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THIS MONTH:

- Customer-first principles secure HDO project order
- Digital disruption changing the global automotive industry
- Automation, equipment efficiency and the Connected Enterprise
- Backup and prime power generation: The case for diesel and gas engines



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Crown House
 Cnr Theunis and
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 Bedford Gardens 2007
 PO Box 140
 Bedfordview 2008

Tel: +27 11 622 4770

Fax: +27 11 615 6108

e-mail: mechanical@crown.co.za
 www.mechanicaltechnologymaga-
 zine.co.za

Editor:

Peter Middleton

e-mail: peterm@crown.co.za

Copy editor:

Erika van Zyl

Advertising:

Norman Welthagen

e-mail: normanw@crown.co.za

Design & layout:

Darryl James

Publisher:

Karen Grant

Deputy publisher:

Wilhelm du Plessis

Circulation:

Karen Smith

Reader enquiries:

Radha Naidoo

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Overcoming Africa's power challenge



At the closing panel discussion for POWER-GEN and DistribuTECH Africa, entitled 'Visions for Africa's Power Future', it was suggested that Africa's rich gas, solar, wind, hydro and geothermal resources be harnessed and added to the energy mix in a sustainable way, and that greater private sector participation in the sector had to be encouraged.

Moderator Gareth Gregory, Africa head of Energy Security Services Africa, compared Africa's power sector to India's IT sector 30 years ago: "We have the potential to turn the situation around in the same way that India sparked its booming IT industry".

Dawie Roodt, chief economist at The Efficient Group, said that power generation, distribution and pricing models should be handed to more private sector players to make vital electricity supplies more competitive. It was not necessary for governments to deliver services such as power or mobile telecommunications, he argued. "In a digital economy, centralisation is becoming outdated," he said, adding, "Governments should focus on regulating the power sector effectively and creating an enabling environment for private investment".

South Africa's independent power producer (IPP) programme had proven the viability of the hybrid model, said Aurecon technical director, Clinton Carter-Brown. "We now need to further capacitate mid-tier and small players to roll out IPP lessons at a granular level, within the best interests of the economy and the power system."

Richard Candy of EON Consulting South Africa argued that aggregators were needed to support small-scale distributed power generation players who could buy and sell power back into the grid. However, this required effective smart grids with high visibility: "You must be able to monitor what is going down the line so that you can enable individual customers to participate and support on-demand models for power consumption."

While Honeywell's Amos Hadebe, highlighted that regional integration would present opportunities to aggregate the market and attract investors. "But to achieve this, we need regional interoperability and harmonised standards," he said.

Conceding that full privatisation of national power utilities was unlikely in the foreseeable future, delegates participating in the discussion said hybrid systems, in which independent power producers and utilities both contributed to power generation and distribution, were likely to emerge as a solution to Africa's power shortfall in the short to medium term.

Contrasting this high level view in *MechTech* this month, Kenny Gaynor, Cummins' director of power generation for Southern Africa, reveals some of the practical solutions being implemented to overcome Africa's Power deficit: fuel-based solutions that are seldom 'championed' by industry experts.

Gensets are often a grudge purchase to mitigate outage and load shedding risks. In many situations, however, for safety-critical applications such as underground mining and hospitals, they have always been required and, in remote areas where access to the grid is unavailable, "there are fewer options other than prime units".

Gaynor points to some "amazing" features of diesel generation: "When it comes to absorbing changes in load, either up or down," he argues, "there is nothing better." He also cites the relatively low capex and maintenance costs of modern units.

"But," he concedes, "the big issue is running costs due to fuel." This makes prime diesel generators ideal for use in hybrid solutions. "Solar technology is now quite sophisticated. Management systems can predict when the solar output is about to drop due to cloud cover, for example, and the diesels can be started in time to prevent power dipping. The diesels ramp up in sync with the solar coming off and the load doesn't see any change in the supply," Gaynor explains. Hybrid diesel-solar systems "could see some 20% savings on diesel fuel costs, which has a huge impact on the levelised kWh cost," he estimates.

In addition, according to Gaynor, sophisticated natural gas and biogas engines are "an increasingly viable alternative to diesel gensets", particularly for combined heat and power applications. "Most hospitals are already using gas for their boilers. We like to redirect that gas into an engine to produce both heat and power. In so doing, we can often take the hospital off-grid without having to use substantially more fuel," Gaynor says.

The direct efficiency of a modern gas engine-driven generator is around 40 to 42% "but a further 45% can be added to that by beneficiating the heat, allowing these systems to achieve overall efficiencies of more than 80%.

In terms of smart technology and connectivity, these generators and hybrid systems are already being installed with built-in 'Connected Enterprise' capabilities. Connecting to a grid is no more difficult than interconnecting the compressors across a mining operation.

As Gregory suggests, we have the potential to create a booming energy sector – and while regulation and policy support would be ideal, political decision makers are fast becoming the followers rather than the leaders.

Peter Middleton

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The Zest WEG Group, a subsidiary of leading Brazilian motor and controls manufacturer WEG, started out as a South African company and maintains its strong commitment to contributing to the development of the African region.

The Zest WEG Group has been servicing the mining sector for more than 35 years and by leveraging best practice engineering and manufacturing capabilities, the group is able to offer a range of standard off-the-shelf products as well as end-to-end energy solutions.

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ON THE COVER



Drum reclaimers: the value of longevity

The Materials Handling business line of thyssenkrupp in South Africa is commissioning a new drum reclaimer on an iron ore mine in the Northern Cape, which will operate alongside a refurbished 43-year old sister. MechTech talks to general manager for Materials Handling, Jacques Steyn.

For more information contact:

Jeanine Arundale

thyssenkrupp South Africa

+27 11 236 1000

Jeanine.Arundale@thyssenkrupp.com

www.thyssenkrupp-industrial-solutions.

co.za

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Drum reclaimers: the value of longevity

The Materials Handling business line of thyssenkrupp in South Africa is commissioning a new drum reclaimer on an iron ore mine in the Northern Cape, which will operate alongside a refurbished 43-year old sister. *MechTech* talks to general manager for Materials Handling, Jacques Steyn (right).

“While we are pleased to be installing a brand new drum reclaimer at an iron ore mine in the Northern Cape, we are also very proud that it will be operating alongside a thyssenkrupp drum reclaimer originally installed 43-years ago. This is a wonderful success story for the robustness, reliability and longevity of our machines and for our partnerships with clients. After 43 years, not only is one of the original machines still operating at full capacity, but also the mine still sees thyssenkrupp as the ‘go to’ company for replacement machines,” begins Steyn.

Of note with respect to the company’s drum reclaimer technology, “the material being handled at this mine is among the most abrasive ores on the planet”, proving the robustness of thyssenkrupp drum reclaimers. “If well looked after with regular servicing and wear liner replacements, the life expected from these machines is exceptional – and it is obvious that the mine is looking after its assets well,” Steyn adds.

Over the years, thyssenkrupp has supplied 10 drum reclaimers to the iron ore mine in the Northern Cape. These machines have become renowned for their excellent blending capability, general machine stability, reliable performance, ease of operation and maintenance – in summary, they are simple, safe and reliable at a competitive price.

The company has also recently supplied five drum reclaimer systems,

which rank among the largest ever built, for two new coal-fired power plants in South Africa. In total, some 20 systems have been installed in South Africa over the years: in the steel industry; for coal-to-gas-to-liquid operations; in the petrochemical industry; and at coal and iron ore mines.

“We operate in a very competitive market and we do so with considerable success. We can still say that the vast majority of the drum reclaimers installed in South Africa are ours,” Steyn continues. “From an operation perspective, we regard our clients as the experts, so we develop and evolve our machines with clients so as to meet the immediate and future needs they identify.

“We have learned to keep things simple from an operational and maintenance point of view. Machines operating in stockyard environments must not be complicated to look after,” he adds.

thyssenkrupp has also adapted its designs over the years. One of the significant developments, for example, has been a single shell to replace the older double shell designs. These are less complicated and less expensive to fabricate, while finite element analysis techniques enable optimisation of the shell thickness to best suit the application.

Another key innovation has been the development of the thyssenkrupp-patented cascade bucket for bi-directional reclaimers. Material is first scooped into the top half of the bucket and, as the bucket rises, it is transferred into the



lower half before being discharged. The symmetrical shape with no moving parts enables bi-directional operation while obviating the maintenance issues associated with flaps and/or hinge systems.

“There is a big drive in the bulk materials handling industry towards standardisation, which makes it difficult for us to compete in all sectors of the market. Our advantage, however, is that we make client-specific machines. We have excellent engineering capabilities, which means we can adapt and change machines to suit the specific requirements of each customer.

“More importantly, we stand by our customers. From the very start of projects, there is a lot of negotiation involved in designing and developing final solutions. Following that, we are also very proud of the extensive support we can offer on the service side,” he tells *MechTech*.

In the current tough economic climate, Steyn believes that servicing existing assets is a priority. “Capex expenditure is under pressure so clients need to get the most out of existing assets. As demonstrated at the iron ore mine, opex

used to good effect can keep machines going well beyond their expected design life," he points out. A key component to thyssenkrupp southern Africa's value offering is its Service Centre in Chloorkop, "which has developed a full servicing capability for all the thyssenkrupp brands that we manufacture". Originally set up to refurbish and manufacture components for the company's Polysius HPGR grinders, the Service Centre has "blossomed". "We have just manufactured a new bucket wheel for a reclaimer, for example, a 6.0 m replacement wheel that was fabricated and machined in Chloorkop," Steyn adds.

Several of the mine's fleet of drum reclaimers have been modernised and refurbished over the years, with new single shell drums fitted to replace the original double shell ones, for example. "We recently refurbished the 43-year old machine, which meant that the mine did not have to invest in two new reclaimers at the same time," Steyn says.

From a reliability perspective, Steyn notes that "we have a very good understanding of the cost of having this equipment stand for whatever reason". "If a train or ship has to wait for a machine to be fixed or get to capacity before it can be loaded, then it can result in substantial losses to our clients. It is vital to make sure that materials handling equipment runs at capacity when the button is pressed," he says. "Hence the need for robust and simple designs that offer high availability, along with ongoing service support and optimised maintenance.

"While customers all talk about lowering operational costs, improving uptime and reducing total costs of ownership, these criteria are not always valued highly enough when it comes to evaluating tenders for new equipment," he continues. "Operating costs are sometimes seen as someone else's problem by the people charged with evaluating technical solutions during project stage – and once the initial decision is made, these people are long gone, so no lessons are being learned," he suggests, adding, "what we consider value is not necessarily generally agreed."

His outlook? "I have a somewhat cynical view of the commodity cycle," he reveals. "While most people interpret the current coal price data as having 'slumped' from the 2007/2008 levels, if one looks back to 2000/2001, one sees a sharp spike at 2007/2008. If this



Currently being commissioned, a new thyssenkrupp drum reclaimer for an iron ore mine in the Northern Cape mine. The single shell design makes these new machines less complicated and less expensive to fabricate, while finite element analysis techniques enable optimisation of the shell thickness to best suit the application.

spike is interpreted as the anomaly, the current price is not far off steady growth expectations over the 15-year period.

"So the current coal price is actually back where it should be and we cannot expect prices to return to 2007/2008 levels," Steyn argues.

He adds that this is also true of other key commodities such as iron ore and copper, "which perhaps spiked to a lesser extent". "This is the best example of Supply and Demand Economics 101 I have certainly experienced. The increase in prices between 2007 and 2008 due to high demand, we can argue the origin, led to more and more entrants into the market. At the high price levels many projects also became financially viable. With the increased production, supply outstripped demand and prices started to fall. We are still experiencing repressed prices due to this oversupply and the commodity prices will recover somewhat as stockpiles disappear and the supply/demand balance recovers, but I do not think we will see 2007/2008 levels again soon. Although I would love to be proven wrong," he explains.

"We all need to get used to the current market and make our businesses sustainable in these conditions. Now is the time to tighten our belts and smarten our operating practices in order to overcome the challenges we currently face," he suggests.

He believes that the Rand value does offer export opportunities. "On the manufacturing side, we have proved that we can manufacture in Africa to the highest quality standards and compete



The same philosophy and principles apply to thyssenkrupp stackers operating on the site, as reflected in the company's new brand claim: 'engineering. tomorrow. together'.

with anyone from anywhere in the world, including the exporters from the East. New projects tend to be on hold at the moment, but in the longer term, we are positioning to take advantage of African export opportunities and we are always exploring efficient ways of doing that.

"We have also reorganised our operations to enable better cooperation between our business lines. Additionally, we have expanded our local offering to include our global Power and Energy business," he says.

thyssenkrupp Industrial Solutions in South Africa is now able to offer solutions in a variety of inter-related specialisms, e.g. in the fields of Materials Handling; Mineral Processing; Cement; Power and Energy or the Process Industries with its chemical and petrochemical segments.

"Today, the same philosophy and principles apply to all thyssenkrupp equipment: for Materials Handling's stacker reclaimers, wagon tipplers, ship loaders and conveyors; Mineral Processing's and Cement's crushers, grinders and comminution solutions; Power and Energy's industrial power plants; and Process Industries' chemical and petrochemical solutions. This philosophy is reflected in our new brand claim 'engineering. tomorrow. together.'," concludes Steyn. □

DCD opens new doors to local market

With its recent forging of a large nozzle component weighing over three tons, leading seamless forged product manufacturer DCD Ringrollers is expanding into new market segments

“With a height of 850 mm, this forging is the largest of 43 components ordered by a South African customer for a pressure vessel application,” says DCD Ringrollers executive director Dion Booyens – once again “pushing the boundaries on behalf of our customers”.

Booyens said DCD was able to meet the pricing requirements of the customer in quoting on these components and expected to now be able to participate more assertively in the local markets for these and similar components.

“With this exciting achievement under our belt, we now look forward to the

prospect of forging other components – such as even larger and heavier nozzles, bushes, rolls and pinions,” he said. “In particular, we are in a position to manufacture a larger range for markets where pressure vessels are in use and heavy section nozzles are required.”

The company’s manufacturing facility at Vereeniging in Gauteng province boasts a 35 000 t annual production capacity and is equipped with the latest automated forging equipment from leading German and Italian suppliers.

Plant on site includes three forge presses, two ring mills, CNC vertical borers and heat treatment facilities for austenising, normalising, tempering, annealing and polymer quenching. The 3 500 t press is capable of both open and semi-closed forging and the ring mills’ capacities range from 200 mm to 4 500 mm outside diameter. DCD also

has automated hardness and ultrasonic testing machines.

Exporting 70% of its manufactured products to more than 40 countries across all continents, the company is accredited by a range of international bodies and client organisations including, ISO 9001:2008, OHSAS 18001, RISAS, Deutsche Bahn, Saudi Aramco, CAF and Bombardier.

“As one of the largest forging companies in the southern hemisphere, we ensure our local and global reputation by applying our advanced technology in innovative ways, and also to fill niche requirements,” concludes Booyens. “Being approved by government agencies and railway authorities all over the world gives customers confidence in our expertise across many other sectors such as mining, petrochemical, nuclear, wind energy, civils and materials handling.”

www.dcd.co.za



With a height of 850 mm, these forging are two of the 43 large nozzle components ordered by a South African customer for a pressure vessel application.

Truck sales track lower predictions

The South African commercial vehicle market is continuing to track various industry predictions with the forecasted decline in new truck sales continuing during August.

This is according to the latest results released by the National Association of Automobile Manufacturers of South Africa (Naamsa), Associated Motor Holdings (AMH) and Amalgamated Automobile Distributors (AAD).

At the end of last month, the truck market was 4.2% down on the cor-

responding period in 2015, reaching 12 154 sales. On a year-to-date basis, only the heavy commercial vehicles (HCV) and bus segments managed to remain in the black, recording growth of 1.6% (3 487 units) and 7.3% (789 units) respectively.

Medium commercial vehicle (MCV) sales have declined by a significant 18% to 5 409 units so far this year, while sales in the extra-heavy segment (EHCV) declined by 7.5% to 7 878 units.

According to Gert Swanepoel, acting vice president of UD Trucks Southern Africa, the EHCV segment in particular is heavily impacted by the lack of business confidence in the local economy.

“In essence, fleet operators are ‘sweating their assets’ or adopting a wait and see approach,” suggests Swanepoel. “However, there has been some positive activity over the past few weeks specifically in the construction sub-segment, but we will have to see how all of this pans out during the coming months and if it will have any significant impact on sales.”

UD Trucks expects the market to remain flat during the next quarter. The company advises truck owners to scrutinise all costs in order to eliminate any wastages and not to let vehicle maintenance fall behind as this can be more costly in the long run.

www.udtrucks.com/en-za/home

New marketing era for Xylem Water Solutions

Xylem Water Solutions South Africa, is proud to announce the appointment of its new marketing manager; Lorraine Smart. “Having been in the industry for such a long time – a total of 35 years with 11 years of in-depth marketing experience – Lorraine stood out from her first interview,” explains Pierre Fourie, managing director of Xylem Water Solutions South Africa. “We needed someone who could pick up the reigns and run in this fast-paced and demanding role. We are fortunate to have found someone as versatile and experienced as Lorraine.”

Smart brings extensive experience of two of Xylem’s globally renowned brands, Flygt and Lowara, to the role along with strong business acumen and a no-nonsense approach to achieving results.

“I look forward to working with the fine team at Xylem Water Solutions South Africa and the wider global team, while ensuring service excellence to our distributors and customers alike,” Smart says.

A new era of streamlined marketing efficiency lies ahead for Xylem Water Solutions with Lorraine Smart at the helm.

www.xylem.com



BED becomes an authorised SKF distributor

Bolt and Engineering Division (BED) is a leading supplier of engineering related products to the construction and mining industries. The Group's national footprint spans Gauteng, North West Province, Free State, Platinum Province, Western Cape, Limpopo and Mpumalanga. The company operates from eleven locations throughout South Africa and the full SKF products and service portfolio will be available to industrial customers in the respective branch areas.

With this latest agreement with BED, SKF now has 60 industrial authorised distributors with an overall total of 169 distributors located throughout Southern Africa. Alongside these SKF industrial distributors, lubrication, agricultural and vehicle service market distributors also form part of SKF's comprehensive authorised distributor network.

SKF distribution development manager, Anton Theunissen, explains that the recent expansion of the company's distributor network not only allows its customers improved access to SKF product and services, but that the strategic selection of SKF authorised industrial distributors ensures close proximity to



Ali Karademir, director of SKF Africa, Ian Cillié MD of SKF Southern Africa, Jan Viljoen, BED director and Mike Giltrow, BED MD at the signing of the agreement.

our customer base.

"This facilitates effective planning and stock management, while enhancing the ability to service customers and end users in the shortest possible time. This partnership with our customers reduce asset down time, while maintaining the best possible production levels, uptime and customer performance – ultimately reducing total costs of ownership to our customers," Theunissen says.

www.skf.co.za

Compressor Technique KZN relocates

Atlas Copco's Compressor Technique service division (CTS) has relocated from Pinetown to Durban to a new home at 21 Pascoe Road, Isipingo. The move adds value to customer service in KwaZulu-Natal by joining – under one roof – its service division (CTS) with compressor rental specialist, Rand Air and Atlas Copco Industrial Technique.

"The move, which is in line with Atlas Copco's trend to consolidate, makes sound business and financial sense when considering the synergies and costs shared between the three businesses – CTS, our sister company, Rand Air and Atlas Copco's industrial tool business area," says Wayne Jacobs, business line manager, Atlas Copco CTS.

"As the majority of our customers are located in Durban, the expedient move to the new more centrally located Isipingo offices facilitates our access to customers and makes it easier for customers in the KZN metro to reach us," he adds.

According to Atlas Copco CTS Durban branch manager, Max Larue, the move is beneficial to all three businesses. "From a rental perspective, we are sharing costs

such as rent, water and lights, security, etc. From a business perspective, it is generating new business. While servicing our customers' equipment we are able to recommend Rand Air for equipment hire and Rand Air brings us customers who require servicing on their compressors.

"So, from the customer's perspective, the seamless interaction between the two businesses has sped up our service offering, ultimately benefitting customers through faster and more efficient service and turnaround times."

CTS occupies approximately 33% of the building as most of their business involves field service on customer premises, while Rand Air uses most of the outside area for its rental fleet park.

The CTS team of four highly qualified technicians attends to compressor maintenance, service and repairs. "All mechanical parts eventually wear but if maintenance is done correctly at the right time, breakdowns and premature failures will reduce drastically, leading to savings both in terms of uptime, productivity and costs," Larue advises.

www.atlascopcogroup.com

In brief

Leading concrete materials company, **Afri-Sam** has sponsored concrete to the value of R100 000 for the construction of a skate park in central Johannesburg. The skate park forms part of a unique Skate School built by the award winning non-profit organisation, Skateistan, which provides programmes combining skateboarding and education to empower youth.

A comprehensive two-day course in chute design and modelling was recently held at the **Centre for Mechanised Mining Systems (CMMS)** at the University of the Witwatersrand, Johannesburg, endorsed by the **Conveyor Manufacturers Association (CMA)** and the **South African Institute of Materials Handling (SAIMH)**. The course was presented by leading Australian and South African experts in chute design and approved for three CPD credits by ECSA.

The **Engineering Council of South Africa (ECSA)** has completed its nationwide consultative process on the revisions to its governance instruments. Says ECSA CEO, Siphon Madonsela: "The engineering profession does not belong to a select few. It belongs to all who contribute to the profession. As such, the principle of consultation is paramount to the regulations of the profession."

Enel, through its subsidiary **Enel Green Power RSA (EGP RSA)** has completed and connected to the grid the 66 MW Tom Burke photovoltaic power plant in Limpopo province. As well as Tom Burke, EGP RSA currently owns and operates the Paleisheuvel photovoltaic power plant (82.5 MW) in the Western Cape and the 10 MW Upington photovoltaic power plant in the Northern Cape Province – and a further 364 MW of projects are currently under construction.

South Africa's Steel Manufacturing and service specialist **Robor**, has again been able to assist **Alberton Child Welfare** this year. Along with support for the Alberton Child Welfare Golf Day, they donated an amount of R20 000 and a fully branded motorcar.

Goscor Lift Truck Company (GLTC) has been ISO 9001:2008 certified and according to GLTC MD, Darryl Shafto, this is an important confirmation of the company's high levels of service, efficiency and product quality. "This leaves no room for complacency. Our all-round quality levels are excellent now and we must ensure that we not only maintain these levels but that we improve on them on a continuous basis," says Shafto, adding that one of the important aspects of ISO 9001:2008 is that it is externally assessed on an ongoing basis.

As a responsible and caring corporate citizen, **Elgin Brown & Hamer (EBH)** Namibia is helping to ensure that the nation has enough blood. The company has offered its premises to the Namibian Blood Transfusion Services' (NAMBTS) mobile clinic to facilitate the voluntary donation of blood from its staff.

Customer-first principles secure HDO project order

Destined for the power sector, Bonfiglioli South Africa is currently delivering on the largest-ever order by value from its HDO range of bevel helical reducers. *MechTech* talks to Steve Herringer (right) about the growing success of the company's expanded product range for complex projects.



Bonfiglioli's heavy duty parallel shaft (HDP) and bevel helical (HDO) gear units were launched into South Africa nearly 10 years ago to complement the company's strength in high torque, high power planetary reducers.

"Going back to 2008, we started using the then new range to replace older units in the power industry, specifically on bucket elevators," says Herringer. "We were able to look at the nameplate data from existing units and, after finding out as much as possible about the application and the original product, we were able to install like-for-like replacements from our HDP/HDO range," he tells *MechTech*.

"Based on our products' performance on these installations, we were invited earlier this year to tender on a major refurbishment project. Our initial involvement was again on the bucket elevators, but we were also asked to look at units for overland conveyor belts," he reveals.

The total order, the largest by value yet supplied by Bonfiglioli South Africa, comprised 21 large HDO 140 conveyor drive gearboxes; 15 smaller HDO 100s and a total of nine HDO 130s for bucket elevators, "which also had to be fitted with a small A50 bevel helical 'pony drive' for running under maintenance conditions.

"We regard all of these units as stock buildable items, which can be locally assembled quickly from parts held in stock. Our local assembly programme allows us to offer a very short delivery period," Herringer adds.

At the time of writing, the final batch of HDO 140s, along with 10 of the HDO 100s were being loaded onto trucks for delivery to the client. "The assembly of the 130s with pony-drives is now being finalised for delivery next week in batches of four," said Herringer at that time.

In addition to the pony-drives, these units were customised with additional

pipework and lubrication points to facilitate maintenance once installed. "Rigid flange couplings on the low speed shaft, together with safety guards are also to be fitted to these units prior to being shipped to site," he informs *MechTech*.

While some of the HDO 140s were shipped from Europe, "simply to meet the required delivery deadlines", all of the bucket elevator drives were locally assembled from in-stock components. "We are accredited by our parent company to assemble up to size HDP/HDO 140



A total of nine HDO 130s for bucket elevators are being supplied, which are also fitted with a small A50 bevel helical 'pony drive' for running under maintenance conditions.

in South Africa. The same strict build and quality standards applied at the factory have to be adhered to. This means that all branches accredited to assemble gearboxes do so at the same European factory standard.

"We strive to offer very short delivery times, but we cannot stock for every possible gearbox combination. It is therefore sometimes necessary to source the product or components from one of our bigger overseas factories," he explains.

The two largest bevel helical units ever sold into South Africa, for example, two HDO 160s with 125 kN ratings, have



Some of the final batch of Bonfiglioli HDO 140s along with HDO 100s being loaded onto one of the trucks for delivery to the client.

recently been supplied for heavily loaded belt feeders on a local mine. “These were manufactured and assembled in Italy and shipped to South Africa for installation,” Herring says.

Bonfiglioli’s project approach

Launched in March 2008, Bonfiglioli’s Projects department was established to take full advantage of the HDP/HDO offering. “We are in a unique position in that we can offer planetary, parallel shaft and bevel helical gearbox options in the heavy duty application field. This enables us to participate in a cross section of project work where a number of different sizes and solutions might be required,” Herring relates.

“Since 2008, we have been building our project capability. This includes access to a global technical platform. Through this communication portal, our local engineering department has access



to a worldwide database of applications, which enables us to offer technically proven solutions with very quick turn-around times. In addition to that, our computer aided calculation package ensures that the selection of equipment closely maps customer requirements. Complimenting this is our local capability to tailor our product offering to suit local environmental conditions,” he adds.

Herring says that 2015 was an excellent year for the projects divisions. “We did a large number of projects last year, including an acid mine drainage project that, in terms of unit volumes, was



Above: All of the supplied units are stock buildable items, which can be locally assembled quickly from parts held in stock.

Right: In addition to the pony-drives, the Bonfiglioli HDO 130 units were customised with additional piping and lubrication points to facilitate easy maintenance once installed. Rigid flange couplings on the low speed shafts, together with safety guards are also fitted.

our biggest to date. On completion of the work, we had specified, assembled and installed some 76 units for the treatment plant – mostly HDP 100s to HDP 130s for mixers and aerators,” he reveals

“We are now at the point where clients have put faith in us and are pleased with our offering. We participated in a project for Sierra Leone while the country was in the midst of the Ebola crisis. In spite of this and the many other difficulties in implementing projects in Africa, the client did a fantastic job of meeting their delivery schedule – and we supported that endeavour. We strive to create a pleasant shopping experience for all our customers,” he assures.

For the Sierra Leone project, stand-alone gearboxes were supplied but projects routinely require a complete drive train assembly (power pack) that includes the motor, high-speed flexible or fluid coupling, a customised baseplate, rigid low speed couplings, safety guards and possibly also a braking system. With higher value and increased local content, projects such as these are interesting for us to tackle,” he adds.

In addition to supplying complete solutions from a product perspective, long-term support is available through the



company’s local service and repair division, based at Bonfiglioli’s Johannesburg head office.

“In terms of our support philosophy, the customer is central throughout the Bonfiglioli world. The global group has operated on customer-oriented principles for over 60 years and has organised its market support and customer assistance along clear ‘customer-first’ guidelines.

“Bonfiglioli has become a leader in the global market because of its ability to provide rapid assistance, customised solutions and expert teams to support customers’ design departments in all project phases,” Herring concludes. □

Ongoing support for Uniglide pumps

The ability to support products in the marketplace that have been operating for more than 30 years requires a depth of technical expertise that is often no longer available in the present day. Howard Jones, dewatering product manager at Weir Minerals Africa, tells of an Envirotech Uniglide pump installed in 1976 that is still running and supported today.

Weir Minerals Africa was recently called upon to assess a Uniglide horizontal split case pump that had reached its perceived end of life at an iron ore mine in the Northern Cape of South Africa. The pump, which was originally installed in April 1976, formed part of a larger order of Uniglide pumps. In total 22 of these dewatering units were supplied to the mine by Salsa Weir, which later became Salweir before being incorporated into Envirotech, which became part of Weir Minerals in 1994.

The 40-year-old Uniglide pump was being used in a dewatering application in the screening plant at the mine and is being replaced with an identical unit.

Jones says that in the past, Uniglide pumps had established a reputation under the name of Harland and these units are still sometimes referred to as such today, although this is not factually correct.

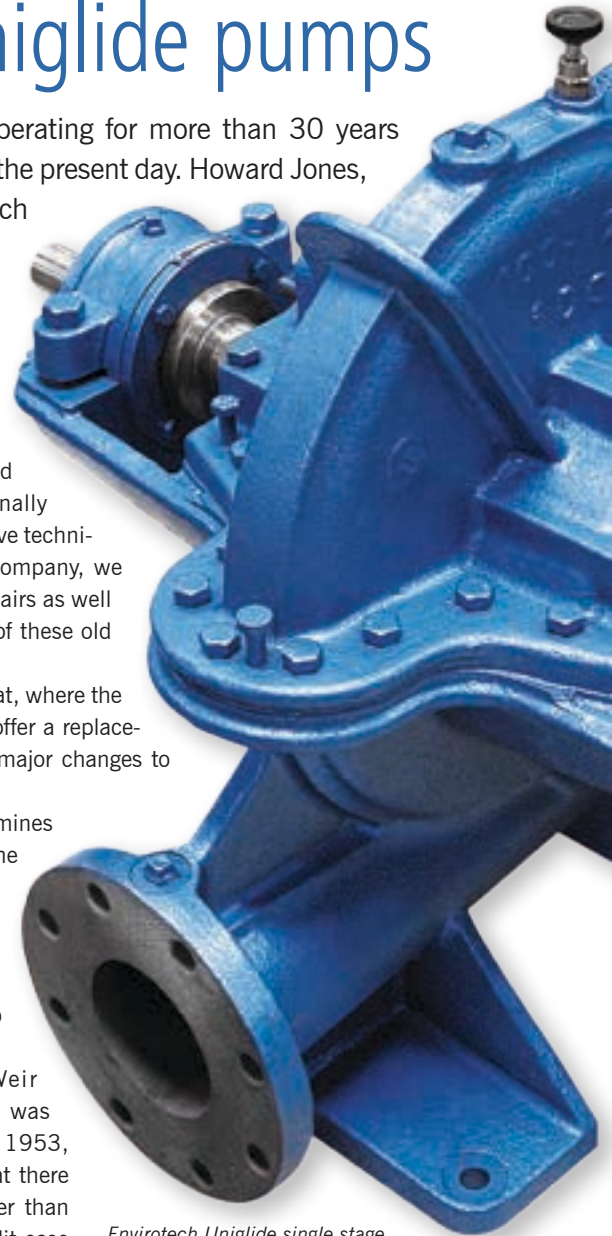
He notes the significance that pumps manufactured and sold into industry in the 1960s and 1970s are still operational today. "This is a testament to the structural integrity of these pumps, many of which are still achieving astronomical operating hours," he says, adding: "There is a need to assess the condition of these aged units, however, to ensure that there are no catastrophic failure risks".

"We have started seeing these very old pumps coming in for refurbishment, and Weir Minerals Africa is in an excellent position to cater for the level of technical support required to keep these pumps functionally operational. Through the extensive technical knowledge residing in the company, we have the ability to undertake repairs as well as the complete refurbishment of these old pumps," he says.

"Important to customers is that, where the pump is beyond repair, we can offer a replacement without the need for any major changes to pipework," Jones adds.

He says that the move by mines and process plants to review the functional efficiencies of pumps is in line with current economic pressures. "Operations need to optimise, drive cost efficiencies and lower total costs of ownership wherever possible," he suggests.

The oldest pump that Weir Minerals Africa has on record was manufactured and installed in 1953, although Jones does caution that there may well be some that are older than this. This Uniglide horizontal split case pump was installed at Iscor Works in Pretoria and was probably used for the circulation of cooling water in the iron and steel works. It was capable of pump-



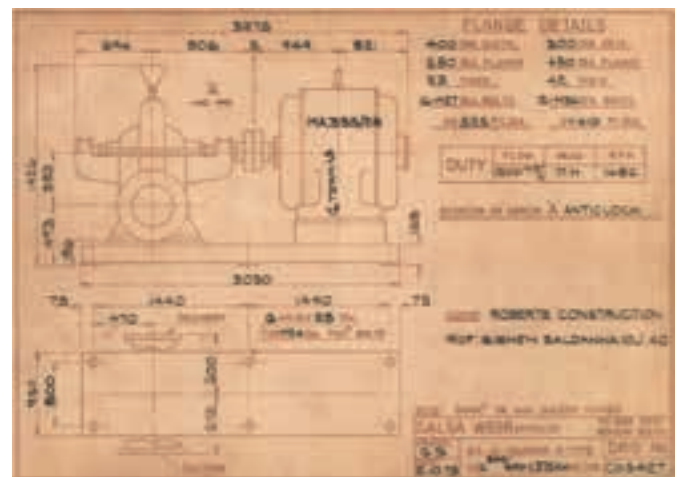
Envirotech Uniglide single stage horizontal split casing dewatering pump.

ing 260 l/s at a head of 110 m.

He explains that the Uniglide, a heavy duty horizontal split case dewatering



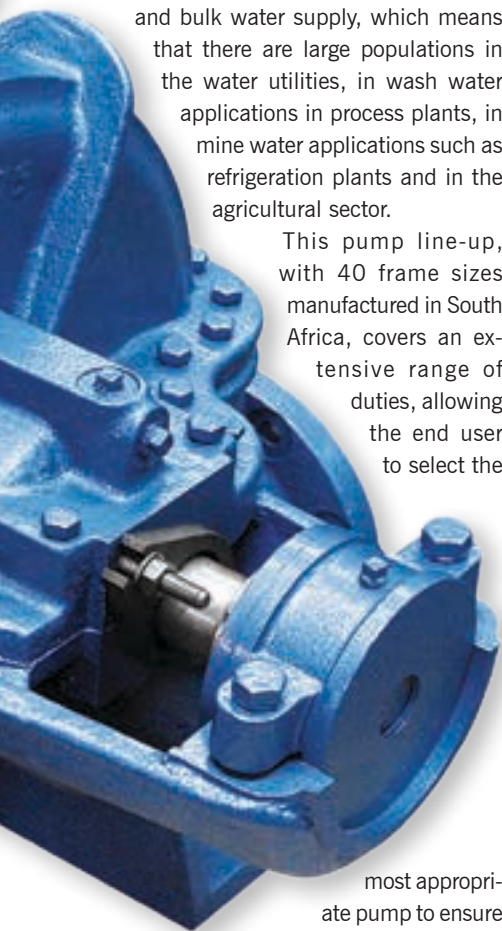
The original Salsa Weir product information plate from a Uniglide pump installed in 1976.



The general assembly drawing for the Uniglide pump installed in the iron ore mine.

pump, is typically used for water transfer and bulk water supply, which means that there are large populations in the water utilities, in wash water applications in process plants, in mine water applications such as refrigeration plants and in the agricultural sector.

This pump line-up, with 40 frame sizes manufactured in South Africa, covers an extensive range of duties, allowing the end user to select the



most appropriate pump to ensure efficient operation at that application's requisite duty. The range offers capacities of up to 3 600 m³/h at heads of up to 170 m.

The pumps can be mounted either horizontally or vertically to accommodate the application installation requirement, and when mounted vertically a smaller footprint results, facilitating greater flexibility in plant layout.

Pumps on larger frames are equipped with a double volute that reduces radial hydraulic thrusts, thereby extending bearing life. This also allows operation over a wider range of the pump curve and enhances the total life cycle of the pump.

Ease of maintenance is assured as the rotating assembly is easily removed without disturbing the pump alignment or pipework. This facilitates repair on the pump and minimises the downtime required for complete rotating element change-outs.

Jones says that while materials of construction have been improved significantly over the last 30 years, it is still the inherent robustness of the Uniglide pump range that has seen these units achieve in excess of 38 years of reliable service before needing to be either completely refurbished or replaced. □

Zero-leak true knife gate valves

External leaks from valves during valve cycling are common problems for plant operators around the world. These leaks can have disastrous consequences, contaminating the environment and endangering workers with hazardous materials, resulting in major down time for the company.

"Delta Industrial™ knife gate valves can guarantee plant operators in difficult process applications zero leakage," confirms John Abbott, Weir Minerals' global product manager for valves. "This isolation is very important because it ensures safe and consistent plant operation, minimises downtime and provides lowest total ownership cost," he says.

"Our customers can install Delta Industrial™ valves into problem areas secure in the knowledge that they will achieve long term performance with exceptional isolation results, protecting their people, their plant and the environment," Abbott continues.

Weir Minerals Delta Industrial™ guided shear gate valves are designed to repeatedly close and provide bi-directional zero leakage isolation no matter what the process fluid contains. "Our knife gate valves guarantee that no process fluid can come past the closed valve, even in abrasive slurry lines or when operating under high temperatures," Abbott assures.

The zero leakage guarantee is due to a unique transverse seal design and seating arrangement. "Although there are at least five distinct types of knife gate valves marketed in the industry, we only produce absolute knife gate valves in our Delta Industrial range, capable of cutting, shearing, and closing against solids while still producing a tight shut-off," Abbott says. This makes it the world's premium isolation valve for scaling applications where traditional valves are inoperable due to cementation or precipitation of solids.

"What's great about our Delta Industrial™ knife gate valves is that they even operate with clear solutions, an area where traditional knife gate valves are not appropriate," Abbott continues.

"Our knife gate valves have demonstrated their ability to deliver low costs of ownership over the life of the valve, resulting in reduced downtime and increasing productivity for our customers," he says.

Weir Minerals is a global leader in the mining and oil sands markets and the acquisition of Delta Industrial Valves,

Inc. strengthens its comprehensive offering for high performance heavy-duty slurry application and in high-pressure environments.

"Within the oil sands sector, the Delta Industrial™ knife gate valves provide innovative, custom products that are well suited for the harsh process of this industry. The valves are heavily entrenched in the oil sands process, where performance is critical and leakage, both external and internal, cannot be tolerated.

"For pulp and paper mills, we can provide Delta Industrial knife gate valves for use in a range of processes including refiners and heavy duty cleaners, areas where traditional designs often fail to perform.

These knife gate valves are ideal in power generation applications because of their reliable performance and low maintenance requirements," he says.

The team at Weir Minerals is currently working on complementing its range of ASME 600 rated valves. There are also developments currently being tested, which will provide enhanced performance in high-pressure applications. "We are all very excited about the product development and new design innovations to help our customers and cannot wait to see these unfold," Abbott concludes. □

Right: Customers can install Delta Industrial valves into problem areas secure in the knowledge that they will achieve long-term performance with exceptional isolation results, protecting their people, plant and the environment.

Below: Delta Industrial™ knife gate valves guarantee zero leakage in difficult process applications.



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Refurbishing high-pressure steam valves to SANS 347

Refurbishment rather than replacement of valves is increasingly viewed as a means of reducing capital expenditure, but only if the work being carried out is in accordance to the SANS 347, the South African Pressure Equipment Regulations and the original manufacturer's strict requirements.

This is according to Ryan Croker, KSB Pumps and Valves, valve service and acting sales manager, who adds that refurbishment can offer a number of advantages "including reduced lead times for large engineered valves". In other instances, the custom-fit nature of certain valves makes it preferable to refurbish rather than replace. "Cost is also a factor, but these benefits are meaningless unless the valve is restored to OEM specifications and an 'as-new' condition to ensure reliable service in the long term.

As one of the largest manufacturers and suppliers of valves for all industries, including high pressure steam valves for power generation, chemical and other plants, KSB Pumps and Valves has recently invested in a workshop and other facilities to ensure that even the most complex and precise valves can be refurbished in accordance to the SANS 347.

"As an OEM manufacturer we are able to supply either new or refurbished valves, whichever makes technical sense or according to customers' requirements. Our workshop is specially equipped

to deal with any type of valve and we specialise in high-pressure steam and technically complicated valves.

"Like our mother-company in Germany we have the technology and processes in place to do the work correctly and in accordance with all relevant legislation. Likewise, as an OEM we have access to all the required technical expertise and after-sales services to support our valves whether they be new or refurbished," says Croker.

He adds that the valves division has been especially beefed-up to meet growing demand from an ever-broadening customer base. Sales, service and logistics efforts enable them to reach out to all corners of the region and ensure that professional and competent services can be offered.

The promulgation of SANS 347 and subsequent upgrading of KSB's valve repair workshop is in line with efforts to ensure safer handling and usage of equipment classified as pressure vessel accessories. In light of the large fleet of specialised valves that exist in Southern Africa, the establishment of a



KSB's valve repair workshop is able to undertake all repairs and refurbishment of large-scale and complex valves, including high-pressure steam valves.

fully-fledged compliant workshop opens avenues for users to professionally refurbish rather than replace valves.

In addition, KSB's valve division will ensure that the industry has access to the best national and international services from the company. Utilities such as Eskom, various water authorities, as well as large-scale companies are already making use of the company's repair and refurbishment services. "As an OEM we are now able to offer customers a full spectrum of services from sales, to support and maintenance to repairs and eventual refurbishment if required," concludes Croker. □

Evolutionary EZstrip transfer pump

Franklin Electric South Africa, a leading manufacturer of world class pumping systems and solutions, demonstrated at Electra Mining how the new Mono EZstrip transfer pump can make a day-long maintenance operation a 30-minute job.

Considered as the biggest leap forward in progressing cavity pump technology for 30 years, the Mono EZstrip transfer pump is the first industrial progressing cavity pump unit that can be stripped without the need for electrical disconnection or removal of pipework. The revolutionary new Mono EZstrip transfer pump is easy to install and presents the opportunity to see downtime drastically reduced as maintenance, cleaning and repairs to the pump can be carried out in-situ.

Franklin Electric showed how to access the pump internals to either maintain the pump or clear out any build-up in less than a minute, with reassembly of the suction chamber taking the same period of time. The company also showed how the entire drive train of the Mono EZstrip transfer pump, including rotor, stator, shaft, rod and seal, can be removed in less than four minutes, and reassembled as quickly. Currently the removal of rotating parts from a conventional progressing cavity pump can take up to a full day.

The Mono EZstrip transfer pump is suitable for applications such as dewatering, coal washing, gland service, sludge, slurries, flocculants and industrial chemicals. Following its launch in South Africa in

2015, the pump has been well received by local industry and is being utilised to pump flocculants, water and personal care products.

Also showcased was the company's entire range of positive displacement pumps, other industrial models of varying sizes, as well as positive displacement borehole pumps for dewatering applications, and demonstrated how a positive displacement pump can pump highly viscous products.

A video of this demonstration can be found at franklin-electric.co.za/products/ezstrip. □





Pumping systems 101:

A real 'old-wives' tail'

In his pumping systems column this month, Harry Rosen's tells a fishy story and relates it to the age-old practice of throttling discharge valves to limit the current drawn by pump motors.

A friend of mine hails from the West Coast and recounted this story to me a while ago. Being close to the sea, fresh fish was always a big part of his menu and, for years, he observed his wife trimming 2-inches of prime flesh off the tail while preparing the fish to put in the oven. One day he thought to ask why the strange preparation ritual? He was told that this was the way her mother had taught her, who had been taught by her mother.

It was a tradition in their family going back to her great grandmother and nobody had ever thought to question it. On further investigation, her great grandfather had been a fisherman and would always return home from a trip with a large fresh fish. Unfortunately the largest dish they had was 16-inches long so she had to trim the tail to fit into the oven. This physical limitation had evolved over time into a strict requirement ingrained into the family's cooking.

This got me thinking of a practice I see in many of the plants I visit – throttling the pump to limit the amps drawn by

the motor. As in the case of the fish story above, the original reason for throttling the pump has often disappeared in the midst of time. Peering through our looking glass, perhaps some of the following reasons could have applied:

- Once upon a time throttling was required to achieve a certain duty and it was convenient to use amps as a visible indicator to determine how much to close the valve. When the duty requirement changes, though, the unwritten rule to keep the amps below a certain value remains.
- Someone thought it was the maximum rated amperage of the motor.
- A bright spark thought he could increase motor efficiency and extend life by running at 90% of rated load – which is 100% wrong!
- Perhaps a rewind motor was used at some stage.
- The pump was considerably worn and drawing more amps than normal. Since then the pump has been refurbished.
- One year they had a really hot summer

and a lack of ventilation within the pump house led to insufficient cooling and the motors tripping.

- And finally, the genuine case: running the pump in its unthrottled condition draws more current than the motor can handle.

What is the problem with throttling anyway? Anyone who has attended a course on pumping system efficiency will know that the specific energy of a system increases when valves are throttled. This is because the additional friction loss through the valve adds additional head to the pump duty, thus consuming more power in order to pump the same amount of fluid. This is clearly shown in Figure 1, where the amount of useful energy – the energy being used to provide actual pumping work – is only a small proportion of the total energy being consumed by the pump.

In cases where the pump is being throttled to reduce the flow rate to a downstream process, pumps have to be oversized to deliver more flow than the system requires. Throttling the pump, however, is often seen as a practical, though inefficient, solution. When the system demands a higher flow rate than the pump is currently delivering, as is often the case in cooling water systems, if the pump is still being throttled then this is just throwing energy and money away.

A case study: throttled pumps at a steel mill

Steel mills produce a huge amount of heat and cooling water systems are often some of the biggest consumers of power in the plant. One such system investigated was circulating water using eight pumps in parallel, of which six were feeding cold water through the shells of a continuous arc furnace. During a plant walkabout, we noted that three of the six pumps were being throttled by 50%, while one valve was almost 75% closed. According to the operators the reason for the throttling was to keep the amps drawn below a certain value, but they did not know what value this was and the current could only be measured in the motor control centre. So they 'just knew' to keep the valves in the throttled positions noted.

The maximum rated current for the 3.3 kV pump motors read off the nameplate was 60.5 A, but when we measured the actual current drawn in the motor control centre, all readings were around 56 A.

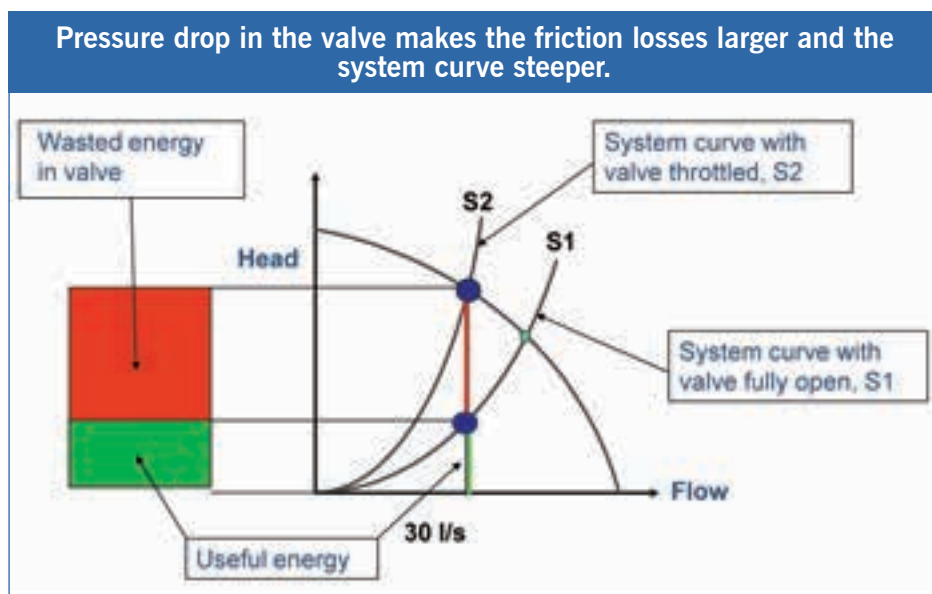


Figure 1: A typical system where a valve is used to control the pump flow rate. As the valve is closed, friction loss through the valve creates additional head, forcing the pump left on its curve and reducing the flow supplied by the pump. The amount of wasted energy in this system is represented by the size of the red block.

We sequentially opened each of the valves and checked that the amps drawn were less than the maximum motor ratings. Unthrottled, all the motors were well within their ratings. In addition, when all the valves were 100% open, we were able to achieve the required flow rate with one pump shut down completely.

Running five pumps instead of six led to savings of 258 kW, which translates into 2.1 GWh in reduced energy costs per year – and this return from a zero cost intervention.

Why were the pumps being throttled? There may have been a reason as some point, but things change and if the consequences are not being measuring, how can pump operators know that throttling every pump still has any beneficial effect? Even if there was a valid reason for throttling at some point, shouldn't it have been investigated to determine whether that reason still applied? Or do we continue to throw away two-inches of prime fish because this is what we have always done?

But what happens in cases where the motor is drawing more amps than its al-



Figure 2: Pumps in parallel often have their discharge valves throttled to ensure that the current drawn is kept below the maximum motor rating. The author has found numerous instance where the current drawn is far less than maximum motor rating and fully open valves do not overload the pump motors.

lowable maximum. Surely this is a case when throttling a pump can be justified?

Wrong! There are other ways to fix such situations and none of them involve wasting energy through throttling. This is

a topic for the next article, however, when we will discuss energy efficient ways to reduce pump output, such as trimming the impeller, reducing the pump speed or changing the pump. □



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Extending pump wear life and saving water at iron ore mines

Itaminas, one of Brazil's largest iron ore mines, has cut maintenance time by 75%, achieved three times the life on wear components and cut back considerably on the use of water by installing Metso's Orion HM series slurry pumps with expeller gland seal technology.

Iron is one of the world's most commonly used metals. It is the key ingredient for almost 95% of all metal alloys produced globally per year. In Brazil, the world's third largest producer of iron ore, the Itaminas mine in Sarzedo in the state of Minas Gerais, produced 7.5-million tons of iron ore in 2014, making it the second largest supplier of pig iron in the country.

The Itaminas mine operates 24/7 and manufactures sinter feed, pellet feed and hematite iron ore, all of which require a continuous and reliable operation for cost effectiveness.

The process begins with the concentrator and then moves to the magnetic separator, cyclone, product stalls and finally on to the tailings tank. The ore is then pumped to the tailings dam via a pumping system comprising five stations. Each station is equipped with three pumps, two in operation and one installed as a standby unit.

As the iron ore from the Sarzedo region has a density of 1.85 kg/m³, the previously installed pumps experienced very high wear due to the abrasiveness of the material being pumped. This rendered them unsuitable for the specific pumping duty required.

The pumps were experiencing life-times limited to approximately three

months. In addition, labour to maintain these pumps was expensive and complex. Itaminas therefore chose to try Metso's pumps with the goal of decreasing the company's maintenance downtime and increasing production.

Experts from Metso installed the Orion HM series pumps fitted with an expeller gland seal, which operates without the use of gland sealing water. This pump is also fitted with high chrome wet-end components, which are highly recommended when pumping very abrasive slurry material.

"Maintenance is much simpler and less frequent now," says Esley Cardoso, Itaminas' operations supervisor. "The tailings pumping system has been working for more than two years now without any failures."

After the installation of Metso's Orion HM series pumps, Itaminas has been able to reduce maintenance by 75%. In addition, because of Metso expeller gland sealing technology, the mine is saving over 6.0-billion litres of water. "As water availability is extremely scarce at the mine, by being able to eliminate the use of gland sealing water, the mine has greatly reduced its costs thanks to the new technology," explains Guilherme Almeida of Metso technical support.

To improve customer service and

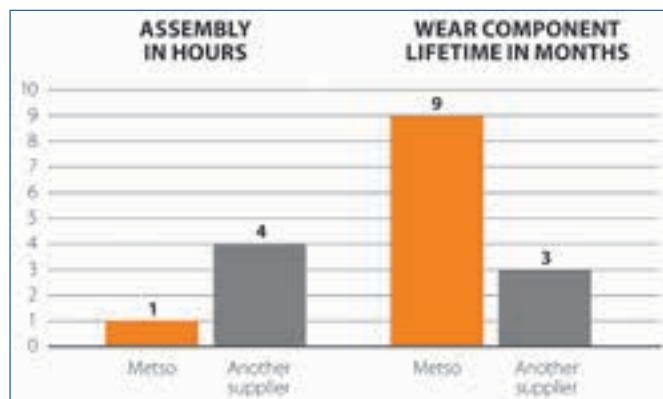


Esley Cardoso, Itaminas' operations supervisor with Audrei Moron, Metso's market development coordinator for the Sorocaba area of Brazil.

guarantee the shortest possible shutdown times, Metso also provided a consignment of stock parts and components to Itaminas. "They only pay for the parts they use. With the maintenance workload reduced, Itaminas can direct the team members to other tasks," notes Metso sales engineer, André Rizzotti. The stock programme involves monthly stock evaluation with monitoring and suggestions for improvements being made by Metso experts.

Not only has this arrangement reduced costs for the mine, it has provided the company with immediate access to parts whenever needed. This reduces unplanned downtime and ultimately maximises production levels.

In total, Itaminas has installed over 70 Metso pumps at its mine, making it one of Metso's largest installed bases in Brazil. □



After the installation of Metso's Orion HM series pumps, Itaminas has been able to reduce maintenance by 75% and extend the life of the wear components threefold, from three to nine months.



The Itaminas mine in Sarzedo in the state of Minas Gerais in Brazil produced 7.5-million tons of iron ore in 2014, making it the second largest supplier of pig iron in the country.

Brubin pump innovations on show

With substantial developments underway, Brubin pumps, which forms part of Letaba pumps, showcased a number of innovative products at Electra Mining 2016.

A Brubin BA CIP (Cleaning in Process) hose pump was displayed at the company's stand in Hall 6, making it a first for South African audiences.

"So far, the international success of this pump design has seen over €1-million being secured in investment," says Brubin general manager, Hannes Liebenberg, who highlights that these pumps use collapsible shoe technology, which allows the hose to be opened for in process cleaning.



The Brubin BA CIP (Cleaning in Process) hose pump features collapsible shoes, which open the hose completely to allow air or water to be passed through for easy cleaning.

Pumping action is achieved by compression of a circular loop of elastomeric hose with two opposed rotating shoes. The rotational motion forces fluid in the hose to move ahead of each shoe.

The pump housing is partially filled with lubricant, aiding smooth running of the shoes on the hose. Because the inside of the hose and inserts are the only parts in contact with fluid, aggressive and contaminated fluids can be pumped – and due to the incorporation of CIP Technology, these fluids can be successfully flushed.

The moment the shoes are reversed, they collapse, which unblocks the entire hose. "By opening the hose completely, air or water can pass through freely, making the hose easy to clean," says Liebenberg.

On a standard pump, users would have to open the unit and remove the shoes for cleaning, which takes about

eight hours on a large pump. "This new design saves time, since users do not need to open up, pull apart, or drain the pump as with the standard hose pump design," he points out.

Another innovation from Brubin showcased at Electra Mining was the Brubin Magnetic Drive Pumps (Mag Drive). "These are the future of chemical pumping," says Letaba Pumps MD, John Vass. "Our Brubin Mag Drives are being supplied to the likes of Denel and Sasol because of their reliability and international support," he adds.

The Brubin range of Mag Drives is built in South Africa and has an already impressive footprint in the industry. "I believe these represent the future of pumping when it comes to clear acids. In the USA, over 50% of clear acid applications use Mag Drives," adds the Letaba Pumps' MD.

Vass highlights that Mag Drive pumps don't require mechanical seals or gland packing "because there is no risk of leaks". The fluid in the pump is hermetically contained, with transmission being accomplished via coupled internal and external magnets. □

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Portable dewatering pumps added to energy range

Following its acquisition of Varisco in January 2016, Atlas Copco has added dewatering pumps to its portable energy range. Varisco in Padua, Italy, has now become the dedicated global competence centre for pump development within Atlas Copco Portable Energy.

Atlas Copco Portable Energy is committed to creating customer value through anticipating and exceeding future needs while never compromising on environmental principles. In order to produce products that are fit for customer purpose, all Atlas Copco products are engineered and not assembled. "We take cognisance not only of our own manufacturing processes but also of the customer's working environment through the provision of energy efficient products," says Portable Energy business line manager, David Stanford.

He explains: "Atlas Copco Portable Energy customers invest in so much more than just a product, they invest in a massive support network that includes factory trained technicians that deliver fast, reliable, expert service to help maintain uptime and production levels.

"As their long-term portable energy partner, our customers are ultimately the winners as they are now able to choose their all-inclusive on-site mobile compressor, generator, light tower and pump solutions from a single source."

The comprehensive range of electrical submersible and self-priming diesel pumps available from Atlas Copco Portable Energy provide solutions for virtually any mobile dewatering application within the flow range of 210 to 16 500 l/min.

The portable dewatering pump range saw further extension in January 2016 with Atlas Copco's acquisition of Varisco. "Varisco's Padua location has become the dedicated global competence centre for pump development within Atlas Copco Portable Energy, complementing our other two global competency centres in Antwerp (air) and Zaragoza (power and light)," adds Stanford.

The new motor design of the Weda 50 and 60 electrical submersible pumps has resulted in improved power to weight ratios. The Weda hydraulic parts de-

liver enhanced performance with flow management from 225 to 16 500 l/min with a maximum head of 85 m. Stanford also reveals that, as a result of customer demand, a diesel driven open canopy range will also be introduced in the last quarter of 2016.

"The same unique value proposition and forward-thinking approach that underpin our compressor, generator and light tower ranges are assigned to our pumps," notes Stanford. "It is about continuously improving product performance, reliability and efficiency to take on even the most stringent conditions – and here engineering and manufacturing excellence, environmental consciousness and expert service all come into play.

"Portable Energy's value proposition differentiates us as a preferred supplier of portable energy products that are inherently energy efficient, light-weight, compact, easy to move and transport, meeting customers' exact needs and contributing to enhanced customer productivity at the lowest cost of ownership over the products' lifetime."

Atlas Copco Portable Energy is a leader in the market as a single source supplier of turnkey on-site mobile solutions with the development and extension of its pump portfolio to complement the division's already well-established range of compressors, generators and light towers.

"The shared synergies between Portable Energy's three pillars - compressors, generators and light towers – made the development of our dewatering pump ranges to form a fourth pillar within the division a natural progression," explains Stanford. He notes that pumps "are not newcomers to the Atlas Copco portfolio, with small hydraulic as well as pneumatic and electrical submersible pumps



For the construction and mining industry, Atlas Copco Portable Energy can now provide solutions for virtually any mobile dewatering application within the flow range of 210 to 16 500 l/min and heads of up to 85 m.



The light range of submersible pumps from Atlas Copco for the construction sector.

having been part of the offering for quite a few years".

"We have now made a solid strategic commitment, which will ensure that our pumps enjoy the same focus and investment as our compressors, generators and light towers and I am most pleased that our hard work is finally coming to fruition."

Roll out of the expanded pump portfolio, in terms of both pressure and flow-rate capacities, will take place over the coming months.

The efficient and safe removal and disposal of water from a job site is fundamental to maintaining safety and productivity. "Performance under pressure within the most challenging environments is where our pump ranges perform to their maximum," says Stanford.

Suitable for transporting or lifting water with abrasive solids in suspension, the pumps are ideal for applications such as construction and mine-site dewatering and diversion of floodwater or streams. □

Backup and prime power generation: The case for diesel and gas engines

MechTech talks to Cummins' Kenny Gaynor (right), director of power generation for Southern Africa, about the role of diesel, gas and biogas engine-generator sets and some of the hybrid options that are fast becoming viable as grid replacement options.



According to Gaynor, generators have two key uses: for standby power to mitigate against the risks of power outages from a connected supply; and for prime power with an unlimited run time for use in industrial applications where the grid is not readily accessible.

As well as during load shedding, standby power generators are often used in emergency or safety critical situations. "Power is critical for safety in underground mines, for example, where lives depend on electrical power, from the basic siren/alarm system all the way to the ventilation, cooling plants and evacuation hoists," he tells *MechTech*.

"In hospitals, surgeons cannot continue to operate on a patient if there is no power and patients on life support systems such as dialysis machines won't survive long if these machines are left without power for any length of time," he argues.

Cummins offers a range of backup power options, from 8.0 kVA to 3 750 kVA. "We offer open sets for installation in plant rooms or containerised units that can be placed outside shopping

malls. For applications along the coast, we can use stainless steel enclosures and, generally, we can engineer a standby power system and its enclosure to best suit the application, the environment and the operating conditions.

"Engine-driven generators for standby and prime use are different, though. A unit used for 600 continuous hours a month has a very different duty cycle than a backup generator that is started several times a month for 200 hours or less of total generation. The specification of the engine and the generator, as well as the power management solution and the cost equations are all very different," Gaynor points out.

For prime use, Cummins Power Generation offers solutions for people needing a 24/7 supply, typically a remote off-grid mine or a mine under development, for example, "and while diesel power generation is always going to be more expensive than utility power, if access to the grid is unavailable, then there are fewer options other than prime units".

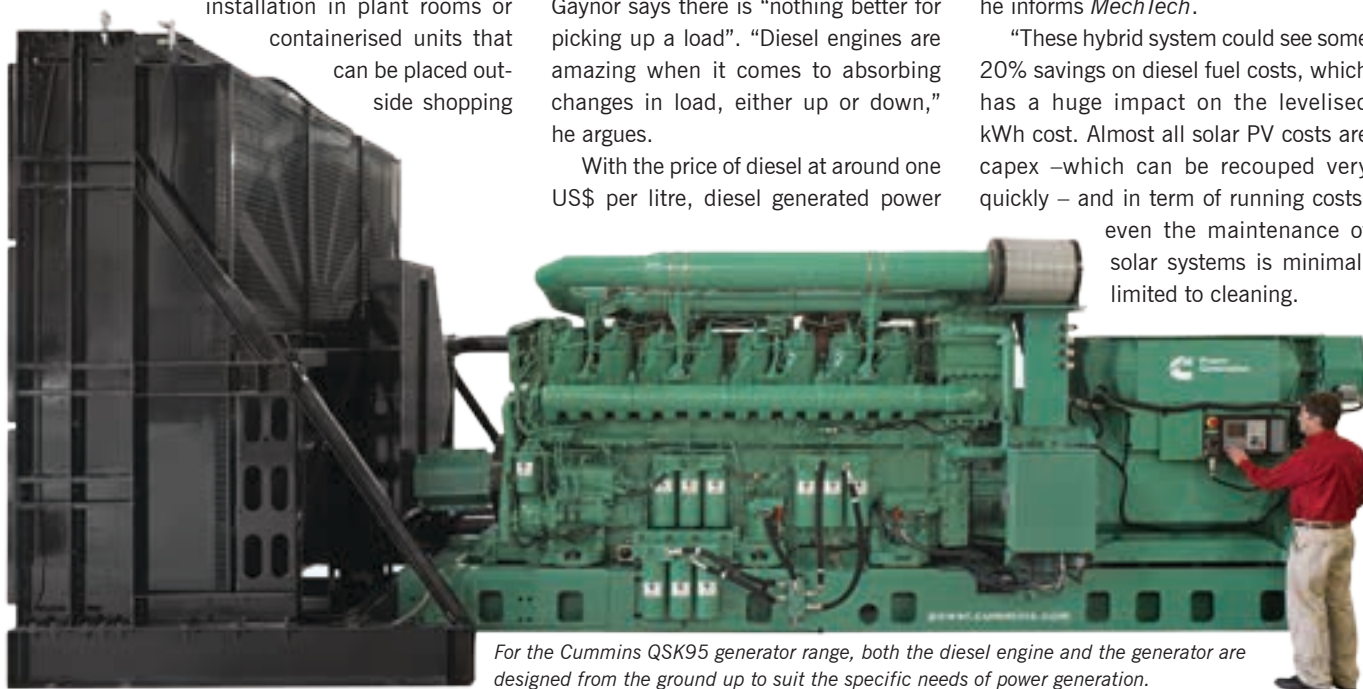
On the advantages of diesel engines, Gaynor says there is "nothing better for picking up a load". "Diesel engines are amazing when it comes to absorbing changes in load, either up or down," he argues.

With the price of diesel at around one US\$ per litre, diesel generated power

costs somewhere upwards of \$0.30 per kWh "And about 73% of this cost can be attributed to the diesel fuel costs, with capex and maintenance accounting for the remaining 27% of the levelised cost of electricity (LCOE).

"The capex and maintenance costs are low but the big issue is running costs due to fuel. This makes prime diesel generators ideal for use in hybrid solutions. We see companies using solar during the day to reduce the fuel costs, with the diesel being used overnight. Solar technology is now quite sophisticated. Management systems can predict when the solar output is about to drop due to cloud cover, for example, and the diesels can be started in time to prevent power dipping. The diesels ramp up in sync with the solar coming off and the load doesn't see any change in the supply," he informs *MechTech*.

"These hybrid system could see some 20% savings on diesel fuel costs, which has a huge impact on the levelised kWh cost. Almost all solar PV costs are capex –which can be recouped very quickly – and in term of running costs, even the maintenance of solar systems is minimal, limited to cleaning.



For the Cummins QSK95 generator range, both the diesel engine and the generator are designed from the ground up to suit the specific needs of power generation.

In Africa, however, particularly in North and West Africa, cloud cover can be a big problem, causing the diesels to come in more often than they would in sunnier places,” Gaynor says, adding, “the cost of solar has decreased significantly in recent times, though, making hybrid diesel-solar solutions very attractive for mining operations that are off-grid”.

This also applies to cell phone towers in rural Africa, which use generators, battery storage and PV panels in similarly managed hybrid combinations. “The generator charges the batteries at night while the solar PV charges them when the sun is shining, with the batteries supplying the direct load,” he explains.

As is now common with modern control and power management technology, remote monitoring capabilities are readily available and built into Cummins power solutions. “When called to look at generators that aren’t working, we often find that a security guard has borrowed the battery to start his car or the fuel tank has run empty. These trivial issues are common and remote monitoring can easily be used to overcome them.

“On a level above this is engine diagnostics. Sensors are installed in all modern engines and this information is ideal for preventative maintenance, to alert plant managers to engine problems before they cause serious damage,” he tells *MechTech*.

On the emissions side, Gaynor says



Cummins’ natural gas-fuelled QSV 91 generator sets are ideal for CHP (combined heat and power) applications such as data centres, where cooling dominates the load profile: this because the exhaust gas stream runs significantly hotter – by about 200 °C – than diesel-engine equivalents.

that Cummins is ahead of the curve. “Internationally, we supply Tier IV diesel engines, but the issue in Africa is fuel quality, so we are still supplying Tier III systems. We design and manufacture our own emissions and filtration systems, which can easily be incorporate into static backup or prime generation plants. These do require some routine maintenance, though, and in very remote areas, even changing a filter can be difficult,” he suggests.

In the past, a diesel engine designed for other applications would be used for a generator. But nowadays, with our QSK95: 3750, for example, both the

engine and the generator are designed from the ground up to suit the specific needs of power generation.

“The loads and acceleration ranges required for generation are very different to transport needs. A mine truck might go from being empty to carrying 200 t when loaded and the speed, rpm and torque ranges are wide. For generation applications, the operating rpm range can be narrowed and held relatively constant for better optimisation of fuel efficiency, reliability and longer maintenance intervals,” he explains. “The power density of generators is also high and they need to be able to ramp electricity generation



Cummins supplied SABMiller Alrode Brewery with four C2500 D5A diesel generator sets for emergency standby power. The 6.6 kV generators boast a prime rating of 1 800 kVA, and are powered by a Cummins QSK60G8 engines.



Hydra Arc's bulk water storage solution has changed the lives of communities and serves as a beacon of hope for so many people. The project entailed design, fabrication, transport and installation of a number of water tanks in densely populated 'water scarce' rural areas.

The water tanks were manufactured at its Sky Hill Heavy Engineering facility in Secunda. The state-of-the art facility has 75,000m² workshops under roof consisting of machinery and equipment unique to Africa. Learners and qualified artisans from its adjacent Mshiniwami Artisan Academy manned the project. Hydra Arc is rooted in Mpumalanga and is a proudly South African company.

Hydra Arc remains committed to Public-Private Partnerships to uplift the lives of underprivileged communities.



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Hydra Arc's Quality Management System is also fully certified in terms of ISO 9001 and ISO 3834-2.

The ASME accreditation is internationally recognised. This opens the door for Hydra Arc to serve the broader market outside South Africa. Hydra Arc is one of only six companies in South Africa that has the 'U' stamp accreditation and one of only two companies in South Africa that has the 'U2' stamp accreditation.



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up or down from full load to zero in less than 10 seconds.

“Footprint is also important, as are sound levels. Our units produce 75 dB at 1.0 m and down to 62 to 65 dB at 7.0 m, but enclosures can be used to dampen this right down to below 55 dB, which is the standard specification for hospitals,” he adds.

Gas power generation

Natural gas and biogas engines are an increasingly viable alternative to diesel gensets, particularly for combined heat and power applications. “Gas engine exhausts run hotter than diesel equivalents, by about 200 °C. So by passing the exhaust gas through a heat exchanger, a second and free source of energy in the form of heat becomes available. There is an ideal application in hospitals, for example, where substantial amounts of hot water are needed, as well as prime and uninterrupted electrical power.

“Most hospitals are already using gas for their boilers. We like to redirect that gas into an engine to produce both heat and power. In so doing, we can often take the hospital off-grid without having to use substantially more fuel,” Gaynor explains, adding: “We have done numerous studies and the cost balance is there. It is a little marginal at the moment but with rising grid-based tariffs, this solution is becoming increasingly attractive.”

Piped gas is ideal as it overcomes the need for onsite diesel tanks or regular deliveries but, where a gas infrastructure is not available, compressed natural gas from tanks can also be used, with the trucking cost being similar to diesel. “From a fuel cost perspective, the \$0.30 per kWh LCOE for diesel can be brought down close to the \$0.20 mark, obviously driven by local gas costs. In Nigeria, where engine generators are routinely used for prime generation, we are seeing price reductions from 30 cents (US) to perhaps 18 cents, when switching from diesel to gas. In addition, the high quality CO₂ in the exhaust stream can offer a third bite of the cherry for bottling, food and beverage companies,” Gaynor points out.

The direct efficiency of a gas engine-driven generator is around 40 to 42% “but a further 45% can be added to that by beneficiating the heat. That allows these systems to achieve overall efficiencies of more than 80%, which is remarkable for an energy generation



The SABMiller Polokwane Brewery in Limpopo was supplied with two fully containerised C1675 D5 gensets with a prime rating of 1 400 kVA each.

system driven by an internal combustion engine,” he tells *MechTech*.

Another opportunity for CHP systems is for data centres, where cooling dominates the load profile. “Using absorption chillers for the HVAC systems of data centres, the exhaust heat from the gas engines can be used instead of electricity to meet the cooling demand. The data centre can then be taken off-grid in a very cost effective and convenient way – and we are sure to see more and more data centres using this technology,” Gaynor says.

Cummins offers gas-based generation solutions from 25 kVA to 2 000 kVA, with the 16 cylinder, 91 litre QSV91 system being the upper-end flagship. “We have the smaller solutions too, though, for offices or remote clinics, which often only need 25 kW,” he adds.

Moving away from natural gas, Gaynor sites the use of gas engine systems fuelled by biogas generated from municipal waste: from landfill sites or sewage works. “Designed in 1970s and 80s, increasing urbanisation has created management problems for sewage plants. Biogas-fuelled CHP systems offer an excellent opportunity to exploit the waste creating the problem,” believes Gaynor.

For sewage, there are two opportunities to extract biogas (methane) for a generator, first directly off the liquid and, second, by gasifying the solid sludge – the exhaust heat from the gas engine being an ideal heat source for drying the sludge.

Not only does this enable a sewage works to be taken off grid, making the plant self-sufficient, it can offer opportunities to sell power to nearby housing or industrial estates. “On urban landfill sites where space is constrained, a methane

plant can be installed to extract the methane from buried organic waste. This can be used by a gas engine to produce heat and power for sale into businesses and communities.

“This is a perfect example of how thinking a little further about our problems can create new opportunities to beneficiate our resources,” Gaynor argues. “These need not be mega plants. Plants of 20 to 100 kW can be cost effective and the technology is available and relatively simple,” he adds.

Long term, power generation from biogas also offers renewable energy opportunities: “Cactus is an excellent feedstock for biofuel production, offering opportunities for mines to better engage with and support surrounding rural communities. By planting and harvesting cactus, agricultural jobs are secured with the harvest being sold to a biofuel producer. The fuel is then sold to a power plant, for credits or kWh, and the power used to create growth opportunities in the community: bakeries, Internet cafés, shops or small industries,” Gaynor suggests.

Concluding, he says that generators are currently often seen as a necessary ‘grudge purchase’. “Companies know that they need them but often make the mistake of seeing them as a once-off purchase at the minimum cost possible. Backup service and maintenance is very important, though. Are parts available, are the products being properly supported and serviced and is anyone available for callout should problems be experienced?

“If the power goes off, can you rely on the purchased generator to supply the backup power? The lowest cost options is seldom going to be the safest one,” he warns. □

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Powering up to meet South Africa's energy challenges



Nico Kruger (right), energy business line leader for Africa for AECOM Resources and Industry, talks about South Africa's energy challenges and shares the company's vision for rapidly increasing access to electricity and improving the energy availability factor.

Effective and reliable electrical energy delivery faces a number of significant challenges in South Africa. A latest trend is a shift away from the established one-utility provider to a mixed generation populated by utilities, IPPs and PPP service providers.

"We share the vision and passion of rapidly increasing the access to electricity for all the citizens of Africa. We are convinced that the new dawn for Africa has arrived, and we intend deploying our considerable talent to support the growth in the utility sector in Africa to the benefit of all African peoples," says Nico Kruger, energy business line leader for Africa for AECOM Resources and Industry.

The bulk of South Africa's power is produced by Eskom. With an installed capacity of some 42 000 MW and a peak demand that at times threatened to exceed 33 000 MW, the power utility was left with a theoretical reserve margin of 9 000 MW.

It is commonly accepted practice to have at least 15% spinning reserve available, hence applying 15% to 33 000 MW translates to ~38 000 MW. "On the face of it, that seems adequate. However, the reality is that the actual energy availability factor (EAF) was trending below 74%, meaning that only 31 000 MW was available on average. That places South Africa in a very precarious situation," Kruger cautions.

He adds that the challenges facing Eskom are diverse, ranging from poor-quality coal to inadequate and irregular coal supplies, maintenance in arrears, constraints on capital expenditure, and the loss of skills in all the key disciplines of engineering, maintenance and operations.

"The addition of Medupi and Kusile's combined 9 000 MW will not happen at once, and can at best be phased to add between 800 MW and 1 600 MW a year. The addition of this load will be welcome, but if demand in growth is factored in, and the EAF does not improve

substantially, the addition of these two large power plants will not significantly take us from the ever-present edge of load-shedding," Kruger stresses.

Further, if one considers the emissions emitted by the Eskom fleet versus World Bank requirements, then significant capital investment is required to ensure compliance. "Given the present economic circumstances and debt downgrades, raising this capital will be challenging," Kruger points out.

South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has been hugely successful, and has achieved much international acclaim. However, the utilisation factor on renewable energy is low due to the inherent problem of sunshine and strong wind not being available 24/7.

"South Africa needs additional sources of power generation," Kruger argues. Hence the major focus at present on the Department of Energy's Independent Power Producer (IPP) programme for coal and gas.

"Some 2 500 MW of coal and 3 500 MW of gas generated power is envisaged, and due to the nature and size of the plants, a distributed base is likely to ensure greater continuity of supply. It is of vital importance that these two programmes are launched successfully and grow from the present target to support Eskom to meet the power requirements of the future," Kruger points out.

"AECOM has a unique offering to provide. We address complex challenges. Governments and organisations rely on us to help them solve the complex challenges critical to their missions and mandates."

"We use our connected expertise – clients face tough challenges, and we work to understand and solve them better than anyone else. We match the complexity of these challenges with the diversity of our expertise spanning all phases of the development life cycle. This experience delivers innovative solutions that transform communities and improve lives," Kruger concludes. □



AECOM sees a shift away from the one-utility model to a mix of utilities, IPPs and PPP providers. The company offers total power solutions from generation to transmission and distribution.

Commercial operation for Eastern Cape

Cennergi, a 50:50 joint venture between mining conglomerate Exxaro Resources and India's Tata Power, recently achieved commercial operations for two wind farm projects: the 134 MW Amakhala Emoyeni Wind Farm Project was handed over in late July, followed by the 95 MW Tsitsikamma Community Wind Farm (TCWF) on 18 August, 2016.

Cennergi was selected as the preferred bidder for two wind projects under the second window of the South African government's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

"The commissioning of the Tsitsikamma wind farm fulfils Exxaro's vision of extending its position in the energy value chain beyond coal. In addition, it is a tangible commitment to our environmental stewardship to reduce the impacts of carbon emissions in the medium-to-long term, while addressing the country's short-term electricity needs," said Exxaro CEO Mxolisi Mgojo on commercialisation of the TCWF.



Above: The Amakhala Emoyeni project involved the installation of 56 Nordex 2.4 MW N117 wind turbines specially developed for low-wind sites.

Left: Cennergi's Amakhala Emoyeni Wind Farm near Bedford in the Eastern Cape has 134 MW of installed capacity.

New Series 10 2-inch tank-blanketing safety valve

A leading supplier of high-end and specialised equipment to the oil and gas industries in southern Africa – Energas Technologies – has introduced Protectoseal's new Series 10 2-inch tank blanketing valve to the South African market.

Tank blanketing is an important and effective way to prevent fires in flammable liquid storage tanks by controlling the formation of explosive vapours or air mixtures. Blanketing minimises evaporation of the stored product, in so doing, reducing emission levels and product loss and protecting the tank's contents from external contamination.

Laetitia Botha, Energas Technologies product engineer, explains: "Tank blanketing has always been a staple in our range of safety products. It works on the basic principal of creating a blanket of inert gas in the tank's vapour space to prevent atmospheric air from entering the tank, and so

maintaining a non-flammable atmosphere." She adds, "We've stocked Protectoseal products for 10 years and bringing in the new Series 10 2-inch tank blanketing valve was a great way for us to offer what the 1-inch valve could not provide for larger flow applications."

A blanketing valve regulates the pressure of the inert gas layer on top of the stored liquid in a tank. The valve senses the pressure of the tank blanket and opens to allow in more inert gas when the pressure drops below the set pressure. In response to the pressure returning to the set pressure, the valve closes and stops the flow.

The Protectoseal Series 10 tank blanket-

ing valve comprises two separate valves working in tandem. "The pilot valve is controlled by the sensed tank pressure, and in turn, controls the opening and closing of the main valve, which provides flow into the tank from the inert gas supply," explains Botha. "The main components of the pilot valve are a pressure sensing chamber and a poppet, which can move up and down. The main valve,

Protectoseal Series 10 2-inch tank blanketing valve creates a blanket of inert gas in a gas tank's vapour space to maintain a non-flammable atmosphere.



wind farm projects

Cennergi CEO, Thomas Garner, added that the commissioning was a culmination of many years of hard work and dedication from the Cennergi team, in partnership with its stakeholders. He also paid tribute to the late Mike Mcebisi Msizi and the Tsitsikamma Mfengu for bringing the opportunity to Exxaro in 2009.

"It is a privilege to have community partners that have joined hands with Cennergi to write a new narrative for development in South Africa. We will assist and support the Tsitsikamma Mfengu community to use this project to further determine their ideal future."

Garner continues: "TCWF is Cennergi's second wind farm that has reached its operational phase in the last 30 days and marks the company's start in growing its vision to be a leader in cleaner energy in Africa, thereby creating value for its stakeholders."

Located approximately 120 km north-east of Port Elizabeth on the Wittekleibosch Farm, the 95 MW TCWF is equipped with 31 Vestas V 112 turbines, each with a capacity of 3.075 MW. Construction started during Quarter 1 of 2013 with the EPC and O&M being conducted by Vestas Southern Africa.

75% owned by Cennergi and 16% by Watt Energy, a key component of the wind farm is to support the Amamfengu community within a 50 km radius of the project site. This is being achieved via 9.0% ownership by the Tsitsikamma Development Trust (TDT), which has set up the Bewind Trust as its legal and commercial trading agent. The TDT will receive income through dividend payouts and revenue generated, which will be used to fund initiatives that positively impact the socio-economic status of the Amamfengu community.

The Amakhala Emoyeni Wind Farm project with a 134 MW installed capacity is located near the town of Bedford in the Eastern Cape. It has an excellent wind resource and close proximity to infrastructure, most importantly the national grid. The project was developed by Windlab in 2010 and Cennergi bought the rights to the project and submitted it into the DoE's REIPPPP Window 2 in March 2012. The project received preferred bidder status in Round 2 and achieved financial close in May 2013.

Construction only started in June 2014, though, due to extensive upgrades required to the Eskom Poseidon substa-

tion and associated infrastructure to enable the project to deliver its generated electricity to the grid.

Nordex was awarded the EPC as well as the O&M contracts. The project involved the installation of 56 Nordex 2.4 MW N117 Wind Turbines. It is the first South African project to use these Nordex turbines, which have been specially developed for low-wind sites. Thanks to a rotor diameter of 117 meters and a rotor sweep of 10 715 m², in 2011 the N117/2400 was declared is the most efficient IEC 3 turbine in its class.

While Cennergi owns 95% of the project, the Bedford Community Wind Farm Trust and the Cookhouse Community Wind Farm Trust equally share the remaining 5.0%.

Cennergi envisions becoming the leading independent power producer in southern Africa. In powering progress in the region, the company has set an aspirational grid emissions factor (kg of CO₂ per kWh) of between 0.3 and 0.5 – lower than the carbon footprint of the region and significantly lower than emissions factors from typical coal-fired power stations (0.91 to 0.95 kg/kWh for CO₂).

The company is committed to generating cleaner energy through a mixed portfolio of generation assets including wind, solar, hydro, coal and co-generation. □



on the other hand, has a piston which can move to control flow into the tank," she adds.

When the flow of gas into the tank increases the tank pressure above the set pressure, the sense diaphragm is pushed up, allowing both the stop and the poppet to rise (made possible by the spring force under the poppet) until the poppet reseals. Once this has happened, the dome pressure is then allowed to build back up to the inlet pressure, pushing the piston closed once more, which ultimately shuts off flow to the tank.

The Protoseal Series 10 2-inch tank blanketing valve has a host of features and benefits. The valve is specifically designed for tank blanketing and its pilot-operated

design offers a very tight operating band. It boasts the most compact design and fewest external connections of any other pilot-operated valve on the market. It is also field serviceable.

"The valve is available in a range of materials," says Botha, adding, "The metal parts are available in 316 stainless steel and the seals and gaskets are available in Buna-N, Neo prene, Viton, EPDM, Chemraz or Kalrez. The inlet and outlet connections of the Protoseal Series 10 are available in many threaded (FNPT, DN PN16, DN PN10), and flanged (ANSI, DN, FF, RF) combinations. The Series 10 conforms to the latest European ATEX directive. In the case of applications involving high purity products, Protoseal Pure-tech high purity blanket valves are available."

The Series 10 offers two special options, namely status port and single port sensing options. The status port option is primarily use in remote areas and gives an indication of the open vs. closed status of the valve.

It offers remote monitoring via the pressure transmitter, sounds an alarm when blanketing gas flow is excessive and reduces operating costs by allowing monitoring of blanketing gas usage.

The single port sensing option boasts single connection mounting, eliminates the need for a separate sense-like connection to the tank and efficiently controls tank pressure.

"Protoseal is the industry leading manufacturer of environmentally sensitive safety products and an important supplier to Energas Technologies' range of products," Botha remarks. "By offering its latest in tank blanketing valve technology, we are able to offer our customers not only a safety-enhancing product, but one that facilitates operational efficiency and minimises waste. We're delighted to bring Protoseal's 'big brother' in tank blanketing to South Africa and look forward to facilitating and supporting its successful uptake in this market," she concludes. □

Automation, equipment efficiency and the Connected Enterprise

MechTech talks to Barry Elliott (right) of Rockwell Automation about the advantages of modern connectivity and its role in fostering leaner and more sustainable process plants and enterprises.



“The ‘Connected Enterprise’ is the phrase we at Rockwell Automation use to embrace the Industrial Internet of Things, the Fourth Industrial Revolution or Industry 4.0,” Elliott begins. “It captures our interpretation of the tangible outputs we can deliver by leveraging modern networking and connectivity technologies,” he tells *MechTech*.

“Connectivity, through Wi-Fi and cellphone networks, for example, has already led to an explosion of social media platforms, which have fundamentally changed the way people stay connected and communicate with each other. In the automation industry, through the Industrial Internet of Things, a similar ‘revolution’ is taking place, where most devices now have an IP address and some level of intelligence, enabling their status and condition to be interrogated and made visible to anything, anyone and anywhere,” Elliott says.

He points out, though, that connectivity in itself is not new. “In the mining industry, from the surface to the very ends of horizontal shafts and to the bottom of vertical shafts, mines are connected. But this is traditionally achieved via a multitude of network topologies and gateways, which create complexities and inherent limitations.

“More importantly, while it has long been possible to collect information,

the question is what to do with it. Aggregating and gathering data is easy, but transforming it into useful information that can trigger a response or a management decision is the real goal. Typically less than 1% of the data collected from all of the currently connected ‘things’ is actually used – and here lies an enormous opportunity,” Elliott believes.

As a concept, The Connected Enterprise involves connecting plant, process or manufacturing equipment at the production level of an enterprise to all of a company’s other production sites; to its entire supply chain, including raw materials and component suppliers, logistics, energy resources and utilities; and directly through sales to its customers.

“At plant level, if the condition of all production equipment is made visible through a networked system, then historical data collected can be used to establish trends, while real time data can highlight the current status and condition of every machine. Together, if the data is analysed effectively, good predictability and reliability is assured.

“But the same data used by the operator and the maintenance manager might also be processed differently and displayed on different dashboards: to track production for the COO; predict operating costs for the CFO; or to compare investment options for the CEO,” he explains.

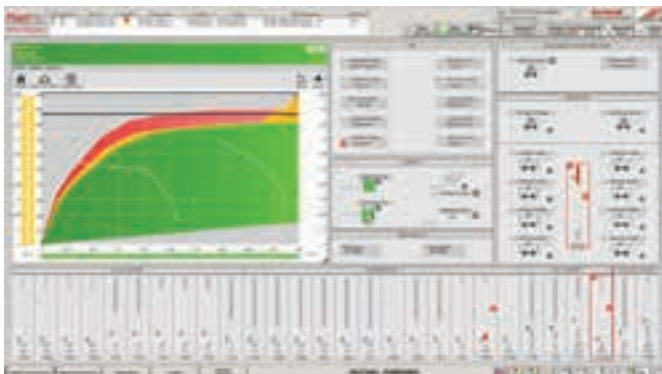
Elliott says that it is even possible to identify value drivers that enable live

profits to be calculated. “In the event of a breakdown or a power outage, for example, the effect on profit can immediately be calculated and displayed, highlighting the urgency of the reparation action required. Competitive advantage, waste reduction, time to market, research and development needs and a host of other performance indicators can be targeted and improved through the process.

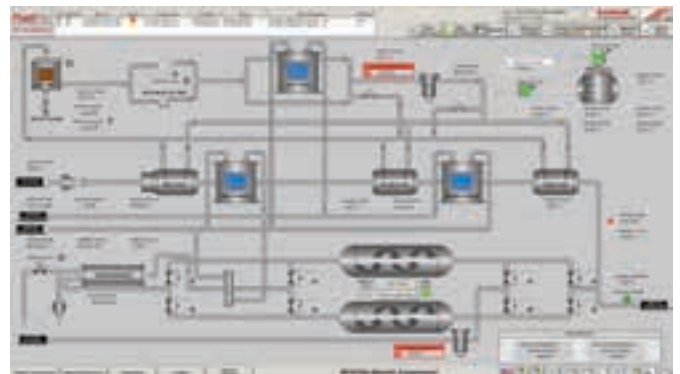
“In the current market, few have the luxury of replacing their plant with a newer and better-connected one, so we are mostly involved with analysing what we can do now to better sweat existing assets for clients. The current focus is all about improving overall equipment efficiency (OEE) and The Connected Enterprise is an obvious way of doing this,” Elliott informs *MechTech*.

“One of the most fundamental misunderstandings about this ‘revolution’ relates to costs. These systems are not big cost adders compared to total project values,” emphasises Elliott. “Sensors are integral to the equipment, anyway, and the cost of aggregation and analytics software to process the data is often insignificant compared to total project costs,” he points out.

“A process control system for a refinery or mineral processing plant, for



Rockwell Automation has developed some clever management techniques for surge control of compressed air, along with sophisticated algorithms to measure performance and determine predictive maintenance needs.



Simple dashboards give system wide visibility, which underpins all production and energy efficiency management drives, “even though the compressors are spread over a 30 km radius,” says Elliott.

example, is typically in the region of 1.0 to 1.5% of the total cost of a project. On a US\$1.0-billion project, the entire control system is likely to cost in the order of \$10-million to \$15-million. If connectivity and a little smart analytics pushes that cost up by even 25%, say, the overall cost increment will still be below 0.4% – and on a Greenfield project, the savings that will accrue through implementing such a system can be huge compared to the investment,” Elliott asserts.

Citing a relatively simple local example on the mechanical side, he says that Rockwell Automation Sub-Saharan Africa has successfully connected an entire compressed air fleet in the mining sector. “Around the platinum belt of South Africa, we have connected our customers’ entire fleet of nearly 30 compressors in sizes ranging from 2-8 MW. While we don’t supply the compressors, we provide the control systems and all components are fully networked.

“Over time, we have developed some pretty clever management techniques – for surge control of compressed air, for example – along with sophisticated algorithms to measure performance and determine predictive maintenance needs,” he relates.

“By aggregating the data from all of these compressors, we compare the performance of each unit and each shaft. This allows live changes to be made to the ventilation system in response to breakdowns, to reduce energy use, or to increase or decrease the amount of compressed air needed in a particular area,” he explains.

“Simple dashboards give visibility, which underpins all efficiency management drives. And even though the compressors are spread over a 30 km radius, managers can quickly react to maintenance issues and target poorest performing units for replacement.

“Simply put, the dashboard view enables management to take control of the compressed air fleet and to optimise performance and energy use, all of which minimise operating costs,” he says.

While this example is tangible, “a Connected Enterprise is not really something ‘you can have’. It needs to be customised and broken down, and specific analytics, algorithms and metrics need to be developed and translated into software to enable valuable information to be effectively used,” Elliott suggests.

As well as mine compressors, mine



The Connected Enterprise makes possible the identification of value drivers that enable live profits to be calculated. Accessible by managers via computers, tablets or cell phones, information can be displayed to highlight a host of indicators for targeted performance improvements.

winders, mills, pumps and conveyors, a host of other energy, safety and production critical equipment can be connected for optimisation purposes. This makes it possible to systematically optimise each unit or plant area, simply by adapting the poorest performers to match the strongest possible operational level.

In addition, according to Elliott, by bringing in other information, such as the 20-year life-of-mine plan, enterprise-wide progress can be tracked and adapted to best suit emerging realities. Through transparency, mining operations can be redirected or new investments made to improve yields.

Once the connectivity infrastructure is in place, the software-based analytical possibilities are almost infinitely scalable. “Once people see the potential, they invariably want more,” Elliott says, adding, “this is the gist of what one should seek to achieve by adopting a Connected Enterprise approach – and it’s all underpinned by OEE.”

While Rockwell Automation can offer all the control system and connectivity technology required, “establishing a Connected Enterprise does not depend on the sole use of our products. Although the integration and data gathering capabilities, and therefore the potential benefits, are significantly enhanced if a complete solution is implemented using our technology platforms. The single biggest thing that we hang our technology on is our use of standard Ethernet IP for connectivity across all our networks. Ethernet IP is open, unmodified and standard, so anyone can access it. The Connected Equipment does not require bespoke

devices, nor is it limited to a particular vendor’s set of compatible components,” Elliott says.

“But while open is good, it has industrial security consequences. This is the biggest risk area associated with connectivity,” he warns, citing an example of a steel mill in Russia that was “hacked for fun” and put out of action for several months.

“But most of the damage caused to systems happens as a result of people with legitimate access making mistakes,” he continues. “The real difficulty is striking a balance between enabling people to do their jobs and preventing them from making critical changes.

“Security for a Connected Enterprise cannot rely in bolt-on, antivirus-type solutions, though,” Elliott advises. “Security has to be built in. Increasingly, system designers are using the term ‘defence in depth’, which we all know in South Africa from the multi-layered approach to home security. The idea is that if a user gets through one layer, there are several more to go through before any ‘dangerous’ access is granted,” he explains.

“For the next five years, I do not foresee any surge in the price or demand for commodities. OEE is, therefore, likely to remain the priority as producers are forced towards becoming leaner in order to survive,” Elliott says.

“Rockwell Automation has the ability and the scale to deliver Connected Enterprise solutions of any size; solutions that have short payback periods and, once installed, have the same low-cost potential for growth as social media platforms,” he concludes. □

A new synchronous motor generation: intelligent, powerful and flexible

Bosch Rexroth is meeting market requirements in the Industry 4.0 environment for intelligent solutions combined with short cycle times and flexibility with its newly designed IndraDyn S MS2N synchronous servo motor product line. Jaco de Beer (right), project engineer for mechatronics at Tectra Automation explains.



The new MS2N servo motor product line from Bosch Rexroth, available throughout sub-Saharan Africa exclusively through Tectra Automation, covers the torque range between 4.0 to 350 Nm with significantly increased power density and greater energy efficiency. In association with IndraDrive control devices, MS2N motors are becoming the source of data for tasks within the networked production plant.

With this in mind, Bosch Rexroth has opened up completely new application opportunities and has set new standards in servo drive technology. The MS2N product line is tailored to the demands of the future in both functionality and performance.

Individual readings of every single motor, as well as the saturation and temperature data, are deposited into motor data storage and automatically processed by IndraDrive control devices. This increases torque precision significantly and reduces the tolerance range during operation to a fraction of the values that have been standard up to now. For the first time,

the servo motor can be used as a reliable sensor, as well as a data source. In this way, applications within the Industry 4.0 environment, such as condition monitoring, can be realised cost-effectively and without additional components.

Up to 30% higher torque density

The motors are significantly more compact despite their higher performance. With a new motor construction and optimised electromagnetic design, this new generation of motors achieves up to 30% higher torque density. This has two effects for machinery manufacturers; smaller motors can be employed for current drive tasks while more performance is available within the prescribed motor clearance. The up to five-times overload capacity with persistently low rotor inertia guarantees the greatest possible acceleration and dynamics in all sizes.

Thanks to high-grade materials, this new development also makes it possible to have continuous output within higher rpm ranges and, along with optimised winding technology, it also reduces internal losses. In the process, the new generation of motors achieves significantly improved energy efficiency and provides a sustainable reduction in operating costs.

Up to 75 m with one cable

The highly dynamic MS2N product line comes in six sizes, with up to five

lengths available in each. The product line covers the 4.0 Nm to 350 Nm maximum torque performance range and the 0.8 Nm to 148 Nm permanent torque performance range. Alternate variations, with higher rotor inertia for better mass customisation, compliment this extensive range and allow for precise alignment of task formulation and motor selection.

To supply power and the encoder signal, Bosch Rexroth provides an innovative single-cable connection, as well as conventional two-cable solutions, with highly flexible cable variations and a practical quick lock.

Both options enable a complete cable length in the IndraDrive standard, which means up to 75 m with no additional components is possible. In this way, both types of connections can be combined with one another at minimal cost. The equipment wiring is no longer subject to the limitations of previous single-cable systems.

Tectra Automation, a Hytec Group company, is a leading drive control specialist providing solutions for industrial and factory automation applications. □



Powerful MS2N synchronous servo motors have innovative single-cable connections combined with IndraDrive control device data.

Integrated industrial robots solutions launched in SA

OMRON has launched a new series of industrial robots, including 49 best-in-class robots from three robot families: Delta (Quattro); SCARA (eCobra); and Articulated (Viper).

South Africa is one of 39 countries globally to benefit from Omron's April 2016 worldwide launch of 49 new best-in-class robots. The robots are integrated with Omron's family of sensors, safety components and award-winning NX/NJ-series machine automation controllers to simplify the implementation of robotic automation in production environments.

These flexible and agile new solutions are ideally suited to the local food and beverage, automotive and high technology industries. Evert Janse van Vuuren elaborates: "The programming software used for the Adept Robots – Adept Ace – has an integrated setup wizard, guiding the user through the configuration setup, allowing fast, easy and user-friendly configuration for pick-and-place sequences for many of the application scenarios pertaining to the South African market, including: pick-and-place applications from stationary

platforms; belt camera part picking; fixed camera part picking; and static pick-and-place applications. In many applications relating to pick-and-place, with or without cameras or belt tracking, no complex coding is necessary, due to the setup wizard's automatic code generator."

He adds that a major benefit of this launch is that it provides industrial robot models that achieve high-speed performance and reliability. "The release of the three robot families – SCARA, Delta and Articulated – brings both high-speed performance and reliability to the mechanical side of the Omron solution. All the robots can be controlled by a common integrated development environment, which enables flexible use of robot types in line with the required applications."

Van Vuuren says it also enables comprehensive linkage with control products, such as PLCs, "as Omron industrial robot solutions seamlessly link all robots with



Omron has released 49 new best-in-class robots, including models from three robot families, from left: Delta (Quattro); SCARA (eCobra); and Articulated (Viper).



Omron's automation control environment (ACE Emulator) is an intelligent virtual software program with powerful 3D emulation and validation tools. It contains application-oriented wizards to significantly minimise the amount of programming code required.

the machine control environment managed by the Sysmac automation platform," concludes Van Vuuren. □

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Engine component remanufacture: the

As the weakened Rand continues to place pressure on local companies importing products and components, remanufacturing of components to OEM standards rather than purchasing new engine components is a solid option as it affords less downtime, quicker turnaround times and less capital outlay, argues Andrew Yorke, director at Metric Automotive Engineering.

“**T**here is a misconception that diesel engine component repair or remanufacture can only be done properly in Europe or America. However, Metric Automotive Engineering has proven otherwise with a solid record in southern Africa spanning 40 years. Our facilities and competencies are comparable to anywhere else in the world. In addition, it is far more cost effective to carry out such repairs or remanufacture locally due to the weak exchange rate,” says Andrew Yorke, director at Metric Automotive Engineering.

Not only is Metric Automotive Engineering able to refurbish large diesel engine components and offer services such as cylinder head remanufacture, cylinder block line boring, milling, honing and boring, camshaft grinding, crankshaft grinding, engine assembly and dynamometer testing, the company is also able to salvage major components that would otherwise be rendered unserviceable.

Metric Automotive realises that using the right technology, such as the newly commissioned Rottler F109 extra heavy duty multi-purpose CNC machining centre and Berco RTM 575 crankshaft grinding machine, will give the company the necessary capacity to remanufacture components. Significantly, the CNC

machining centre is the only one of its kind in Africa.

Yorke points out that the case for remanufacturing engine components in South Africa is strengthened by the fact that many replacement parts are no longer available ex-stock in the country. This means that they would need to be shipped into South Africa and in instances where they are needed urgently air freight charges would add extra costs to the overall component price.

Another benefit the company offers is the diagnosis and fault analysis service provided by its sister company Reef Fuel Injection Services. The ability of Reef Fuel Injection Services to remanufacture the latest generation fuel systems means that companies save substantial amounts on components that would otherwise be considered as waste.

“With the capabilities provided by Metric Automotive Engineering and Reef Fuel Injection Services, the local industry has access to an OEM standard component remanufacturing service that can cover both engine and fuel system components. This affords them a faster turnaround time, which will naturally have a positive impact on their business operations, with the added assurance that component specifications and tolerances are strictly adhered to,” Yorke says.

Engine remanufacturing for the shipping industry

Metric Automotive Engineering is known in the arduous mining industry for its ability to repair to exact OEM specifications or even exceed these standards. These diesel engines and components operate in severe environments, ranging from very high altitudes to applications subjected to high dust levels.

Yorke believes the company has the opportunity to introduce the shipping industry to the latest technologies and methods available in the international engine and components remanufacturing sector, while restoring faith in South Africa's own salvaging capabilities.

He says a major differentiator for the company is its ongoing investment in the dedicated equipment that is needed to provide a thorough and quality remanufacturing service. This is complemented by 45 years of refining its remanufacturing services as well as ongoing research and development that has kept its practices in line with the latest developments from OEMs.

“Years of experience in this industry have seen us refine component remanufacture without compromising quality, and we have been able to extend engine



viable option



life at a fraction of the cost of new items,” says Yorke.

A sound example of this is the company’s line bore remanufacturing process that negates the need for any welding on the engine block’s main bearing housings, thereby removing the additional stresses introduced into the block through the conventional welding process. All line bore remanufacturing work is certified with laser alignment certificates.

Metric Automotive Engineering’s facility in Johannesburg, Gauteng, also features a three-axis computer numerical



Above: This unit, one of only 11 operating worldwide, provides consistent accuracy levels and has the capacity to handle 6.5 m blocks. **Left:** Metric Automotive Engineering’s facility in Johannesburg, Gauteng, also features a three-axis computer numerical controlled machining centre.

controlled machining centre. This unit, one of only 11 operating worldwide, provides consistent accuracy levels and has the capacity to handle 6.5 m long blocks with ease.

The company’s facility is also home to several specialised machines that are able to remanufacture surfaces and bores of large blocks; this complements its dedicated comprehensive block remanufacturing operations.

Metric Automotive Engineering also owns several dedicated crankshaft-grinding machines, of which the most recently acquired offers the newest technology to be introduced to the local remanufacturing industry in many years. It is seated on an isolated foundation, eliminating any

exposure to vibrations from inside the factory ensuring a quality remanufactured end product. The machine can handle crankshafts of up to 4.8 m in length and weighing as much as 5.0 t.

Yorke says that it is operated together with process critical compensators. These compensate for the rotational deflection found when grinding large crankshafts, resulting in improved surface finishes and dimensional tolerances.

The South African government has placed increased emphasis on growing South Africa’s oceans economy, and Yorke believes that Metric Automotive Engineering’s local diesel engine and remanufacturing capabilities will add value. □

Left: Metric Automotive Engineering operates a crankshaft-grinding machine capable of grinding shafts of up to 4.7 m long and with weights of up to 5.0 t. **Centre:** The company operates the only CNC machining centre of its kind in Africa, capable of line boring, surfacing and blue-printing blocks up to 6.0 m in length. **Right:** A major differentiator for Metric Automotive Engineering is its ongoing investment in the dedicated equipment that is needed to provide a thorough and quality remanufacturing service.





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Rail innovations at InnoTrans, Berlin

The new 400 DE RailPack and the latest S111 turbo transmission are just two of the innovations being exhibited by Voith at InnoTrans, Berlin, the world's largest trade fair for the rail transport industry. These solutions typify the company's pursuit of stable, robust, easy to maintain solutions with long service lives.

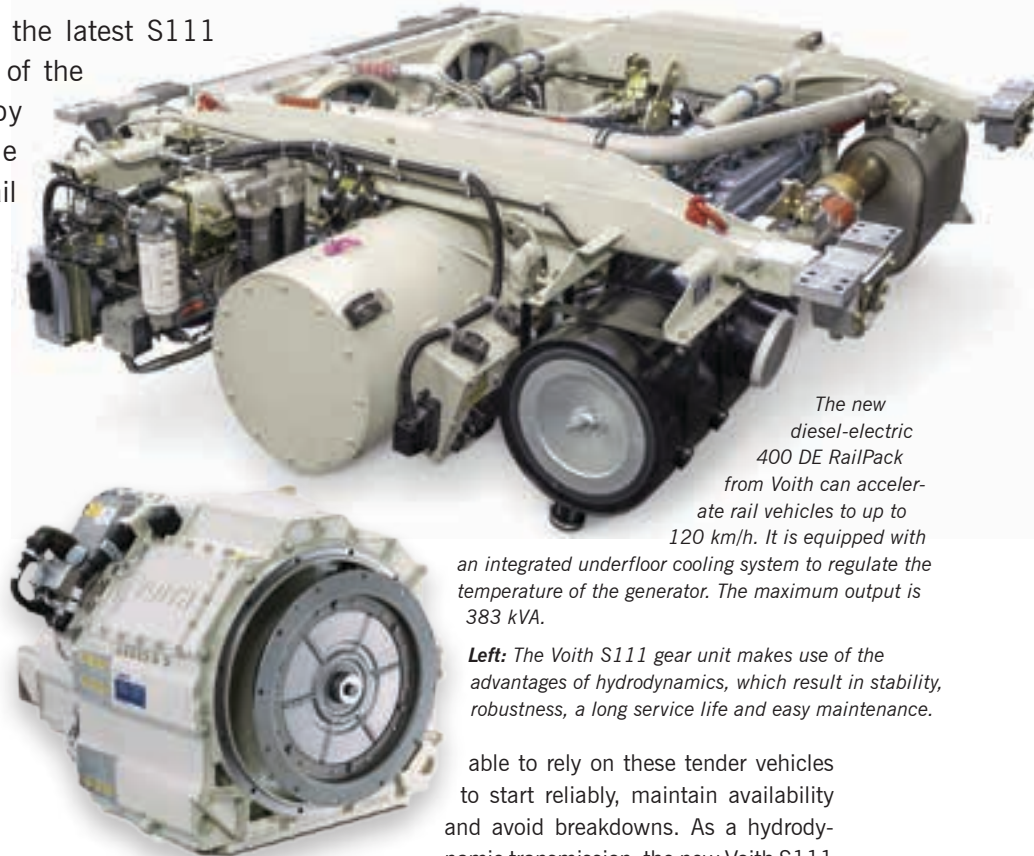
Voith RailPacks are motor-gear units designed for use in single- and multiple-unit diesel railcars operating in commuter, regional, national and inter-city service. They are available as diesel-mechanical, diesel-hydraulic and diesel-electric models.

Approximately 1 200 Voith RailPacks are already in use around the world. The complete drive systems are constantly growing in popularity with rail vehicle manufacturers. The advantages are obvious – the engine, gear unit, cooling system, electronic control, and last but not least an emission technology that consistently ensures compliance with Stage IIIA+B and UIC II norms in diesel-powered RailPacks – all come from a single source. They are optimally synchronised and have proven themselves thousands of times over in practical applications.

Vehicle operators expect not only robust and maintenance-friendly system technology, but low operating costs as well, which are all advantages achieved by the Voith RailPack family. Designed for use under all applications and weather conditions, long maintenance intervals ensure low operating costs.

The most recent addition to the RailPack family is the diesel-electric version. The RailPack 400 DE is already being used in Chinese track building vehicles. Propulsion is provided by an electric motor, supported by an additional diesel engine, which allows the vehicle to be deployed on non-electrified routes.

Voith RailPacks are designed for engine outputs of between 294 and 735 kW. Besides engines of different output powers, they are equipped with a DIWA T211/212 or T312 transmission. The most powerful RailPack, for example, can reach top speeds of up to 200 km/h



The new diesel-electric 400 DE RailPack from Voith can accelerate rail vehicles to up to 120 km/h. It is equipped with an integrated underfloor cooling system to regulate the temperature of the generator. The maximum output is 383 kVA.

Left: The Voith S111 gear unit makes use of the advantages of hydrodynamics, which result in stability, robustness, a long service life and easy maintenance.

in class 185 trains in England.

In addition, RailPacks also provide excellent driving comfort. The frame constructions from Voith, which are individually designed for each power class, and the corresponding drive-unit bearings, ensure minimum vibration transfer to the interior of the vehicle.

Recently, Deutsche Bahn ordered 71 three-unit Link vehicles, which accommodate up to 142 seats, from the Polish vehicle manufacturer PESA Bydgoszcz SA. Inside the Link, two RailPacks provide an engine output of 565 kW. The vehicles will be commissioned in 2017.

Turbo transmission for special vehicles

Special rail vehicles must be able to handle special requirements, and reliability, availability and flexibility are top priorities. The new Voith S111 Turbo Transmission fulfils these characteristics using proven technology and is already demonstrating this with a two-axle tender vehicle in China.

These tender vehicles are equipped with a crane, flatbed or personnel cabin and are used in applications such as track maintenance tasks on high-speed segments. Vehicle operators must be

able to rely on these tender vehicles to start reliably, maintain availability and avoid breakdowns. As a hydrodynamic transmission, the new Voith S111 Transmission ensures that these criteria are fulfilled.

The Voith transmission is designed for maximum engine powers of 280 kW and 1 800 Nm with one converter and one coupling. This is adequate for special vehicles in the lower power segment. Combined with the virtues of hydrodynamics, these robust, heavily driven machines offer a long service life and are easy to maintain. This is accomplished through hydrodynamic technology, which protects the engine and drive components due to the fact that it decouples vibrations. Stepless starting and an automatic speed adjustment without interruption of tractive effort are other positive features that distinguish hydrodynamic transmissions and all Voith turbo transmissions.

The extremely compact design, based on the innovative superimposing gear on the front side and the indirect bearing concept, has been particularly successful. This concept has a positive impact especially during maintenance. This impact is due to the fact that new Voith S111 Turbo Transmission places all controls related to maintenance and service on the left side of the transmission, making them easier to see and to access. □

Digital disruption changing the

The SA Festival of Motoring – successor to the Johannesburg International Motor Show – along with the 2016 CAR Conference, were held at the refurbished Kyalami Grand Prix Circuit and International Convention Centre from August 31 to September 4, 2016. Presented below is a summary of key presentations.



Martyn Briggs, an industry principal of Frost and Sullivan in the United Kingdom presenting on the topic 'Megatrends and the future of mobility', said that digital dealerships using small showrooms in shopping malls were proving increasingly successful in the UK.

The global automotive industry and many related facets of the business are changing rapidly as the digital revolution causes major disruption. This makes it essential for motor businesses to adapt or die.

This message came through loud and clear at the biennial CAR Conference held at the Kyalami Grand Prix circuit as part of the SA Festival of Motoring earlier this month, where the overall conference theme was *'Consumer Trends and Disruption: How SA automakers can drive the change required to adapt to a new future.'*

The arrival of self-driving autonomous cars sooner rather than later was also a topic for many of the speakers.

Martyn Briggs, an industry principal of Frost and Sullivan in the United Kingdom and one of the keynote speakers, presented on the topic "Megatrends and the

future of mobility", an area of the industry where he is an expert. His address was an ideal scene-setter for the intriguing series of presentations that followed.

Much of what Briggs told the delegates was admittedly about future developments but he also had plenty of facts and figures about what was happening right now in terms of ride sharing, car sharing and ride hailing apps as well as the increasing use of apps to assist in finding a parking space in congested cities.

Briggs went on to explain how digital dealerships, which were using small showrooms in shopping malls with only one or two cars on display to do business online, were proving increasingly successful in the UK. He predicted that this trend is expected to spread worldwide.

He added that most people now know exactly which car they want to buy by the time they entered the relevant dealership and on average only visited the dealer twice when doing the deal to buy a new car.

Briggs said that car design is another aspect of the automotive world that is being influenced by the changing digital landscape and the manner in which more and more vehicles are being used these days. This is resulting in the so-called 'trifecta design proposition', whereby traditional body styles like hatches, sedans, MPVs and SUVs are being crossed and morphed to make hybrid designs. Examples here are the Suzuki SX4 and Tesla Model X.

Shayne Mann, the managing director of Mann Made, a brand experience company, summed up the rapidly changing automotive landscape when he said: "Technology is disrupting every industry worldwide and motor retail is not going to be spared. Disruption is coming – from online retail to driverless cars – and those who don't learn to innovate now will find themselves left behind."

Mann, who has already been involved in developing virtual automotive showrooms for local dealer groups, offered sound advice and examples of how



The new Kyalami International Convention Centre, the new venue for the South African Festival of Motoring – the re-imagined successor to the Johannesburg International Motor Show – and the 2016 CAR Conference.

dealers can catch the wave and start innovating faster.

He says that "it's time to reboot!". Not necessarily by throwing away the expertise and physical footprint offered by traditional dealerships, but rather to re-imagine their role in an uncertain, but exciting, future.

Chris de Kock, the managing director of WesBank, the country's leading vehicle finance house and the main sponsor of the SA Festival of Motoring, continued in the same vein about the need for change. He said that the current linear process of buying a car – search, sell, finance, buy – had to change as it was inefficient, did not offer a personalised experience and was expensive for the customer.

De Kock said WesBank was mulling the various disruptive technologies that will deliver the desired experience to the customer. Options include Platform Business Systems, Blockchain, Cloud Computing and the Internet of Things.

The need for change was reinforced by Dave Duarte, the founder of Treeshake, a consultancy dedicated to growing digital marketing capability, who also served as the master of ceremonies at the conference.

He set the scene by explaining that growth towards a digital world in South Africa was driven by the fact that the number of active website users in the country, which now numbered 18-million people, was already double the number

global automotive industry



of cars on South African roads.

Other thought-provoking statistics put on the table by Duarte included: 45.9% of 1 000 people surveyed in SA would be willing to buy a car online; and only 17 people out of more than 4 000 interviewed in another survey said they were satisfied with the current car buying process – all the others wanted change.

Duarte warned dealers that quick responses were necessary when dealing with potential buyers online. “They are not prepared to wait long for feedback to queries.”

The founder of Treeshake also explained that buyers of new vehicles were using general websites such as Gumtree when buying a new vehicle and not only using these sites for buying used vehicles. This trend has resulted in many dealers now using Gumtree and similar online websites to advertise both new and used models.

NAAMSA president paints encouraging picture

Mike Whitfield, President of NAAMSA and managing director of the Nissan Group of Africa, painted an encouraging picture of the future of the South African motor industry at the conference.

Whitfield was also able to give an insight into the industry in Africa following a recent visit to Nigeria as a member of a delegation from the African Association of Automotive Manufacturers (AAAM).

He stressed the importance of the local motor industry’s contribution to SA’s overall economy where it accounts for 7.5% of GDP and a massive 33.5% of the country’s manufacturing output. SA

now ranks 21st in the world in terms of annual vehicle production, but this figure of 650 000 units manufactured locally last year accounts for only 0,7% of total global output. The industry objective is to lift this to 1% by 2020.

Whitfield said the current business environment was both tough and complex, due to macro-economic factors such as high interest rates, a weak rand and ongoing fluctuations in the fuel price. Other major influencers were rapid advances in technology, new players in the automotive industry, such as Uber, Google and Tesla, as well as changing patterns of behaviour from consumer.

“Fortunately we enjoy ongoing support and stimulation from the Department of Trade and Industry (DTI), highlighted by the Automotive Production and Development Programme (APDP), which runs to 2020, and its predecessor, the Motor Industry Development Programme (MIDP), both of which have contributed to the local motor industry’s growing international competitiveness.

“These programmes have resulted in huge amounts of capital investment over the years, including R24-billion between 2011 and 2015, with R7.6-billion slated for investment this year,” said Whitfield. “The focus on efficiencies has also resulted in the number of vehicle platforms manufactured in South Africa being slashed from 42 in 1966 to only 12 in 2016.”

Already the DTI has appointed a technical team to assist in the development of a post 2020 master plan aimed at ensuring the long-term sustainability of the industry in terms of policy and support mechanisms. Other objectives are to increase investment, production and exports while creating more job opportunities.

In view of Nissan’s extensive involvement in the development of electric vehicles, it was understandable that Whitfield focused on this form of alternative power when discussing the rapidly changing landscape in terms of vehicle technology.

Although the take up of electric vehicles has been slow in South Africa, Whitfield says he believes the expanding network of charging stations being established jointly by Nissan and BMW



Mike Whitfield, NAAMSA president and MD of the Nissan Group of Africa, highlighted some of Africa’s challenges: unclear automotive policies; high levels of ownership of vehicles by fleets; strong used car markets; large numbers of so-called grey imports; and finance to purchase vehicles, which he said is a major stumbling block due to the high interest rates charged.

will increase sales of these vehicles in the future.

He presented some interesting views on the growth of alternative mobility options with changing vehicle ownership patterns, shrinking dealerships, virtual sales, an emphasis on low cost fleet servicing and the ongoing development of mobility technology by the OEMs.

Whitfield, in his position as vice chairman of AAAM, made interesting observations about African challenges: unclear automotive policies; high levels of ownership of vehicles by fleets; strong used car markets; large numbers of so-called grey imports; and finance to purchase vehicles, which he said is a major stumbling block due to the high interest rates charged.

However, there were also opportunities, including viable automotive assembly sectors, inter-regional trade, self-sustainability and an entry into the global automotive industry.

Whitfield summed up by saying, for the South African motor industry to flourish until 2020 and beyond, it was vital that all the players moved with the times in terms of innovation, new thinking and developing creative solutions and different ways of doing things. □

BMG invests in gasket and sealing manufacture

“BMG has invested in state of the art machinery – including Atom CNC knife cutting machines with high precision cutting technology – to ensure the highest manufacturing standards of its extensive range of sealing products,” says Steven Hodgkinson, manager, gaskets, BMG. “With stringent quality controls and conformance to global specifications and uniformity standards, the materials used for these products, which are manufactured by Phoenix Sealing in the UK, provide consistent performance, even in the most demanding environments.

“The selection of the correct industrial sealing product in modern engineering is a critical consideration, both in the design of new equipment and in the choice of products to replace those that are no longer suitable.

“Basically, a gasket has one prime

function, to create a positive seal between two relatively stationary parts. The gasket must perform a number of tasks well to function effectively: create an initial seal; maintain the seal over a desired length of time; and be easily removed and replaced.

“The success of a sealing installation is dependant on how efficiently the gasket seals the system media and its chemical and corrosion resistance to this media. It is critical that the gasket does not contaminate the system media. The gasket must deform sufficiently to flow into the imperfections on the gasket seating surfaces, providing an intimate contact between the gasket and the seating surfaces. It also needs to withstand elevated system temperatures and have sufficient strength and creep resistance to cope efficiently with the applied load.”

BMG stocks a range of high performance compressed fibre sheet materials and products designed to cover the full spectrum of non-metallic sealing applications. This sheeting, which was developed by the Phoenix team of industrial sealing experts, is manufactured to the highest quality standards.

BMG also supplies a wide range of PTFE products, a materials that is easy to handle and cut, has resistance to chemicals and is suitable for low bolt load applications. Other benefits include FDA compliance, extremely low gas

permeability and these products can withstand temperatures from cryogenic to +260 °C. High performance biaxially orientated materials have reduced creep and uniform strength.

BMG’s graphite products, with excellent stress retention and chemical resistance, are designed for demanding applications at elevated temperatures to 450 °C. These sealing products are manufactured from high purity exfoliated graphite in various forms and are available with or without metallic reinforcement.

With technical support from leading metallurgical experts, BMG supplies a wide range of metallic gaskets, obtainable in standard and non-standard, custom designs. This range, which ensures reliable operation in demanding applications, is available in different configurations, sizes and materials. BMG also stocks standard ASME Spiral Wound gaskets.

Other sealing products include rubber sheeting and cut gaskets, compression packing, boiler door joints, insulation products, flange covers and PTFE flange sealants.

www.bmgworld.net

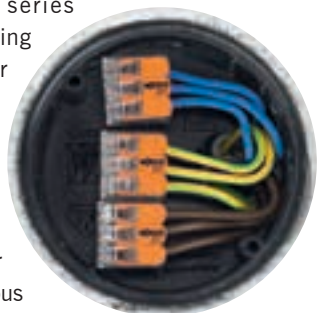
Compact splicing connectors for wire types

Magnet has extended its range of products for electrical installations to include Wago’s 221 series compact splicing connectors for all wire types.

“Wago’s new splicing connectors, which are 40% smaller than the previous series, enable solid, stranded and fine-stranded wires to be connected faster and more reliably, without the need for any tools,” says Brian Howarth, managing director of the Magnet Group. “The flexibility of the design means these connectors can be used wherever different wires have to be connected in a confined space.

“This series is suitable for use in diverse applications, including general electrical installations, junction boxes, lighting fixtures and for the connection of motor leads. They are also ideal for mobile applications, including recreational and emergency vehicles,” he says.

www.magnetgroup.co.za



BMG has invested in state of the art machinery to ensure the highest manufacturing standards of its extensive range of gaskets and sealing products.

New packaging design for aftermarket products

SKF unveiled a new packaging design for its vehicle aftermarket products that reached European customers in April and is now being rolled out into all markets around the world.

The new design stays true to the company’s blue colour and incorporates graphic elements that pay tribute to SKF’s long history and its areas of expertise. The focal point of SKF’s new design is a zoomed-in graphic of its iconic wheel bearing.

“The success of SKF vehicle aftermarket products is rooted in aspects that remain universally important – a commitment to quality based on long-standing technological expertise and a true sense of customer service,” says Mia Bökmark, head of business

and product development for SKF’s vehicle service market. “Our new design highlights these values in a modern and dynamic way and it is one of many steps in our endeavour to reinforce SKF’s position as the leading brand for automotive aftermarket products within its sector.”

The packaging also features a quick-response (QR) code that enables customers to easily access technical product information, fitting instructions, videos and other relevant material that help them use the products in the most efficient and effective way. QR codes can be scanned with smartphones and function as a gateway to specific online content.

www.skf.com



Smart Diagnostics for harsh industrial environments

Manufacturers and industrial operators can now access more detailed sensor diagnostics in harsh operating environments by using the IP67-rated, Allen-Bradley ArmorBlock IO-Link master from Rockwell Automation. The device builds on the company's IO-Link portfolio with event and process time-stamping capabilities for on-machine applications.

The new IO-Link master stores up to 40 timestamps of sensor events on each channel. This event history can help users track changes and more easily diagnose issues. Input timestamps of all sensor data can also be sent to the controller upon a change of state. These and other diagnostics available through the device can reduce issue-resolution time by as much as 90%, improve preventive maintenance and optimise overall system performance.

"The ArmorBlock IO-Link master with IO-Link-enabled sensors can aid end users in creating smarter operations without a complete overhaul," says Kevin Gagliostro, product manager, Rockwell Automation. "They can deploy the technology to monitor temperature and

margin-indication or proximity parameters in critical processes. They can also target problem areas where better diagnostics are needed to remedy issues."

While the new ArmorBlock IO-Link master is ruggedised for use in harsh applications, the Rockwell Automation portfolio also includes an in-cabinet solution for light applications. The on-machine option requires only a single cable from the cabinet, reducing the number and length of cable runs and potential failure points.

The ArmorBlock IO-Link master includes connectivity for up to eight IO-Link sensors. The master and sensors share an IP address, helping end users reduce the cost and time to commission equipment.

www.rockwellautomation.com



Voith unveils latest materials handling technology

In 2015, Voith added the field-proven drive systems from mining conveying manufacturer, Hese Maschinenfabrik, to its portfolio. This means that the company is now able to offer an even broader range of products for mining and materials-handling customers, which were showcased at Electra Mining Africa 2016 earlier this month.

Voith TurboBelt Hese pulleys are technically and economically optimised belt conveyor pulleys that allow for a long product lifecycle. Providing excellent running characteristics under extreme conditions such as heat, cold or humidity, and performing well in demanding and tough environments, Hese pulleys have a service life of up to ten years. Voith offers customised pulleys for different applications such as drive pulleys, tail pulleys, bend pulleys and other options for high system availability.

The TVVS-type controlled-fill fluid coupling was also showcased. Used mainly in belt conveyor drives, these couplings are used to ensure smooth start-up, to protect the drive against overload and dampen torsional vibration, thus preventing unplanned downtime and increasing component lifetimes.

Voith offers full aftermarket support for all of its products, and its service personnel have unique experience and training to ensure that installation and commissioning meet Voith's exacting standards. The company's service team is always aiming to increase equipment availability and reduce downtime.

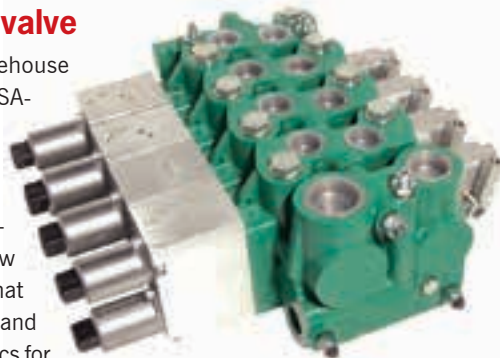
www.voith.com

SALAMI load-sensing valve

Hydraulics & Automation Warehouse (HAW) recently introduced the SALAMI VDPO8 load-sensing valve to the hydraulic industry. The valve is ideal for a wide range of applications, mainly in the mobile field, where independent flow control of actuators is needed that is not affected by load variations and offers good metering characteristics for increased energy savings.

With the high-quality features SALAMI products are renowned for, the valve offers a more cost-effective solution than competitor products and is easily retrofitted without having to change mounting specifications. The valve can be used in applications with flow of up to 130 l/min and maximum working pressures of 350 bar.

"This type of sectional directional control valve has become popular in the industry, owing to the simplicity of the design, its ability to function under extreme operating conditions, and its excellent controllability," explains Wynand Kellerman, general manager of HAW. "In addition, the many control positioning options available to operators eliminates



The energy efficient VDPO8 load-sensing valve from SALAMI for independent flow control.

the need to add auxiliary components and additional pipe connections."

Another benefit is its modular design. "In the case of a malfunctioning valve section, only the faulty section needs to be replaced, and this can be done on site without having to remove the entire valve," Kellerman continues. Modularity also offers more versatile solutions that enable users to expand the valve configuration when the need for more machine functions arise.

The VDPO8 load-sensing valve can be ordered for use with both variable and fixed displacement pump applications.

www.hytecgroup.co.za

Specialised steel floor tiles

Modular steel floor tiles have become increasingly popular and are being used in place of concrete and ceramic flooring in certain applications due to their advantages.

Engineered with precision interlocking characteristics, Mentis steel tiles offer strength, coverage and, most importantly, an even finish free of joints. When laid, these steel floor tiles ensure a continuous surface, providing a smooth surface for pedestrians, trolleys and even man-ridden machinery.

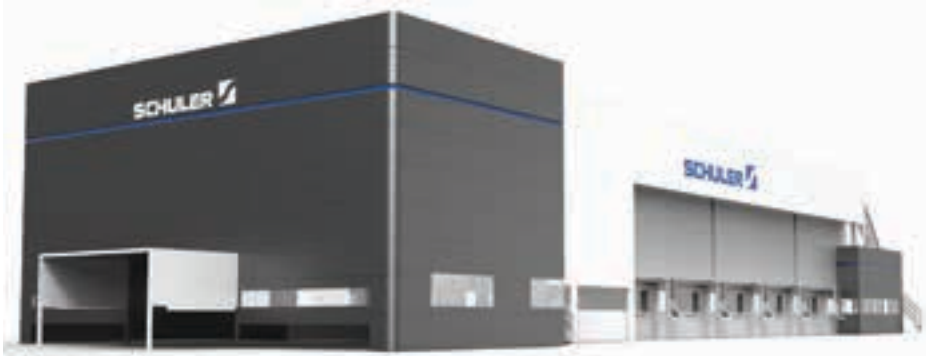
Manufactured from stainless steel, Mentis Steel Tiles are tough, resistant to rust and easy to clean. As steel is not porous, there is no ingress from bacteria, allergens and other contaminants and this makes them the most hygienic option. Perforations on the tile provide a non-slip surface with the screed filling the perforations and ensuring a non-slip underfoot condition.

www.mentis.co.za

Interlocking steel tiles from Andrew Mentis have perforations that provide a non-slip surface.



Networked systems increase process reliability and cost-effectiveness



Many operators wish that their systems could tell them exactly what the problem is. In the age of the Industrial Internet of Things, machines that communicate are no longer something to aspire to in the future. At the EuroBLECH trade fair, to be held in Hanover at the end of October, Schuler's 'Smart Press Shop' concept will be demonstrating how networking solutions in forming technology can increase not only process reliability, but also cost-effectiveness in production.

The necessary interfaces are already available. In a modern servo press line from Schuler, around 30 industrial PCs are networked with one another. This is the only way to ensure high levels of productivity and safe part transport from one press station to the next. Single presses, laser blanking lines and various automation components also already have the necessary interfaces for comprehensive networking.

What is the maximum speed at which a specific sheet metal can be formed? Forming simulation provides valuable

information for the virtual optimisation of the entire system. To stay with the example of a servo press line: long before the tool sets are clamped into place, the virtual model of the system produces one part after another.

Optimisation based on simulation

By simulating the entire system, including all press stages and automation components, the time needed for part transport is minimised. Schuler offers tools for optimising output, helping to reduce the time required for commissioning considerably. The customer can also get information on the energy required for production.

The systems provide data measured by sensors installed at numerous points, for example to monitor the press force. By drawing the right conclusions from this information, this area also has huge potential. If the press force progression deviates from a particular pattern, this indicates irregularities in the process. These solutions gather important information that can be used to maintain the line, thereby preventing damage to the machine and tool.

If it becomes apparent that not everything is running smoothly, the service engineer can connect to the customer's system online. In nine out of ten cases, problems can already be solved remotely through the Schuler Remote Service. Condition-based maintenance can therefore help save a lot of money.

Many of these examples are already common practice at Schuler. "Schuler has the key advantage of having equipped press plants throughout the world for decades, from the decoiler through to the automatic racking system", says chief technical officer, Stephan Arnold. "This experience helps enormously when it comes to developing intelligent functions



Above: The simulation of the entire system optimises output and reduces the time required for commissioning considerably.

Left: Servo press lines are already comprehensively networked and equipped with interfaces for future systems. Photos courtesy of Schuler.

for the 'Smart Press Shop' and the press plant of the future."

Schuler will be exhibiting in Hall 27 at EuroBLECH in Hanover from 25 to 29 October 2016.

Industry diary

October 2016

Cape Town International Boat Show

7-9 October
V&A Waterfront
www.boatshow.co.za

Welding Coordination: ISO 3834 and ISO 14731

19 Oct, JHB and 16 Nov, Cape Town
SAIW: Laetitia Dormehl
011 298 2111
laetitia.dormehl@saiw.co.za

November

17th Annual International RAPDASA conference

2-4 November
VUT Science & Technology Park, Sebokeng
+27 16 930 5063
annen@vut.ac.za

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The new generation of sheet metal working!

From 25 to 29 October 2016, the 24th International Sheet Metal Working Technology Exhibition will open its doors in Hanover, Germany.

The exhibition presents the entire sheet metal working technology chain: sheet metal, semi-finished and finished products, handling, separation, forming, flexible sheet metal working, joining, additive manufacturing, welding and surface treatment, processing of hybrid structures, tools, quality control, CAD/CAM/CIM systems and R&D.

Some 1 600 exhibitors from 40 countries will present their cutting-edge technology live to a worldwide audience of some 60 000 trade visitors.
www.euroblech.com



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