

SEW
EURODRIVE

Driving growth in South Africa and beyond



MECHANICAL
TECHNICAL
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THIS MONTH:

- I-Shift with crawler gears
- Smart connected PLM launched in SA
- Coal, pump design and smart maintenance
- Fit-for-purpose slurry pumping and lowest TCOs

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Jenny Warwick and her legacy

We at Crown are still stunned by the passing of our founding publisher, Jenny Warwick, who died on the afternoon of June 2. I joined Crown in February 2007, having met Jenny in the last week of December 2006. I had become frustrated by decisions being taken by my previous employers and I pleaded with a writing associate at MacMillan to “get me out of here”. She immediately forwarded the details of Jenny and Crown Publications, with no more information other than ‘they were looking for someone’.

I sent off a hastily updated CV, not really expecting any response and not even sure I wanted a new job. I was sitting in Jenny’s office within two days showing her the school text books I had been involved in writing. I received a follow up phone call with an employment offer while shopping that weekend. Only then did I realize that I was making a significant career choice, from writing classroom activities to a journalist? The option had never entered my head before.

The post offered was assistant editor to Dale Kelly on *Mechanical Technology* and *African Fusion*. But when I signed the appointment offer, that too had been changed, I was to be editor of *African Fusion*, with Dale’s help, and she would be editor of *Mechanical Technology* with mine. I was extraordinarily flattered by the confidence Jenny seemed to have in me, but also very afraid. I had no idea what the job entailed.

Crown has always been a family business and Jenny ran it as if all her employees were part of her family. Dale was my ‘sister’ helping me to find my feet and Jenny the ever-supportive ‘mother’. As a boss, she was so uninvolved in my day-to-day piecing together of the magazines that I sometimes felt she didn’t care. But I don’t remember a time that she wasn’t paging through the print advance copy, which she would be so positive about that I felt I had to point the flaws. I am now sure that she never missed anything of importance.

About South Africa, Jenny was also unfailingly positive, being openly excited about good news and almost irrationally dismissive of bad.

So it was that, during the week of the funeral with memories of Jenny rattling my head, I attended a two-day ABB media tour. As reported in *MechTech* a few months back, ABB has been installing a demonstration microgrid plant at its South African headquarters in Longmeadow. The company’s global specialists from Sweden, Switzerland and the UAE all descended to join the company’s South African hierarchy for the official switch-on of the system.

ABB’s microgrids are based on the company’s power stabilisation, automation, intelligent control and power management solutions. They are custom-designed to ensure utility-grade power quality and grid stability, whether a grid is present or not.

The Longmeadow facility combines a PV system; a battery store; a backup diesel generator; and the Eskom grid in a solution that automatically optimises power use based on demand, the sources available and the prevailing costs of each. Any combination is possible at any time. It’s a tidy solution to the need to sparingly supplement renewables during low-generation periods with base load or fossil-based generation options. But I hope to share more about this in a future issue.

Following the ribbon cutting for Longmeadow’s microgrid, a tour of ABB installations began. We visited the largest gas insulated switchgear (GIS) installations in the world, currently being installed behind the Kelvin Power station for Johannesburg’s City Power. Following an overnight stay in the Pilansberg, we then visited the Gautrain sub-station in Midrand, which uses ABB equipment to energise the entire network from Park Station to Hatfield and from Sandton to OR Tambo – and the company has also started to refurbishing the ABB traction motors and transformers that drive the trains themselves.

From Midrand, we were taken to the FNB Stadium, where ABB supplied 14 transformers to the stadium prior to the world cup.

In many ways it was a nostalgic tour, revisiting exciting developments of our past. But also, with respect to the microgrids and the GIS switchgear, with strong suggestion of pieces being put in place to secure the future of our beleaguered power supply infrastructure.

The first magazine Jenny founded was *Electricity and Control*, a magazine that supports the South African electrical industry. I think she might have liked the symmetry of the week of her funeral being associated with some of that industry’s past successes and its ongoing endeavours to improve our future.

There are many regal references associated with Jenny’s company: Crown, Sovereign Street and the Warwick name. In many respects she was our queen. Crown Publications is her legacy and we, Jenny’s Crown family, remain to foster that legacy.



Peter Middleton

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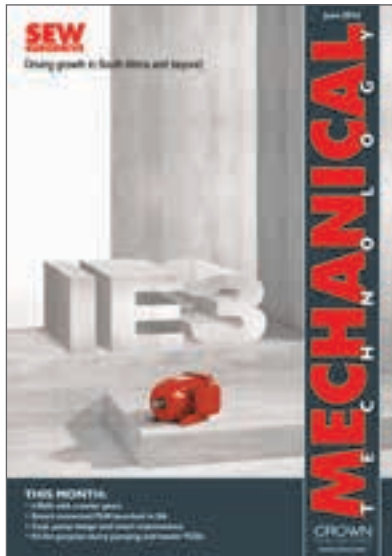


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ON THE COVER



Driving growth in South Africa and beyond

From humble beginnings as a small workshop with 16 employees 85 years ago, SEW-Eurodrive has become a global family-run drive engineering business with over 16 000 employees, who demonstrate their commitment by working day in, day out to ensure the machines and systems of customers throughout the world keep on moving.

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36 Smart connected PLM launched in SA

PTC's Windchill 11 Smart Connected PLM solution was launched into South Africa on May 11 and 12, 2016 in Johannesburg and Cape Town, respectively. *MechTech* catches up with business development manager, Riaan du Plessis and PLM solutions architect, Johan Strydom, of local channel partner productONE.

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Driving growth in South Africa

From humble beginnings as a small workshop with 16 employees 85 years ago, SEW-Eurodrive has become a global family-run drive engineering business with over 16 000 employees, who demonstrate their commitment by working day in, day out to ensure the machines and systems of customers throughout the world keep on moving.

German-based SEW-Eurodrive has strong roots in the South African market, which generally continues to select quality over price, despite an economic slump that has led to tightened budgets. "While mining and mineral processing industries are sluggish, we remain competitive," says MD, Raymond Obermeyer, adding that the company is also gaining ground in better-performing sectors such as logistics, automotive and the food and beverage industries.

"German products are synonymous with quality and innovation. Our IE3 premium efficiency mechatronic product range has become sought-after in the local market, because efficiency and reliability have retained greater priorities among customers across industries," he says.

This has resulted in measurable growth, not only locally, but also across the African continent with branches being opened in Cameroon, Morocco and Tanzania. To sufficiently supply the growing demand, SEW-Eurodrive will expand the operational space at the Johannesburg offices and storage facility.

The planned R16-million upgrade, which will take place between August

2016 and February 2017, will include the expansion of a new workshop and the upgrading of cranes. "As part of our global growth strategy, our South Africa office has been tasked with offering guidance and supplying operations into Africa," adds Obermeyer.

The close working relationship between the German head office and its South African subsidiary has proven valuable in the branch's status locally and in Africa. "We have a good relationship with the German head office. We maintain an open-door policy where we are able to discuss possible problems and solutions," he says.

SEW-Eurodrive's joint-owner Juergen Blickle visits all subsidiaries at least biannually to oversee operations. "Africa remains important to Juergen and we often consult him regarding the African market and provide local opinions as to which step the company should take next," Obermeyer adds.



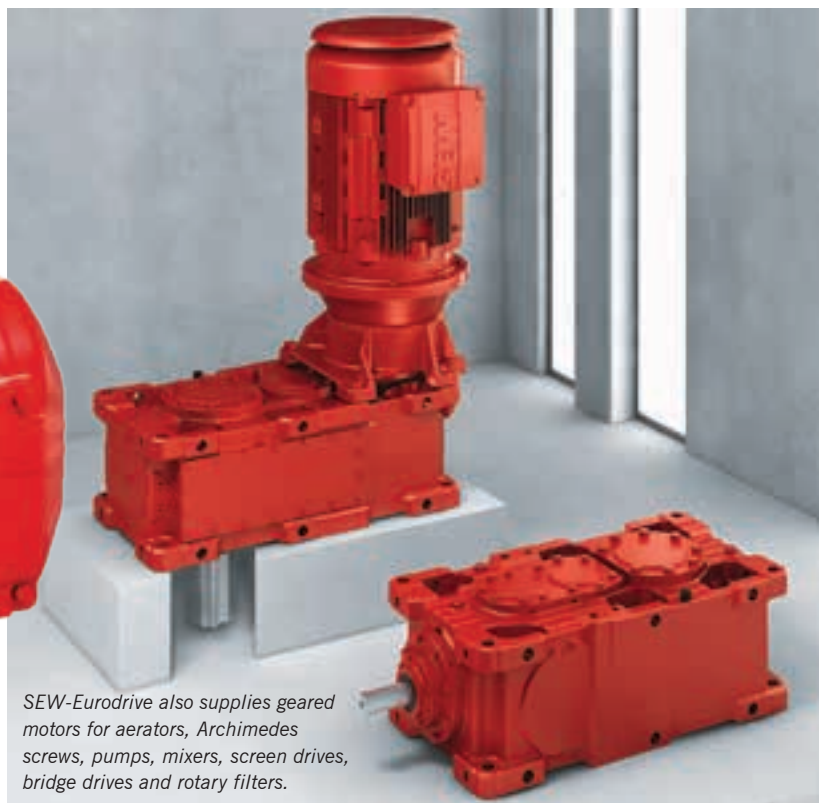
Raymond Obermeyer, SEW-Eurodrive's South African MD.

Value from German quality

With the volatility of the rand, imported gearboxes and motors are costly items of equipment. However, if proper care and maintenance is provided, the units will



SEW-Eurodrive's IE3 premium efficiency mechatronic product range has become sought-after in the local market, "because efficiency and reliability have retained greater priorities among customers across industries".



SEW-Eurodrive also supplies geared motors for aerators, Archimedes screws, pumps, mixers, screen drives, bridge drives and rotary filters.

and beyond



SEW-Eurodrive's South African works manager, Peter McEvoy.



While mining and mineral processing industries are sluggish, SEW-Eurodrive is gaining ground in better-performing sectors such as logistics, automotive and the food and beverage industries.

ensure years of productivity and long-term return-on-investment.

The benefits of regular gearbox and motor care and maintenance include: extended product lifespan; efficient and cost-effective service; reduced downtime; and safer working environments.

According to works manager Peter McEvoy, effective care and maintenance means using the correct unit for the correct application, and servicing according to specified OEM standards. "Operating instructions come with every unit and can also be downloaded from the Internet. These provide the end-user with comprehensive information on operation and maintenance," he explains.

Genuine parts and spares are also essential. "This provides the user with the peace-of-mind that all parts conform to SEW-Eurodrive's international standards, thereby ensuring component lifespan is maximised," he adds.

McEvoy points out that SEW-Eurodrive boasts an extensive stockholding to ensure minimal turnaround times. "In the event that the part is not available, we are committed to sourcing or importing whatever is required," he continues. "What's more, a correctly-specified, high-quality lubricant is vital to the per-

formance of a geared unit. A damaged or contaminated lubricant will severely impact on the performance, lifespan and maintenance costs."

"As part of its value-added service offering, our company provides clients across South Africa and beyond, with a qualified field service team to do the required lubricant change and assist in any other ways possible," McEvoy assures.

Commitment to customer service

In addition to high-quality products, excellent customer service is at the core of the company's business model. This is clearly evident on a local level, as exemplified by milling equipment manufacturer Eureka Construction, which has been making use of SEW motors since its establishment in 1980.

Based in the Free State, Eureka features a team of 25 employees that specialise in the manufacture of milling conveying and elevator equipment for the food processing industry.

Eureka owner Koos Theunissen notes that the company's wide range of products are exported to high-profile clients in regions such as Botswana, the DRC, Gabon, Ghana, Nigeria and Senegal. "Our clients include Bokomo, Resulta, Sasko

and Tiger Brands," he elaborates.

Theunissen says all of Eureka's motors are supplied by SEW-Eurodrive. "We have received excellent service from the company since day one, with regards to delivery times and after-sales support. We tried other suppliers in the past, but were not satisfied.

"SEW also boasts a variety of products that are manufactured to internationally recognised quality standards. As a result, we make regular purchases, the most recent being an order for 23 EPKO motors only a few weeks ago," he continues.

According to Theunissen, steel availability is a challenge in the industry that leads to delays. "The economic slowdown in South Africa is also a challenge. Despite these challenges, we continue to perform strongly, and will continue to partner with SEW-Eurodrive for the foreseeable future."

Obermeyer says that despite difficult economic conditions, there are still many opportunities for growth. "We have found new avenues for growth, not only by identifying new markets, but also by changing our entire strategic approach regarding sales. Being open to change is one of the most important aspects of business success," he concludes. □

R2-billion investment boosts SA tyre manufacturing

Sumitomo Rubber South Africa (SRSA) is investing R2-billion to upgrade and expand its Dunlop tyre manufacturing plant at Ladysmith, KwaZulu-Natal.

The direct job creation impact and employment spinoffs as a result of the completion of Phase 1 are already being realised. “The first of nearly 120 new employees needed over the next few years have already been recruited and Phase 2

will attract a further 300 new employees. This will increase the employment of the plant to more than 1 200 employees on completion of the investment,” says company CEO Riaz Haffejee.

“Our investment consolidates our commitment to the South African and KwaZulu-Natal economies, as well as to the Ladysmith community. As one of the largest employers in Ladysmith it will deepen our impact on stimulating job creation through increased production and industrial development competitiveness.”

The initial phase of R1.1-billion, which commenced in 2014, focused on the upgrading and modernisation of the plant’s capacity, introducing new technology and equipment aimed at increasing manufacturing output of high quality passenger and Sport Utility Vehicle (SUV) tyres. Its parent company, Sumitomo Rubber Industries (SRI) in Japan, allocated the investment for the development of Phase One. This coincided with

the introduction of new SUV tyre models that were not yet manufactured at the Ladysmith plant. “This is our response to the market trend and demand for these models in both South Africa and other African markets,” Haffejee said.

Phase 2, at an estimated value of R910-million, focuses on the introduction and manufacture of truck and bus tyres for commercial use. This Dunlop branded product line is currently being imported into South Africa from SRI’s plants in Japan and China, due to the unavailability of suitable manufacturing capacity locally. This new investment will establish a suitable local manufacturing base and terminate the current import arrangement.

In what is being described as “an exemplary model of private-public sector partnership”, the Department of Trade and Industry (DTI) approved SRSA’s application for a support grant of an estimated R300-million under the Automotive Investment Scheme (AIS).

www.srigroup.co.za



An aerial view of the Dunlop tyre manufacturing plant at Ladysmith, KwaZulu-Natal. Its owner, Sumitomo Rubber South Africa, is investing R2-billion to upgrade the plant.

BMG opens RSC in Riverhorse Valley

“The consolidation of BMG’s KwaZulu-Natal workshop facilities and field services into a centralised hub enhances the company’s service to a diverse customer base throughout the region,” says Donovan Scott, general manager for BMG KwaZulu-Natal’s Regional Service Centre (RSC). “This 2 600 m² dedicated service centre, which focuses on our core KZN divisions – drives, gaskets, hydraulics and materials handling – works closely with 13 dedicated BMG branches in the region,

to meet customer-specific requirements.

“BMG’s new specialist service centre, with assembly, repair, maintenance and support operations, offers a combined technical expertise and value-added product solutions to further strengthen the company’s service in the region.

“Advantages for customers include improved service, repair and delivery efficiencies, centralised technical support and easy access to BMG’s comprehensive range of quality branded engineering

components,” Scott says.

The RSC’s training programme covers electrical, mechanical, hydraulic, pneumatic, electronic and materials handling disciplines, as well as predictive maintenance and component failure analysis.

BMG’s mobile field services team conducts breakdown and routine maintenance on plant, carries out troubleshooting and advises on possible productivity improvements.

Specialist services include installation, adjustment, replacement and maintenance of components, shaft and pulley alignment, balancing, condition monitoring, oil sampling and analysis and critical equipment inspections and lubrication schedules. Maintenance training and fault diagnosis also form an important part of BMG’s field services.

BMG is likely to establish similar RSCs in the Western, Northern and Eastern Cape regions, as well as in Mpumalanga.

www.bmgworld.net

World water day celebrated in Alexandra

Xylem Water Solutions South Africa celebrated this year’s World Water Day and South African Water Week in conjunction with Afrika Tikkun and Afrika Tikkun Services at its Phutaditjaba Community Centre in Alexandra. The team at Xylem hosted an educational theatre show for the pre-schoolers at the centre, teaching about water conservation in a fun and educational manner, while decorating walls leading into the crèche at the centre with colourful blackboard-art.

World Water Day is an annual initiative rolled out in 1993 by the United Nations to raise global awareness of water as a scarce resource. Participants from all over the world find innovative ways to address fresh water challenges in the neediest of areas.

This year’s World Water Day activity was the second consecutive year Xylem Water

Solutions South Africa, partnered with Afrika Tikkun for World Water Day: “After last year’s enormous success; we decided to work with them again for this year’s celebration. We feel the values of developing children from an early age for the labour market is a commendable effort,” explains Heinrich Louw, Xylem’s marketing manager – Middle East and Africa. “If we can contribute to engender a culture of water conservation at an early age, we are happy to be involved.”

“We value Xylem’s partnership with us because it speaks to a fundamental resource that is necessary for the dignity, growth and development of young people and families we work with,” says Onyi Nwaneri, head of legal, resource development, marketing and communications at Afrika Tikkun.

www.xylem.com/mea/za



Tammy Mdladlose (left) and Wasim Ally splicing a food grade conveyor belt.

Vert Energy appointed distributor for ASCO power

“ASCO power switching and control components now form part of Vert Energy’s extensive range of electric power generation (EPG) products for generator set builders, panel builders and for numerous applications that require switching between different power sources,” says Vert Energy’s managing director, Grant Robertson. “Through ASCO, we provide advanced solutions to efficiently handle the transfer of critical loads from a primary to a secondary and/or emergency source.

“These flexible components, designed for the protection of critical loads, significantly enhance Vert Energy’s specialist solutions service to diverse sectors, including data, financial and telecommunications centres, as well as process manufacturing, transportation, fire pump applications and healthcare facilities.

“Mission-critical applications depend on reliable automatic power transfer switches (ATS) to ensure a seamless load transfer for continuous power. For this reason, we have extended our range to include ASCO transfer switches and controls, along with Froment and Avtron



Michael Navarria, sales manager for ASCO Power Technologies (left) with Vert Energy’s managing director, Grant Robertson.

load banks,” he says.

ASCO ATSs are the only power transfer switches available that conform to stringent IEC60947-6-1 regulations, which specify that transfers at full load for both ac and dc currents, must be done seamlessly. The use of circuit breakers, contactors and load break switches commonly used in industry, are not compliant with this specification.

Vert Energy is also the exclusive representative in southern Africa for other premium electric power generation brands including, Leroy Somer alternators, DEIF generator controls and Covrad heat exchangers. www.vertgroup.co.za

Rockwell control system for KZN water project

Rockwell Automation has supplied the control system that will automate one of the largest bulk potable water infrastructure projects in KwaZulu-Natal: the Lower Thukela Bulk Water Supply Scheme, which was constructed in partnership with Umgeni Water and the Department of Water and Sanitation. As part of the Lower Thukela Bulk Water Supply Scheme (LTBSS), the plant will supply 55 Mℓ/day of potable water to various towns within the iLembe District.

The plant, located in Mandini, will abstract water from the Thukela River through a low-lift pump station and, following pre-screening for the removal of coarse grit and aquatic life, divert it to a water treatment process that includes filtration, flocculation, clarification, disinfection and sludge dewatering.

Allen-Bradley ControlLogix PLCs are at the heart of the plant’s control layer, with a total of 2 500 hardwired I/Os. Rockwell Automation also supplied three 355 kW PowerFlex AC drives; Dynamix 1444 Integrated Condition Monitoring modules; and E300 Electronic Overload Relays for motor protection.

On the software front, the Rockwell Automation FactoryTalk View package

provides the SCADA system, supplying a versatile and powerful HMI application for machine-level operator interface devices. Additional software includes FactoryTalk Historian, which logs plant parameters and collects critical time-series data to provide a holistic performance database that can be used for a range of statistical and predictive functions.

With tighter water quality standards and rising labour, operating and maintenance costs, plant owners are looking for ways to maximise the performance and efficiency of their assets. Conventional water plants use field equipment and logic controllers that generate performance data, but this data is not traditionally linked at the level of the enterprise network.

Technology leveraging the connected enterprise, enabled by Rockwell’s Information and Control architecture, communicates performance, status and machine condition data to provide visualisation of each plant process, which enables automated reporting.

This information can be used to make accurate, informed decisions to maximise the efficiency, performance and reliability of the plant and the water infrastructure. www.rockwellautomation.com

In brief

Voith Turbo South Africa has appointed Isaac Maphosa as its customer support manager for its Power, Oil & Gas Division. Maphosa, who assumed his new position in March 2016, comes with a wealth of experience within the industry. He is tasked with processing all inbound and outbound customer requests relating to Voith solutions, products, spare parts and service.

EBH Namibia has put a strategic stabilisation plan into action to accommodate the sustained low oil price on the downstream oil and gas industry. By adopting a series of stringent performance improvement plans (PIPs), the company has yielded significant savings. Says CEO Hannes Uys: “Continuous improvement is an ongoing strategy at EBH Namibia as it ensures future sustainability and growth in market share and is part of being a responsible and invested corporate citizen.”

Enel, through its subsidiary **Enel Green Power RSA**, has completed and connected the Pa-leisheuvel photovoltaic power plant to the grid, the company’s largest power plant in the country. Located in South Africa’s Western Cape province, Pa-leisheuvel has an installed capacity of 82.5 MW and is able to generate more than 153 GWh of energy per year.

Local IT asset disposal specialist **Xperien** has acquired a 49% shareholding in **Information Technology Asset Management South Africa (ITAMSA)**. The newly formed partnership will help companies manage their IT assets more efficiently and cost-effectively, maximising return on investment.

Aveng Grinaker-LTA’s Mechanical & Electrical Engineering division, working in partnership with **Aveng Botswana**, was selected as the preferred Electrical and Instrumentation (E&I) contractor for the Lethakane Mine Tailings Resource Treatment Plant project. The scope of work includes the supply and installation of electrical and instrumentation equipment at the Debswana mine. The contract will take nine months to complete.

Schuler AG, a market leader in forming equipment, is to take over the die construction specialist **AWEBA**. Based in Aue, Germany, the AWEBA Group is one of the world’s leading full-service providers of dies and fixtures. Under the terms of the purchase agreement, Schuler will acquire 100% of AWEBA Werkzeugbau GmbH Aue.

PFE International, along with sister company, **Van Dyck Carpets**, is installing a second plant for recycling truck tyres into rubber crumb for use to manufacture, for example, acoustic underlays and cradles. In 2015, Van Dyck recycled approximately 40 000 truck tyres, which will increase to 150 000 with the new plant.



Adrian Buddingh,
general manager of SMC
Pneumatics South Africa.

Global pneumatics specialist

Having first opened offices in 2015, SMC Pneumatics South Africa officially opened its purpose built head office, factory and training facility in Midrand, Johannesburg on April 21, 2016. Boasting a total area of 4 317 m², SMC's new facility is home to a fully-functional, state-of-the-art showroom, several fully-equipped training rooms, a warehouse and a manufacturing and assembly facility for the local production of selected items.



The stylish interior of the new facility.

Established in Japan in 1959, SMC Pneumatics is a global leader in pneumatic technology and industrial automation offering 12 000+ basic components in over 700 000 variant forms.

Available in 84 countries including USA, Brazil, Germany and more recently, South Africa, SMC prides itself on constantly researching and developing and has been voted one of the world's most innovative companies in Forbes Magazine's Top 100 for three consecutive years.

SMC Pneumatics South Africa's

general manager, Adrian Buddingh spear-headed the local launch of the pneumatic giant under the careful guidance of SMC's United Kingdom team. "Our local team, made up of some of the best talent in the industry, strives to provide ultimate customer satisfaction around the country thanks to our customised, cost effective and quality solutions that ensure that we raise the bar as world market leaders," says Buddingh.

"SMC has invested heavily in our market and our production lines are equipped with the latest technology. Our production facilities will be fully operational as of July 2016 and we look forward to being able to offer shorter delivery times and availability of non-standard versions of certain items in our range."

Under the careful eye of SMC UK production manager, Peter Austin, production facilities are specified not only to international standards but to SMC's stringent quality standards too. "Having the backing of teams from around the world, we are able to share and reaply the latest in innovation and technology here on African soil." Buddingh explains.

Truly understanding the needs and objectives of customers is a value that SMC emanates everyday "Our extensive network of 400 sales offices in 83 countries ensures that we are at the forefront and also gives us the benefit of being exposed to more problems and solutions than our competitors."

SMC's national training schedule developed by national training manager, Riaan van Eck offers Basic Pneumatics, Electro-Pneumatics, Basic Hydraulics, Electro-Hydraulics and Mechatronic courses. The courses are designed to cover both theory and practice and make use of some of the latest, state-of-the-art training equipment. Additionally, SMC Pneumatics also prides itself in

its constant pursuit for customisation and thereby offers customised training courses should businesses require a tailored curriculum. "Training is critical to our success. In order to generate competitive advantage, our team goes on training throughout the year."

Providing solutions for almost every industry imaginable ranging from electronics and automotive to food and packaging and life sciences, SMC Pneumatics is built upon three pillars, which ensure its success across diversified markets:

- **Product and supply** – SMC is able to provide wide range, low cost, high quality and fast delivery worldwide, thanks to its integrated production system.
- **Service network** – SMC comprises over 6 000 sales staff worldwide and assists with service improvements and advancements in new product development.
- **Technology development** – SMC actively develops new products whilst improving pneumatic control devices. "Our strategy is one of long-term investment and growth. We are taking all the necessary steps to ensure that we can maintain and deliver international quality, cost effectiveness and customer-specified solutions whilst creating a positive internal culture through communication, ongoing training and the right people for the job."

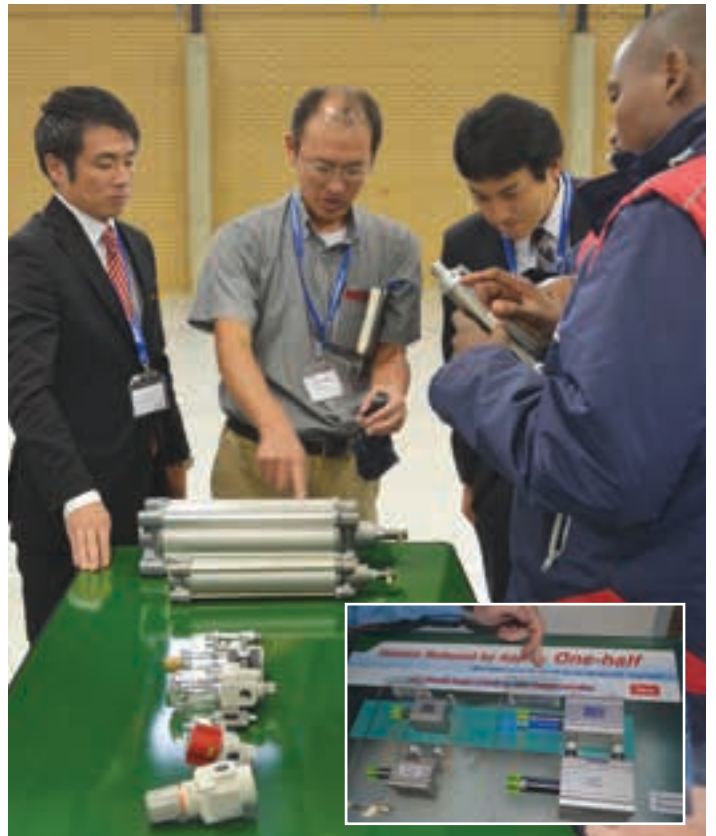
International support has been instrumental in SMC's local success thus far

opens doors in SA



Left: A view of the inspection station at SMC's 4 317 m² manufacturing and assembly facility at its new Head Office in Midrand, Johannesburg.

Right: Shun Ino (SMC Japan), Chihiro Sawada (Bridgestone) and Tetsuya Tsuruta (SMC UK) discuss the merits of SMC's CP96SDB air cylinders at the official opening of its Johannesburg headquarters in Midrand. **Inset:** The company's compact cylinder range offers air volume reductions of nearly 50% along with weight savings of 42% compared to standard equivalents.



and the opening saw top SMC executives from United Kingdom, Japan, Spain and Germany fly in for the grand opening. "Having access to such a broad and supportive network of global executives is a great privilege for us. It ensures that we are always on top of our game."

So, what can the market expect from SMC? "Cost effective, exceptional quality, customised offerings and superior service from our team. We strive to work tirelessly to meet needs and objectives, and we currently believe that our innovativity and drive sets us apart. The possibilities are endless."

"As a global market leader in pneumatics technologies, SMC Pneumatics is proud to have officially launched in South Africa, and we look forward to further expansion prospects into Africa," says Buddingh. □



Above: A demonstration automation system built with a Mitsubishi robot and SMC Pneumatics' actuators, sensors and control technologies.

Right: A display of some of the sensors and actuators now available through the new South African subsidiary.

Left: Training is a cornerstone of SMC's new local offering and the new facility boasts several fully-equipped training rooms.



Fit-for-purpose slurry pumping and lowest TCOs

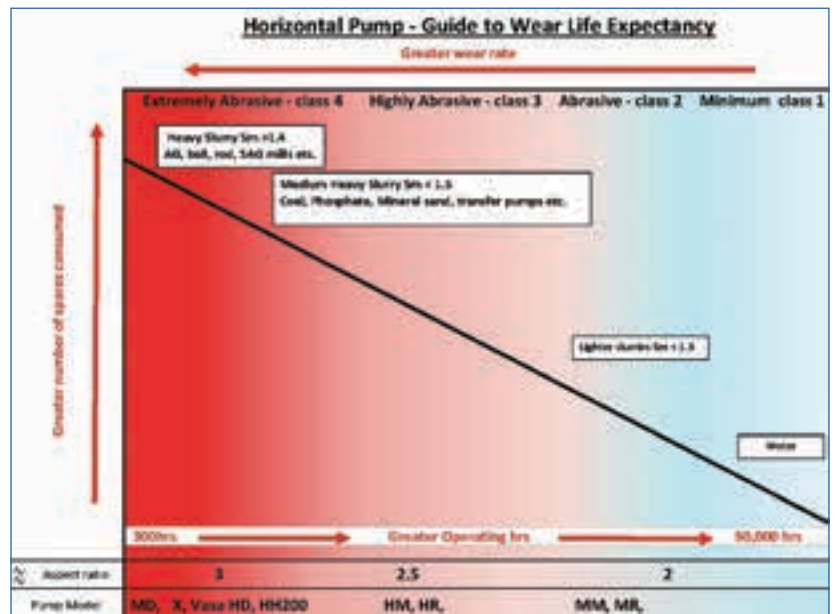


Using the flagship MD range of slurry pumps as an example, Metso's Europe, Middle East and Africa director for mining flow control, Steve Sedgwick talks about Metso's approach to slurry pump design and the key features that enable the company to offer the lowest possible total costs of ownership.

Slurry pumps include various types of heavy-duty centrifugal pumps used for the hydraulic transportation of solids. "Slurry pumping involves a varied portfolio, depending on the media being pumped, but slurry pumps are almost always designed and chosen based on their wear performance," begins Sedgwick.

The Metso slurry pump range covers the pumping of any type of materials, primarily ground rock, including large particles using dredge pumps that can handle particles of over 150 mm. "The typical discharge from the mill in a minerals processing application is in the 100 µm to 250 µm average particle size range, combined with large rocks and a steel content caused by mining activity and broken mill balls (scats), which are all pumped as very dense slurries that cause high wear rates on the pump's internal components," he explains

"Metso can offer the full range of duties and wear lining options, from



Metso's slurry pump selection chart and its pump selector software, Pumpdim, use the aspect ratio as the primary variable in organising its range for different slurry requirements.

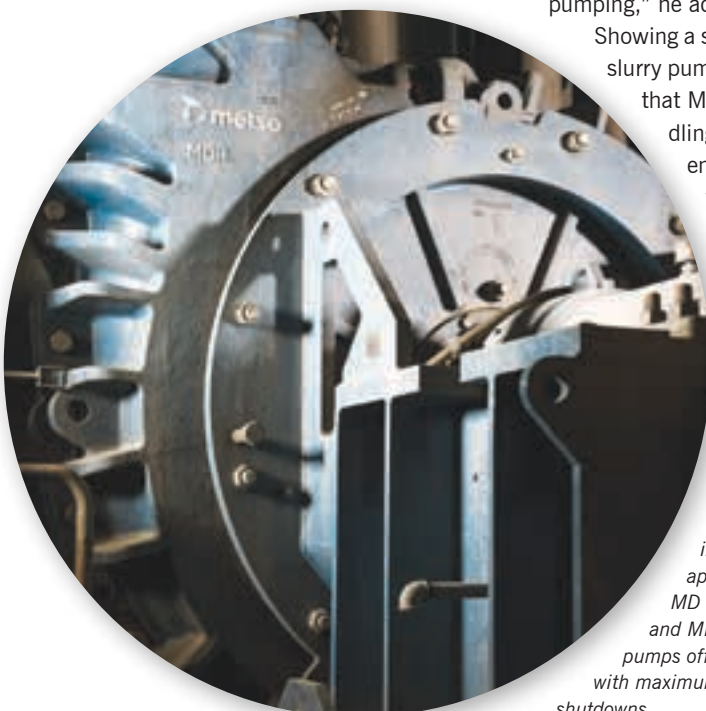
rubber-lined to high chrome white cast iron, but to get the best value, the pump has to be well suited to the slurry it is pumping," he adds.

Showing a summary diagram of the slurry pump range, Sedgwick says that Metso's approach to handling the diversity of different slurry types starts with the American Hydraulic Institute's wear category classification. "For a Category 4 slurry, for example, we recommend an impeller aspect ratio of 3. This is the ratio between the pump's outside diameter and

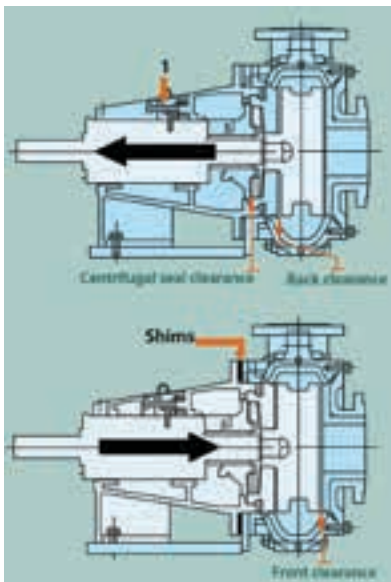
the internal impeller diameter at the eye of the impeller – OD/ID. Our flagship MD pump is designed to meet these extremely abrasive Category 4 needs," he tells *MechTech*.

The aspect ratio is a simple number that sets the basic design limitation for any centrifugal pump subjected to wear. If the aspect ratio is large, then the size of the pump has to be made larger to accommodate the larger impeller. This allows the impeller to rotate at a slower speed for the duty required, and it increases the impeller vane length and thickness, which slows its deterioration rate.

But the larger size is associated with higher costs. "A Category 4 MD pump might have an impeller with an OD of 600 mm and an ID of 200 mm. A Category 3 with an aspect ratio of 2.5 that can produce the same duty only needs an impeller with a 500 mm OD for the same inlet size. So a pump capable of producing the same flow and head has an impeller, a volute and a frame size that are all physically smaller by some 25%,"



Designed from its inception for mill circuit applications, the Metso MD series MDM hard metal and MDR rubber lined slurry pumps offer sustained performance with maximum time between mill shutdowns.



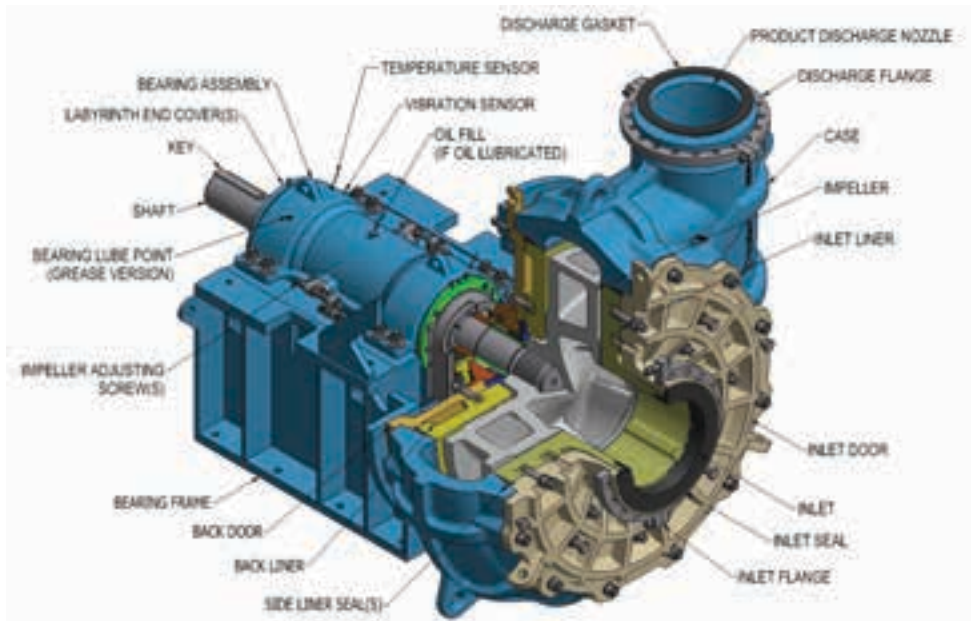
Metso's MD pumps are double adjustable: the front and the back impeller gap can both be restored at same time.

making the pump significantly cheaper, easier to handle and to maintain," Sedgwick explains.

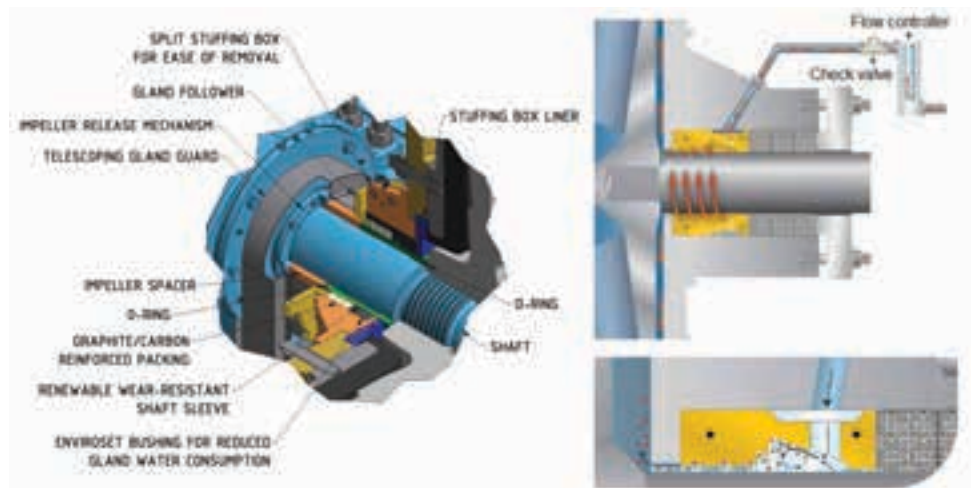
"Hence the importance of selecting the appropriate aspect ratio for the slurry being pumped. It is the starting point in selecting the most cost effective pump," he advises.

Metso's slurry pump selection chart and its pump selector software, Pumpdim, use the aspect ratio as the primary variable in organising its range for different slurry requirements. "The pink colour (HM and HR range), for example, represents an aspect ratio of around 2.5. Our slurry pumps are organised on the selection chart in order of reducing aspect ratio, that is, from most abrasive (3) to least abrasive (2), with Metso's MD pumps being the most suited to cope with the highest abrasion levels," Sedgwick notes.

Another differentiator for Metso is its focus on limiting the inlet fluid velocity of its pumps. "For heavy slurries we keep our inlet velocity down to below 5.5 m/s to minimise impact damage to the impeller from sharp, coarse and heavy solids. From a hydraulic design perspective, we also try to make sure that the pump always operates just to the left of the best efficiency point (BEP), whilst maintaining a relatively low inlet velocity. This results in the highest possible efficiency, minimum internal turbulence and the longest wear life. Wasted energy has to go somewhere, into vibration or turbulence, for example, which may cause bearing failure and accelerated wear," Sedgwick points out.



A typical MDM series pump section summarising some of the pump's key features.



Metso's EnviroSet seal has a built-in lantern ring and a helical grooving system that imparts a centrifugal flow to the flush water, which throws the particles in the fluid to the outer bore of the separation chamber. Gland flush water savings of over 50% can be achieved.

Addressing the design innovations that improve the hydraulics for abrasive applications, Sedgwick says: "A pump is always going to wear when pumping slurry. On some applications, the best products might only last for 400 to 600 hours, which can be less than a month. This makes it important for operators to choose pump designs that extend wear life and make it easier to maintain hydraulic efficiency."

As an example, he says that a slurry pump does not operate well with a big gap between the impeller and the front casing liner. "Pumps accelerate fluid under centrifugal action and convert this kinetic energy into pressure energy. If there is a gap between the suction wear plate liner and the impeller, fluid under pressure at the outlet is forced back to the inlet through this gap. This process is known as recirculation.

"The more high-energy material that is flowing around the front of the impeller, the higher the wear rate on the liner – and the larger the gap the higher the recirculating flow. So this gap must be kept to a minimum at all times," says Sedgwick.

"Recirculation also reduces the specific energy of the pump, ie, the energy used per m³ of flow, since some of the flow is being recirculated," he adds. "So this front liner gap has to be adjustable. The conventional way is to push the impeller forward on its shaft until it hits the front liner, then to shift it back a little for clearance.

"On our MD pumps, however, we have a front liner that can be adjusted independently of the impeller shaft. The front adjustment can be made by moving the suction wear plate liner forward, without disturbing any of the shaft components," he explains, adding: "Big

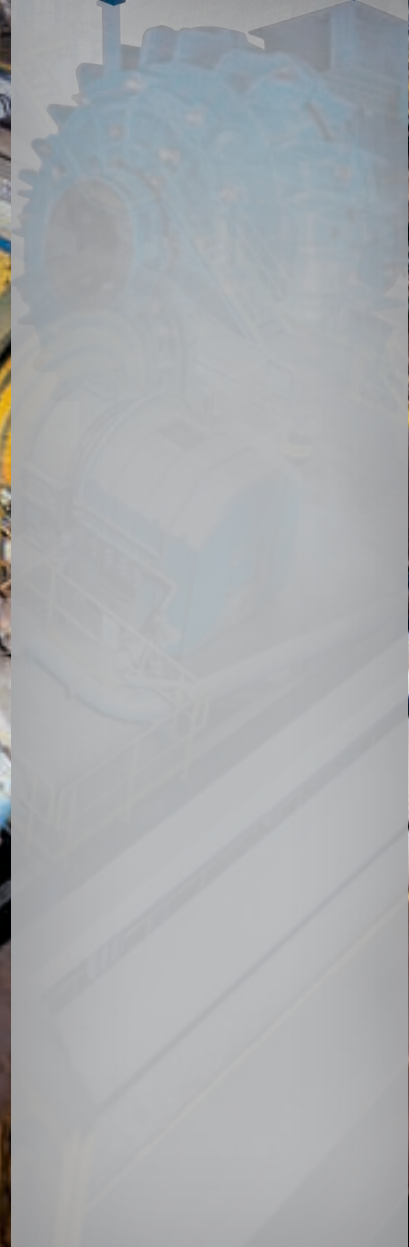
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pumps have big motors, bearings and couplings. They also have a water-fed gland seal that is disturbed by moving the shaft. By moving the front liner, the adjustment becomes significantly easier and less time consuming.”

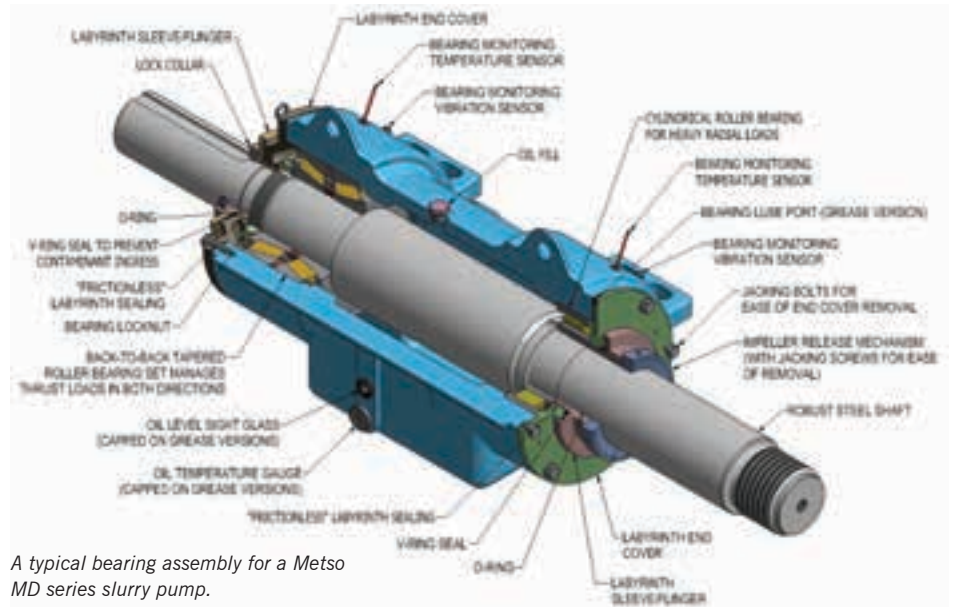
Sedwick points out another advantage: “This also makes the pump double adjustable – the front and the back impeller gap can both be restored at same time. Some recirculation also occurs behind the impeller. For the longest possible impeller and liner life, it is best to occasionally move the shaft back to close the gap behind the impeller and then to adjust to suction wear plate forward to close the front gap,” he explains.

A critical component for slurry pumps is the shaft sealing system, which has to keep highly abrasive particles suspended in water away from the rotating elements on the shaft. “Our MD pumps are all fitted with water-fed Metso EnviroSet™ gland seals, which reduce water consumption by 50 to 60% compared to traditional gland-based solutions,” he reveals.

“Gland flush water is used to wash abrasive particles away, keeping them from migrating between the packing material and shaft sleeve, where they can cause considerable damage and premature failure of parts,” he explains. The EnviroSet solution has a built-in lantern ring and a helical grooving system that imparts a centrifugal flow to the flush water. This throws the particles in the fluid to the outer bore of the separation chamber, resulting in a more than 50% water saving over most conventional glands.

Says Sedgwick: “It all comes down to total costs of ownership (TCO), which far outweigh the slightly higher investment costs for a better pumping solution. If the life of a pump can be extended; the number and costs of spares reduced; and the reliability improved, then fewer un-planned stoppages occur and the total cost over the pump’s life can be significantly reduced. Maintenance intervals, liner refit times, unplanned shutdowns and breakdowns can all be reduced, contributing to much better production uptime for the mine,” he argues.

To simplify pump maintenance, MD pumps have a back pull out facility. “Pumps are connected to pipes via flanges with many bolts and it can take a long time to disconnect the pipework to access and inspect the internals.



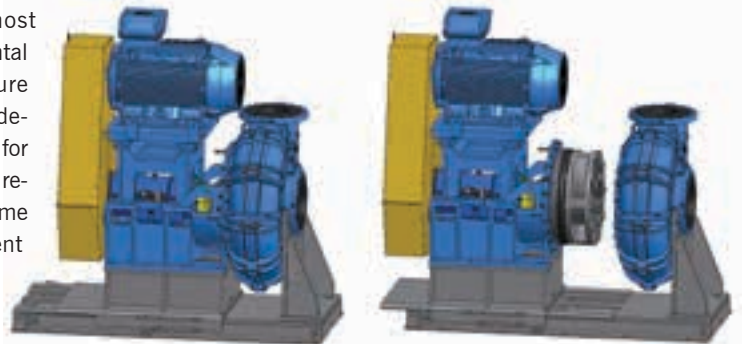
A typical bearing assembly for a Metso MD series slurry pump.

Metso MD and most of our other horizontal pump ranges feature the back-pull out design, which is great for routine inspection or repair: the bearing frame and rotating element can be removed as a unit. This enables the impeller and gland seal to be replaced rapidly, without having to disconnect either the suction or the discharge pipework,” he explains.

Sedgwick adds: “We have a release mechanism incorporated into the design on larger pumps, to free the impeller from the shaft. The biggest cost to a mine is stopping production, so everything we can do to enable a repair or change-out to be completed more quickly saves the mine money.”

As an optional extra, Metso also offers its maintenance slide base to make it even easier for personnel to access and repair its pumps. “This once off expense can save considerable amounts of time over the lifetime of a pump, particularly in situations where a pump is being relined every 400 hours,” he suggests.

Describing a health and safety related innovation, he says that the mining charter insists that a safety guard with captive fasteners is fitted to pumps to prevent access to moving components. “For efficient water use by the gland follower, however, these need to be adjusted regularly, to reduce the water flow from a gush to a trickle. HSE says you have to stop the pump to adjust the gland, but the water stops flowing when the pump



Metso’s back pullout facility and its maintenance slide base (left: closed and right: open) make it even easier for personnel to access and repair its pumps.

stops, making this difficult.

“So Metso has designed a telescopic guard to allow the gland to be safely adjusted without removing the guard or stopping the pump. This is part of the MD design concept, with its strong focus on simplifying maintenance tasks,” Sedgwick says.

“In spite of all of the cleverness that has gone into these designs, our pricing remains very competitive, Sedgwick assures. “Along with simplified maintenance, we aim to offer more competitive spares pricing, lower total operating costs and longer component life,” he assures.

“Modern product manufacturers are making their products more cost efficient by looking at every nut, bolt and washer in order to save weight, costs and improve efficiency. So mines should be doing the same, first by selecting the best pump for the particular slurry being discharged and, second, by looking at TCO and the whole spectrum of savings that can be generated by using products designed according to modern principles – products such as ours,” Sedgwick concludes. □



The systems approach to pumping

In this issue we welcome new columnist, Harry Rosen, from TAS Online and 2KG Training. Rosen is currently one of the two international pump experts for the United Nations Industrial Development Organisation (UNIDO). In this, his first column, he outlines the main differences between the component and systems approaches to pump efficiency analysis and optimisation.

The world is split into two camps when it comes to improving the energy efficiency of pumps. The component-based approach is being driven in Europe through legislation and setting minimum efficiency levels for pump and motor manufacturers. The systems approach has been championed by the USA ever since the US Department of Energy piloted a successful energy savings project in the mid 90s in China. Although it started off as an electric motor optimisation project, it was very quickly discovered that the major savings' opportunities came from looking at the pumping system, rather than just concentrating on pumps and motors.

The main difference between the component and systems approach comes down to how wide you intend to set your system boundary when evaluating a pumping system. Take the typical pump system of a pump taking fluid from a reservoir and pumping it to a discharge tank a suitable distance away and at a higher elevation – as shown in Figure 1.

The component approach

Let us start with the box surrounding only

the pump and motor. Power is measured from the MCC, flow rate from the flow meter situated just downstream of the pump, and head from the difference in pressure between the suction and discharge pressure gauges. The pump efficiency is calculated to be 75.4% and, by comparing this to that on the pump curve from the manufacturer, we find that it is close to the maximum of 79% efficiency for this pump. On a component level the pump is operating efficiently and does not warrant any further attention.

The system approach

Now let us expand the system boundary to incorporate the flow control valve (FCV). This opens to allow bypass flow back to the suction side when demand is low. It is thus not the flow rate through the pump that is important in our example, but the flow to fill the second tank, or to supply a downstream process. The energy consumed for pumping any liquid back to the suction tank is wasted energy.

If we expand the system boundary once again to incorporate the pressure control valve (PRV), we get the true picture of the system demand in terms

of flow and pressure. The pressure downstream of the PRV is what the system actually requires, and the pressure loss through the control valve must also be treated as wasted energy.

By using the flow rate at F2 and the pressure after the PRV in our calculations, we can determine the overall system efficiency, which could be dramatically less than our original calculation of pump efficiency. Our system level opportunity would be to remove the throttling valve, close the bypass line and find another way to meet the required system demand – by installing a VSD, trimming the impeller or changing the control methodology, for example.

If we assume that 20% of the flow rate is being returned to the suction tank, and the pressure drop across the throttle valve is around 30% of the upstream pressure, then the overall system efficiency can be calculated to be around 42%. Suddenly there is a major energy savings opportunity. This is the benefit of looking at the system rather than individual components.

A case study: The bypass flow at a sugar mill in the Philippines

The system: Sugar mills provide great opportunities for reducing pumping energy costs. There are numerous pumps used in all aspects of the process, as well as for cooling of process heat. In addition, many mills have cogeneration plants with boilers running on bagasse, the high calorific dry pulpy residue left after the extraction of juice from sugar cane. These plants require additional pumping systems for boiler feed water and cooling pumps for condensing steam back to water.

The system investigated included four hot-well pumps (three operating normally) that pump hot return water from the refinery to a set of spray pans – a low cost alternative to traditional forced-convection cooling towers. The water is cooled down through natural convection by approx 10 °C and then pumped by another set of pumps back to the plant

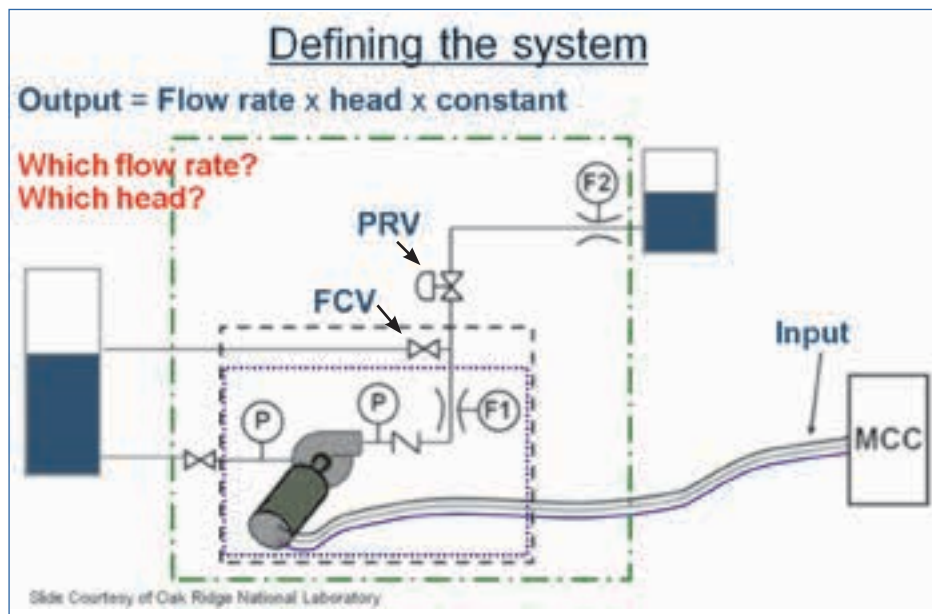


Figure 1: The main difference between the component and systems approach comes down to how wide you intend to set your system boundary when evaluating a pumping system.

for process cooling.

The level of the water in the sump is below the intakes of the pumps, which can cause ongoing problems for the pumps due to loss of priming and suction lift. Vent pipes had been installed on the discharge of the pumps to facilitate the removal of air from the system when priming the pumps. Plant operators found that if they left these pipes open during normal pumping operation, the stream of water back into the hot well was a visible means of identifying any loss of priming and thus avoiding cavitation and the pumps running dry (See Figure 2).

The opportunity: Adopting the systems approach above, these vent lines are functioning similar to a permanently open bypass line, meaning the energy consumed to pump this portion of the flow is wasted. The flow was measured to be in the region of 3.0% of pump flow, which superficially does not seem a lot. However this translates to between 3.0 and 5.0 kW per pump – and in a single pump house operating with three hot-well pumps of 160 kW each and three cold-well pumps of 100 kW each, the total power loss comes to 25 kW, or 197 000 kWh of wasted energy per year. The Philippines currently has the second highest cost of power in Asia (Japan has the highest) and at 10 Pesos per kWh, this ‘waste’ amounts to 1.97-million Pesos (R630 000).

In addition, there were at least another 14 pumps in the plant operating with open-vent pipes, causing total energy wastage of around 410 000 kWh costing P4.1-million (R1.3-million).

During a pump performance test, we found that the flow rate through Pump #3 was dramatically down, and the pump efficiency was as low as 30%. Even though the vent line was full, the pump had not been primed correctly and had been operating in that condition for more than 24 hrs, wasting excess energy as well as systematically destroying the insides of the pump. This proved that observing a stream of water through the vent line was ineffective in determining whether the pump was primed correctly or not.

The proposal

Proposed options for rectifying the problem include:

- Install cheap pressure gauges on the suction of each pump to identify any loss of priming as well as the onset of



Figure 2: Plant operators found that if they left the vent pipes open during normal pumping operation, the stream of water back into the hot well was a visible means of identifying any loss of priming.

cavitation. By alerting operators to any suction issues and remedying them, energy consumed is reduced and the reliability and life of the pumps is extended.

- Only open the vent (bleed) lines when priming the pump, to get rid of any air in the system. The rest of the time the

valves should be closed.

- Use the energy savings from the above project to invest back into more capital-intensive projects, and save even more energy.

In my next column, I will look at the issue of throttling losses through control valves. □

Harry Rosen: a UNIDO International Pump Expert

Harry Rosen, with 25 years of experience in the pumping industry, is the managing director of TAS Online, an international market leader in engineering software and consulting services for both users and manufacturers of pumps. The company's global service offering includes pump selection software, pump monitoring products, on site system assessments and performance tests, in addition to Testbed automation systems.

Rosen studied at Wits University and qualified with a BSc Mech Eng in 1987, receiving his Pr Eng in 1992. He is a past chairman of the SA Institution of Mechanical Engineering, Central Branch and was instrumental in setting up the International Pump User Conference (IPUC), which brought together the world's experts in energy efficient pumping systems.

He has carried out more than 50 pumping system assessments, both in South Africa and around the world, for applications including: bulk and municipal water supply;

iron and steel manufacturing; petrochemical and process plants; mining (underground, open cast and dune mining) and minerals processing plants; power stations; pulp and paper plants; and sugar mills.

Harry Rosen was recently appointed as one of only two International Pump Experts for the United Nations Industrial Development Organisation (UNIDO) delivering expert pump training programmes in South Africa, Malaysia, Indonesia, Thailand and Philippines. He has also been involved in the UNIDO 'Train the Trainer' programme, whereby a group of pump experts is selected to be developed as pump systems efficiency trainers.

He also presents a three-day workshop for 2KG Training on improving the efficiency and reliability of pumping systems. This workshop is CPD approved and has been supported by Eskom and the National Energy Efficiency Agency as a valuable tool for helping industry achieve its targeted 15% savings in electricity. □

Coal, pump design and smart maintenance

Pumps play a crucial role in the coal preparation process. Tony Lawson, engineering director at Weir Minerals Europe, explains how evolving pump design and condition monitoring are helping drive efficient production at coal mines around the world.

The complexity of a coal preparation plant varies according to the nature of the raw material, the requirements for the end product and the local regulations around water use and waste production. Some plants can require up to 15 different stages, whilst others have significantly fewer.

One thing that many plants have in common is that the coal is moved around the plant by slurry pumps. The pumps are vital components in the process, as the other pieces of equipment in the circuit – screens, hydro cyclones and separators, for example – are all gravity driven. It is slurry pumps that provide the energy to lift the material to the top of the plant, to transport it from one stage to the next, and to carry waste slurry to the disposal facilities.

This crucial role means that the performance of pumps has a direct impact on the efficiency of an operation. A unit that does not perform efficiently can become a major bottleneck in the process.

The curved vane centrifugal slurry

pump was developed in the middle of the 19th century, and the basic principle remains the same today. However, the increasing sophistication of computational fluid dynamics (CFD) and computer-aided design has seen engineers make significant advances in terms of understanding the complex flow of slurries and how it interacts with the impeller and casing inside a pump.

The research that has taken place in recent years has allowed engineers to continue to improve the efficiency, versatility and ease of repair of pump units and this has meant significant reductions in the total cost of ownership of pumps – the factor that determines the value delivered to the customer.

It was this challenge that led the research and development team at Weir Minerals to develop the latest model of Warman[®] slurry pump – the Warman WBH[®] pump.

Over the past 50 years, Weir Minerals' best selling pump – not only for coal processing but also across many other applications in the mining industry – has been the industry standard Warman AH[®] pump.

In order to further enhance the performance of this benchmark pump, engineers at Weir Minerals took on the challenge of redesigning the whole pump. The aim was to design a brand new pump that would outperform the AH series in every way – wear life, efficiency, safety and ease of maintenance.

The primary challenge of the project was to redesign the hydraulics of the pump to deliver slurry flow through the unit that was less turbulent, and therefore more efficient, and less likely to cause rapid wear to internal parts.

CFD modelling was used to develop wear prediction and performance analysis models. This revealed the areas of highest turbulence and the impact of



particles against the impeller and casing for a range of different slurry mixtures. Digitally manipulating the shape and re-running the models allowed the design to be refined to deliver an optimised performance for the pump's intended duties.

This digital design process was supported by wear parts data from existing AH pumps, gathered over a period of several years, by examining worn impellers and casings that had been used on different kinds of slurry application.

One outcome of the design process was a new impeller which made a radical departure from the five vane design of the AH pump, replacing it with a new four vane arrangement that delivers improved slurry guidance and smoother hydraulic flow.

This new impeller, known as the Warman WRT[®] impeller, is also backwards compatible with the AH pump, bringing the benefits to those not looking to invest in a whole pump upgrade. Streamlining the volute liner and redesigning the cutwater to reduce turbulence delivered further improvements.

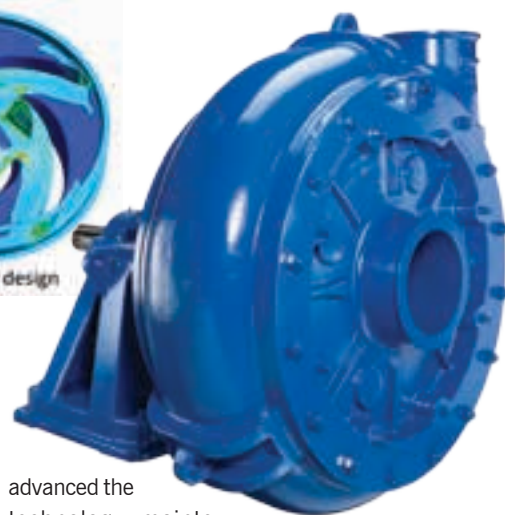
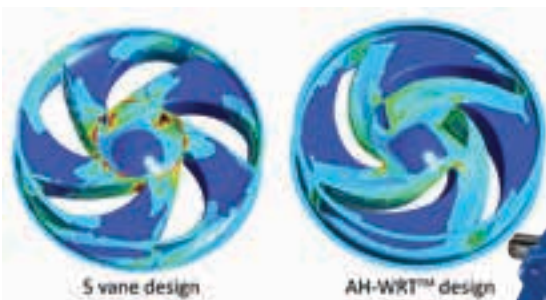
Since the new unit was launched in 2011, on-site performance has demonstrated the efficiency gains that have resulted from this ground-up redesign. The lifespan of wear parts has been increased, fuel consumption has been reduced and improved net positive suction head (NPSH) characteristics have been achieved.

Built for purpose

Another recent innovation in the Warman family of pumps is the Warman MDC[®] pump series, which has been designed specifically with the coal industry in



The Warman WBH slurry pump undergoing testing at the Alrode manufacturing centre.



Above: CFD simulations comparing a five vane and a four-vane solution for coal applications. **Left:** Design engineers at Weir Minerals Africa working on a CFD model. **Right:** The new Warman MDC pump is designed for heavy-duty slurry applications.

mind. Featuring an unlined pump casing and a three-vaned impeller with maximised clearance, the pump is able to pass the very large particles common to coal processing applications.

The simple, low cost 'wet end' of the pump – the parts that come into contact with the slurry – can be mounted to existing Warman mechanical ends – the bearing assembly, drive shaft and mount – making on-site upgrades straightforward to implement.

In addition to re-designing and evolving existing units, Weir Minerals has also achieved considerable efficiency gains by finding innovative new uses for existing products.

A good example of this is the increasing popularity in the coal industry of pumps that were originally designed to work efficiently with froth slurry streams containing a high proportion of air, which causes a major challenge for traditional centrifugal pump designs.

One of the key objectives of modern coal processing circuits is to optimise the removal of water from the waste slurry stream, creating a very thick paste. This is beneficial, as it maximises the capacity of tailings facilities, a common limiting factor in coal production, while also reducing levels of water loss in the process.

A little over 15 years ago, Weir Minerals developed the Warman AHF® froth pump, a modification of the Warman AH pump that features an oversized inlet and a four-vane impeller with innovative inducer blades that scoop the slurry at the inlet and help feed it into the pump, avoiding air locking and blockages.

More recently, during testing, Weir

Minerals engineers discovered that the flow inducing properties of the impeller design meant that the Warman AHF pump also delivered excellent performance in applications involving highly viscous slurries, moving them with higher efficiency than traditional centrifugal pump designs.

Weir Minerals has seen many coal mining customers adopting this solution and re-purposing their existing AH pump for thickened waste flow duties by applying the AHF pump modification, rather than investing in a new pump that is purpose built. This example clearly illustrates why, for those customers looking to minimise capital expenditure, making modifications to existing designs can be an excellent way of achieving efficiency gains that can quickly justify the expenditure.

Belt drive systems are one of the most popular means of delivering power to pumps, but they can also be a source of inefficiency, largely because of the need to replace drive belts periodically.

Pumps on-site often run with poorly aligned or tensioned belts, and this can lead to significant performance issues, not only because of increased downtime resulting from worn out belts, but also through lost energy as a result of belt slipping or bearing damage through vibrations.

A hydraulic belt tensioner such as Weir Minerals' Gemex® system solves this problem by effectively providing a quick-release system for drive belt replacement. Rather than needing to re-align and retension the system every time the belt is changed, the hydraulics will return it to the optimum settings almost instantly.

Smart monitoring

The high impact nature of a coal processing plant means that wear and tear is an unavoidable factor and, no matter how

advanced the technology, maintenance will always be required throughout the lifespan of a pump for optimum performance to be sustained. It is therefore crucial that the right repair and maintenance strategies are in place for any given project so that potential problems are identified before expensive failures are allowed to take place. This also ensures reaction is fast if any unexpected issues arise.

The traditional approach to pump maintenance is reactive – to wait until major warning signs show themselves before taking action to make repairs. This is often caused by a commitment to keep the process running whenever possible, and only interrupting it when absolutely necessary.

In reality, approaching maintenance this way brings with it a number of demonstrable disadvantages. The first of these is that wholly reactive maintenance means accepting that sub-optimal performance and unexpected failures are inevitable. This should not be the case, as reacting to a problem in the process can prove much more costly in terms of downtime than would be the case with a well managed programme based on condition monitoring and scheduled servicing.

Poor performance or failure of pumps has a direct effect on the productivity of the entire process and an unforeseen issue can cause it to grind to a halt altogether. The duration of the resulting interruption can vary enormously depending on the proximity of qualified maintenance engineers, how long it takes to diagnose the cause of the problem and how readily available any necessary parts are. In the worst cases, processes can be halted for a matter of days – at potentially significant cost to the business.

Scheduling regular system checks will allow the condition of critical parts

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to be monitored over time. This means that replacements can be made before excessive wear leads to sub-optimal performance or failure.

Examining the condition of internal parts such as the lining and impeller will mean taking it out of action for a short time. This is often worthwhile in order to avoid unexpected repairs and long periods of poor efficiency.

The frequency of these tests should be determined based on a good knowledge of the average operating lifespan of individual parts at the relevant levels of duty. This way, checks will be performed frequently enough to maintain efficient performance, but not more often than necessary, avoiding excessive costs.

Non-interruptive monitoring should also be carried out regularly, as this provides a way for any issue arising between scheduled checks to be noted. Temperature and vibration measurement of any moving parts, energy consumption and flow-rate monitoring can all be carried out while a pump is operational – supplying useful information without costly downtime.

All mechanical seals should also

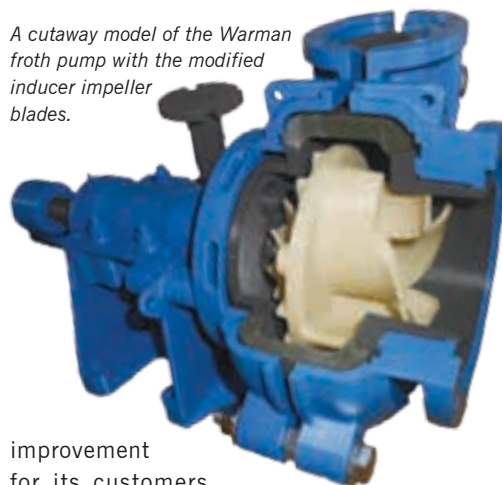
be regularly checked and, if necessary, adjusted – especially those around the drive shafts of pumps.

Advanced monitoring systems are available that use handheld devices connected to a central database to guide on-site personnel through the process. This ensures that no part is missed and that all monitoring data is stored centrally so maintenance can be properly prioritised across a whole site. In 2013, Weir Minerals launched a proprietary condition monitoring system, which is used by its maintenance engineers and is available to its customers. Many cases have been seen where automating the maintenance process at coal mining sites has delivered a significant improvement in equipment performance.

Systems, conditions and acceptable performance margins vary between different sites, so there cannot be a standard solution that meets the requirements of all. Consulting with an equipment supplier or maintenance expert is advisable to ensure that the right level of monitoring is in place.

It is Weir Minerals' mission as a pump manufacturer to deliver continuous

A cutaway model of the Warman froth pump with the modified inducer impeller blades.



improvement for its customers, whether in terms of increases in energy efficiency, reduction in the frequency with which parts need replacing and the ease with which this can be done.

It is important for those operating coal processing plants to keep abreast of the developments both in pump technology and in the support strategies that many suppliers are now beginning to adopt in order to ensure that the pumps driving their process are performing well.

Ultimately, fit-for-purpose pumps running at optimum efficiency will bring significant production benefits. □

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Customised solutions resolve standby power issues

Power outages have become increasingly frequent with a widespread knock-on impact being experienced across industry. The ability to provide fit-for-purpose standby power solutions is the marque that has distinguished Zest WEG Group's Generator Set Division.

Standby power solutions can range from a single diesel driven generator set to a total standby power solution depending on the size of the building or project in question. Larger contracts often require a blend of smaller and larger generators to meet the needs of the various elements within the project. In all instances, fast reaction times from suppliers and the deployment of a reliable and durable generator set should be the standard.

Zest WEG Group's Generator Set Division has built a solid reputation with a large number of clients over a diversity of industries, clearly demonstrating its capability to cater for large-scale standby power projects. A number of recent contract awards highlight the company's ability to provide solutions that range from standalone generator sets to turnkey power stations, such as the one supplied to AVI Group's Indigo Brands.

This original equipment manufacturer is responsible for the total project management and control coordination, including the testing and commissioning of the entire system. Close cooperation with the customer ensures that the design of the standby power solution seamlessly integrates with the overall structure of the building to allow the equipment to be readily accommodated.

The scope of supply on the Indigo Brands project comprises three 1 000 kVA generator sets and three 1 000 kVA transformers. Zest WEG Group's Generator Set Division is also designing a custom-built electrical panel for distribution, interfacing and synchronisation purposes. The company will additionally be supplying a 23 000 litre bulk fuel tank system, as part of the optimum solution.

In a recent refurbishment contract, a containerised standby power solution was supplied to a client at the V&A Waterfront. Craig Bouwer, projects and product manager at Zest WEG Group's Generator Set Division explains that after discussions with the customer it was determined that this would provide the most cost effective solution.

The project involved a 'rig-out' of the existing equipment from the original building, designing and fitting a sound proof canopy, louvres and base frame adaptor to allow the generator set to be housed outdoors, as well as final testing of the newly containerised unit.

Silo 1 tenant Allan Gray occupies a Green Star building that requires adherence to specific environmental regulations. Zest WEG Group's Generator Set Division supplied a customised solution on this flagship project that met the latest



A 70 kVA, 400 V Zest WEG diesel generator set housed in a sound and weather proof enclosure.

European Tier 3 emission's control regulations. The system, which incorporates specialised switching controls to ensure continuous power at a major data centre, is designed to reduce the exhaust emissions from diesel-powered generators, which include nitrogen, hydrocarbons, carbon monoxide and particulate matter in the form of any visible smoke and soot.

In addition, the company supplied and installed inlet and outlet air sound attenuated splitters to meet the sound level requirements of 65 db(A) at 7.0 m. This contract forms part of the larger Silo Precinct project, which calls for five 500 kVA generator sets that synchronise with a common control panel.

"The V&A Waterfront is only one of many flagship projects that Zest WEG Group's Generator Set Division has been involved with. Another notable project is Century City, a 250 ha mixed use development in Cape Town that combines office, retail, residential and leisure elements. We are in the process of supplying and installing one 400 kVA and two 800 kVA generator sets for the Urban Square residential, hotel and conference project at Century City," says Bouwer.

"A particular challenge we encountered at Urban Square was that we were required to provide solutions and designs for irregular room sizes and exhaust runs. The ability to remain flexible and devise customised solutions is a hallmark of our capability as a supplier of non-standardised generator set solutions," Bouwer continues.

In yet another customised solution



Three 450 kVA Zest WEG open type diesel generator sets equipped with WEG alternators.

project, Zest WEG Group's Generator Set Division was contracted to supply, install and test an 800 kVA generator set into a purpose-built plant room at the Melomed Private Hospital in Tokai, which is currently under construction by Murray & Roberts Western Cape.

"The generator set measured 4.0 m by 1.6 m and 2.3 m high and weighed almost 9.0 t. Inlet and outlet acoustic louvres were required to ensure that the noise level remains under 65 db(A) at 7.0 m. We also supplied a purpose-built changeover electric panel for remote mounting," says Bouwer.

Key to Zest WEG Group's Generator Set Division's success on such specialised projects is its ability to devise innovative solutions. A prime example of this is the contract to supply a standby power supply for worker accommodation at the DRA Minerals Firestone Diamonds Lihobong Diamond Mine in Lesotho.

A major challenge encountered by the Generator Set Division team was the location of the mine, which is 2 000 m above sea level in the Maluti Mountains. Not only did special consideration have to be given to the logistics of transport-

ing all components to the site, but the presence of significant amounts of snow during May to September called for an innovative solution to the housing of the generator sets. The Lihobong Diamond Mine access road had to be widened and its load-bearing capacity increased to accommodate the low-bed trucks transporting the solution.

Zest WEG Group's Generator Set Division designed, supplied and installed three 12 m high purpose-built containers that incorporate a special 'snow roof' structure to prevent snow build-up on top of the generator sets, and subsequent blocking of the louvres. Particular attention was paid to the design and engineering of these 'snow roofs' to enable them to be collapsed when the containerised units are transported.

The three 630 kVA generator sets needed to be synchronised via Woodward Easygen controllers and were subject to a soundproofing requirement of 65 db(A) at 7.0 m. This stringent standard is normally applied to residential areas but was deemed necessary, since the application was for worker accommodation. Further requirements were for a 1 000 litre fuel

tank with gauge and level indicators and a fusible fire link on the generator sets and inlet dust filters. Furthermore, a 6.0 m load distribution container, with a self-contained fire suppression system, was also provided.

Generator Set Division offers 20 to 250 kVA units as off-the-shelf products, while 300 to 2 000 kVA individual customised units can also be supplied as well as multiple sets to achieve turnkey solutions in excess of 12 MVA for large-scale applications or projects. All gensets are sold with a standard 12-month warranty, and maintenance contracts are available for all applications. A notable differentiator is that the company offers a 24/7 breakdown support service.

"Zest WEG Group's Generator Set Division has an extensive reference base of customised solutions for challenging and arduous applications. Leveraging the experience gained by our technical team on an impressive number and variety of projects in both the commercial and industrial markets, we are able to mitigate any power supply problems for the medium and long term," Bouwer concludes. □



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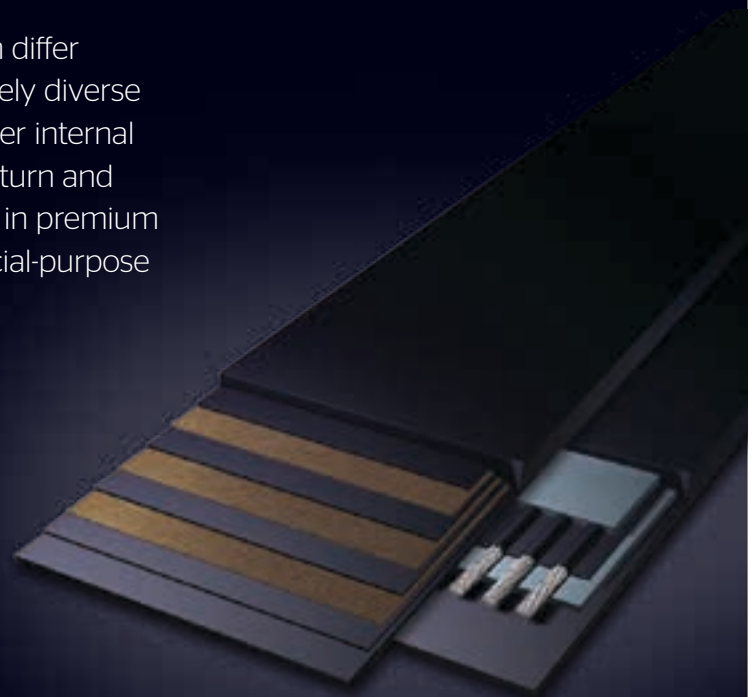
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Fast-tracking low carbon development in SA



Harmke Immink (left), a director of the carbon advisory firm, Promethium Carbon, discusses the findings of a report into low carbon development, which supports the unlocking of low carbon investments in line with the National Development Plan (NDP).

It is not well known that many of the burdens of carbon offset schemes have been significantly reduced through innovations in recent years, through mechanisms designed to reduce the barriers in accessing carbon finance while maintaining the credibility of the programmes and the integrity of the carbon credits generated.

A report produced by Promethium Carbon on fast-tracking low carbon development in SA, funded by the British High Commission in Pretoria, supports the unlocking of low carbon investment in South Africa in line with the National Development Plan.

The unique carbon tax and offset scheme proposed for South Africa allows for carbon offsets to be used to mitigate a firm's carbon tax liability. Projects that qualify to generate credits for the scheme must use an internationally recognised programme approved by the government and must be implemented inside the borders of the country and comply with the stated eligibility.

The research focuses on the streamlining of administrative processes to be followed to obtain carbon finance. It also addresses the removal of barriers faced by smaller projects.

Carbon finance is linked to specific carbon programmes such as the Clean Development Mechanism (CDM), Verified Carbon Standard (VCS) and the Gold Standard (GS). The programmes proposed for the South African carbon offset scheme have a reputation of having large administrative burdens. In many cases this is deserved.

It is however not that well known that many of these burdens have been significantly reduced through innovations in recent years, designed to reduce the barriers in accessing carbon finance while maintaining the credibility of the programmes and the integrity of the carbon credits generated.

Reducing costs and administrative burdens have been key areas of development for many international offset programmes. Examples include

the recent developments of standardised baselines in the CDM and the development of positive lists in the VCS. These developments are aimed at accelerating access, specifically for smaller projects, to potential sources of carbon finance.

Many of the innovations in carbon-off-set programmes require action from the government of the country in which the programmes are implemented. Examples include certain submissions that need to be made by the Designated National Authority of a country to utilise certain provisions for automatic additionality under the CDM.

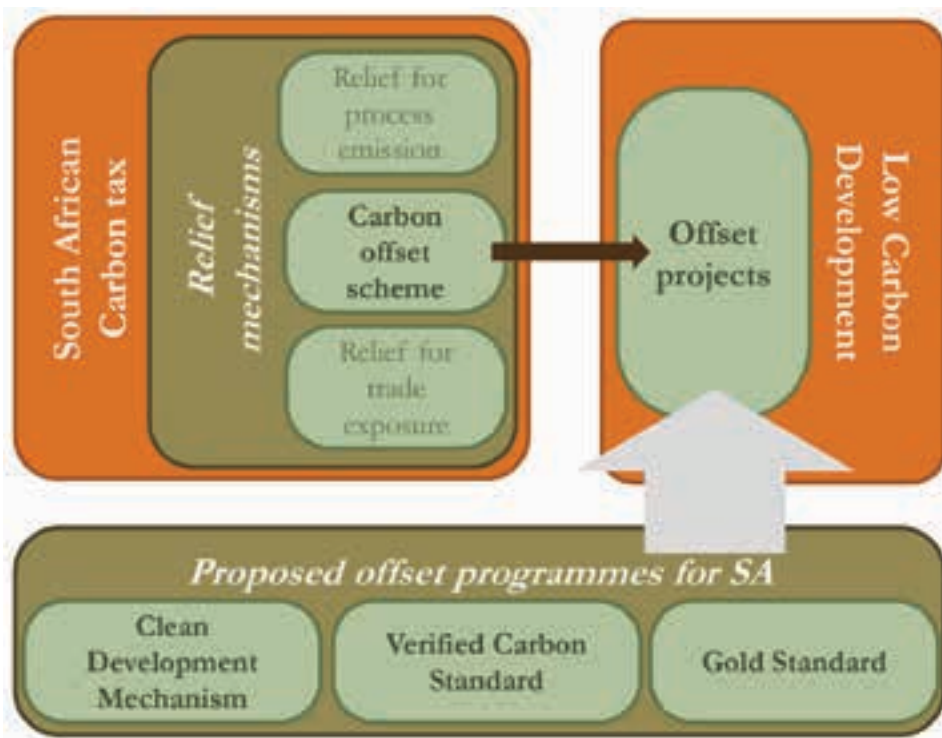
Additionality is the effect of the offset project activity to reduce anthropogenic greenhouse gas emissions below the level that would have occurred in the absence of the project activity. It is also defined as whether an emissions reduction project would have occurred in the absence of incentives, such as a payment for emissions reductions.

The baseline scenario is the scenario for an offset project activity that reasonably represents the anthropogenic emissions that would occur in the absence of the proposed project activity. The baseline emissions are the greenhouse gas emissions that would occur in the baseline scenario.

Carbon offset programmes are



Low carbon development in underdeveloped regions in South Africa will not only assist in reducing extreme poverty in these regions, but also help to reduce migration of vulnerable people from these areas. Photo: Kilowatts for Humanity, Zambia.



A diagram showing the link between the proposed carbon tax, the offset scheme and low carbon development.

offset project registration lies in the steps of proving project additionality and establishing the project baseline. Two main tools are available in this respect: automatic additionality and standardised baselines. These tools are similar in nature in the CDM, the VCS and GS.

Automatic additionality in the CDM allows for either technologies or projects in specific geographic areas that comply with certain predetermined conditions to be deemed automatically additional. In the case of technologies, the requirement is typically based on the rate of adoption of specific technologies in a region. Technologies that have low adoption rates are typically exempt from having to prove additionality during project registration. In the case of regions, small-scale projects implemented in areas that are classified as special underdeveloped zones (SUZ) are also exempt from having to prove additionality during project registration.

designed with the primary aim of maintaining environmental integrity. When the systems were initiated in the early 2000s a substantial number of checks and balances were put in place to ensure the integrity of the systems.

The result was that the systems had very low risks of erroneous inclusion of projects but this came at a high price – a high administrative burden and a high risk of erroneous exclusion. Recent developments in both the CDM and the VCS have focused on the easing of the administrative burden. Many of the changes are however not automatically available.

In the case of the CDM, it needs action from the Designated National Authority in a country to allow that country to make use of the changes. In the case of the VCS, methodologies need to be developed to access the potential benefits.

The two main areas of innovation lie in proving additionality and establishing

standardised baselines. All offset projects, irrespective of the programme used, need to prove additionality.

Traditionally this step requires significant inputs from experts and auditors to ensure that the criteria are met. If projects can be deemed automatically additional, a huge burden of proof is removed from the project.

Emission reduction is defined as the difference between the emissions in the baseline and the emissions of the project. Proving emissions in the baseline can be challenging because it is mostly based on theoretical calculations. This requires inputs from experts and auditors and can be cumbersome to prove. The use of standardised baselines can make a big impact on the inputs required during project validation.

Removal of barriers

Much of the administrative burden in

Special underdeveloped zones

The CDM deems small-scale projects that are implemented in special underdeveloped zones (SUZ) to be automatically additional. As both the VCS and the GS allows for the CDM methodologies, this fast track option is, therefore, available under all three programmes considered.

A special underdeveloped zone is an administrative unit where the proportion of the population with income less than US\$2 per day, adjusted by purchasing power parity (PPP), is greater than 50%. In South Africa, the smallest administrative unit is a municipal ward. Where a large portion of the wards in an area qualify as special underdeveloped zones, the local municipality can qualify as a special underdeveloped zone.

Even though South Africa is a high middle-income country, it is also the country with one of the highest levels of inequality in the world. South Africa can capitalise on the removal of barriers

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ers for projects implemented in specific areas if data for underdeveloped zones is provided and administrative steps followed. The criteria for underdeveloped zone applications can change over time, but it is linked to the income per person per month, based on data not older than three years.

Taking the 2011 South Africa food poverty line of R321, the number of qualifying wards is 956. This includes 45 local municipalities, which comply with the criteria in full. These 956 wards are spread across 117 different local municipalities. With the US\$2 World Bank Purchasing Power Parity of R286, the number of qualifying wards is 911, including 37 local municipalities.

In the respective long-term Integrated Development Plans prepared and updated annually, the 37 local municipalities have linked climate change to disaster management and ecosystem preservation. Carbon finance can increase resilience in these areas and unlock investment for service delivery improvement. Carbon offset projects are well suited for municipal Integrated Development Plans as they are longer-term initiatives

with continuous benefits in local poverty alleviation.

Conclusion and way forward

It is widely recognised that an effective response to climate change requires an increased level of mitigation action. South Africa is in the process of implementing an innovative carbon tax and offset scheme in 2017.

Offset projects provide valuable GHG mitigation and support low carbon economic development opportunities in South Africa while offering financial benefit to tax payers. Investment in these carbon-offset projects should be fast tracked enabling implementation in 2016, in order to be ready for trading against carbon tax in 2017.

The main challenges with carbon offset project development are that it is very time consuming and that significant upfront costs and effort are typically involved. It is only with data gathering, analysis, projections and verification that these baselines can be set.

The fast track options can assist low carbon development through:

- Utilising recent developments in the

three programmes identified in the South African offset scheme to reduce barriers to project registration through automatic additionality, positive lists and standardised baselines.

- Streamlining the administrative process of project registration based on these interventions.

Project implementers in South Africa can get access to these fast track options if the Designated National Authority takes certain actions, including:

- Making data on technology penetration rates proving automatic additionality available to project developers.
- Updating the current standardised baseline for grid electricity, which is expiring in May 2016.

Low carbon development in underdeveloped regions in South Africa will not only assist in reducing extreme poverty in these regions, but also help to reduce migration of vulnerable people from these areas. This, in turn, will assist to alleviate inequality in South Africa. Obtaining the data supporting the identification of the underdeveloped zones could be funded through the adaptation part of the Global Environmental Fund. □

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Six questions to ask when securing your IoT

“To truly gain the advantages and opportunity the Internet of Things (IoT) promises, you need to accept the convergence of IT and OT network infrastructures,” says Mike Hannah (left), product business manager for networks at Rockwell Automation. In this article he identifies six questions that should be asked about creating an Internet of Things cyber security strategy to help protect your network, increase efficiency and meet future infrastructure needs.

Industrial applications across the globe are being transformed by connecting a greater number and wider range of ‘things’ that create tremendous opportunities to innovate and drive out inefficiency. However, as your organisation creates an Internet of Things (IoT) strategy, you should answer these important security questions:

Q How do I determine whether a device is a candidate for IoT?

As more devices are embedded with smart sensors and gain the ability to communicate, these things then become the tools we use for better understanding complex processes. They can help create smarter machines that can then be better controlled, thereby increasing efficiency. All these devices are linked through wired and wireless networks using the same network technology as the Internet, so securing the architecture from attacks, data authentication and access control become increasingly more important.

To determine if your device should be connected to the IoT, simply ask, “What is the value of having it on the network?” Just because you can connect something, doesn’t mean you should. If the value of connecting is greater than the risk, then it is a likely candidate. If you do decide to put it on the network, make sure it uses standard EtherNet/IP™ technology

and conforms to IP standards and best practices. This helps deliver data in a consistent manner and allows various levels of security technologies to be used.

Q What can I do to protect the control systems from a potential flood of IoT communications and threats?

We all have seen or been in nasty traffic jams caused by roads that weren’t changed to accommodate the rising population in that area. That’s what your network can look like without careful planning. By 2020, it is estimated that 20 billion devices will be IoT-connected. Do your homework and put a proper plan in place that not only addresses your needs today, but also looks ahead to the future.

No one product, technology or methodology can fully secure industrial applications. It takes a Defence in Depth (DiD) approach to address both internal and external threats. This approach uses multiple layers of security including physical, policy and technology.

As an example, verify that all unused ports are locked either programmatically or physically using lockout connectors; put your controller into ‘run mode’ and use passwords. These are things that can be done today.

In addition, you can put policies in place to control human

Automated and networked solution for SAB plant

Rockwell Automation recently supplied South African Breweries (SAB) with its first fully automated and networked EtherNet/IP-based control system for its new maltings plant in Alrode, Gauteng. The new control system will integrate traditionally dis-

parate malt production processes into a single networked solution to provide plant-wide visibility and actionable data. The new plant will account for more than half of the breweries’ South African and Namibian malt production when fully commissioned.



SAB’s first fully automated and connected maltings plant will produce 150 000 tons of malt every year.

Situated next to the company’s existing brewery in Alrode, the new plant will increase local malt production from 60 to 90%, reducing the financial impact of imported malt and increasing malt production from 42 000 to 150 000 tons per annum.

SAB contacted Rockwell Automation to design a fully automated and networked solution, a first for SAB. The solution plant connects all data from the plant floor to the rest of the SAB enterprise, transforming the plant into a ‘connected enterprise’.

“By converging operations technology and information technology, SAB now has secure access to operational, business and transactional data to improve the malting plant’s supply chain, economic and sustainable performance,” explains Adrian van Wyk, business manager for power and components, Rockwell Automation, sub-Saharan Africa.

All devices and processes within the plant are integrated

interaction with your systems whether they are internal or external, on-site or in remote operations. Authenticate who is on your network, authorise what they can do, and then account for what they are doing on your network. Use best practices for segmenting your networks: establish domains of trust, and use network infrastructure technologies such as VLANs, VPNs, firewalls, ACLs, and passwords to limit who and what has access on your network.

Segmenting your network into smaller VLANs can also help maintain them and provide a level of isolation. For example, this segmentation helps avoid taking your entire network out due to a problem on one machine line. With the IoT comes great opportunity, but it's not without its challenges. However, you don't have to do it alone. Help is available for you, such as the Industrial IP Advantage (www.industrial-ip.org), an on-line community that can provide the information you need to successfully deploy your industrial information architectures.

Q How is cyber security for IoT and industrial control systems different?

There is no major difference. A good cyber security plan includes: prevention – setting policies and procedures to reduce risks; and resolution – what to do in the event of a security breach. This is fundamentally the same for industrial control systems (ICSs), and in fact might be even more important, because downtime of operations can be very costly to the company.

Q How should IoT and ICS cyber security be managed?

To truly gain the advantages and opportunity the IoT promises, you need to accept the convergence of IT and OT network infrastructures. This allows you to manage the entire network using the same technologies and personnel, helping to reduce assets and training – one staff instead of two, with one common objective instead of two disparate ones.

However, this isn't a simple journey; better collaboration between departments, facilities and suppliers will need to happen. Many plant networks were never designed to connect

with the enterprise, so a comprehensive assessment is a good start to developing your strategy and execution plan.

Q Who should be responsible for providing IoT cyber security?

Just as there's no one product, technology or methodology to fully secure your control system, there's no one provider either. Each needs to keep security in mind when providing products or solutions for your business. This should include your entire supply chain. Network owners need to design their networks using validated designs and best practices and plan for who, what and when information will be available on the network.

ICS providers should offer control systems that follow global standards and regulatory security requirements and have common, secure design requirements in their product developments.

OEMs or equipment builders should follow best practice designs in their machine networks as well. Their machines should integrate easily into their customers' operations, meeting IT security policies and OT performance objectives. This integration also allows the machine builder to drive even more value to their customers. For example, with the ability to establish secure remote access from anywhere in the world, customer machine downtime and travel expenses are minimised.

Q What is the role standards play in managing IoT cyber security?

Standards are critical in realising the promise of the IoT. Without them, these 'things' aren't going to connect in a consistent fashion, meaning more work for everyone. The standards help validate that technologies and methodologies are proven and provide greater interoperability. They can also help users put these 'things' on the network so the data gets to where it needs to be at the right time, and gets there securely.

"Solution providers can help to better secure networks built on these standards. Following standards will allow better evolution of your infrastructure. With a properly designed network that can accommodate evolving standards and technologies, you can avoid those future traffic jams," Hannah concludes. □

in a single secure network with dual-port EtherNet/IP-based hardware connected in a Device Level Ring configuration. "This provides a strong future-proof technical solution with high-performance delivery and Network resilience on the Device Layer," says Van Wyk.

Controlled by Allen-Bradley ControlLogix controllers and Allen-Bradley Stratix industrial EtherNet/IP switches, the motor control centres comprise more than 500 E300 Intelligent electronic overload control relays, 70 PowerFlex 750 ac drives and 50 SMC Flex smart motor control soft starters for motor starting, stopping, control and protection, which improve production efficiency.

To address the plant's energy metering, energy consumption, load shedding and harmonics analysis, Rockwell Automation supplied a range of its Allen-Bradley PowerMonitor metering solutions. Technical partner, MSE, provided all packaged motor control centres, distributed throughout the

plant to reduce cabling costs.

In order to keep the plant running 24/7/365, all motor control centre device level hardware is equipped with the Rockwell Automation automatic device configuration (ADC) for automatic self-healing and configuring of replaced componentry. ADC, paired with the Rockwell Automation device level ring network, ensures uninterrupted real-time device communication, provides SAB with greater network resilience and reduces unplanned downtime.

"We've used the very latest control and motor control technologies that are not only future-proof, but provide backward capability to ensure SAB's operations are more productive, sustainable and respond competitively to dynamic market demands on a global level," says Van Wyk. □

All devices and processes are integrated in a single secure network with dual-port EtherNet/IP-based hardware to provide plant-wide visibility and actionable data.



Flexible production cells for smart tube processing

Stefanie Flaeper, managing director at transfluid, talks about the company's sophisticated technology concepts for automating and inter-linking tube bending, separation, cleaning and tube forming processes.

Precisely produced tubes help make energy and water flow or medical devices support the life-saving work of doctors. Robust, short hose connections for automotive construction or long, multiply-processed tubes, those used as air conditioning lines, for example, also have many different requirements before they can be used in the production environment.

Depending on the industry and application area, these tubes first need to be specifically formed, bent, and diversely processed. The networked 'T-motion' automation systems by transfluid create combined options for large series operation.

This not only leads to higher production capacities but also ensures process

safety and that parts are always produced to the same high levels of quality.

"We use our sophisticated technology concepts for tube bending, separation, cleaning and tube forming for the automation systems, supplementing them, for example, with loading systems, weld seam control or complete handling," says Stefanie Flaeper, managing director at transfluid. "With the easy-to-operate production cell coordinated in this manner, production can start right away. The principle is one of 'plug-and-produce'. Our customers place value on this and trust our decades of experience and in our progressive high-tech solutions."

Complete systems for complex challenges

The specialists at transfluid integrate

expansions such as marking facilities, seam detection devices, printers, tightness tests or visual, contact-free camera systems for inspecting geometries or surfaces, brazing and welding units and auto-frettage as optional components. Effective loading systems, storage systems, supply of the workpieces or complete handling by a robot or in linear systems can be added as well. "We coordinate the solution specifically to the customer's requirements, including generation of the layout to achieve optimised material flow and best utilisation," explains Flaeper.

Highly flexible linear systems or robots?

Selection of handling options also focuses on highest possible efficiency. The devices used strongly depend on the parts to be produced. Flaeper presents a general principle: "Everything that can be done to the tube in the straight condition considerably reduces the handling effort. From the bending machine onwards, the robot usually takes over. Linear handling can often be faster, more cost-efficient and easier to reach."

For smooth production flow, transfluid develops its production systems to permit loading of isometric data online from a CAD system and to avoid elaborate programming of robots.

Matching component supply

Coming off of the starting block well and maintaining a head start will bring a runner in first, too. Therefore, the systems for loading and separation already contribute to the high performance of 't-motion'. Components (nuts, flanges or screws) are supplied from splitter magazines or rotation separators with presence and position checks.

Additionally, supplies from a coil or a loading table, belt, stage, plate, chain or vibrating conveyor are available to match the overall system. "With a strong connection to tube forming, separating and tube bending technologies, transfluid ensures high-performance automation systems are linked in a result-oriented manner so that they can offer individual solutions for many different tube products," says Flaeper. □



Complete production cells are specifically coordinated to meet tube production requirements. This includes the modification of the layout of interconnected modules to achieve the perfect material flow. Image® transfluid.

Wide light band for reliable detection

Featuring a wide light band, the Leuze RK 46C.DXL VarOS retro reflective sensor is able to reliably detect both small and large objects. Objects can be round, angular or both, with glossy surfaces, have transparent shrink wrapped film or even be totally black, with gaps or with high ambient light levels. These Leuze sensors are ideal for when the objects to be detected or the associated environmental conditions deviate from the norm.

The Leuze RK 46C.DXL VarOS retro reflective sensor is particularly effective in this regard as it responds to objects with the entire width of its light band, which gives it the capability to handle interruptions. The wide light band allows for detection over a 45 mm to 60 mm wide area.

The sensitivity and/or resolution of the sensor can be adjusted easily by means of a button located on the rear housing. This Leuze sensor also features a handy 'teach me' function, which allows it to be adapted easily between two object sizes greater than 8.0 mm at the touch of a button. This ensures optimum flexibility of application. The use of this sensor does away with the need for expensive light barriers or multiple

individual sensors.

Other features include the ability to calibrate for detection of transparent, perforated or small objects as well as to reliably detect objects with depolarising media such as foil packaging.

Germany-based Leuze Electronic has been solving sensing problems for more than 50 years for use in industrial automation systems. With subsidiaries all over the world and over 1 000 employees, customers can rely on the competent consultation and reliable customer service offered as well as solid application know-how and comprehensive industry knowledge.

The Leuze RK 46C.DXL VarOS retro reflective sensor is available in South Africa from Johannesburg-based Countapulse Controls, the leading southern African supplier of sensing, measurement, counting, switching, monitoring and positioning instrumentation. With over 40 years experience in sensing technology, Countapulse controls offers reliable, efficient and application appropriate sensing, control and motion detection solutions.

As well as offering the Leuze range of photoelectric sensors, other brands lo-

cally represented by the company include Hengstler counters and encoders, EGE flow monitoring and specialised sensors, Pulsotronic inductive sensors, ABP drive components and Secatec magnetic switches.

Countapulse controls also offers a complete technical advisory service for the most effective use of its products in automotive and other branches of engineering. □



The new Leuze RK 46C.DXL VarOS retro reflective sensor features a wide light band to reliably detect both small and large objects.



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Simple automation: MPS production and an ultrasonic bath

These two success stories, described below by Jaco de Beer, a project engineer for Tectra Automation – a member of the Hytec Group of companies and the authorised distributor for Bosch Rexroth automation products – demonstrate the diversity available from this leading local automation solutions provider.



BEKA Schröder has increased its average production rate of LED luminaires by 50% through four new semi-automated manual production systems (MPS) supplied by Tectra Automation at its Olifantsfontein factory.

The production line replaces a more batch-oriented configuration for the assembly of four recently designed LED light ranges used for lighting streets, highways and outdoor facilities. Tectra Automation supplied an MPS for each range as part of a turnkey project that included the design, supply, factory acceptance testing, integration and commissioning of the MPS, as well as its electrical installation.

Each of the four production lines consists of five workstations, connected in a 10 m lane of aluminium rails and runner blocks where operators assemble the luminaire units on specialised aluminium trays. Tectra Automation fitted these trays with specialised mounting blocks that secure the units during assembly.

At the end of the production line, units are removed from the tray for quality inspection. The tray then enters a lowering station, where it is automatically

lowered to a return line and delivered to the front of the production line. Trays can accumulate one behind the other before being fed to the top, one by one.

“By improving the efficiency of movement and flow of production within the facility, the MPS has enhanced the productivity of assembly, with improved workmanship and product quality,” explains Jaco de Beer, project engineer, Tectra Automation.

All production line lifting and lowering requirements are achieved through a maintenance-free pneumatic system. Tectra Automation supplied valves, pneumatic actuators, air supply units and filtration systems. “We used the new Aventics AV03 valve to control each pneumatic cylinder,” De Beer explains. “This valve is ideally suited to these types of applications because of its compact, neat, all-in-one functionality.”

BEKA Schröder’s four white-light LED ranges, OMNIStar, LEDlume-maxi, LEDlume-midi and LEDlume-mini, de-



liver exceptional colour rendering and visibility over a long lifespan, and are highly efficient in energy consumption. “Such is the success of the products that they will soon be exported to Europe,” De Beer concludes.

The MPSs were installed over a three-week period at the end of 2015, with other necessary changes to production prepared and implemented during the year-end shutdown.

Ultrasonic bath: engineered for accuracy

Tectra Automation has also designed and



Side view showing the assembly line. The inclined level of the MPS is used to return the assembly trays to the first workstation following the delivery of a completed light to quality inspection at the end of the line. Inset: The 10 m MPS lanes each consist of five workstations, where operators assemble Beka Schröder’s LED luminaires on specialised aluminium trays.



Above: Tectra Automation designed and built an ultrasonic linear measurement bath that automates the scanning of composite components used by Denel Aerostructures. **Left:** The automated scan test reveals any flaws or structural weakness in the composite material. It has not only sped up the process, but increased quality as well.

built an ultrasonic linear measurement bath for Denel Aerostructures. The bath will automate the scanning of composite

components that Denel Aerostructures supplies for military transport aircraft. The system was recently delivered to the company's Atlas Road facility in Kempton Park, Johannesburg.

The structure is a bridge crane system constructed from aluminium extrusions and linear motion technology from Bosch Rexroth, and is about 10 m × 1.0 m. The system automates an extremely precise scan path across the composite component to ensure the scanning of each part is executed to the required high accuracy.

The test will reveal any flaw or structural weakness in the composite material, alerting Denel Aerostructures to components that do not meet its stringent quality standards. An automated scanning process not only speeds up the testing process exponentially, it also enhances production quality. With the bridge maintaining a uniform height across the scan path, the irregularities in scan heights characteristic of manual scanning are eliminated.

Achieving this precision in the scanning process was complicated by the large size of components. "We had to join two 5.0 m aluminium extrusions to get the required length of 10 m," explains De Beer. "Once we'd assembled this length,

we noticed the aluminium was creating minor sag along the length. To overcome this problem, we had to develop a series of customised struts and box-type frames to ensure the beam remained perfectly horizontal. It is the longest bridge-type system we've built to date."

The automation of the ultrasonic system is controlled by the MTX Micro single controller, which is extremely versatile and highly accurate. "Programming the specified scan path, which it does via G-code, is simple and will be familiar to anyone working with CNC lathes and milling machines," De Beer explains. "All that is required for programming, from an operator's perspective, is inputting the correct length, width and indexing specifications."

As Tectra Automation supports such an extensive stockholding of Bosch Rexroth products, it was largely in control of delivery time. The system was built in less than eight weeks to meet the tight timeframe required by Denel Aerostructures.

Tectra Automation also supplied specialised polyurethane backing, which lines the surfaces of the bath to maximise the system's suitability for ultrasonic linear measurement applications. □

Tectra Automation enters the oil and gas process market

Tectra Automation entered into a sole distribution agreement with Italy-based process valve and actuator manufacturer OMAL Automation late in 2015 and, in terms of the agreement, Tectra Automation now stocks and distributes OMAL's entire range of oil and gas industry-certified valves and actuators throughout South Africa and sub-Saharan Africa.

The agreement gives Tectra Automation a foothold in the sub-Saharan Africa process market and facilitates the expansion of the company's pneumatics division. Essentially, in addition to its pneumatic and vacuum products, technology and solutions, the division adds process market products as a third leg to its offering. It also puts the company in a position to bring customers from the oil and gas industry into the fold.

"We have had our growth strategy in place for some time now," explains Malan Bosman, product manager, pneumatics, Tectra Automation. "When OMAL began the process of withdrawing its South African office from the country, we took the opportunity to enter into an agreement with the company's Italian head office. Their product range quality is in-line with Tectra

Automation's quality offering, and the addition of this range enhances our overall solutions offering."

The process industry valves and actuators, now a part of the Tectra Automation's process market products, comprise pneumatic scotch yoke actuators, electrical actuators, co-axial valves, angle seat valves, butterfly valves and ball valves.

"It is a win-win agreement for both parties," Bosman points out. "OMAL will benefit from Hytec's South African and sub-Saharan African footprint, as well the Group's established African distribution channels." While there are smaller established OMAL distributors in the country, Tectra Automation's appointment as sole distributor for the region means each of them will now source their OMAL products from Tectra Automation – and comprehensive stock of all OMAL valves and actuators is being held so that smaller distributors can benefit from

fast order turn-around times.

Bosman and former OMAL South Africa sales representative, Marno Gloy, who has taken up a similar position with Tectra Automation, underwent a week's product training at OMAL offices in Italy. "The transition has been seamless," Bosman says, "and for the smaller distributors and established South African and African OMAL customers there was no lapse in service or stock delivery."

OMAL Automation is one of four OEMs internationally that have certification to manufacture valves and actuators for the oil and gas industry. □





I-Shift makes it possible to add up to two new crawler gears, resulting, among other things, in the ability to start-off from standstill and transport a gross combination weight (GCW) of up to 325 t.

I-Shift with crawler gears

Volvo Trucks has introduced a new member to the I-Shift family: I-Shift with crawler gears. The new gears, which have been added to the vehicle's automated transmission, provide specialised start capability for trucks carrying heavy loads in demanding situations.

Volvo Trucks' new I-Shift crawler gears system is entirely unique for series-produced extra-heavy trucks. This version of I-Shift

makes it possible to add up to two new crawler gears, resulting, among other things, in the ability to start-off from standstill and transport a gross combination weight (GCW) of up to 325 t.

"I-Shift with crawler gears offers an

entirely new scope for extra heavy trucks with automated transmission: to regulate their speed when crawling slowly and even reversing. The driver can haul a heavy load without worrying about getting into situations that may lead to costly standstills," said Malcolm Gush, sales director at Volvo Trucks South Africa. "This new technology will also be available in South Africa where extreme road and weather conditions often have a big impact on a fleet's productivity, safety and profitability."

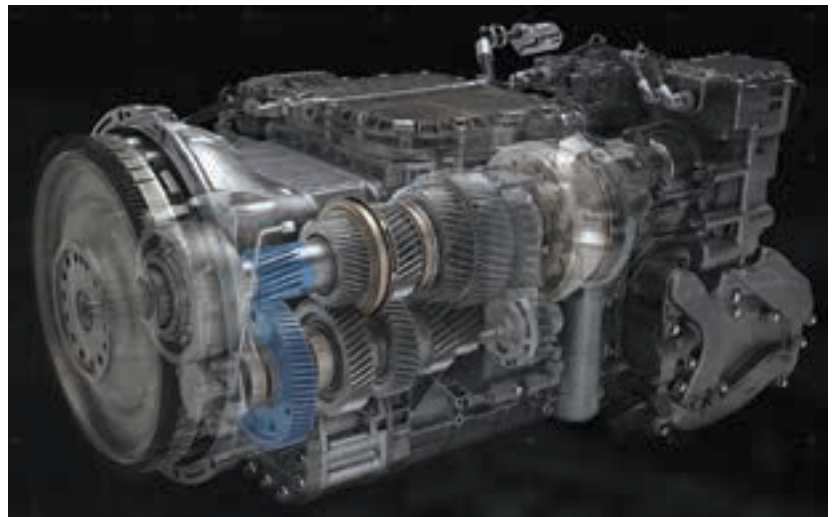
With the new crawler gears, the truck can drive at speeds as low as 0.5 to 2.0 km/h. This helps immensely during precision manoeuvres such as in construction and maintenance tasks.

"The vastly improved driveability and starting capability with the new crawler gears makes the driver's job far easier when operating in difficult terrain on slippery surfaces with heavy loads, such as on construction sites, in mines or in forests. The heavier the transport operation and the poorer the surface or the terrain, the more the driver gains from a truck with crawler gears," explained Gush.

For haulage firms carrying out heavy transport operations on demanding surfaces as well as regular highway driving, crawler gears also offer considerable flexibility and the possibility of improved fuel economy. "I-Shift with crawler gears makes it possible to start-off from standstill in extreme situations. Combining them with a suitable rear axle ratio that optimises engine revs at high speeds also results in lower fuel consumption on the highway. This is a significant benefit to haulage firms operating in these scenarios," said Gush.

Facts: I-Shift with crawler gears

- I-Shift with crawler gears is a further development of Volvo Trucks' I-Shift automated transmission.
- The new version of I-Shift has been specially developed for excellent starting capability and for driving at particularly low speeds.
- I-Shift with crawler gears can allow driving as slowly as 0.5 – 2.0 km/h and can handle starts from a standstill with a gross combination weight of up to 325 t, which is unique for series-produced trucks with automated gearboxes.
- The transmission is available as either a direct-drive or overdrive gearbox with one or two crawler ratios. It is also possible to specify two reversing crawler ratios.
- The low crawler gears are integrated into the I-Shift transmission. In order to handle the high loads involved, several components are made of high-strength materials. The gearbox is 12 cm longer than a conventional I-Shift unit. I-Shift with crawler gears is available for Volvo Trucks' 13- and 16-litre engines in the Volvo FM, Volvo FMX, Volvo FH and Volvo FH16.



In an I-Shift gearbox with one crawler gear the ratio is 19:1 in a direct-drive gearbox, or 17:1 in an overdrive gearbox.

Depending on application area, I-Shift is available with one or two forward crawler gears, and with or without two reverse crawler gears. Reverse crawler gears make it possible to reverse extremely slowly, which is a major advantage when reversing manoeuvres require immense precision.

In a gearbox with one crawler gear the ratio is 19:1 in a direct-drive gearbox, or 17:1 in an overdrive gearbox – the ratio of the lowest gear in a regular I-Shift direct-drive gearbox being 15:1. In a direct-drive or an overdrive gearbox with two crawler gears the lowest ratio is 32:1. The ratio of the lowest reverse gear is 37:1 in a direct-drive gearbox.

All the models on the FH, FM and FMX ranges already use Volvo's I-Shift 12-speed automated mechanical gearbox without a clutch pedal. Locally, this gearbox comes standard with special software packages that have been designed for each specific industry segment to save on fuel costs for fleet owners. □



With I-Shift with crawler gears drivers can haul a heavy load without worrying about getting into situations that may lead to costly standstills.

China launches advanced autonomous driving experiment

Volvo Cars plans to launch China's most advanced autonomous driving experiment in which local drivers will test autonomous driving cars on public roads in everyday driving conditions. Volvo Cars expects the experiment to involve up to 100 cars and will, in the coming months, begin negotiations with interested cities in China to see which are able to provide the necessary permissions, regulations and infrastructure to allow the experiment to go ahead.

Volvo believes the introduction of autonomous driving (AD) technology promises to reduce car accidents as well as free-up congested roads, reduce pollution and allow drivers to use time spent in their cars more valuably.

The Swedish company, whose name has been synonymous with automotive safety ever since it invented the seat belt in 1959, is pioneering the development of autonomous driving systems as part of its commitment that no one will be seriously injured or killed in a new Volvo by the year 2020.

"Autonomous driving can make a significant contribution to road safety," Håkan Samuelsson, president and chief executive of Volvo Cars told a seminar in Beijing in April, entitled 'Autonomous Driving – could China take the lead?' "The sooner AD cars are on the roads, the sooner lives will be saved."

Samuelsson welcomed the positive steps that China has taken to develop autonomous driving technologies, but also encouraged the nation to do more to try and speed up the implementation of the regulations that will oversee autonomous driving cars in future.

"There are multiple benefits to AD cars," said Samuelsson. "That is why governments need to put the necessary legislation in place to allow AD cars onto the streets as soon as possible. The car industry cannot do it all by itself. We need governmental assistance."

The introduction of AD cars promises to revolutionise China's roads in four main areas – safety, congestion, pollution and time.

Independent research has revealed that AD cars have the potential to reduce the number of accidents significantly. Up to 90% of all accidents are caused by human error, something that is eliminated by AD cars.

In terms of congestion, AD cars allow traffic to flow more smoothly, reducing traffic jams and, by extension, decreasing dangerous emissions and associated pollution. Reduced congestion also saves drivers valuable time.

Samuelsson welcomes moves by regulators and car makers in the US and Europe to develop AD cars and infrastructure, but he also encourages all parties involved to work more constructively together to avoid patchwork global regulations, technological duplication and needless expense.

"AD is not just about car technology. We need the right rules and the right laws. It is natural for us to work together," Samuelsson concludes. "Our starting point is that both the public and private sectors stand to benefit from new technologies and industries, so it is better to build bridges and work together than to all go in different directions." □



Volvo aims to trial up to 100 new XC90s with its autonomous driving (AD) technology on Chinese roads this year – and its Pilot Assist II and semi-autonomous driving capability will be a standard feature on this top-of-the-range SUV from 2017 on. **Inset:** Volvo's autonomous driving interface, the IntelliSafe Auto Pilot, is mooted to be "the best application thus far of a smooth transition between normal and automated driving".



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Leading the drive to reduce harmful emissions

Engen, a leading producer and marketer of fuels, lubricants and oil-based products, is continuing its drive to reduce vehicle emissions. In this article, Sydney Brückner (right), Engen's business manager for emission fluids, talks about AdBlue®, the additive required to reduce (NOx) emissions from diesel engines.



Two years have passed since Engen Petroleum became the first petroleum company in South Africa to market Air1®, the world's top AdBlue® brand. "Despite a lag in more stringent emissions legislation for trucks and buses operating on South African roads, the on/off road AdBlue business is growing steadily in sub-Saharan Africa," says Brückner.

AdBlue is used in conjunction with selective catalytic reduction (SCR) units in exhaust systems. This reduces nitrogen oxide (NOx) emissions in diesel engine exhaust gases, which is in line with more stringent emission regulations introduced in other parts of the world.

Brückner says South Africa is committed to reducing CO₂ and NOx gas emissions. The local energy industry, including the bus and truck transport sectors, has been identified as a key contributor to reducing emissions into the atmosphere.

"The modern diesel engine has become a highly sophisticated piece of machinery that is far removed from its original design. Today many original equipment manufacturers (OEMs) continue to focus on increasing power from smaller engines while also needing to adhere to more stringent environmental laws that require these engines to be extremely clean burning and fuel efficient," adds Brückner.

Currently, transport emission legislation in South Africa only requires diesel vehicle compliance with Euro II emission standards. Despite this, a growing number of automotive OEMs have already introduced passenger cars, buses and trucks meeting Euro V and VI emission standards into the South African market. This is in anticipation that South African emission limits will tighten in the near term, which will have a major bearing on the on-road and off-road sectors.

Brückner says: "It is encouraging to note that an increasing number of major

fleet operators across South Africa have adopted strong green practices.

South African customers and the markets we serve are becoming more and more serious about sustainability and green products that are better for our environment.

At Engen, we are strategically positioned to provide solutions that match these changing market requirements."

As the only major oil company operating in South Africa to offer AdBlue, Engen is the one-stop shop for fleet operators, privately owned vehicle owners and off-road equipment operators seeking a product that offers to lower emissions from the vehicles or the equipment used.

"At Engen we believe we have an obligation towards bringing environmentally friendly products to the South African market. Engen AdBlue – or Air1, our brand name for the additive – is known to reduce levels of pollutants by up to 90% in the exhaust gases of vehicles and the product is non-hazardous and safe," says Brückner.

"AdBlue is a natural fit to the Engen business and shares a common product platform with other Engen eco-line product offerings such as low-sulphur diesel and low-SAPS [sulphate ash, phosphorus and sulphur] lubricants," adds Brückner.

AdBlue, (Air1) is available at a number of Engen's service stations, Engen truck stops and at select Engen reseller customers across South Africa. This gives local OEMs the flexibility to introduce latest technology vehicles into the South African market.

"Irrespective of whether or not South African vehicle owners have heard of AdBlue or the Air1 brand, the chances are that they may soon be driving ve-

hicles that require it," Brückner says.

"While modern diesel vehicles fitted with SCR systems are an additional capital investment, fuel savings should cancel out this extra expense over time," Brückner continues.

Diesel consumption is approximately 3.0% to 5.0% lower, depending on the type of engine and the work it does. The AdBlue tank, which is normally fitted adjacent to the diesel tank, would typically require filling every time drivers refuel with diesel.

"The introduction of AdBlue into the Engen product portfolio is a major step forward in Engen's ongoing environmental drive, demonstrating its commitment to a more sustainable future growth path," says Brückner.

Notable predecessor programmes include Engen's own bulk fuel transport fleet replacement initiative, which focuses on models that run on low-sulphur diesel and meet the Euro V and VI emission standards. "Engen will continuously strive to provide product solutions that match changing market requirements," concludes Brückner. □



Engen Petroleum was the first petroleum company in South Africa to introduce Air1®, the world's top AdBlue® brand.

Smart connected PLM launched in SA

PTC's Windchill 11 Smart Connected PLM solution was launched into South Africa on May 11 and 12, 2016 in Johannesburg and Cape Town, respectively. *MechTech* catches up with business development manager, Riaan du Plessis and PLM solutions architect, Johan Strydom, of local channel partner productONE.



Riaan du Plessis, business development manager for productONE; PLM solutions architect, Johan Strydom; and the company's marketing manager Mpho Ntuane.

Modern product designs, which leverage a combination of mechanical, electrical, software, and connectivity technologies, require a robust, multidisciplinary development approach, yet these products must be released to market faster, with better quality, at a lower cost, and with more desirable features.

In response to these ever complex demands, PTC has developed smart connected role-based PLM, which strives to target stakeholders at their point of need, aligning Windchill with the underpinning role-based approach now adopted for the Creo Suite of product design applications (apps). "Our Windchill software is now being supplemented by an online platform, accessible via several different apps that access different data sets, designed to suite all of the different stakeholder roles of a product's lifecycle," begins Du Plessis.

"Infrequent users of traditional PLM packages used to have to go through several days training. But, because they didn't use the software often enough, it was still difficult for them to be effective users. Now they can access the role-based app most suited to their needs. These apps have been streamlined and simplified to make them easier to use – and different apps have been developed

for each users role within the product lifecycle," he explains.

Strydom continues: "The first set of these apps on the Windchill 11 platform are the viewing apps. These give personnel peripheral to the mainstream design processes the tools to view PLM data in a minimal structure. And this is all portable. Models, 2D drawings and data can be viewed on any smartphone – including Android- OSX- and Windows-based phones or tablets – as well as any laptop or computer," he says. "The View App is ideal for design reviews or for communicating and collaborating with stakeholders and partners," he says.

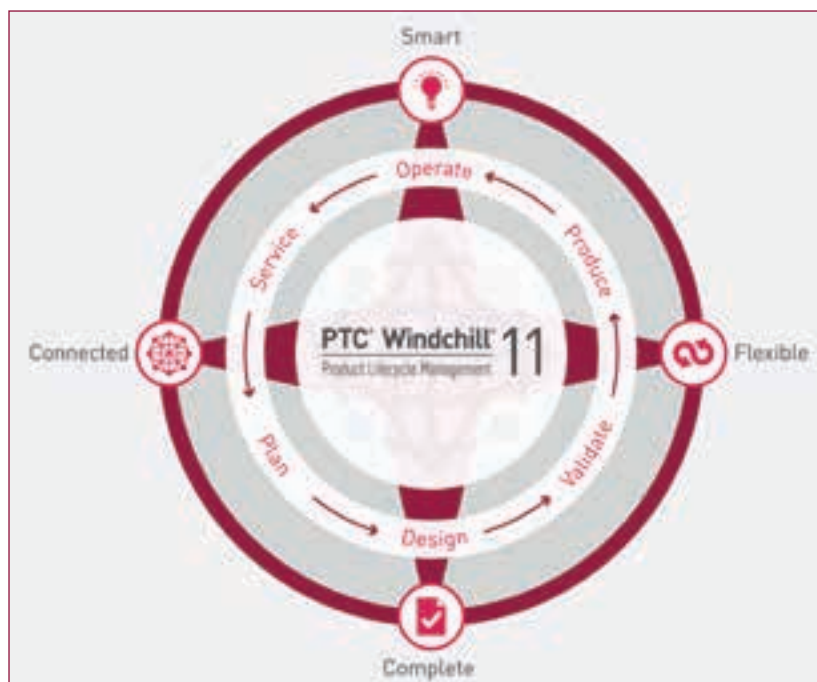
Once a design moves into production, a new set of stakeholders becomes involved. "From the viewing perspective, shop floor managers might be interested in the 2D-orthographic drawings for the workshop, for example, or the manufacturing instructions. These are now accessible from any device with an Internet connection. The data is also guaranteed to be 100% up to date, while the product IP remains as well protected as ever," Strydom assures.

The engineering bill of materials (eBOM) as well as the manufacturing (mBOM) and servicing (sBOM) are separately accessible to relevant responsible persons in the same way. "For manufacturing, IGIS, STEP or STL portable file formats used by product manufacturers, are directly downloadable onto CNC machines or 3D printers on factory floors. Through Windchill 11, these files are maintained and automatically updated should any modification be made to the design model.

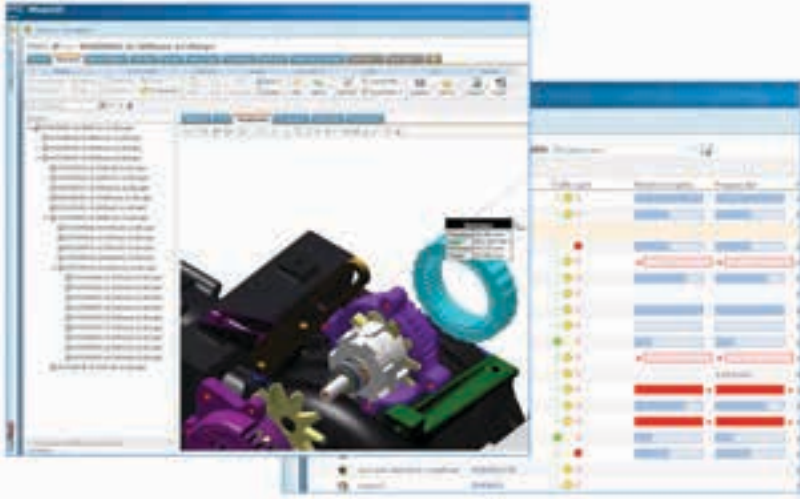
"In addition, the latest versions of documents in pdf, Word or any other format, containing instructions or specifications, for example, are accessible via any net connected server. Drawings and related assembly instructions and notes, for example, are more accessible than ever before," Strydom points out.

Coming, in the second release of the View App, will be the opportunity to feed information and ideas back to the system. Called the Contribute App, this tool will enable users to report back about what works, what does not or which pieces of vital information are missing.

Du Plessis adds: "All of this Windchill 11 PLM capability is available for download. That is what we mean by smart and connected. There is no longer any specific software installation required for people to access the Windchill PLM repository. Other than the role-based app that resides on the phone, tablet or computer,



PTC Windchill 11: the first smart connected role-based PLM platform.



The new Bill of Materials Management tools apply a drawing-centric to parts-centric approach to manage and share the complete, multidimensional BoM.

the only software programmes that need to be installed for local use in computer systems are the creation apps, such as Creo for product design-related tasks or a word processor to generate documents.”

The Internet of Things

“Windchill 11 has been built with the Internet of Things (IoT) revolution in mind,” continues Strydom. “This approach provides unrivalled visibility over a product, from initial concept all the way through to monitoring performance and maintaining the product through its useful life,” he argues.

Citing an air conditioning product as an example, he says that modern systems are designed with built in sensors connected to wireless networking systems. “Vibration information, for example, is automatically sent back to the OEM. As soon as vibration levels fall above a preset benchmark, an alarm, a problem report and a service requirement notice is generated. As soon as something starts to go wrong, the product user and its maintenance service provider can be made aware of the issue,” he explains.

Through Windchill 11, this automated condition monitoring and maintenance capability can be built into the product from its inception and made available to the end user via PTC’s Service & Maintenance applications. “This includes remote diagnostics, firmware upgrades and performance trending data. Leveraging the Internet of Things, connected data from the product’s operation is used by Windchill to close the product lifecycle loop. By that, we mean that real operational performance is fed all the way back to the product development team, which can then be used for con-

tinuous product improvement,” Strydom points out.

Adds Du Plessis: “Maintenance problems, failures and performance trending, therefore, can now be collected automatically and fed back into the design for incorporation in next-generation products – all through a single Windchill system. This PLM system now incorporates most of the features of asset management, condition based maintenance and reliability solutions systems.”

This capability started with the acquisition by PTC of an IoT concept development company called ThingWorx. “By using ThingWorx for PTC’s product design and PLM products, the Internet of Things revolution is being embedded into product design at the inception stage – and ThingWorx is now being linked into the whole suite of PTC products,” Du Plessis explains.

“For Creo, for example, a Performance Advisor has been added, which monitors Creo design sessions and automatically generates suggestion about how to make the software run more efficiently and reliably. Even the software development products now have embedded condition monitoring systems,” he tells *MechTech*.

Strydom adds that this is also true for Windchill, which has a built-in ability to monitor server quality and performance. “Suggestions are generated as to what can be done to improve the software configuration and to maximise reliability,” he says.

Turning attention back to Windchill 11’s support for physical products, Strydom says that PTC’s Arbortext product documentation and manual generation software is now linked into Windchill 11 via the Author App. The generated

documents are automatically updated and made available via the Arbortext product suite. “This new feature gives users the ability to directly print an operating or servicing manual online, so that users and technicians have easy access to the information they need – and the connectedness of the system ensures that all these manuals are ‘live’. Any design or procedure changes or recommendations that emerge from trending or any other feedback are automatically and immediately incorporated, keeping the manuals updated and fresh,” Strydom points out.

“The server-based Windchill 11 PLM solution enables enormous amounts of product information to be put into the system, but getting out what people actually need is another matter,” says Du Plessis. PTC has, therefore, incorporated advanced search functionality. “Across all the apps, we now have the ability to do faceted searches. Based on results of an initial search, users can now drill down into specific areas of interest to quickly home in on the information they need,” he explains.

From a financing point of view, Windchill 11 overcomes the need to buy a single expensive PLM software package. Says Du Plessis: “The idea is to offer flexible deployment options that scale to a user’s needs. First, product developers only need to invest in the aspects of the system and the apps that they actually need. Also though, as productONE, we can now offer new subscription options, which take away the pain of a large upfront investment, and we have a ‘software-as-a-service’ offering that can include hosting of the PLM data,” he informs *MechTech*.

“There are already two-million Windchill customers, including eight of the top 13 motor vehicle OEMs and almost all of the top aerospace companies, including Airbus, Boeing, BAE Systems and the Brazilian aerospace conglomerate, Embraer,” Du Plessis notes.

“Windchill 11 is the preferred choice of cutting-edge product developers such as iRobot, manufacturers of the cool cleaning robots that wake themselves up in the middle of the night to clean the office, for example. The company uses Windchill PLM to manage eCAD, mCAD, Bill of Materials, and change process information across all three of its product lines: home, defence, and virtual presence. iRobot is an excellent reference for us,” he concludes. □

Economical submersible wastewater pump



KSB Pumps and Valves has released its high-efficiency range of Amarex KRT submersible motor pumps for handling municipal and industrial wastewater in an effective and cost effective manner.

Taking their cue from previous models, KSB engineers have further improved the operating reliability and hydraulic efficiency to squeeze more out of the pump.

By focusing on the typical operating ranges of wastewater pumping stations, the developers have adjusted the impellers' free passages to not only comply with the applicable standard, but also to allow the pumps to offer the

broadest range of applications possible.

Available with four different improved impeller types, the submersible motor pumps can achieve a maximum flow rate of 10 080 m³/h and heads of up to 120 m. With 850 kW of power on tap, the range offers the highest standard motor power available on the market today.

In addition, KSB electric drives for these modern submersible motor pumps are ultra-efficient. Depending on a system's load profile, users can choose a high-efficiency motor variant, which corresponds to the IE3 efficiency level in accordance with IEC-60034-30. Such motors are particularly interesting for powerful pumps with a high start-up frequency.

Two bi-directional mechanical seals are installed to reliably protect the motor space against ingress of water. A cham-

ber filled with environmentally friendly oil ensures cooling and lubrication of the mechanical seals even when gas-laden fluids have to be pumped. Generously dimensioned ball bearings, sealed for life, support the stainless steel shaft with a special focus being placed on the design of the cable gland. Individual conductors, stripped, tinned and sealed in resin, ensure that the cable gland is absolutely watertight even in the event of damage to the cable sheath or the insulation. This effectively protects the pump from short circuits.

To ensure that the pumps can be easily dismantled after years of operation under tough conditions, all wet-end screwed connections are made of stainless steel. And for transporting acid wastewater, KSB also supplies pumps made from high-grade stainless and acid-resistant duplex steel. www.ksbpumps.co.za

Industrial slides sole distributorship agreement secured

Tectra Automation has recently been appointed as the sole distributor of Accuride in sub-Saharan Africa. Originally appointed as an official distributor in 2012, the demand for Accuride industrial slides has grown to the extent that the sole distributors are now stocking a range of light- to extra-heavy-duty linear motion slides and telescopic slides.

Known globally for their versatility in a wide range of applications and with rugged, modular construction, Accuride's industrial slides are ideal in a wide range of market sectors, from commercial ve-

hicles to military electronics.

"Accuride products offer more than just the standard ball bearing telescopic slide," explains Greg Calder, product manager at Tectra Automation. "It is a specialised range that offers locking mechanisms, multi-angle positioning and various materials of construction to suit demanding African application requirements."

Tectra Automation's range now includes Accuride linear motion slides from light-duty (130 kg) to extra heavy-duty (360 kg) as well as the telescopic range, which consists of light- to heavy-duty



Featuring heavy-duty lock-in and lock-out mechanisms and a front latch release, Accuride telescopic slides are ideal for securing drawers in mobile applications.

slides with loading capacities from 17 to 227 kg.

Along with a larger stockholding to reduce lead times from two weeks to just three days, the agreement will also increase the service and support capabilities for industrial slides in the region. Accuride is the only company in the industry to offer a lifetime warranty on its range of industrial slides and Tectra Automation will uphold this warranty.

"Accuride is a premium brand that represents quality, reliability and customer reassurance, and together with our range of Bosch Rexroth linear motion products, we are able to offer holistic solutions for virtually any application," concludes Calder.

Accuride industrial slides are available throughout sub-Saharan exclusively through Tectra Automation, a member of the Hytec Group of Companies. www.hytegroup.co.za

New 4-axis step motor controller

Up to four electric actuators can now be controlled simultaneously for single or multiple axes using SMC's latest controller, the JXC83. Providing a comprehensive and flexible solution for customers, this latest controller offers several vital savings including equipment costs, programming time, wiring and space.

Launched in 2016, the worldwide leading pneumatics specialist has delivered a controller that is compatible with the majority of the actuators in SMC's LE range. It also uses minimum wiring due to a common power supply cable and less I/O cable is required, thereby reducing overall costs.

Ernst Smith, SMC product manager says that the JXC83 also reduces labour time for increased productivity in the workplace, "All four axes of this controller can be set with just one connection ensuring easy programming and minimal hassle," explains Smith.

He continues: "By introducing the JXC83, we have responded to market needs for a single controller that is flexible and simple to set up."

The JXC83 can control the movement of two axes with arc interpolation or three axes with linear interpolation at the same time. "The JXC83 will greatly benefit the general industrial machinery sector and is suitable for a range of applications such as pick and place, and vertical board lifting." Smith concludes. www.smc pneumatics.co.za



Continual product research and mine safety

“South Africa features the deepest underground gold mines in the world, which stretch down as far as 4 000 m beneath the surface. At this depth, greater risks are naturally inherent. Examples are rock collapse, explosive gas pockets, toxic gas, fire and underground water, to name a few. Reliable safety equipment is therefore of the utmost importance, and more operations are realising this,” notes MSA Africa director, Colin Oliver.

“Continual product research and development is at the core of MSA Africa’s strategy. As a result, we have been instrumental in introducing new safety technologies.”

MSA Africa safety products used extensively in the local mining sector include the Altair 4X Mining multi-gas detector, the only SABS-approved instrument of its kind. It boasts a sensor response and clear time of less than 15 seconds, and can detect up to four gases at any given time: CH₄ and O₂ with optional combinations of CO/H₂S, CO/NO₂ or H₂S/SO₂. The large LCD display screen makes the measurement readings easy to see.

Another innovative MSA Africa mining safety product is the Luminator cap lamp, which sets itself apart from all other cap



The Altair 4X Mining multi-gas detector can detect up to four gases at any given time: CH₄ and O₂ with CO/H₂S, CO/NO₂ or H₂S/SO₂ combinations.

lamps in the world, as it enhances the miner’s ability to more effectively detect cracks on hanging walls, which usually represent signs of ground falls and roof collapse. By swiftly identifying these cracks, miners save valuable seconds and are able to evacuate in the event of a rock fall. This improved visibility is made possible by two state-of-the-art LEDs.

In addition to being a leading manufacturer and supplier of personal protective equipment (PPE), MSA Africa is also a headline sponsor of MineSAFE – the South African mining industry’s premier safety conference designed to bring local operations to Zero Harm status.

www.msasafety.com

Quality a major challenge in the I&C sector

The biggest challenge facing the instrumentation and control (I&C) sector, both in South Africa and on the continent, is the impact of the deteriorating Rand/Dollar exchange rate.

“Clearly the biggest challenge is landing product at a reasonable price. Our challenge is balancing the 30% Rand/Dollar exchange rate depreciation along with the normal supplier increase,” asserts Kevin Klaff, director of the Actum Group, which includes Peter Jones Electronic Equipment under its Actum Industrial division.

Suppliers have to ensure that they are able to present a value proposition, in addition to top-quality products, as opposed to cheaper imports from less reputable sources.

“The key strategy of the Actum Group is quality, which can never be compromised. Quality is a given across our entire product range, as all of our principals are global leaders in their respective markets.

“It is this focus on quality, together with our enhanced customer communications, that will continue to differentiate us



The Actum Group represents quality global brands such as Graphtec of Japan, which manufactures midi loggers for flexible data recording.

in the marketplace,” Klaff adds.

Looking to the future, Klaff reveals that the Actum Group has a concerted African expansion strategy. “We are trying to focus more on Africa as a potential market. We have done some nice Dollar-based deals there that give us a foot in the door.

“Africa is all about making the right contacts and finding resellers on the ground who know what to do. One cannot easily find the technical skills; one needs to find the guy trading in various sectors who is able to find gaps and facilitate,” Klaff concludes.

www.actum.co.za

Flow indicators enhance safety at fire-fighting facility

Flocare recently assisted South Africa’s largest freight logistics company in making its operations safer with the supply of two Ajax flow indicators. Contracted by local valve supplier, Inbal SA, the UK-imported flow indicators will provide essential water flow visualisation when installed at the company’s new seawater fire-fighting facility in East London, South Africa.

The two AJ Series indicators, suitable for 10-inch and 2-inch pipelines, provide essential information on whether seawater flow is occurring through its pipelines in the case of an emergency. “Both indicators are equipped with a double-sided, single-glazed window and internal flap to give operators visual confirmation of water flow when required,” says Norman Moul, director, Flocare South Africa.

Made to order and imported from the UK, Ajax indicators have earned an industry reputation for their robust performance in on-board, oilrig or harbour service. The supplied AJ Series indicators are constructed from bronze to ensure they withstand the corrosion associated with seawater. In addition, the indicators provide shock- and vibration-resistance, an advantage in heavy-duty marine applications. The indicators are simple to install, with an in-line design that provides easy connection in both horizontal and vertical pipelines while minimising pressure loss.

Flocare is an authorised distributor of Ajax in South Africa, and upholds the company’s 12-month manufacturing warranty on the AJ Series of visual flow indicators.

www.flocare.net

Energy saving analyser

With South Africa’s cost of power is increasing at an alarming rate, industry and facilities are looking for ways to conserve energy in order to reduce ever-escalating energy bills.

Fluke, represented in southern Africa by the Comtest Group, has come up with a solution that has the ability to clearly quantify energy losses. Its answer is the Fluke 430 Series II Power Quality and Energy Analysers, which is designed to give electricians the ability to determine how much power is being wasted and to calculate the exact extra consumption costs.

www.comtest.co.za



Diesel pump distributor appointed in South Africa

Integrated Pump Rental has secured the distributorship for the Sykes range of pumps, complementing the company's existing rental offering by adding this line up of reliable, proven diesel driven units. Sykes pumps are purpose designed and built for the mining, construction, municipal and rental markets. Integrated Pump Rental will be marketing the range for sale and to its rental customers.

"By becoming the official distributor of the Sykes range of pumps, we have significantly boosted our abilities as a pump project rental specialist. Having quality diesel mobile units in our range means that we can now offer our customers mobile units that can be used in areas where there is no available electrical power," says Lee Vine, Integrated Pump Rental's managing director.

The company decided to partner with Sykes because of the original equipment

manufacturer's (OEM) more than 40 years of experience manufacturing quality high performance pumps.

"Sykes is a well-known and respected player in the international pumping industry, while Integrated Pump Rental has built up a solid reputation for being able to supply quality pumping solutions for a range of projects. These synergies mean that both companies will benefit significantly from this partnership," says Vine.

Sykes pumps feature cleverly designed automatic priming capabilities based on a Venturi system that can deliver suction lifts of up to 9.0 m. The pumps offer market-leading efficiency, are extremely robust and built with a 316 stainless steel impeller and wear plates as standard, ensuring reliability coupled with versatility.

Vine also notes that the dry running, oil lubricated mechanical seals fitted to the Sykes range allow the pumps to operate under snore conditions and to re-prime automatically without incurring damage.

Integrated Pump Rental will be offering the OEM's full range of pumps, including the low head (LH), medium head (MH), high head (HH) and extra high head (XH) series for handling solids.

Vine says Integrated Pump Rental will focus on growing the Sykes pump range in the South African market, which is still fairly new to the offering, compared to other countries on the continent where the pumps have been operating successfully for many years. These pumps are used in a host of applications ranging

from water transfer and pit dewatering through to site cleaning.

Vine reports that the response to the Sykes launch by South African pump users has been "phenomenal" with many Integrated Pump Rental customers expressing "a keen interest in the technology".

Significantly, in order to increase the local content value, Integrated Pump Rental will be packaging some of the Sykes range in Johannesburg, Gauteng. This will include local fuel pods, skids and trailers, and Vine says the final package will be very competitive and also ensure excellent flexibility in meeting customer specific requests and lead times.

The combination of quality pumps and a revered name in the local pump rental market can only mean success for both companies in South Africa. □



The Sykes extra high head (XH) pump range caters to the demands of the mining industry and all models have the ability to operate unattended at high discharge heads.

Oil & Gas Africa, 2016

The world's oil and gas industry is probably experiencing its most tumultuous period since the infamous oil crisis of 1973. However, instead of severe oil shortages and sky-high prices, current market turmoil is due to the inverse – Middle East wells pumping at maximum capacity with concomitant low prices.

Demand for oil and gas from markets in Africa remains high. But low crude prices combined with poor physical infrastructure, inadequate logistical solutions and onerous government regulations have blunted investment in oil and gas field development. As a result, some African governments such as Tanzania and South Africa are reappraising their oil and gas legislation.

These are just some of the challenges that will be covered at the Oil & Gas Africa Conference 2016, which takes place on July 13 and 14 at the Cullinan Hotel on the V&A Waterfront in Cape Town.



The Sykes Contractor pump is a true self-priming pump, and does not require manual priming of a suction line or filling of a priming tank in order to begin its normal operation. It is designed to meet the demands of the construction, mining and rental industries.

Industry diary

June 2016

AfricaRail 2016

28-29 June, Sandton Convention Centre

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Manufacturing Indaba:

Manufacturing the future

28-29 June, Emperors Palace, Ekurhuleni

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Pump Efficiency and Reliability:

Harry Rosen

30 June-01 July, Durban

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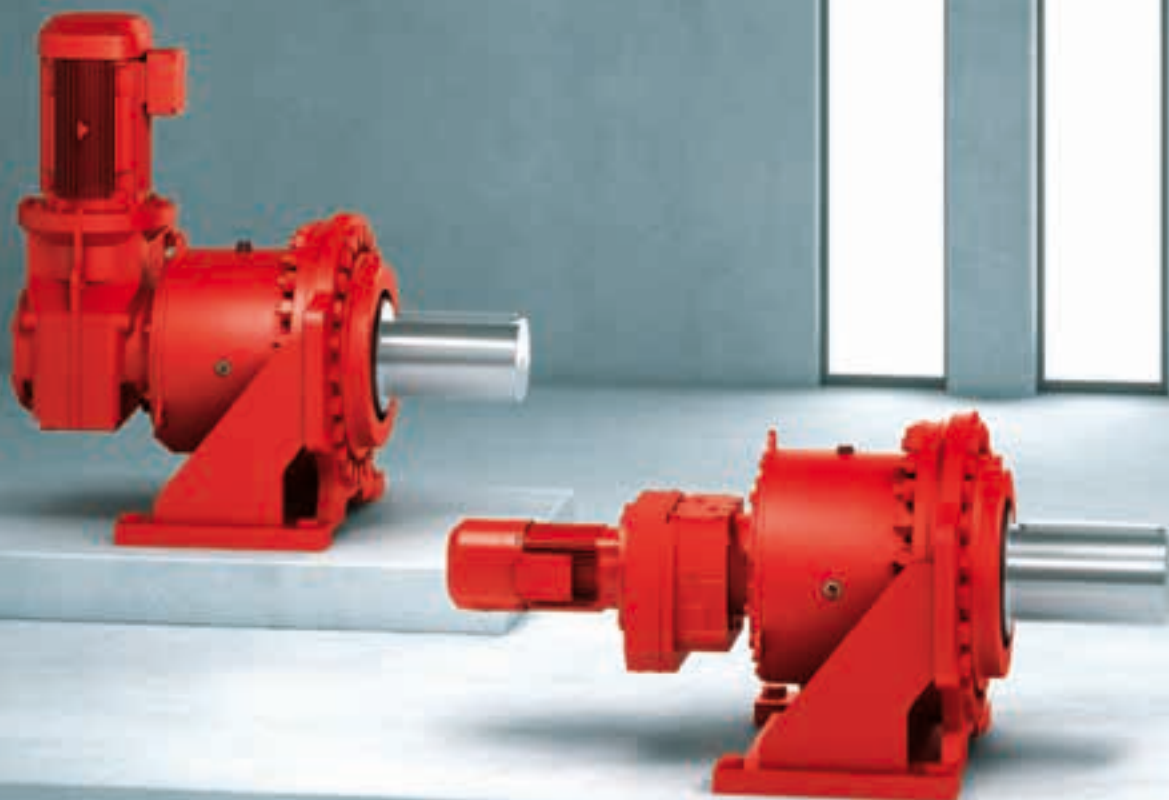
Drive

85 Years SEW-EURODRIVE

Seeing the big picture

We drive the water industry

PHOTO: THE SPA



SEW-EURODRIVE offers a new solution for the mining industry - a completely new type of planetary geared motor which offers impressive product advantages. The compact gear units are designed so that the gearmotor is mounted directly in front of the planetary gear unit. Couplings, intermediate flanges and adapter flanges that take up space and increase the price are a thing of the past.

The P-Series has been successfully used in bucket wheel, apron feeder and milling applications. The SEW-EURODRIVE modular concept results in a cost-effective performance relationship with shorter delivery times.

SEW-EURODRIVE - Driving the world.

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