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- Africa's largest pump rental hub opens
- SA's doubly successful World Solar Challenge
- How M2M will revolutionise the automobile sector
- Hydrogen infrastructure, electrolyzers and the hydrogen pump

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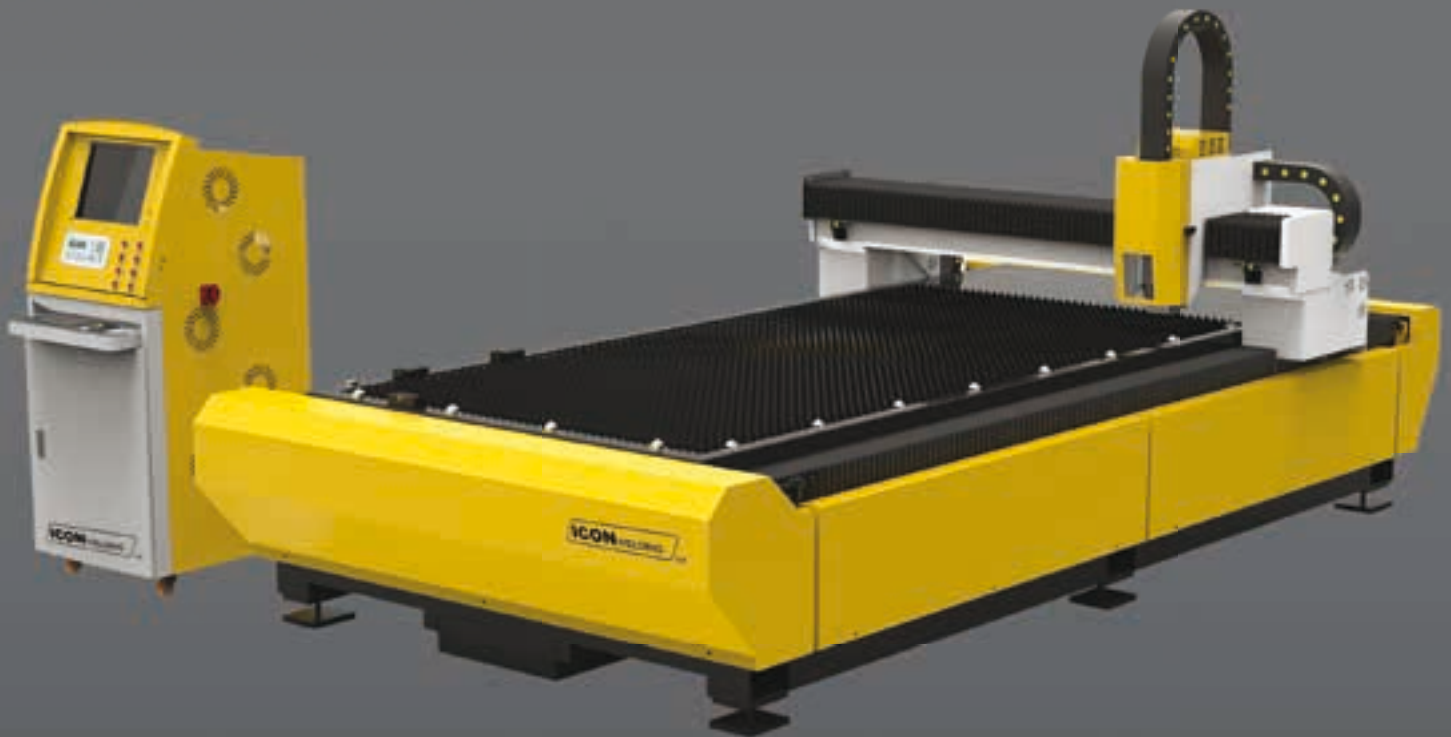
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Stainless steel: adapting and collaborating

M'ay you live in interesting times' is a curse attributed to the ancient Chinese, although no equivalent expression exists in the Chinese language. Ironic, though, that the prevailing 'interesting economy' is so sensitive to the fortunes of China.

Across the world, people are peering into the future for signs of growth at near-comfortable levels. And by 'growth' we tend to mean 'consumption'. The world is waiting for China to consume more, import more and have less reason to dump its surpluses on our shores.

On a recent tour of the Columbus Stainless plant, CEO Lucien Matthews expressed an alternative view: He said we should stop peering into the future and adapt to suit current conditions. We are actually quite good at adapting in South Africa – perhaps because we have had to do it so often?

Columbus Stainless' origins date back to a ferrochrome pilot project in 1963, driven by Rand Mines, which led to the establishment of Southern Cross (stainless) Steel in 1964. The company became the steel division of Middelburg Steel & Alloys in 1968 and in 1980, MS&A Stainless was established. Columbus Stainless was formed in 1991 as a joint venture between Samancor, Highveld Steel and Vanadium; and the IDC.

At the heart of this evolution was the beneficiation of South Africa's chromite ore – we are estimated to hold over 72% of the world's reserves and, together with Zimbabwe, 90%. While China prefers to import our chromite to feed their own ferrochrome smelters and its heavily subsidised stainless steel mills, it is, undoubtedly, better for our economy to produce ferrochrome and processed stainless steel for local conversion and export markets.

Columbus Stainless – now part of global stainless steel group, Acerinox – together with Samancor, which owns the ferrochrome smelter over the fence from Columbus' stainless steel plant, is a shining example of how mutual co-operation and shared vision can be beneficial, not only for the two producing companies, but to the South African economy.

Almost all stainless steel plants in the world are located along a coastline, so that deliveries of scrap, ferrochrome and other raw materials can be easily shipped and unloaded, while finished product can be reloaded for export. Columbus, however, is over 500 km from the Richards Bay shipping terminal and nearer 600 km from Durban. Yet it is the mill of choice for hot-rolled 'black' coils, which are shipped to Acerinox's new Malaysian plant for cold rolling.

Stainless steel plants generally take delivery of cold-crushed/granulated ferrochrome for smelting, but at Columbus, molten ferrochrome is transported directly across to the stainless steel plant from Samancor's smelter. This removes crushed/granulating and logistics cost from Samancor and, via close cooperation and communication, enables on-demand stainless melts of a large variety of stainless types. Within the Acerinox Group, therefore, Columbus Stainless is regarded as the most flexible mill in the stable.

Also though, when you consider that a typical stainless steel grade requires 18% chromium and that the ferrochrome used in the melt is an iron-chrome (FeCr) alloy containing up to 50% iron, then some 36% of a stainless recipe can be added as liquid, saving significant amounts of energy.

Ultimately, no matter how efficient and competitive the mill, its success depends on a healthy end-user market for the material. Here too, through collaboration, innovation and adaptability, the South Africa stainless steel industry has excelled.

Most notably, the development and marketing of the utility ferritic grade, 3CR12, which has become the material of choice for coal wagons all over the world, not because of its aesthetics, but because it offers significantly better corrosion protection and wear life. Coal wagons made in 3CR12 have a current life expectancy of over 30 years, making the material the lowest cost option, by far, for this application.

Sassda is South Africa's vehicle for promoting stainless steel use and developing the stainless value chain. The association's current executive director, John Tarboton sees collaboration as key to the success of the industry. He is broadening sassda's alliances with other metal's associations and partnering with Manufacturing Circle to improve lobbying effectiveness, for example. "We provide a platform for members to collectively promote the sustainable growth and development of the industry, with an emphasis on stainless steel converted in the South African economy," he says.

The 'interesting times' are likely to continue next year. But if we collaborate, support local conversion and adapt our processes towards being sustainable in spite of low growth, then we need not be cursed by a mythical Chinese proverb.

Thank you all for your interest in and support for *Mechanical Technology* during 2015. We wish you a happy, healthy and successful new year.

Peter Middleton



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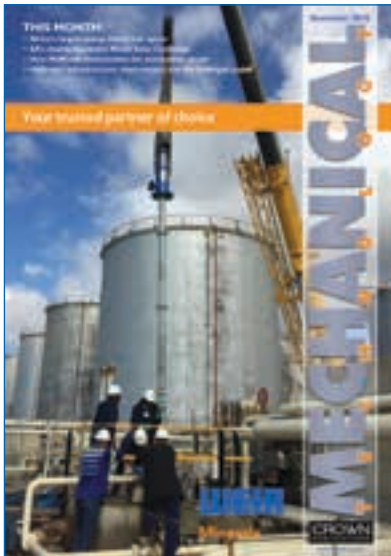


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ON THE COVER



Fit-for-purpose pumping solutions and Flowway pump technology

Kevin Roelofse, senior applications engineer at Weir Minerals Africa, talks about the successful application of Weir Minerals' Flowway® Vertical Turbine Pump (VTP) technology in a petrochemical application, while dewatering product specialist, Neil Matthews, describes the use of the slurry pump version, the Flowway VTSP, at a copper mine in Zambia.

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After 3 000 km under solar power, NWU's Sirius X25 and UKZN's Hulamin both crossed the finish line of the 2015 Bridgestone World Solar Challenge in Australia. The two South African teams competing for the first first-time completed the Challenge Class event in 11th and 13th place, respectively.

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Fit-for-purpose pumping solutions

and Floway pump technology

Kevin Roelofse, senior applications engineer at Weir Minerals Africa, talks about the successful application of Weir Minerals' Floway® Vertical Turbine Pump (VTP) technology in a petrochemical application, while dewatering product specialist, Neil Matthews, describes the use of the slurry pump version, the Floway VTSP, at a copper mine in Zambia.

The provision of fit-for-purpose technology in pumping applications not only increases efficiency and performance but also significantly reduces maintenance and extends the life of the pump itself.

It is the ability to assess and recognise application-specific requirements across a broad range of industries that enables engineers at Weir Minerals to provide customers with the most appropriate pumping solutions. Through this global player, customers have access to best in class technology, irrespective of whether the pumping application is for clean or dirty water or slurry.

Kevin Roelofse, senior applications engineer at Weir Minerals Africa, points to a recent success in the petrochemical sector where a Floway® Vertical Turbine Pump (VTP) replaced a similar pump in an oily water application providing the customer with a sustainable cost effective solution.

"It is critical for the customer to maintain the correct level in this hydrocarbon and water sump to prevent environmental contamination. The on-going line shaft bearing failures of the previous pump resulted in excessive unplanned downtime with a subsequent high cost of ownership," he says.

Roelofse explains that one of the most important factors when selecting a pump for an arduous application such as this is to ensure that the construction materials are capable of withstanding both hydrocarbons and abrasive conditions. "A thorough assessment of this oily water application, where suspended solids are present in the hydrocarbon and water sump, confirmed that the Floway VTP would be the ideal pump," he says.

"It is important to understand the differences in market sector requirements. For instance, petrochemical applications require far tighter tolerances on pump components to ensure that the



Neil Matthews, product specialist at Weir Minerals Africa.

levels of reliability, efficiency and safety required in this industry sector are met," Roelofse says

Engineered for top hydraulic performance in arduous conditions, the Floway VTP, which complies with the American petroleum standard API 610, 11th edition, is manufactured from the best combination of pump components and materials to facilitate reliable operation, a reduced risk of disruption, minimised downtime and a low overall cost of ownership.

Significantly, Weir Minerals' Floway VTP is fitted with a rubber marine bearing with a phenolic backing, thus ensuring a high resistance to abrasion, oil and solvents. Other features incorporated in the two-stage Floway VTP include dynamically balanced ductile iron impellers, a grease lubricated thrust bearing assembly and a galvanised strainer. The pump has a length of 4.3 m excluding the motor and is capable of a flow rate of 43 m³/hr at a 25 m head.

While awaiting completion of the



Kevin Roelofse, senior applications engineer at Weir Minerals Africa.

Floway VTP installation, the customer elected to replace another pump that was not performing reliably with a WSP™ self-priming pump as an interim measure to maintain an acceptable sump level. This skid-mounted pump, which was available from Weir Minerals ex-works, was retained by the petrochemical plant as a standby unit after the Floway VTP was delivered and commissioned in June 2015.

Being responsive to customer needs remains a major differentiator and this characteristic saw Weir Minerals secure an order from a copper mine in Zambia for a Floway Vertical Turbine Slurry Pump (VTSP).

According to Neil Matthews, product specialist: Lewis, GEHO & Local Dewatering Products at Weir Minerals Africa, the mine urgently required a sustainable dewatering solution for its open pit operation. "Weir was able to expedite the production of the Floway VTSP within a shortened time frame to meet the mine's requirements and ensure that the pump can be installed prior to the rainy season in Zambia," he says.

The Floway VTSP will be pontoon mounted, as it is considered the most effective and reliable solution for this particular dirty water dewatering application. Matthews says that not only does

HAW becomes authorised SALAMI distributor

Hydraulic and Automation Warehouse (HAW) has concluded an agreement that appoints the company as an authorised distributor for SALAMI in sub-Saharan Africa. SALAMI's hydraulic gear pumps, motors and manual-operated mobile control valves will now be available to



SALAMI hydraulic components, including gear pumps, motors and manually operated mobile control valves, will now be distributed in sub-Saharan Africa by HAW.

the region's hydraulic industries, with full backup and after sales support.

"SALAMI hydraulic components have an established reputation across the globe as a top-class brand with a wide range of products that introduce cost-effective, efficient and reliable performance in fluid power applications," explains Wynand Kellerman, general manager, HAW. "We're excited to add SALAMI to our list of available products, which further cements our status as one of Africa's largest stockholders of hydraulic components from the world's leading brands."

In the valve category, the agreement includes distribution and support of SALAMI monoblocks; sectional and load sensing valves; and electronic load sensing systems. The monoblock and sectional valves are characterised by very low leakage between spool and body and excellent metering characteristics. The

spools are fully interchangeable.

SALAMI electronic load-sensing systems are highly efficient solutions that reduce power consumption, have a high control capacity and support simultaneous operation of more than one actuator without interaction.

The company's gear pumps and motors include products manufactured in cast iron and aluminium alloys. The new product ranges offer a high degree of efficiency and are easy to combine in multiple drive units with maximum reliability. These solutions are especially suitable for applications where low noise levels are required and the cast iron units are very durable.

HAW is a Hytec Group Company. It has provided an expansive, high-quality product line of hydraulic hose and fittings components and accessories for the southern African fluid power industry for more than 20 years.

www.hytegroup.co.za

Airports engineer acclaimed at world energy congress

Airports Company South Africa mechanical engineer, Jerusha Joseph was named a '2015 Legend in Energy', at the 38th World Energy Engineering Congress in Orlando, Florida on 29 September 2015.

Joseph's invitation to the World Energy Engineering Congress came after she had obtained internationally recognised 'Certified Energy Manager' status from the American Association of Energy Engineers (AEE). "I am thrilled to be representing Airports Company South Africa, my country and women at this prestigious event. I am positive that

this award will encourage young women studying towards engineering that all is possible, regardless of gender and race," says Joseph.

Joseph completed her BScEng degree at the University of KwaZulu-Natal in 2009 through the Airports Company South Africa Sakhisizwe bursary scheme, the company's initiative to nurture and develop talent in science and technology. She began full time employment with Airports Company South Africa in 2010, while pursuing her MScEng degree on a part time basis. One of her key duties is



Jerusha Joseph, named a '2015 Legend in Energy' at the 38th World Energy Engineering Congress.

to optimise infrastructure and facilities at King Shaka International Airport. This involves making current infrastructure efficient and to optimise operations from a resource and operating-cost perspective, and she currently leads the implementation of the Energy Management System (EnMS) at the airport.

As part of her Master's degree, Joseph undertook a study of a solar-assisted air conditioning system for South Africa and this is now commercially available worldwide. Based on her experience, Josephs believes South Africa is not short of talented and skilled individuals. "South Africa has the necessary engineering and technical infrastructure and, through working together and sharing of ideas, even more can be achieved," she says.

www.acsa.co.za

Logistics distributor for automation specialist

BMG has been appointed as an official logistics distributor for automation technology specialists, Festo South Africa.

"Festo's extensive product range – which encompasses electromechanical and pneumatic drives, valves, motors and controllers, as well as handling systems, sensors and process automation – is now available from BMG," says Wayne Holton, BMG's fluid technology manager. "The addition of the Festo product range to BMG's sales network forms part of the company's expansion strategy, geared to enhance the steady growth the South African operation has enjoyed over the last 40 years," he says, adding, "Festo's market share will be significantly expanded through this distribution agreement, which improves accessibility to Festo products

throughout the country."

Currently, Festo products are available from 12 BMG outlets in South Africa's major centres and this distribution reach will grow as the business expands into other BMG outlets. "A broader distributor network enables Festo to focus on establishing a highly trained sales engineering team to support customers in diverse sectors, including specialist industries," says Holton.

Festo automation systems enhance BMG's extensive product range, which now encompasses bearings, seals, power transmission components, electric and geared motors, as well as belting and fasteners. BMG also distributes filtration, hydraulics and pneumatics systems, tools and equipment.

www.bmgworld.co.za

Training assistance for Tshwane College

Zest WEG Group believes that it has a fundamental responsibility to assist in improving the lives of disadvantaged individuals in South Africa by providing access to education and skills development opportunities within the engineering industry. Its CSI policy not only underpins the group's strategic intent but also aligns with the relevant mining legislation, including the Mining Charter.

This philosophy is evident in the recent donation of a substantial quantity of electrical equipment to the Tshwane North Technical and Vocational Education and Training (TVET) College. Zest WEG Group's relationship with TVET colleges (previously known as FET Colleges) dates back to 2011, when the group committed to help address the shortage of technical trades through equipment donations to a number of colleges.

Tshwane North College is one of the 50 public TVET colleges in South Africa.



Electrical Infrastructure learners at Tshwane North TVET College during a practical lesson.

It is geared towards ensuring that those skills that are needed to drive regional economic growth and social development of South Africa are delivered in all its campuses to enhance government investment and broad service delivery.

The equipment donated by Zest WEG Group, which includes motors, contactors, relays, starters, circuit breakers, fuses and other accessories, will be utilised in the workshop of Tshwane North's Rosslyn, Temba, Soshanguve North and Mamelodi campuses. www.zest.co.za

VWSA achieves new international certification

Volkswagen Group South Africa's (VWSA) manufacturing plant in Uitenhage is the first of the 119 production plants in the Volkswagen Group production network to receive ISO 9001:2015 certification from TÜV NORD Hanover.

It took the VWSA's Quality Assurance department just six weeks to meet the requirements. The annual management system audit certifies that VWSA is compliant with the new ISO 9001:2015, VDA6.1 and Conformity of Production standards.

This achievement guarantees that the Uitenhage plant has the management

systems in place for export to international customers. It ensures the continuation of VWSA's export programme and provides assurance to customers, suppliers and employees that VWSA is compliant with international standards.

"ISO 9001:2015 Quality Management System is the world's leading quality management standard and we are proud as VWSA to be the first manufacturing plant in the Volkswagen production network to achieve this certification," says Thomas Schaefer, managing director of Volkswagen Group South Africa.

www.vw.co.za

Atlas Copco re-enters Dow Jones Sustainability Index

Atlas Copco, a leading provider of sustainable productivity solutions, was listed in the Dow Jones Sustainability Index (DJSI) Europe for 2015/2016. The prestigious index highlights companies that are both sustainability driven and attractive for investors.

"Showing leadership in sustainability through our energy-efficient products and strong code of conduct gives our business a competitive edge," says Mala Chakraborti, Atlas Copco's vice president for corporate responsibility. "We feel very proud to see this value creation confirmed by our inclusion in the index." It is the fifth year in a row that Atlas Copco has been included in

the Dow Jones Sustainability Index.

The DJSI Europe index includes the top 20% of the many hundreds of publicly listed companies in the region assessed. The index identifies and evaluates companies that represent an attractive investment opportunity by demonstrating an ability to manage sustainability issues. The companies were also analysed based on factors such as climate strategy, labour practices, occupational health and safety, and strategy in emerging markets.

The DJSI listing is based on research by RobecoSAM, a specialised investment group.

www.atlascopco.co.za

In brief

The manufacturer-independent service provider, **seebaWIND Service** has been awarded a tender from the **ENGIE Energy Group** for service, maintenance, and 24/7 remote monitoring of the Karstädt-Blüthen wind farm in Prignitz County (Brandenburg). With 32 Nordex N60 wind turbines and a total capacity of almost 42 megawatts, this wind farm is one of the biggest Nordex wind farms in Germany.

Flowrox, a global leader in heavy-duty industrial valve manufacturing and services, has been awarded a significant project for the Husab Uranium Mine in Namibia – the second largest uranium mine in the world. Flowrox has been contracted to deliver 550 mm hydraulically actuated pinch valves to the project for its tailings operations.

Select PPE was recently awarded the Frost & Sullivan 2015 Southern African Personal Protective Equipment Visionary Innovation Leadership Award at a ceremony that hosted 140 of Africa's top innovative executives at Table Bay Hotel in Cape Town. The annual client-nominated award recognises outstanding achievement and superior performance and was awarded to **Select PPE** for its innovative solutions for women and its software that facilitates greater PPE control in previously unreachable markets.

The **Capital Equipment Group (CEG)** of Invicta Holdings Limited, has appointed **Criterion Equipment** branch manager, Graham Clare, as acting KwaZulu-Natal branch manager of **CSE – Construction Specialised Equipment**. Clare will now take on both roles within the group.

This year, the **EBH XI Coastal** combined team participated in the National Premier Cricket League for the first time in four years, reaching the semi-finals and putting coastal cricket back on the map. This was a direct result of **EBH Namibia's** support for the Junior Coastal Cricket Academy (JCCA) in an intensive coaching and sponsorship programme that was initiated by EBH in 2012.

As part of its ambitious expansion in Africa, **Ford Motor Company** has begun to assemble the Ford Ranger in Nigeria. The first Ranger came off the assembly line during November, built in an existing facility with Ford's Nigerian partners, Coscharis. The facility will accommodate one shift and will produce an initial 10 units per day for the Nigerian market.

Africa's largest pump rental hub opens

In October 2015, Xylem Water Solutions SA opened a new rental hub in Kempton Park, mooted to be the largest of its kind in Africa. *MechTech* attends and takes a tour of the offering with UK-based Mike Stimpson, Xylem's product support and applications engineer.



Mike Stimpson demonstrates a Godwin 'hush unit' for use in environmentally sensitive areas. "This pump is attenuated to 75 dBA while running, and any spillages are contained within the bund, which is a secondary tank that encloses the entire unit," he says.

"The opening of this facility, the largest pump rental hub in Africa, confirms Xylem's commitment to African Development," says Patrick Tantum, senior development and growth centre manager for dewatering at Xylem SA. "We have a total rental fleet comprising about 7 500 assets and the blueprints for this rental facility is the same as those we have established in several other parts of the world," he announces.

The company's South African managing director, Pierre Fourie adds: "We have the people and the technologies to deliver what customers need and want in Africa. Today is like a birthday for us. It's about celebrating and showcasing that ability," he says, before inviting guests to proceed to the front of the building for the ribbon cutting.

Back inside, UK-based product support and applications engineer, Mike Stimpson conducted a tour of the rental pumps on offer to African customers. Stimpson has been part of Godwin Pumps, now a Xylem brand, for over 25

years, and reveals that the company has been manufacturing these pumps, "in all shapes and sizes" in the UK for over 130 years.

Godwin pumps, designed for rental applications

"Rooted in the rental industries, the current generation of Godwin pumps has been evolving since the early 70s. Our products have undergone a long-term development cycle, which is geared towards reliability and robustness in the very harsh rental environment," Stimpson says.

Specialising in Dry-Prime pump units, Xylem's Godwin brand offers a broad product line of fully automatic self-priming pumps suitable for temporary and permanent use. A full range of diesel and electric pumps are available to purchase or rent, for dewatering and liquids transfer in mining, construction, municipal and industrial projects around the world.

"When looking at the basic construction of Godwin pumps, one will always see the same key features: they are extremely robust, built to last and to suit very harsh environments," he says, pointing out the oversized casting thicknesses on a trailer-mounted CD150. "The impellers along with the wear parts on this unit are made in high-chromium cast steel, which is very resistant to wear and abrasion. This is from our CD range (contractor dewatering) and is designed for general dewatering that requires high flow at medium heads," he explains. "This one is driven by a 112 kW Caterpillar C9 engine and you will notice that the engine is close coupled to the pump, so there are no alignment issues when it comes to maintenance," he says, adding that the Cat engine is generally preferred by African customers, but other brands can be used just as easily.

Another key feature making Godwin units ideal for rental use is self-priming. "With these units, the suction pipe can simply be placed into the water and, once

started, the pump will self-prime and begin to pump," says Stimpson.

Describing the principle, he says that compressed air from the engine is blown across a venturi to draw a vacuum at the pump inlet. "This vacuum can suck from up to 8.5 m below the inlet level in 10 seconds – and because there are no moving parts in the priming system, maintenance is minimal.

"Also, Godwin pumps can be run continuously dry. Most pumps have mechanical seals that rely on the liquid being pumped for cooling and lubrication. Our seals run in an oil bath so their reliability does not depend on media. On a typical dewatering application, the pump will be switched on and left to empty the pond. Once dewatered, the pump will often be left in 'snoring' mode, and while this is a waste of energy, a Godwin pump will not be damaged," he assures.

Godwin pumps are also designed to be automated, a principle that Stimpson demonstrates using float switches. When the water rises to the level of the higher float switch, the pump automatically switches on, while when the level reaches that of the low level float, a signal is sent to switch off the pump. "There is a 10 minute delay built into the system to allow the engine to charge the battery, cool and shut down gently. This also prevents spurious start/stop signals from turning the engine on and off unnecessarily," he says.

Moving across to a sealed 'hush unit', he adds that the same pump can also be packaged for use in environmentally sensitive areas. "This pump is attenuated to 75 dBA while running, and any spillages are contained within the bund, which is a secondary tank that encloses the entire unit," Stimpson says.

Also on display are a high flow CD 300 unit on skids; an HL (high-lift) unit, typically for uses requiring heads of 100 to 150 m or for jetting; and an FC100, a unit specially developed for the sewage industry for applications with high solids content. The Godwin FC series uses Xylem Flygt's N-series non-clog impeller technology.

Completing the range of diesel driven pumps on display at Xylem's rental hub launch is a hydraulic submersible, the Godwin Heidra pump. "When suction



Godwin's CD range (contractor dewatering) is designed for general dewatering at high flows and medium heads. The engine is close-coupled to pump, so there are no alignment issues when it comes to maintenance.



The Hydra's submersible pump head features a hydraulically activated slurry gate that can open in the event of clogging.



Xylem's Godwin Hydra pumps are hydraulic submersibles for use when suction lift of greater than 8.5 m is required. On these units, a diesel engine is used to drive a hydraulic power pack, which delivers biodegradable oil via hoses to a hydraulic submersible pump on the pond floor.



FST, through satellite-based connectivity, enables sophisticated automation to be applied in the most remote areas of Africa.

lift of greater than 8.5 m is required, then submersibles take over from the Dri-Prime range," Stimpson explains. On these units, a diesel engine is used to drive a hydraulic power pack, which delivers biodegradable oil via hoses to a hydraulic submersible pump on the pond floor. "So no electricity is involved at all, which can be an advantage in some sensitive areas," he explains.

The Godwin Hydra 150MR hydraulic submersible pump is a powerful, yet compact, pump with flow capabilities up to 301 m³/hr and discharge heads of up to 35 m. It has the ability to handle solids up to 75 mm in diameter and, even though it is a submersible, liquid bath mechanical seal technology is used to ensure dry running capabilities.

"These pumps also have a slurry gate that can open in the event of clogging, allowing some back flow to clear any inlet blockages and to churn up sediment on the pond floor," Stimpson says.

Field Smart Technology (FST)

Xylem is currently rolling out its Field Smart Technology (FST) across Africa. FST combines communication and control technology to allow any pump, anywhere to be remotely monitored and controlled: "Satellite-based FST allows our pumps to be monitored from any smartphone, tablet or computer, so we can access the engine performance, the pump performance parameters, the fuel levels and the pump's location – to within 2.0 m. It allows us to switch the pump

on and off remotely, vary the pump speed and to monitor the condition of the unit so that we can send in service technicians as soon as we begin to detect problems," Stimpson reveals, while demonstrating a unit being controlled from an App on a phone.

"FST enables sophisticated automation to be applied in the most remote areas of Africa, accurately tracking the suction and discharge pressures to get a clear idea of how the pump is being used, whether a strainer has become blocked and how much fuel is left in the tank," he says.

While sophisticated, FST technology is seen as an ideal solution for protecting the assets of Xylem's new rental hub as they spread across Africa. □

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Leo series centrifugal pumps

for the SA market

Carl Mulock Houwer of RAP Technologies talks about the LEO XST series pumps and their advantages over conventional end-suction centrifugal pumps for clearwater applications.

RAP Technologies, a leading supplier of water pumps in South Africa, has a long-standing partnership with the LEO Group in supplying their products to the local market. A well-supported staple in this product range is the LEO XST series standard centrifugal pump.

As its name suggests, the XST series standard centrifugal pump is an axial suction and radial discharge centrifugal pump designed in accordance with ISO 2858 and EN 733 standards. These standards specify the designation, nominal duty point and dimensions on 16 and 10 bar end-suction centrifugal pumps. These pumps can be used for the circulation and transfer of clean, chemically non-aggressive water and other liquids with physical and chemical properties similar to water.

Carl Mulock Houwer, RAP Technologies' marketing manager, comments, "Centrifugal pumps play a significant role in water supply – be it with pressure boosting systems or irrigation systems – in the industrial, mining, construction and agricultural sectors," adding: "the XST series standard centrifugal pump – made of the highest quality materials – boasts very low maintenance, excellent efficiency and power absorption properties. The lifecycle cost on the pump is competitive and the spare parts are cost effective and easily interchangeable."

The pump is used in a range of applications including water supply, water circulation in air-conditioning systems, irrigation, landscaping, fire pumps, as well as cooling for heavy industrial equipment. The pump boasts a flow of up to 220 m³ per hour, a head of up to 95 m and a power range of between 0.75 and 55 kW. Standard temperatures sustained are from -10 °C to 85 °C with an optional range between -20 °C and 120 °C.

The product boasts a great number of advantages, most important of which are its reliability, efficiency and ease

of installation. "The pump is highly efficient and the electro-plated coating or 'e-coating' inside the volute casing helps to guard the pump body, impeller and bracket against corrosion. What's more, the volute casing can be rotated for any type of pipe installation," says Mulock Houwer.

The pump cover and motor front are designed in an integrated way, which reduces the possibility of pump damage over time. The pump and motor shaft also have no coupling connection for pumps of 7.5 kW and below, which increases pump efficiency and reduces the number of wear parts. Finally, thanks to the new wet-end design of the impeller and pump body, the pump is 3-8% more efficient than a conventional end-suction centrifugal pump.

"The larger pumps in the series – from 7.5 kW upwards – incorporate a back pull system to keep maintenance simple. The motor itself is rewindable, meaning that it can be rewound by any reputable armature rewinders. Alternatively, a motor from another manufacturer can be fitted onto the pump and it will work."

The pumps offer multiple benefits to the end user: The high efficiency of the pump makes for energy as well as cost savings; the pump is compact; quiet; and it is easy to maintain. "A critical point to note is that the pump's efficiency and power absorption – two main features of the product – are being improved all the time," notes Mulock Houwer.

When compared to a conventional end-suction centrifugal pump, the XST series standard centrifugal pumps occupy a third less space and employ a monoblock design for the pump and motor, improving on pump performance



When compared to a conventional end-suction centrifugal pump, the XST-series occupies a third less space and reduces maintenance costs by as much as 70%.

and noise reduction as well as making for an impressive 70% reduction on maintenance costs.

Typical applications

Municipal water pressure is often insufficient to meet the water requirements of high-rise buildings, which then require booster pumps such as the XST series. The pump can also be used in commercial settings, such as offices or hotels, and because of its compact size, it is ideal for small HVAC systems. The pump is well suited for use in irrigation, landscaping and industrial equipment cooling and, with stainless steel or brass impellers, the XST pump can also be used in both fire-fighting and sprinkler systems.

"We have many clients from a number of different industries using the product. From farmers to industrial suppliers and even air-conditioning installers, the common denominator is that they need quality centrifugal pumps that won't let them down. With RAP Technologies, they can get all that and more from a reputable company that offers exceptional after-sales service and has established itself as the leading supplier of water pumps in South Africa," Mulock Houwer concludes.

As the sole appointed agents for LEO in the country, RAP Technologies offers products backed by years of water pump technology expertise. □

Cost effective slurry pumping for Africa

The combination of Grindex slurry and dewatering pumps with SlurrySucker dredge units and Slurry Blaster cleaning units is driving significant growth in the mining sector for Integrated Pump Technologies and sister company Integrated Pump Rental. Colin Adams and Lee Vine explain.

Integrated Pump Technology (IPT), the exclusive distributor in southern Africa for Grindex, is achieving considerable success with its Bravo submersible pump range, which is proving an efficient, cost effective alternate solution to vertical spindle pumps. This is one of numerous IPT products gaining traction within the mining sector and one that continues to support the company's growth trajectory.

"The Grindex Bravo slurry pump footprint is also growing quickly because of its robust design. These pumps can operate reliably within the most arduous African mining conditions," says IPT general manager for export, Colin Adams.

Because submersible pumps operate in the slurry, infrastructure construction is unnecessary and pumping start-up is immediate. Bravo submersible pumps, in particular, are engineered to pump slurry and fluids with a high content of abrasive solids, with particle sizes of up to 50 mm. The range offers reliable pumping performance and the pumps are fitted with a cooling jacket and an agitator for effective slurry handling, eliminating the issue of silt build-up.

"This new approach to pumping slurry with submersibles guarantees higher efficiency, lower running costs as well as lower maintenance costs. It is often the most cost effective pumping solution for slurry handling applications," Adams says.

According to Adams, 90% of IPT's business is being generated from southern African mining projects, largely as a result of this product range's escalating success. Total sales contributions from the product are up from 10% last year to 30% at present – with over 120 Bravo pumps already installed this year.

Adams also refers to IPT's service delivery and after sales offering, pointing out that it is another company strength. "We have a dedicated and fully committed sales team at our head office in South Africa, as well as support through an established distribution network of eight strategically located and specialised local



The Grindex Bravo submersible pump range is proving an efficient, cost effective alternate to vertical spindle pumps and is particularly well suited to the mining sector.

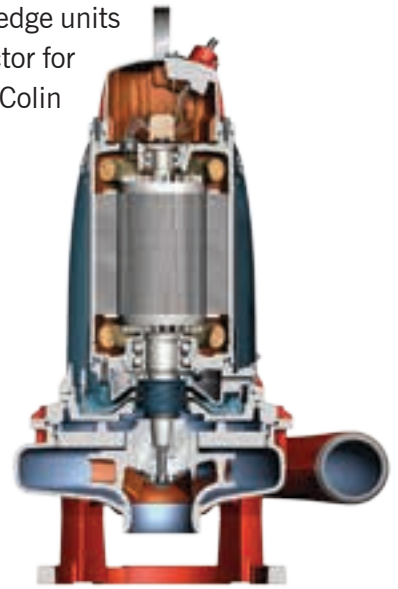
pump companies whose proximity to customers provides a fast, personal service.

Support into Africa is through a well-positioned network that covers Botswana, Namibia, Zambia, the Democratic Republic of Congo (DRC), Mozambique and Zimbabwe with fully trained representatives who provide customised product recommendations to customers in these regions based on on-site evaluations. "Their facilities are also equipped with maintenance and full service capabilities as well as parts stockholdings. Together with their understanding of local market requirements, our presence in Africa has grown significantly since our start-up in June 2014," Adams highlights.

SlurrySucker and Slurry Blaster

In line with its growing slurry pump presence, IPT has also developed a new slurry product that easily removes silt and built-up sediments from lined water storage areas.

Locally designed and engineered,



Bravo submersible pumps are fitted with water jackets and an agitator to allow them to pump slurry and fluids with a high content of abrasive solids, with particle sizes of up to 50 mm.

IPT's SlurrySucker dredge unit, "effectively de-silts or de-slimes dams without damaging the lining", Adams explains. The concept took about six months to develop and test. The SlurrySucker comprises a Grindex slurry pump in combination with Grindex dewatering pumps to create a jetting system.

Lee Vine, managing director of Integrated Pump Rental, IPT's sister company, says that the rental division has fast established a reputation for identifying areas in process plants where an effective alternative solution is needed to cope with the day-to-day activities. "It is sometimes in the most obvious places that there is a need for more reliable equipment that is capable of withstanding the rigours of daily use," he says.

Vine highlights the company's Slurry Blaster solution as an example of a hydro mining equipment solution that offers optimum performance coupled with reliability. Typical applications include plant floors and sumps, drainage areas, tailings dams, process water dams and other difficult to reach areas. Slurry Blaster offers mining and plant operations a cost effective cleaning tool for all applications where slurry needs to be washed away.

"Not all applications are the same and for this reason, we have made the Slurry Blaster available in three main configurations, and it can also be modified to suit

individual customer applications, should this be necessary," Vine says. The Slurry Blaster can be supplied on a pontoon for use on ponds and dams, it can be trailer mounted or used via traditional manual operations.

"The decision as to which configuration to use is based on the application at hand and our technical team has the necessary competency to assess the situation and propose the appropriate option to the customer," Vine says.

Each installation of the Slurry Blaster comes standard with a 37 kW feed pump with a float, a 22 kW slurry pump for the removal of the slurry, a 200 metre heavy duty layflat hose and an electric control panel.

Slurry Blaster units are available for medium- or long-term rental, outright purchase and on a full turnkey project basis.

In addition to identifying solutions for problem areas in a plant or mine, Integrated Pump Rental operates an extensive pump rental fleet, which includes Grindex submersible drainage and dewatering pumps, diesel driven pumps and accessories. Value added services



The Slurry Blaster is a cost effective cleaning tool that consists of a 37 kW feed pump with a float, a 22 kW Grindex slurry pump for the removal of the slurry, a 200 metre heavy duty layflat hose and an electric control panel. The unit is available on a pontoon (left), on a trailer (below) or with a support frame for manual use.

such as dam cleaning and pontoons, pump flotation modules and pipe floats are also available and all products used by Integrated Pump Rental are ISO 9001 certified.

Vine says that technical advice on the most suitable pump for specific applications is always available from the experienced Pump Technology or Pump Rental teams.

Integrated Pump Rental's service level agreement (SLA) includes the provision of a full maintenance service. This entails regular inspections of pumps before and during contracts to ensure that uptime is

emphasised. Routine testing and ongoing maintenance of the pump fleet by Integrated Pump Rental's experienced team of technicians provides customers with the reassurance that pump availability remains high. □

AWS D1.1 Course Revamped. Don't miss it!

The **Southern African Institute of Welding** has revamped its long-running and popular AWS D1.1 course. The new course was developed by Robert Shaw (pictured) who is one of the world's experts in this field.

The AWS D1.1 Structural Welding Code – Steel is widely used both internationally and locally in the welding of structural steel in a wide range of applications.

This four-day course provides a comprehensive look at the welding requirements and recommendations of the code. Inaugural course will be presented by Bob Shaw.

The course content includes:

Welding Nomenclature i.e. Joints, Welds, Position, Metallurgy; Engineering Requirements, Production Drawings and Welding Symbols; Welding Processes and Filler Metals e.g. SMAW, FCAW, GMAW, SAW, GMAW-S, GTAW, ESW, EGW; AWS A5 filler metals, matching filler metals; Welding Procedure Specifications; Welding Personnel Qualification; Inspection and Nondestructive Testing; Tubular Joints; Stud Welding; Fatigue Life Enhancement and much more.

COURSE COST: Non-member R8 900; Members R8 200

DATES: Inaugural course (JHB): 18 - 21 January 2016. For other dates and regional courses see SAIW website.

WHO SHOULD ATTEND: Personnel involved in the fabrication, production, inspection and quality management of steel structures; Engineering personnel wanting to improve their understanding of welding and quality management of steel structures would also benefit.

Book now to avoid disappointment! CPD credits awarded for attendance.



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Robert (Bob) Shaw Jr. is founder and president of the Steel Structures Technology Centre in the U.S. He has 42 years experience in steel construction and 10 years experience with the American Institute of Steel Construction.

Bob is a long time member of the American Welding Society's (AWS) D1 Structural Welding Committee.

SA company completes Malawi pump station refurbishment

APE Pumps has completed a major portion of the €16-million upgrade project for the Blantyre Water Board being financed by the World and European Investment Banks to rehabilitate pipelines and pump stations supplying water from the Shire River to Blantyre in Malawi.



Peter Robinson, managing director of APE Pumps.

APE Pump's contribution to refurbishment of Blantyre's water supply comprised two separate contracts awarded by the Blantyre Water Board, with a combined value in the region of R200-million and managed as turnkey projects shared between the company's Johannesburg works and the Kolkata factory of holding company, Worthington Pumps India.

APE Pumps controlled all phases of both projects from tender, through design

and manufacture, to installation and commissioning.

The official handing-over ceremony to the Blantyre Water Board took place at the end of October.

The first and larger of the two contracts, to upgrade the Chileka pump station, was awarded in April 2013. It was followed in October by a contract to complete the upgrade of raw water and high-lift pumping stations at Walker's Ferry, begun by a foreign company that defaulted soon after delivering components and equipment to site.

At Walker's Ferry, located some 40 km northwest of Blantyre on the Shire River, water is pumped through a water treatment plant via two pipelines to a high-lift pump station, which transfers it 26 km to the Chileka pump station, which in turn boosts the water flow all the way to storage tanks in Blantyre.

The refurbished raw water pumping station at Walker's Ferry comprises six pump units, each extracting water from the Shire River at a rate of 1 350 m³/h at a delivered head of 35 m. After transfer to the purification plant, two further pump stations, each housing three pumps in parallel and one on standby – capable

of producing 550 m heads – transfer the water at between 800 m³/h and 900 m³/h into the Chileka Pump Station.

To complete the work at Walker's Ferry, which required the rehabilitation of all aspects of the existing water intake works and the high-lift pump station, APE Pumps established an on-site workshop and made as much use as possible of contract components already delivered to site by the defaulting contractor, modifying and remanufacturing these where necessary.

APE Pumps itself manufactured the raw-water and high-lift pumps' motor controls and various valves and actuators, along with all pipework and manifolds.

All non-functioning valves and associated actuators, fittings, couplings and pipes were either replaced or repaired, together with all pump sets and related electrical equipment, instrumentation, suction and delivery pipework and fittings.

New high voltage devices, including the power feeder, transformer, main distribution boards and all cable connection and control cabinets were also installed after manufacture by Worthington Pumps India.

At Chileka, 26 km away, the upgrade work making up the larger of APE's two contracts comprised the manufacture, installation and commissioning of eight multi-stage pumps with electric motors, all motor controls and associated valves, and civil work that included demolishing and re-building all concrete plinths and bases in the existing pump house.

Pipelines were inspected for leakage, and existing surge protection and sacri-



APE Pumps installed Mather+Platt pumps at the refurbished high-lift pump station at Chileka, Malawi. Eight PJ250H Mather+Platt multi-stage pumps capable of sustaining flow rates of between 750 and 900 m³/h and a maximum heads of 550 m were manufactured at the company's Wadeville facilities in South Africa.

ficial cathodic protection examined and replaced where necessary.

The eight pumps installed at Chileka are multi-stage units manufactured by APE's sister subsidiary Mather+Platt, each with a capacity of 750 m³/h and a head of 550 m. All pumps are driven by 1 650 kW electric motors and the combined pump-motor efficiency exceeds 75%.

The majority of the manufacturing for the two contracts took place at the APE Pumps/Mather+Platt works at Wadeville, Johannesburg, with equipment for the electrical arm of the project being supplied by Worthington Pumps India, including five 5 000 kVA transformers to lower the 11 kV supply voltage down to the 3.3 kV required by the motor controllers (MCCs).

Besides the pumps themselves, APE Pumps also supplied all other mechanical and fluid handling equipment for the project, including valves and manifolds.

The upgrades at Walker's Ferry and Chileka are the latest in a string of turnkey projects undertaken by APE Pumps in Malawi. Completed projects include three water treatment plants at Zomba

Plateau, Mangochi and Mzuzu, the extension of Chilumba fuel receiving depot, and the 4,5 MW hydroelectric scheme at Wowwe North.

Peter Robinson, managing director of APE Pumps, says that a highlight of the latest projects at Chileka and Walker's Ferry had been maintaining the supply of water to Blantyre at between 2 700 m³/h and 3 000 m³/h throughout the sixteen month duration of the refurbishment.

"We did this by taking off each pump and associated 3.3 kV panel one at a time for refurbishment at the old station, while at the same time building the new station and repeating the process there," Robinson explains.

"Probably the biggest challenge was to take over components abandoned by another company because we had to modify and re-manufacture some of these, but we were successful. All operations' manuals were being completed prior to official handing-over of the commissioned stations.

"This project has taken APE Pumps further along its evolutionary path from a pure manufacturer of pumps to a projects company with complete turnkey capabili-



Vertical turbine pumps being manufactured in APE's Wadeville factory.

ties. We are currently in the process of acquiring a second projects firm to take us further along this path, and we are working on our CIBD rating to help us get there," says Robinson.

APE Pumps remains one of only a handful of South African pump companies actively seeking turnkey project work, with most competitors preferring to restrict themselves to supplying pumps and accessories. □

Refineries upgrade mechanical seals

According to Flip van Heerden, manager of AESSEAL's Secunda branch, sales of double mechanical seals have increased year-on-year because Petrochemical refineries have begun to replace single mechanical seals with double mechanical seal designs in order to comply with tightened safety legislation.

He said that the increase in activity is the result of API 682 Edition 3 and refinery overlay specifications, which specify the fitting of double mechanical seals to all pumps transferring hazardous fluids in five categories:

- Fluids that are immediately lethal or toxic upon exposure.
- Fluids that will cause a chronic condition following long-term exposure.
- Flammable products.
- Reactive products.
- Any product of high monetary value.

The specifications also indicate the use of a double seal to improve reliability.

Van Heerden says that all South African refineries are likely to implement full replacement programmes and some have already begun the process.

However, he urged caution in the case of early edition API 610 pumps, which do not have large enough mechanical seal

housings to accommodate the API 682 category 2 seals specified by API 682 Edition 3. "Some refinery production managers are under the impression that it will be necessary to either machine out the housings or replace the pumps," van Heerden says.

"But this is not the case, because mechanical seals from AESSEAL are of more recent design and are an exact fit for the mechanical seal housings of all API 610 pump editions," he assures.

AESSEAL is believed to be the only major mechanical seals supplier providing end users with a viable alternative to very costly pump modification or replacement options. "Excessive expenditure is not necessary because our CAPI (Cartridge API) mechanical seals range, both pusher and bellows, has been designed with specific consideration for both new and old equipment," explains van Heerden.

"These are fully compliant with the specifications of API 682, and use the same qualified seal face technology for API 610 Edition 10 pumps and API 610 Edition 5 pumps – and all pump variants in between manufactured in the past four decades," Van Heerden says, adding: "All the older pumps in refineries across South Africa can



AESSEAL's cartridge API (CAPI) mechanical seals have been designed for both new and old equipment. Fully compliant with API 682, the same qualified seal face technology is used for API 610 Edition 10 pumps and API 610 Edition 5 pumps – and all pump variants in between manufactured in the past four decades.

be retrofitted, saving millions."

Sales growth at AESSEAL's Secunda branch has doubled year on year for the past several years. According to van Heerden, this is because the branch tries to supply the correct mechanical seal by understanding where the product fits within the various refinery processes.

"Our progress in understanding the dozens of different application is ongoing," van Heerden concludes. □



Hydrogen infrastructure, electrolysers

MechTech visits the research facilities of the DST National Hydrogen Infrastructure Centre of Competence (HySA Infrastructure) at the Potchefstroom campus of the North-West University (NWU) and talks to the centre's director, Dmitri Bessarabov (right).

According to Bessarabov, Hydrogen South Africa (HySA) is a national special flagship programme conceived some seven years ago. "The overall goal is to develop and guide innovation along the value chain of hydrogen and fuel cell technologies in South Africa, in support of the beneficiation of South Africa's mineral wealth, with a specific focus on platinum group metals (PGMs).

"South Africa has large deposits of PGMs and is a key processor of the raw materials containing these metals. About 70% of the platinum used in the world is mined here, and the metal is used extensively for catalytic converters in the global automotive industry," he says, adding that, as well as for catalytic converters, PGMs such as platinum and iridium are used as catalysts in water electrolysers and hydrogen fuel cells.

As a national programme, HySA is hosted at a number of state-owned institutions around the country, which are responsible for providing facilities and equipment. "The HySA Infrastructure

centre of competence is hosted by two organisations, the Potchefstroom campus of NWU, and the CSIR in Pretoria. We are responsible for development of systems and components for hydrogen production, storage and delivery," Bessarabov tells *MechTech*.

HySA Catalysis is co-hosted by the University of Cape Town and Mintek and takes responsibility for catalysts such as those in fuel cells, reformers and portable power systems, while HySA Systems, hosted by the University of the Western Cape, develops hydrogen fuel cell systems and the associated systems' integration. "Each centre is involved in collaborative projects with each other, as well as taking responsibility for specifically allocated technology areas," he says.

"Here at NWU we focus on efficient hydrogen production, which is strongly linked to the development and use of renewable energy: identifying new ways to use hydrogen; and, along with our colleagues from CSIR, developing storage and transportation systems to distribute hydrogen to where it is needed," he notes.



Globally, some 60-million tons of hydrogen are produced per year with the petrochemical industries and ammonia producers as key consumers. "Sasol, for example, uses large quantities of hydrogen that it produces by reforming natural gas. But this comes with an environmental penalty, because of the amount of CO₂ emitted.

"Here at HySA infrastructure, we are producing hydrogen from water using renewable energy, with oxygen as the only other by-product. We use neither fossil fuels nor natural gas to produce our hydrogen and we strive towards carbon neutral hydrogen generation," he assures.

At the starting point of HySA Infrastructure's hydrogen generation plant is



At the starting point of HySA Infrastructure's hydrogen generation plant is a 21 kWp solar photovoltaic system installed on the carports outside the HySA facility.

and the hydrogen pump

a 21 kW_p solar photovoltaic system installed on the carports outside the HySA facility. "Inside, we have a 120 kWh battery bank and a large electrolyser. We can channel the dc current generated by the solar panels directly into the electrolyser to produce hydrogen and we can store any excess production in the battery bank for later use. Currently, we have the capacity to produce some 3.0 kg of H₂ per day from the solar system; equivalent to approximately 11.5 ℓ of petrol per day," Bessarabov says, explaining that the gge (gasoline gallon equivalent) of hydrogen is close to 1.0 kg.

Apart from refinery, ammonia for fertilisers and fuel cell use, there are a large number of applications that depend on a reliable hydrogen supply: in the food industry for hydrogenating oil to make margarine; for making glass; and for manufacturing silicon-based microchips in the electronics industry, for example. "Power generation systems use hydrogen for cooling the turbines, because of its high thermal conductivity and high specific heat capacity properties. And in the future there will be automotive applications for hydrogen-fuelled fuel cell vehicles, but while waiting for these technologies to take root in South Africa, we are actively exploring other markets," says the HySA Infrastructure director.

Electrolysers and ion exchange membranes

As demonstrated in chemistry classrooms around the world, the simplest way to produce hydrogen is to split water. All that is needed is a dc supply of electrical

current into the water via two electrodes. The electrical energy then splits the water (H₂O) into its constituent elements, forming H₂ and O₂ gases.

"This process has been known for many years, but the technology is advancing rapidly towards more cost efficient and industrially useful techniques," says Bessarabov.

"Ideally," he continues, "the hydrogen



Battery storage capacity of 120 kWh is used to store PV-generated power for use by the electrolysers and hydrogen pumps, while SMA inverters make ac power available to the centre.



Above: HySA Infrastructure's largest hydrolyser at its NWU facility. The centre has the capacity to produce some 3.0 kg of H₂ per day from its solar system; equivalent to approximately 11.5 l of petrol per day.



Left: The demonstration hydrogen pump at the facility was able to pressurise hydrogen to 4.0 bar within minutes, powered only by a single (flat) AA battery.

produced in the process should be at high pressure. In addition, we like to avoid having to use corrosive electrolytes, such as potassium hydroxide (KOH). We also strive to develop modular systems so that it is easy to scale up to larger production levels."

At the heart of addressing all of these challenges is the role of membrane technology. The electrolyser HySA are working on comprise two gas chambers separated by a special membrane material. "The membrane materials being developed for electrolyser are dense films, which are not gas permeable and have high pressure holding capacity. Because

of their density, neither hydrogen nor oxygen gas can permeate the membrane. This allows for very efficient separation of the two gases during electrolysis," Bessarabov explains.

Used in both fuel cells and electrolyser, membrane materials are ion conductive, which enables hydrogen ions (H⁺) to pass through the material as positive charge carriers, a phenomenon known as proton exchange. These membrane materials are used in the construction of flat-plate membrane electrode assemblies (MEAs), which consist of a layer of the ion exchange membrane with a PGM coated anode on one side and a similarly coated cathode on the other. "And the ion conductive nature of the membrane obviates the need to use electrolytes such as KOH to make the water ion conductive," he adds.

Describing how the process works, he says that water is introduced into the chamber on the anode side of the electrolyser. There, under the action of the platinum or iridium catalyst, the water is split and oxidised in the anode chamber. Oxygen gas forms, along with hydrogen ions. This is the first reaction,

The hydrogen ions or protons are conducted through the ion conductive membrane, also known as a PEM (proton-exchange membrane) to the cathode surface, where, also under the action of the PGM catalyst, they are reduced to form hydrogen gas.

The dense membrane film prevents the two gases from remixing and can take large differential pressure. "The practical limit is now at about 300 bar and we are already achieving close to that. This means that we can generate hydrogen under pressure, typically at 200 bar, directly from the electrolyser, without having to use mechanical compression. The pressure coming directly out of a hydrolyser, therefore, is the same as that from a pressurised hydrogen cylinder," Bessarabov says.

In addition, the purity levels of the hydrogen is very high. "The membrane virtually eliminates cross contamination, so we are currently achieving hydrogen purity of five-9s (99.999%)," he points out.

The hydrogen pump

As well as generating hydrogen, a flagship development for HySA Infrastructure is the use of their electrolyser technology to pressurise and purify hydrogen. "We are able to use this system as a hydrogen pump. Instead of feeding water into the system, we introduce gaseous hydrogen or a hydrogen containing gas mixture. The hydrogen is ionised and the ions pass through the membrane to the cathode, where hydrogen gas is formed. Because of the impermeability of the membrane, the hydrogen pressure can be built up. So we have a system with no moving parts that can pressurise hydrogen.

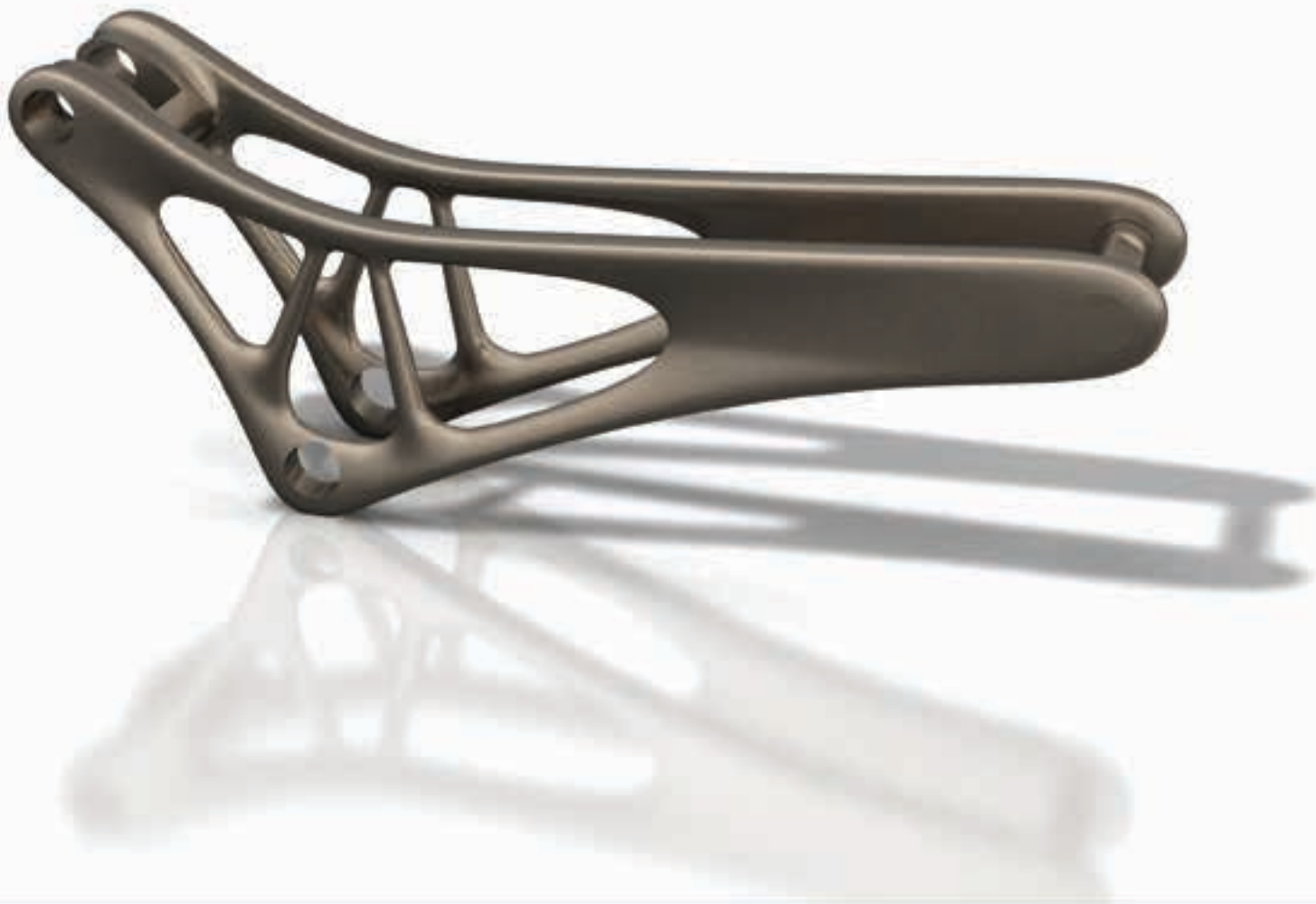
"We can also use the process to purify hydrogen. If, for example, a mixture of helium and hydrogen is introduced, then the hydrogen will pass through the ion exchange membrane, while the helium will accumulate on the anode side. We see applications for this in the purification of methane from hydrogen, for example," Bessarabov informs *MechTech*.

Hydrogen on tap

One of the immediate uses for HySA's electrolyser technology is for the generation and direct use of ultra-high purity gas in laboratory equipment such as gas chromatographs.

"At an onsite mobile laboratory, for example, the lab manager might need to buy ultra-high purity hydrogen gas in

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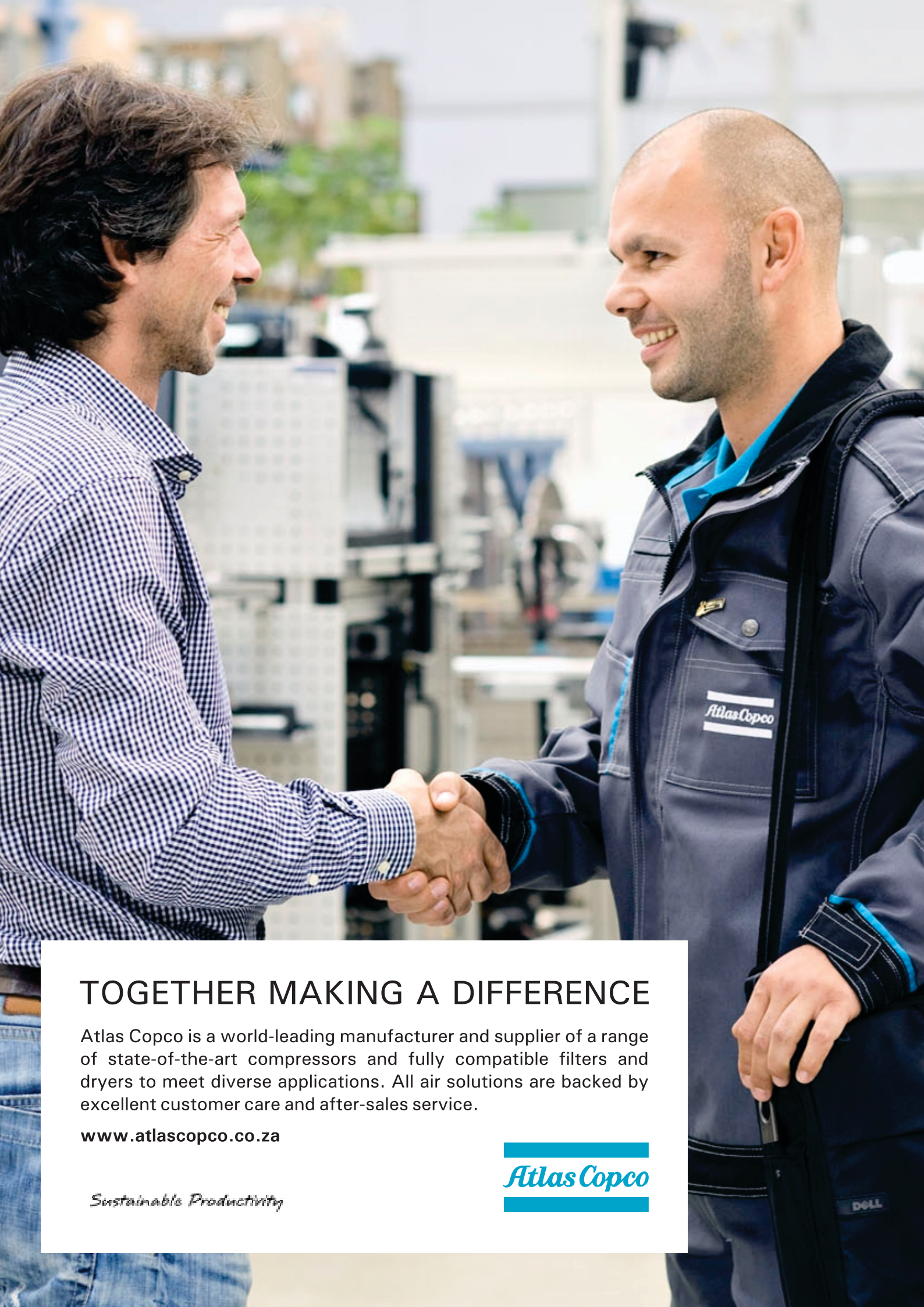


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cylinders rented from a gas company – at a substantial premium. Safety issues and dedicated storage space will limit the amount that can be stored, typically in cages, and a piping infrastructure with safety features has to be installed for its use. A single gas cylinder weighing around 70 kg contains approximately 700 g of hydrogen at 200 bar – 1.0 % by weight.

“We are able to offer hydrogen production via a portable electrolyser, which allows hydrogen to be produced onsite from water. The system can generate the purity required and when the gas chromatograph is switched off, the electrolyser can be switched off too, so no storage is required,” says Bessarabov.

Power to gas.

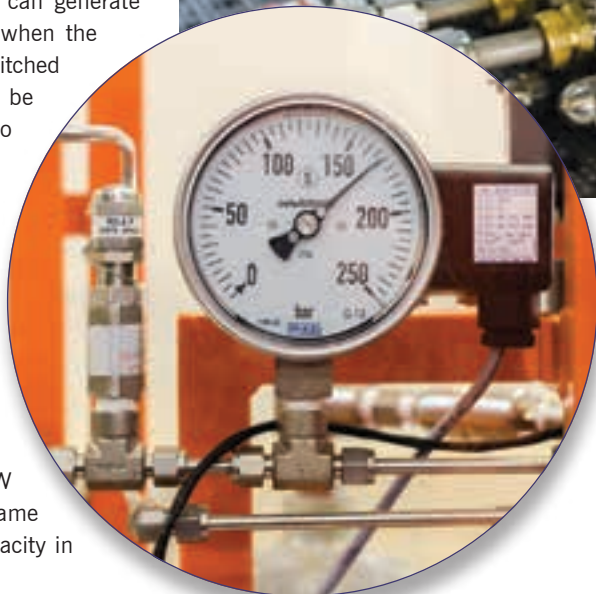
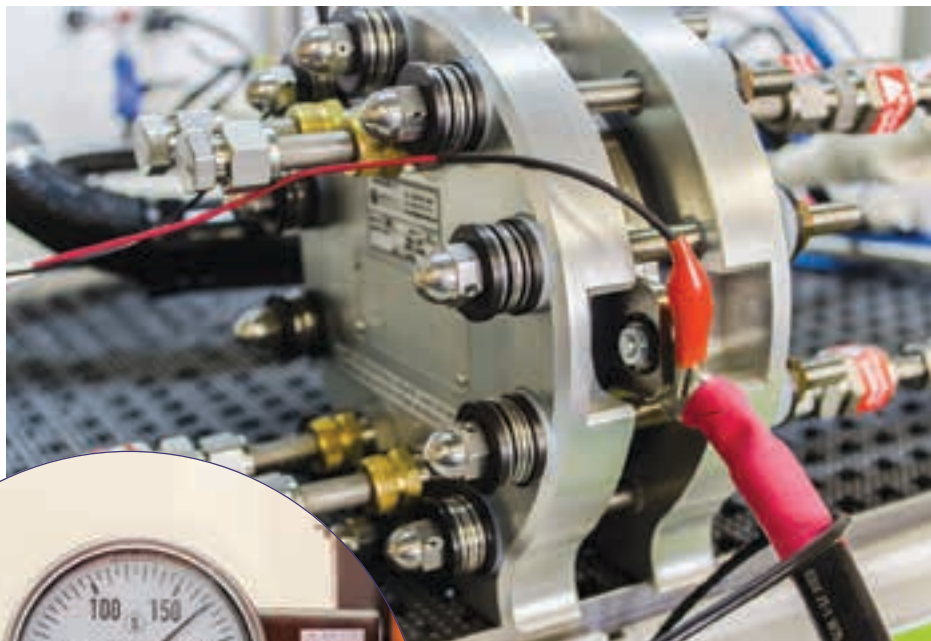
Describing an emerging use of hydrogen in the renewable energy sector, Bessarabov says that, in Germany, wind from the North Sea is generating about 40 GW of power, roughly the same as the total installed capacity in South Africa.

When too much power is added to the grid, the oversupply can destabilise the whole network, so any excess needs to be stored. A growing trend is to use the oversupply to produce hydrogen via large electrolysers, effectively sinking renewable electricity into hydrogen storage.

Europe also has a highly developed natural gas (methane, CH₄) pipeline network. This offers free energy storage opportunity, since up to 10% hydrogen can be mixed with methane without affecting the calorific value of the gas and without causing any degradation to the pipe materials (hydrogen embrittlement). “In some cases where heavier hydrocarbons are present in the natural gas mix, the hydrogen helps to reduce the overall density of the gas mixture so that its average is closer to that of pure methane,” says Bessarabov, adding that, if South Africa ever exploits our shale gas resources, this could become a local opportunity for hydrogen storage.

CO₂ capture

Renewable hydrogen, generated from renewable electricity sources such as solar or wind can also be used in carbon



The hydrogen pump, a flagship development for HySA Infrastructure, is able to pressurise hydrogen to over 200 bar at 99.999% purity. This technology is ideal for producing ultra-high purity hydrogen for laboratory equipment such as gas chromatographs.

generated via the action of a platinum catalyst and then the hydrogen is extracted in a reverse process at the point of use, allowing the organic liquid to be cycled continuously.

“This is already of great interest in countries such as Japan looking to transport hydrogen in large quantities. The liquid can be safely pumped through pipelines or transported in tankers or drums, making it as easy to distribute as currently used automotive fuels,” he says, adding that the group is also working on combining hydrogen into metal organic frameworks (MOF), which are structures of organic molecules into which hydrogen can be bound. “The key advantage of these is that they are lightweight, significantly lighter than metal hydrides, for example.

“We at HySA are developing understanding of hydrogen generation and storage technologies with a view to channelling them into the most appropriate direction for the country. We have successfully demonstrated renewable-energy-powered, efficient, low cost, high pressure and high power density electrolysers, along with a hydrogen pump solution – and these are commercialisable.

“We believe that the hydrogen economy will make a significant contribution towards the localisation and benefications of our renewable energy and natural mineral resources,” Bessarabov concludes. □

capture processes to displace CO₂ emitted from fossil generation sources.

“The well known Sabatier chemical reaction combines CO₂ and hydrogen to produce methane and water – and the presence of a PGM catalyst makes the process more efficient. The Sasol processes, for example, produce significant quantities of CO₂ and this can be mitigated if these emissions can be combined with hydrogen to produce methane,” Bessarabov says.

Hydrogen storage

HySA Infrastructure needs to develop hydrogen storage technology as a logical consequence of its expanding hydrogen generation capacity. “We are currently installing a storage facility for 45 kg of hydrogen that will be housed in high-pressure tubes at 200 bar. In addition we are developing a 50 l LOHC – liquid organic hydrogen carrier capacity,” he reveals.

LOHCs are organic liquids that can be handled in a similar way to diesel, for which piping and storage infrastructure is already available. The LOHC is hydro-

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Game changing hybrid solar-diesel solutions

A new approach is emerging from the genset industry that promises to overcome the limitations of traditional gensets, maximise the potential of solar PV systems and to reduce operating costs for mining companies.

Conventional gensets are typically optimised for efficient operation at their operating load points, which causes them to be inefficient under low-load conditions. In so-called solar-diesel hybrid applications, gensets balance the intermittencies from the solar plant – for example, when clouds shade the PV array. An attractive target for solar-diesel hybrid plants is the mining industry as power consumption is usually high and mines are typically in remote locations with high costs for diesel and for the delivery of fuel to site.

As the future market potential of solar-diesel hybrid solutions has become more explicit, the diesel genset industry has reacted by launching a first-of-a-kind solution, which is specifically optimised for balancing solar plants. Danvest Energy, an innovative diesel technology company from Denmark and a world leader in hybrid wind-diesel power, has introduced its Power Box solution based on gensets driven by either CAT or Cummins engines. These traditional gensets are modified so that they can run at low-load and operate in a reverse mode, whilst hardly consuming any diesel, but with the full ability to respond quickly to output changes from the PV array or to changes in demand.

On sunny days, penetration of the PV system can reach 100%, while the diesel consumption is almost zero. At night, when the PV plant does not generate electricity, the low-load diesel gensets are run as normal diesel gensets to power the mine.

Danvest's experience suggests that increased wind and solar penetration can result in annual reductions of fuel consumption and carbon dioxide emissions of up to 70% compared to conventional diesel generator plants.

"Danvest low-load generators have been used in combination with wind turbines for years. As the solar-diesel market receives more attention than the wind-diesel market at this moment, we have adapted our field-tested solution for this very dynamic segment," explains Thomas Qvist Vestesen, Danvest CEO.

A recent study, 'Low-load Gensets for Solar-diesel Hybrid Plants in the Mining Industry' analyses the technical and strategic fit of low-load gensets for solar-diesel hybrid applications. It integrates several tests and verifies market-related questions through 21 expert interviews. In addition, several business cases are simulated.

The study shows that low-load gensets almost double the solar penetration rate in solar-diesel hybrid systems and that low-load diesel gensets are more efficient in hybrid plants, all this without the use of batteries or other storage systems.

This straightforward solution has the potential to considerably lower the operational costs of mines. The fast spinning reserve of the low-load diesel systems in all modes of operations ensures a continuous supply of power regardless of

variations in demand or of PV production losses, for example due to cloud shading.

Says Thomas Hillig, CEO of THEnergy, a consultancy that assists companies in dealing with energy-related challenges and to develop sustainable energy solutions: "The demand for raw materials has slowed and commodity prices have decreased recently, causing the mining industry to face substantial challenges. Reducing costs of operations such as energy expenditure has, therefore, become an important competitive factor.

"Low-load diesel hybrid power plants, which can maximise output from locally produced inexpensive solar and/or wind energy plants can be game changers. Even at currently low oil prices, optimised hybrid technologies can undercut the conventional diesel-based electricity prices. The additional investment for a hybrid system, including the PV system, usually has a pay-back period in the range of four to seven years," he says.

"We see significant market potential for these low-load gensets, especially in the mining industry where power demand is high and conventional sources are not always readily available – and several energy companies are reporting projects in the pipeline," Hillig concludes.

The study can be accessed from the English tab of THEnergy's website (www.th-energy.net) on the renewable energy and mining platform page. □



A recent study, 'Low-load Gensets for Solar-diesel Hybrid Plants in the Mining Industry' shows that low-load gensets almost double the solar penetration rate in solar-diesel hybrid systems and that low-load diesel gensets are more efficient in hybrid plants.

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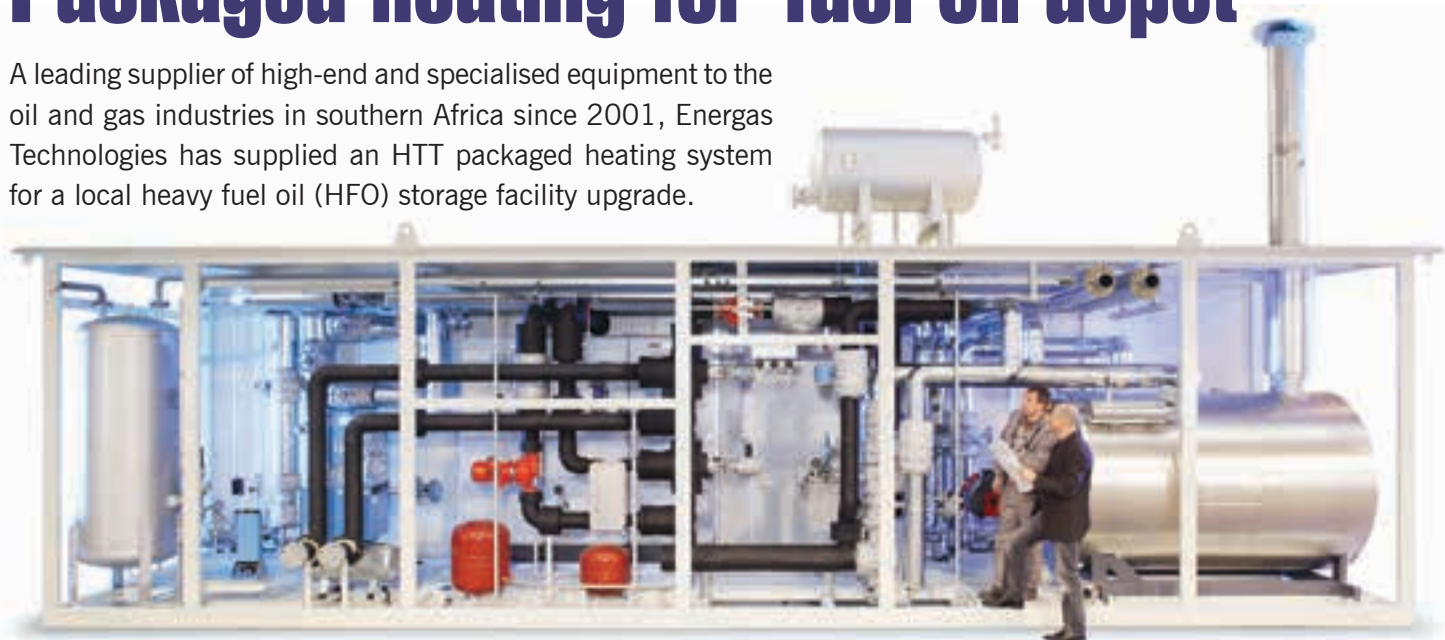
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Mini-Substations

Packaged heating for fuel oil depot

A leading supplier of high-end and specialised equipment to the oil and gas industries in southern Africa since 2001, Energas Technologies has supplied an HTT packaged heating system for a local heavy fuel oil (HFO) storage facility upgrade.



Energas Technologies has supplied an HTT packaged heating system for a local HFO storage facility upgrade.

Havy Fuel Oil (HFO) is stored in large tanks and has a high viscosity at ambient temperature. Before loading into road tankers, therefore, the HFO needs to be heated to reduce the viscosity.

“In order to address this need, we have supplied an HTT packaged heating system, which will be used to heat up this oil from 20 to 80 °C,” says Laetitia Botha, product engineer for Energas Technologies. The system comprises a gas-fired oil heater and a thermal oil circulation system as well as a control system and heat exchangers.

“The packaged unit is fully automated and fitted with local control systems, process control and instrumentation equipment. The control system is interfaced with the local RTU PLC, which means that making changes on the heater units remotely is a possibility,” she adds.

The HTT system boasts a number of advantages, including: increased productivity due to higher process temperatures; lower investment costs due to the lower operating pressure of the thermal oil compared to steam; lower operating and personnel costs because of unattended operation; low maintenance costs; and world-class product support.

Botha explains how the system works: “The heat transfer medium flows through two concentric coiled tubes in the heater that are connected in series, with the hot flue gases being guided by means of defined annular gaps in the counter flow

direction. In contrast with conventional construction, the flue gases are recirculated twice inside the apparatus, delivering their energy to the transfer medium via convection.”

Apart from the compact design of the package, the key advantage of the HTT principle is that it dispenses with a fireclay-lined furnace. This permits heat storage masses to be reduced to a minimum, eliminating thermal overloading of the heat transfer medium that was previously unavoidable in the event of an unscheduled shutdown. This is an important step towards maintenance-free operation. The system can be operated using either natural gas or LPG.

The heat transfer facility for this HFO upgrade was installed outdoors, so the components had to be weather resistant – fitted with a rainproof weather jacket to guard against inclement weather, as well as manufactured from high-quality corrosion resistant materials. HTT’s service team from Germany has commissioned the heater system on site and trained the personnel.

Investing in energy

On the subject of investment in energy in South Africa, Botha says: “Energy has always been more affordable in South Africa than in European countries, but times are changing now and the industry will have to consider investments that are more energy efficient in the long run. We often find that projects are

driven by initial capital investment costs or savings and do not always take the long-term benefits of paying for quality into account.

“Paying a premium upfront for better technology with higher efficiency could save millions in running costs throughout a plant’s lifetime and returns on investments can often be achieved within 12 to 24 months,” Botha says. “This is what Energas Technologies, with world-class product support from HTT, aims to achieve with the HFO depot upgrade. As a leading supplier to this market, no one else knows the value of energy quite like we do. And we know how to save it,” she concludes. □

Energas Technologies

Energas Technologies’ core focus is to support and supply equipment to the natural gas industry and its products find application from the gas well, through the distribution network right up to the end user. Applications include pressure reduction and metering stations, pipeline ball valves, HDPE pipes and fittings, pig launching and receiving stations, domestic metering and regulating units. The company also provides skid-mounted high-pressure reduction and metering stations with gas-fired or electric heaters.

Energas also offers HTT Energy’s range of fired heaters, indirect heating and cooling units and heat recovery products. A secondary focus is on liquid storage tank protection equipment. □

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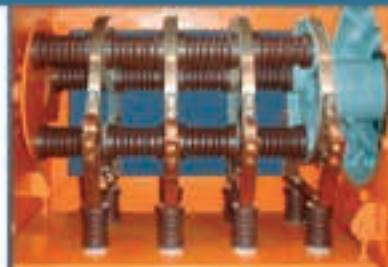
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Linear motion systems for extended service

Rouff Essop, general manager, bearings division, BMG, talk about the STAF range of integrated linear motion systems, which include linear guides, ball screws and linear tables, available in southern Africa exclusively from BMG.

“**W**ith the growing local demand for economical yet efficient linear way products, BMG has established a partnership with OME Technology to supply and support STAF linear motion components. This range is known globally for high speed and precision; easy integration and interchangeability; energy saving and environmental friendliness,” says Essop. “STAF linear motion products are used in diverse applications, including welding, soldering and drilling; industrial machinery; measuring and inspection; printing, scanning and packaging; assembly plants and warehousing; as well as in robotic arms and manipulators.”

Linear guides – the key part of precision instruments – are used in conjunction with compact ball screws – which are locked onto a platform and linked to a servo motor – to produce linear motion. The main function of the guide is to allow the platform to maintain high-precision, high-rigidity and high-load motion.

STAF linear guides have a common rail, interchangeable alloy steel slide, designed for reliability and flexibility. The dust sealing twin lip structure ensures effective sealing and the large internal lubricant storage facility reduces maintenance requirements and extends the service life of the system.

Cage and non-cage types, which are fitted on the same profile rail, have new, patented features that include a ball re-circulation design with no gap for smooth running. The newly designed chain lubrication system reduces friction during operation, significantly extending service life.

STAF’s BGC cage type linear guides, which are suitable for high speed applications, contain lubricant between the steel balls, the friction produced during operation is reduced by the oil film. Advantages over conventional systems include reduced contact pressure, lower noise levels, less vibration and lower heat generation.

In traditional guides, the steel balls collide, producing a sharp, screeching noise and are easily worn out. BGC linear guide cages are manufactured from a macro-molecule polymer, with lubricant space designed within the chain belt. With the flexibility of the chain belt and the cushioning effect of the lubricating oil, most of the noise produced from the chasing effect of the steel balls is eliminated.

STAF’s advanced lubrication system ensures lubricating oil reaches all surfaces in the loop during operation and while static, with minimal oil loss.

The BGC steel ball retainer has a fixed distance retaining function so that each steel ball receives a balanced force for stable operation and extended service life. The issue of irregular gaps is far smaller than with traditional linear guides.

The BGX non-cage series, with a four-groove design, ensures even load capacity in all directions, irrespective of how the rails are mounted. An auto adjust capability prevents assembly errors and allows quick, accurate linear motion by eliminating the deviation of the mounting planes. Advantages of this four-groove series over the conventional two-groove design include quick, light movements,

Top: Both the cage and the non-cage types of STAF linear guides fit on rails with the same profile. Above: STAF has also developed micro-linear guides – the MBX and MBC series – with an integrated dust proof design and an efficient lubrication system.

reduced friction, high load ratings and improved stability.

The accuracy of linear guides depends on the efficiency of circulation of steel balls between the slide and the rail. The incursion of the smallest objects can cause skipping and bumping of the slide and lead to permanent damage. The advanced seal design of the BGX series is divided into top and bottom seal systems to prevent the incursion of foreign objects. The top seal system prevents particles caught at the rail holes from entering the circulation groove and the bottom seal system prevents objects from entering through the gap in between the slide and rail.

STAF has also developed micro-linear guides – the MBX and MBC series, with an integrated dust proof design and an efficient lubrication system. These miniaturised cage and non-cage types, have application advantages that include high precision, low noise levels and extended service life.

STAF linear motion systems are manufactured in Taiwan according to stringent international quality and safety specifications, including ISO 9001 certification and they comply with the Restriction of Hazardous Substances (RoHS) directive.

These advanced linear motion systems are all supported by BMG’s comprehensive engineering solutions service. □



Motion Cube: a customised mass production solution

Motion Cube, an innovative palletising system that allows workpieces to be transported independently and simultaneously to different assembly stations, has won a prestigious Handling Award for inventor, Festo, in the automation and robotics category at Motek 2015.

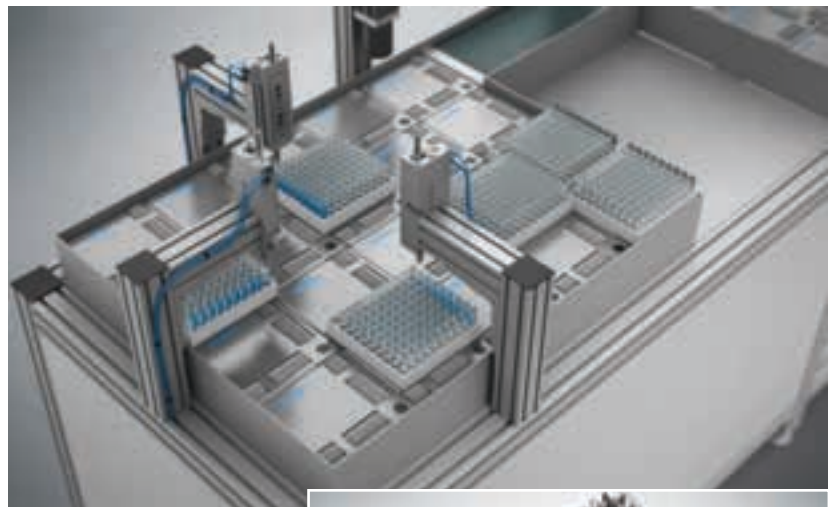
Bringing automation one step closer to Industry 4.0, Motion Cube allows for workpieces to be transported independently and simultaneously to different assembly stations. This unusual concept led an independent technical jury to award Motion Cube a Handling Award 2015 in the category 'automation and robotics'.

Motion Cube consists of individual modules, each with its own built-in drive mechanism, in a housing shaped like a cube. The drive mechanism transports individual pallets from one assembly station to the next, allowing unique assembly tasks to be carried out. The modules can also be combined to operate in matrices, depending on the application in question.

This technology enables different products to be handled in parallel, making simultaneous processes possible and saving time. In contrast to a classic conveyor system, several travel commands can be carried out at the same time. Individual pallets can be overtaken and workstations can be skipped.

In the spirit of Industry 4.0, the prototype Motion Cube can allow individualised production from a central machine: the assembly of mobile phones, for example, with different features according to customers' wishes – memory capacity, housing colour, engraving, etc. A customer could configure his or her preferred phone online, transmit the data to the machine and have a unique mobile phone assembled to order.

In laboratory automation, specimens in a handling application can be automatically assigned to the relevant evaluation stations in accordance with the required analyses. Motion Cube can also be used as a shaker to mix liquids in sample vials. A cover that extends over all the modules ensures an easy-to-clean enclosed system for applications with strict hygiene requirements – and the pallets



Above: The Motion Cube palletising system can be deployed flexibly and is able to react immediately to all requirements regarding sequences and target positions.

Right: Motion Cube consists of individual modules, each with its own built-in drive mechanism, in a housing shaped like a cube.



can be driven by magnetic couplings to further simplify cleaning in place (CIP). Transport using air bearings is also a feasible option.

Further possible uses are: applying adhesives to components of different shapes; palletising workpieces; testing and inspecting components; and filling, sorting, storing/buffering and transporting functions.

Since the system can transport and palletise at the same time, considerable savings can be achieved at the periphery of an assembly facility. For example, in palletising, the system can deliver pallets to set-down positions. This means there is no need for X and Y axes for positioning.

Thanks to the modular and flexible design of the palletising system, individual production lines can be created very quickly and adapted to changes in production conditions. Its unusual architecture means that the system offers impressive flexibility while occupying little space.

Conventional conveyor systems transport pallets on continuous belts. This means that the operating system and the sequence of pallets are fixed at the

belt loading point. In order to change the sequence, deflectors and a number of conveyor belts have to be installed, generating higher costs and requiring more space.

The Motion Cube palletising system, on the other hand, can be deployed flexibly and is able to react immediately to all requirements regarding sequences and target positions. It can be expanded easily and adapted quickly to changing production conditions. Further positioning modules can be added without any great expense, so that the palletising system can be expanded or modified at will. The principle of the palletising system allows a production line to be set up in very tight spaces.

The Motion Cube concept won over the technical jury at the Handling Award 2015 and inspired its experts to select the system for first place in the automation and robotics category. The award was presented by professor Bernd Kuhlenkötter, holder of the chair of production systems at the University of Bochum, to Michael Feyrer, Festo's design engineer in the company's product concepts evaluation department. □

SKF and Lincoln Lubrication SA

In February 2015 SKF successfully acquired South African-based Lincoln Lubrication SA (Pty) Ltd and the company now forms part of SKF's Lubrication Systems core technology.

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As a complementary product, GreenLinc offers environmentally accredited spill kits.

For more information about the acquisition and Lincoln/SKF Products and Services, please contact your nearest SKF/Lincoln Lubrication Distributor or Branch.

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Frequency inverters reduce emissions at VW plant

The installation of SEW-Eurodrive frequency inverters has resulted in the Volkswagen Autoeuropa vehicle-manufacturing plant in Portugal achieving a 28% reduction in energy consumed by the fans that dry paint on the production line. This has resulted in annual cost savings of €31 000, about R450 000, and a reduction of 250 t/y of CO₂ emissions.

The VW Autoeuropa plant manufactures 100 000 vehicles each year. As part of its commitment to environmental sustainability, VW commissioned SEW-Eurodrive to install Movitrac LTP-B frequency inverters at the plant. The plant uses 17 fans to dry painted vehicle surfaces. Although they perform this task reliably, these fans consume large amounts of electricity.

The operational speed of the fans was the main focal point. "We first had to establish how far the speed can be reduced without having a negative impact on the drying process. As a result, we were looking to maximise the energy savings without making any compromises regarding the quality of the painting process," says Reis Neves, SEW-Eurodrive Portugal's technical manager.

The first step was to install new air filters. Neves explains that this enabled the speed to be reduced further, without negatively affecting the fans' thermal

capacity. A total of 17 Movitrac LTP-B frequency inverters were installed in the fans. "This was done during the summer shutdown in order to minimise impact on production," he adds.

The planning and installation process barely affected day-to-day operations and co-operation with VW went smoothly. SEW-EURODRIVE prepared two energy audits – one before and one after the new frequency inverters were installed – and presented the report and the predicted energy savings to VW and the Portuguese government, which subsidised the new installation.

As part of its 'Think Blue' factory strategy, VW has set a target of achieving a 25% reduction in the costs associated with key environmental performance indicators – including; energy, water, CO₂, waste and solvent emissions – between 2010 and 2018. SEW-Eurodrive is successfully assisting VW in achieving these objectives. □

ABB's largest ever robot

The IRB 8700 robot from ABB, the company's largest ever, is 25% faster than its competitors, making it the best performing high-payload robot available, with the lowest possible total cost of ownership.

This multi-purpose industrial robot has a reach of 3.5 m and is capable of handling a payload of up to 800 kg to 1 000 kg with the wrist down and 630 kg with LeanID. "When designing the IRB 8700, we emphasised reach and payload as well as performance," says Ola Svanström, ABB product manager for large robots. "Thanks to ABB's superior motion control technology at high moments of inertia, this – our highest ever payload robot – automatically adapts and adjusts its speed to accommodate heavy and wide parts. With a compact footprint, optimised counterweight, parallel linkages, stiff axes and fewer drive motors, the IRB 8700 keeps its momentum down and its speed up."

The IRB 8700, offers all the functionality and expertise of the ABB portfolio in a much bigger package. The robot has only one motor and one gear per robot axis, while most other robots in this size class use dual motors and/or gears. In addition, there are no gas springs; only a reliable counterweight with mechanical springs for counter balancing. Together, these design features give the IRB 8700 fewer components and enable it to deliver shorter cycle times and higher accuracy.

The IRB 8700 is available in two configurations, one with a reach of 4.2 m and a payload of 550 kg to 620 kg with the wrist down and 475 with LeanID – and its larger brother, with a reach of 3.5 m and a payload of 800 kg.

Both configurations have an a high moment of inertia at 725 kgm². □

The ABB IRB 8700 multi-purpose industrial robot has a reach of 3.5 m and is capable of handling a payload of up to 800 kg – 1 000 kg with the wrist down and 630 kg with LeanID.



A total of 17 Movitrac LTP-B frequency inverters were installed in the fans of the paint shop to dry the painted vehicle surfaces.

How M2M will revolutionise the automobile sector

Michael Frans (right), head of automotive business operations at T-Systems South Africa, describes how machine-to-machine (M2M) communication is and will continue to revolutionise the automotive sector.



High-tech companies such as Tesla, Apple and Uber are already adopting machine-to-machine (M2M) communication advancements. Shown above is the digital control and communication panel of the Tesla S electric vehicle.

The technology industry's love affair with the so-called 'internet of things' continues unabated. Technologists in almost every industry are touting the future of connected sensors, devices, components, and actuators – all pumping information into a sprawling network of cloud services.

The automotive industry is regarded as one of the verticals most perfectly primed to capitalise on the Internet of things and machine-to-machine (M2M) communication advancements. In recent years, high-tech companies such as Tesla, Apple and Uber have raced into leading positions in the automotive and transportation arenas.

New technology has certainly exposed a number of slower-moving, more traditional automotive players to various risks of disruption. But, for those vehicle manufacturers and service providers that are willing to embrace change, advancements like M2M offer incredible opportunities.

These include reduced costs, greater efficiencies, increased transparency, minimised risks, enhanced service quality, better environmental protection, and the possibilities for new business models.

Essentially, we can describe the emer-

gence of M2M in the automotive sector across three levels, showing the escalating value that can be derived by manufacturers and others in the ecosystem.

Level 1: Connect and visualise: devices and sensors start recording driving patterns, vehicle performance, geolocation data, and other metrics.

This can be overlaid with other data sources – such as weather, real-time traffic data, airport and bus schedules, or traffic light failures – to communicate useful information back to the driver. This promises to enhance vehicle safety and general enjoyment levels, and reduce annoyances.

Level 2: Analyse and optimise: by developing the right tools to understand and analyse the streams of incoming data, we can start to predict certain things – such as traffic congestion in certain areas, risks of driver fatigue, or vehicle components that are likely to fail soon.

Safety is a major selling point for connected car technology. Noting that most accidents happen at intersections or while changing lanes, in-vehicle warnings could alert drivers to potential crashes with merging vehicles that are nearby, cars that are in the driver's blind-spot or even harsh braking from the vehicle in front.

Level 3: Innovate and grow: for vehicle manufacturers, rich insights from customers' movements while driving will fuel new product and service offerings, and new collaboration opportunities – even with service providers in previously unrelated industries, but now part of the connected car ecosystem.

Original Equipment Manufacturers (OEMs) will be able to make an evolutionary leap, from once-off sellers of hardware (the car itself), to integrated service providers that remain in close contact with their customers throughout their lives. Radical new partnerships



will become possible in areas such as security, track-and-trace, entertainment and internet connectivity, navigation, insurance, emergency help, and roadside assistance.

A recent study from Machina Research predicted an astonishing 1.5-billion M2M connections in the automotive sector by 2022 – creating a global connected car market of US\$282-billion.

While these estimates may sound optimistic, some companies have already accelerated away from the start line: with some higher-end cars already featuring adaptive cruise control, blind spot systems and cameras, and lane-changing aids.

But the key to unlocking the future potential of M2M, and achieving the kind of radical transformation that analysts such as Machina are predicting, is developing platforms to handle the explosion of data. These platforms are the 'information superhighways' that transmit, interpret, and find meaning in the masses of machine-generated data.

These platforms empower OEMs with the ability to achieve what we term 'zero distance' with the consumer: close contact and intimate understanding, throughout every stage of the customer's journey and the vehicle's lifecycle.

M2M truly does hold the potential of transforming the automotive sector and improving the way we move around every day. Supported by powerful information superhighways, the role of OEMs and other industry payers can be transformed in the high-tech future of transportation that stretches ahead of us. □

Maritime data technologies showcased

Following the acquisition by Marine Data Solutions (MDSol) of Marine Radio Acoustic Devices (MRAD) earlier this year, Steve Nell and Eddy Elschoot talk about their products showcased at African Ports Evolution and the exciting future of the African maritime industry.

Marine Data Solutions (MDSol) is a Cape Town-based company specialising in world-leading maritime surveillance technologies, services and solutions. Founded in 2004, the company has the largest installed base of marine domain awareness technologies on the African continent, and was excited by the opportunity to showcase its technology capabilities at this year's African Ports Evolution in Durban.

Under the dynamic, entrepreneurial leadership of Steve Nell, MDSol has built up a strong customer base among South African and African maritime authorities and related industries. This 'young-at-heart' organisation has seen consistent growth since its inception, and a number of acquisitions have served to augment its customer offering and value proposition.

"Our vision at MDSol is to provide an increasingly holistic solution to our customers, ensuring that our service offering meets the requirements of our customers in the long term. We have made it company practice to listen carefully to our customers and find new ways of adding value," says Nell.

The company made its most recent acquisition in October 2015, acquiring a majority shareholding in Marine Radio Acoustic Devices (MRAD), a well-established provider of world-class on-board electronic equipment for the maritime and fisheries industries. Leveraging the key synergies between the two companies, MDSol and MRAD have worked together on a number of projects over the past couple of years.

"This acquisition has been in the pipeline for more than two years, and is an exciting step forward for both companies," says Eddy Elschoot, general manager of MRAD. "We have established an extremely good relationship with MDSol and are looking forward to combining our respective fields of expertise to bring our mutual customer base greater levels of service, technology and product support."

Nell adds: "As specialists in shore-based marine technologies, we are very pleased to be joining forces with such a well-established provider of on-board systems. It means that we will be able to offer a wider-ranging maritime technology solution to our mutual customers; and our shared approach to service and firm commitment to excellence forms a strong foundation for the future growth of both companies."

MDSol has a strong presence in the maritime sector, with over 65 installations both in South Africa and along the African coastline. Its range of globally proven technology includes vessel traffic management and information systems, ports and coastal surveillance systems, automatic identification systems and navigation aids, amongst others.

"MDSol is committed to building integrated technology platforms to create an increasingly accurate picture of the marine domain. It is about gathering customer-specific and relevant intelligence, with the overarching vision of creating new levels of safety and efficiency in the



Steve Nell, managing director of the MDSol group of companies with Eddy Elschoot, general manager of MRAD.

maritime sector. African Ports Evolution is an invaluable forum to share our vision with likeminded individuals and organisations," Nell says.

"With the blue economy, or 'ocean economy' on everyone's lips – spurred on by the government's Operation Phakisa – the maritime industry is an exciting space in which to operate. Furthermore, creative use of technology can really assist in fast-tracking growth and development of the industry; and contributes to a growing economic sector – not only in South Africa – but around the entire continent," he concludes. □

Formed in 2004, **Marine Data Solutions (MDSol)** is a holistic service provider specialising in marine domain awareness (MDA) solutions. The company is partially owned by Kongsberg Norcontrol IT, a global leaders in maritime surveillance solutions.

MDSol Galactic, a subsidiary of MDSol, provides fire engineering, safety and security solutions, while **MRAD**, now part of the MDSol group of companies, provides a wide range of electronic equipment for the marine and fisheries industries.

A proudly African company, MDSol is ISO 9001:2008 and holds a B-BBEE Level 1 certificate.

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Quick-change rim system for off-highway trucks

Designed and built to strict Caterpillar specifications, Cat wheel rims help ensure better drive train performance and extended component life in off-highway trucks by combining the highest level of strength with the minimum amount of weight to maximise payload and decrease fuel costs.

“By functioning as an integral part of Cat drive train systems, these rims help extend the life of all power transmitting components, as well as the suspension, bearings, brakes and tyres,” explains Wally Parsons, Barloworld Equipment senior product manager – Barloworld Equipment is Caterpillar’s southern African dealer. “This is why tyre selection and fitment is such an important part of the overall production planning on any mine.”

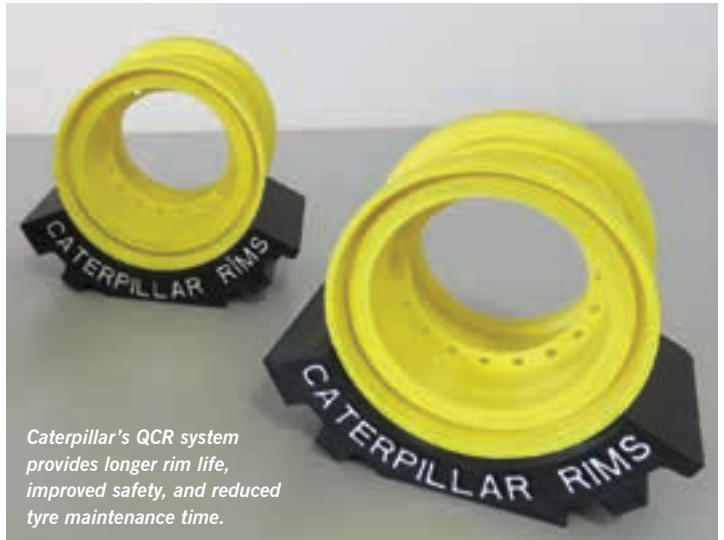
Tyre removal and installation is a specialised operation. It can also be a time consuming exercise when using standard rim configurations. Traditionally the only way to change the rear axle inside tyres on a mining truck has been to remove the entire outside tyre and associated rim systems. On average, this process takes between six and seven hours to complete by a well-trained team.

Caterpillar’s quick-change rim (QCR) system has revolutionised this practice and greatly contributed to improved production efficiencies by reducing

change-out times to around two hours, due to fewer rim base removal and installation procedures. As a result, the system is proving particularly popular with large and ultra sized mining truck fleet owners. Key models using QCRs include the Cat 785C, Cat 785D, Cat 789D, Cat 793D and F, Cat 795F, as well as the range topping Cat 797F with a 2 828 kW engine and a 363 t payload.

The QCR system has a position specific outer rear rim with separate dual bead seat bands and flanges. These components allow the tyre and rim components from the inner rear rim to slide over the outer rear rim. The key factor here is that the system allows the inner and outer tyres to be removed and replaced without having to remove the rear axle outside rims.

The back section of the QCR base is modified to include additional lock-ring and O-ring grooves for a second bead seat band, which allows the tyre to be removed without the need for a hydraulic bead breaker tool to separate the inner tyre bead from the rim base.



Caterpillar’s QCR system provides longer rim life, improved safety, and reduced tyre maintenance time.

“The lock ring is a single piece design,” explains Parsons. “It’s made with specially designed materials that allow it to be expanded for easier attachment and removal. Compared with other aftermarket quick change rim systems, it’s the only one that is interchangeable between all six tyre positions.”

The wedge shape of the flanges, bead seat bands and lock rings increase friction and torque, which helps keep the tyre in place to prevent tyre slip in high rim pull and heavy retarding applications.

“Quick change rims also encourage more frequent and effective tyre rotations and inspections, which in turn improves overall life,” concludes Parsons. □

Multilayer Steel Head Gasket Sets

Metric Automotive Engineering has made the latest Multilayer Steel (MLS) cylinder head gasket sets for Caterpillar C13 engines from IPD available to the local rebuild market. “The MLS construction features a graphite mating surface treatment,” says Andrew Yorke, operations director. It comprises a heavy-duty, high-temperature steel graphite head gasket bonded mechanically to a perforated steel core.

The Cat C13 is a common industrial engine found typically in stationary engine applications such as drill rigs, compressors and power generation units, which all feature a high constant load. The MLS cylinder head gasket set from IPD is designed specifically for Cat C13 engine overhauls.

“What IPD has done is provide additional thickness on the head gasket. This

compensates for the fact that when an engine’s major components are overhauled, they are skimmed and height is lost on the block, which is a critical dimension,” Yorke says.

The fact that it has a graphite layer makes it far more tolerant to extreme heat conditions and therefore prolongs engine life. This is important in African operating conditions, where engines tend to run at higher temperatures.

Metric Automotive Engineering represents IPD in the local market, a leading aftermarket provider of engine components for heavy-duty diesel and natural gas powered engines based in the United States. IPD’s Caterpillar replacement parts are manufactured in a Lloyds accredited ISO 9001:2000 quality controlled environment.

Metric Automotive Engineering is South

Africa’s most comprehensively equipped heavy diesel engine and component manufacturer. Established as a family business in 1969, the company has a strong ethos of investing in both quality equipment and expert personnel.

Subsidiary, Reef Fuel Injection Services, offers Bosch, Delphi and Denso approved fuel injection services and is acknowledged as the specialist in CAT fuel systems. □



Metric Automotive Engineering’s IPD Multilayer Steel (MLS) cylinder head gasket sets for Caterpillar C13 engines.

SA's doubly successful World Solar Challenge

After 3 000 km under solar power, NWU's Sirius X25 and UKZN's Hulamin both crossed the finish line of the 2015 Bridgestone World Solar Challenge in Australia. The two first-time South Africa teams completed the Challenge Class event in 11th and 13th place, respectively.

In Adelaide, Australia on October 23, the first ever entrants from the African continent completed the 2015 Bridgestone World Solar Challenge in Australia. The Sirius X25, a solar vehicle designed and built by North West University (NWU) in Potchefstroom finished 11th in the Challenge Class, completing the 3 000 km journey from Darwin in 47h22 at an average speed of 71.7 km/h – a feat that makes the NWU team the first African team in the race's history to complete the journey.

But finishing the race two places further back in 47h53m was South African rival, the University of KwaZulu-Natal (UKZN), in a car called Hulamin that achieved a calculated average speed of 70.40 km/h.

The Challenger Class, a race for four-wheeled solar vehicles, is widely considered to be the primary racing class and the two South African teams competed with 28 others from 25 different countries around the world.

At the front of the race, another national feud unravelled with two teams from The Netherlands, Nuon from Delft University of Technology; and Red One from the University of Twente. The two Dutch teams managed speeds of close to 100 km/h on the final day and were only two minutes apart in the closing stages of the race. As they descended into Adelaide, Nuon inched ahead to win in 37h56m12s, eight minutes ahead of its rival – and both achieved calculated average speeds for the 3 000 km journey of above 90 km/h. This was Nuon's second successive win and its sixth in the event's history.

UKZN's Hulamin

The Hulamin solar vehicle is five meters long, has an aerodynamically optimised design, weighs less than 250 kg, and is nimble and agile. The vehicle has

Right and below: At the finish line in Adelaide are South Africa's NWU team with their solar vehicle, the Sirius X25.



an asymmetrical design with a highly aerodynamic profile and a small frontal area. The theoretical drag of the car is only 0.07, extending the speed and range of this solar vehicle.

Designed to be lightweight yet rigid and safe via a fully carbon-composite monocoque chassis, the car uses 6.0 m² of super-high efficiency silicon solar panels to harness energy from the sun and 21 kg of lithium ion battery storage.

Patron of the UKZN Solar Car Project, vice-chancellor, Albert van Jaarsveld was delighted when he heard the race result: "My hearty congratulations to the whole team. We are all very proud of you for flying the UKZN flag high down under. Viva Hulamin Viva!" he said.

"It was a tough race that required a lot of hard work," said co-team leader Clinton Bemont. "We were on the go all the time and never had a chance to relax. Now I'm looking forward to a good shower, time to relax and a beer!"

"The team is exhausted but happy to have finished two days before the cut off," said academic leader for mechanical engineering, Glen Bright, who travelled from South Africa to meet the UKZN team at the finish line. "I am very proud of their achievements. While they had to deal with resource constraints, they still overcame many challenges along



the route, to emerge as worthy UKZN and South African contestants," he said.

The team named the car 'Hulamin' in gratitude to the aluminium manufacturing company, which funded and supported the project with the intention to see it entered into the World Solar Challenge.

NWU's Sirius X25

Built on the foundation of local Sasol Solar challenges in 2012 and 2014, the NWU team decided to build a better and faster vehicle for the World Challenge event. The new Sirius X25, named after the closest star to the earth's solar system, is larger than its predecessor and, through the optimisation of the design and the use of a combination of carbon-fibre and resin, the vehicle's weight has been reduced to 185 kg.

The drive system now uses a single rear-wheel drive motor and the battery pack, as well as weighing less, incorporates technology to enable the configuration to be adjusted to match changing solar irradiance. The aerodynamics was improved by means of modern sailplane technology and the vehicle's control systems allow for ongoing reconfiguration to optimise energy use. High-efficiency solar panels, which are 50% more efficient than those used for rooftop systems,



Above and left: Team UKZN and its Hulamin finished the 3 000 km World Solar Challenge in 13th place, only 30 minutes behind the NWU team.



cover 6.0 m² of the vehicles surface.

Speaking before the race, team leader, professor Albert Helberg said that the Sirius was propelled by the amount of energy used by a hair drier (800 to 1 800 W).

At the outset Helberg's objective was

to cover the distance in five days at close to the vehicle's optimum speed of 75 km/h. "Our biggest dream will come true if we can only finish the race and at the same time be the first team ever from Africa to cross the finishing line. This will put us in the record books."

His dream came true.

"This is a learning project, which forms part of our long-term vision. The experience will enable us to aim for a podium position in 2017. It can be done. We have the expertise to develop our own technology further and better," he said in advance of the race.

We commend the success of both the UKZN and the NWU teams and, in the light Helberg's accurate performance predictions for the Sirius X25, we look forward to a South African podium finish in 2017. □

Thymio Robot collaboration at Eden College

The University of KwaZulu-Natal (UKZN) together with the NCCR-Robotics centre in Switzerland, have jointly begun work on the Thymio Robot project in South Africa, which involves learners from Eden College, Durban.

A world-first international event, named 'Remote Robotics using the Thymio 2' (R2T2), took place on November 4, at which Eden College was connected to schools in five other participating countries, which included Switzerland, Italy, Austria, France and Russia. Via YouTube streaming video and Skype chat, learners interacted with each other to remotely program and control robots in Switzerland using Thymio software.

The event replicated a search and rescue scenario on the planet Mars. A meteorite damaged an important Martian power station and the damage needed to be assessed so that the main generator could be restarted.

The 16 robots on the Mars site had to

be controlled by a team of engineers and space experts from Earth. Between Mars and Earth there is a delay in video transmission (replicated at the event) and direct remote control is impossible. Therefore the Earth experts need to programme the robots to solve the tasks.

The Thymio Robot project in South Africa, headed up by Riaan Stopforth and Shaniel Davrajh from the School of Engineering at UKZN, aims to enlighten scholars on better understanding of robotics.

The collaboration with UKZN began when, Prof Francesco Mondada, a professor in Mechatronics Engineering from EPFL (École Polytechnique Fédérale De Lausanne) in Switzerland, developed an interest in robotics education and developed the Thymio robot as an educational tool.



Learners from Eden College, Rachel Hamilton, Resheen Ramsamy and Glenda Poswa, participated in a world-first international event, 'Remote Robotics using the Thymio 2' (R2T2), which took place on November 4 and involved students in robotics from South Africa, Switzerland, Italy, Austria, France and Russia.

The Thymio robot is programmed using a graphics interface and generates the code in text on the side of the screen to allow learners to observe the commands and correlate them with the graphics. This allows programming techniques to be learned and programs to be modified using advanced commands. □

SA power products supplier gains foothold in Zambia

Goscor Power Products recently expanded its dealership footprint on the African continent with the appointment of a fifth dealership, Handyman's Paradise, a leading hardware chain in Zambia.

Political stability coupled with a consistently growing building industry has positioned Zambia as one of Africa's faster developing countries. "Recognising this tremendous potential, we decided to look for a business partnership in Zambia and we started dealing with Handyman's Paradise in 2011," says Goscor Power Products export manager, Toni Almeida.



The robust and affordable Lutian super-silent diesel generator from Goscor Power Products' new Zambian dealer, Handyman's Paradise, is finding wide acceptance in Zambia.

Handyman's Lusaka-based head office is supported by a nine-strong branch network strategically located throughout Zambia, from Ndola up in the Copper Belt to Kabwe and Lusaka in the agricultural centre. "These key locations are fundamental to fast product and service delivery to markets for our product offerings, which include light construction, domestic and end-user sectors as well as SMMEs such as small scale farmers and contractors," notes Almeida.

"While Subaru, our premium brand, immediately gained wide acceptance in the Zambian market, we noted that the quality of products available to the lower end of the consumer segment was questionable," he continues. "The apparent need for more affordable products without compromising quality led us to introducing our well-priced Lutian and H-Power products through Handyman's

network. These two brands have very quickly become the volume movers throughout Zambia, thanks to their robust design, dependability and back-up support."

Handyman's Paradise supplies virtually the full range of power and light construction equipment from Goscor Power Products, from generators – necessities for survival in Africa's notoriously high temperatures – making up the bulk of the sales. Handyman's is able to supply a wide range of machines, from the small Lutian 2.8 kVA open, petrol generator right up to the larger silent, diesel, water-cooled units ranging from 12 kVA to 50 kVA/380V. The supply of over 100, 350 ℓ-capacity diesel-driven concrete mixers to the Zambian construction industry since the start of 2015 bears testament to the fact that Goscor Power Products' range is fit for the market.

www.laverickmedia.co.za

New FDA-approved AODD pump ideal for filter presses

Industrial pump manufacturer and distributor Verder Pumps South Africa (VPSA) has introduced a new, FDA-approved high-pressure, double-acting air operated diaphragm pump (AODD), suitable for filter-press applications where the discharge pressure is higher than the available compressed air pressure.

The new VA25-HD (DA) diaphragm pump features the traditional advantages associated with high-pressure pumps, including:

- Stalling against closed discharge, which means that no safety pressure valve is required.
- Boosts pressure to double the compressed air pressure.
- No need for ancillary equipment to regulate flow at raised discharge pressures.

In addition, the pump includes some unique new features:

- The new model has the same maximum flow rate as a standard Verderair VA25 diaphragm pump.
- It is double-acting, therefore produces stable and efficient flow.
- It has a low to high-pressure switch that allows better efficiency to be achieved.

This makes the VA25-HP (DA) an ideal pump for filter-press applications.

In contrast, the existing range of high-pressure diaphragm pumps are single-acting pumps that can deliver



The Verderair VA25-HP (DA) is an FDA-approved AODD pump ideally suited to filter-press applications where the discharge pressure is higher than the available compressed air pressure.

fluid pressures of up to double the supplied compressed air pressure. This, however, results in a pulsating flow, high compressed air consumption and a 50% reduction of the flow rate.

The VA25-HP (DA) pump has a pressure selection switch to change pump operation from low pressure to high pressure. At the low-pressure setting the pump operates in normal, low-pressure mode with optimum use of the compressed air. When operating in high-pressure mode, the pump boosts the liquid pressure to double the compressed air pressure, at a flow rate of double that of a single-acting, high-pressure pump.

www.verder.co.za

SIL3 for SA valve manufacturer

Industrial valve manufacturer Gunric Valves has achieved a SIL3 safety integrity level, the highest level of safety, for their metal seated butterfly valves. SIL3 for electrically operated components within a system in a plant such as a refinery is assessed based on safety and reliability, as well as the impact of a system failure.

This Certification enables Gunric Valves to offer the oil, gas and water industries a guarantee that, when they need to close a particular section, the Gunric metal seated butterfly valve will close safely.

The Technology Localisation Implementation Unit (TLIU) assisted Gunric Valves in obtaining the SIL Certification according to IEC 601. The certification process took four months at a cost of R500 000. TLIU, hosted by the CSIR, is an initiative of the Department of Science and Technology (DST) and is mandated to assist state-owned companies in realising its localisation programme by improving the competitiveness of strategic suppliers.

By obtaining SIL3 certification, Gunric Valves can now supply locally manufactured products to the industry, and by-pass the traditional use of non-tariff barriers that allowed imported products with similar certifications to keep local products out of the market. www.gunric.com

Maintain generators for optimum ROI

Tom Bloom, general manager for the construction equipment division of SPESmith Power Equipment (SPE), distributors of Kipor generators, says that one of the problems in the industry is that, because of the intermittent nature of load shedding, owners are not servicing their generators properly. "This can have a serious effect on the longevity of the equipment," he says.

"Even if you are only using the generator a few times a year, one should perform maintenance according to the prescribed plan to get the best return on one's investment. We also find that a generator is often 'out of sight and out of mind' and when it's needed, there are often problems due to a lack of maintenance," he says.

Firstly, part of the maintenance plan is to ensure that the generator is in the right location. The following should be taken into account:

- Generators produce poisonous gases, which need to be expelled outdoors, hence they should be installed outdoors, under a roof, or in a room with good ventilation.
- A generator needs to have a good airflow to ensure it does not over-heat, hence the roof should not be too low and the area should be well ventilated, making sure all gases are extracted.
- To be able to get at the generator



Tom Bloom of SPESmith Power Equipment (SPE), distributors of Kipor generators, says that owners are not servicing their generators properly.

for maintenance purposes, it needs at least 1.0 m on each side for easy access.

- The generator should be positioned close to the distribution board to reduce cabling and installation costs. "Servicing and maintenance need not be time consuming or expensive – on the contrary! they save significantly on time and money in the long run," he continues. "A generator, like a motor vehicle, needs to be serviced regularly to prolong its life. The first service should take place after 50 hours and, at the very least thereafter, once annually or every 250 hours.

"All Kipor dealers countrywide have qualified technicians that are fully equipped to service generators to ensure the integrity and lifespan of the investment," he concludes.

www.smithpower.co.za

Link master and sensors for smarter manufacturing

The new IO-Link master for the Allen-Bradley POINT I/O system and IO-Link enabled sensors from Rockwell Automation go beyond detecting machine problems to enhancing machine productivity. These enhanced sensors simplify configuration, monitor machine health, and communicate data and diagnostics in real time via the global IO-Link communication protocol.

Traditional sensors merely send on/off status information. If a sensor fails, users only know when an operation goes awry downstream. IO-Link-enabled sensors provide a continuous flow of diagnostic information from the production line, helping to better predict maintenance needs.

"These smart sensors create smarter machines for smarter manufacturing," says Christo Buys, business manager for control systems, Rockwell Automation,

sub-Saharan Africa. "Based on IO-Link technology, our smart sensors and I/O are enabling technologies for the connected enterprise, which integrates control and information. The result is seamless visibility of field data through Rockwell Automation Integrated Architecture control systems."

The new sensors featuring embedded IO-Link operate the same as standard I/O sensors until connected to a master. Once interfaced with an IO-Link master, users can access advanced data and configuration capabilities while using the same three-wire cables.

Users can also program sensors and controllers in the same design environment. The Rockwell Software Studio 5000 Logix Designer software combines



Communication between operator and sensors means more useful information for decision-making.

design and engineering elements in a single interface, enabling users to access I/O and configuration data across the integrated architecture system.

www.rockwellautomation.co.za

Automation starter kit with MAC Sysmac Studio

Responding to the global trend, Omron has introduced its new NJ1 and NX7 machine automation controllers (MACs), which further expand the range at the heart of the Sysmac automation platform. The release of NJ1 and NX7 enables a wide range of automation solutions from cutting-edge, advanced production systems to simple machines.

The scalability of these MACs is further complemented by the new NJ1, the entry-level controller for up to two axes, which is fully compatible with NJ5/NJ3 MACs. The NJ1 enables the Sysmac solution to be used with existing production equipment. Sharing a common concept, dimensions, general specifications, and functions, the NJ1 is ideal for machines with few axes.

With architecture that can quickly incorporate the latest information communication technology (ICT), Sysmac offers a highly innovative manufacturing environment. It does this by creating a variety of application functionalities using software and by connecting to their own and third party factory automation hardware and design tools, such as 3D simulators.

The NX7 is the flagship model, which offers speed without compromising reliability. It provides the industry's fastest processing speed thanks to the Intel Core i7 quad-core processor and large memory capacity. Focusing on the future of sophisticated production sites using the Internet of Things, Omron has developed this integrated controller to provide users with scalability beyond the framework of previous controllers and PLCs.

The starter kit includes the industry's fastest MACs, the NX7 and NJ1 basic machine controller.

www.omron.com

Hydrogen storage for an energy-efficient future

With mounting pressure for industries to reduce their carbon emissions, hydrogen is a 'hot topic' in the motor vehicle manufacturing and renewable energy sectors. For Tshwane-based specialised engineering company RTS Africa Engineering, hydrogen-based technologies have exciting implications for a more energy-efficient future.

"Hydrogen is potentially the energy carrier of the future: by transforming electricity to hydrogen through water electrolysis, energy can be stored for later use. It is also considered one of the important future fuels as it provides clean and emission-free fuel for transport," says Ian Fraser, managing director of RTS Africa Engineering, the sub-Saharan

African agent for global hydrogen technology company NEL Hydrogen.

NEL Hydrogen produces electrolyzers for large-scale hydrogen production and for hydrogen storage of renewable energy and has installed more than 500 electrolyser units around the world.

In Africa, these include installations in Kenya, Egypt, Algeria and Nigeria and locally in South Africa, Saldanha Bay and Sezela in KwaZulu-Natal (KZN).

These units are extremely robust and reliable, requiring almost no maintenance, according to NEL Hydrogen's Eric Dabe. "Our hydrogen production plants have a long life-cycle, 40 years or more," he says adding, "the technology itself is simple, stable and safe, providing a reliable, ongoing supply of hydrogen. The only maintenance required is an overhaul of the electrolyser cells, which is recommended every eight years."

RTS Africa Engineering was the first of NEL Hydrogen's representatives to become a service agent. "Service at a distance can be a challenge. I am pleased that NEL Hydrogen has entrusted us with local service and support. Our customers expect a 24 hour service and we have been able to fulfil that requirement," says Fraser.

NEL Hydrogen based in Notodden, Norway, started life as part of Norsk Hydro, using electrolyser technology for large-scale hydrogen production for the company's ammonia fertilizer plants. In the 1970s, the company started selling its technology further afield, and became part of Norway's oil and gas giant Statoil in 2007.

In 2014, a group of Norwegian investors bought NEL Hydrogen and a new listed company was formed, NEL ASA, which is becoming a driving force in hydrogen-based technologies worldwide. With the acquisition of the Danish company H2 Logic in 2015, NEL ASA plans to further develop the hydrogen refuelling station (HRS) infrastructure in Norway and further afield.

The company has also bought the rights to Rotolyser rotating electrolyser technology, which offers enhanced efficiencies and footprint reduction. This technology, described by Dabe as "revolutionary" is still in its research and development stages.

"NEL Hydrogen has entered into a very exciting phase with two main driv-

ers: hydrogen production through global electrolyser plant installation; and a new focus on hydrogen refuelling stations through our acquisition of H2 Logic. We are committed to a future hydrogen society, which includes using hydrogen as a storage medium in integrated, renewable energy systems and providing the technology to make this possible," says Dabe.

Since 2011, NEL Hydrogen has supplied over 50 megawatts (MW) of hydrogen plants worldwide or approximately 12 000 Nm³/hour (normal cubic metres per hour).

"With the backing of many decades of continuous improvement in electrolyser technology for the production of hydrogen, at a minimum life-cycle cost, we can offer our customers in Africa expert advice, service and support through our local partner, RTS Africa," Dabe concludes. □



NEL Hydrogen has developed three standard models, which are modular in design and can be scaled up. These include the NEL A-150, providing between 50 and 150 Nm³/hour, the NEL A-300 that can generate up to 300 Nm³/hour and the NEL A-485 that can produce 485 Nm³/hour.

Africa Energy Indaba 2016

16 & 17 February 2016, Sandton Convention Centre, Sandton, Johannesburg

Africa is developing strategies to increase energy capacity, improve the energy mix and work together to create cross-border energy projects that will help to build a sustainable, accessible energy industry and alleviate the current energy crisis.

The Africa Energy Indaba 2016 conference and exhibition programme has been designed to bring together international and continental experts to share their insights and solutions to Africa's energy crisis, while simultaneously exploring the vast energy development and investment opportunities on offer in Africa.

The potential available in the energy sector will be discussed at the Africa Energy Indaba as well as at several official side events.

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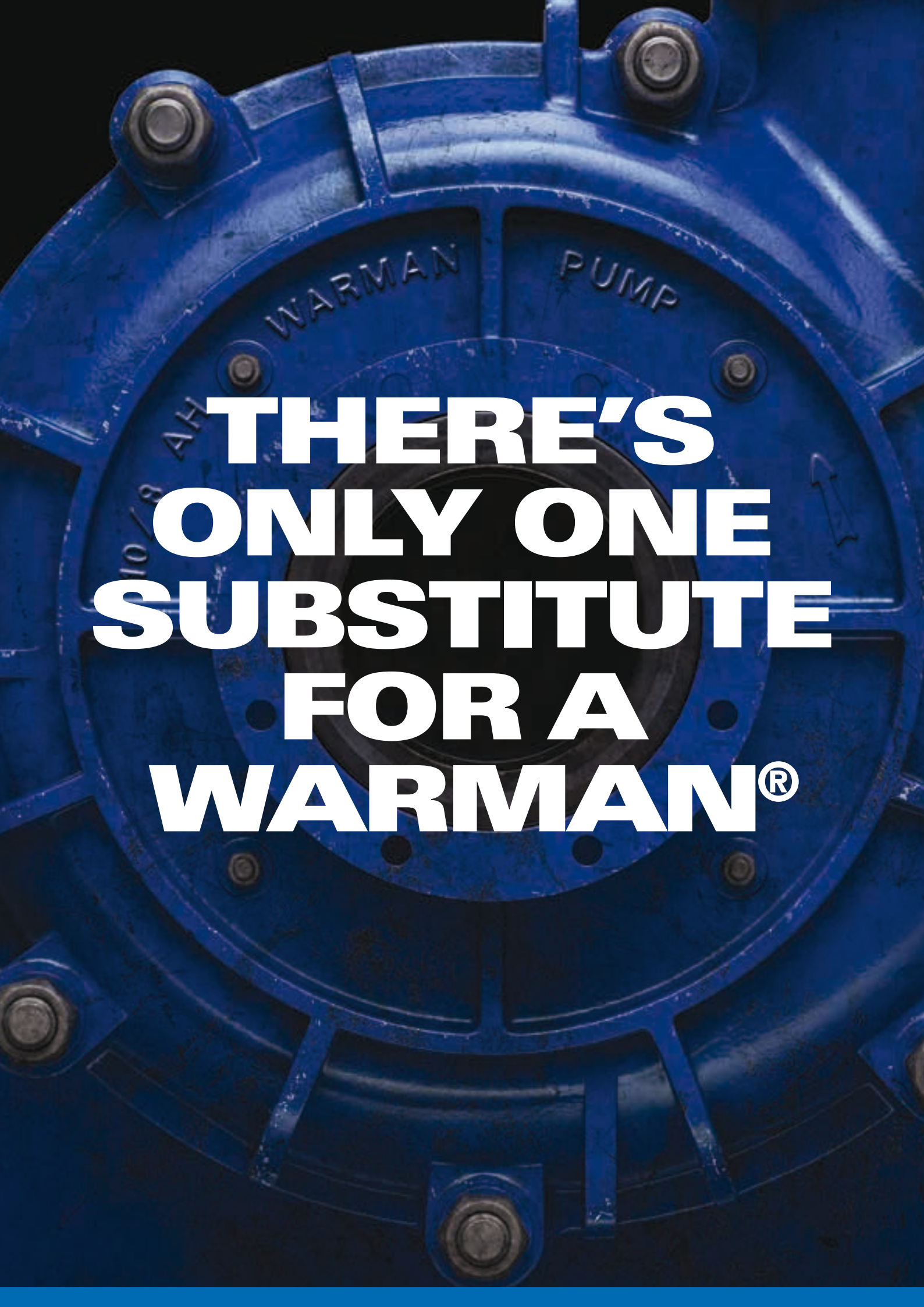
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