Mining Trade Expo & Conference 2016

12-13 May 2016  
Kitwe Showgrounds, Zambia  
leatitav@s specialised.com  
www.cbm-tec.com

##### African Utility Week 2016

17-19 May 2016, Cape Town  
+27 21 700 3500  
auw-info@spintelligent.com  
evan.schiff@spintelligent.com

### Southern African Metals and Engineering Indaba, 2016

26-27 May 2016, IDC Conference Centre, Sandton, Johannesburg

The metals and engineering sector, a vital part of manufacturing, is under immense pressure. Over the past few years it has been among the most negatively affected sectors of the economy, with 2015 having been its worst year to date. If our economy – and in particular, the metals, engineering and related sectors – are to turn the corner, collaboration among all stakeholders (business, labour and government) is absolutely vital.

The 2016 conference will focus on cutting-edge issues related to our industries and also present numerous opportunities for networking and socialising with government leaders, opinion formers and business leaders drawn from various sectors.

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