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JULY 2017

# AFRICA

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PUBLICATIONS



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## This month:

Hydraulic systems advance drum reclaimer technology

The IIoT: Customers' views of advanced diagnostics

A visit to the Mad Giant microbrewery

SA vehicle specialist adopts the connected PLM solution

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# One million jobs by growing manufacturing

Peter Middleton

## COMMENT



**D**elivering the keynote address at the opening session of the Manufacturing Indaba, Nampak CEO and Manufacturing Circle chairperson, André de Ruyter, talked about kick-starting industrialisation in South Africa.

He opened by highlighting the dire situation we are in: Manufacturing's contribution to GDP has fallen from 24% in the early 1980s to less than 13% by 2015. South Africa, De Ruyter says, is experiencing "premature deindustrialisation".

"For our stage of development, manufacturing's GDP contribution should be at double current rates and is lagging behind other emerging markets," he points out. The reasons? Increased competition from imports; increased labour costs; high energy costs; poor infrastructure; policy and regulatory uncertainty and asymmetrical compliance with WTO rules.

Since 1989, as the share of GDP has shrunk, South African manufacturing has shed 500 000 jobs. At 27.7%, current unemployment is the highest it has been for the past 14 years – and manufacturing contracted a further 3.4% in the first quarter of 2017.

"If manufacturing were to have an appropriate share of GDP (28 to 32%) for South Africa's developmental stage, 800 000 to 1.1-million jobs could be created," De Ruyter points out.

In addition, "manufacturing has the highest job multiplier of any sector", so manufacturing job losses have a bigger negative impact. And, compared to mining, "manufacturing generates 3.4-times higher social returns for the same private returns," 29.6% compared to 8.8% for every 10% of private income generated.

The case for a radical transformation of this sector is surely made?

Quoting Jerry Jasinowski, De Ruyter says that the economy of developed nations has tended to pass through industrialisation and into a services economy. "History teaches that a strong economy begins with a viable manufacturing base." Africa, he says, is seeking "a viable path to prosperity without passing through an industrialisation phase. This is not likely to happen. It is by no means clear that it is even possible."

Showing consecutive diagrams of the 'The vicious cycle of deindustrialisation' followed by the 'virtuous cycle that promotes economic growth', De Ruyter says that the departure point is demand. When people have less disposable income and consumer confidence is low, then demand falls, which causes lower capacity utilisation. Returns therefore fall, causing future investments to be deferred or cancelled. From a job's perspective, fewer shifts precede retrenchments and skills training

falls away, all of which cause demand to fall further.

"Without a virtuous cycle of investor and consumer confidence, supported by stable policies, South Africa will continue to deindustrialise, without the capacity to move to a services economy," he notes.

The solution? "To stimulate demand for local goods, via preferential procurement, protecting local industries through more assertive trade policies and support for localisation initiatives such as Proudly SA." Simply put, this leads to greater investor confidence, more jobs and training, higher levels of disposable income and increased demand.

But investment will not take place "if demand side policies do not dovetail with supply side policies ... and current demand from local consumers will not create impetus for growth." South Africa, De Ruyter believes, "needs a macroeconomic environment that facilitates more capital investment in local manufacturing."

Showing a matrix of possible initiatives, organised under the headings: Government incentives and support; Regulatory and policy interventions; and Private sector counter-performance requirements, he says that, while the goal is to persuade the private sector to invest in new capacity, this comes with responsibilities: job creation; a commitment to remain invested; and to support black industrialists at scale.

From the Regulatory column he lifts out a suggestion for government to 'consider a super-ministry to drive industrialisation – SA's Ministry of International Trade and Industry – which would offer a less fragmented approach to the endeavours of the ministries currently involved in this area: Trade and Industry (dti), Economic Development (EDD); Small Business Development; Finance and Public Enterprises.

Other policy suggestions include: proactive trade policies; using regulatory levers; private sector participation in SOCs; reconsidering proposed disincentivising taxes; and better support for black industrialists. And, most notably in the incentives and support column: a favourable tax rate of 15% for existing and new business in designated industrial areas.

Concluding, De Ruyter reveals that the Manufacturing Circle, in collaboration with industry associations, has launched an initiative to create a million new jobs in the manufacturing sector in South Africa. "We are currently identifying: first, investments that could be made by manufacturing firms and; second, what needs to be resolved, unblocked or addressed in order for these investments to take place," he says.

A long overdue process that deserves all of our support. □

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Stainless Steel Eiffel Tower Project - LCC App Entry Data				
Life Cycle Costing Input		Mild Steel	Utility Ferritic Stainless Steel (e.g. 3CR12)	Lean Duplex Stainless Steel (e.g. LDX 2101)
Rates & Duration	Cost of Capital pa	2%	2%	2%
	Inflation Rate pa	1%	1%	1%
	Desired Duration (years)	100	100	100
	Downtime per Maintenance Event (days)	0	0	0
	Value of lost production (amount per day)	0	0	0
Initial Costs	Material Cost	7 300 t @ \$600/t \$4 380 000	7 300 t @ \$1 475/t \$10 767 500	5 475 t @ \$2 575/t \$14 098 125
	Fabrication Cost	1.25 x Material Cost \$5 475 000	1.25 x Material Cost \$13 459 375	1.25 x Material Cost \$17 622 656
	Other Installation Costs	Painting \$4 073 376	Cleaning (0.3 x painting costs) \$1 222 013	Cleaning (0.3 x painting costs) \$1 222 013
Operating Costs	Maintenance Costs	Painting	None	Cleaning (0.3 x painting costs)
	Cost Per Event	\$4 073 376	\$0	\$1 222 013
	Time Between Maintenance Events (years)	7	N/A	20
	Replacement Costs	Scrapped After 100 years	Scrapped After 100 years	Scrapped After 100 years
	Elapsed Time Between Replacement (years)	100	100	100
	Removal Cost Per Event	\$1 000 000	\$1 000 000	\$1 000 000
	Material + Installation Cost Per Event	\$0	\$0	\$0
	Residual Mass of Material Per Event	7 300 t @ \$200/t \$1 460 000	7 300 t @ \$300/t \$2 190 000	5 475 t @ \$700/t \$3 832 500
Annual Material Related Cost	\$0	\$0	\$0	

Would a stainless steel Eiffel Tower be cheaper than a mild steel one?

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# Service priorities for

*MechChem Africa* talks to Atlas Copco's Ian Ainsworth, the new business line manager for Compressor Technique Service (CTS) about positioning the service offering to better suit the needs of its compressor users.

“From a service perspective, we at Atlas Copco want to be seen as on our customers' side, making their processes more efficient, more effective and more productive,” begins the company's new service line manager, Ian Ainsworth. “Our global vision is to be ‘first in mind, first in choice’, and our internal interpretation of that is that our staff should have our customers first in mind so that they choose us as their preferred partner for compressed air,” he adds.

“Corporates tend to become inward focused, relying on internal procedures and machine specifications in their dealings with customers, who can be left feeling let down because nobody is responding directly to their specific needs and concerns. We believe in forming partnerships with clients, personal relationships that involve mutual trust and a thorough understanding of each customer's needs and priorities,” he says.

“At CTS, we see our role as going beyond servicing, repairing or overhauling a machine.

It's more about finding ways of supporting customers so that their business and ours can succeed and grow,” Ainsworth tells *MechChem Africa*.

Describing a new initiative in the service planning department, he says: “We have always had an excellent planning team who are strong when it comes to administration, planning and using the CRM (customer relationship management) systems. But these administration specialists are not always technically trained and some have never visited a compressor on site. When a customer phones, it always helps when the person talking to them can see their environment and fully understand the issues involved,” he points out.

“When standing in a compressor room at a Platinum mine 300 km away reporting a fault and asking for immediate assistance, background information such as whether power cables are connected and/or accessible; how high the ceiling is and whether lifting gear is available onsite might be very relevant. But from a planning/call-out perspective these



questions seldom occur to a CRM-system specialist.

“What we have now done is add technically experienced people to the spares and service planning division so that customers can be better supported by people who understand the servicing needs. When that call comes in, the technical service coordinator knows to ask the relevant questions and, while planning the service visit, he or she can imagine and discuss exactly what the customer's concerns are and what the Atlas Copco technician will need to bring in order to resolve the issue to the customer's total satisfaction,” he says.

“The immediate result of this approach is that delays are avoided, customer downtime is reduced and our onsite technicians' time is used more efficiently,” explains Ainsworth, adding that this benefits both the customer and Atlas Copco.

“It is about making it easier for customers to do business with us. Through more responsive and better service, we are committed to making customers feel better supported,” he adds.

A second innovation, according to Ainsworth, involves “beefing up our internal planning systems: Our existing system, MAM, has been used for work scheduling for several years. This is a centrally located online system with a calendar view that enables us to go paperless with respect to service schedules and work allocation.



*Atlas Copco Compressor Technique's South African service team.*

# customer growth



*Above: While planning the service visit, the technical service coordinator can identify exactly what the Atlas Copco technician will need to perform the service.*

*Left: CTS Service Plans are Atlas Copco's preferred way of establishing lasting long-term relationships with the users of its compressor technology.*

"With the new roll out, project management functionality such as Gant charts has been added so that we can tell at a glance where each technician is, where the overlaps are and what excess capacity we have. This will allow us to better deal with unexpected breakdown work, which always tends to be urgent, causing a negative impacts on the planned service support side," he reveals.

The new system, called MAM<sup>2</sup>, is being rolled out with the core goal of better supporting the hundreds of South African customers on Atlas Copco Service Plans. "We are now populating our calendars months ahead to make absolutely sure that our loyal Service Plan customers are better prioritised," Ainsworth assures.

Service plans offer customers significant reliability benefits. "In the ideal world machines will run without problems and unscheduled breakdowns. When Atlas Copco takes control of the scheduled service side of compressor operations, this ideal can be more closely realised and unscheduled breakdowns almost entirely avoided. This allows operators to take better care of their core production processes without distractions and uncertainties.

"Compressed air, like electricity, is one of the utilities in manufacturing or processing plants. It need not be anything else. It should be there when needed without the worry about how it will be supplied," Ainsworth sug-

gests, but he cautions that he is not suggesting that customers should neglect their systems – they still need to ensure that the filters are not clogged, coolers blocked, the ventilation is adequate and, most importantly, that the machines are well lubricated.

CTS Service Plans are Atlas Copco's preferred way of establishing lasting long-term relationships with the users of its compressor technology. "We see the protection of these machines as a partnership. Users need to be alert to the things that indicate problems, while we keep track of the routine maintenance requirements. That way, the best life and performance can be extracted from the investment and the costs of ownership kept to a minimum," he says.

In addition, almost all new Atlas Copco compressors are now delivered with advanced monitoring and communication systems built in. Through SmartLink, machines are able to monitor and self diagnose their condition, with data being automatically uploaded via a GSM connection to Atlas Copco servers in the cloud. This enables advanced predictive maintenance to further protect customers' assets.

Information that makes the compressor room more accessible and transparent to the customer can be analysed and displayed on dashboards by the customer or by Atlas Copco technicians. Every machine's performance can be tracked so that reliability issues can be detected early and energy use efficiently managed.

"With our SmartLink Uptime licence, sensor and alarm data from the compressor is uploaded every 40 seconds and, should any

fall outside of normal operation, users and Atlas Copco technicians will be immediately alerted.

"If coupled with our Total Responsibility premium offering service plan, an Atlas Copco technician will be dispatched to attend to any fault before the operator is even aware of an issue," he tells *MechChem Africa*.

From a sustainability perspective, Atlas Copco has long been at the forefront of developing and supplying the most efficient compressor systems available, driven by advanced VSDs and permanent magnet motor technology. "In Europe, it is common for plants to invest millions in order to save 2.0% on their energy costs," Ainsworth reveals.

"As a rule of thumb, if a plan can reduce the pressure requirement from its compressor system by 1.0 bar, the electricity consumption and cost for compressed air will reduce by 7.0% – and from a service perspective, there are many ways that this can be done: reducing pressure drops across the filters; fixing all of the air leaks; and paying close attention to the lubrication and cooling of the compressor, to name but a few.

"During a recent service, we noted that the lubricating oil was running at 85 °C. Following servicing and by switching to the recommended lubricant, we were able to reduce that temperature by 15 °C, which massively improves the machine's efficiency," he relates.

Atlas Copco's SmartLink Energy is the monitoring tool that strives to optimise energy use for compressor users. Through customised reports on the energy efficiency of the compressor room, in compliance with ISO 50001, it becomes possible to identify energy saving opportunities across the plant so as to minimise operational costs. In addition, better-optimised systems are more reliable, so compressor operational costs can be further reduced.

"As a cost-effective starting point for taking back control of compressor rooms, we recommend the Atlas Copco Preventative Maintenance Agreement with a SmartLink Uptime licence. This covers scheduled services but has the added protection of advanced monitoring to minimise the risk of unplanned breakdowns," Ainsworth suggests.

"From our side, we are also implementing a new local strategy to better utilise the data available from our machines in the field. We are fortunate to have several experienced technical specialists that can drill down, interpret and summarise machine data coming in from connected machines so that we can more regularly pre-empt onsite problems," he adds.

"Through all of CTS's new service initiatives, we aim to put customers first and get back to relationships where customers know that we have their interests in mind," he concludes. □

# Craig Sheridan: lavender oil, wine

*MechChem Africa* profiles new SAIChE IChemE President Craig Sheridan, who was elected to take over from Dawie van Vuuren at the Institute's Annual General meeting on April 20, 2017.

“I attended seven schools while growing up. My step-father was a consulting mechanical engineer so we tended to move around a lot. I finished off at Springs High School for boys, which was very strong in maths and science. My matric class of 1994 produced some 10 graduate engineers, which is a lot for any single school,” Sheridan begins.

Having won a Goldfields bursary to do chemical engineering, Sheridan was required to complete a pre-university year. “As part of that process we were required to work for six months, so I became a learner official for extractive metallurgy at Leeudoorn, a division of the Kloof mine in Westonaria.

“I worked at an operator level, which involved real hands on training – how the crusher section worked; the stacker-reclaimers; the milling; the leaching; and how the carbon

in pulp processes worked – and this gave me a thorough understanding of plant-wide processes,” he tells *MechChem Africa*.

“So by the time I joined Wits for my first year in 1995 and we started to hear about ion-exchange and solvent extraction processes, I actually knew how these plants worked in practice and the difference between them,” Sheridan recalls.

What made his Wits experience most notable, however, was that Sheridan failed his thermodynamics exam in his third year, which meant having to repeat the year. “I never viewed this as failure, though. Instead, I learned that I wasn't ready to proceed. This year gave me the opportunity to reflect and discover what I really enjoyed doing,” he says.

It was during this year that Sheridan developed his love of academic research. “Because I had so much extra time on my hands, I did

research for professors Diane Hildebrandt and David Glasser, where I developed a love for the practical side of academic research,” he reveals.

The research? “I created a small lavender oil distillation plant. I built a steam stripper from a pressure cooker with a packed bed, a glass column, a condenser and decanters for separation. It was a really nice rig. In the process, I was able to fully understand and describe the mechanisms for extracting oil from the plant material,” he responds.

Goldfields merged with Gencor in that year, ending the bursary programme, “but I got a bursary from Fluor for the last two years of my degree. And I was able to use the lavender oil distillation work for my research project, which made my final year really easy. I had lot of time to interrogate and analyse the research and I still managed to finish by September of my final year.”

To make best use of the time available to him, Sheridan applied for an IAESTE (International Association for the Exchange of Students for Technical Experience) programme and managed to secure a three-month exchange to FLS Automation in Copenhagen.

“At that point, I realised that I wasn't ready to start working for Fluor, so I resigned and took out a student loan to pay off my bursary. Then I signed up for an MSc at Stellenbosch University to look into the wine-making industry from a chemical engineering perspective.” His thesis title was: ‘A critical process analysis of winemaking to improve cost, quality and environmental performance’.

Following his masters, Sheridan went onto complete a PhD in the wine industry on environmental and water issues. “Water usage in wineries involves a lot of washing of tanks using caustic soda, so the industry's wastewater needs to be handled carefully,” Sheridan explains.

Cleaning the water is also difficult and the waste cannot be reintroduced into the environment. Having 300 cellars with contaminated water sitting on a river system can become real a problem,” he points out.

Sheridan worked on a water treatment strategy called constructed wetlands. “These are artificial and 100% contained systems for treating domestic or industrial wastewater. While natural processes are used to purify the water, the processes involved are highly complex and difficult to fully understand or predict,” he notes, adding that biological processes tend to evolve in an interconnected and complex way.

“Constructed wetlands use different



Craig Sheridan at a water harvesting and purification facility at Wits. “Should we be using treated potable water for our gardens when less pure water sources are perfectly adequate?” Sheridan asks.



# and water research

bacteria at different locations along a flow-through system. For recalcitrant water, residence times might be as long as two weeks, while waste that biodegrades more easily might need a shorter time.

"From a team point of view, one can see the need for a holistic approach when it comes to developing successful systems such as these," he argues, adding that he currently still has several research students working in this area.

After completing his PhD, Sheridan joined the environmental consultancy, ERM, where he conducted EIAs, risk assessments, contaminated site management projects and remediation. After three years in this job, a post opened up at Wits as a lecturer and I was appointed to start in 2010. I also managed to get my PrEng in that year having finally found time to complete the design requirement, a project to strip out precious metals from waste streams using solvent extraction.

Following three years as a lecturer and a six-month sabbatical to Leipzig in Germany and to the Sustainable Minerals Institute at the University of Queensland in Australia, Sheridan was promoted to senior lecturer in August 2013. "Since then, I have been ramping up our research activities and I was promoted to associate professor in August 2015.

"I have always been interested in the water and environmental space but uncomfortable with water being so closely aligned with civil engineering. To me, the needs in this space involve chemical engineering with other cross-disciplinary technologies.

"I was an early mover into the environmental and water side of chemical engineering. Civil engineers design water reticulation systems, dams and wastewater/sewage plants. In many ways wastewater treatment plants are a chemical processes 101 course for civil engineers and we have developed a course in wastewater engineering for final year students," he tells *MechChem Africa*.

More and more chemical engineers are now involved in treatment plants. "Water treatment is much more technical on the reactor side. Historically, wastewater treatment was simple: the sewage was dosed and aerated, this created sludge and you knew that if you left this for long enough, the water would be OK. The plant would do its job.

"But nowadays, these plants need to adhere to tighter controls with stricter environmental discharge limits, so more chemical engineers are moving into that space. In the UK and Europe, water treatment is handled in cross-disciplinary teams of engineers," he adds.

"Our most recent endeavour is to promote a more holistic and interdisciplinary approach



*Sheridan demonstrates an ongoing mini-constructed wetlands research project at the University of the Witwatersrand.*

to resolving water-related problems in South Africa. We have just established a new Centre in Water Research and Development, which is a cross-facility, cross-curricula, cross-school and interdisciplinary water think-tank that, as well as all the engineering disciplines, also embraces social science, economics, art, the school of governance as well psychology and political science.

"If you look at the food/energy/water nexus, it becomes clear that these are totally inter-connected. If the price of oil goes up then the price of food goes up. The price of sunflower oil is directly linked to the price of oil, because both can be used to make fuel.

With respect to water, some 70% of global water consumption is used on agricultural crops, so drought is the very first thing to affect food prices. This nexus forms a triangle. If you push on one side you always impact the other two.

"It is possible to live without energy – animals do – and to survive without food for over a month. But water is critical to survival. People can only survive for 130 hours without water, after that you die. It's that simple," Sheridan notes.

"We need to understand and develop ways of influencing society towards better respect for the critical importance water plays in our survival. To do this we need to engage with the whole cycle of influence and of being influenced. As engineers we need to ask ourselves how we can influence society," he says.

"The Centre in Water Research and

## SAIChE IChemE



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Development is a think-tank that strives to get people from all walks of life thinking in the same place at the same time. We are striving to generate the realisation that water is precious and an awareness of all of the things we can and should be doing to preserve, protect and efficiently use this critical resource," he informs *MechChem Africa*.

"Should we be using treated potable water for our gardens when less pure water sources are perfectly adequate?" Sheridan asks.

"I get very upset when I see a leaking sewer because it will cause major damage all the way down the water resource. When reported, the City should react immediately. But if society doesn't care, then why should the City care?"

"The idea underpinning the Centre in Water Research and Development is that, while engineering is one of the spaces that can have an impact on water availability, society itself is the lever that engineers respond to, not the other way around," Sheridan concludes. □

# New mounted and unmounted

Bearings International, part of the Hudaco Group and a well-known supplier of bearings and power transmission products in Southern Africa, has new products on offer, including mounted and unmounted bearings and housings from KML. As well as these, BI has recently obtained dealerships for various products for bulk materials handling and cement applications, such as KÖBO's high-quality, reasonably priced product range. Lastly, BI offers the ROCOL RTD lubricant for reaming, tapping and drilling operations.



BI's business unit head for product and engineering, Ross Trevelyan.

**K**ML Bearings, distributed locally by leading supplier Bearings International (BI), offers a range of mounted and unmounted bearings and bearing housings. In addition, it also has automotive-specific products for the

passenger and commercial vehicle sectors.

"There is even a product range dedicated to the electric motor industry," adds business unit head, Ross Trevelyan. These bearings are manufactured specifically and carry the 'Electric Motor Quality' (EMQ) suffix.

According to Trevelyan, KML has proved highly successful in the industrial, OEM, and agricultural markets as a second-tier brand that does not sacrifice quality, while offering significant cost benefits. "We have managed to negotiate better pricing in line with the current economic climate on agriculture-specific and mounted ball bearing units, and are happy to have passed these discounts onto the market," Trevelyan highlights.

With 35 years' experience in the bearings industry, KML has an in-house research-and-development department. Milestones to date include the first in the industry to introduce a dedicated cleanroom for the manufacture, cleaning, and packaging of EMQ bearings. With a presence in over 50 countries, end users can rest assured that replacements are readily available globally.

Latest developments include the development of an improved version of a harrow disc hub

bearing unit for the agricultural market. "We are now finalising the design to ensure an exact fit to the current discs available on the market so that we can offer a simple drop-in solution," Trevelyan explains.

BI has a dedicated engineering department that can offer customers and end users assistance in terms of failure analysis and recommended improvements where necessary, from product selection and recommendations to design improvements.

## Products for bulk materials and cement

Also distributed exclusively by BI are engineered and standard chains, sprockets and ancillary products such as outboard rollers, scrapers, and carrier pans used in conjunction with chains from leading manufacturer KÖBO.

Target industries are bulk materials handling, steel, pulp and paper, wood, automotive, escalators, food and beverage, and water treatment. "With international supply to global OEMs, as well as industry-specific support companies, BI is well-positioned to support the local market with KÖBO's high-quality, reasonably-priced product range," product manager Gavin Kirsten comments.

KÖBO's focus on replacement chains and sprockets for the OEM sector in particular means that end users are assured of fit-for-purpose, cost-effective



KML's mounted and unmounted bearings and housings have proved highly successful in the industrial, OEM, and agricultural markets as a second-tier brand that does not sacrifice quality, while offering significant cost benefits.

# bearings and housings from KML

replacement options. As the sole manufacturer and distributor of its product range, KÖBO is able to keep tight control over end quality and consistency. This is because its extensive chain-design knowledge is backed-up by 120 years of in-house manufacturing experience.

A particular growth opportunity locally is the cement industry, specifically in terms of hot-pan conveyor chain, anti-bend back chain, apron feeder and reclaiming chain, and bucket elevator chain. "With the high-quality requirements of the cement industry, particularly in Europe and the Americas, KÖBO has been a leading supplier to major OEMs for many years," Kirsten highlights. The cement industry locally represents "a large independent segment" that BI is targeting and offering value solutions with products such as KÖBO's.

BI offers full local aftermarket and technical support, in conjunction with assistance from the KÖBO engineering and design team in Germany. Customised chain-maintenance is also offered as a value-added service for specific customer requirements.

This encompasses preventative and general maintenance, repair, on-site repair and machine modifications, scheduled shutdowns, alterations, adjustments and modifications, machine set-up and final assembly, dismantling, transport and reassembly, set-up assistance, emergency repairs, and spare parts.

## Lubricant for reaming, tapping and drilling

Yet another product distributed locally by BI, called ROCOL RTD, is a hand-applied

*A KÖBO baking oven chain: BI is well-positioned to support the local market with KÖBO's high-quality, reasonably-priced product range.*



lubricant for reaming, tapping and drilling operations. Available in both liquid and spray formulations, the range contains technically-advanced extreme-pressure additives that reduce friction at the cutting edge.

"This means that ROCOL RTD extends tool life as well as promoting a superior surface finish, resulting in cost-savings and improved quality," says BI product manager, Richard Lundgren.

The liquid formulation not only doubles tool life, but also is suitable for all metals, including aluminium. Benefits include reduced wear and tap breakages, increased rates of metal removal, reduced scrap, and greater dimensional accuracy and repeatability. It is available in 400 g, as well as five litre and 20 litre containers.

The spray formulation is a 400 ml aerosol-applied metal-cutting lubricant

suitable for all metals, including hardened steels and titanium in even the most severe cutting operations. Ideal for applications where accessibility is an issue, it is a must-have product for all machine shops, tool rooms and maintenance departments. "ROCOL RTD has been the market leader for over 60 years. However severe the reaming, tapping or drilling application, this is the ideal product," Lundgren concludes.

"It is part of our strategy to be a total solutions partner for our customers in stocking some of the best products and brands from around the world, and ROCOL RTD definitely falls into this category," says BI business unit head: product and engineering, Ross Trevelyan.

BI, part of the Hudaco Group, has consolidated its position as a leading distributor of bearings and power transmission products in Southern Africa by launching a new brand identity at the end of last year. "Our aim is to become a proactive company providing excellent service to our customers to ensure we are the preferred supplier," claims BI CEO Burtie Roberts. □

## New premises for SEW EURODRIVE in Port Elizabeth

SEW EURODRIVE South Africa's Port Elizabeth branch has relocated to Unit 4, Aldo Business Park, Old Cape Road in Greenbushes, reflecting both the growth of the branch and the importance of the Eastern Cape region, according to branch manager, Francois Sieberhangen.

Although Port Elizabeth is the smallest SEW EURODRIVE branch nationally, it is showing very promising growth. "We look after some of the largest accounts nationally, and are a major contributor of servo drive technology, AC drives, and decentralised drives," says Sieberhangen. The branch services the entire Eastern Cape region, with customers in the automotive, food and beverage, tyre and rubber, wood and timber, and fishing industries, in addition to OEMs and resellers.

The Port Elizabeth branch was established initially as a service and repair branch, with minimal assembly taking place. "We have grown tremendously since then, to the point where we outgrew our previous facility completely. In order to keep up with market requirements, we needed larger premises," Sieberhangen explains. The new 800 m<sup>2</sup> building is significantly larger than the original 300 m<sup>2</sup> premises.

"We managed the entire move internally with great success.

Various tasks were assigned to, and managed by, different employees. Timing was of the essence, as we could only move various components of our sales and operation once critical aspects were in place at our new premises, such as alarm systems, electrical work, compressed air, network, and telephone facilities. We managed the entire move in a couple of days, with little to no disruption to our customers," Sieberhangen says.

"The new premises allow us to implement internal SEW EURODRIVE requirements. Furthermore, it provides space to employ additional staff. The addition of a mechatronics engineer allows us to improve our technical support and field service to our customers. An additional administrator removes some administrative duties from the sales staff team, who can now focus on processing customer enquiries more efficiently," Sieberhangen concludes. □



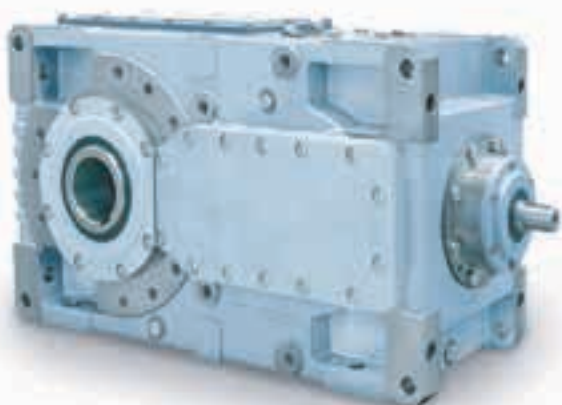


Bonfiglioli Industrial Solutions

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# Special services for the sugar industry

BMG's KZN field service team has been involved in a number of field service projects in the local sugar industry during recent off-crop seasons, as well as dealing with urgent breakdowns in sugar mills and refineries.

A recent field service project completed during the previous off-crop season was a turnkey *in situ* replacement of diffuser head shaft bearings and the complete refurbishment of the multi misalignment couplings driving each end of the head shaft.

"BMG's design and installation team faced many challenges during this project, including the lack of engineering drawings required for the manufacture of replacement components. This meant bearing sleeves could only be final-machined after the extraction of components, some of which had been in operation for approximately 20 years," says Chris Johns, BMG's regional manager for KZN and Swaziland.

"Restricted space for moving enormous components added to the difficulties of the project. Due to the extended reach of the head shaft, it was not feasible to employ the conventional approach of using mobile cranes. Instead, support structures were specially manufactured and placed under the 126 t head shaft and used to jack the shaft up and out of the pedestals, allowing the team access to replace the 900 mm bore diameter bearings.

"BMG coped with extremely tight timeframes to manufacture replacement components and complete the project, which also involved the installation of new bearings and adaptor sleeves, as well as new keys and connector arms for the couplings," according to Johns.

BMG's field service team also recently attended to a failure on a mill gearbox in KZN, where the coupling box had seized, causing excessive axial loading on the final drive bearings, resulting in failure of these bearings.

The complete mill gearbox had to be dismantled, all gearing dressed and damaged components repaired. Scope of operations also included fitting and mounting of all bearings, re-assembly of the gearbox and alignment and blueing of all gearing. BMG supplied new bearings, adaptor and withdrawal sleeves, seals and grease for this project.

Other recent breakdowns in the sugar industry involved attending to a Dorstener mill gearbox in Swaziland and a shredder failure in KZN.

BMG is committed to providing engineering solutions and technical services that optimise productivity, to make a difference to the efficiencies of every sugar mill and refinery.

A wide range of products, selected especially for the sugar industry, is available from BMG, throughout Africa. These components include carrier and diffuser chain, knife and shredder bearing housings, custom sprockets and gear couplings, as well as steam gaskets, heat exchangers and hydraulic tools. Diffuser and mill gear boxes, in addition to mill lubrica-



BMG's specialist services to the sugar sector include bearing and gearbox inspection, bearing and chain refurbishment, large size bearing assembly and alignment and balancing, as well as customised product design.



BMG's KZN field service team has been involved in a number of field service projects in the local sugar industry during recent off crop seasons, as well as dealing with urgent breakdowns in sugar mills and refineries.

tion and hydraulic systems, form a critical part of this range.

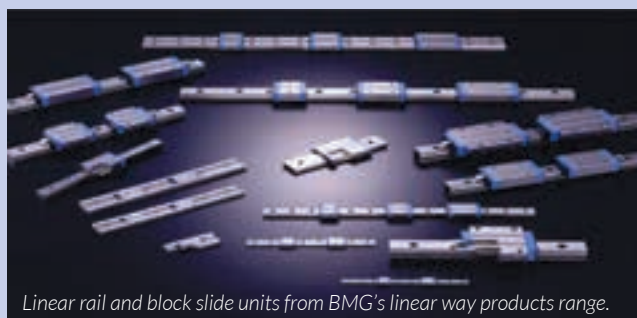
BMG's specialist services to the sugar sector include bearing and gearbox inspection, bearing and chain refurbishment, large size bearing assembly and alignment and balancing, as well as customised product design. BMG also offers a trouble shooting and maintenance service, condition monitoring and training. □

## Linear motion systems meet demands of advanced engineering

BMG's linear motion systems and associated products are designed for high speed, high precision performance, to meet the rigorous demands of technologically advanced engineering.

"With the growing trend for companies to move away from manual machine operation to specialised mechanisation as part of cost saving programmes, BMG has made a substantial investment in expanding our product range to meet specific demand in economical and highly complex applications," says Rouff Essop, general manager, bearings, BMG. "BMG's quality branded linear motion products have been carefully selected for excellent accuracy and smooth linear motion, easy integration, energy saving and environmental protection."

BMG's linear way products include linear guides, runner blocks, rails, ball screws, bushings and shafts, designed for use in diverse applications, including OEMs, the machine tool sector, automotive



Linear rail and block slide units from BMG's linear way products range.

plants, design houses, packaging, beverage plants, robotics, brick and glass manufacturing, paper, pulp and wood industries, as well as for measuring systems. □



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# Hygienic design of bearings is key to food safety

Bearings are easy places to trap food particles. SKF has considered this for a long time in its design principles for bearings, especially so in the case of the food safety product ranges. SKF has its own hygienic design offices and has been a member of the European Hygienic Engineering & Design Group since 2006.

**A**n emphasis on the hygiene element of the design of equipment can play an important role in controlling the safety of manufactured food products. However, applying this too broadly without focusing specifically on the hygienic design of the components part of the system can potentially risk the spread of bacteria trapped within bearings, says Davide Zanghi, the person responsible for the hygienic design office at SKF.

Hygienic design considers specifically how problems such as corrosion, lubricant leakage, cleaning and self-drying could adversely affect food safety – and applies design principles to solve the problem. In essence, it is a design philosophy applied through dedicated and specific rules. Just as ergonomic design pays close attention to the physical needs of product users, hygienic design has a laser focus on preventing issues of food contamination.

In November 2016, Denmark ran its biennial World Congress at which SKF – a member of the European Hygienic Engineering & Design Group (EHEDG) since 2006 – highlighted its long record using these design principles. In general, EHEDG guidelines consider bearings an easy place to trap food particles and water and therefore these are seen as potential breeding grounds that will harbour bacteria. The best advice is to keep bearings well away from food product contact areas.

This is very much the case with recent guidelines on hygienic design of belt conveyors for the food industry, where EHEDG addresses two of the major challenges in safe food production: how to avoid contamination of food through inadequately designed processing equipment and how to improve food safety without raising operating costs for cleaning and production hygiene. Even if a great deal of attention is concentrated on systems design, major components such as belts, bearing and bearing units consistently have a low profile within the overall hygienic system design.

However, even if not in direct contact with the food zone, bearings are often in the proximity of food products and, with high-pressure water or dry cleaning regimes, they

pose the risk that bacteria – if present – can become airborne and potentially contaminate the food product.

In order to minimise the risk of contamination, designing bearings with hygienic design principles in mind is a key consideration. One of the most important principles underpinning hygienic design is the ability to clean effectively. For bearings and bearing units, this may be easy to understand but it is often difficult to achieve in practice. For a start, the products should be made from non-corrosive and non-porous materials, such as stainless steel, or composites, and with shapes that are cleanable and allow for self-draining. Bearing units should have filled bases, which removes cavities where germs may fester.

In general, materials used such as elastomers, composites and grease, should be compliant with food safety directives and regulations. In all instances, any potential for grease leakage onto the food product during operation should be avoided.

Ideally, bearing units should have effective



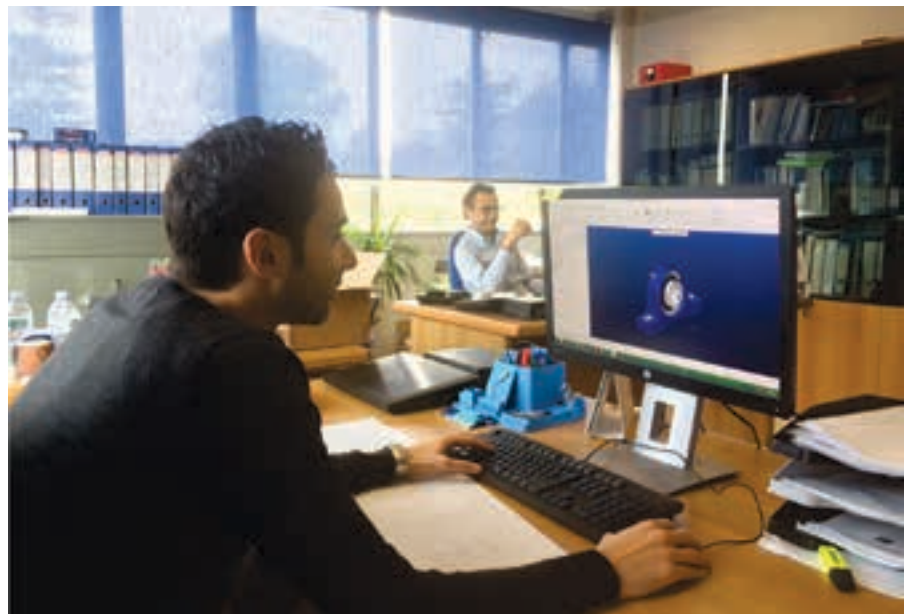
*Hygienic design of bearing is key to food safety.*

end covers that prevent process contaminants and cleaning fluids from entering the bearing units' cavities and, at the same time, allow for frequent visual inspection.

Other important aspects include:

- Avoiding metal-to-metal contacts in-between unit components and in-between units and attaching surfaces.
- Avoiding re-lubrication as much as possible.
- Achieving a high service life despite very demanding operating and cleaning regimes.

Hygienic design applies to food production and packaging machinery in their entirety. But dealing specifically with one of the most problematic components – bearings – can only help to improve the overall risk strategy. □



*SKF's hygienic design office. Hygienic design considers specifically how problems such as corrosion, lubricant leakage, cleaning and self-drying could adversely affect food safety – and applies design principles to solve the problem.*



## Hydraulic systems advance drum reclaimer technology

Following the recent commissioning of two thyssenKrupp drum reclaimers at the Medupi Power station and the delivery of a further three to Kusile, *MechChem Africa* talks to Klaus Marggraff, systems sales manager for Hytec, about the novel hydraulics being used to advance the performance of thyssenKrupp Industrial Solutions (TKIS) South Africa's specialist technology.

**T**KIS South Africa has now completed the delivery of five drum reclaimers to the new-build power stations in South Africa, two to Medupi and three to Kusile. "Hytec developed and supplied the hydraulic systems for these machines, which include: the system to operate the rakes; the heel adjustment mechanism that sits underneath the rakes; and a new conveyor belt adjustment system," begins Marggraff.

These are dual drum reclaimers, which means that they can reclaim coal down the one side of the stockpile while the stacker is adding coal behind. Then, when at the end of the pile, the front rake is switched off and

the rear rake is activated for reclaiming in the opposite direction. Marggraff adds that the machines are fully automated. "There is an operator on each reclaimer, but his role is to respond to safety issues and unusual events. The routine reclamation process proceeds under full automatic control," he says.

Coal stacking and reclamation at power stations is essential for blending purposes, so that the pulverised coal that enters the boiler has relatively consistent calorific value. This is to prevent excessive temperature, pressure and power fluctuations.

The thyssenKrupp drum reclaimers are used to feed blended coal into common bunkers, from where coal is fed to all six units at

the respective power stations.

Describing the role of the rakes on the reclaimers, Marggraff says: "The rakes oscillate across the stockpile so that a steady stream of coal flows down the pile, into the drum and onto the conveyor inside the drum. The rake's role is to initiate material flow without causing avalanches, which could cause the system to overload.

"The reciprocating movement of the rakes is achieved using a single through rod cylinder with a 2.0 m stroke on each rake," he informs *MechChem Africa*. Cylinders with a 160 mm bore and a 120 mm rod are used at an operating pressure of around 160 bar, with the through rod cylinder design ensur-



The reciprocating movement of the rakes on thyssenKrupp drum reclaimers is achieved using a single through rod cylinder with a 2.0 m stroke on each rake.





*The rake system is driven by a variable displacement Rexroth A11VO swash-plate hydraulic pump capable of producing a maximum flow rate of 370 l/min.*

ing that speed in either direction can be easily maintained.

"The rake system is driven by a 90 kW hydraulic power pack, with an electric motor driving a variable displacement Rexroth A11 swash-plate hydraulic pump capable of producing a maximum flow rate of 370 l/min," Marggraff says.

"Speed control and direction change is achieved via a proportional control valve, with an input signal coming directly from the system's main controller," he adds.

Turning attention to the heel adjustment system, he says that this mechanism is driven from the same power pack used for the rake and is also centrally controlled by the drum reclaimer's master controller.

Explaining the heel's role, Marggraff says that in order to control the coal feed flow into the drum reclaimer, the rake angle has to be adjusted to match the inclination angle of the stockpile at the point where the surface material can flow freely. "Wet coal, for example, will be more sticky so it will need a steeper rake angle, while dry coal will flow at lower inclinations," he explains, adding that the rake angle adjustment is done via a mechanical pulley system.

In addition to the rake angle, these modern systems incorporate an adjustable heel that sits below the rake and just above the drum for additional fine flow adjustment. This regulates the amount of coal being picked up by the drum's buckets and dropped onto the belt inside.

The third hydraulic system incorporated in these new drum reclaimers is a hydraulically operated conveyor belt tensioning system – the first ever application of continuous belt tensioning to be used on drum reclaimer belts in South Africa.

"Previously, if the belt started running skew or began to slip, tensioning had to be done manually. The machine had to shut down, the locking nuts loosened and portable hydraulic jacks were used to reposition the idler pulley, which was then locked into position again.

"The new hydraulic system enables the belt to be kept at its ideal tension continuously," Marggraff explains. This is accomplished using two parallel cylinders on either side of the belt, which are connected to the shaft of the idler pulley. Integrated position transducers on the cylinder rods are used to ensure belt adjustments on either side are within 3.0 mm to ensure that the belt always runs true.

Tension is achieved very simply, by maintaining the hydraulic pressure that produces the exact belt tension required. "The system also gives an early warning of belt tears, overloading or other problems, since such problems will also cause the cylinder positions or the

tension-related pressure to fall outside of their tolerance bands," Marggraff adds.

"The cylinder stroke of 1.5 m gives a nice adjustment flexibility and the system makes it very easy to slacken the belt, should a splice be required, for example," he adds.

"Most importantly, the hydraulics continuously maintains a constant belt tension, which reduces the downtime associated with tensioning the belt as it stretches and actively compensates for the differential loading on the belt. With the previous locked-position arrangement, the tension would spike if the belt was overloaded, potentially damaging the belt," he explains, adding that the active system also autocorrects for belt misalignment.

"The cylinders are driven by a small 2.2 kW power pack. It's a very elegant use of hydraulics and, although a little more expensive in terms of capital outlay compared to a manually adjusted pulley, the added reliability, uptime and belt-life benefits make for very rapid payback times," Marggraff argues.

The total value of the hydraulics contract? "About R5-million for all of the hydraulic systems on all of the machines," he reveals.

Marggraff says that with Medupi's Unit 4 having been synchronised to the grid on Thursday, 1 June 2017 and with Unit 6 and Unit 5 already in full commercial operation, the Lephalale power station is now producing 50% of its eventual 4 800 MW. Unit 4 is now expected to reach full commercial operation ahead of its early 2018 schedule.

Hytec is the hydraulic systems and turnkey solutions specialist for the Hytec Group of companies. It has branches in Cape Town – with specialist skills in systems for marine vessels – and Durban, which focuses mostly on systems for mobile equipment such as Bell Equipment's off-road construction vehicles. □

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**HÄGGLUNDS**

# Hydraulic motors improve mine safety and reliability

In the hazardous mining environment, safety is as important as productivity. This is why one Brazilian multinational, producer of around 15% of the world's iron, chose to install Hägglunds direct drive hydraulic motors from Bosch Rexroth.

Conveyors are critical to mine production, and certainly to a mine that refines around 350-million tonnes of iron ore and pellets per year. This mine was the first in Brazil to equip a belt conveyor with Hägglunds hydraulic direct drive systems.

The Hägglunds system replaced an electro-mechanical drive with independent electric motors, each run at a constant speed and coupled with a speed reducer. With its infinitely variable speed and inherent

resistance to shock loads, the hydraulic direct drive system offered clear production advantages. But for the mining company, the strongest argument was safety.

The company had carried out a feasibility study, which highlighted potential improvements in safety and beyond. With a hydraulic direct drive on the conveyor, all rotating parts are enclosed, no temperamental couplings are required, and the hydraulic motors themselves have their own internal relief system to regulate shock torque loads. Combined, these advantages offer safer conveying with greater reliability.

A hydraulic direct drive comprising two hydraulic Hägglunds CB400-320 motors, as well as a hydraulic pump unit and a Rexroth control system was installed at the mine – in only three days. “The motors were a good choice for the torque demand,” says Bosch Rexroth sales engineer,

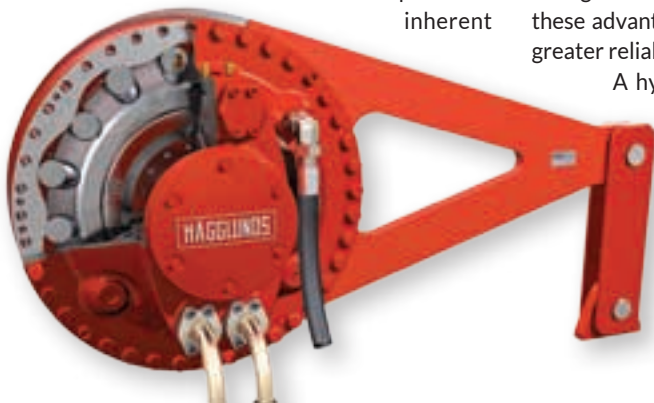
Roberto Akira Koga, “and the tight integration between our teams helped us get the solution in place quickly.”

Since installing the new drive solution, safety has indeed improved. Moreover, according to the mining company's records, eliminating the low-speed coupling between the transmission and conveyor drive drum has done away with a good deal of maintenance.

“Maintenance is definitely lower with the direct drive solution, and the smoother, softer belt starts reduce wear and tear on the belt itself,” says Akira. “The system now absorbs any torque peaks, and it can be operated at a wide range of speeds to meet different process requirements,” he adds.

In fact, the hydraulic direct drive still has more to offer. Measurements show that the conveyor now carries around 2 700 t/hr, and that its capacity is slightly more than it was with the original drive system. But thanks to the flow rate and power of the newly installed drive, it is possible to substantially increase the speed or torque without affecting the service life of the drive or belt.

“The diagnostic tests that have been carried out show that the drive system is in excellent condition, and that the mining company can increase its production volume significantly if needed,” says Kjell Byström, a Bosch Rexroth engineer. “The company is very satisfied, which has been our experience virtually every time a hydraulic direct drive has been installed on a conveyor. It's a pleasure to see,” Byström concludes. □



A hydraulic direct drive comprising two hydraulic Hägglunds CB400-320 motors, as well as a hydraulic pump unit and a Rexroth control system has been successfully installed on the conveyor systems of a large iron producer in Brazil.

# Next Generation R-Series 200-250 kW

Ingersoll Rand®, a global leader in compression technologies and services, introduced new models to its line of Next Generation R-Series oil-flooded rotary screw air compressors, which provide a more energy-efficient solution for customers with high capacity air requirements.

Ingersoll Rand RS200 to RS250 models are available with the new, state-of-the-art single-stage airend, or the two-stage airend that increases airflow by up to 16%. The new fixed-speed models are 10% more efficient compared to legacy products, while the variable speed option is up to 35% more efficient compared to the industry average.

"The ability for these compressors to deliver outstanding efficiency without compromising reliability meets the increasing demands of industries to increase productivity while reducing energy use," says Eric Seidel, vice-president of product management for compression technologies and services at Ingersoll Rand. "Our Next-Generation R-Series RS200 to RS250 models help customers increase overall system reliability and decrease their total cost of ownership with new 'state-of-the-art' features and performance enhancements that can save them tens of thousands of Euros."

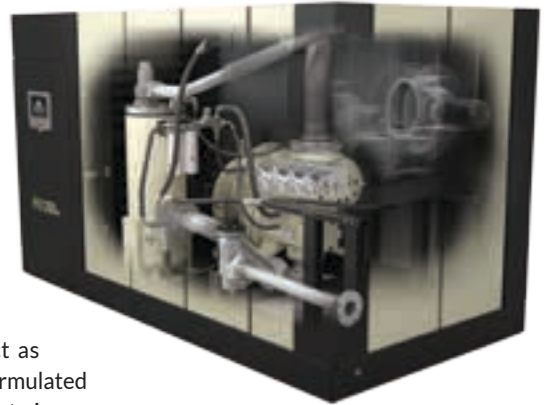
Ingersoll Rand has added these models to the Next Generation R-Series portfolio allowing customers who run 24/7 and rely on large amounts of compressed air to have equipment that is as reliable as their demand. According to internal testing, efficiency and design improvements on some of the high capacity compressors deliver up to a €40 000 of energy cost savings over a two-year period per compressor compared to previous models. The RS200 to RS250 models are the third introduction to the Next Generation R-Series line of compressors, following the Next Generation R-Series 30 to 37 kW fixed-speed and variable speed drive introductions in 2015 and 2016.

At the core of every Ingersoll Rand Next Generation R-Series compressor is an airend that is specifically designed to improve overall system efficiency. In addition to the enhanced single-stage airend, the RS200 to RS250 models are also available with the new two-stage airend, which is the most efficient airend available today.

Each compressor comes standard with Progressive Adaptive Control (PAC) Protection, V-Shield™ technology, floating coolers and Ultra EL Lubricant. These features help keep equipment running efficiently and maximise uptime for facilities that are manufacturing around the clock.

PAC Protection continuously monitors key operating parameters and adapts to prevent unexpected downtime; Shield technology safeguards all critical fittings by securing them

largely free from distortion with o-ring face seals; the floating cooling system from Ingersoll Rand contains heat exchangers with finger-tight connections so they can expand and contract as needed; and Ultra EL lubricant is formulated to last up to 16 000 hours, which is twice as long as other rotary lubricants. □



Ingersoll Rand RS250 can increase airflow by up to 16%.

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# SA vehicle specialist adopts Windchill 11,

MechChem Africa talks to productONE PLM solutions' architect, Johan Strydom, and sales manager, Francois Du Toit, about the adoption by Paramount Combat Systems of PTC's latest PLM solution, Windchill 11.

In 2013, defence and aerospace company, the Paramount Group, acquired a proudly South African design service provider specialising in the design of military vehicles and systems. "Bringing design specialists into our group means that we now have an in-house design capability that will strengthen our competitive edge and deliver cutting-edge solutions," said Paramount's head, Ivor Ichikowitz at that time.

Paramount Group has always been a local engineering house and manufacturer, with a host of successes: a family of armour-protected vehicles including the Maverick, Mbombe,

Matador and Marauder and, first introduced in 2011, of the Advanced High-performance Reconnaissance Light Aircraft (AHLAC), to name but a few.

"The expanded design, engineering and manufacturing entities have now been merged to form Paramount Combat Systems (PCS)," Strydom tells *MechChem Africa*.

## PTC software a common thread

PCS' designers started using PTC's Creo design software – then known as Pro|Engineer – from its inception in 2000. Then, in 2004, it became the first customer in South Africa to adopt PTC's Windchill product lifecycle management (PLM) solution. Paramount has also been a user of both Creo and Windchill, which makes for easy integration of historical engineering and design data.

In 2015, just after the Paramount acquisitions, the company added MPMLink and ProjectLink to its Windchill PLM suite, followed in late 2016 by Arbortext, ISODraw and PTC's SLM offering.

Now, in 2017, Paramount Combat Systems became the first company in Africa to adopt

Windchill 11, which incorporates PTC Navigate for better-than-ever connectedness, collaboration and integration capability.

"Windchill 11 is a step change in PLM development. As well as offering significantly enhanced integration, this PLM solution strives to be smarter, better connected, complete and flexible," says Du Toit. "It embeds PTC's Internet of Things (IoT) platform called ThingWorx, which incorporates integration functionality via the PTC Navigate application," he adds.

Strydom continues: "Windchill 11 offers simple ways for non-regular software users to get access to Windchill data – and the capability exists to use this data to realise IoT type functionality."

Through Integrate, users can pass PLM data into MES or ERP systems from several major software OEMs. This gives an easier way of integrating between design and the production/manufacturing, servicing, stock control and cost analysis functions that are typically handled by ERP-type systems. In addition, Windchill 11 can access data from all the commonly used design software formats: SolidWorks, Catia, NX, Autodesk and several more.

"While Windchill PLM's use is best suited to product planning and design data management, through add on tools such as MPMLink, the manufacturing planning suite, design data managed through Windchill can now be easily passed onto manufacturers for direct use," explains Strydom. "While this is not new, with Navigate we can make design data embedded in Windchill available for viewing by MES or ERP systems, for example, simplifying downstream processes," he explains.

Strydom adds: "A key advantage of going the IoT route is that you can have a digital twin of a product operating in the actual world. This allows the performance of the product to be monitored and compared to the intended design performance. This performance can



Windchill 11 incorporates PTC Navigate for better-than-ever connectedness, collaboration and integration capability.



Paramount Group is a local engineering house and manufacturer with a host of successes including armour-protected vehicles such as the Mbombe 8, unveiled at the Africa Aerospace and Defence show 2016.

# the connected PLM solution

be tracked and analysed to determine what might be causing failures and what action can be taken to prolong life and avoid breakdowns. In addition, real performance data can be fed back to the product designers for iterative product improvements.

“The main role of the SLM, however, is planning for service,” he continues, “establishing how this product is going to be maintained. At the starting point of this task is creating the service bill of material (SBOM). All the bills of materials, (BoMs) – the engineering, manufacturing and service BoMs – are all created from the same set of product data, originating from the CAD model itself,” he tells *MechChem Africa*.

In addition, data for the documentation related to service and operation is also directly accessible from the PLM data. This enables the service operations manuals and parts catalogues to be automatically created, via a combination of Windchill Service Parts, ISODraw and Arbortext.

## PCS' PLM add-on choices

With respect to Windchill ProjectLink, Strydom says: “Paramount Combat Systems had a joint venture with a customer in Kazakhstan to build a vehicle locally. ProjectLink was chosen to enable data to be securely shared between PCS and the manufacturer.”

Web-based ProjectLink enables collaborators to securely harness the talents and energy of the entire team – inside or outside their firewall. By creating a virtual workspace, ProjectLink provides instant access to the right product and project management information at the right time, keeping the team aligned, on track and moving forward.

“MPMLink, (manufacturing process management) has added massive benefit in the planning and documentation processes used in the manufacturing facility. It enables a seamless exchange of data between, for example, the design teams of the company to the engineers and then onto the manufacturing teams,” Strydom suggests.

“Because Windchill 11 enables manufacturing process management (MPM) to be done in sync with engineering, by sharing the same design data, it is possible to positively impact product cost, accuracy of manufacturing deliverables, and development cycle time,” he adds.

“The service lifecycle management (SLM) component of Windchill is currently being rolled out and, although Paramount users are familiar with the standalone Apps, this is all now being brought into Windchill 11,” Strydom reveals.



**Above:** Windchill 11 can combine information from different sources to provide a targeted dashboard view. (Source: PTC). **Below:** This PLM solution strives to be smarter, better connected, complete and flexible.

As well as streamlining the service bill-of-materials, SLM's key roles include: maintaining up-to-date service information; identifying and managing product changes; enhancing service information applicability; and defining applicability rules to make the most relevant service information available.

In addition, with ArborText, authoring productivity is improved, centralised management of service information enables the information to be organised in a logical, product-centric manner, with ISODraw being used by the logistics team to create illustrations for these service manuals.

“In general, the Windchill upgrade is being very well accepted. At PCS, we have 40 licensed users and 20 are already regular users who are happy with the new functionality,” notes Strydom.

“We expect training to be completed by July/August of this year. Since the individual technologies are not new, engineers only need to become familiar with the integration aspects of the new version and to be introduced to the powerful new capabilities,” he notes.

The training approach adopted by productONE is to “target the current tasks” so that users get a real world experience of the software. “We also offer adoption management services following training, where we



stay onsite to help clients to best-embed the software into their working practices,” Du Toit tells *MechChem Africa*.

“Our transformative purpose is to ‘Make African Products Great’, says Strydom. This drives us to build longstanding partnerships with our customers based on fully understanding their needs, both current and future, and developing tailor-made solutions designed to cater for each unique business case.

“Over the years, productONE and Paramount have established a mutually beneficial relationship based on two-way communication. Paramount brings industry expertise and productONE brings product knowledge. This combination enhances the customer experience and helps to build world class South African products that enable us to more effectively and profitably compete in the global market,” Du Toit concludes. □

# Addressing Today's Product Development Challenges with PTC Windchill 11



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# Artemis Racing and designing the difference

Artemis Racing is a professional sailing team that challenged for the 35<sup>th</sup> America's Cup. Representing the Royal Swedish Yacht Club, the fifth-oldest yacht club in the world, Artemis Racing teamed up with Altair for the development of the daggerboard design.

**A**ltair together with Artemis Racing have applied design and simulation technology to help place Artemis Racing in the 35<sup>th</sup> America's Cup. The design of the daggerboards – foils that lift the boat out of the water to break the drag barrier – will be a critical differentiator between the competing teams as they have a significant impact on a boat's performance. The Altair and Artemis Racing technical teams have placed a great deal of emphasis on perfecting these composite material structures.

"Technology plays a huge part in the America's Cup," says Iain Percy, team manager and on-water tactician for Artemis Racing. "It's been said the fastest boat has won the America's Cup for the last 160 years and I'm not sure that is about to change. The daggerboard is the appendage that we fly the boat off and it transfers side force into driving force. Millimetres of difference on the daggerboard make knots of difference to the speed, so the optimal manufacturing and design of these boards is absolutely critical."

The teams have focused much of their effort on optimising the strength, shapes and thicknesses, and how water and wind interact with daggerboards using a simulation-driven design approach. To accomplish this, Artemis Racing used several Altair technologies from the HyperWorks® suite including:

- The HyperMesh® complex composite material finite element model development software.

- OptiStruct® for structural analysis and optimisation.
- And RADIOSS® for nonlinear, large deflection analysis.

Two sets of daggerboards were created to withstand unexpected challenges from mother nature – one pair designed to perform optimally in heavier winds and waves and another for lighter wind and wave conditions – both designed to rapidly lift the boat from the water with minimum drag.

"The tools that we use are at the forefront of the industries," says Brett Ellis, lead engineering for daggerboards and rudders. "We are working to tight tolerances and small differences in section shapes on the daggerboards can lead to relatively big gains on the water. We are all pushing hard and pushing the design limits to win that America's Cup."

"The technology involved in designing these boats is a critical component to providing a speed edge for the teams vying for the win," adds Uwe Schramm, chief technology officer, Altair. "It was an honour to collaborate with the Artemis Racing design team and apply our design and simulation technologies to create a world-class sailing vessel."

Artemis Racing represents Kungliga Svenska Segel Sällskapet (KSSS – the Royal Swedish Yacht Club), the fifth-oldest yacht club in the world. Artemis Racing has a multinational crew comprised of the most successful and respected sailors and designers in the world. The sailing



Artemis Racing's Yacht design for the 35<sup>th</sup> America's Cup incorporated daggerboards designed with Altair's simulation software solutions.

team members have participated in 12 America's Cup campaigns and competed in 21 Olympics Games, winning 11 medals, seven of which were Gold. Additionally, Artemis' engineers, boat builders and support team have been involved in 64 America's cup campaigns, including 14 victories. Altair has released a short film documentary titled "Surface To Air" that was developed to celebrate the hard work and innovation that is positioning Artemis Racing to win the 35<sup>th</sup> America's Cup. The film highlights the profound impact that simulation-driven design has on the development of the Artemis boat, available for viewing at [www.designthedifference.com](http://www.designthedifference.com). □

## Motor pre-design tool increases efficiency

Altair has announced the release of FluxMotor™, a dedicated platform focusing on the pre-design of electric rotating machines. FluxMotor is part of Altair's HyperWorks® CAE Suite, which includes Flux™ the leading software for low frequency electromagnetic and thermal simulations. The software tool allows users to design and create machines from standard or customised parts, as well as to intuitively add windings and materials to run a selection of tests and compare machine capacity.

"FluxMotor is an easy-to-use and efficient dedicated pre-design tool, targeting designers from all sectors related to the electric motors field," says Gregory Michaud, electromagnetic engineer at Softbank

Robotics, who was involved in the testing phase of the new software together with the development team.

Appealing to a broad range of users such as designers and manufacturers of electrical rotating motors, the software allows motor specialists to define machines and assess their technical-economic potential within minutes. Flux Motor's efficient working environment ensures a better visualisation of machine performances, enabling fast and accurate computations that can easily be connected to Flux finite element software and other tools within the HyperWorks suite for

more advance studies, including multiphysics optimisation tools.

"We wanted to develop an easy to use software without compromising accuracy. FluxMotor helps reduce computing time to a minimum while still maintaining accurate results," explains Fabrice Marion, program manager for FluxMotor at Altair. □



FluxMotor helps reduce computing time to a minimum while still maintaining accurate results.

# The IIoT: Customers' views of advanced diagnostics

At an Endress+Hauser breakfast function held at the African Automation Fair 2017, Jenish Gheewala, industry manager for mining, presented experiences from around the world about the implementation of the industrial Internet of Things (IIoT) and how advanced diagnostics is adding value to process plant operations.

about IoT technology, which immediately makes one ask: is this just hype or can we use the IIoT? Can it be useful in solving some real problems?"

In order to go beyond simple marketing, Gheewala decided to take his research to branch level, to talk to Endress+Hauser plant managers and their customers.

"The initial feedback I got from those responsible for service provision was scepticism. Plant operators wanted to know whether large investments were necessary and if so, when they could expect a return on this investment. In addition customers asked: Do I have to uproot the systems I have right now and install new systems to enable the IIoT?"

"At the root of all of these questions, plant engineers wanted to know what problems could be solved, which needs addressed and how would smart devices work at plant level?"

"Where is the gap?" Gheewala asks.

Displaying a diagram of the traditional automation pyramid, he says that, like the pyramids of Egypt, traditional systems – those

that rely on sensors feeding into PLCs for control purposes, with SCADA's for transparency, and remote connections to higher level big-data software such as MES and ERP systems – are very stable.

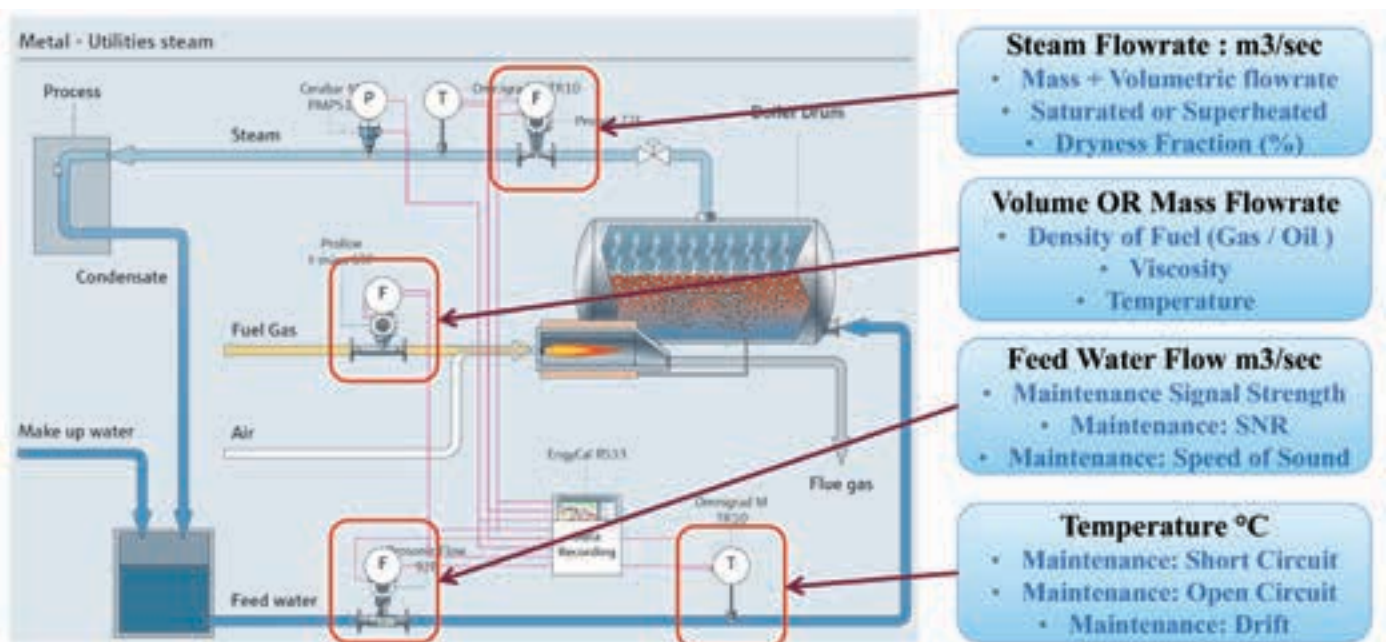
"The new IIoT paradigm, however, in addition to traditional process control, also promises process and reliability optimisation opportunities," he advises.

"What is the IIoT about? We are all consuming a huge amount of data. Weather, temperature and humidity information and GPS data from satellites, for example, is instant and immediately available on any smartphone no matter where you are in the world. Simply put, the IIoT is about using the vast amount of data we are able to collect in the industrial world, via two important new principals: instant access and data analytics." Gheewala suggests.

"In the past instrumentation was limited, not because of a lack of physics' knowledge but due to limited computing power. Now we can clean up raw signals to make reliable measurement available – and even the noise can be useful," he says adding that he is not pushing new systems that are more expensive and require more maintenance. "It's more a

Following a long history of R&D and solving practical problems being experienced in mining and minerals processing applications around the world, Gheewala was tasked to look at the opportunities to offer via the Industrial Internet of Things (IIoT).

"The first thing I did when I was asked to look at how to implement IIoT was to do some research," says Gheewala. "On average, two to four articles a week are being published



A general schematic of the steam production process. "A significant amount of data is already collected from steam generation systems: Feed water temperature and flowrate; fuel volume and mass flowrate; and steam pressure, temperature and flowrate," says Gheewala.



case of using the information already available to us to better solve the problems we face," he suggests.

### Speculations versus big data

"On a visit to a customer operating a geothermal power plant in Guatemala, an interesting question arose: The customer asked: 'Out of your existing sensors can you get additional information?'" Gheewala continues.

Showing a general schematic of the steam production process, he says that a significant amount of data is already collected from steam generation systems: Feed water temperature and flowrate; fuel volume and mass flowrate; and steam pressure, temperature and flowrate.

"Can the data being collected also be used to extract maintenance, fuel quality and steam quality information, though?" the customer asked. "If more data, such as the viscosity of oil used in the burner or the calorific value of gas used was accessible, we would be able to identify new opportunities for reducing energy loss," he adds.

"Operators say there are leaks in their plant, so the flow readings are not good enough or the condensation traps on the steam lines might not be working well enough. This is not information, it's speculation and customers do not like speculation. They like certainty," Gheewala argues.

"Using existing sensors, a lot of this speculation can be confirmed. We can check the quality of the steam, the quantity of fuel being consumed and the quality of that fuel. The data needed for these analyses is already being collected: all you need to do it to add some algorithms to extract the specific information needed," he reveals.

These results then allow operators to respond much more quickly to changing conditions, enabling the plant to be run more efficiently, safely and reliably.

Describing the data available from a commonly used vortex flowmeter, Gheewala says that steam production transportation and distribution is plagued with issues related to the wetness of the steam. On the raw vortex signal, a distinctive pattern associated with wet steam can be observed. This can be used directly to identify the degree of wetness, while at the same time as determining the flowrate.

"This is what we call advanced diagnostics. At the same time as running data diagnostics – for flow in this example – the same data can be analysed for secondary diagnostic effects, such as steam quality or wetness," he explains.

In addition, he says, to overcome dangerous problems such as water slugs and water hammer, Endress+Hauser has released the world's first wet steam alarm in a vortex flowmeter. "This will help to detect dangerous situations in a steam system and to point towards improperly operating condensate traps, improper insulation and potentially large wetness loads on boiler systems," he adds.

"While the 'fit-and-forget' promise is a dream, advanced diagnostics can make for a more relaxed life for operators. We can reduce the uncertainty involved in many areas of the plant. In addition, though, can the data be used to optimise plant performance?"

### The IIoT and digital mines

When talking to a gold mining customer, Gheewala realised that similar basic principles apply. On a gold processing circuit grinding,

carbon leach, froth flotation and concentration are combined in the extraction process.

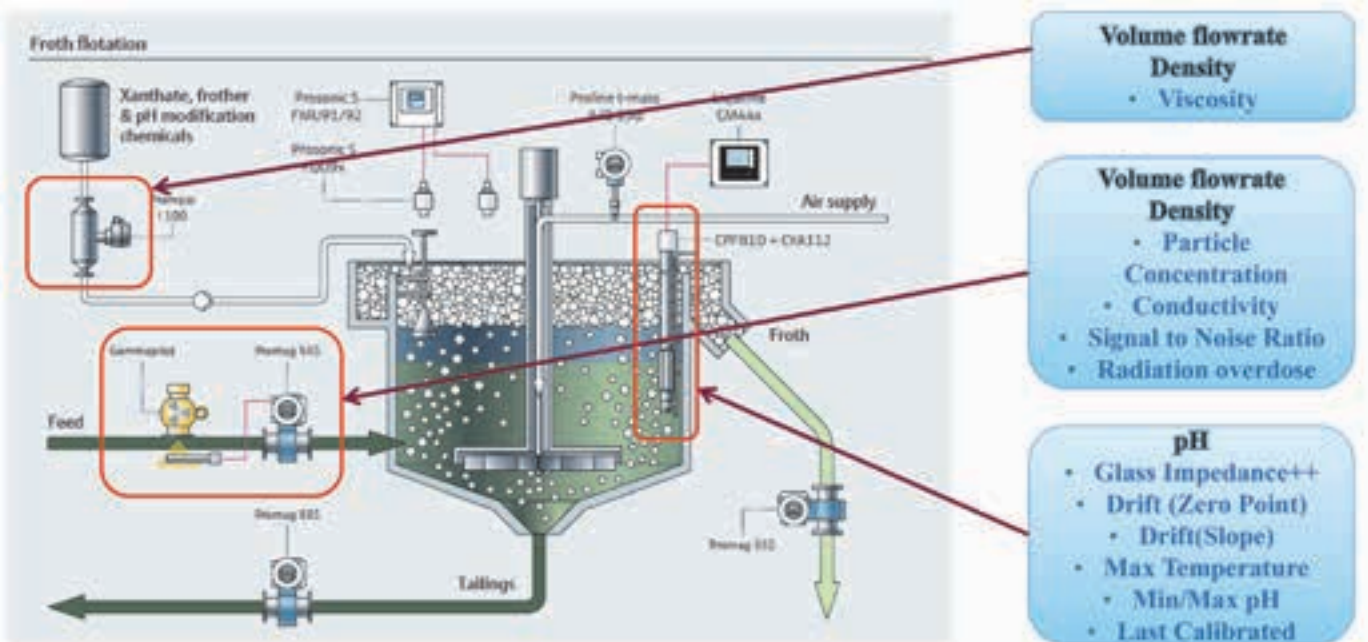
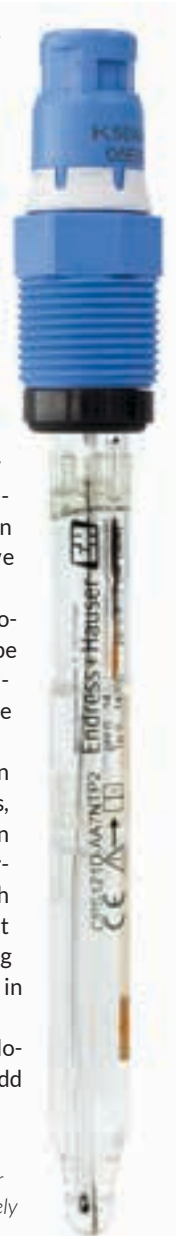
"What we are looking for are the critical applications, the ones that cause plant wide problems if they stops working. On this gold plant, I was told that grinding was the most critical, because if it stops, losses accumulated at around US\$10 per second," he says. The focus for grinding equipment, therefore, is reliability, condition monitoring and predictive maintenance.

"There are also other processes, however, that can be optimised to make minerals processing plants more efficient.

Typically, a froth flotation unit has many sensing devices, which collect information about the infeed and underflow; the amount of froth being taken off; and, most critically, the pH of the dosing chemical solution and that in the flotation cell.

"Minerals recovery in a flotation cell starts when you add

*Endress+Hauser's digital pH sensors with Memosens enable flotation cells to be run at tighter limits and therefore more precisely and reliably.*



By switching over to smart pH metering with Memosens' digital connectivity and advanced diagnostics, the performance of flotation cell operations can be substantially improved.



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The scarcity of water in South Africa makes it extremely important to ensure it is safe and we can detect pollution threats immediately. Whether it is drinking water or effluent from waste water plants and industry or the surface water quality, there are merits in monitoring and recording the quality parameters online and visualising the measurements and condition of your instruments wherever you are.

### Benefits of Endress+Hauser panel solutions

- All instruments are correctly installed and pre-commissioned
- A single transmitter can be used for up to eight parameters
- The panel solution simplifies installation on site and saves commissioning time
- Customer will have history of water quality measurements and can get early warning where these measurements are non-compliant

### Benefits of Endress+Hauser remote monitoring solution

- Choose between different sets of measurement principles (pH, conductivity, SAC, turbidity, ammonium, nitrate, oxygen, sludge level and more) supported, enabling you to monitor what is important to you
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specialty chemicals, generally in powdered form, which are mixed with a solvent to form a liquid. If this solution is not of the correct quality, then the flotation unit will not perform at its maximum capacity. Measuring that the pH value of this mixture is in the required range can ensure that the chemical solution is optimum for the minerals recovery required," Gheewala explains.

"When talking to metallurgists, they tell me that they cannot always believe the pH readings from the meters. These pH sensors are exposed to harsh conditions. Particles are continuously hammering against the glass and the chemicals affect the glass impedance. This changes the instrument's calibration: causing zero point or the slope drift," he explains.

"The metallurgist needs to know when this is happening and whether the sensor is experiencing zero point or slope drift. In addition, big chunks of materials can break the pH sensor's glass, which takes the eyes off the mineral recovery efficiency.

"It is important to get this information immediately. That is why we monitor the glass on these instruments and track the calibration performance," Gheewala adds.

By upgrading to Endress+Hauser Memosens pH sensors, the performance of the flotation cell operation at this gold mine was substantially improved. "Because of the big

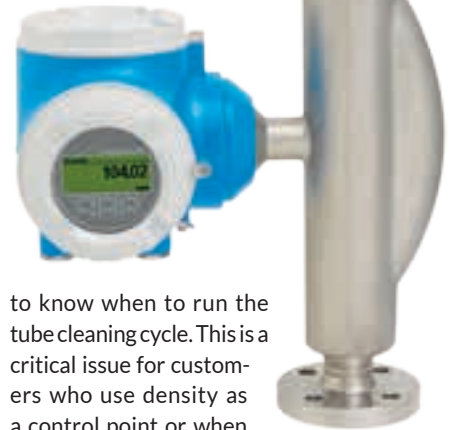
data and advanced diagnostics coming from these sensors, metallurgists can now rely on the pH data," he reveals. "Also, this sensor enables the use of the expensive chemical, sodium metabisulphite, to be reduced by up to 50%, increasing process efficiency as well as occupational safety.

Quoting the senior instrumentation engineer at this plant, Reijo Mammioja of Agnico Eagle mine in Sweden, Gheewala says that the Memosens pH meters, were able to reduce calibration effort from 2 200 hours per year to only 240 hours, a 90% reduction in calibration-related maintenance costs – simply by switching over to smart pH metering with Memosens' digital connectivity and advanced diagnostics.

"With Memosens, we are able to run the (flotation) plant at tighter limits and therefore more precisely and reliably," said Russi Ruokanen, the plant's metallurgist.

Gheewala moves on to describing similar developments Endress+Hauser has put in place to improve condition-based maintenance tasks on other instruments. "Coriolis meters use a symmetric spring mass balance system. This can become imbalanced in adverse loading conditions: the mass of the Coriolis tubes increase from the effects of settling solids, coating and particulate build up. An underlying need for all customers is

*With the Proline Promass F 300 Coriolis mass flowmeter, customers now know exactly when to clean and calibrate their sensors.*



to know when to run the tube cleaning cycle. This is a critical issue for customers who use density as a control point or when they rely on volumetric flow," he explains.

Using smart instruments such as the Proline Promass F 300, customers now know exactly when to clean and calibrate their sensors and exactly how often.

Concluding, Gheewala notes three simple steps to get advanced diagnostics started: Step 1, get more data from existing smart sensors; Step 2, upgrade the network to enable more data to be collected; and Step 3, generate the analytics necessary to help find solutions to the challenges of the plant. □

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# IPC platform combines openness with real time control

Omron has released a new Industrial PC (IPC) platform for the connected future: a rugged Windows-based PC range that is available with a built-in Sysmac machine controller. *MechChem Africa* talks to Omron field application engineer, Driaan Coetzer.

“Our new NY Industrial PC has been designed from first principles to be powerful, reliable and scalable, making it ideally suited to visualisation, data handling, measurement and real time control applications,” begins Coetzer.

“For openness, all the computers in the range use the Windows operating system and an Industrial Box PC version and an Industrial Panel PC with an integrated touch screen are both available,” he adds.

From a power perspective, Omron IPCs are available with fourth-generation Intel® Celeron®, Intel 2-core i5 and 4-core i7 processors, so that fit-for-purpose solutions can be matched to appropriately powered IT systems.



Omron's new Industrial PC (IPC) Box combines Sysmac machine control with Windows IT technology, with the two platforms operating simultaneously but separately.

Omron IPCs are designed specifically for machine usage, making them ideal for Internet of Things (IoT) applications. Combining innovative design with high levels of reliability, these IPCs come with the machine controller from the Sysmac family. “So it is a PC with full versatility and connectivity. Not only does it offer open access to a wide range of programs, but it also has the machine control capability of a state-of-the-art Sysmac PLC dedicated to running servo systems; inverters/VSDs; and multi-axis drives on robots, OEM manufacturing machinery or integrated automation systems,” Coetzer explains.

The combination is mooted to be the ‘perfect fusion’ between Sysmac machine control and Windows IT technology. “The two platforms operate simultaneously but separately. “The controller cannot be hacked. The real-time machine network and the Windows operating system function 100% independently of each other, so even if Windows crashes or is disabled for any reason, the controller will be unaffected. The automation system will continue to operate as normal,” he assures.

With the added benefit of the industrialised touch screen, this package replaces traditional automation solutions that use PLCs with HMIs and then have to be connected to a computer-based master controller in a control room. “Omron’s IPC solution empowers automation engineers to explore manufacturing innovation that can leverage big data, natural user interfaces (NUIs) and the IoT without compromising proven PLC reliability and robustness,” Coetzer tells *MechChem Africa*.

Describing key design features, he says that Omron has simplified the construction of the box to maximise robustness, uptime and to reduce costs.

“The new IPC package is built for factory floors. Instead of having local PLC that then has to be connected to a computer in a clean control room, these systems can sit right alongside the operating automation system, controlled either by the machine operator on the floor or remotely via any Internet connected computer.

“The touch screens are particularly innovative. With an IP65 rating, these industrial-quality touchscreen panels and monitors,

whether used separately with an IPC Box or integrated into the IPC Panel version, enable operators and maintenance engineers to directly interact more effectively with the machine. The touchscreen controller can detect non-standard actions such as false touches, palm rejection and water droplets after cleaning – and it works even if the user is wearing gloves,” Coetzer reveals.

Prolonging the life of the IPC Box is a heat dissipation innovation that prevents any contact between dust from the factory floor and the microprocessor, motion controller or the internal electronics of the computer. “Instead of using a fan to directly cool the IPC’s processors, the air flow is channelled through the heat sink, with the electronics isolated on the inner side of the channel walls. This significantly improves component life,” he says, adding that the touch screen and IPC Box designs both won innovation awards in 2016 – a Red Dot Award and an iF Design Award.

Ideal for systems integration tasks that involve several robots, positioners and/or conveyors that need to be synchronised to operate as a single automation system, Coetzer says that Omron’s Sysmac motion controller can accommodate a up to 64 high-speed motion axes – and these can be spread across several different systems. “A single IPC with a motion controller can, for example, be used to control 10 separate six-axis robots, either with or without synchronisation between them, that is, each can be independently controlled at the same time,” he notes.

Also, because of the use of EtherCat communication, “which is the fastest communication protocol available at present”, I/O communication between the IPC and the individual machine axes is “as fast and reliable as it gets”.

“For machine-to-machine communication, this single solution option presents a key advantage. In previous generation control solutions, a standalone PLC needed to be connected to high-speed motion control and I/O cards. Now with the new IPC, the PLC and communication capability for real-time machine control, intelligent sensing and I/O is all embedded in a single IPC.

In addition, because of its network capabilities and Windows operating system, the

control room's visualisation and factory level control functionality is also readily available without the need for any additional hardware," he points out.

Omron IPCs also come with full programming capability and powerful Windows-based programming tools: Sysmac Studio, the integrated development environment for logic sequencing, motion, safety, robotics, vision, HMI and Database connection; the Sysmac Library for optimising engineering time and machine availability; and Omron's CX-Compolet development software for those who prefer to write their own visualisation code in VB or C-Sharp.

"CX-Compolet enables users to write interfaces that can draw information directly from the PLC, which means there is no need for users to buy a separate SCADA package to develop interfaces for HMI's and visualisation side of their systems," Coetzer informs *MechChem Africa*.

With respect to hardware, the HMI/visualisation aspects are all incorporated into the IPC's touch screen, so there is no need for any of the extended hardware required



With the added benefit of the industrialised touch screen, Omron's IPC package replaces traditional automation solutions that use PLCs with HMIs and then have to be connected to a computer-based master controller in a control room.

by traditional PLC-based automation system," he reiterates.

With regard to the IoT, the Windows side means that data collected through the controller can be easily analysed locally before being uploaded via an Internet connection to MES, ERP or any other big data analytics platform. "Part of the advantage of using the Windows operating system is the easy

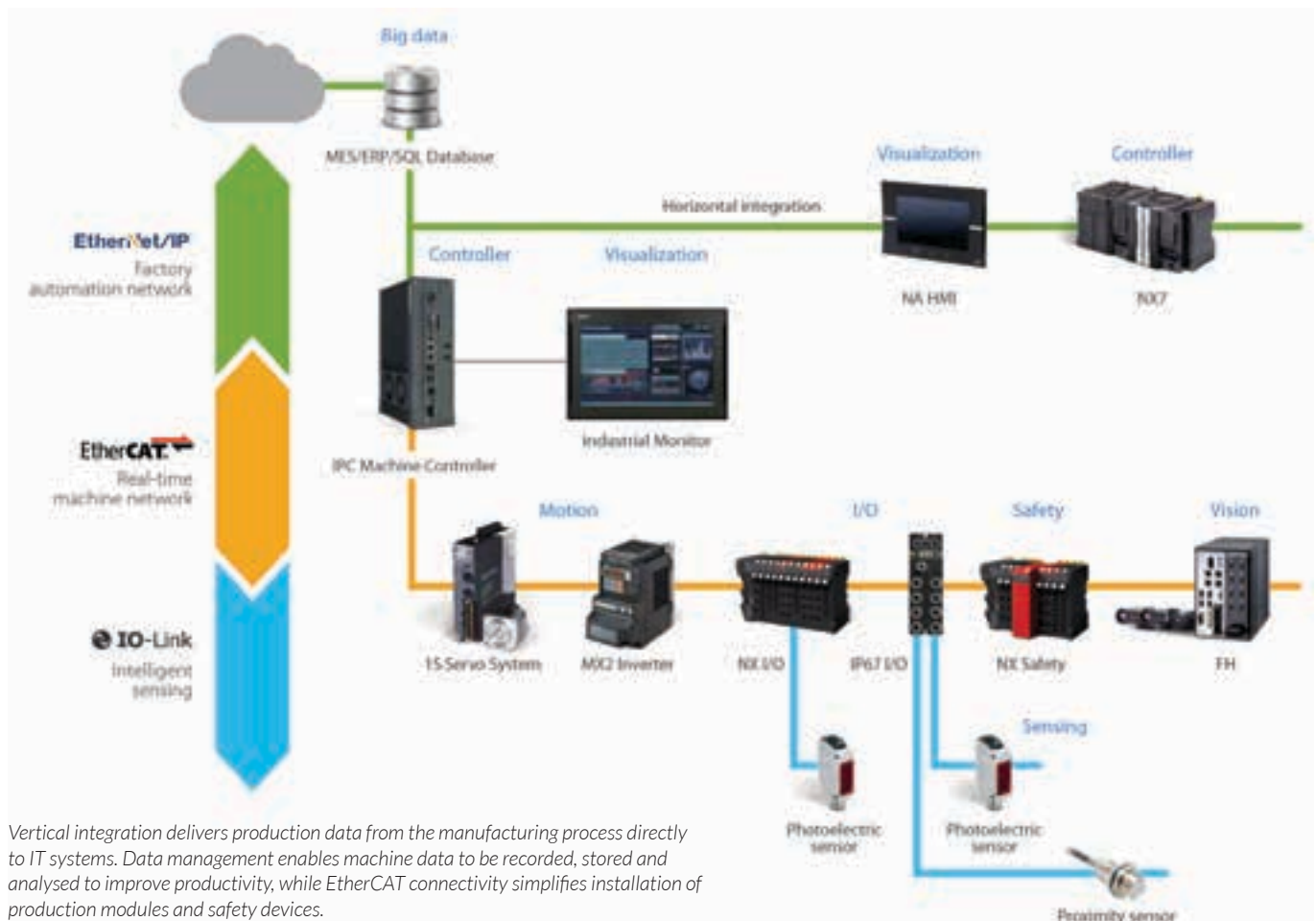
access to cloud-based SQL servers, which are ubiquitous and universal. Almost any modern enterprise or factory management system can access the SQL data format for use in enterprise wide historian or optimisation endeavours," he suggests.

"At the outset, the challenge was to use Sysmac machine control in combination with an open operating system such as Windows, so that all of the functionality of an integrated automation system, along with future-proofing for the IoT, could be included without affecting machine control performance.

"By using partitioning between Windows and the Sysmac motion controller, this

has been very successfully achieved. Both operating systems can work independently while easily and securely communicating with each other.

"The end result is a fast, powerful, rugged and cost effective total automation solution that offers all of the connectivity benefits of the IoT without any of the security headaches," Coetzer concludes. □



Vertical integration delivers production data from the manufacturing process directly to IT systems. Data management enables machine data to be recorded, stored and analysed to improve productivity, while EtherCAT connectivity simplifies installation of production modules and safety devices.

# Valves for critical flow control applications

At the Africa Automation Fair 2017 at the Ticketpro Dome last month, Metso Flow Control demonstrated its niche range of valves, actuators and its universal valve controller. *MechChem Africa* visits the stand and talks to Douglas McCrum, regional sales manager for Flow Control and Steve Clark Metso's director for the Africa market area.



According to Clark, Metso Flow Control has its roots in the Metso automation division, which specialised in valves, process control, condition monitoring and analytical equipment for the pulp and paper industry. "Most of this division was sold off to Finland-based Valmet in late 2015, which remains involved in pulp and paper automation," he tells *MechChem Africa*.

"The valves side of the business, however, was retained and combined with Metso's Pumps division, which has now been renamed Metso Flow Control," he adds. Product areas managed by Flow Control include pumps, valves, valve actuators and a range of intelligent devices and accessories, including Metso's new Neles NDX valve controller.

"While our pumps are used primarily in the minerals processing markets on the slurry pump side - where they are used in numerous applications including processing facilities and mill circuits distributed across Africa - our valve products tend to service completely different markets: pulp and paper; petrochemical, oil and gas; and the industrial gas markets, for example," says Clark.

Metso's valve products were originally manufactured in Finland in the 1950s under the Neles brand for the pulp and paper markets. "As the company grew, Metso acquired a US-based company called Jamesbury, which manufactures soft-seated ball and butterfly valves along with an actuator range.

"In 2011, we purchased a company called Mapag, a Linde-owned German valve manu-

facturer of a specialised butterfly valve range engineered for the industrial gas industry. Their specialised butterfly valve range includes very high pressure valves with cryogenic capabilities," Clark continues.

"More recently, in 2013, Metso acquired a globe-valve manufacturing company in South Korea. This was our first real move away from rotary valves and into the linear valve market for flow control," he relates.

"This is significant," continues McCrum. "Previously, we had always been a rotary valve specialist, but with this acquisition, we now have a broader product scope which can service the majority of industry applications, especially where the applications have very specific requirements for either rotary or globe technology. Globe valves, however, have long been an ideal flow control solution because it is possible to adapt their trim to precisely suit the type of flow required: to provide linear/proportional, balanced or unbalanced trim configurations, for example," he explains.

"In addition, it is possible to verify what the internals are doing much more easily than with other valves types," he says, while noting that it is also quite normal to utilise rotary valves on control applications in certain industries.

"We saw a market for globe valves that would enable us to compete with the established control globe valve suppliers. In the oil and gas industry, we have become a preferred supplier of automated on/off and emergency shut down valves from our high-end ball and butterfly valve range. But we are involved in more and more projects where operators are trying to reduce their supplier numbers, so having a high-spec globe valve option makes it easier for us to do more business in the oil and gas sector," McCrum explains.

Clark adds: "Specifications and certifications always apply in these industries. If a globe valve is specified for a task, then it cannot be substituted for a ball or butterfly valve, even if the performance requirement could be achieved with the alternative technology. Previously, therefore, we have been



*A Neles GM Series globe valve with an NDX controller, a combination designed to provide the best possible control accuracy with economical high-performance.*

excluded from this market by virtue of the product scope."

Globe valves tend to be used for cleaner fluids, McCrum continues. "Whereas our ball valves have come from the pulp and slurry side of the business, we are now broadening our valve scope to include more industries: petrochemical and chemical plants, for example.

"Metso has always tended to cater for demanding applications, and are seen by many industries as the 'Rolls Royce' solution. Like our Neles ball or butterfly valves, these globe valves are no different," adds Clark.

Manufactured in the completely re-built South Korea factory, Metso's Neles globe valves are tested and certified to the same quality standards as Neles butterfly and ball valves. "They align with the top-of-the-line quality standards that have applied since the 1950s. All are metal-seated valve designs engineered for high performance and with safety in mind to specifically suit industrial applications," says Clark.

"We have valves for very specific critical applications, such as our gas burner shut off valves, which are manufactured to EN161 specifications for Gas Shut-off and we have valves for oxygen, chlorine or cryogenic

service. We compete on quality, value and lifecycle costs as opposed to purchase price alone," says McCrum.

From a supply chain perspective, Metso now has five valve technology centres: Shrewsbury in the USA, the original home of Jamesbury valves; Helsinki in Finland, where Neles products originate; the original Mapag factory in Germany; the new Neles Globe factory in South Korea; "and a large factory in Shanghai, China," Clark informs *MechChem Africa*.

"We have the latest state-of-the-art equipment in these facilities and are focused on employing the best manufacturing principles to keep the quality standards high and costs to a minimum. For castings, for example, we are doing pre-engineering and quality control at foundry level to ensure that, before the casting arrives to be machined, final manu-

facturing and assembly can be confidently completed to the assured quality standards," Clark says.

Service is another important component of Metso's business. "In South Africa we have three fully fledged service centres; one in Secunda; a second in Vereeniging and a third in Durban, where we inspect, assemble, repair, overhaul, test and calibrate valve products," he continues. "Typically, we will fit actuators, valve positioners and solenoids to the valves and perform final testing on them prior to delivery to clients," he adds.

Describing the niche advantage of Metso's new NDX controller solution, McCrum says that this controller is suitable for all valve brands in a wide range of applications regardless of customer or industry. "Not only does the product deliver the robustness and reliability you'd expect from a valve controller by

Metso, it is also extremely easy to install and use and the same controller is suitable for any valve size," he notes.

"These are intelligent devices," he says. "They constantly monitor what the valve is doing internally: how much air is being consumed; the air pressure required to actuate the valve; and the force required to move the ball, butterfly or globe valve plug. The NDX controller accumulates this data, which can be extracted and uploaded for use in condition monitoring or data analysis systems," he explains.

Based on an open FDT protocol for integration, transparency and feedback purposes, the Neles NDX controller's unique design can reduce the amount of external instrumentation needed on valves, while offering a built-in valve condition monitoring capability," McCrum concludes. □

## New automatic tin spraying system for Bakesure

Tectra Automation recently designed and supplied the Tectra 650™ automatic tin spraying system for Bakesure Ingredient Suppliers – Africa's leading baking ingredients and solutions provider. After a tenuous search for an automation supplier that could fulfil its requirements, Bakesure turned to Tectra Automation as the only company that was able to supply all components for the system, including its unique Bosch Rexroth variable speed drive (VSD) with specialised sequencing specifications.

Bakesure required an automatic tin spraying system for its baking plant in Johannesburg. The Tectra 650™ is a stationed system that sprays 650 of the company's baking trays per hour with its new Cake-lease spray releasing agent, as the manual application process was costing the company valuable time. Tectra Automation, with its sole distributorship of Bosch Rexroth in southern Africa, was able to design and supply the unique Tectra 650™ system in just six months.

The supplied solution included: frames, Bosch Rexroth VSD, dc motor, control panel and the actual spraying equipment. "All the components on the Tectra 650™ work towards a common goal: the easy and quick application of cake-releasing agent on the baking trays," comments Joseph Ngungu, mechatronics technician at Tectra Automation.

The motor rotates the tin while the timers measure and monitor the number of tin rotations. After this, the actual spraying starts. Each tin is sprayed for one second before the machine automatically stops. "Thanks to the logic relays deployed in this system, this

whole process is activated, stopped and controlled by a single push of a button," adds Ngungu.

Tectra Automation opted for the adaptable Bosch Rexroth VSD as its one of the only drives on the market that can be seamlessly integrated with a non-Bosch Rexroth dc motor, in addition to its logic relays and timers. "The drive's adaptability and ease of use is well-suited to the fast pace of the bakery. And when it is set with the right parameters, ensures the fast and simple spraying of the releasing agent," concludes Ngungu. □



*The Tectra 650™ sprays 650 baking trays per hour with cake-releasing agent.*



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# Local manufacture key to African mining

The HMA Group has been appointed as Uretech's sole international distributor, including South Africa, with the HMA Group's own broad product range to be made available in Africa for the first time.

**T**he HMA Group of Australia ultimately plans to establish a manufacturing facility to produce wear-solution products to service the metalliferous and coal sectors in sub-Saharan Africa.

This was revealed by HMA Group Australasia managing director, Tony Rogers, on a recent visit as part of the launch of HMA South Africa, which is headed up by general manager, George Hoffmann, founder of local wear-solutions specialist Uretech.

The HMA Group has been appointed as Uretech's sole international distributor, including South Africa, while the HMA Group's own broad product range will be made available in Africa for the first time.

Established in 1966 as Halley & Mellowes, the HMA Group manufactures, services, and sells a range of capital plant equipment to diverse industries. The materials handling, wear solutions, instrumentation, and geotechnical

divisions of the group will be introduced into the local market, piggy-backing on Uretech's representation in the African mining industry.

Rogers explains that Uretech initially fell on the radar of the HMA Group following an exploratory foray into South Africa to test the local business waters. "As we specialise in wear-resistant solutions, we came across Uretech and its polyurethane (PU) product range. PU is an alternative wear solution material that was not represented in our stable at that time, so we initiated discussions."

The agreement concluded was that the HMA Group would acquire the sales and marketing segments of Uretech, which retains its manufacturing capability and intellectual property rights. Hoffmann was subsequently appointed to oversee the HMA Group's South African operation, employing its strategically located sales force.

Commenting on why the HMA Group de-



cid to enter Africa, Rogers explains: "I was extremely passionate about the opportunities over here, and buoyed particularly by the similarities in culture, infrastructure, and tax laws, among other factors." HMA South Africa will also embrace the Broad-Based Black Economic Empowerment (BBBEE) opportunities offered by the Australian company's entry into the South African market.

"We as a company specialise in entering regions with a market mix similar to that which we have in Australia. I have learnt over the years that the only way to penetrate new markets is to embrace the local system, its people, and its specific laws and regulations," Rogers comments.

This has resulted in the HMA Group also establishing a major engineering and support hub in Jakarta so as to gain a foothold in the burgeoning Indonesian market. "We are looking at setting up offices in Kalimantan and Sumatra, so we are very active in that region as well." Hence the decision to enter the African market follows in the wake of a larger global strategy to expand the HMA Group from its traditional Australian home base.

"The HMA Group celebrated its 50<sup>th</sup> anniversary last year, which is a fantastic achievement. I myself have been with the company for 27 years. Thus, I have been through a lot of transitions and economic cycles, and what genuinely distinguishes the group is its staff retention, which means we have garnered considerable project and technological experience and expertise over the years," Rogers points out.

Not only has the HMA Group fared extremely well during the recent commodity boom in Australia, but also it has been undergoing rapid growth for the past decade. "The current downturn in the commodity super cycle is not a concern for us. The primary



Materials-handling solutions are a key focus for the HMA Group in Africa.





*Above: HMA Bulk materials handling and wear solutions are ideal for use in the coal sector.*

*Above right: The HMA Group also supplies a range of capital equipment to diverse industries.*

*Right: The HMA Group has garnered extensive global project and technological experience.*

commodities we are interested in over here are coal, in addition to copper, zinc, manganese, and iron ore, which are all showing green shoots at the moment."

Rogers admits that while the HMA Group and its product stable is virtually unknown on the continent at present, it has worked with major project houses such as DRA in Australia, which is also well-established locally. "These are EPCM contractors that are actually designing and constructing all of the new Greenfield projects, which is where the bulk of our business comes from. We shall therefore capitalise on our relationship with such international players, and hope to replicate our success over here."

China's growing influence in the global resources market means it is vital for players such as the HMA Group, to team up with local companies in order to access opportunities in Africa. "If you have experience dealing with a particular EPCM contractor in one country, generally that stands you in good stead somewhere else. Our revenue stream is consequently becoming increasingly internationalised, with a significant portion now being generated outside of our home market of Australia," Rogers highlights.

At the outset, HMA South Africa will focus on bulk materials handling, wear solutions, instrumentation, and geotechnics, which are all fully-fledged divisions. With the South African coal-mining sector linked inextricably to power generation, Rogers says this is a market, which it will focus on as well. "Although it was not our initial plan to become involved in the power



generation sector, the opportunity just arose, so we are taking it."

While this sector is fairly stagnant in Australia at the moment, it is a burgeoning market on the continent as Africa grapples with a severe electricity shortage and rapidly increasing urbanisation and industrialisation rates. "There are a lot of cross-border power-supply agreements in place in Africa, together with new projects, and the potential to service and refurbish existing equipment."

Rogers reveals that HMA South Africa is on the cusp of clinching its maiden African contract in the Democratic Republic of the Congo. "However, for the time being we will focus our energy on the South African market, and entrench ourselves here initially, before venturing further afield as part of our ongoing expansion into Africa," he concludes. □

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# Local stainless steel industry battles SA's economic storm

The Southern African Stainless Steel Development Association (sassda) held its 2017 AGM in Sandton, Johannesburg on June 14. This article summarises executive director John Tarboton's annual report.

South Africa's R15-billion stainless steel industry has felt the strain of a contraction in its apparent consumption figures in the last two years, caused by a flood of Asian imports mainly from China, a drop in exports of finished products and the resultant huge decrease in the conversion of primary to finished products, said Tarboton in summarising the state of the stainless steel industry.

"Our declining apparent consumption is a concern. Prior to 2015 our figures mirrored what was going on in the rest of the world, whereas now we're deviating from the global trend," he said in opening his presentation.

Looking at the value and output of the local market he explained that apparent consumption last year was just over 130 000 t in terms of primary product, which represents a value of R4.6-billion, if you assume an average cost of \$35 000/t. The conversion of that product – costed at twice that of primary product value – equates to an additional R9.2-billion, which results in a total value for the local stainless industry of close to R15-billion.

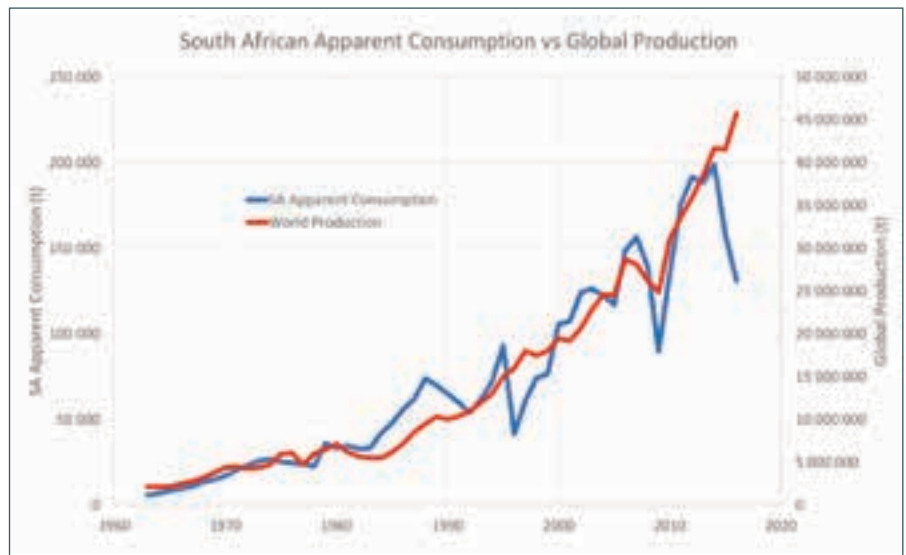
In terms of physical output, the national average is currently 4.0 t per worker per year, which, based on apparent consumption figures, means approximately 32 000 people are employed in the conversion of stainless steel primary products to finished products.

## Overall picture

Overall, the statistics show that the stainless-steel market continues to contract in 2017. The forecast is showing zero primary, non-producer exports and so apparent consumption may return closer to that of the primary supply into the market – primary supply minus primary exports equals apparent consumption. At present, the forecast shows similar primary supply for 2017 as 2016.

Looking at the first four months of this year compared to last year – January to April 2016

**Apparent consumption last year was just over 130 000 t in terms of primary product, which represents a value of R4.6-billion, if you assume an average cost of \$35 000/t.**



versus January to April 2017 – the primary supply of stainless steel is down by 17% leading to apparent consumption having declined by 10%. Tarboton explained that the reasons for the supply of product into the market declining is due to a lack of demand in the local market "reflecting our current grindingly, tough economic conditions".

A longer term comparison of 2015 versus 2016 reveals that primary supply – consisting of locally produced + imported stainless steel including: sheet, coil and plate stainless steel – dropped by 11% in 2016 or 20 000 t and unfortunately, the apparent consumption figure, which is the amount of stainless steel expected to be converted to a finished product, declined by 31% in 2016, "probably due to destocking of primary products and the reversal of the finished products trade balance".

Imported finished products surged with an increase of 44%. This is supported by anecdotal evidence and feedback from the sassda member survey and is largely due to a flood of imported product, primarily Chinese. In comparison, the export of finished products dropped by 20%, which is the opposite of previous years.

Tarboton noted: "So, whereas in 2015 we were a net-exporter of stainless steel finished products and exported 8 000 t more than we imported; we now import 40 000 t more stainless steel finished products than we exported.

We are therefore running a trade deficit on stainless steel finished products."

## World view

At the AGM, Tarboton also reported back on his recent attendance at the annual International Stainless Steel Forum AGM and associated meetings in Tokyo. "The general view was that the economic climate has resulted in an improved outlook for stainless steel. This is because, since late 2016, the commodity crisis may have reached its worst point and may have turned a corner, which means we could start to see an improvement, particularly in mining investments, something that our market is seeing glimpses of."

For 2016 the ISSF reported that the global growth rate of the stainless steel market was at just over 10%. Virtually all that growth occurred in China, which in 2001 had virtually zero share of global production as compared to 2016, while it now commands 54%. "I had hoped that after 2014 that that would start plateauing to just over 50%, but it has started to increase again towards the 60% level. This is a concern to our local stainless steel industry," commented Tarboton.

He added; "Fortunately, forecasts for the rest of the world are looking better. Our region is predicted to grow at 1.2% in 2017 and 1.6% in 2018, which represents a more optimistic outlook than has been the case for the last nine years." □

## A message from sassda's chairman, Charles Cammell

"It is my privilege to welcome you to our 2017 AGM," begins Cammell, before announcing that John Tarboton would be reporting on sassda's activities, the financial position and the plans ahead.



"I thought I would dwell on a couple of our pet subjects, though," he said.

"If we cast our minds back ten years and think about where we are today it is quite terrifying. In 2007/2008 the RSA market was flying along with the rest of the world. Oops! And along came the sub-prime crisis in 2008, which led to a global economic meltdown. We felt the effects through 2008 and 2009 in South Africa, but then bounced back for three really good years – from 2010 and the Soccer World Cup through to the first half of 2013.

"Then we experienced, until 2016, a tough economy with relatively poor demand for stainless steel and a large number of business closures," he recalled.

"Welcome to the back end of 2016 and 2017," Cammell continued, before noting some key issues disrupting the world and its economies: Trump; Brexit; rating agency downgrades; the national metal industry strike; Zuma and his cabinet reshuffle; softening global commodity demand; unpredictable exchange rates; etc, etc.

"Considering where we as an industry and association are today, I believe we have largely weathered the storm," Cammell suggested.

Despite the challenges, Cammell believes that sassda is well placed for the future. "Our financial reserves are secure and the team is in place to support members. But those of us who have weathered the storm have had to change," he noted.

"About three weeks ago, we held a one-day strategy session at these offices. The intent was to review our relevance and the pillars that support this. I am happy to tell you that consensus was achieved that we are largely on the correct path. We will, as an association, be looking at sassda's role relative to transformation and market development projects. On the latter point, we will be putting focus on two critical areas, namely power and water," he reported.

"Transformation of our industry is critical and, if we are to achieve our goals of growing the demand for locally fabricated stainless steel, this will require significant focus," Cammell predicted. "We may choose to ignore this, but it will have serious challenges for those who don't embrace the change so needed in this country. We need to improve our BBBEE scores; encourage management- and family-owned businesses; and our industry needs to attract black investors and black industrialists," he said.

"Finally, to the board, main committee and the sassda team, well done and thank you for your support and focus over the last year. I look forward to working with you again during this next year as we face more opportunities and challenges," he concluded.

As well as being sassda's chairman, Charles Cammell is the general manager of Macsteel VRN Stainless. □



## fact

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# United Way South Africa launches in Johannesburg

United Way South Africa, a proudly South African non-profit organisation (NPO) that is part of the global United Way Worldwide movement, held its official launch at the beginning of June in Johannesburg, Gauteng.



**Left:** Criselda Kananda, MC for the launch of United Way South Africa. **Right:** Chairman of UWSA, Thabang Tawarima, said: "United Way South Africa is here to provide opportunities that will have a positive impact on people's lives."

United Way South Africa's point of departure is the national development plan 2030, which identifies major areas of focus towards addressing the challenges of poverty, inequality and unemployment. More specifically, poor education, the burden of disease and enterprise development align directly with United Way's intended areas of intervention.

The organisation aims to unite and con-

nect all sectors of society – individuals, businesses, non-profit organisations and government – to create long-term positive social change. The NPO advances the common good and creates opportunities for a better life for all by focusing on education, income and health, which are the building blocks for a good quality of life.

Amon Maluleke, currently chairman of a co-op farm in Bertrams, Johannesburg, learned business management and

technical farming skills through United Way South Africa's urban farming project. "Farming has long been a passion for me, and through collaborative partnerships with United Way South Africa, the City of Johannesburg, Deloitte and others, I am equipped to make a sustainable difference in other peoples' lives," Maluleke comments.

Over 100 children from Childline received school bags, stationery and other

requisites for a full school year through a separate education project, explained beneficiary, Khosi Mazibuko, at the launch.

Introduced by the MC for the evening, popular Metro FM talk show host, Criselda Kananda, the Chairman of UWSA, Thabang Tawarima, said: "United Way South Africa is here to provide opportunities that will have a positive impact on people's lives. Through strategic collaboration between all stakeholders, we provide a collective approach to community impact. We have plans to develop and enhance knowledge, skills and experiences of disadvantaged youth within the targeted communities, to improve their chances of being employable or growing their entrepreneurial ventures. This will be achieved by partnering with strategic players in the market to connect deprived unemployed South Africans to sustainable economic opportunities, thereby increasing the health literacy and access to primary health care for indigent South Africans. We already have projects running with several of our partner companies which bear testimony to this," said Tawarima.

Pharmaceutical company, Eli Lilly, handed over a \$500 000 gift from past CEO, Dr John Lechleiter, Sarah Lechleiter and the Lilly Foundation to UWSA at the launch. Keynote speaker, the well-known SAfm talk show host and founder of Champion South Africa, Ashraf Garda, stressed the importance of creating public/private partnerships by collaborating effectively around critical community issues to ensure maximum social impact that provides lasting changes within individuals and societies.

The organisation's business model is underpinned by strategic collaboration between all stakeholders in communities. This collective approach to community impact allows the organisation to leverage, aggregate, and to support, and also expands common development programmes for disadvantaged South Africans. Collective community impact will bring about long-term sustainable change in South Africa in the areas of education, income stability and health.

The local organisation enjoys a solid volunteer board comprising leadership and expertise from several prominent corporates including: Accelerate Performance, Coca-Cola, Cummins, Deloitte, Eli Lilly, Fluor, IBM, McCann World Group, YBK Consulting and 3M. □

*It's a credo. A mission. A goal. A constant reminder that when we reach out a hand to one, we influence the condition of all. We build the strength of our neighbourhoods. We bolster the health of our communities. And we change the lives of those who walk by us every day.*

## About United Way

**Our vision:** United Way South Africa envisions a nation where all individuals and families achieve their potential through education, income stability and healthy lives.

**Our mission:** Our purpose is to improve lives by mobilising the caring power of communities around the nation to advance the common good.

**Our relevance:** United Way South Africa's objective is to unite and connect all sectors of society – individuals, businesses, non-profit organisations and governments – to create long-term social change and mobilise the collective caring power that produces healthy, well-educated and financially stable individuals and families

**Our goal:** We aim to play a leading role in capacitating South African youth by conven-

ing the key stakeholders within the Education sector and co-creating interventions that address the high levels of unmatriculated youth in our country. Our aim is to improve the skill and education of these youth while creating opportunity channels for employment amongst our corporate partners.

**Our strategy:** Our strategy is focused on creating renewed educational opportunities for South African youth. It is safe to say that formal qualifications play a key role in driving long term income growth opportunities. Every un-matriculated youth that comes through our programmes will have the opportunity to further their education through matric re-writes, trade learning and enrolment into the City of Joburg's Massive Open Online Varsities (MOOVs) situated across Johannesburg.

[www.unitedway.org.za](http://www.unitedway.org.za)



## Strategic acquisition of UK company creates opportunities



Bosch Projects' continuous vacuum pan supplied into Zambia's Nakambala Product Alignment and Refinery project.

Bosch Projects has expanded its global operations with the recent acquisition of UK-based Booker Tate Limited. The company provides innovative, cost-competitive technical solutions for cane sugar mills and refineries, cogeneration plants, ethanol distilleries, sugar cane production and general agribusiness, in over 100 countries. Specialist services extend from feasibility studies to detailed engineering design, construction and commissioning.

**B**osch Projects, part of the Bosch Holdings group of multidisciplinary consulting engineering companies, has expanded its global operations, with the recent acquisition of UK-based Booker Tate Limited, from RCL Foods.

"Effective from 1 May 2017, this strategic acquisition in an international agricultural production and processing consultancy creates new opportunities for Bosch Projects to offer enhanced engineering services to a broader client base globally," says Mike Gibbon, CEO of Bosch Holdings. "The synergy of Bosch Projects and Booker Tate augers well for the international sugar and agricultural sectors, which will benefit from combined technical capabilities and complementary strengths of two reputable organisations.

"Bosch Projects, collectively with Booker Tate, has over 100 years' experience in the sugar sector and is well positioned to offer a truly global service. The company provides innovative, cost-competitive technical solutions for cane sugar mills and refineries, cogeneration plants, ethanol distilleries, sugar cane production and general agribusiness in over 100 countries.

"Specialist services extend from feasibility studies to detailed engineering design, construction and commissioning in

both the agricultural and factory sectors."

Bosch Projects has an extensive network of offices in Africa, South and Central America, the United Kingdom and Indonesia and works closely with technology partners in South East Asia, the USA and India.

The company also offers solutions in diverse sectors, including energy and industrial plants, water and waste water, roads, land and building developments, as well as ports and terminals. □

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



The Nakambala sugar refinery in Zambia.

## Accurate, reliable hydrogen monitoring

When refineries produce petrol, the product is a specific blend of hydrocarbons. When refining petroleum products from crude oil, a key element – hydrogen – plays a key role as a feedstock used in the various processes.

RTS Africa Engineering, based in Tshwane, specialises in innovative technologies that provide solutions to industrial challenges. Among other things, the company has been involved in supplying hydrogen production and analysis equipment for many years.

"Importantly, we also offer an inline hydrogen monitoring instrument, the Hy-Optima 2700 – from our international California-based principal H2Scan – for use specifically in the oil and gas refining industry," explains managing director of RTS Africa Engineering, Ian Fraser. Common applications of the Hy-Optima 2700 are in refinery reforming, cracking, recycling, tail gas, fuel gas, flare gas and other multi-component process streams.

The challenge for process engineers working in oil refineries is to monitor and control the levels of hydrogen in refining processes – particularly the monitoring of hydrogen used in catalytic 'cracking' and also in the recycle gas stream. "Too much hydrogen is not good because you have too much energy and it starts to damage the catalyst; and too little hydrogen is bad because it slows down the process," explains Fraser.

Currently, the traditional methods used by refineries to measure hydrogen involve the use of gas chromatographs, thermal conductivity meters and density analysers. RTS Africa's solution is in the shape of the Hy-Optima 2700 process analyser. These explosion-proof instruments can be installed at strategic points in a refinery's process streams, to provide analogue and serial outputs to communicate with an existing SCADA-type control system.

"The Hy-Optima 2700 is the only instrument that can withstand the hydrocarbon background typically found in refineries; where gases such as hydrogen sulphide, carbon monoxide, chlorides and other corrosive gases damage most other measuring instruments," concludes Fraser.

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



The inline hydrogen monitoring instrument, the Hy-Optima 2700 from California-based H2Scan, is available in South Africa through RTS Africa Engineering.

## Major seaports play key role in traffic flow

Up and down Africa's coasts, major seaports with bunkering facilities play a key strategic role in keeping sea traffic flowing and industries growing. It is big business and includes the storage of bunker (ship) fuels and the provision of fuel to vessels. Bunkering includes the shipboard logistics of loading fuel and distributing it among bunkers.

In 2014, the Mauritian authority that sources fuel for the country's requirements, liberalised the importation of

heavy fuel for bunkering in order to support Port Louis as a bunkering hub for the region. Heavy fuel contributes 62% of the bunkering sales in Mauritius and is used by many industries, including fishing and cargo ships.

The invitation to players (including Engen) specified a 380 CST grade fuel, which for Engen proved to be non-competitive in terms of price, due to the availability of dedicated storage facilities and barges to target big customers.

Convinced that Engen's 180 CST would do a better job than the 380 CST Grade, a joint team was assembled from Engen and tasked with formulating and executing a strategy to get the company into play. The first phase involved a number of high-level stakeholder engagements, which saw the business get approval for 180 CST.

The team then managed to secure the optimal storage and logistics solutions by partnering with third parties for storage and barge facilities. In doing so, the business secured healthy shore storage tank capacity, barges and a dedicated pipeline for receipt and loading of barges.

Engen tightly manages inbound logistics into Port Louis, daily price volatility and financing of the product to ensure that it is always competitive. Engen Petroleum Mauritius manages the in-country storage and outbound logistics through marketing and delivery to customers.

Christian Li, Engen commercial business development manager; Christian Musindi, trading manager; Anmarie Kleinhans, marine sales and operations manager; and Ricardo Aimee, commercial executive teamed up to create awareness to local and international customers on product quality and availability.

Engen has thus succeeded in growing its market share of fuel oil by more than tenfold.

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



A barge in St Louis, Mauritius, bunkering Engen's 180 CST Grade fuel.

## Air Products a top 50 company in the Eastern Cape

Taking the lead to provide a secure supply of industrial gas to the industries in Eastern Cape, Air Products launched the first air separation unit (ASU) in the Eastern Cape in the Coega Industrial Development Zone (IDZ) back in November 2014. The impact of this investment and its contribution to

economic growth was highlighted with Air Products being selected as one of the top 50 Companies in Nelson Mandela Bay (NMB) for 2017.

According to managing director Rob Richardson, the facility in the Coega IDZ formed part of a long-term capital investment pipeline of R2-billion and was aimed at establishing gas supply to serve the local industries. "Air Products was the 29<sup>th</sup> operational investor in the IDZ and we truly appreciate this award, which recognises our contribution to the growth of the Eastern Cape's regional economy," he says.

Air Products had been serving customers in Nelson Mandela Bay and surrounding areas from the cylinder fill facility in

Deal Party since 1984 until the strategic decision was taken to enhance the region's supply chain network. With the establishment of the ASU in the Coega IDZ, Air Products has strengthened its infrastructure in the Eastern Cape as it was no longer necessary to truck in the industrial gas over long distances from other provinces. Establishing a secure supply further supported the competitiveness and sustainability of the business.

Richardson concludes: "We believe that the quality of our technology and our strong emphasis on safety, quality and customer service will enable us to add further value to manufacturing and industrial processes in the region for years to come."

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



Air Products built the first air separation unit (ASU) in the Eastern Cape in back in November 2014.

## Environmentally friendly cleaning of urban spaces

The cleaning industry is one of the most pervasive in the world. In spite of its scale, local industry leaders believe there is nowhere near enough understanding in South Africa of the significant role the cleaning industry should play in sustainability, pointing to a weight of environmental legislation directed at land and wildlife but not enough aimed at the environmentally friendly maintenance of urban spaces.

There are three commonly accepted pillars to sustainability in cleaning:

- Genuinely eco-friendly cleaning products.

- Reducing wastage of water, electricity and disposables.
  - Longer lasting and recyclable machinery.
- Industry watchdogs caution about widespread green product claims. According to Stephen Ashkin of The Green Cleaning Network, particular scepticism should be reserved for 'chemical-free' labels as he believes few products truly warrant that description."

However, there are now many options available in South Africa that meet the standard US Occupation Health & Safety Administration (OHS) definition of green

cleaning products as 'safe to use and less harmful to your health and environment than conventional alternatives such as bleach and ammonia'.

Gavin Herold, general manager of Africa and the Middle East for Nilfisk, one of the world's leading suppliers of cleaning equipment, believes that recent supply crises in South Africa in both electricity and water have helped to focus managers on sustainable cleaning issues, especially the urgent need to reduce wastage in cleaning.

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



## Canadian students visit Multotec

A group of Canadian students from the University of British Columbia's Mining Engineering faculty recently visited the Multotec Group manufacturing facilities in Spartan, just outside Johannesburg in South Africa. The visit for the students, from the graduating class of 2017, provided the ideal platform from which to interact with a leading South African manufacturer that supplies both capital equipment as well as consumables to the minerals processing sector.

Training facilitator at Multotec, Brent Combrink, says that the modern manufacturing industry is often not understood by university graduates and students from tertiary institutions. For this reason, Multotec believes it is important to provide opportunities such as facility visits so

students can see this side of the industry they have studied.

"Exposure to real world manufacturing environments is a valuable tool and not only assists in consolidating what has been learned at tertiary education centres, it also allows students to understand the types of employment opportunities that this sector can offer," Combrink says.

The group's facilities, spread over several properties, are equipped with 'state-of-the-art' design technologies, including 3D prototyping, computational fluid dynamics, computer aided drawing and trajectory modelling, among others. Combrink says visiting the various sections allowed students to get a real feel for the manufacturing sector.

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

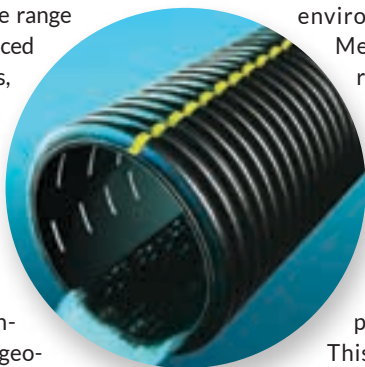


Students from the University of British Columbia's Mining Engineering faculty on a visit to the Multotec Group's manufacturing facilities.

## Slotted pipes for subsoil drainage

Fibertex supplies a wide range of components for advanced subsoil drainage systems, designed for use in various industries, including civil engineering, construction and agriculture. Included in this range are Drainex slotted drainage pipes, which are used in conjunction with Fibertex geotextiles and composite drainage systems that encompass geonets, fin drains and wick drains.

"Drainex pipes are manufactured from high density polyethylene (HDPE), which is a chemically resistant polymer with resistance to acids or alkali attack. These durable drainage pipes also offer high impact resistance and are UV stabilised, ensuring extended service life in arduous



environments," says Darryn Meisel, national sales director: geosynthetics, Fibertex SA.

"These drainage pipes are bedded and side filled with filter material and properly compacted surrounding soil, to form a complete pipe-soil system.

This robust structure can withstand loads in excess of 150 kN/m from soil pressure and other superimposed loads."

Drainex pipes have a double wall sandwich construction, with a corrugated external wall and a smooth inner wall, with a low coefficient of friction. This design combines high ring stiffness (>450 kPa) with excellent flow characteristics, allowing for the optimum utilisation of

## SMC rolls out two new compact cylinders

SMC's latest compact cylinders, the JMGP guide cylinder and the compact JCQ Series, have been designed with weight and space savings in mind. Both help to reduce machine sizes and costs, and deliver increased efficiency due to their light-weight nature, which could enhance cycle time.

With the launch of its compact cylinders, SMC, a leading worldwide expert in pneumatics, is helping customers meet the demand for space saving components that drive down costs and drive up productivity.

The JMGP is a guide cylinder, featuring a dual rod, which has been designed for a variety of applications including pushing, clamping and lifting where there are space and weight restrictions, such as in transport lines or for robotic manipulation and handling. The compact JCQ is ideal for similar applications where a short cylinder is required, but without the lifting capability.

With space being at a premium in many manufacturing plants, the need to produce smaller, more efficient machinery is growing. These two new models achieve just that, as they are both smaller than similar cylinders on the market. Being lighter in weight, they also achieve improved cycle times and help to deliver higher output.

The ability to directly mount auto switches reduces overall labour costs and, the fact they do not protrude beyond the body of either cylinder, helps minimise the risk of interference with other machine parts. In addition, options for four piping directions and three mounting surfaces on the JMGP makes it extremely versatile.

[www.smc pneumatics.co.za](http://www.smc pneumatics.co.za)



SMC's latest compact cylinders, the JMGP guide cylinder and the compact JCQ Series, have been designed with weight and space savings in mind.

pipe diameter. Drainage perforations are created in the valley of the corrugations to protect the pipe from blockage from drainage aggregate.

Drainex is available in diameters of 75 mm, 110 mm or 160 mm, in coils and 6.0 m lengths. Push fit couplings and profiled sealing rings ensure reliable joining and watertight sealing of Drainex pipe fittings.

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

## 3D printers for fast robotics parts

RS Components (RS), the trading brand of Electrocomponents plc (LSE: ECM), the global distributor for engineers, has introduced two high-reliability 3D printers from Zortrax, which enable engineers, innovators and project developers working in the field of robotics to produce



The Zortrax M200 and M300 3D printers are now available from RS. These new 3D printers strengthen the existing comprehensive selection of products supporting the robotics range stocked by RS.

detailed and accurate concepts and prototypes. Those working in robotics have already adopted 3D printing technology to streamline project development. Tackling the limited availability of specialist components or subsystems, 3D printing delivers the capability for developers to create highly complex and application-tailored parts, or even entire robots, for a variety of end applications.

Employing single-extruder LPD (layer plastic deposition) printing technology, the reasonably priced Zortrax M200 and M300 3D printers are reliable, efficient and offer exceptional quality with high dimensional accuracy and repeatable precision. This enables the high-quality printing of detailed elements that duplicate models without any loss of the original appearance, as well as completing extensive

print jobs with almost no maintenance.

The M200 pack is a fully integrated plug-and-play system that allows users to get up-and-running immediately and includes the 3D printer, starter kit, dedicated intuitive Z-SUITE software bundle, and compatible material.

Specifications of the M200 include: workspace dimensions of 200 × 200 × 180 mm; 90 to 400 µm resolution, wall thickness capability of 400 µm (minimum) to 800 µm (optimum); and single printable point resolution of 400 µm. Other key specifications include material diameter of 1.75 mm and a nozzle diameter of 0.4 mm.

Compatible with stl, obj, dxf and 3mf file types, both machines support Mac OS X/Windows 7 and newer versions, and have access to a helpful model library. Further accessories available for both machines include the Zortrax 40 × 40 mm fan cooler and extruder cable with adaptor.

[za.rs-online.com/web](http://za.rs-online.com/web)

## Networking evolves using lightly managed switch addresses

Manufacturers that use unmanaged network switches but struggle with downtime or security concerns now have an alternative to using managed switches. The Allen-Bradley Stratix 2500 lightly managed switch from Rockwell Automation provides the security, resiliency, segmentation and bandwidth-optimisation benefits of a managed switch without the need for

extensive configuration.

“Unmanaged switches deliver the network connectivity required for less complex industrial applications, but they cannot provide diagnostics, manage traffic or enhance security,” says Christo Buys, business manager for control systems, Rockwell Automation sub-Saharan Africa. “Manufacturers need a more robust

switch when issues such as packet storms are bringing down their network, or if they want to protect against growing security threats.”



When first installed, the Stratix 2500 industrial Ethernet switch can prioritise critical industrial network traffic. It can also be configured for application-specific needs. Manufacturers can use this flexibility to future-proof their operations by deploying the switch out of the box today and scaling it up to a lightly managed switch as their needs evolve.

The Stratix 2500 switch far exceeds the capabilities of an unmanaged switch by monitoring and optimising traffic flow and providing diagnostic information to help minimise downtime. It also supports up to 64 VLANs for logical segmentation, which helps reduce total cost of ownership. In addition, port security allows users to disable ports or control end-device connectivity based on the media access control address.

This switch uses embedded Cisco technology and is part of the Rockwell Automation Integrated Architecture system. As a result, network configuration, management and support are made easier while integration with the enterprise network is optimised.

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

## Sharpening productivity and profits

The production of small steel components is a key part of overall sheet steel production. Now Bystronic, a world-leading provider of cutting and bending solutions has released the Xpert 40, a compact, mobile press brake designed specifically for the high-speed production of smaller components.

According to First Cut’s managing director, Andrew Poole, when it comes to the business of metal fabrication technology, Bystronic is the world leader. “Not for nothing is the

Xpert 40 referred to as the Swiss Army knife of press brakes,” he says. With a capacity of 40 t, Xpert 40 can carry out up to 1028 bends an hour – three times as many parts in the same time as a large machine would – allowing users to bend quickly and efficiently,” Poole comments.

These high processing

speeds have been achieved through upper flank and back gauge acceleration; and the fact that the machine is fully programmable with the use of BySoft 7 software. “Thanks to intelligent functions such as energy saver and automatic stop-start, the Xpert 40 operates more economically than larger press brakes – while bending at higher speeds,” he says.

First Cut’s Bystronic sales director, Gareth Jackson, agrees, adding: “Another major advantage of the Xpert 40 is that, being so compact, it can be deployed in approximately five minutes. In addition, the machine has forklift ports, allowing for mobile deployment and integration into almost any industrial environment or fabrication configuration.”

The Xpert 40’s process-controlled drive unit reduces power consumption by up to 30%, resulting in substantial savings and maintenance costs.

Xpert 40 is now commercially available locally through First Cut.

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







## Energy Engineered Products announces BEE partnerships

Energy Engineered Products is taking its stainless steel business (Energy Metals), and valves business (Energy Valves) forward into a more inclusive, progressive and sustainable future with the recent conclusion of an empowerment share transaction.

In line with the black economic empowerment (BEE) ownership agreement, Edwin Gafele Bogopa, CEO of Metsana Group, now holds equity in Energy Engineered Products and serves as a non-executive board member. Energy Engineered Products senior sales managers, Rowena Suneerchand and Anesh Prithilall, have also taken up meaningful shareholding in the business.

"While we have been active on the BEE front for a number of years through skills development, staff training and procurement, we recognised that the time was right to address one very important aspect on the scorecard, that of ownership," states Graham Whitty, director of business development. "At this juncture in our country's history, transformation of the economy is essential, and we are fortunate to have talented young individuals who can add value to the business as shareholders."

Bogopa, engineer and entrepreneur extraordinaire, approached Energy

Engineered Products approximately seven years ago expressing an interest in obtaining equity in the business. While the company was not in a position to enter into any agreements at that time, the communication channels were kept open.

"When we were ready to move forward with our BEE responsibilities, we did not hesitate in approaching Edwin," affirms Whitty. Since establishing Metsana Engineering in 2002, Edwin Bogopa's business has grown and evolved from a single company into a Group of companies. Metsana Group, formed in 2010, looks at various aspects of the market including design, engineering and project management services in civil and electrical engineering, natural gas extraction, hydro-power generation, environmental waste management, and more.

Looking internally, Whitty says that staff remains the company's most valuable asset. "The development of talent and people skills from within is crucial to the company's sustainable growth and progress. Rowena and Anesh have been with Energy Engineered Products for twelve and nine years respectively and are members of our staff who have shown true dedication and commitment to our businesses. It was therefore a logical step to include them in our BEE plans."



Energy Engineered Products concludes its empowerment share transaction: Front row from left: Rowena Suneerchand, Hugh Whitty, Fiona Jacobs; Back row: Graham Whitty, Ken Perel, Anesh Prithilall, Edwin Bogopa.

With unrivalled experience and expertise in corrosion resisting alloys, stainless steel and related products, Energy Engineered Products services customers in South Africa as well as on the rest of the African continent through two Johannesburg-based business units: Energy Metals and Energy Valves. Specialist metal company Multi Alloys is headed up by Ken Perel and is a leading supplier of nickel alloys, duplex and high alloy stainless steel, titanium and other niche products.

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

## Crane hoist safety vital to smooth projects

Deploying tower cranes and construction hoists on work sites raises the pace of the project through higher productivity, but any non-compliance with the numerous safety regulations will have the opposite effect.

"This is why we, at SA French, take as much of the administrative load as possible off our customers' shoulders when it comes to lifting-related safety compliance," says Brenden Crous, SA French's manager for safety, health, environment and quality (SHEQ). "Our expert knowledge ensures that we cover all the bases with the necessary procedures and documentation, so that everything is on hand for inspection."

Crous highlights that a Department of Labour inspector may consider a site shutdown if there are any significant gaps in compliance, leading to costly and inconvenient delays.

"Both our product lines, Potain tower cranes and SA French construction hoists, involve high risk activities, so one of our main priorities is to control the risks

associated with working at height," he says. "All areas of risk in relation to tower crane or hoist safety procedures must be identified, assessed and mitigated so that our customers are not exposed to that risk."

While tower cranes must comply with both the Driven Machinery regulations and the Construction regulations of the Occupational Health and Safety Act (OHSA), construction hoists must also meet OHSA's Lift, Escalator and Passenger Conveyor regulations as they can carry both passengers and materials.

"These stringent requirements demand compliance with a range of South African National Standards relating to the construction, installation, maintenance and operation of passenger conveyors," says Crous.



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

## Inline pinch-valve sleeve

Afrivalve, a division of eDART Slurry Valves, now offers a simple patented design of the Red Roc Hi-Lift pinch valve that allows for inline changing of the rubber sleeve, without the use of lifting equipment. This unique and innovative feature offers a drastic reduction in downtime and manpower to replace worn sleeves, eliminates the need for lifting and rigging equipment in remote areas as well as the need to remove and re-align the pipework.

Red Roc Pinch valves, which are manufactured at eDART Slurry Valve's facilities in Jet Park, Gauteng, range in sizes from DN150-DN600 with larger sizes on request, and can accommodate pressures ranging from PN10 to PN40 depending on the size.

Afrivalve's group marketing manager, Gregor Hopton, says: "We are a 100% local manufacturer allows us to tailor our valves to exact customer requirements. Thus we can offer the Red Roc Hi-Lift Pinch Valve in higher pressures and sizes than the DN600 to meet specific requirements. Although predominantly used in the mining industry, Red Roc Pinch Valves are suited for use applications such as power generation, sewage and effluent industries."

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

# A visit to the Mad Giant microbrewery

On June 27, 2017, Air Products hosted a visit to the Mad Giant microbrewery on 1 Fox Street in central Johannesburg. MechChem Africa's Peter Middleton takes the tour and talks to Ndumiso Madlala from Ubuntu Kraal Brewery and Mad Giant's Eben Uys.

**M**ad Giant brings together science and an immense love of beer. Eben Uys, the brand's co-founder, is a graduate chemical engineer from Stellenbosch University who brings a thorough understanding of the process control and a love of experimentation to the art of beermaking. Mad Giant, according to Uys: "is about little guys who are crazy enough to pursue big dreams".

"We use the 'one-eyed giant' as our emblem to remind us that, while experiencing big scary dreams, we must always keep one eye on the prize. And through what we are achieving here, we hope to inspire other people to fight the corporate monster and pursue their own independent dreams," he says at the beginning of a tour of his microbrewery.

Located in the 1 Fox Precinct, the Mad Giant brewery is a collection of restored warehouses in Johannesburg's historic

Ferreirasdorp district. The spectacular downtown craft brewery consists of Mad Giant brewery's shed, which has a huge retro-style sign on its roof and a spacious beer garden that stretches around the building. Inside, the space has been given a fun makeover with quirky light fittings and unusual Meccano-inspired tables and chairs.

Behind the bar is a giant metallic one-eyed giant sculpture, and there's also a small shop selling Mad Giant-branded glassware and bottles of beer. The brewery shares space with the Urbanologi restaurant, which is known for its unique Asian-inspired gourmet tapas.

"In principle, making beer is very simple. We take starch, convert it to sugar, convert the sugar to alcohol and then we sell it to

people," Uys says. "The biggest challenge is to make beer that lasts on the shelf. This is where all of the science and difficulty comes in," he adds.

At its starting point is milling of the malt, which is done outside of the brewery shed. "Malt is our source of starch and we use mostly barley with some wheat malt mixed in. After milling we pass the malt into this mash tun, which is where the starch conversion (to sugar) happens," he explains, after taking us up onto a gantry above a row of bright stainless steel tanks.

"Malt starch is made up of long chain sug-



The mash tun, where the malt starch is converted to sugar, the hops kettle and associated pre-fermentation tanks where craft beer is made in 3 000 l batches.



*Left: For fermentation followed by maturation, Mad Giant currently has several 3 000 ℓ tanks and a few 9 000 ℓ tanks that can take three batches of any brew. Right: A clean in place network ensures that every tank can be cleaned between brew batches. In keeping with the modern environmentally aware approach, the chemicals used are recovered, where possible, for reuse.*

ars, and the enzymes inside the barley break these down into simpler sugars that we can manipulate: by changing the temperature in the tun; the time in the tank; and using different types of malt.

Ubuntu Kraal's Master brewer, Ndimiso Madlala, adds: "We also use acids to manipulate the pH – naturally occurring lactic acid or acidulated malt, which comes from Germany. The pH is an important aspect governing the release of the right sugars for each brew style," he explains.

Once the preferred sugars are formed, the mix in the tun is like a thick soup or porridge. "We are only interested in the sugary liquid, so we separate this out, removing all of the solids. This liquid is called wort and it tastes a little like very sweet Horlicks," continues Uys.

The wort is then boiled with hops, which gives the beer its bitterness, flavour and aroma. "Hops comes from the same plant species as marijuana and is full of alpha acids. The longer hops is boiled, the more bitterness and less flavour it gives to the wort, so we have to control these times carefully to get the right taste for the beer style being brewed," Uys explains, adding, "we add different hops at different times, bitter hops at the beginning, for example and aromatic hops later."

Mad Giant imports its hops from all over the world. "Hops is only grown at very specific longitudes," notes Madlala. George is the only place in South Africa where hops can be grown and this can only be achieved by using additional night lights to fool the hops into thinking the day is longer.

"Hops needs cold winters and long summer days. We struggle to get the flavours we want from the locally grown varieties, so we tend to favour the original hops growing regions of the world. Next year we are going to change over to using 100% German or other imported malts," Uys adds.

"After boiling and getting the right sugar concentration and flavours for our alcohol, we go to the whirlpool, where the remaining hops is removed. Then we have to cool the wort because higher temperatures will kill the yeast used in the fermentation process," Uys continues.

Mad Giant employs an energy recovery system for the cooling process. Heat from the wort is transferred to cold water coming in through a heat exchanger. This heated water is then used in the kettle for the next brew.

Once the wort is cooled, the fermentation process can begin.

The key ingredients at the starting point

of fermentation are yeast and food-grade oxygen. "This is the first time we add gas," says Madlala, "and we use food-grade oxygen here. Oxygen acts like adrenalin for yeast, activating and invigorating it. It initiates and sustains the fermentation process, which is where the alcohol is being generated," he explains.

"Oxygen causes expansion, budding and replication, but once all the oxygen is consumed, then the yeast switches to the next stage: it looks for simple sugars – glucose, fructose and galactose – and it eats those sugars into ethanol (CH<sub>3</sub>CH<sub>2</sub>OH) and CO<sub>2</sub>. At the same time, several flavours are produced, such as the ester-like banana and other fruity flavours," Madlala points out, adding that, if the fruity flavours are not preferred for the beer being brewed, then the temperature is set differently to promote a dryer brew.

The yeast settles to the bottom of the conical fermentation tanks and is taken out of the brew after about five days. "Then we reduce the temperature down to zero degrees for the maturation stage, which takes three to five weeks," continues Uys.

"We make beer in 3 000 ℓ batches and, eventually, we will be able to do three batches every 12 hours. Currently we have several 3 000 ℓ fermentation tanks and a few 9 000 ℓ



Kegs are first washed with steam. Then CO<sub>2</sub> is used to push all the air out before the keg is filled with beer and then pressurised using CO<sub>2</sub>.

tanks that can take three batches of any one beer brew," he says.

"We are also able to reuse the yeast we extract from the first stage of fermentation for up to eight generations, but we don't generally reuse the yeast more than three or four times," he adds, before moving us over the clean-in-place (CIP) facility.

For the vessels used for making the wort, a simple water rinse is enough to clean the vessels between batches of the same brew. "But if there is any break in their use then a full wash down has to be done," continues Uys.

"But for the fermentation vessels, we have to do a full cleaning cycle after every brewing cycle. This involves a hot alkali wash using sodium hydroxide/caustic soda. Then we do an acid rinse followed by a sterilising rinse," he says.

In keeping with the modern environmentally aware approach, the chemicals used are recovered, where possible, for reuse. "Mad Giant has invested a lot of money in equipment to keep the plant operating to the high hygiene standards required," Uys adds.

The time spent maturing in the fermentation tanks enables all of the remaining sugars to be converted and the beer to be clarified and cleaned. "Green beer tastes horrible," says Madlala. "But by the time the beer comes

out of the tanks three or four weeks later, it is beautiful. You can't make a good beer in days," he asserts.

The water used? "We use municipal water but we have to treat it, mostly to remove any trace of chlorine," Uys responds.

From the CIP facility we are taken into the laboratory, where the ingredients and the beer are tested for suitability and any signs of contamination. "This is one of the best-equipped brewery labs I have ever seen," asserts Madlala, possible because of Ewan Uys' original profession as well as his passion for creating new tastes and flavours.

A lot of time is spent testing the shelf life of the various Mad Giant craft beers. "We guarantee a nine month shelf life and we always use brown bottles. The factors that make a beer go stale faster are oxygen, heat, and UV light. Green bottles do not block out UV, so beers sold in these have a shorter shelf life," notes Madlala adding that, personally, he never drinks beer from a green bottle.

Bottling and packing sits at the end of Mad Giant's microbrewery shed: Chilled beer is carbonated before being bottled and capped and then labelled and packed. "This is the most automated part of our process. We fill about 700 to 850 bottles an hour using this equipment, which is imported from Italy."

## Air Products' support for craft brewers

Craft beer brewing has evolved from being a home-brewing hobby to a precise and complex process, aimed at delighting craft beer lovers who have become enthusiasts of this new era of beer and the more distinguished tastes offered by microbreweries.

As a supplier of gases, which is vital to the brewing process, Air Products has been playing an important role in supporting microbreweries to create craft beers suited for this local, expanding and increasingly popular craft beer market.

Words such as hops, vessel, malt and fermentation comes to mind, but it is much more complex than simply adding certain ingredients

together and hoping for the best taste once the 'beer' has matured. Craft beer brewing has become an art form and the use of the correct gases at the correct time in the correct quantities is vital in ensuring the best outcome.

Air Products supplies gases such as oxygen, carbon dioxide and nitrogen to a number of microbreweries in Gauteng.

Craft beer brewers are able to create unique beers by producing small quantities that deliver strong flavours. The ingredients used by microbrewers are different to those used by large, commercial brewers. The introduction of craft beers to South African beer drinkers has created a new excitement in the marketplace as there is now a wide range of tastes available and beer drinkers are no longer restricted to the same brands and styles that have been available in the past.

Food-grade Air Products Freshline Oxygen, which is added to the wort prior to the fermentation process, improves yeast performance, ultimately affecting the flavour of the beer. Freshline carbon dioxide is used for carbonation of the final product and Freshline nitrogen is used to create the 'head' or 'collar' of a beer, which adds to the attractiveness of enjoying a 'cold one'.

Air Products' Freshline product manager Nelisiwe 'Neli' Dlamini explains the use of Freshline oxygen in craft beer brewing: "Brewing craft beer is an intricate process and it is important to ensure a secure supply of oxygen to the brewery – malt and hops, water, yeast and oxygen is required for the fermentation process and without the oxygen, the entire process and ultimately the quality of the beer is affected. We understand the process and aim to ensure that we supply product to the microbreweries, enabling them to produce quality, tasty craft beer."

Air Products has formed a strong relationship with a number of



Nelisiwe Dlamini with Ndumiso Madlala of Ubuntu Kraal Breweries: Air Products can supply microbreweries with Freshline gases via cylinders, Maxitank, Minitank or CryoEase®.



Mad Giant has invested a lot of money in process control equipment to keep the plant operating to the high quality and hygiene standards required.

Mad Giant also fills kegs for distribution to pubs. "Our kegs are first washed with steam. Then we use CO<sub>2</sub> to push all the air out, fill the keg with beer and then pressurise using CO<sub>2</sub>," Uys notes, adding that kegs are quickly becoming Mad Giant's most expensive asset.

The beer tasted on the day, several of them but in 150 ml glasses, tasted very good indeed.

And while the 'craft' might still have a little of the 'hit-and-miss' reputation associated with 'home-brews', the precise and complex process used at the Mad Giant and Ubuntu Kraal microbreweries undoubtedly result in consistency and quality.

Combined with the passion and creativity of these brewing artists, the product is sure to attract loyal consumers. □

microbreweries in Gauteng and is proud to be associated with their growth in market share in the last two years. For breweries such as Drayman's Brewery, Mad Giant and Ubuntu Kraal Brewery it is of extreme importance to ensure that gases are available during specific parts of the brewing process, as delays or interruptions as a result of a lack of oxygen and other ingredients will have an impact on the final product.

Air Products' infrastructure enables the company to supply microbreweries via cylinder, Maxitank, Minitank or CryoEase®, which is an effective and convenient alternative to cylinders, suited for customers with smaller operational spaces.

Moritz Kallmeyer from Drayman's Brewery says: "As a craft beer brewer, I strive to constantly improving the brewing process. A part of what I would like to achieve is to brew beer with a lower oxygen count, more stability, greater clarity, improved balance and better head retention. As a microbrewer, modern technology is costly to acquire, however, we do not hesitate to consult the Air Products team to advise us on improving our beer quality by altering our gas usage and composition. We consider Air Products to be a part of our brewing team."

According to chief beer officer at Ubuntu Kraal Brewery, Ndumiso Madlala, Air Products

has been a part of its operations from the beginning when the brewery was being commissioned. On the role of Air Products in its operations, Madlala says: "It is important for us to ensure that our product is available to customers at all times. With the assistance of Air Products, we can ensure that our beer is available to our Soweto Gold lovers through the focus on prompt delivery and efficient customer service."

"As a chemical engineer and a beer lover myself, quality is of the essence, whether it be the appearance or taste of the beer. Through Air Products' commitment to ensure a supply of product when we need it for our delicate brewing processes, we can pride ourselves in the quality and availability of our beers as the market demands, especially in the light of the fact that we also sell our beer at the brewery," says Eben Uys from Mad Giant.

According to the craft brew masters, craft beer is expected to take at least 10% of total market share of South Africa by 2022.

Dlamini concludes: "We are fortunate to form part of the growth of the craft beer market. With the knowledge, skills and insight of brewers such as Kallmeyer, Madlala and Uys, the growth of craft beer is inevitable. There is no question - Air Products will be supplying the product needed by the brewers to continue to brew quality craft beer." □

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 SMC Pneumatics - South Africa

# New opportunities for gas operations

A new one kilometre high-pressure underground pipeline, feeding from Sasol Gas' transmission network, was commissioned by Nampak Glass from Energas Technologies, which completed the construction at the end of May 2017, within deadline and in budget.

**N**ampak Glass has commissioned a 1.0 km high-pressure underground pipeline, which feeds from the existing Sasol Gas Ltd's transmission network and ties into the newly constructed Nampak pressure reduction station (PRS) in Germiston.

Implemented for strategic business reasons, the high-pressure underground pipeline construction includes a pressure reducing and metering station with two parallel lines, one in service and the other on standby. Each of the lines boasts: a filter separator to clean the gas; an electric heater to heat the gas prior to the Joule Thompson effect when the pressure is reduced; a flow meter to measure gas flow; and a regulator and slam-shut valves for pressure reduction and control and to protect downstream equipment. The project encompasses all necessary civil, mechanical, electrical and instrumentation work.

According to Morkel du Preez, project engineer from Saiyl, "This high-pressure pipeline and metering station is one of the few in South Africa that is not owned by Sasol. Energas Technologies was commissioned to supply the

electric heaters, filter separators, flow meters, insulation joints, isolation valves, control and slam-shut valves as well as relief valves."

The construction of the high-pressure underground pipeline was overseen by project management team, Saiyl, and commenced in April 2016 with basic engineering. Implemented from December 2016 and concluded, within deadline and budget in May 2017, commissioning activities on the project have already commenced.

Construction of the pipeline took place during the rainy season and over April, which was a shorter than average working month, because of the numerous public holidays. "Tight schedule controls and project acceleration methods were instituted to ensure that the project was completed by its original commissioning date," du Preez explains.

Laetitia Botha, product manager at Energas, says that Energas Technologies has been a leading supplier of specialised equipment to the natural gas industry since 2001 and has extensive experience in providing excellent support and after-sales service to its clients. "Our technical expertise and wide range of products played a pivotal role in the awarding of the contract," she notes.

"The success of our role in this project is underpinned by the quality of the equipment, service and commissioning support we provide. These are attributes that make Energas Technologies the 'go-to' equipment supplier for new and existing gas metering stations across the country and further afield," she concludes.



The newly constructed Nampak pressure reduction station (PRS) in Germiston.

The high-pressure underground pipeline and metering station was constructed by a workforce of around 50 people and represents new opportunities for gas operation experts at the Nampak PRS facility.

Energas Technologies has been a leading supplier of high-end and specialised equipment to the oil and gas industries in Southern Africa since 2001. Its 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 until the end user.

Energas Technologies also offers a range of products from its supplier, HTT energy GmbH in Germany, including fired heaters, indirect heating and cooling units from -80 °C to 400 °C, and heat recovery products. □

## Industry diary

### August

#### Infrastructure Africa

21-22 August 2017

Johannesburg, South Africa

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### September

#### Oil Analysis 1 – Understanding oil and its analysis

12-13 September 2017, Namibia

#### Oil Analysis 2 – Report interpretation

14 September 2017

Kay Meyrick

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#### Photovoltaic (PV) Solar Training Course

27-29 September 2017

The Solar Training Centre, Potchefstroom

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## The BMG World Reveal

BMG is set to officially open its recently upgraded BMG World distribution and engineering facility at a two-day event in September 2017. "The reveal of the BMG World facility in Johannesburg, is the culmination of a consolidation and supply chain re-engineering strategy which began nearly 10 years ago. The BMG World facility reflects the company's ability to supply world class integrated engineering solutions to Southern African industries," says Gavin Pelsler, managing director, BMG, part of Invicta Holdings Limited.

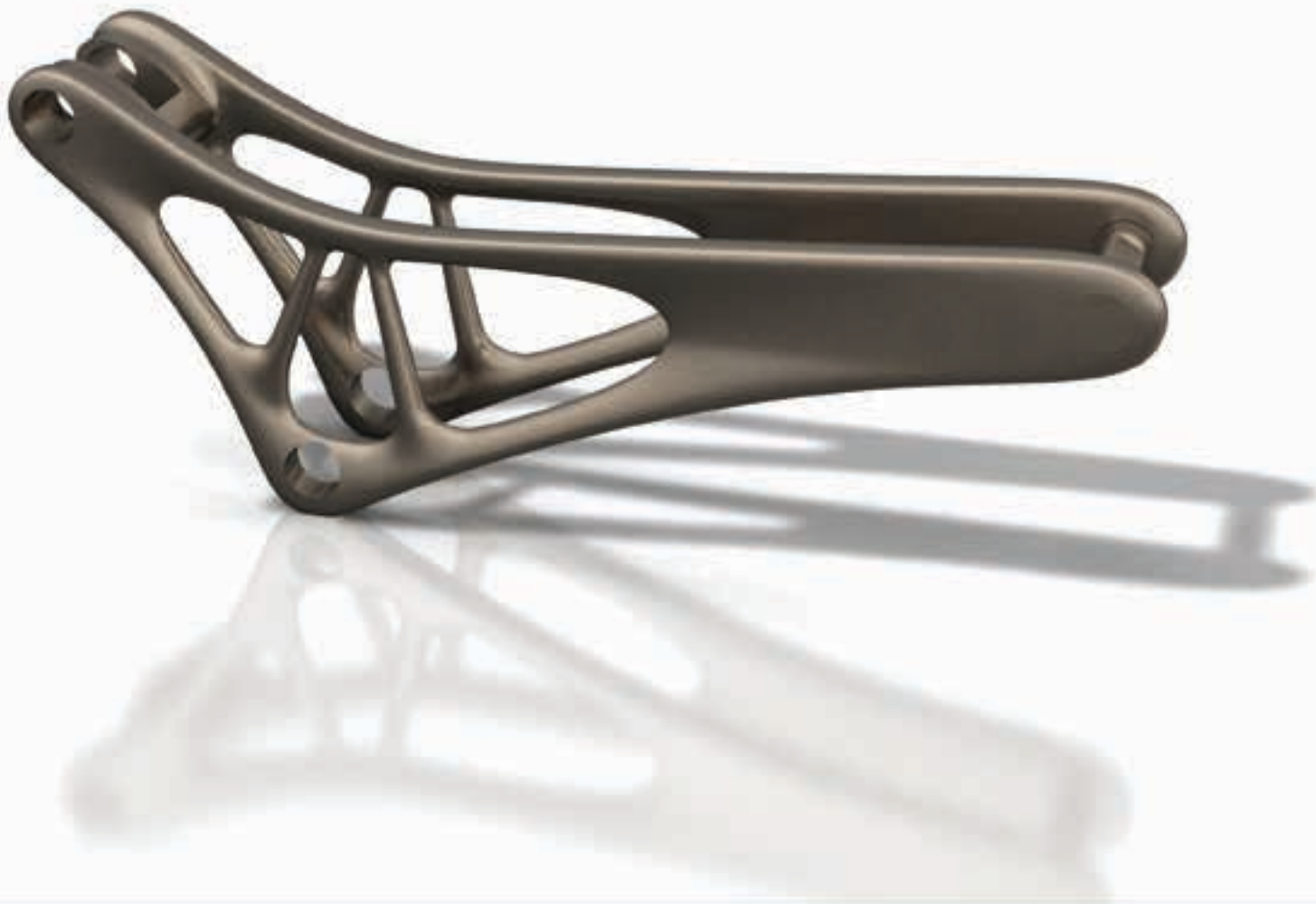
"The R350-million improved facilities

contain over 50 000 m<sup>2</sup> of warehousing and more than 300 000 line items of product. This enables BMG to continue to provide high levels of operating efficiencies and delivery service, in line with the substantial continued growth of the business.

The BMG World reveal will not only highlight the company's extensive range of engineering components and technical expertise, but there will be a focus on how BMG integrates its vast product range and extensive technical services into tangible operational efficiencies.

This event takes place at BMG World in Droste Park, Johannesburg, on 14 and 15 September 2017.

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