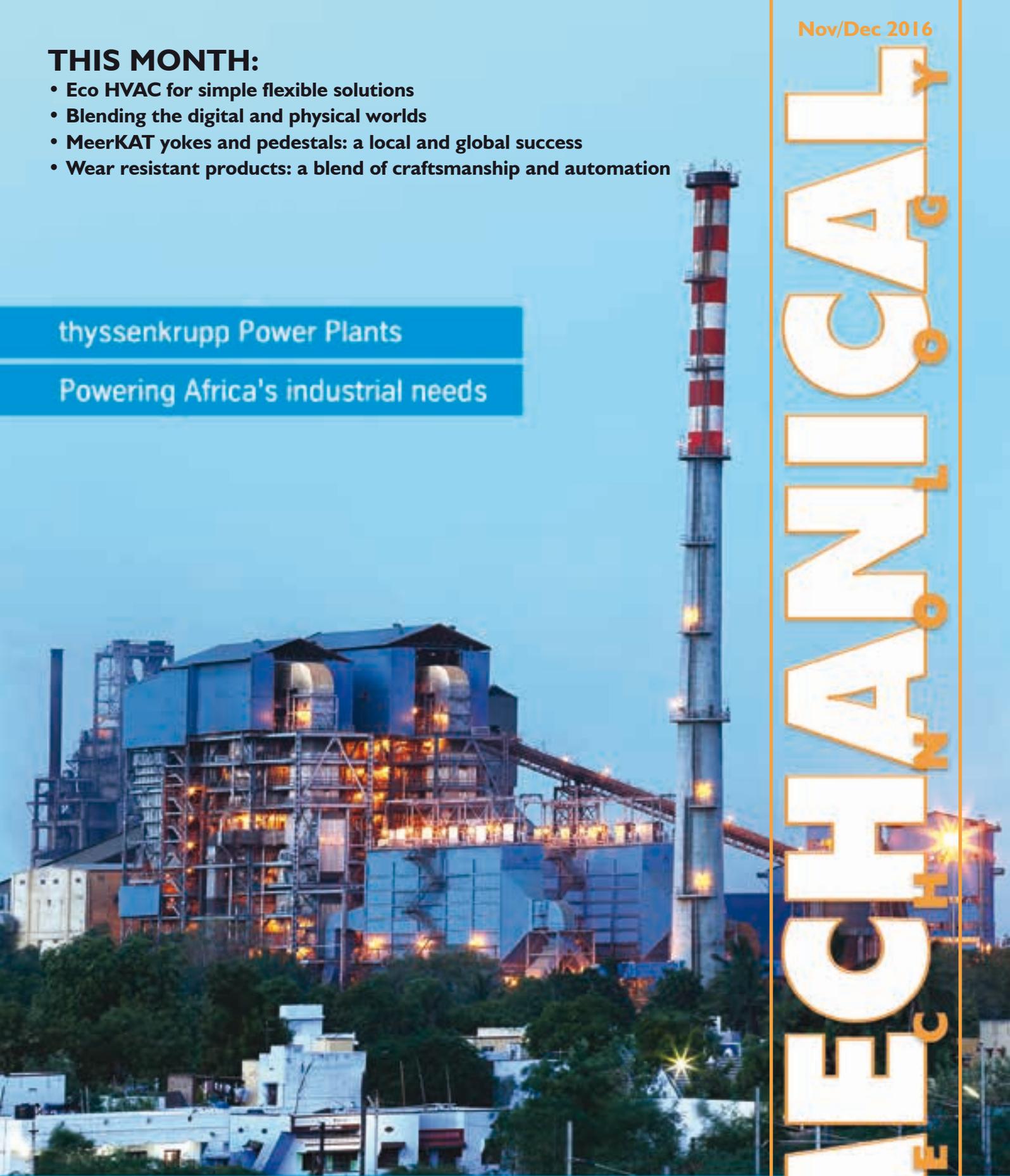


THIS MONTH:

- Eco HVAC for simple flexible solutions
- Blending the digital and physical worlds
- MeerKAT yokes and pedestals: a local and global success
- Wear resistant products: a blend of craftsmanship and automation

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Ingredients for sustained success

On the November 4 in Clubview, Centurion, I attended a year-end dinner as a guest of productONE, PTC's partner and reseller for sub-Saharan Africa. In terms of local engineering excellence and IP, the users of design and engineering software are world-class pockets of optimism, so it was a privilege to brush shoulders with them at productONE's dinner.

The keynote speaker was Adrian Saville, author, professor and chief strategist for Citadel & CIO Cannon Asset Managers.

At the start of his talk, Saville quoted boxer Mike Tyson who once said: "Everyone has a plan until they get punched in the mouth," a phrase that launched a talk about business strategy laced with lessons from the 'Rumble in the Jungle' between Muhammad Ali and George Foreman.

Saville began by pointing out that company growth relates directly to earnings. He quotes Warren Buffet on this: *'In the short term the market is a popularity contest; in the long term it is a weighing machine.'* But year on year earnings data shows close correlation with the economy. "GDP growth has the greatest impact on company performance," Saville said, adding, "so for companies to perform well it helps to have a supportive business environment."

Research into more than 1 000 JSE-listed companies was conducted by Saville's team to see if any managed to grow earnings in spite of the economy. "Between 1997 and 2013, there were only a handful. We call these the 'exceptional exceptions' and they are quite an eclectic mix – from Mr Price to WBHO and from EOH to Famous Brands. These 'counters' have managed to grow earnings consistently ahead of nominal GDP growth, regardless of the economic cycle," Saville revealed.

The additional 'ingredient' for the success of these companies, believes Saville, can be found in the performance of Muhammad Ali during his 1974 fight in Kinshasa against the younger and stronger George Foreman. "Ali was not expected to win. In fact, a plane was waiting on the runway ready to fly him directly to a neurosurgeon after the fight," he pointed out.

While Ali was noted for his lightning speed and high-energy around the ring, during the fight he deliberately leaned against the ropes, took a defensive posture and allowed Foreman to hit him on the arms and body, while constantly taunting him about how ineffective his punching was. Ali later dubbed this strategy 'the rope-a-dope'.

For eight rounds, Ali taunted Foreman, encouraging him to hit harder and harder while opportunistically throwing straight punches to Foreman's face. Then, during the eighth round, with Foreman visibly tiring, "Ali came off the ropes, landed several right hooks, followed by a 5-punch combination, a left hook that brought Foreman's head up into position and a hard straight right that knocked him to the canvas," said Saville.

From a strategic point of view, Ali was brilliant. He did not adopt his 'dance like a butterfly, sting like a bee' skill. He developed a new fighting technique in order to improve his odds against a very powerful opponent.

The key 'ingredient' for business success that Saville lifts from this is 'agility'. The 'exceptional exceptions' all have the ability to quickly realign their strategies to accommodate the conditions facing them.

Secondly, he lifts out the 'rope-a-dope' technique used by Ali. "Companies need to withstand the vagaries of a challenging environment. They need 'shock absorbers' in place to cushion company earnings during turbulent or trying times." This 'ingredient' Saville calls 'absorption'.

Two contrasting companies that he argues exemplify the value of these 'ingredients' are Kodak and Fujifilm. "In 1995, Kodak employed some 150 000 staff but, by 2014, that number had shrunk to 8 800. In contrast, Fujifilm has seen its employee numbers rise from 15 000 in 1990 to 50 000 today.

Realising that the traditional chemical-film photographic industry was collapsing, Fujifilm used its background in materials chemistry, imaging, optics and analysis to develop a diverse range of products from digital X-rays to cosmetics. And the company is now recognised as one of the world's most innovative.

"Companies that are able to balance both the qualities of agility and absorption experience better profitability and return on equity. Those companies wishing to see off the challenges of a subdued business environment should look closely at these two factors – agility and absorption – and find ways to enhance both," Saville advises.

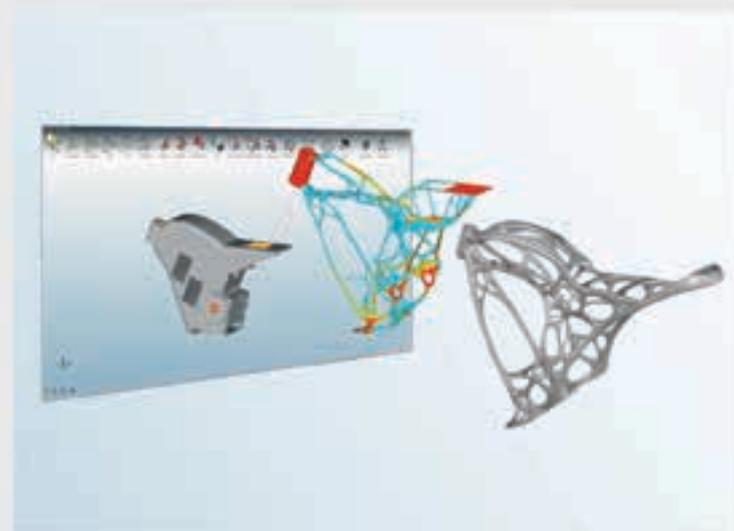
I find it fitting that Ali's agility and absorption lesson was delivered in Africa. We are still going to have to weather slow GDP growth, but we are not unused to absorbing economic pressures and, across Africa, agility is evident.

In our future as *MechChem Africa* we are determined to use Saville's key ingredients and to seek out real success stories as inspirational as those of the great Muhammad Ali.

Peter Middleton



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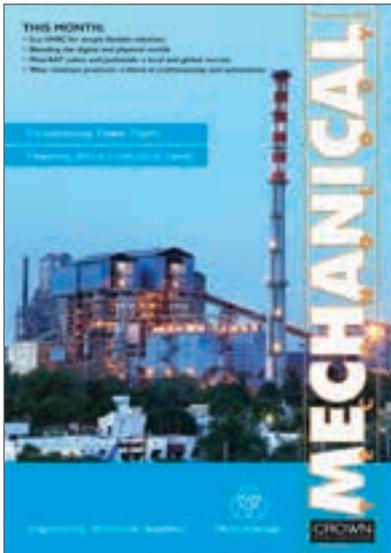


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ON THE COVER



From pit waste to power: solutions for Africa

Peter Middleton talks to the general managers of thyssenkrupp Industrial Solutions – Jacques Steyn, GM for Materials Handling; Wilfred Barkhuizen, GM for Minerals Processing, Power and Energy; and Ruben Lamprecht, Services GM – about the company's comprehensive equipment and service offerings and the introduction of its power solutions into Africa.

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The Efficient Engineering Group is more than half way through the manufacture, integration and testing of 64 yokes and pedestals for the MeerKAT antennas. *MechTech* talks to Warwick Jackson about the company's pivotal role in the project.

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From pit waste to power: solutions

Peter Middleton talks to the general managers of thyssenkrupp Industrial Solutions in South Africa – Jacques Steyn, GM for Materials Handling; Wilfred Barkhuizen, GM for Minerals Processing, Power and Energy; and Ruben Lamprecht, Services GM – about the company’s comprehensive equipment and service offerings and the introduction of its power solutions into Africa.



thyssenkrupp Industrial Solutions GMs: Wilfred Barkhuizen, Minerals Processing, Power and Energy; Jacques Steyn, Materials Handling; and Ruben Lamprecht, Services.



“**T**he thyssenkrupp brand is well known in Africa for its ‘pit-to-port’ mining and materials handling solutions and its turnkey cement plants, but the Industrial Solutions business area among others also combines leading know-how in the fields of chemicals, fertilisers, oil & gas and electrolysis. It also has a long and successful history in developing and supplying sugar plants, boiler installations and power plants, especially in India,” begins Steyn.

Spanning the comprehensive range of plant solutions and equipment is the company’s service offering, with the thyssenkrupp Industrial Solutions Service Centre in Chloorkop at its heart. Originally equipped with the capacity to manufacture and refurbish the largest Polysius-branded HPGRs (high-pressure grind rolls) in the thyssenkrupp range, the facility has CNC vertical and horizontal machining centres capable of handling 100 t components – “and we have just improved and refurbished an HPGR for a diamond mine in Gauteng,” says Lamprecht.

Today, all thyssenkrupp Industrial Solutions’ business lines are supported through the Service Centre, as well as through field and onsite presences. “Refurbishments, new and replacement parts and wear part manufacturing, fabrication and machining for any of our equipment offerings can be done locally and quickly through our Service Centre,”

he continues. “We hold and manufacture spares, support the field services teams and are available 24/7 for breakdowns, shut-downs and product support.

“We also offer technical training and we can take full responsibility for plant uptime via customised integrated asset management (IAM) contracts, through which we can operate and maintain industrial plants and/or equipment,” he assures.

“We provide services that cut across all of the pit-to-port, cement, process plant and power equipment solutions that we offer,” adds Steyn. “Our integrated service offering makes us unique in that a huge variety of industrial plant equipment can be serviced from a single source,” he says.

Power solutions for emerging markets

Power and Energy is a recent introduction to thyssenkrupp Industrial Solutions’ sub-Saharan African product offering. “Globally, this is a strong division in its own right,” says Barkhuizen, adding that, in India, thyssenkrupp has over 200 installations.

“The offering includes three core technologies: coal-based circulating fluidised-bed combustion (CFBC) plants of between 20 and 150 MW per unit; biomass boiler installations for the likes of renewable power plants including the sugar and pulp & paper industries; and waste recovery plants for industrial en-

ergy users wishing to reduce the specific energy associated with their production processes,” he tells *MechTech*.

The core application for the biomass technology in India lies primarily in the sugar industry, which uses large amounts of steam for the extraction process and, from the cane residue, produces a dry waste product called bagasse, which is an ideal fuel for thermal plants.

Cold-cyclone CFBC technology first entered thyssenkrupp through a collaboration in the late eighties with Deutsche Babcock Germany and thyssenkrupp Industries India (tkII). The technology was widely adopted for captive power generation/co-generation applications and, in India to date, thyssenkrupp has over 55 CFBC boilers commissioned and 15 in various stages of execution.

“Most utility-scale power stations in South Africa use pulverised coal to ensure complete and efficient combustion. CFBC power stations operate at lower combustion temperatures and can use much lower quality coal, including discard coal that is normally regarded as unusable,” says Barkhuizen.

How does it work? Instead of being pulverised, the coal is simply crushed to a size of less than 8.0 mm. It is then fed onto a fluidised bed on the boiler floor. Air is blown up into the bed from below, which suspends and agitates the fuel, resulting in large fuel particles circulating in the bed. Smaller particles are blown into the furnace and are captured with a

for Africa



Above: The thyssenkrupp Industrial Solutions Service Centre in Chloorkop, originally equipped to manufacture and refurbish the largest Polysius-branded HPGRs, has CNC vertical and horizontal machining centres capable of handling 100 t components. **Left:** thyssenkrupp's coal-based circulating fluidised-bed combustion (CFBC) power stations operate at lower combustion temperatures and subcritical steam conditions. They can use much lower quality coal and discard coal, for example, which is normally regarded as unusable.

cyclonic filter at the furnace outlet, before being recirculated back to the fluidised bed. "Generally speaking with low quality coal, the carbon is unreactive and the ash fusion temperature is low. In a fluidised bed, the airflow removes the surface ash, the circulating action ensures a high residence time for combustion of unreactive coals and the relatively low bed temperature prevents ash from fusing," Barkhuizen explains.

"These are conventional sub-critical tower type boilers with superheaters upstream of the cyclones and a fluidised bed at the bottom. They use normal balance of plant items, such as water treatment systems, conveyors, crushers, flue gas treatment (bag filters, for example) and normal steam turbine generators," he tells *MechTech*.

Barkhuizen continues: "India has the same coal problems as we have, with high levels of discard coal from its mines. In South Africa, high quality fuel is used most frequently, so coal producers end up with large stockpiles of discard coal, which cannot be sold.

"But this discard fuel is ideal for use in CFBC plants. Our estimations suggest that most coalmines could meet their own power requirement by burning discard coal, which, since the coal is already mined, is a very low-cost fuel that offers an exceptional business case for power plant installations," he says.

But are the emissions a problem? "No," responds Barkhuizen, "because

of the lower combustion temperatures, along with the addition of lime to the fluidised bed, SO_x and NO_x emissions are significantly reduced. SO_x is entrapped in solid ash waste in the form of gypsum, while thermal NO_x is reduced due to the lower combustion temperature. Emissions from our CFBC plants are acknowledged to be below World Bank standards," he explains.

Due to their simplicity and the packaged nature of the solutions, the investment costs for installing a thyssenkrupp CFBC plant are significantly lower compared to conventional solutions. "I think it is fair to say that these solutions come in at a fraction of the cost of pulverised-coal equivalents. We estimate the costs at between US\$1.8 to \$2.4-million per megawatt installed," he says.

"The second problem with big grid connected plants is the distribution infrastructure. If a coalmine, sugar plant or steel mill installs a captive CFBC plant to take care of its local needs, it is very economical to install the infrastructure to supply the surrounding communities. This has been a common model in India and is ideal for overcoming weak grid issues across Africa," he continues.

"As well as the capex being low, the opex is very low. The fuel used is less expensive or 'free' and the less sophisticated nature of the plant makes it easier and less complex to maintain when compared to the large power plants. And we can install a plant, from signing

the contract to producing power, in 24 months," he assures.

Service is key

Power plants are designed to operate 24/7 for 30 to 40 years, so servicing of the plant itself and the balance of plant equipment becomes vital if the full benefits are to be realised. "Through our asset management, service centres, field services offering and part manufacture and supply, we are ready to take on full IAM responsibility by operating and maintaining power plants at every level," says Lamprecht.

"We can do shut-downs, revamps and full plant-wide asset management, which is the best way to establish the reliable power supply needed for African industrial growth," he adds.

"For us in South Africa, the Power and Energy business is new and exciting. Africa does not always need the R100-million shiploader or the R130-billion power station. Sometimes a simple conveyor on the end of jetty is perfectly adequate, or a 50 MW power plant burning biomass or waste coal.

"Our power offering, as well as our balance of plant, mining, cement and materials handling solutions are all custom-engineered to fit the purpose and scale of the intended application. We believe that this approach and the solutions we offer are ideally suited to the emerging economies in Africa," Steyn concludes. □



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Dedicated pneumatics sales partner counter

With over three decades' experience in the hydraulic and pneumatics industry and as a sales partner of SMC Pneumatics in South Africa, Hutchings Hydraulics (KZN) is proud to announce the recent opening of its dedicated SMC Pneumatics sales counter at 98 Khuzimpi Shezi Road, Congella, Durban.

Thanks to a large SMC consignment stock holding, Hutchings Hydraulics now boasts over 800 SMC Pneumatics stock items and a dedicated, knowledgeable team who is ready to help solve automation challenges. The consignment stock holding will ensure shorter lead times and availability of various products in SMC's extensive portfolio.

As renowned pneumatics and hydraulics specialists, the seamless collaboration between Hutchings Hydraulics



and global automation leader, SMC Pneumatics in the KZN region is one that meets both organisations' objectives and aligns closely to their values. Having completed several large installations locally and on African shores, the partnership between SMC Pneumatics and Hutchings Hydraulics ensures an extensive reach and an impressive offering to Hutchings' customers.

www.smc Pneumatics.co.za

Air Products' new MD places safety at the forefront

Rob Richardson, Air Products South Africa's newly appointed MD, has placed safety high on his list of priorities. Richardson's first visit as the new MD was to the Witbank facility. Despite a challenging economy in the industrialised Witbank area, Richardson highlighted the importance of the facility to remain focused on safety, quality, customer service and growth within amenable markets.

Safety is one of main reasons for Air Products South Africa's success over the past 47 years. As a key player in the manufacturing of industrial and specialty gases, the company places a lot of em-

phasis on ensuring the highest safety standards are maintained at all of its facilities.

According to Richardson, Air Products believes that safety is a moral responsibility. "We have one goal when it comes to safety, and that is zero accidents. We instil a mindset of continuous safety and quality in all employees."

Air Products' global Basic Safety Process (BSP) structure ensures that the responsibility for safety cascades through the organisation in order to build safety knowledge, skills and a mindset of a safe working environment and behaviour.

www.airproductsafrica.co.za

Rockwell Automation acquires Maverick Technologies

Rockwell Automation has acquired leading systems integrator Maverick Technologies to expand domain knowledge and help deliver innovative control and information solutions to customers in industries, such as chemical, food and beverage, and oil and gas. The acquisition significantly strengthens Rockwell Automation's expertise in key process and batch applications to help its customers realise greater productivity and improved global competitiveness through process control and information management solutions.

"Industrial control and information solutions are most effective when they result from close collaboration between a knowledgeable supplier and the user," says Ken Champa, Rockwell Automation

senior vice-president of Control Products and Solutions.

"The combination of our global industrial automation leadership with Maverick's platform-independent domain expertise will help our customers reduce complexity and realise unprecedented productivity."

The acquisition supports the Rockwell Automation growth strategy to help customers increase global competitiveness by adopting 'The Connected Enterprise' – a vision that connects information across the plant floor with the entire enterprise to drive new business value. This is particularly important to process customers whose uptime and continuous performance are critical.

www.rockwellautomation.com/en_ZA

In brief

BMG – part of the engineering consumables segment of **Invicta Holdings Limited** – has made the following appointments: Gavin Pelser, managing director, BMG; Paul McKinlay, chief operating officer, BMG; Bennie Groenewald, chief financial officer, BMG; Gavin Hall, managing director, **Mandirk Group**; and Emil Berning ad managing director of **Hyflo**.

After 40 years of service and dedication, Sir John Alfred Sherry, founder and independent non-executive director of **Jasco**, is retiring as a board member and will be emigrating permanently to Malta. His involvement within the Group is not entirely over, as he will be consulting to Jasco with a focus on expanding the business to the Middle East and North Africa.

As part of a drive to be close to customer operations and to optimise equipment performance and uptime, **MBE Minerals South Africa** has established a service centre in the heart of the Witbank/Middleburg coalfields. Johannes Kottmann, managing director of MBE Minerals South Africa, says the service centre, which is being opened in partnership with **3D Projects**, will offer a comprehensive range of support services to customers in the region.

The **National Nuclear Regulator (NNR)** in partnership with the **University of Pretoria (UP)** has officially launched the **1st Centre of Excellence for Nuclear Safety and Security (CNSS)** in South Africa at UP's Hatfield campus. The centre will provide a continuous supply of personnel for overseeing nuclear safety as required by the nuclear regulatory body.

For the 17th year in a row, the **Dow Jones Sustainability World Index (DJSI)** has listed **SKF** as one of the most sustainable companies. Says Rob Jenkinson, SKF's director of corporate sustainability: "Our long-running inclusion in the DJSI makes us feel very proud. Sustainability issues for businesses have evolved during this period, with an ever-increasing focus on reducing negative environmental impacts and doing more for society as a whole."

Siemens has awarded 17 year-old Sinenhlahla Dlamini from Ongoye High from Empangeni a three and a half year engineering scholarship in Germany – the only one of its kind this year – for her science project on home energy management. Dlamini invented a smart system that monitors home energy use. He has won R1-million, three-year engineering apprenticeship in Germany.

Schuler has launched its first technology centre for forming technology systems in China. The demonstration and reference centre in the industrial metropolis of Tianjin offers companies from the sheet metal-processing sector the opportunity to try out latest-generation servo presses.

MeerKAT yokes and pedestals: a local and

Local fabricator, specialist designer, manufacturer and maintenance service provider, The Efficient Engineering Group is more than half way through the manufacture, integration and testing of 64 yokes and pedestals for the MeerKAT antennas, a pre-cursor project to Phase 1 of the Square Kilometre Array (SKA) radio telescope. *MechTech* talks to Warwick Jackson (right) about the company's pivotal role in the project.



Efficient Engineering is a dynamic engineering solutions company based in Gauteng, Africa's economic heartland. Since its founding as a fabricator of earthmoving and materials handling equipment, the company has grown to occupy facilities spanning in excess of 28 500 m² in Gauteng and in the Western Cape and has diversified into a broad-based engineering solutions provider.

In recent times, Efficient Engineering has been pioneering turnkey, accelerated offsite construction and the design of modular, integrated, portable or prefabricated construction solutions, which are assembled, optimised and tested prior to delivery to site.

"We were initially awarded the contract for the fabrication of the MeerKAT yoke and pedestal structures. The initial scope of the contract was limited to the structural steel fabrication. Based on a recommendation from a slew manufacturer that knew of our success with modular plant, our project scope has grown to include the manufacture and integration of a host of sub-assemblies as well as the full integration and testing of the mechanical and electrical perfor-

mance of the assembled yoke and pedestal positioners," Jackson tells *MechTech*.

"Driven by the desire to achieve over 75% local content, we have walked the road with a number of the world's best global and local project participants: the local project leader, primary sub-contractors from the USA and Germany, and the client. The success of systems and the expansion of the local scope of work, I believe, can be attributed to an amicable, open, honest and co-operative approach to resolving technical problems," he says.

Initially asked to complete the structural build for the first two prototypes, Efficient Engineering systematically worked through all of the design glitches in the most amicable and cooperative way. "There were post-qualification design enhancements, and via positive cooperation, we developed an excellent relationship with Stratosat Datacom, which won the tender as prime bidder for the MeerKAT project, as well as its subcontractors General Dynamics and Vertex Antennentechnik."

Early in the developing relationship, it became apparent that Efficient Engineering was much more than a steel fabricator. "We began to be offered

more of the integration work – work that was expected to be beyond the scope of South African manufacturers. So, from building the yoke and pedestal structures, we were asked to meet a difficult paint specification. And while we did battle, through transparency, involvement and an open way of working with the designers and clients, we developed a way to get it right. For success in collaborative projects such as these, it is important not to hide behind issues. By getting the South African, US and German companies all aligned, a level of trust emerged that enabled us to get involved in tasks that were outside of our original scope – most notably, the vast array of sub-assemblies," Jackson relates.

"To maximise local content, we were tasked with sourcing local equivalents for standard sub-assembly components available overseas – and we ended up exceeding expectations in terms of delivery times and quality.

"This led to us being offered the op-



The SKA telescope will be co-located in Africa and in Australia. It will have an unprecedented scope in observations, exceeding the image resolution quality of the Hubble Space Telescope by a factor of 50, whilst also having the ability to image huge areas of sky in parallel.

global success

portunity to install and integrate the sub-assemblies into the yoke and pedestal structures – the slew rings, the universal joints, the torque tube down the centre of the structure and a host of fittings and bracketry. The work involved significant numbers of machined parts and specialised stainless steel components,” he continues.

While the servo drive systems were being manufactured in Germany, Efficient Engineering also rewired electronic modules for the first four units to resolve design compatibility issues.

“All this led to one of the best decisions of the whole project for Efficient Engineering – to complete the integration and testing of all units off-site. Through our experience with modular plant, we have long been convinced of the many advantages of completing as much work as possible in the factory environment. A significant number of the delays and cost overruns associated with site-based construction can be avoided if fully functional and tested plant modules can be delivered to site. The idea is to deliver a plug-and-play solution that can be placed on a pre-prepared plinth, connected to the required utilities and immediately brought into operation,” Jackson explains, adding “debugging a system after installation on site can be a nightmare.”

So for the MeerKAT antennas, following full electrical and mechanical integration, the functionality and mechanical accuracy of each unit is tested and signed off at Efficient Engineering’s Germiston premises.

“We use a highly accurate 3D laser tracker to ascertain the various geometries of the slew bearing. The information is fed into a Roma Arm positioner and this enables us to accurately install the mounting brackets for the position encoders. A tolerance to within 50 μm is required in the x-y and z directions relative to the slew bearing’s angular position,” he informs *MechTech*.

The slew ring is rotated by electric motors driven by a servo system. “It is critical for the integrity of the antenna’s reception that no electromagnetic interference (EMI) noise from the drive is allowed to interfere with the receiver equipment. So the slew bearing and its drive are housed in a shielded compartment,

which traps EMI interference, preventing it from reaching the radio telescope.

“The interesting part of this shielding system is the door of the compartment. Called an EMI door, it was developed by Interference Testing and Consultancy Services, another local company. It consists of a stainless steel door with a specialised copper leaf interlocking system. Sprung copper strips are used for excellent electrical continuity between the shields that trap the interference.

The inlet air filter system is an EMI filter that uses particular wave-guides sized to restrict the wavelengths and frequencies of the interference. “The air vents block the EMI signals while allowing airflow in and out of the compartment. For testing the integrity of the whole system, we place an EMI generator inside the compartment and we use a ‘sniffer’ outside to measure the levels of EMI attenuation and to certify that the compartment is sealed to the degree required,” Jackson explains. “It has been fascinating to have been involved in so many interesting facets of this project and we are proud of the quality results we have achieved,” he adds.

So far, Efficient Engineering has completed and delivered over 38 of the 64 units. “We are completing the remaining yoke and pedestals at a rate of four a month, which is well within the delivery deadlines – and we have exceeded the 75% local content target. It goes to show that, with the right attitude and approach, South African companies can work with multi-nationals across different continents and we can produce world-class quality equipment using local resources,” Jackson believes.

To achieve this, he says that integrated teams need to be established so that people don’t differentiate between their own colleagues and those from other participating companies. “A united team pursuing an honest and blame-free approach can develop solutions quickly. Hiding behind limitations or mistakes is a disaster in this environment,” he advises.

“We at Efficient Engineering have been able to contribute to such teamwork: on the technology side, to the design and, for production, implementing enhancements to make the build easier and more practical. Overall, this has been very good for us and for the MeerKAT project,” he says.

Validating Efficient Engineering’s role in the development process, the company



Deploying thousands of radio telescopes, the SKA represents a huge leap forward in engineering and research and development. It will enable astronomers to monitor the sky in unprecedented detail and survey the entire sky thousands of times faster than any system currently in existence.

is currently providing industry training for three technicians from the local Carnarvon area who have participated in the technician training initiative offered by SKA SA. The goal is that these apprentices will receive their National Diplomas and, hopefully, end up working on MeerKAT operations in the Karoo.

“Training is a cornerstone of our approach. We have experienced millwrights, boilermakers and other artisans who can pass on the valuable information they have to the younger generation. Including the three SKA apprentices, we have a total 36 young people currently engaged in apprenticeship programmes, which plays a big role in our B-BBEE Level 2 status on the new codes,” Jackson says, adding “when Stratosat suggested training some of SKA SA people, there were absolutely no objections.”

“We have the skills and resources in South Africa to be competitive on the global stage. We are capable and the world is at our feet. It has been great to be involved from the beginning and to see how our capabilities and confidence have grown.

If we take any lessons from the SKA project, let it be that we need to believe in ourselves,” Jackson concludes. □

Desuperheater success at Sappi Ngodwana

Babcock has kept the Sappi Ngodwana Paper and Packaging Mill steaming ahead thanks to its ability to provide a swift and well-engineered solution for an application after two previous attempts failed. Equally noteworthy is the rapid pace at which Babcock achieved this, successfully delivering the project three months earlier than initially proposed.

With more than 120 years' experience in the steam generation business, Babcock is one of the most established and experienced suppliers in Africa. Supported by best in class technology, the company's skilled workforce draws on decades of knowledge and experience, enabling Babcock to provide safe, effective solutions for the entire lifecycle of industrial plant, from design and build, through operation and maintenance, to decommissioning and remediation.

Babcock's engineering business specialises in the front-end design of steam generation plant and associated equipment, construction concept generation and development of potential solutions in a business case environment, while focusing on feasibility of new build options, performance upgrades, efficiency improvements and emissions reductions.

The Sappi Ngodwana project required the replacement of an existing 1 100 kPa desuperheater in the steam plant at Sappi Ngodwana, a vital component in the production capacity of the plant as the majority of the mill processes requiring steam cannot operate if the desuperheater system is faulty or shut down. The desuperheater is a system that is used to reduce the temperature of superheated steam by injecting water

into it. The water injection is controlled to reduce the steam temperature within close proximity of the saturation temperature of the steam.

The two main reasons for lowering the steam temperatures are: first, to permit operation of downstream process equipment that is designed for lower temperatures, and, second, to maintain a constant temperature for processes that require precise temperature control.

Babcock's project and system engineering manager, Etienne Wannenburg, explains that when Babcock submitted its proposal, the current system was unreliable and not operating as required and that two previous attempts by other organisations to replace the desuperheater had been unsuccessful.

"The client required a reliable, high performing system that included an accurate steam temperature control within a 10 °C range with a high turndown and quick response time. Furthermore, the plant could only allow for maintenance once a year, and we had the added challenge of completing the installation within 11 days," says Wannenburg.

Despite the severely constricted time frame to commission the project, Babcock swiftly responded to the tightly scheduled brief and delivered an engineered solution not only within the specified time constraints, but which

also exceeded the client's expectations. "During our first proposal we put forward a period of eight months to design and supply the equipment. A delay in the placement of the order constricted our time frame; nevertheless, we were able to reduce the engineering and supply duration to five months through resource management, engaging with our suppliers and working through the year-end holiday period," explains Wannenburg.

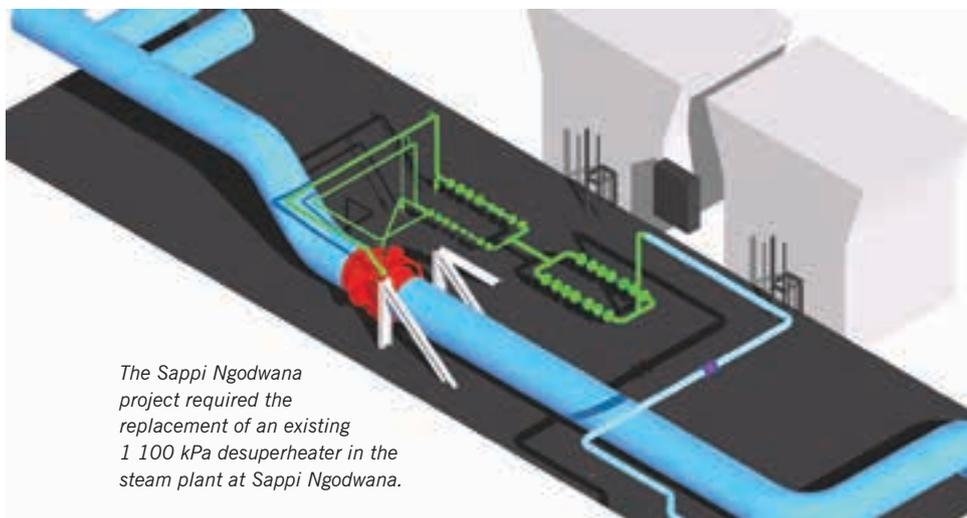
He says factors attributing to Babcock's rapid turn-around time included:

- The design of the system – aided by Babcock's in-house 3D scanning and modelling capacity to deliver accurate results.
- Ensuring that all the interfacing systems were properly defined and investigated during the design phase.
- Efficient interaction between Babcock and its equipment suppliers to ensure correct equipment selection and to reduce the delivery period.
- Effective design plans allowing for proficient and swift installation.

Wannenburg adds that during commissioning, it was established that the performance of the system exceeded their client's requirements and that Babcock was able to deliver a system that effectively controlled the steam temperature throughout the required range.

More than a year later, the desuperheater system continues to operate without any failures, proving its reliability and attesting to Babcock's proficient engineering skills. Babcock also continues to assist Sappi Ngodwana with general maintenance of the annual boiler shutdown.

Two years ago the Sappi Ngodwana Mill in Mpumalanga was expanded and modernised as it entered into an exciting new phase of growth and development including the introduction of 210 000 tpa of chemical cellulose production at the mill. The mill's total production of chemical cellulose is expected to increase to over a million tonnes per year, entrenching Sappi's position as a global leader in chemical cellulose production, a fast-growing, high-margin business serving the textiles, consumer goods, foodstuffs and pharmaceutical industries. □



The Sappi Ngodwana project required the replacement of an existing 1 100 kPa desuperheater in the steam plant at Sappi Ngodwana.

Plant services for strategic pipeline project

Babcock's commitment to delivering trusted engineering support services to industry saw their plant services division assisting Transnet in successfully completing one of the country's most ambitious engineering and construction projects to date. Babcock supplied mobile cranes and other mechanical construction equipment to four of the main contractors working on Transnet's New Multi-Purpose Product Pipeline (NMPP).

The NMPP is one of the largest and most complex multi-product pipelines in the world, covering an underground distance of 715 km, designed to transport liquid petroleum fuel from Durban to Gauteng and neighbouring regions. Without the NMPP, South Africa's inland areas, including Gauteng – the country's economic epicentre – would have faced severe fuel restrictions as demand was fast outweighing supply. The new 24-inch main pipeline replaced the existing 12-inch Durban to Johannesburg Pipeline (DJP), which had been in operation since 1965 and was reaching the end of its economic lifespan.

Charles van der Westhuizen, senior sales representative for Babcock's plant services division, says that the four main contractors that Babcock supplied were Group Five Oil & Gas, Goss & Balfe, Mei Construction & Services and Msweli Industrial Projects, all of which worked on the Heidelberg/Nigel section of the project where Terminal 2 was being constructed.

The project commenced in 2008 and comprised the construction of 160 km of 16-inch steel inland pipelines; a 550 km 24-inch main trunk pipeline; three inland pumping stations; and two accumulator terminals in Durban and Johannesburg respectively, with the aim of transporting three types of fuels along the pipeline to the Inland Terminal 2 at Heidelberg, from where the fuels will be supplied to various parts of the inland. The three fuels being transported are gasoline/petrol (unleaded 93 octane and unleaded 95 octane), diesel (low-sulphur diesel and ultra-low-sulphur diesel) and jet fuel.

"Babcock's involvement in the NMPP project commenced in July 2013 with the supply of specialised equipment and broad range of expertise," says Van der Westhuizen.

He adds that the plant supplied for the project by Babcock over a period of three years included 14 mobile cranes, ranging from 8.0 t to 220 t, three tractors with 12 m trailers, a 300 kVA generator, 35 generators in the 25 kVA to 50 kVA range, 10 single diesel welding machines, and about 110 inverters.

Babcock is a leading supplier of engineering support services and plant to the energy, process, mining and construction industries in Africa. The plant services division has a combined inventory of more than 40 000 items and specialises in the provision of mobile crane services, rigging equipment and expertise, abnormal transport, and welding and mechanical construction plant to meet the needs of any large or small contractor. The equipment and machinery for the NMPP project was supplied and serviced by Babcock's Sasolburg branch.

Babcock is the largest empowered mobile crane and plant service provider in South Africa with a substantial fleet of cranes managed by highly skilled operators and comprises modern, well-serviced mobile cranes with lifting capacities from 8.0 t to 600 t, distributed nationally and within other South African Development Community countries.

Van der Westhuizen says the company operates to a 'safety



An aerial view of section of the Terminal 2 on the Heidelberg/Nigel section of Transnet's New Multi-Purpose Product Pipeline (NMPP) project, which was built by four main contractors that Babcock supported: Group Five Oil & Gas, Goss & Balfe, Mei Construction & Services and Msweli Industrial Projects.



Babcock recently invested in a new, fully automatic, CNC bending machine for manufacturing steam generation parts as part of a drive to improve efficiencies at its Jet Park, Boksburg fabrication facility.

first' philosophy, striving to exceed standard safety requirements by ensuring all personnel are competent, qualified and well trained on what they need to do and that equipment for hire is serviced, certified, inspected to standard and ready for operation. The company moves equipment into place with a focus on safety and clear communication and planning while their QR code scan and tracking system monitors the life cycle of every single item of inventory so as to have instant access to the items' hire history, service intervals and related parts.

In addition Babcock's equipment is serviced after every hire and inspections are carried out every three months to guarantee the highest in safety and operational standards. Babcock's track record currently stands at 20 years without a single product failure or injury.

The NMPP represents cutting-edge innovations in concept, design and implementation and is expected to deliver significant benefits, particularly environmental and socio-economic, by enabling economic growth, reducing road congestion and road maintenance costs and lowering carbon emissions associated with road transport. The pipeline is a legacy project designed to serve South Africa for decades to come and is expected to be a strategically important world-class asset for the long term. □

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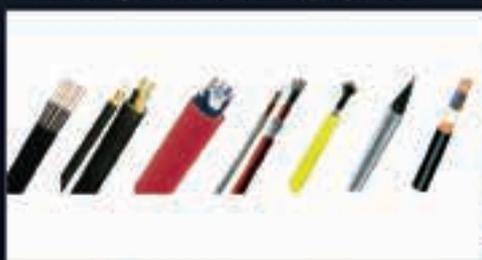
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MDR 300 slurry pump cuts downtime and power

The largest steelmaker in Turkey, Erdemir Group, wanted to improve reliability and process efficiency of the iron ore pelletising unit and selected Metso MD slurry pumps to do the job. With the help of the innovative Metso MDR 300 pump, Turkey's only iron ore pelletising facility is able to maximise its production.

"Very high resistance to wear and lower power consumption results have decreased the labour for maintenance," says Tamer Sahin, plant maintenance manager, Erdemir Group.

According to Sahin, the Metso MDR 300 has proven to be worthy of his praise. This is why the Turkish iron ore pelletising facility intends to acquire another pump at 'break-neck speed'.

Industrial giant Erdemir Group was looking for ways to shorten the downtime in production at its Divrigi facility in central Turkey and the Metso MDR 300 pump, with its wide-ranging technical features, turned out to be the perfect fit.

The double adjust feature makes it easy to sustain the high efficiency of the Metso MDR 300 pump. Since installation, Erdemir's engineers estimate that the power consumption associated with this severe pump service has decreased by five to 10% compared with the previous pump from a different OEM.

Latest technology minimises outages

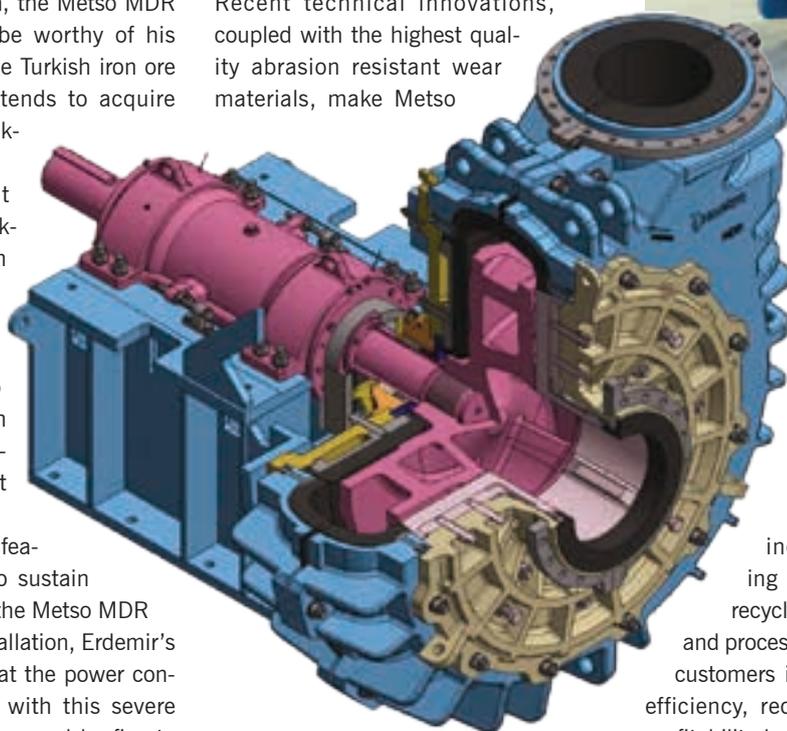
The Mill Discharge hard metal (MDM) and Mill Discharge rubber-lined (MDR) slurry pumps are the newest products to Metso's complete range of heavy-duty slurry pumps. The Metso MD series answers today's market needs and demands for improved, sustained performance. Specifically designed for mill circuit applications, the Metso MD series offer consistent operation between mill shutdowns.

"We are pleased that this customer

counts on our expertise and that our pump offering met its needs. Reliable pumps are crucial in maximising the process availability and increasing production efficiency. Our strong pump services expertise will also allow us to provide the needed predictive and preventative maintenance activities that our customers need and deserve", says Jim Board, senior vice-president, Metso Mining Flow Control.

Low maintenance costs and heavy duty design

Recent technical innovations, coupled with the highest quality abrasion resistant wear materials, make Metso



mill discharge slurry pumps long-lasting and reliable.

The MD series combines: the latest high-performance materials that resist abrasion, corrosion and erosion; consistent hydraulic design that limits inlet velocity at the best efficiency point; and a modular design that provides flexibility and optimisation for continuous pump performance.

Erdemir Group is Turkey's largest steelmaker and exports to more than 40 countries. The company produces 50% of Turkish iron ore output and meets 20% of the country's iron ore demand. Erdemir's iron ore pelletising facility is located in Divrigi, Sivas region, in central Turkey.



Above: The double adjust feature makes it easy to adjust the gap between the impeller and the inlet, making it easy to sustain the Metso MDR 300 pump's high efficiency.

Left: The MD series combines: the latest high-performance materials that resist abrasion, corrosion and erosion; consistent hydraulic design that limits inlet velocity at the best efficiency point; and a modular design that provides flexibility and optimisation for continuous pump performance.

Metso is a world-leading industrial company serving the mining, aggregates, recycling, oil, gas, pulp, paper and process industries. "We help our customers improve their operational efficiency, reduce risks and increase profitability by using our unique knowledge, experienced people and innovative solutions to build new, sustainable ways of growing together.

"Our products range from mining and aggregates processing equipment and systems to industrial valves and controls. Our customers are supported by a broad scope of services and a global network of over 80 service centres and about 6 400 services professionals. Metso has an uncompromising attitude towards safety," Board explains.

Metso is listed on the NASDAQ OMX Helsinki, Finland, and had net sales of about €2.9-billion in 2015. The company employs over 12 000 people in more than 50 countries. □

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Find out more about the savings, safety and reliability that each Neles NDX valve controller offers at metso.com/ndx

#TheMetsoWay



Mario on maintenance:



Is condition monitoring all smoke and mirrors?

In Mario Kuisis' final column for 2016, he asks fundamental questions about the value of condition monitoring and offers a checklist-based solution to enable adopters to clearly identify operational goals.

In the world of proactive maintenance, condition monitoring is generally thought of as a basic tool. Something like a screwdriver that no self-respecting artisan would leave out of his toolbox.

Is this always true? Or does the screwdriver belong in some toolboxes and not others? If you are a bricklayer, will a screwdriver add any value? Investing in a tool that will never be used makes no sense. The same argument could apply to condition monitoring.

From time to time, we need to go back to basics. Why do we have this? Is it serving a useful purpose and adding value? Does our original thinking still make sense? Are we getting what we set out to achieve? Have the goal posts shifted?

In the end, it's all about ensuring that we maintain alignment with the goals of the organisation. Every tool and action, including condition monitoring, should contribute toward a common objective. This differs for every organisation or department. It is a reality of life today that the business environment is subject to constant change, so stepping back and reviewing from time to time is essential. Increasingly, yesterday's breakthrough becomes today's passé solution and tomorrow's roadblock.

Then again, some are of the opinion that condition monitoring is all smoke and mirrors anyway. They have never experienced any real benefits, so would readily take it out of the toolbox. This view is likely to be based on personal experience and was quite prevalent some years ago. It is less common now with improvements to old tools and a flood of new tools. Even so, a cold hard look is always good.

So can we assess our condition-monitoring programme to see if it is still appropriate for today? There is a way without getting bogged down in technical detail. It is to be found in answering the most basic question – why do condition monitoring anyway? If you cannot tick most of the boxes, then you really need

to question the reason for doing it at all.

For the sake of providing guidance, the checklist table below should be helpful. It is by no means exhaustive as every situation is different, but it can be regarded as a starting point, which should be supplemented and weighted according to the situation faced by the asset owner.

It is often thought that asset failure will be eliminated through condition monitoring, but this is often not true. In many situations, the asset cannot be taken out of service for corrective action. It is simply too critical at that point in time. The value then lies not in preventing the failure, but in knowing that it is going to happen, what will fail and when. All necessary contingency plans can be formulated and put in place so that the consequences of failure can be minimised. In these cases, the objective is to prevent unplanned failures.

Alternatively, the service stress of the asset is reduced by adjusting the load or production rate to extend asset life. In this way performance, cost and risk are balanced in line with the aims of the organisation. This can be done particularly well with continuous on-line condition monitoring in real time.

It is most important to recognise that these are only potential benefits. Condition monitoring, of itself, does not fix things, it only provides insight and knowledge. This knowledge must then be used and acted upon in order for the value to be realised. If this loop is not closed then condition monitoring simply becomes an added cost to the organisation, or the potential value is only partially realised. Unfortunately, experience shows that this happens all too often.

So, to embark upon proactive maintenance properly, it is essential to be prepared to critically evaluate the extent to which the information that has been obtained from condition monitoring is utilised to beneficial effect. The proven solution is an asset management system that has all the necessary checks and balances built into standard business

processes, which ensure that the right things are done at the right time and properly closed out.

Perhaps the best thing to do is to make a thorough evaluation of how well the condition monitoring programme is integrated into the asset management system. If serious flaws are found, remedying the situation can bring significant competitive advantage. □

Value contribution	Yes	No
Permit corrective action to prevent costly failures.		
Prevent unplanned failures.		
Reduce or eliminate unnecessary preventive maintenance.		
Eliminate or minimise secondary damage.		
Reduce corrective action outage time.		
Plan for corrective action when it is convenient.		
Take corrective action without undue time pressure.		
Ensure availability of appropriate spares and resources.		
Reduce spare parts holding.		
Identify and manage asset failure personnel safety risks.		
Identify and manage asset failure environmental risks.		
Maintain assets with reduced resources at less cost.		
Enhance reliability, availability and uptime.		
Eliminate avoidable repeat infant mortality incidents.		
Maintain or improve energy efficiency.		
Maintain or improve performance.		
Extend asset life.		
Base replacement strategies on objective knowledge.		
Focus resources where needed most.		
Maintain or improve quality of product and/or service.		
Enhance client perception.		
Reduce certain asset related consumable spend.		
Negotiate a reduction in insurance premiums.		
Detect latent defects in new or repaired assets.		
Verify the efficacy of preventive and corrective action.		
Base difficult maintenance decisions on objective knowledge.		
Demonstrate responsible and effective asset management.		
Reduce CO ₂ emissions.		
Reduce carbon tax.		
Meet statutory requirements for risk management.		

WearCheck expands further into Southern Africa

South Africa-based condition monitoring company, WearCheck, has opened two more cross-border laboratories, bringing to 13 the number of laboratories operated by the company, in nine countries.

Electrical operations and other industrial concerns in Zimbabwe now have their very own local WearCheck laboratory, right on their doorstep. The company recently acquired the long-established oil analysis laboratory of Harare-based Tribology Services, and brought it into the WearCheck fold.

The Zimbabwean laboratory has been operating for 27 years and already services a wide range of clients. Now, as well as traditional oil analysis, WearCheck



WearCheck managing director, Neil Robinson, attends the official opening of the oil analysis laboratory at Husab in Namibia. Here, he outlines how WearCheck's on-site laboratory will boost plant performance.



WearCheck Zimbabwe laboratory technician, Admire Katanda, operates a viscometer.

Zimbabwe also conducts thermography, vibration analysis, balancing, laser alignment, motor current analysis and milling. WearCheck Zimbabwe offers on-site sampling, as well as a 24-hour sample turnaround.

In addition to the new laboratory north of the border, WearCheck also headed west and opened an on-site condition monitoring laboratory in Namibia, at the Husab Uranium Project. Swakop Uranium, owners of the mining operation, awarded WearCheck a five-year contract to supply and operate an

on-site laboratory for the mine.

As an open-pit mining operation, Husab uses the conventional truck and shovel mining method. WearCheck's laboratory is well-placed to maintain the mining plant and equipment used – including a large fleet of loading and hauling equipment – operating at optimum output capacity. This aligns perfectly with the WearCheck target to help save customers' time and money through reliability solutions for plant maintenance.

The Namibian laboratory was set up as part of a joint venture with sister company, Set Point Laboratories, who built and supplied the assay side of the laboratory.

For WearCheck managing director Neil Robinson, the company's expansion is a positive move. 'We are delighted to have the privilege to do business across South Africa's borders, and we have been made very welcome in Zimbabwe and Namibia. By extending our geographical footprint, we are now able to offer condition monitoring services to many more industrial operations, which previously had no access to these services.'

'WearCheck's laboratory instruments are constantly upgraded to remain at the forefront of international standards, and our staff members attend ongoing training courses to keep ahead of global condition monitoring trends.'

This year, WearCheck celebrates its 40th anniversary of condition monitoring excellence. □



The Husab oil analysis laboratory at Swakop Uranium, fitted with the full complement of laboratory instruments.

Environmental solutions unveiled at EMA

Exhibiting for the first time at Electra Mining Africa 2016, environmental solutions company I-CAT launched a range of water-, fire- and dust-suppression technologies.

I-CAT marketing director, Lourens Jansen van Rensburg, says that the flagship exhibition was an ideal forum to showcase the company's services and products to potential new clients. "I-CAT has been in existence for ten years, and our exponential growth in the last five years has underlined our unique offering to clients in the mining industry."

"We operate in a very competitive industry and Electra Mining affords us the opportunity to offer mining operators an alternative to their current service and product providers. Due to the prestige and sheer size of Electra Mining, we expected it to draw a much more focused visitor profile dedicated specifically to finding solutions and suppliers for their specific requirements," Jansen van Rensburg says.

The R-SDR retractable stockpile dust ring was showcased as the latest innovation from I-CAT Dust Solutions. Introduced to address dust issues at

conveyor discharge points, the R-SDR system creates a virtual curtain around material flow for outstanding particle containment.

The I-VAP System (Waste Water Evaporation Cannon) from I-CAT Water Solutions is capable of handling 500 m³ per 12-hour day. The evaporation rate is 60% to 65%, depending on ambient weather conditions.

The Roto-Fire-Pack, a backpack fast response system from I-CAT Fire Solutions, makes use of T-Rotor technology, currently the leading misting technology internationally. It extinguishes all classes of fires using foam mist as the agent.

In addition, I-CAT also exhibited its standard range of products for dust suppression and environmental services, including RDC 20 and GreenBit. A range of fire extinguishers, vehicle protection and localised protection systems was also showcased.

Visitor participation and interaction was encouraged by on-site demonstrations of the Roto-Fire-Pack and various extinguishers and systems, together with a working model of a dust suppression ring and a full-size evaporator.



Visitor participation and interaction was encouraged by on-site demonstrations of the Roto-Fire-Pack and various extinguishers and systems.



Introduced to address dust issues at conveyor discharge points, the R-SDR retractable stockpile dust ring was showcased as the latest innovation from I-CAT Dust Solutions.

"All mines need to comply with environmental and OHS regulations, and most of our services and products aim to offer specific solutions in this sub-sector. We believe our brand is becoming well-known in the mining fraternity and we want to underline its message of 'excellent service' and 'superior products'," Jansen van Rensburg concludes. □

Motor rebuilt for Zambian copper mine

Marthinusen & Coutts, a division of Actom, recently completed the rebuild of a 6 550 kW, two-pole, 11 000 V squirrel cage induction blower motor for a copper mine in Zambia.

According to Rob Melaia, engineering and technical executive at Marthinusen & Coutts, the motor had suffered a rotor failure that caused collateral and associated damage to the stator and also considerable damage to the rotor laminations at the core extremities.

Marthinusen & Coutts has extensive experience with the rebuilding of such large rotating machines and it is this ability to leverage knowledge gained from years in the industry that facilitates the identification and repair of electrical machinery in limited time.

The repair work undertaken comprised a stator rewind, a rotor rebar, including a partial re-core, with new laminations and the replacement of the P900 high strength rotor retaining rings.

The retaining rings are made from the

same steel used for the largest turbo generator in the world and this was sourced by Marthinusen & Coutts from a leading German supplier in record time. "Working closely with our network of local and international partners facilitates access to specialists in all fields and allowed the fast track procurement of these specialised rings. This was especially impressive as these were procured over the Christmas period," Melaia says.

The rotor rebar involved new rotor bars using a high resistivity brass alloy and the redesign of the rotor cage axial locking system.

Once the rebuild had been completed, the motor was tested at Marthinusen & Coutts' facility, which houses the third largest high speed dynamic balancing machine in sub-Saharan Africa.

"We were able to perform high speed balancing as well as a full no-load run test to verify vibration and bearing integrity condition performance," Melaia says.

Marthinusen & Coutts is Level 3 B-BBEE

rated, ISO 9001 accredited, holds SANS 1561 LV motor repair, SANS IEC 60079-0/1 flame proof and SANS IERC 60079-15 non-spark permits and has been awarded a five-star NOSA rating. With five production workshops covering 30 000 m² under roof in southern Africa, Marthinusen & Coutts is conveniently located to provide customers with a fast turnaround on repairs and upgrades on all rotating equipment. □



Marthinusen & Coutts recently completed the rebuild of a 6 550 kW, two-pole, 11 000 V squirrel cage induction blower motor for a copper mine in Zambia.

Turnkey storage solution for Intermodal Cargo

Africa's leading warehouse storage solutions company, APC Storage Solutions SA, recently completed the installation of a turnkey system for Customs Franchised Container Freight Station Company, Intermodal Cargo Solutions. Ettienne Meyburgh, GM for the company's KZN region and automation, highlights the systems advantages.

The contract to supply a pallet shuttle system for the global container transport and logistics giant, Intermodal Cargo Solutions, was awarded to APC against a number of competitors due to its numerous benefits and a design to aid the client develop a final solution. This included a sprinkler system, for which one of APC Storage Solutions SA's business partners was used.

Intermodal Cargo Solutions had been in talks with one of APC Storage Solutions SA's competitors and required an additional service provider to propose and quote on a similar solution. APC Storage Solutions SA was approached and took the time to understand all of the client's needs, including facility layout, load units, pick rates and throughputs. The fact that Intermodal was dealing with various companies, each able to provide only a part of the overall required solution, counted substantially in APC Storage Solutions SA's favour, as it was in a position to manage the entire project. With this information at hand, the team submitted a design to meet the client's requirements, which led to the contract being awarded.

About 110 containers are received

by Intermodal fortnightly and 5 500 pallets are dispatched, resulting in total warehouse turnaround every two weeks. "Our proposed solution meant that we needed to take the standard operating procedures, business rules and active target rate of receiving and dispatch into consideration, as well as receiving and dispatch door locations. This was necessary to allow the customer to optimally plan for pick and replenishment waves without negatively impacting on the warehouse flows," says Ettienne Meyburgh, general manager – KZN region and automation, APC Storage Solutions SA.

APC provided the first block of 30 m wide, five levels high and 68 pallets deep; and another block of 10 m wide, four levels high and 20 pallets deep, coupled with a world-class wifi radio pallet shuttle system operating on the FIFO (first in, first out) principle. The installed pallet shuttle system is designed to prevent or minimise damage to racking units and to best control FIFO and batch



Above: The warehouse handles approximately 5 500 pallets, with total warehouse turnaround achieved fortnightly. **Left:** The pallet shuttle conveys pallets up to 1 500 kg at 1.3 m/s to designated storage bays within the racking lanes.

receive and dispatch operations. It also boosts pallet load and unload rates and, therefore, throughput rates. The pallet shuttles move along special rails attached to the racking, eliminating the need for aisles as storing and extracting pallets is achieved via remote control using wifi-enabled tablets.

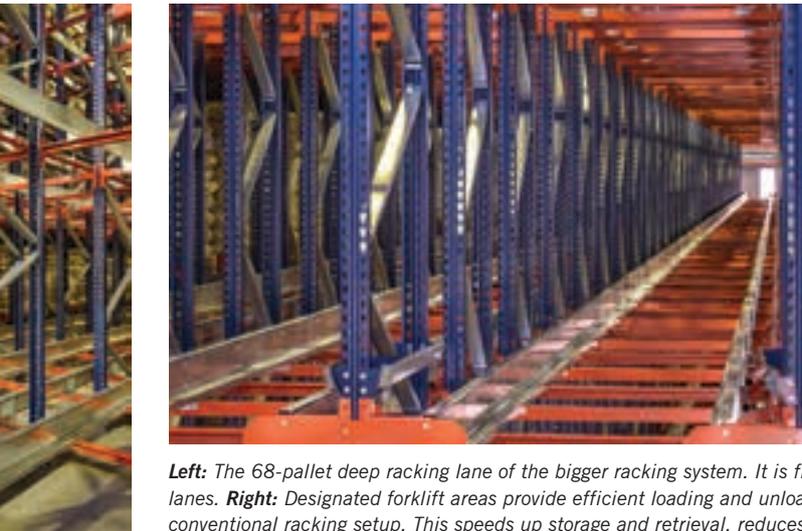
As the pallet shuttle has its own 'intelligence' and electrical supply system, it is able to stock pallets deep inside storage tunnels, then retrieve and convey them to the front of the tunnel. Its deep lane storage and retrieval, with the ability to transport various pallet sizes with weight loads of up to 1 500 kg, and at speeds reaching 1.3 m/s, adds to increased productivity and enhances product safety. Operator time is reduced by half, in/out flow efficiency is retained and available storage capacity is maximised.

In addition, overall efficiency improvements are gained by safer pallet handling (a 10 mm accuracy rate), electronic pallet length checks for optimal density storage, and the fact that operators remain outside of the tunnels.

The pallet shuttles have several safety and control systems in place, which include incorporated electrical components that allow autonomous displacements, radio frequency commands transmitted to the shuttle's PLCs, an incorporated emergency stop button, sensors to bring the shuttle to a halt in the event of a collision or if obstructions are detected



With rapid travel speeds of 1.3 m/s achieved with precise location accuracy, pallet shuttles maximise storage and retrieval efficiency and prevent damage to the racking structure.



Left: The 68-pallet deep racking lane of the bigger racking system. It is five levels high and 30 m wide. The smaller racking setup utilises 20-pallet lanes. **Right:** Designated forklift areas provide efficient loading and unloading points, and eliminate the need for forklifts to enter the lanes as in a conventional racking setup. This speeds up storage and retrieval, reduces damage to the racks and enhances warehouse safety.



whilst moving in the tunnels. Bumpers and stop points also help to avoid would-be accidents. The wifi-controlled terminal allows control of multiple shuttles from a Dell tablet and intuitive functioning means operators use push-button actions only in order to convey instructions.

This storage system consists of four-pallet shuttles in two main aisles. A supplementary back-up pallet shuttle was issued on consignment, as was a rescue cart to assist in the event of battery fail-

ure. If repositioning or site transfers are required, the pallet shuttle is manually handled using a conventional reach truck.

Before Phase 1 of the installation was complete, Intermodal realised the need for additional capacity sooner than anticipated. They commissioned APC Storage Solutions SA to install a planned Phase 2 installation as part of Phase 1. "We were sufficiently flexible to incorporate the latter requirements into our installation," Meyburgh points out, "and

we completed this part of the project in an operational environment."

Intermodal Cargo Solutions has now been a full year in production subsequent to implementation of APC Storage Solutions SA's full maintenance agreement. The Customs Franchised Container Freight Station Company has not experienced any downtime on APC Storage Solutions SA's pallet shuttles since the implementation of the maintenance agreement. □

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Bifurcated chute system for Skouries project

Weba Chute Systems, known for challenging the boundaries in transfer point technology, has leveraged its in-depth applications knowledge and know-how to engineer an innovative bifurcated chute system for Eldorado Gold's Skouries Project in Greece. Alwin Nienaber, technical director at Weba Chute Systems describes this export success.

A Weba Chute Systems bifurcated chute design is one of nine transfer point solutions being engineered and manufactured for the Hellas Gold Skouries Project. This high-grade gold-copper porphyry deposit is located in the Halkidiki Peninsula in northern Greece, and will operate as an open pit mine for around seven years followed by a further 20 years' of underground development.

Nienaber says this is not the first time the leading manufacturer of transfer point solutions has worked with Eldorado Gold operations. Previous successes have included custom-engineered chute systems for the mining house's Tuprag Kisladag operation in Turkey.

An important contributing factor to this particular project was the extensive communication between the mine, the EPCM contractor and Weba Chute Systems, which resulted in Weba Chute Systems being able to assess, adjust and verify general arrangements between

conveying, crushing and screening equipment. "As a result of this, we were able to engineer chute solutions with the correct performance characteristics that will deliver the required throughput," Nienaber suggests.

Commenting on the design of the bifurcated transfer point, he explains that this particular chute is engineered for the secondary crushing circuit. The chute feeds either a surge bin, which in turn feeds the secondary crushers, or it provides a facility whereby the crushers are bypassed.

Among the challenges in this particular application was having to overcome a transfer height of 17.5 m by passing from just below the head pulley through the conveyor building, then under the structure, over the bin and down to the conveyor, and still provide access for crusher maintenance.

An additional challenge with the transfer point was that this particular bypass leg's only function is to allow for the removal of mill balls and occasional tramp iron. Design draughtsman at Weba Chute Systems, Wesley Hunkin, explains that the chute is equipped with a metal detection device located approximately 30 m behind the head pulley. "One of the challenges was to provide



Among the challenges in this particular application was having to overcome a transfer height of 17.5 m by passing from just below the head pulley through the conveyor building, then under the structure, over the bin and down to the conveyor – and still provide access for crusher maintenance.

a reliable solution that would ensure iron balls or tramp iron would report to the correct chute leg, thereby eliminating any possibility of this reporting to the crushers," he says.

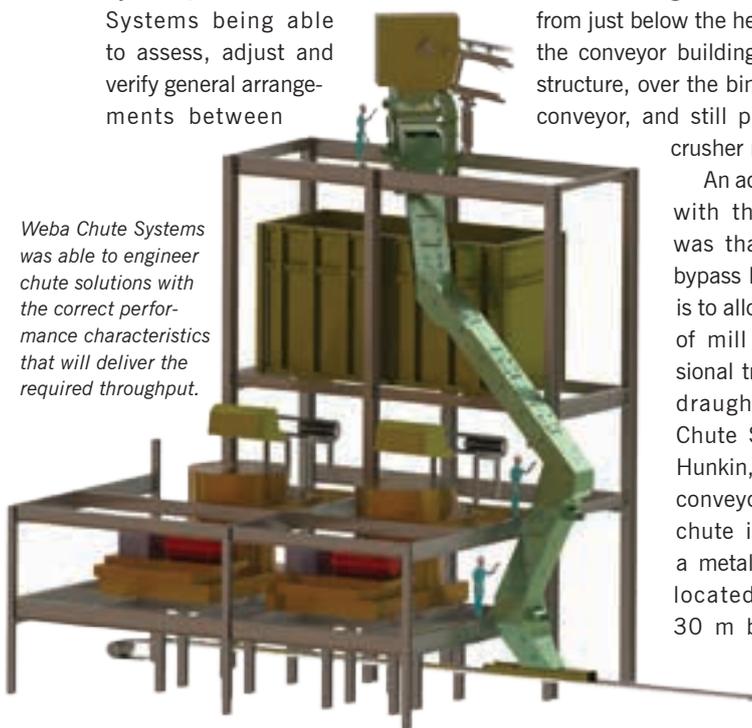
Weba Chute Systems technology, widely renowned for eliminating the disadvantages associated with flopper doors, provided a best practice solution for the plant.

"An innovative articulating trolley chute section was incorporated in this transfer point to redirect the portion of product containing iron balls and tramp iron into the bypass leg," Hunkin says. "The velocity of this trolley section was also crucial in order to reduce the additional volume that would be added to the recirculating load."

Six of the chutes, out of the total order for nine, will be installed on the primary crushing circuit; four of which are apron feeder discharge chutes and have been designed for material feed rates varying from 1 200 tph up to 1 598 tph with a max lump size of minus 300 mm.

The other two chute systems to be installed in the primary crushing circuit are a primary crusher sacrificial conveyor discharge chute and an ore reclaim sacrificial conveyor discharge chute. The former is designed for a material throughput rate of 1 598 tph and the

Weba Chute Systems was able to engineer chute solutions with the correct performance characteristics that will deliver the required throughput.



latter 1 197 tph; both transferring minus 300 mm material loading onto belts with a width of 1 372 mm.

Apart from the innovative bifurcating chute system, two others will be installed in the secondary crushing and pebble bypass circuits.

The first of these is a SAG mill screen oversize chute designed for a feed rate of 611 tph with a maximum lump size of 75 mm. This transfer point is another example of where Weba Chute Systems used its extensive experience and provided an innovative solution to eliminate direct belt impact.

"This was done by splitting the chute into two, thereby avoiding direct belt impact. By doing this, we have been able to preserve belt presentation resulting in a reduction in impact, dust and noise as well as less wear on the belt," Nienaber says. "Another advantage will be improved idler life because the belt will be running true.

"Had a conventionally designed chute been installed at this challenging transfer point, material presentation onto the conveyor belt would have been at high impact with a marked tendency for skew belt loading," he adds.

The last of the chutes in this section of the plant is a bypass circuit conveyor chute that feeds back onto the SAG mill conveyor. This is approximately a 45° chute reversing back on itself and changing direction three times over a height of 4.0 m.

"This type of custom-engineered solution was essential as a conventional chute would have had a hard time presenting material back onto a conveyor under these conditions," Nienaber explains.

Other significant advantages that Weba Chute Systems brings to bear on projects are the company's flexibility, agility and commitment to meeting project deadline. Nienaber notes that portions of these Weba Chute Systems were manufactured in Turkey. "This enabled us to shorten the lead-time and, in so doing, meet the requisite time-frame for delivery," he says.

"Providing solutions to such challenging applications is not always as straightforward as it would seem, and it is through leveraging our more than 26 years of experience and applications knowledge that we are able to partner with companies across the globe to meet their exacting materials transfer needs," Nienaber concludes. □

Optimum transfer point design

Unimpeded material flow with optimum belt presentation is critical in any materials handling system on a mine. Yet, despite this, insufficient attention is often paid to transfer point design.

Mark Baller, managing director of Weba Chute Systems, explains that the company custom engineers each transfer point and in this manner is able to provide a chute system designed to take specific operating parameters into account.

"These parameters can include anything from a need to control belt presentation to reducing spillage, dust and noise, and importantly, to control flow so that wear is minimised," Baller says.

Essentially the Weba Chute System uses a streamlined scientific approach to the dynamics of bulk materials handling taking all aspects such as belt speed, belt width, material size, shape and throughput in account. Each solution is custom-designed to control the direction, flow and velocity of a

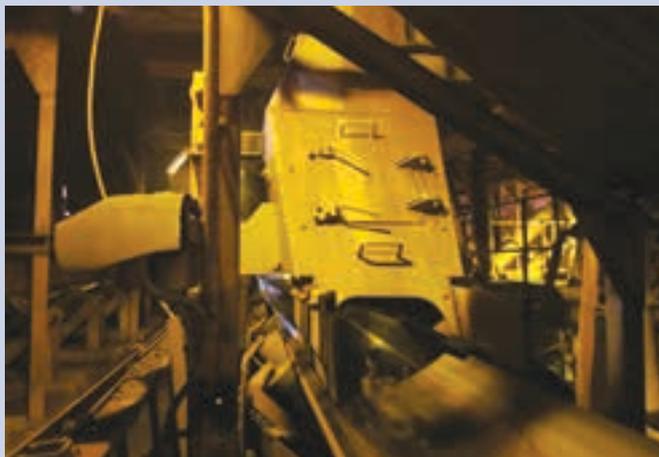
calculated volume and type of material in each individual application.

The design process is considered the most important stage of any project at Weba Chute Systems. Once the data received from the customer has been verified, extensive use is made of sophisticated 3D computer software to arrive at what is considered the optimum design for the application in question.

Manufacturing of the system is undertaken at the company's Wadeville premises where plasma cutting equipment is used to ensure that the highest levels of accuracy and tolerances are met.

Engineering expertise, extensive practical experience and the use of quality manufacturing procedures result in all Weba Chute Systems being supplied with performance guarantees in accordance with pre-set parameters specific to each application.

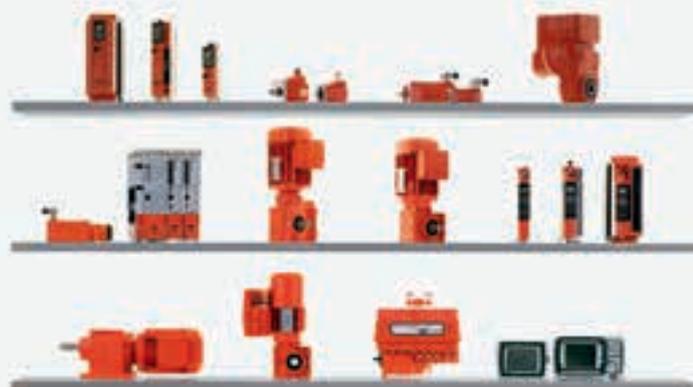
At present there are more than 4 000 custom-designed Weba Chute Systems operating successfully worldwide. □



Above: Each Weba Chute System is custom designed to control the direction, flow and velocity of a calculated volume and type of material in each individual application.

Left: Unimpeded material flow with optimum belt presentation is critical in any materials handling system on a mine.

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New generation coal conveyor belt

ContiTech South Africa has designed, manufactured and installed a new generation solid woven Coal Flo conveyor belt for use in underground coal mining applications. ContiTech Africa's Avril Botha (left) talks about the development.



“This four-layer PVC belt illustrates our ability to produce a new generation conveyor belt at a reduced cost through innovation and extensive research and development,” says Avril Botha, managing director of Conveyor Belt Group at ContiTech Africa. “This is essential in current mining market conditions where it is paramount for suppliers to have the capability to reduce cost to clients without compromising quality of product.”

Four 250 m rolls of the new Coal Flo belting have been installed on South 911 Irenedale Bosjesspruit in Secunda, Mpumalanga. Sasol is using the belt in a trunk conveyor belt application. Bosjesspruit is one of five underground coalmines belonging to Sasol and has 47 km of underground conveyor belting installed.

Due to the presence of methane gas in underground coalmines, equipment needs to be flame retardant. With this in mind, Coal Flo has been manufactured to comply with specifications contained in SANS 968:2013 regulations.

“We expect the installed product to have a lifespan of four years during which it is expected to convey up to 25-million tons of coal,” explains Botha. During the test period, Sasol will analyse the performance of the belt and make a decision regarding the replacement of existing conveyor belts in its underground coal mining operations with ContiTech's Coal Flo. Preliminary feedback on the performance of the Coal Flo belt is favourable, but a long-term evaluation is required for in-depth analysis.

Key feature and advantages include:

- The total solution was provided to the customer.

- Coal Flo solid woven belt will convey in excess of 25-million tons of coal.
 - The solution adheres to SANS 968:2013 specifications.
 - A substantial reduction in total cost of ownership for the client will result.
- This is the first underground solid-woven conveyor belt from ContiTech installed at the mine. Botha believes the extensive research and development undertaken to design and manufacture this specialised product will reflect in the long-term analysis data.

Continental develops intelligent technologies for transporting people and goods. As a reliable partner, the international automotive supplier, tyre manufacturer, and industrial partner provides sustainable, safe, comfortable, individual, and affordable solutions. In 2015, the corporation generated sales of €39.2-billion with its five divisions, Chassis & Safety, Interior, Powertrain, Tyres, and ContiTech. Continental employs more than 212 000 people in 55 countries.

The ContiTech division is one of the world's leading suppliers of technical elastomer products and is a specialist in plastics technology. It develops and produces functional parts, components, and systems for machine and plant engi-



Patrick Dawson from Bosjesspruit Mine with Gail Priemaier, ContiTech field service and safety manager and Johan de Witt, Sasol Bosjesspruit Mine overseer for underground belting.

neering, mining, the automotive industry, and other important industries. ContiTech generated sales of almost €5.4-billion in 2015 and currently employs around 43 000 people in 44 countries worldwide. □



Four 250 m rolls of the new Coal Flo belting have been installed for Sasol Mining on South 911 Irenedale Bosjesspruit in Secunda, Mpumalanga.

DCD and Southwest give muscle to

Three years of successful collaboration on Gravico mining aftermarket products has led the partners – the Vereeniging-based DCD Group and Netherlands-based Southwest Group – to consolidate the venture into a stand-alone business that incorporates assets from both stakeholders.



Gravico managing director, Louw Kriel; Digby Glover, DCD Group chief executive officer; and DCD Heavy Engineering general manager, Dawie Marais.

Boasting a substantial design portfolio of mining attachments and machine structures from Southwest, Gravico is now also home to some of DCD's most experienced project engineers and skilled staff – as well as a range of specialised machining and fabrication facilities.

“With the steady decline in surface mining equipment sales since 2012, many original equipment manufacturers (OEMs) have taken much of their produc-

tion in-house,” says DCD group chief executive officer Digby Glover. “This has reduced the demand for product from third-party manufacturers, who now have to re-define their value offering.”

Glover says mining companies are, at the same time, looking for sustainable margin improvements through innovation and cost reduction.

“Our commitment to Gravico expresses DCD's intent to work closely with mining customers to help improve

their productivity with our high-quality, cost-effective solutions,” he says.

Southwest Group managing director Louw Kriel, says Gravico attachments – including dragline buckets, excavator buckets and truck bodies – had been well received by customers in southern Africa in recent years. This had led to a number a substantial manufacturing contracts being undertaken by DCD Venco in Newcastle, now incorporated into DCD's operations in Vereeniging.

“The Gravico promise is to reduce long-term ownership and operational costs for our customers,” says Kriel. “We deliver this through designs that perform better in the field and have longer maintenance and repair intervals; this saves our customers money and makes their operations more sustainable, especially in the current tough economic environment.”

He says Southwest provided Gravico with standard and engineered-to-order designs to fit all OEM machines – guided by cutting-edge manufacturing system designs, engineering investigations and 6 Sigma project management methodology. Glover highlighted the powerful synergy between DCD's specialised production capacity and Southwest's design excellence, making Gravico “an attractive brand that offered exciting potential for both stakeholders”.



A ship loader crane leg being manufactured by DCD Heavy Engineering, which is part of the DCD Group's mining and energy cluster and is active in rail, defence and marine segments, offering comprehensive and integrated heavy engineering solutions.

Gravico venture

“The Gravico portfolio of products and services gives DCD a valuable opportunity to demonstrate our depth of skill and technical capacity – and also to showcase South Africa’s foundry and machining sector to global markets,” he says. “Partnerships like this are part of our strategic plan to secure ourselves a firm place in the global mining economy as a vibrant, forward-looking business with both engineering design and manufacturing world class expertise.”

The cooperation began in 2013 when DCD Venco became the manufacturing partner for Southwest’s Gravico range in Africa. Based in the Dutch city of Eindhoven, Southwest specialises in the engineering and development of a wide range of products around the world.



Ducting for power generation plant leaving DCD Heavy Engineering’s Vereeniging site.

These include backload and front-shovel buckets in capacities from 7.0 m³ to 52 m³, dragline buckets (30-105 m³), dump truck bowls (80-360 tons) and dragline rigging.

Gravico’s aftermarket products include machine structures such as excavator booms, sticks and axle boxes, as well as components such as bushes, pins and ground engaging tools. □

Gravico lightweight bodies for Namibian mine

The first of 12 lightweight bodies for its Komatsu 785-5 mining trucks has been delivered to a mining contractor at a mine in Namibia by Vereeniging-based engineering company Gravico.

According to Gravico managing director, Louw Kriel, the purpose-designed Komatsu 785-5 mining trucks bodies recently supplied into Namibia are part of an R18-million contract. “Our customers are moving away from heavy-duty OEM truck bodies towards lightweight, payload-focused bodies,” says Kriel. “The Gravico 70 m³ body for this application therefore comes with a weight reduction of 35% and a payload increase of 13%, making it a more productive option for hauling on mining operations.”

He said OEM bodies are designed for multiple applications and material densities, therefore vehicles would sometimes not reach their payload targets.

“Our philosophy is that truck bodies need to be specific to the purpose and operation, so our designs are differentiated from OEM truck bodies to address our customers’ specific production needs, while maintaining or improving upon the bodies’ structural integrity, reliability and durability,” he says.

Gravico is a joint venture between the Southwest Group of the Netherlands, and the South Africa-based DCD Group – one of the country’s most established specialist manufacturers. The venture focuses on the design and production of aftermarket products for surface mining equipment.

“We emphasise the reduction of owning

and operating costs by investing heavily in research on materials, conditions and customer feedback on our applications – and integrating the results in our truck body designs,” adds Kriel.

The design element of lightweight bodies is vital to their success in the field as they can be more susceptible to fatigue failure. The Gravico body concept has, therefore, been developed from conceptual test models and makes extensive use of computer simulation software to refine and optimise the products’ geometry, mass and structural integrity.

“We follow a systems approach in our

design, creating value for our customers through defining a balance between payload and service life,” he continues. “This led to a body design that resists impact and wear while remaining as light as possible, based on the continuous box frame structure that we have patented.”

High-quality manufacturing is also a hallmark of the Gravico brand, with a simplified, easy-to-assemble process and a reduction in welding that allows short production cycles. “And the manufacturing process is monitored and documented at all stages for excellent traceability,” concludes Kriel. □



One of the lightweight Komatsu mining truck bodies on its way to Namibia. Vereeniging-based engineering company Gravico, a joint venture between the Southwest Group and the DCD Group, has an order for 12 of these as part of an R18-million contract.

Demag solution for Egyptian automotive plant

Demag Port Elizabeth supplied its unique Demag Mono-Rail System (DMS) to a motor vehicle manufacturer in Egypt. DMS is an electrified aluminium mono rail system suited for high cycle times, increased accuracy, complex automation and low-maintenance applications.

Demag had certain criteria to meet, such as increasing cycle times, explains project engineer and technical sales representative, Niki Mizen. A particular focus was the assembly process itself, which saw automotive bodies and chassis from two separate production lines being joined on a single moving line.

Mizen explains that chassis are conveyed along a line moving at a set rate in metres per minute. The Demag project team then had to align a hoist, fitted with a single cab and load box with the chassis by matching the different speeds.

This represented one of the single biggest orders for the Port Elizabeth branch of Demag. The nine-month project included the overall design and delivery of the solution. The Demag project team also assisted with the existing conveyors

to ensure these could be slowed down or speeded up in accordance with production targets.

A particular challenge was the design of a purpose-built hangar from where the single cabs and load boxes could be picked up from for the assembly process. Another challenge was modernising the labour-intensive approach at the plant.

The solution proposed by the Demag project team encompassed a main control system for the assembly process, from which an entire production line could be operated. The electrical system was also upgraded to global specifications.

Demag's flexibility in being able to respond to – and overcome – its client's particular requirements meant that the project was completed sooner than expected. This was despite challenges such



The assembly process saw automotive bodies and chassis from two separate production lines being joined on a single moving line.

Kwatani: engineered for tonnage in Africa

Kwatani, previously known as Joest Kwatani, has made the final transition to position itself as a company with a proud African history. Kim Schoepflin, managing director of Kwatani, says this has been “a natural progression” and better reflects the company's operating philosophy, its African heritage and overall commitment to transformation in South Africa. “KWA TANI means engineered for tonnage in Swahili, and underpins the company's commitment to producing quality vibrating equipment for the continent's mining industry,” he explains.

The ability to respond rapidly to market demands has always been one of Kwatani's strengths and its reputation of supplying robust vibrating equipment, capable of withstanding the tough African mining conditions, has seen the South African-based original equipment manufacturer grow from strength to strength.

The company began in 1976 as a small operation called JOEST that imported motors from Germany and assembled small vibrating equipment. Purchased in 1989 by Gunter Vogel, the fledgling company, under his skilled leadership, successfully integrated home-grown South African technology into the original German designs.

Schoepflin, who is also the daughter of founder, Gunter Vogel, says the incorporation of new-generation proven South African technology was essential.

“This strategy allows the company to produce robust heavy-duty equipment that offers end-users the required throughputs as well as the efficiencies and longevity needed for such capital equipment. We can truly say that Kwatani vibrating equipment



Seated on a Joest scalping screen that can process up to 7 000 tph at an iron ore operation in the Northern Cape are, from left: Derrick Alston, CEO of Kwatani, Kim Schoepflin, MD and Theresa Walton, Kwatani's general manager of service.



While a chassis is conveyed along the line, the Demag solution had to align a hoist above, fitted with a single cab and load box, travelling at a matching speed.

is specifically engineered for tonnage," she says.

Celebrating 40 years' of successful operation on the African continent is no mean feat, and Schoepflin is quick to point out that Kwatani's custom-engineered vibrating equipment can be found across all commodities through the mining sector in Africa.

"Our experienced in-house design and technology teams are able to accurately interpret customer requirements and translate this information into solutions that are engineered for optimum throughput tonnages, and most importantly, this is achieved without sacrificing reliability or quality," she says.

Kwatani also leverages its proprietary advanced testing and measuring technology for condition monitoring of customers' assets. This approach is already paying dividends for mines that have contracted the company to assist in reducing the total cost of ownership.

Another feather in Kwatani's cap is that the company is a Level 3 B-BBEE contributor and is 30% black-owned, making it the first in its class to exceed the mining charter requirements in South Africa. □

as specification and software changes, which were circumvented by on-site technicians to ensure that the project implementation went as smoothly as possible.

Even though system modernisation at automotive plants is capital-intensive at the outset, the resultant increased cycle times have a marked impact on profit-

ability and productivity. "In addition, the system is virtually maintenance-free, which also enhances the cost-effectiveness of the solution offered by Demag. The experience we have gained on this major project has given us an opportunity to benchmark ourselves internationally in the automotive sector," Mizen concludes. □

Spirals improve recoveries, grades and yields

Northam Chrome Producers is realising improved recoveries, better grades and higher yields following the retrofit of Multotec spirals at its recovery plant.

The decision to replace the existing spirals with those designed and manufactured by Multotec was taken by this chrome producer following extensive testwork performed by both Northam Chrome Producers and Multotec.

Results from the testwork performed at Northam Chrome Producers revealed that Multotec's spirals outperformed the competitor units originally installed in the plant. Testwork was later validated at Multotec's in-house technology division in Spartan, Gauteng, South Africa by Faan Bornman, technology manager. "Tests showed that by using the Multotec spirals, the plant would be able to increase recoveries by an additional 6%," says Multotec's Graeme Smith.

He says Multotec was tasked with removing 172 spiral assemblies from Northam Chrome Producers' existing recovery plant and replacing these with 72 Multotec spiral assemblies. These comprised Multotec HX5 and Multotec HX3 spirals with feed tonnage capacities ranging from four to nine tph per start.

"One of the biggest challenges of the eight-week long project was retrofitting the new spirals into the existing structure. Extensive work was done by Multotec's in-house drawing office, which undertook all the drawings and confirmed the new layout of the plant, while also presenting the modifications to the structure to accommodate the new installation," he says.

The project was overseen by Smith and field service technician, Raymond Masinga. "The commissioning of the plant was an easy exercise. It started up the same day and immediately started outperforming the earlier test results," Smith reports, adding that the entire plant's yield is now closer to 30% compared to an average of 21% for 2014.

Multotec engineers have ascertained that the cost of the spiral assembly is about 0,004c/feed ton, with Northam Chrome Producers expected to see a return on its investment within four-years.

Smith says, based on the feedback the company has received from many of its customers, "Multotec has the best performing spirals in the market in fine and heavy

minerals applications," which he attributes to their optimised feed-in angle.

They were originally designed as a rougher and scavenger spiral to handle material ranging from 800 µm to 38 µm. "Such is their reputation in the international mining sector that a prominent iron ore miner wants to test them at one its flagship operations. Here, they will be used to recover fines ranging from 80 to 75 µm," Smith says.

Multotec definitely has another happy customer in the mining industry to add to the long list of successful projects it has undertaken over the years. □



The retrofit installation of Multotec HX3 spiral bank used a custom-designed frame to suit the existing spiral building structure.

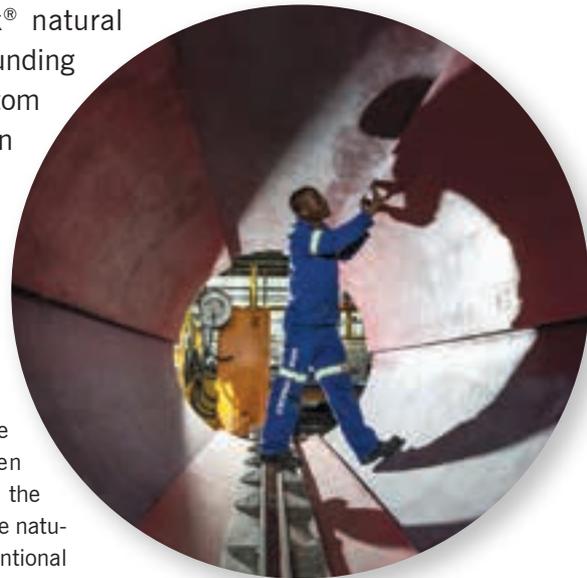


The completed retrofit of the cleaner stage (left) and the scavenger stage (right) with the Multotec HX3 three-turn large diameter spirals designed to handle chrome material ranging from 800 µm to 38 µm.

Wear resistant products: a blend



Weir Minerals, the global OEM for Linatex® natural rubber using proprietary liquid-phased compounding methodology, has a state-of-the-art custom hose and equipment lining facility in Alrode, South Africa. *MechTech* visits the facility and talks to Yatheen Budhu (left), the business' product manager for Rubber Products in Africa.



Weir Minerals Africa offers Linatex® premium rubber lining for equipment such as mills, pumps, cyclones and valves.

Weir Minerals' rubber hose products are used all over the world as a preferred slurry transportation solution. The company's advanced manufacturing techniques and proprietary rubber compounds, most notably, Linatex® premium rubber, provide a high-quality product that is consistent, robust, reliable and exhibits outstanding wear life.

"We provide tailored engineered solutions, regardless of application and conditions and, here in this facility, we have world-class hose manufacturing expertise and wear lining capability that stems from the combination of automation and the craftsmanship," Budhu tells *MechTech*.

At the heart of its premium offering is Linatex, its proprietary range of natural rubber compounds. "Conventional rubber blending processes rely on high temperature processing. Natural rubber bales are granulated and then heated to above 130 °C, which breaks down the molecular chains of the polymer. Chemical additives are then dispersed into the blend at high temperature. Property enhancing additives are then incorporated to promote new polymerisation with improved performance characteristics," he explains.

"Our unique process for Linatex rubber, however, is a liquid phase process that retains the original properties of the natural rubber. Chemicals are dispersed into the liquid latex at low temperature, which prevents any structural changes from occurring while creating the improved compound. The liquid process also improves dispersion and avoids having to destroy the natural structure when blending," he says.

Linatex premium rubber offers outstanding abrasion resistance when handling wet and fine slurries. "Natural

rubber has long chain molecules and high molecular weights. These properties are preserved when processing Linatex rubber, while the heat, shearing and breaking of the natural rubber associated with conventional compounding destroys these," he adds.

Linatex premium rubber sheet is imported into South Africa from Weir Minerals' processing plant in Malaysia. The starting point of the manufacturing process is the slitting and buffing of the rubber. "We bring in rubber sheets at 30 mm thickness and slit them down to the thickness we need: 3.0 mm being the minimum. The automatic machine we use slits off one thickness at a time to ensure consistency and thickness accuracy to a tolerance of 10% – 0.6 mm on the thinnest sections.

"Once slit, the sheet is passed through a buffing machine, which roughens one or both surfaces for better adhesion after bonding," Budhu explains.

"From a capability perspective, this gives better flexibility with respect to the liner thicknesses and allows us to process bigger orders more quickly. We don't have to rely on our Malaysian facility for non-standard rubber thicknesses. We can manufacture what we need from standard 30 mm stock," he explains.

"In addition to Linatex premium rubber sheet, we also have a range of other products to cater for various applications. The Linard® rubber range was developed for applications where larger particles and materials resistant to cutting are required and the Linagard® rubber range can handle the acid, oils, higher temperature and food applications."

Hose manufacture

For manufacturing straight lengths of Linatex hard-walled, cut-end mining hose, soft-wall and gimble ring hose for slurry

suction and discharge applications, Weir Minerals' manufacturing plant in Alrode has six custom-built hose manufacturing lines. "Four of the lines are used for our standard range of hose, which goes up to a diameter of 600 mm (ID). We also have a further two lines for manufacturing hose of up to 1.1 m in diameter – and all of these lines can handle lengths of up to 10 m," he informs *MechTech*.

Describing the manufacturing process, Budhu says the lines are all semi-automated. In principle, the process starts with uncured Linatex rubber sheeting being wrapped around a pre-lubricated mandrel. "While the craftsman is there to set up the machine and start the process accurately, the automated wrapper ensures exact tension and placement of each applied layer," he says.

Depending on the pressure and application requirements, the hoses are reinforced by several layers of SBR rubber-embedded fabric with spring steel spiral wire or gimble rings. End flanges can also be incorporated into the manufacturing process on either side of the hose to give excellent and repeatable length accuracy and with rubber-lined mating surfaces to act as gaskets for the coupling. The hose is finally wrapped in a layer of ozone and weather-resistant rubber.

"Since the hose is manufactured from uncured rubber, it needs to be cured in one of our autoclaves. Depending on hose size, thickness and blend composition of

of craftsmanship and automation



Left: Weir Minerals Africa's state-of-the-art hose manufacturing bay in Alrode, South Africa. **Right:** Weir Minerals Africa has installed six custom-built manufacturing lines for semi-automated hose manufacture.



Left: To improve the accuracy, consistency and safety of liner cutting, Weir Minerals uses a CNC AquaCut water jet cutting system to cut Linatex sheet into the rubber shapes required. **Right:** Linatex premium rubber sheeting is passed through a buffing machine to roughen the surfaces.

the rubber, this can take anything from one hour to six hours," Budhu explains.

The process involves holding the component in a steam atmosphere at a maximum temperature of 140 °C at a pressure of 350 kPa above atmospheric. "We have three autoclaves in use on this site, sized at: 1.2×13 m; 1.2×11 m; and 3.7×7.0 m," he tells *MechTech*.

In addition to manufacturing straight hose, Weir Minerals in South Africa has developed a novel process for manufacturing hose bends. The company operates two additional machines for manufacturing customised hose bends to suit the diameters and radii required on site. "We can accommodate most commonly used hose diameters with typical curvatures of three, five or six times the hose diameter.

"Via accurate placement of the end flange on the mandrel, different angles and curved lengths can be manufactured," he says, adding, "the CNC controller is programmed for the length

and the machine automatically wraps each layer working from the centre. The exact length required will be produced and the distance between flanges will be a perfect match for the section being replaced on site."

Budhu continues: "On a straight hose, it is relatively easy to remove the mandrel once the hose has been constructed: using a simple hydraulic winch, we hold the hose and pull the mandrel out. It is much harder to remove a curved hose from a curved mandrel. We have developed a proprietary way of doing this, which enables us to construct customised hose bends to the same complexity as our straight section hoses," he says.

Equipment lining

In addition to hose manufacture and the supply of rubber sheeting, Weir Minerals' Alrode plant also undertakes the rubber lining of equipment. "We apply cured and uncured rubber to metal surfaces of equipment such as mills, pumps,

cyclones and valves. By starting with uncured rubber and curing it in one of our autoclaves, very high bond strengths can be achieved. We can also reline equipment on site using pre-cured rubber and the cold vulcanisation process," he explains.

To improve the accuracy, consistency and safety of liner cutting, Weir Minerals uses a CNC AquaCut water jet cutting system to cut Linatex sheet into the rubber shapes required. "In terms of cost efficiency and minimising wastage, we use nesting software to enable us to cut as many shapes as possible off a single sheet. And we have a full team of skilled artisans to apply the rubber linings to the equipment.

"The steel is first shot blasted, then 'grey-primed' with a bonding agent. The surface of the liner is also primed with a rubber adhesive before the craftsman begins to 'stitch' the rubber to the steel surface using rollers and purpose designed corner and edge tools. This is our



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own proprietary adhesive system, which results in an excellent bond strength and a sealed rubber lining over the metal,” Budhu informs *MechTech*. He adds: “if uncured rubber is used, then the finished product must also spend some time in an autoclave.”

A common use of the cold vulcanisation process is for mills for the platinum industry. “In the case of mills, which are often too big to go into an autoclave, we developed a bladder-based stitching process. This applies an even pressure to the liner, ensuring proper adhesion,” he explains.

“These particular liners also have a coloured indicator layer on the inner surface of the mill. When the red liner wears to the coloured layer, the operator knows that the mill needs to be stopped for a liner replacement. This prevents costly damage to the mill shell,” Yatheen Budhu says.

“In this application, our Linatex rubber lasts between 12 to 14 months in ideal operating conditions – versus some competitor offerings that lasted only six months in this application,” he notes.

Outside the workshop, Budhu

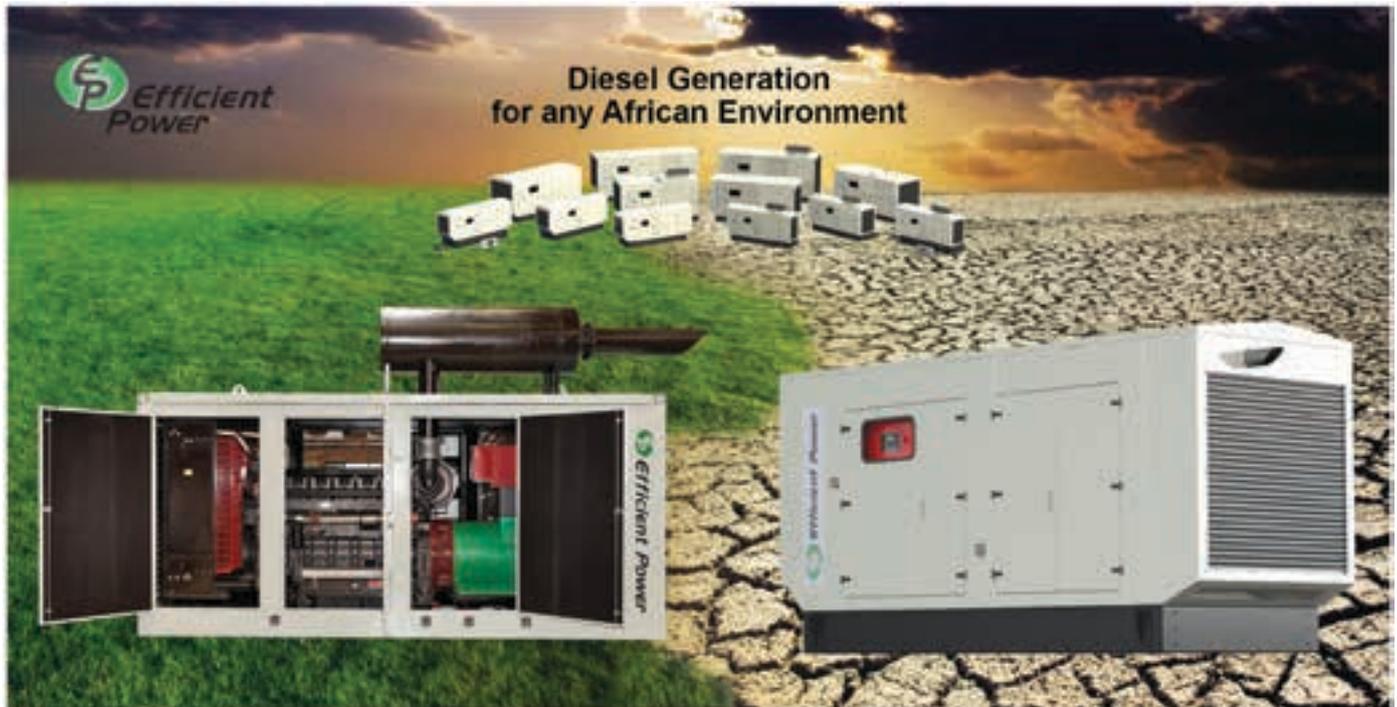


One of three autoclaves at Weir Minerals Africa's Alrode plant used to cure rubber hoses as part of the manufacturing process.

shows *MechTech* a completed length of hose ready for delivery. It reads: ‘Manufactured in RSA by Geoffrey’. “We stamp the craftsman’s name onto each hose he produces. We have skilled people who are proud of their work and this stamp focuses their minds on maintaining high quality standards, a

key goal throughout Weir Minerals.

“Our customised hose and lining facility combines the experience, skill and craftsmanship of our people with innovation and automation, so that the specific product and service quality requirements of all our different customers can be met,” he concludes. □



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Eco HVAC for simple flexible solutions

Following the release by SEW-Eurodrive SA of its dedicated Eco HVAC drive at Electra Mining Africa earlier this year, *MechTech* talks to Norman Maleka (right), the company's national sales manager about suitable applications and advantages.



With the launch of the Movitrac LTP-B Eco HVAC Building product range, SEW-Eurodrive in South Africa hopes to have opened up new markets for its LTP-B range of variable speed drives. With a historic focus on industrial applications such as hoists, conveyors, water and wastewater pumps, the LTP-B general-purpose range has been used for several HVAC applications in the past.

"But, with this exclusive release into the South African market, we have developed a fit-for-purpose HVAC drive specifically for the HVAC industry. Unlike the general-purpose drive, which is still being used, we have incorporated dedicated firmware to tailor the drive to specifically suit ventilation and air handling systems in hospitals, shopping malls, car parks, offices and commercial buildings," Maleka tells *MechTech*.

"We became aware of opportunities in the HVAC industry when we were asked to supply drives to the HVAC sector in Cape Town. It was a smaller scale installation, which is our strength, and we implemented it successfully using VSDs from our general-purpose range. We realised several things: that we needed to have specific HVAC branding

and solutions; and that these applications require specific features to allow them to operate successfully and efficiently. We believe that our LTP-B Eco HVAC drives satisfy these needs and will enable us to compete successfully in this market," says Maleka.

Describing the key features of the new drive, he says that electric motors used in HVAC systems are often used to drive fans, either for extraction or for air handling units; and chilled water circulation pumps. "HVAC systems are also heavy energy consumers, so as electricity prices soar and more people become aware of the carbon emissions' problem, the market focus has shifted towards energy efficiency. More and more green buildings are being developed and building service managers are seeking ways of reducing the energy consumption of existing installations," he explains.

"The biggest advantage of installing an Eco HVAC drive is energy efficiency, because of their ability to vary the speed of the fan and/or the chilled water flow based on cooling demand. In modern commercial buildings, shopping malls car parks or hospitals, all energy use is becoming demand driven. An HVAC system will pick up the demand, via temperature or occupancy sensors, for example, and feed this information back into the system. Using software algorithms and firmware, this demand data is then used to regulate the HVAC system. This avoids unnecessary energy use for cooling that is not required. And when cooling is required, these systems adjust the fan speed and/or the chiller pump flow so that the conditioned air in the cooled space closely matches the specific requirement. This prevents excessive over-chilling and associated energy inefficiency," Maleka explains.

"In terms of functionality, our Eco HVAC LTP-B drive incorporates the firmware to work out the demand and to optimise the fan speed or the chilled water flow to minimise energy use.

"One drive is needed to control each fan/pump motor, and this can be achieved locally without the need for

an additional PLC controller or building management system (BMS). The functionality built into SEW-Eurodrive's Eco HVAC drives, however, enables them to communicate with each other via a simple PLC or a central BMS. The use of this drive solutions is, therefore, easy to scale, from a simple system controlling a single fan, to a small system of four or so units and all the way through to a building wide system of 50+ units centrally controlled by a BMS," Maleka points out, adding that the drives are available with power ratings from 0.75 to 375 kW, "covering a comprehensive range of HVAC applications".

Key functionality

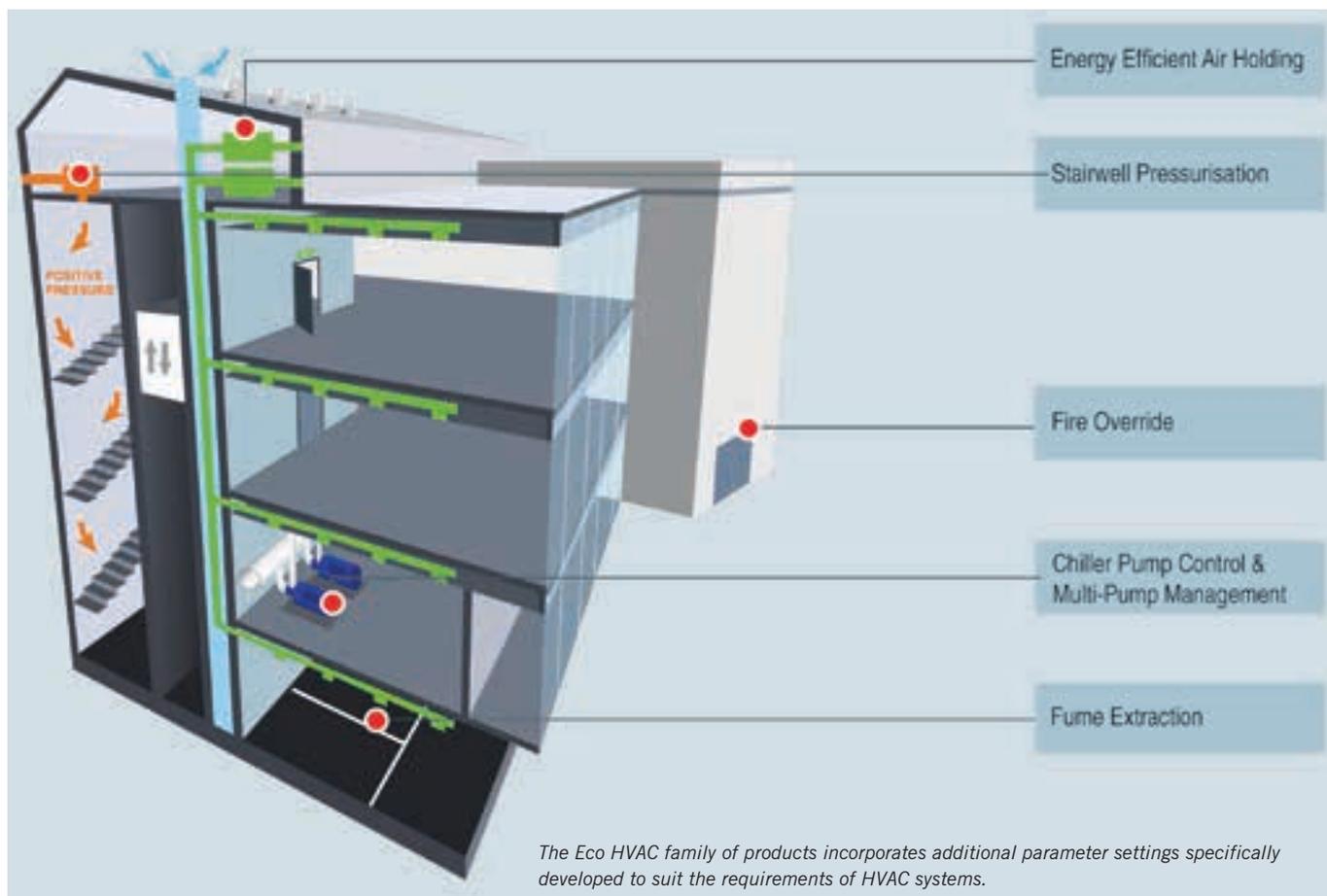
As well as incorporating demand-based management principles, the Eco HVAC family of products also incorporates additional parameter settings specifically developed to suit the requirements of HVAC systems. "While the hardware is similar to the general purpose units, we have developed different firmware to cater for the specific requirements of fans and circulating pumps for chilled water."

For extraction fans or fans for air handling units, for example, Maleka cites the Flying restart feature, which protects the motor should the fan be turning in the wrong direction on restart – due to drafts, for example, "This feature automatically detects the fan speed and direction before restarting and, if revolving in the wrong direction, it will first bring the fan to a controlled stop before softly restarting," he explains.

For extraction fans and stairwell pressurisation systems, he says that, in the event of a fire, air pressure needs to be maintained in the stairwell for as long as possible to give time for people to escape. "This feature, called Fire mode, ensures that, if a fire is detected, the fan will maintain the pressure and extrac-



With its Movitrac LTP-B Eco HVAC Building product range, SEW-Eurodrive has developed and introduced a fit-for-purpose HVAC drive specifically for the HVAC industry.



tion suction for as long as possible to give people the best possible chance of leaving the building safely," he explains, adding, "the unit will ignore all alarms and error messages and continue to run until it self-destructs."

Also included is a Break protection function, which will bring the fan motor to an emergency stop should the belt between the motor and fan break.

Describing features for HVAC circulation pumps, he says the same unit can be used to manage chilled water circuits, simply by accessing the pump menu instead of the one for fans. "For pumps we have a stir function, and unblocking function and a dry run protection function.

"The pump stir function is useful for circulation systems that have been idle for any length of time, following a cool winter spell, for example. Before starting the pump, the stir function gently rotates the pump a few times to dislodge any sediment before accelerating to speed. This is also used as part of the cleaning function, which first dislodges any sediment before coolant draining and recharging," he explains.

The cleaning function has also been successfully employed for small mobile pumps for wine farms, where, combined with blockage detectors, the pumps can

be kept in good working order while pumping juices with pulp residues.

Simplicity is key

While the key benefit of using the Eco HVAC drive is energy savings, Maleka says that, across its product range, a key goal for SEW-Eurodrive is to make the units easy to set up. "Customers do not want to struggle with installation. We strive to minimise the effort required to set up these drives and establish the parameters needed for the application.

"SEW goes the extra mile to make it easy to use its products. This is a key differentiator for us. No one wants to spend days on site trying to figure out how a drive works. And, if an installer is experiencing problems, we have a team available to assist with installation and commissioning and, as with all of our technologies, 24/7 breakdown support is available for the HVAC range," he says.

The use of SEW-Eurodrive's Eco HVAC systems enables solutions to be highly customised to achieve the exact requirements a customer is asking for. "We are, therefore, targeting HVAC OEMs and systems integrators who want to do a little more than simply install standard systems for their clients," Maleka continues.

"This drive is also ideal for retrofits and upgrades. We can, for example, convert fixed speed HVAC systems to on-demand systems, simply by installing LTP-B Eco HVAC units between the controllers and the motors. In almost all cases, this will result in energy savings and rapid returns on investments," he asserts.

"Motor technology has also moved on. We are still using IE1 motors in many applications in South Africa. We at SEW have now standardised in IE3 motors and permanent magnet (IE4) motors are already here. The Eco HVAC drive is compatible with both of these, so older HVAC system can now be cost effectively upgraded to meet current energy efficiency standards," he adds. With the emergence of greener and more energy efficient buildings, HVAC technology is changing fast. "We have a product that can be easily upgraded via firmware to match ever greener and more efficient control strategies, a product that offers a cost-effective solution for installations and retrofits of most sizes.

"The LTP-B Eco HVAC Building product range makes sophisticated HVAC solutions available to a much broader spectrum of HVAC users," Maleka concludes. □



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HFO R-1234ze refrigerant boosts chillers and heat pump efficiency

Carrier's latest generation of AquaForce® chillers and heat pumps are now using HFO R-1234ze, a low global warming potential (GWP) refrigerant from the Carrier PUREtec™ family of long-term refrigerant solutions.

The Carrier brand, which is represented in South Africa through the joint venture AHI Carrier, part of UTC Climate, Controls & Security, a unit of United Technologies Corp.

"AquaForce in combination with HFO R-1234ze boasts an energy efficiency gain of 5% in both heating and cooling applications when compared to the traditional R-134a refrigerant," says Jaco Smal, commercial sales director, AHI Carrier. He adds that the new refrigerant reduces the greenhouse gas footprint by up to 10%.

HFO R-1234ze is designed to lower CO₂ emissions and improve energy savings significantly. R-1234ze, a hydrofluor-

roolefin (HFO) refrigerant, has a GWP of less than 1, below that of CO₂ – according to the 2010 assessment of the Scientific Assessment Panel (SAP) of the Montreal Protocol. It serves as a replacement for the hydrofluorocarbon (HFC) R-134a previously used for screw chillers and heat pumps, a refrigerant favoured for its zero ozone depletion potential (ODP) but with a GWP of 1 300.

In terms of heat pumps, the combination of Carrier technology with HFO R-1234ze as a refrigerant has redefined heat pump operating limits to provide hot water of up to 85 °C. This significantly extended operating range allows the new 61 XWH-ZE heat pump to meet many more high-temperature heating applications, such as district heating, space heating, sanitary hot water production or process heating.

Founded by the inventor of modern air conditioning, Carrier is the world's leader in high-technology heating, air-condition-



AquaForce in combination with HFO R-1234ze boasts an energy efficiency gain of 5% in both heating and cooling applications when compared to the traditional R-134a refrigerant.

ing and refrigeration solutions. Carrier experts provide sustainable solutions, integrating energy-efficient products, building controls and energy services for residential, commercial, retail, transport and food service customers.

The company is part of UTC Climate, Controls & Security, a unit of United Technologies Corp, a leading global provider to the aerospace and building systems industries. □

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Blending the digital and physical worlds

Through acquisitions and further innovation, PTC is currently demonstrating solutions for closing the loop between the real and digital worlds, not only for the design phase, but also right through a product's service lifecycle. *MechTech* talks to Charles Anderson, MD of productONE, PTC's South African value adding reseller.

Parametric and feature-based CAD software pioneer, PTC, recently moved its lifecycle management solution, Windchill, onto the web; and is now extending its closed-loop lifecycle management idea to embrace much more of the operating life of the products created using its software.

"Rather than explaining what we mean, let me show you something," Anderson begins, pointing towards a simple plastic model. "Here we have a physical model of the base unit of a tank, without its turret. In the centre of the model, is a proprietary identifier, called a 'thing mark', an advancement on the QR code idea but with physical orientation information included.

"This model represents a 'real thing' that can be interrogated via the Internet and the 'thing mark' is its unique identifier," Anderson says.

Holding up his iPad, he positions the camera so that the hexagonal 'thing mark' fits into a matching shape on the screen. "Using a new PTC web-based applications called Vuforia, as soon as

the mark is recognised, a menu of related experiences comes up, which can be downloaded from the private cloud," he explains, making a selection on a short menu.

A 3D model of the tank appears on the screen with its turret fitted. "What you are seeing now is the augmented reality experience associated with that model. A specific turret has been fitted, along with some background terrain. "We can now move around the terrain, mimicking the real tank's performance and we can change the turret to demonstrate to customers all of the different configurations incorporated into the design," Anderson tells *MechTech*.

"All the detail is embedded in the 3D digital model, developed in CAD, managed in PLM and now incorporated into the Vuforia environment to enable us to show customers exactly what this product can do," he adds.

For the African Aerospace and Defence (AAD) expo, productONE was able to demonstrate a plane, ship and a tank model. "The Vuforia environment



Charles Anderson, MD of productONE, demonstrates the capability of PTC's Vuforia at the 2016 Africa Aerospace and Defence (AAD) Air show and Defence Exhibition.

enabled us to fit and fire different missiles and manoeuvre vehicles according to their specifications," he says.

The shift towards service lifecycle management (SLM)

Turning to a component level model, Anderson says: "imaging this is a pump or motor sitting in a ship, tank, aircraft or in a processing plant. Via the Internet, the unique 'thing mark' identifier can be used to directly access all of this specific pump's data and history. PTC calls this 'smart connectedness' – all of a smart connected component's information can be accessed and used in a host of different ways."

Referring to the pump model, Anderson says, "as a smart connected pump,



A simple physical model of the base unit of a tank, without its turret is used as the starting point for experiences downloaded from the private cloud.

Inset: In the centre of the model, is a proprietary identifier, called a 'thing mark', an advancement on the QR code idea but with physical orientation information included.



A 3D Vuforia model of the tank appears on the screen with a specific turret fitted, along with some background terrain. "We can now move around the terrain, mimicking the real tank's performance and we can change the turret to demonstrate to customer all of the different configurations incorporated into the design," Anderson tells *MechTech*.



this has embedded sensors that are continuously collecting important data such as temperature, oil pressure and speed, and sending it via a wireless or Ethernet connection to the OEM. An immediate diagnosis with respect to the condition of that pump can be made directly, and made visible as soon as its 'thing mark' has been scanned. Warranty information, spares' holding capacity and service history are also immediately accessible.

"Imagine the scenario that this pump is on a ship and it breaks down. If the OEM is monitoring these conditions all the time, it can see if how it is being used and whether there are any abnormalities in the data. Via trending and associated performance analytics, it is possible to predict when this pump is likely to fail and inform the ship operators so that it can be replaced in time, avoiding expensive delays at sea or in a distant harbour.

"The ship operator will get a message that this pump is about to fail and, without human intervention, the pump arrives – perhaps delivered by a drone," Anderson continues. "The ship's technicians can then scan the code and the step-by-step animation of exactly how to replace the pump is immediately accessible," he says.

"This not only avoids the 'breakdown' scenario, but also, the visit by an OEM specialist to diagnose the problem, the delay in sourcing the exact replacement part and the need for specifically skilled service specialists are all obviated," Anderson argues, adding: "By closing the loop between the digital data incorporated in the design and the real product operating in the field, a whole new approach to maintenance becomes possible."

The virtual reality experience, which

relates to the specific installation, shows what tools to use and exactly what steps to follow to remove and replace the component. "So the maintenance experience no longer sits in the mind of the 'old-hand'. It now resides in the cloud and can be made available to technicians with general skills for multiple roles, giving local operators direct

access to the knowledge and support they need," Anderson explains.

A typical industrial product can spend up to a year or more in the design phase and anywhere from two months (for a pump) to two years (for a ship) in manufacture. "But once these products go into operation, they need to be serviced and supported for a further 20 to 40 years. It is this substantially longer opportunity that is now exciting PTC," Anderson reveals.

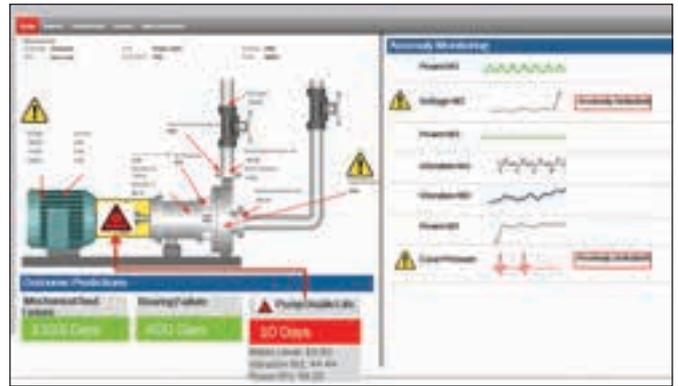
"Already, company's such as Rolls-Royce are selling their engines based on hours of operation. This involves a whole different business model, one that depends on the long-term reliability of the product and service reaction times. A product's value is now seen in terms of total costs of ownership," he adds.

Vuforia now falls under the PTC Service Lifecycle Management (SLM) offering, which also includes a full suite of analysis and reliability tools. "Air and armed forces are typically flying Hercules aircraft and driving armoured vehicles that are 30 to 50 years old. Through SLM, managing the support, servicing and uptime of such high-value equipment becomes more systematic, efficient and cost effective," he says.

Closing the lifecycle loop

Describing the flat-bottom V of a typical design process loop, Anderson says that, following the identification of an idea or need, product development generally starts with a system-level analysis, where information such as specifications and requirements are captured and managed. "This involves planning and is based on numerous assumptions relating to the use of the conceptualised product," says Anderson.

This stage is followed by the formal design detailing process, from which a



Through PTC's service lifecycle offering (SLM), managing the support, servicing and uptime of high-value equipment becomes more systematic, efficient and cost effective.

digital CAD model will emerge. On the right of the V are the verification and validation activities, where the design is compared and verified for suitability against its specification and the assumed conditions of service.

At this point, the digital engineering data has been finalised and the product lifecycle moves into the physical half of the loop, starting with manufacture. "The digital data is then used to work out how this product will be manufactured – and the techniques used might be different in different countries," suggests Anderson, adding: "These manufacturing processes, factories or production lines also need to be designed and PTC is taking this technology further. During manufacture, for example, every process performed by every person involved can be monitored and stored as part of the product's history. It is now possible to track and trace every rivet inserted on an Airbus, for example," he points out.

Following manufacture, the product goes into service. If it is a smart connected product, the real condition of service can be continually measured and fed back into the digital development side of the process for comparison against the initial assumptions made. This enables product designs to be continually improved to better match actual operating conditions.

Also closing the loop is the service and support arm of the process, with the use of SLM and Vuforia to minimise the TCOs and maximise uptime and product life.

"It is now possible to do design analysis based on data from every aspect of a product's lifecycle. And this can be done for individual products, whether they are in manufacture or nearing the end of their life. This is what we call closed loop lifecycle management. It enables continuous product improvements to be 'live' and online," Anderson concludes. □

Sanitising bulk bag batch unloading system

The new BULK-OUT™ Bulk Bag Weigh Batch Unloading System from Flexicon is designed to automatically convey weighed batches of contamination-sensitive materials to downstream processes and to allow rapid sanitising.

The discharger frame is equipped with a cantilevered I-beam with an electric hoist and trolley for positioning of bulk bags without the use of a forklift. A clamp ring on top of a telescoping tube securely connects the clean side of the bag spout to the clean side of the equipment intake and maintains constant downward tension on the bag as it empties and elongates, promoting complete discharge.

At timed intervals, FLOW-FLEXER™ bag activators raise opposite bottom edges of the bag as it lightens, ultimately forming a steep V-shape that promotes complete discharge of free- and non-free-flowing materials from the bag.

In addition, a bag dump station with a folding bag shelf allows manual dumping of minor additions into the hopper from hand-held packaging and containers.

The hopper is vented to a BAG-VAC™ dust collection system that draws airborne dust from manual dumping



The BULK-OUT™ sanitary bulk bag weigh batch unloading system with integral flexible screw conveyor and BAG-VAC™ dust collector.

activities away from the operator when the hopper lid is open. When the hopper lid is closed during bulk bag discharging, the dust collection system prevents displaced air and dust from entering the plant atmosphere, and collapses

empty bags prior to tie-off, preventing dust generation when empty bags are flattened manually.

Integral to the hopper is a FLEXIFORCE™ lump breaker, which reduces agglomerates and promotes the continuous flow of material into the charging adapter of the flexible screw conveyor. Load cells supporting the entire system are linked to a PLC that stops the conveyor once the system has lost a pre-set amount of weight.

The flexible conveyor is the only moving part contacting material, and is driven above the point at which material exits the conveyor, preventing material contact with seals and allowing rapid sanitising in place. The screw can also be removed through the bottom of the tube for sanitising and inspection.

Positioned above the clamp ring is a POWER-CINCHER™, a pneumatically actuated flow control valve that cinches the spout concentrically, allowing re-cinching of partially empty bags for leak-free tie-offs.

The entire system is constructed of stainless steel finished to sanitary standards rated for wash down.

www.flexicon.co.za

New Lincoln PowerLuber grease gun

SKF has announced the introduction of its Lincoln 12-volt, lithium-ion PowerLuber. Developed for quick, effortless application of lubricant, this grease tool is suitable for agricultural, automotive, construction, general maintenance and industrial applications.



The 12-volt PowerLuber features a lithium-ion battery for maximum power and efficiency and delivers grease at up to 551 bar. Its three-point base keeps the tool upright for user convenience and helps prevent dirt and debris from entering the motor. An ergonomic, light-weight construction reduces operator fatigue and allows easy access to tight areas.

The tool's new dual-lip follower enables bulk or cartridge delivery and eliminates grease bypass. The 12-volt PowerLuber has a bright, built-in light emitting diode to illuminate the work area. Also, the grease gun has an integrated hose holder and tube guide for secure hose storage and easy threading of the grease barrel.

www.skf.com

Refrigeration on demand improves bottom line

Due to rising energy and maintenance costs, the cost of operating refrigeration systems is continuously increasing. The complexity of managing this is also becoming more difficult for owners to understand.

Measuring efficiency is very difficult and understanding maintenance requirements of a modern plant to achieve optimum efficiency even more so. This results in a substantial amount of electricity being wasted by ineffective systems, combined with a high maintenance bill. This according to Dawie Kriel, head of the HVAC & Refrigeration division at Energy Partners.

"The installation costs of refrigeration systems are generally a significant portion of the capital requirement in any retail or manufacturing business, and the cost of upgrading to newer systems every few years is generally too high for most businesses. Consequently, they often find themselves having to do maintenance more and more regularly, costing the business not only steadily increasing sums of money but also time and loss of quality," he says.

He suggests that a more viable solution for most businesses is to buy cooling from a service provider whose core business is to operate the refrigeration system. "The service provider's responsibility is to properly maintain and upgrade the refrigeration system and the business pays an agreed R/kWh of refrigeration on a pay-as-you-use basis. This provides an inherent efficiency service level, due to the agreed price nature of the cost of cooling," explains Kriel.

"This kind of option makes a lot of sense especially in the food retail and dairy industries as well as the logistics arena, but other facilities that have a refrigeration load for most of the year are prime candidates for conversion," he adds.

"Energy Partners launched the first such solution in June of this year. We install our own refrigeration units for the businesses at no upfront cost to them, and then operate the system as a utility. The client pays us an agreed rate per cooling unit and are then free to focus on their core activities," Kriel says.

www.energypartners.co.za

Rugged, simple and reliable fluid couplings

Elecon fluid couplings, distributed locally by Bearings International (BI), are ruggedly built, simple in design and reliable in operation.

These transmission fluid couplings offer a multitude of benefits, including soft start, correct starting torque, motor protection and shock absorption, as well as perfectly balanced motor loading and the elimination of unwanted vibration.

The high performance level of fluid couplings is largely due to the design of the working circuit: the shape of the circuit, the number of vanes in the circuit, and the placement of these vanes. The working circuit developed by Elecon is the result of years of extensive R&D experience.

"In the case of an extended jamming period, a fusible plug blow off will empty the fluid coupling thereby disconnecting the output from the input, protecting both driving and driven equipment," says BI product manager, Jackie Jacobs.

Elecon fluid couplings are available in four different types, namely CD: A coupling without a delayed filling chamber; CDR: A coupling with a delayed filling chamber; CDRP: A coupling with an extended delayed filling chamber; and CDRS: A coupling with an extended delayed filling chamber and controlled nozzles.

www.bearings.co.za



Royal Purple lubricant treatment

Leading wear-control specialist Filter Focus has launched the Royal Purple lubricant brand into the South African market.

Manufactured in the US by Calumet Specialty Products, Royal Purple has a full range of lubricants for all industrial, commercial, automotive and consumer applications. "Filter Focus is proud to be associated with Royal Purple, which offers the highest level of protection, while reducing friction coefficients and associated parasitic losses. With Royal Purple lubricants significant energy saving can be gained," says COO, Craig FitzGerald.

He adds that this US-based premier lubricant brand offers the lowest total cost of ownership in terms of improved performance and output, while dramatically extending Mean Time Between Failure (MTBF).

"Industrial users have the most to gain in terms of equipment reliability, performance gains and financial savings. If you have a high-performance sports car, daily driver, truck, tractor, bus or even lawnmower, the Royal Purple treatment is immediately evident upon start-up," FitzGerald claims. "Local South African dynamometer testing on road vehicles indicates that horsepower output is increased by 5% on average, with dramatically improved consistency throughout the power curve," he notes.

www.royalpurpleoil.co.za

CAD repository with 75 000 3D models

RS Components (RS) now has a 3D CAD library containing more than 75 000 component models from its catalogue of stocked products, providing engineers currently designing or looking to design in 3D with an even wider choice.

The RS 3D CAD model program, which has been running for more than six years, allows electronic, mechanical and automation engineers to download 3D CAD models completely free-of-charge. As many as 120 suppliers are represented within the library of models, which now includes the company's own-brand RS Pro product line.

za.rs-online.com



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State-of-the-art microgrid to power African Red Cross

An ABB hybrid microgrid is to provide uninterrupted and cleaner power derived from renewable solar PV and diesel gensets to the International Committee of the Red Cross (ICRC) in Kenya

ABB technology is to power the largest logistics hub of the International Committee of the Red Cross (ICRC) through a state-of-the-art microgrid, delivering reliable power for the first time in a region exposed to frequent outages and power quality issues.

Located in the Kenyan capital, Nairobi, the global logistics centre for the ICRC employs 170 employees delivering food and other essential items such as medicines and relief supplies across the African continent.

ABB will build a microgrid for the ICRC that runs on solar energy and diesel to maximise the use of renewable energy and secure the supply of reliable power. It is scheduled for completion by the middle of 2017. The agreement reflects an ICRC initiative launched in 2014 for greater technology collaboration with the private sector.

"We are delighted to partner and support the humanitarian work of the International Committee of the Red Cross," said ABB CEO Ulrich Spiesshofer. "Microgrids have enormous potential in Africa, where more than 600-million people live without access to electricity. Reliable access to electricity is essential to speed up economic development."

Microgrids are used to integrate distributed energy resources and loads that can be operated in a controlled, coordinated way either connected to the main power grid or to provide power independently, ensuring utility-grade power quality and grid stability.

"Reliable power is essential for our staff to continue their life-saving work uninterrupted in the field," said ICRC president Peter Maurer. "In addition, the ABB microgrid solution is in line with the ICRC's goal to use environmentally friendly technologies. Solutions such as this are proof that cooperation between the corporate and humanitarian sectors is not only possible, but also imperative. We are happy and proud to count ABB as a member of our corporate support group."

ABB is a pioneer in microgrid technology with a track record of more than 30 global installations that are operated commercially for

a diverse range of applications such as remote communities, islanded electrical grids, utility grid support and research and industrial campuses.

ABB has been a member of the ICRC corporate support group for the past decade, contributing to water and habitat programmes for victims of conflict in the Democratic Republic of Congo and Iraq. ABB also helps train ICRC engineers.

Microgrids are low- or medium-voltage grids located at or near the consumption sites. They can generate power from renewable and conventional sources and, although they are mainly electrical systems, they can also incorporate a thermal energy component, such as combined heat and power.

Microgrids are increasingly being equipped with energy storage systems, as batteries become more cost competitive. The system is controlled through a microgrid controller incorporating demand-response so that demand can be matched to available supply in the safest and most optimised manner. A flywheel or battery-based grid stabilising system can be included to offer real and reactive power support.

The concept of a microgrid is not new: the earliest electricity networks were essentially microgrids before they were joined into regional and national grids. What is new is their changing and expanding role in the face of rising power demands, falling cost of renewable sources, and the increasing need for supply resilience and autonomy – both on- and off-grid.

www.abb.com



ABB is to provide a hybrid solar-diesel microgrid to power the Kenyan logistics hub of the International Committee of the Red Cross (ICRC).

The African Energy Indaba and NEPAD's Renewable Initiatives

NEPAD, the implementing arm of the African Union (AU), is embarking upon an exercise to accelerate the development and implementation of Africa's High Priority Renewable Energy Projects.

Through the Sustainable Energy for All Initiative (SE4ALL), NEPAD is cooperating with The Africa Energy Indaba Conference to host focused sessions where country project owners will present their selected projects to potential investors/developers and other interested stakeholders, who would consider

funding these projects for further development or implementation.

NEPAD senior energy advisor, Professor Mosad Elmissiry notes, "This will be the first time that country government's will be showcasing their high priority renewable energy projects to the open market and looking to attract private sector participation and investment."

The 2017 Africa Energy Indaba is taking place at the Sandton Convention Centre in Johannesburg from 21-23 February 2017.

Industry diary

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