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Beckhoff is opening up new avenues in machine design with XPlanar. This is made possible by planar movers that float freely above planar tiles and enable extremely flexible, precise and dynamic positioning. For machine builders this results in maximum flexibility and simplification in the design of machines and plants. Read our cover story on page 11 to find out how XPlanar can be used as a highly flexible transport system in general machine building, especially for the automation of packaging, assembly, sorting and order picking processes, in clean rooms as well as in a vacuum.

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Are you ready for Industry 5.0?

In this issue of *Motion Control* we have some stories about collaborative robots from Festo, Metal Work and Cobot. These are launching the manufacturing industry into a whole new world and are a reality in this country too. Just as we are getting used to Industry 4.0, guess what, Industry 5.0 has arrived.

At a recent presentation at a SAIMC technical evening the local company, Cobot, demonstrated one from Universal Robots and prompted me to find out more about this new technology.

What Industry 5.0 does is to take the benefits of automation and bring humans back into the picture. It allows people and machines to work together using collaborative robots, or cobots. In a nutshell it is the humanisation of automation. It brings together automated digital processes and the insight and creativity of people. While Industry 4.0 has a mechanised focus, Industry 5.0 is about skilled people and robots working side by side to create specialised products and services. This is making mass personalisation a reality and giving consumers what they really want.

Cobots assist people with manual tasks. Currently they are mainly used for sorting and packing orders, handling heavy or dangerous freight, and other warehousing jobs. They complement human labour rather than replace it. By taking on dangerous, strenuous or repetitive tasks, they are making factories safer and more productive.

Cobots are versatile, easily programmable and safe. If you get in their way they will stop. They can be programmed with a tablet or by just moving their arms – no coding is required. If the cobot is needed in a different part of the factory, it can be easily moved. The latest cobots have position sensors that enable them to react to the presence of a worker in an instant, without the need for the safety cages that protect the traditional heavyweight robot arms.

Today’s cobots are built with artificial intelligence and machine learning. With the latest advances in sensor and vision technology they can quickly inspect large numbers of items for flaws, automate the transportation of materials throughout a workplace, and avoid hazards using predictive intelligence.

They can detect abnormal activity in their environment and they comply with the fourth criterion of safe collaboration, which is the limitation of force and power. All cobots have force feedback sensors in their joints which stop their motion in case of an impact. This allows you to run the cobot at full speed and not worry about the potential danger of the power in its arm.

Led by global organisations like Universal Robots, Festo, ABB, Kuka, Fanuc, and Yaskawa, the cobot market has become very competitive. The concept is relatively new. Universal Robots introduced cobots in late 2008, working closely with major automakers like Volkswagen. The machines quickly became popular because of their safety, simplicity and ability to directly work with people. This growth was driven partly by declining prices, which are falling by 3 to 5% a year. Cobots are so now that they account for less than 5% of the $40 billion industrial robot market; but Barclays Capital estimates the market could grow from $100 million last year to $3 billion by 2020.

Many companies cannot automate because of the high cost of traditional robots, but these flexible robots have the potential to revolutionise production, in particular for the smaller companies that account for 70% of global manufacturing. They are a boon to small and medium sized companies that have to compete against larger rivals in low cost markets.

Cobots are becoming a game-changer in a wide range of applications. Factories around the globe such as SEW-Eurodrive’s factory in Baden-Wurttemberg, Germany, have already started using cobots on the shop floor. Here humans work alongside robotic trucks that restock the workstations on the floor. Working with BMW, researchers found that robot-human teams are 85% more productive than either one alone. Cobots are also being used on the Ford Fiesta plant in Germany, where factory workers and cobots are teaming up on its assembly lines to install shock absorbers. In the Amazon fulfilment centre, cobots bring goods to the associates to prepare for shipment, reducing the order fulfilment time from an hour to 15 minutes.

While cobots won’t replace the last generation of automation for heavy lifting, they’re finding a new place working collaboratively with people. Designed to work with rather than for people, this automation revolution is all about job enhancement, pushing up the power of human labour and adding value to our work – not taking away jobs. Who would have thought that the future of automation is in fact smaller, weaker, slower – and smarter?
Driving force for the future

Association Objectives

- Raise the professional standards of the pneumatics and hydraulic industries
- Stimulate and promote education and training in the fluid power industry
- Build synergistic rapport between companies within the industry
- To promote, collect, collate, distribute data, ideas and knowledge
- To encourage the growth of the membership base

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SAFPA membership certificate may be used to support tender applications, members are also welcome to use the SAFPA logo on all their advertising.
From the President’s desk

As my last President’s letter over the year I have served, I would like to thank the council and the industry for the support over this term, it has been a privilege to sit as the council President and add my two cents worth where possible.

The SAFPA council has formed a sub-committee for the upcoming industry survey. We would like to ensure all the participating companies are able to extrapolate meaningful data from the survey by setting up the questionnaire in such a way that a valuable census will be generated – also to ensure the survey does not waste the time of the representative who completes it. Based on the work carried out by the sub-committee, SAFPA would like to have the survey completed and the report available to members within the next six months.

A sub-committee has also been formed with regard to the pressure vessel industry standards for hydraulic accumulators, cylinders, piping and pneumatic cylinders, and the pressure equipment regulations according to South African National Standards and the Mine Health and Safety Act. The sub-committee will be chaired by Chris Arbous, a retired engineer and ex-employee of Goldquest/BMG. His mandate is to form a technical committee comprising key individuals from the industry, AIA bodies and end-users to put forward a comprehensive industry best practice document and have this document endorsed by a certification/inspection body such as TUV. This document will be easily referenced for various divisions within the fluid power industry to ensure the design, use, operation and maintenance of pressure vessels is carried out within sound engineering principles.

SAFPA has the following upcoming events that should be diarised:
- Thursday 16 May: SAFPA AGM, venue to be confirmed
- Friday 23 August 2019: SAFPA Cycle Race, Avianto
- Thursday 5 September: SAFPA Golf Day, new venue at Modderfontein Golf Club
- Sunday 10 November: SAFPA Soccer Day, Benoni

SAFPA would like to continue with the awareness campaign about the ISO standards available within the hydraulics and pneumatics industry for various product lines and system engineering. We shall endeavour to develop awareness around these standards to ensure equipment manufacture and sourcing is in line with global standards and equipment is safe for operation. Please look out for upcoming technical evenings where some time will be spent on familiarising the industry with these standards.

All the best for rest of 2019, I hope it will be a prosperous one.

Dustin Pereira

SAFPA technical evening

At a recent SAFPA technical evening, Ben Janse van Rensburg from the Tshwane University of Technology gave a presentation on SAFPA’s 2018 market survey of the hydraulics and pneumatics industry, which is currently in progress. He covered the methodology, participation and planned final report.

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Ten years of emerging enterprise and graduate development

Bosch Ulwazi marks its tenth anniversary this year, with a track record in the advancement of engineering skills across South Africa. The company was established in 2009 as a subsidiary of Bosch Holdings in order to mentor engineers and project managers to achieve professional registration with regulatory bodies. Today, Bosch Ulwazi provides a range of technical skill solutions to public and corporate organisations that employ graduate engineers, technologists and project managers who are candidates for professional registration. Professional registration is a key milestone that prepares young graduates for leadership, or even branching out into their own enterprise.

“A critical part of Bosch Ulwazi’s operations is to identify, mentor and develop black-owned businesses,” explains Bosch Ulwazi’s managing director, Balan Govender. “In partnership with leading organisations, including state-owned enterprises, we play a key role in the development of small, medium and micro-sized enterprises. Our highly skilled team provides guidance on project and operations management, skills development and the planning and implementation of expansion strategies, in compliance with corporate governance.”

To date, Bosch Ulwazi has developed 78 emerging enterprises in South Africa, which are now profitable and sustainable. Another key focus is graduate development. The company’s Engineer-in-Training (EIT) and project management program provides opportunities for graduate engineers and project managers to enhance their practical engineering and project management competencies, to meet the requirements of ECSA and SACPCMP for professional registration. To date, 15 graduates have successfully registered as professional technicians, technologists and engineers.

For more information contact Balan Govender, Bosch Ulwazi, +27 31 535 6000, govender@boschulwazi.co.za, www.boschulwazi.co.za

Unique mechatronics academy

ElectroMechanica (EM) has set a new benchmark in the automation industry by collaborating with Polytech Africa in establishing the first Mechatronics Academy to be accredited by merSETA. This will focus on the National Qualifications Framework (NQF) Level 2 learnership. This is based on essential aspects of precision mechanical engineering, electronics, and computer design systems used to control and automate mechanical products with electrical signals. Here EM plays a vital role, as its specialised products include the Delta industrial automation range.

Upon completion of the NQF Level 2 qualification, certificate holders will be able to gain entry to highly-skilled sectors such as mechanical and electrical engineering, pneumatics and hydraulics, robotics, PLCs, CNC, industrial IT, the automotive sector and precision welding.

“She adds that the Mechatronics Academy will play a vital role in addressing the skills shortage in the automation industry, particularly in Africa.” While we have a good skills base in South Africa, the main problem is the pipeline of younger people entering the field. We definitely need to enhance the existing skills and develop new ones. “We are upping the ante on the usual product training to offer a fully-accredited and recognised academy that give learners a skills-based education to prepare them for the workplace of the future,” says EM director, Andrew Nobbs. “Our customers and the industry will have access to employees who are workplace-ready through on-the-job skills development, with formal accreditation.”

For more information contact Karen Zotter, ElectroMechanica, +27 11 249 5000, karenz@em.co.za, www.em.co.za

Festo takes part in WorldSkills competition

Early this year students from South African Technical and Vocational Education and Training (TVET) colleges, technical universities and engineering companies headed to Durban with a common goal – the National WorldSkills competition final. This was hosted by the Department of Higher Education through WorldSkills South Africa. Festo Didactic once again had the honour of assisting these young South Africans by sponsoring the Mechatronics and Water Technology Skill competitions with equipment which was used by students throughout the competition.

The company also offered training and expertise for the Water Technology and Mechatronics Skill competitions. Festo also exhibited at the event and provided training to participating students before the competition. Students from various institutions were hosted at Festo’s Johannesburg offices for a week and ongoing technical support was provided to all participants. This was to ensure that they were prepared and familiar with the equipment to be used.

Thabiso Matlou, a chemical plant operation student at Capricorn TVET College, won the Water Technology competition. Tebogo Shabangu and Thabang Modise from Sedibeng TVET College won the Mechatronics competition, which required teams of two participants. All three winners are currently undergoing training in preparation for the WorldSkills International Competition in Kazan where they will represent South Africa.

The rapidly changing technological world that we live in not only requires new and advanced equipment, but also highly skilled and competent operators. This is why Festo is invested in these young students. They are our future technology leaders and inventors.

For more information contact Kershia Beharie, Festo, 08600 FESTO (33786), kershia.beharie@festo.com, www.festo.co.za

www.motioncontrol.co.za Second Quarter 2019 5
Hytec appointed Service Partner to Zollern

Hytec South Africa has been appointed southern Africa Service Partner to the Drive Technology Unit of Zollern. The partnership allows Hytec South Africa to sell, execute inspections, and conduct maintenance, repairs and other services on Zollern gearboxes and winches across southern Africa.

Hytec South Africa supplies Zollern gearboxes to end users for cranes, winches and drilling equipment as part of its gearbox range, and has been conducting any required repairs at its Cape Town and Johannesburg operations since 2007. “The difference now,” explains regional manager, Iaan Du Toit, “is that we can provide this service across the sub-continent and are not restricted to servicing only the Zollern equipment that we installed.”

Hytec South Africa’s history with Zollern dates back to 2007. ‘In a little over a decade our customers’ installed base of Zollern equipment reached a level that required us to enter into a service agreement with the OEM,” Du Toit explains. “We are exceptionally pleased that this agreement has come to fruition as it benefits both our companies and customers across southern Africa. The support we receive from Zollern for its products and our service offering is outstanding and we look forward to working with them.”

He adds that this most recent partnership agreement illustrates the can-do attitude of Hytec South Africa and the Bosch Rexroth SA Group of Companies. “It is a win-win-win situation and is one of the ideal examples of our promise to our customers: “We Move – You Win,” he concludes.

For more information contact Iaan Du Toit, Hytec, +27 21 551 4747, iaan.dutoit@boschrexroth.co.za, www.hytecgroup.co.za

Hyflo incorporated into BMG fluid technology

The Engineering Solutions Group of Invicta Holdings has incorporated Hyflo Southern Africa into BMG’s Fluid Technology division. This development is a positive move for both companies and for the local fluid power sector, which will benefit from the combined services of two streamlined organisations. “As part of this restructure programme, all Hyflo’s customer and supplier trading activities will be integrated into BMG, yet Hyflo will retain its brand presence in the market,” says Fluid Technology business unit manager, Wayne Holton.

“Apart from new customers and markets which are being leveraged through BMG, we are rolling out our Hyflo product offering through BMG’s network of 106 branches, thereby enhancing sales and creating new opportunities for both companies.”

“Hyflo’s product range and technical expertise are a perfect fit with BMG’s Fluid Technology services. Complementary products include hydraulics and pneumatics, hose and fittings, industrial valves, instrumentation, filtration and pumps, as well as lubricants and lube systems. Hyflo’s highly skilled engineering, manufacturing and field service team will transition into BMG’s Engineering division, to ensure continuity for our customers.”

Hyflo’s operations will continue to operate from their current locations, but these branches will eventually become BMG Regional Service Centres, each with a focus on engineering, sales support and the manufacture and repair of hydraulic systems, pumps and cylinders.

BMG’s fluid technology services – incorporating Hyflo’s products and expertise – encompass project engineering and consulting, cylinder design and manufacture, training, repair and testing, as well as on-site container services.

BMG also offers total process and lubrication management solutions throughout the African continent.

For more information contact Lauren Holloway, BMG, +27 11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net

HAW showcasing eight product lines at NAMPO 2019

Hydraulic and Automation Warehouse (HAW) is showcasing eight of its niche product lines at NAMPO 2019 in May. HAW’s focus this year is on its Uniflex Grease Crimpers – specifically the Uniflex UG20; Salami brand gear pumps and valve banks; the M+S gerolotor and gerotor motors and M+S steering orbitals; and tie-rod cylinders. Other products in the line-up include Intertraco hose and fittings, OMT filters and LuEn in-line components. “Interacting with Free State-based resellers and distributors is the highlight of this annual event for us,” says general manager, Werner Joubert. “It is the stage where we connect with existing customers to promote new products and technologies and introduce our products, technologies and brands to potential new customers.”

Joubert says that HAW has the technologies, quality products and industry expertise to provide application-specific, cost-effective hydraulic solutions that can enhance agricultural equipment and machinery. “We use the NAMPO opportunity to demonstrate our commitment to agricultural equipment OEMs, and to get customer feedback and suggestions for exploring new technologies. We’re looking forward to seeing how HAW will be able to meet any new requirements identified by our target market.”

For more information contact Werner Joubert, Hydraulic and Automation Warehouse, +27 11 281 3800, werner.joubert@haw.co.za, www.hytecgroup.co.za
SEW-Eurodrive will give visitors to Africa Automation Fair 2019 a foretaste of its MOVI-C modular automation system, which is readymade for the requirements of Industry 4.0. This represents the next generation of automation technology from Germany, and will be phased in gradually by SEW-Eurodrive in South Africa, according to national sales and marketing manager, Norman Maleka.

The system includes a stand and polycarbonate guard, CMP motors, MOVI-C Modular, MOVI-C Controller, a Human Machine Interface (DOP), and MOVIKIT Robotics software. It provides for an end-to-end automation solution, from planning to commissioning, operation and diagnostics software, electronic control and monitoring devices, mechanical drives, and gearmotors. What's more, it features an open communications topology from Profinbus and Industrial Ethernet to Modbus.

While the MOVIDRIVE B Drive Inverter and MOVIAXIS Multi-Axis Servo Inverter have been available for some time, the MOVI-C modular automation system sets SEW-Eurodrive on a path to embrace Industry 4.0. “This requires products that are both open and flexible,” Maleka stresses. “Our focus is to provide our customers with a fully modular and customisable solution.”

The unit on display will be a high-speed pick-and-place solution, including a tracking function applicable to a range of industries. It will be showcased at the Africa Automation Fair 2019 as a teaser of what customers can expect in the near future from SEW-Eurodrive, which is already developing new technologies with a three- to four-year window period in response to both industry trends and customer requirements. “Our main theme at the exhibition will focus on energy efficiency,” Maleka notes. Three segment conveyors about 1 to 1.5 metres in length will feature IE2, IE3, and IE4 motors, with the different energy consumption displayed on a screen. Apart from its motor range, the MOVIGEAR mechatronic drive system will also be showcased. This technology is making inroads into the food and beverage industry due to its ease of use and quick installation, and the fact that it is easy to clean and meets strict hygiene standards, for which an optional smooth surface is available.

Other energy efficient products that will be on display include variable speed drives and the LTP-B Eco HVAC drive, which is ideal for applications as diverse as large buildings, hospitals, and even mills. Features include an advanced ‘sleep’ and ‘wake’ function that maximises energy efficiency by only switching on a pump, for example, when it is required.

Maleka concludes that SEW-Eurodrive will use Africa Automation Fair 2019 as a platform to interact with existing and potential customers about Industry 4.0-ready technology such as its MOVI-C modular automation system. “Our aim is not only to stay ahead of the technology curve, but to be in a position to ensure our customers always have access to the latest complete solutions that are flexible, adaptable, and cost-effective.”

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za

The University of Johannesburg (UJ) recently held a career day for engineers, organised by the student chapter of the SA Institute of Mechanical Engineering. A wide range of representatives from industry were there to meet the students and tell them about the career opportunities open to them. Among the companies making their presence known were BMG, Siemens, Festo, SKF, InBev, Spirax Sarco and Thyssenkrupp. The exhibition was very well attended by the students, who enthusiastically responded to this initiative.

For more information contact Matthew Slabbert, mslabbert1997@gmail.com
**BMG acquires Rustenburg Engineering and Joerg Foundry**

Through BMG’s acquisition of Rustenburg Engineering and Joerg Foundry, the company is now a major player in the foundry industry. “This strategic investment in a dynamic sector of the engineering industry broadens BMG’s product range to include the supply of SG and cast iron components and products to OEMs and end-users,” says Anton Kritzinger, general manager of Rustenburg Engineering, which now forms part of the Engineering Solutions business segment of Invicta Holdings.

This acquisition is also a boost to the Fenner brand. BMG is the exclusive distributor locally of highly acclaimed Fenner products. Joerg Foundry has been manufacturing Fenner Power Transmission components under licence since 2011 and this new agreement provides exciting opportunities for all companies. “Fenner conveyor belting products, which include steel cord and solid woven conveyor belting, are manufactured at the Fenner Isando plant. However, whenever castings are required, we are able to source them from Rustenburg Engineering and Joerg Foundry,” continues Kritzinger.

Rustenburg Engineering and Joerg Foundry has manufacturing facilities that include a no-bake resin sand foundry for jobbing and short runs and a green sand foundry for production runs. The company’s expertise covers a range of capital equipment and consumable components used in diverse sectors. Typical products cast include wheel hubs, rod ends, torque plates, castle nuts, brake shoes, bearing and motor housings, rail components and flange couplings, as well as pulleys, valve bodies and diaphragms. The company also manufactures mill and barrel liners, wear plates, chill moulds, crane wheels, sheaves and bearing housings.

For more information contact Lauren Holloway, BMG, +27 11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net

**Festo to go digital at Automation Expo**

The world is currently undergoing radical digital transformation, which is viewed as an implementation of digital technologies in all sectors, including the automation industry. As a company that continuously strives to exceed customer expectations, Festo will host its second Automation Expo focusing on higher productivity through digitization in the area of automation.

Festo is pulling out all the stops with a course designed to maximise customer productivity and competitiveness. The course will focus on an ‘Introduction to Industry 4.0: core elements and business opportunities’. The seminar is designed to appeal to management level, senior executives, technology enthusiasts and engineering professionals. In addition to the knowledge gained, every customer that attends this course will earn 0,5 CPD points.

This full day expo will also include a seminar from four of the company’s industry specialists.

For more information contact Festo Events, +27 11 971 5560, events.za@festo.com, www.festo.co.za

**Cummins showcases its strength in North and West Africa**

Cummins showcased its strong presence in North and West Africa by occupying three stands at the fifth edition of the Salon Halieluis exhibition in February 2019 in Agadir, Morocco. The event attracts a broad spectrum of visitors. Cummins used it as a broad platform to display its comprehensive range of products, from its KTA19 marine engine to gensets and the Fleetguard range of filtration and coolant products.

Morocco is a leader in Africa in the fishing industry and this presented the opportunity for Cummins to diversify further into this market with its marine engine range, as well as to offer customer support and technical backup services throughout the wider region.

“While we have a long history in Morocco, we were not present in all markets. Now with the establishment of a Cummins entity we are targeting new opportunities and markets,” said industrial sales and business development leader, Jaouad Ezzarhouni. “Marine represents the second largest market for us in the region, apart from mining. Therefore the OEM’s participation at Salon Halieluis will not only generate brand awareness in the region, but will reiterate that Cummins is 100% behind its large customer base.”

For more information contact Deepa Runagasamy, Cummins, +27 11 589 8512, deepa.runagasamy@cummins.com, www.cummins.com
Kanreki Celebrations
SMC 60th Birthday
**Appointments**

Bosch Rexroth South Africa has appointed Mike Harrison to oversee its East African operations and African distribution arm.

Tectra Automation has appointed Malan Bosman as national sales manager.

Axiom Hydraulics has appointed Lance Tendolo as applications engineer.

Bearings International has appointed Andrew Gerald Altree as product manager.

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Flying motion

A planar motor system of free-floating movers with six degrees of freedom.

Beckhoff is opening up new avenues in machine design with XPlanar. This is made possible by planar movers that float freely above arbitrarily arranged planar tiles and enable extremely flexible, precise and dynamic positioning. For machine builders this results in maximum flexibility and simplification in the design of machines and plants.

The XPlanar system combines the individual arrangement of planar tiles with the multidimensional positioning capability of the planar movers floating above them. The movers can be moved jerk-free and contact-free in two dimensions at up to 4 m/s with 2 g acceleration and 50 μm positioning repeatability – noiselessly and without abrasion.

The planar motor system is highly scalable to suit individual needs and considerably simplifies the design of machines and plants. Due to the maximum flexibility in mover positioning and the very high dynamics it is possible, for example, to divide product flows very simply and individually, so that previously needed robots or inflexible mechanical devices can be efficiently replaced. The contact-free mover travel also eliminates wear, emissions and the carryover of contamination.

Flexible and versatile motion functions
The basis of the XPlanar system is the planar tiles, which measure 240 x 240 mm and can be arranged in any desired geometry that is precisely adapted to the application at hand. The tiles contain the entire electronics and support EtherCAT G communication. A freely selectable number of planar movers floats above them, made possible by integrated permanent magnets. The movers can be used not only horizontally, but also vertically and even upside down.

There is a choice of four different planar mover types:
• The 95 x 95 mm small mover for payloads of up to 0.4 kg
• The 155 x 155 mm standard mover for payloads of up to 1.5 kg
• The 155 x 275 mm long mover for payloads of up to 3 kg
• The 275 x 275 mm big mover for payloads of up to 6 kg

The two-dimensional X/Y positioning of the movers is supplemented by further motion functions:
• Lifting and lowering by up to 5 mm, an optionally included weighing function
• Tilting by up to 5° for transporting and handling liquids
• Rotation by up to ±15° or up to 360° above special planar tiles

The collision-free and synchronised movement of several movers with automatic path optimisation are further features provided by the TwinCAT automation software. The movement of several movers together in a group, for example, allows the maximum payload to be increased.

Suitable for the widest range of applications
XPlanar is suitable for use as a highly flexible transport system in general machine building, especially for the automation of packaging, assembly, sorting and order picking processes. The free choice of surfaces – easy to clean glass, stainless steel in hygienic design or plastic film – enables use in a clean room and in the pharmaceutical and food industries, as well as in a vacuum.

For more information contact
Michelle Murphy, Beckhoff Automation,
+27 11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
The factory of the future brings to mind abstract concepts like big data, artificial intelligence, digital twins, algorithms and connected machines. It creates for us a vision of speed, communication and flexibility. What is not always addressed is how you turn all these ideas into products you can touch. What tools are equally fast, flexible and free of physical constraints, and can actually machine a workpiece in these highly connected and flexible processes?

This is where the world of photonics comes in – the science of harnessing photons through the cutting edge use of lasers and fibre optics – and it has become a key technology for smart factories. The connection between data and the physical world is a focused beam of light that is weightless and contactless – connected light. And look at what that light can do.

### Machining at the speed of light

One of the biggest advantages of lasers is that they can process whatever material you like, from metals and glass to plastics and even skin. They give you complete freedom. They don’t have tool changes, they don’t break down and they don’t wear out.

They also have a high degree of precision in processes monitored by sensors to produce micro and even nanosystems; and they are ideal for sensitive materials, as heat input can be controlled precisely. In combination with scanners and sensors, control loops are possible that adjust themselves in real time. Smart lasers understand what material they are processing, how the process develops and when it is finished; and they can adapt to changes in the material such as shape, reflectivity, thickness and orientation.

### Photonics is the enabler

Photonics is widespread in industries ranging from automotive, aeronautical and mechanical engineering, to plastics, glass and electronics. Lasers can be used to manufacture a strong, lightweight wind turbine blade or the crash-safe chassis of a car. The production of batteries, fuel cells and solar cells requires laser technology. Shipbuilding yards use lasers to cut and weld enormous steel structures for freighters.

Every semiconductor chip today is manufactured using optical lithography; and photonics provides smart factories with optical fibres for high speed, reliable data communication, fibre lasers for production, and sensors for intelligent feedback.

Laser technologies also provide the accuracy and flexibility needed for the production of millions of electric motors, electronic power components and lightweight 3D printed metals and plastics. Laser-welded hairpins are replacing costly windings in electric motors. Laser-cut electrical sheets have advantages over mechanically machined sheets in the production of motors.

### Changing the game

The vision of IIoT is to create smart, efficient factories where autonomous machines can recognise their surroundings and communicate with other machines, as well as people. Intelligent production means the machine finds out for itself what to do. This is done by using photonic sensors to combine data connectivity, sensor technology, speed and artificial intelligence.

This is already happening. With reliable in-line quality monitoring, many machines in today’s production lines are now intelligent enough to interface and operate themselves without the need for manual input. They can deliver reports automatically as well as report or shut down any processes after analysing the data collected. For example, a machine can recommend a change in material flow if it...
Identifies an interruption in the production line or a change in average completion times for a process. Sensor systems enable safe human-machine cooperation.

Small batch sizes need flexibility and easily controllable tools. This is a problem in factories that still depend heavily on mechanical processes such as milling, punching, sawing and drilling. But mechanical tools are gradually being phased out. They are being replaced by lasers, which offer a faster, simpler and more flexible way to produce things on demand. These are the trends:

- Manufacturing chains using lasers are on their way in, manufacturing chains using mechanical tools are on their way out
- The actual workpieces are turning into data carriers with the power to communicate
- Individual parts are being made from data sets
- Part shapes can be changed with each different set of data

Smart laser industries
These are some of the industries where lasers are paving the way for IIoT, with the processes provided by cutting edge companies such as Trumpf, Coherent|ROFIN, II-VI HIGHYAG, IPG-Laser and Manz.

Additive manufacturing
Also called 3D printing, this allows fully automated, digitally controlled serial production from one unit. Lasers build up highly complex components layer by layer from metallic or plastic powder – without tools and with previously unimaginable design freedom.

Photonics for a new era of mobility
The automotive industry is driving two future global projects: electromobility and autonomous driving. Based on a survey of more than 320 automotive manufacturers, digital transformation consultancy firm Capgemini reports that smart factories could add up to $160 billion annually to the auto industry alone in productivity gains by 2023.

Lasers play a key role in high voltage battery manufacturing. One third of an electric vehicle’s added value is accounted for by the battery process chain alone – considered to be the very nucleus of electromobility. Lasers are as indispensable here as in in-line process monitoring. The same is true of the complex manufacturing processes needed for the mass production of electric motors, power electronics and lightweight designs.

Imaging specialists such as Keyence, Stemmer and PCO contribute indispensable in-line inspection solutions for battery cell manufacturing. Cell service life and operating safety are often a question of nanometres and micrometres. Sensors measure electrode thickness, monitor the homogeneous distribution of active materials, and control all the rolling, drying, cutting and welding processes, enabling production defects and deviations in tolerances to be immediately rectified.

Photonics also forms the backbone of automated driving, for imaging, sensing, smart displays and media communication networks. Light detection and ranging (Lidar) systems for control and navigation in autonomous vehicles are replacing the sensory perception of human drivers. Optical sensors generate massive volumes of data (in the terabyte range every hour), so the trend is towards intelligent sensor systems that perform their own data analysis before deciding which data to forward to the on-board computers. This high level computing power in confined spaces together with efficient data transmission would not be possible without laser technology and optical inspection.

Printing
The printing process chain is another typical example of IIoT in action. Small print runs and personalised prints mean more frequent order changes, so automated process chains prevail. Printing is done on packaging, glass, metal and ceramics, as well as on individualised print products. Inks are fixed on surfaces with UV or IR heaters or LED technology. Laser and camera systems control the quality.

Codes applied by laser to the products transport the control information to the respective machining centres and robots. These codes allow clear allocation of production parameters to individual products and also make the process transparent. The production status can be tracked and documented. The codes also contain shipping information.

Ultrasound-pulse laser technology
At the cutting edge, ultrasound-pulse laser (USPL) technology, awarded the 2018 Nobel Prize in physics, is rapidly breaking into industrial production. This is set to transform the photonics landscape and revolutionise applications for IIoT. Operating at extremely high peak intensity and ultrashort pulse widths in the femtosecond range (10-15 seconds), USPLs suppress heat diffusion to the surroundings and enable ultra-high precision nanofabrication of a wide range of materials that cannot be achieved with existing microfabrication technologies. Optical fibres will soon distribute the energy from USPL lasers instead of solid-state lasers, paving the way for completely new applications.

In the automotive and railway industries USPL technology meets the demand for miniaturisation, high precision, high quality, applicability to a diversity of materials, smaller lots and cost-effectiveness. For example, ultrafast lasers have been used to produce exhaust gas sensors made of special ceramic layer systems. Panasonic has used picosecond lasers in mass production to produce funnel-shaped ink-jet nozzles. Irradiation by a femtosecond laser in halogen gas produces conical microstructures on a Si surface that can act as an antireflective surface. This technique was commercialised by SiOnyx for the production of photovoltaic Si solar cells and led to a 15% reduction in costs.

In addition, the development of killer apps for semiconductor chips such as printed board drilling by CO₂ lasers and photolithography by excimer lasers will establish a firm position for USPL processing in manufacturing.

Adaptive beam shaping
Another approach to smart laser manufacturing is being pursued by research fellow Dr Ben Mills at the Optical Research Centre of the University of Southhampton. He is combining the precision of femtosecond lasers with the high speed control of beam shape, potentially enabling some extraordinary new applications. “We’re ready to unlock a revolution in laser processing for applications ranging from sensing to healthcare,” says Mills of the highly customisable technology. The latest closed loop system self-corrects in real time, for example to work around a speck of dust – perfect for IloT.

The potential for industrial applications is significant – this beam-shaping approach enables processing in almost any material at extremely high precision. The current challenge is to move to 3D manufacturing. “We believe our technology will eventually enable the fabrication of 3D structures from almost any material at a resolution of hundreds of nanometres,” Mills concludes.
Five hydraulics technology trends

Innovative new technologies are laying the foundation for the latest hydraulic systems and applications designed for construction, agriculture, mining and power generation. From smart user interfaces to load sensing valve technology to hybrid actuation systems for renewable energy applications, these solutions lead to productivity increases, energy savings and maximised operational efficiency. Here are five key technology trends presented by Parker Hannifin that are shaping the future of hydraulics.

1. Innovative heavy duty vehicle technology
New generation load sensing valves: Parker’s EQA EcoFormance electric flow amplifier technology is a significant advancement in load sensing valves. By automatically adapting the meter-out pressure to the load conditions, machine control is greatly improved. This is especially useful for functions with slew or jib movements, or digger arms with over-centre movement.

Electro-hydraulic control: Parker’s IQAN Connect is a totally electronic approach that replaces mechanical and electromechanical systems for controlling and monitoring hydraulics in mobile machines. This digital ecosystem ties together Parker’s smart hydraulics and electronics products, resulting in a synergy of intelligent components and customisable software that delivers next generation connectivity while providing flexibility in design and development.

Accurate mobile diagnostics: Abnormal temperature and pressure levels can adversely impact the function of hydraulic lines and pump systems in heavy mobile machinery. Parker’s SensoNODE Blue™ sensors give users an advanced condition monitoring solution that provides accurate readings without excessive wiring, allowing for mobile diagnostics with the cab door closed.

2. A smart user interface to improve machine efficiency
Parker has been building a new presence in industrial Internet platforms and ecosystems by developing a software platform for advanced and flexible user interface design. This enables machine manufacturers to increase machine functionality and efficiency and to create new types of business. Developing smart applications requires a robust software platform for the HMI device. Parker’s UX Toolkit software tool enables easier development of demanding applications for machine instrumentation, control and adjustment. The applications can include supporting applications for core machine functions, smart control systems, diagnostics or prediction applications that decrease downtime, or GPS monitoring and navigation applications. Solutions helping end-users to improve performance and efficiency include applications for mobile hands-free devices, logbooks, usage monitoring, and task management (for example managing bus lines).

3. Energy saving hydraulic systems using drive controlled pumps
Modern industrial machinery is creating ever-increasing demands on hydraulics to provide more efficient and quieter solutions with a smaller footprint, while maintaining the traditional benefits of hydraulic systems such as high power density, precise control and enduring performance. But these benefits come with the high cost of inefficient energy allocation, heat generation and noise.

Conventional hydraulic power units require oversized pumps and motors to ensure performance during a system’s highest duty cycle demands. In today’s eco-conscious and globally competitive economic environment, a transition to systems in which power is precisely modulated to the requirements of specific tasks within highly complex hydraulic systems is essential. This is where drive controlled pump (DCP) technology can provide a solution to address the challenges of more demanding applications, rising energy costs and greater environmental requirements.

4. Variable speed drives become simpler and more efficient
Variable speed pump drives save up to 70% energy compared to conventional drive solutions. Parker has developed a new, innovative variation of its drive controlled pump. The combination of an optimised axial piston pump with two displacement volumes and a very compact synchronous servo motor offers decisive advantages over common variable speed pump systems:

• Low torque due to de-stroking in pressure holding, resulting in reduced acquisition costs for the motor and frequency converter
• High traverse speed through up-stroking when in rapid drive mode
• High operating pressure, high productivity and high energy efficiency

5. New hybrid actuation system ideal for renewable energy applications
Parker has developed a hybrid actuation system (HAS) that is ideal for renewable energy actuation applications such as those used with solar panels, wind turbines and hydropower dams. The new hybrid design combines the controllability of traditional electromechanical actuators with the power density, longer life and resistive force capabilities of traditional hydraulic systems. The result is an improved actuation system for wind and hydro and other renewable energy systems, with a wider range of capabilities.

The hybrid design of this high efficiency, modular system is a fully self-contained system with no hydraulic hoses or power units. Hybrid hydraulics achieve exceptional economies of scale, with the ability to move over a megawatt from a single point. This makes HAS a good choice for large or small arrays.

To read the full story go to https://motioncontrol.co.za/+parker3 or visit https://tinyurl.com/ylyk49dd

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za
REDEFINING THE DCS...AGAIN.

AUTOMATION & CONTROL SOLUTIONS

Complete Process Control Solutions and Services Provider
Schneider Electric’s new high end Modicon M580 Ethernet programmable automation controller (ePAC) features redundant processors, native Ethernet, and cybersecurity embedded into its core. It combines native Ethernet capabilities, high performance, high availability for processors and networks, improved industrial cybersecurity, greater flexibility in design and improved agility for operation.

The Industrial Internet of Things (IIoT) refers to the billions of industrial devices, ranging from machines in a factory to the systems running oil pipelines that are filled with sensors, connected to wireless networks, and gathering and sharing data. The introduction of inexpensive sensors and high bandwidth wireless networks means that even the tiniest devices can be connected up and provide the intelligence that enables them to be monitored and tracked, sharing data and communicating with other devices. This mountain of data can then be collected and analysed, and acted on in real time to make better decisions and to improve processes. As advances in technology make it more cost-effective to deploy IIoT, industries will need to acquire a strategic approach to integrating new sensor data with pre-existing data environments.

The competitive advantage this data can bring means that today, more than ever, industrial organisations are looking for ways to integrate controls, automation, and data analytics visualisation software to reap the benefits of IIoT and gain operational and competitive benefits for their business.

With this in mind, Schneider Electric has spent decades developing solutions to help manufacturing organisations reap the benefits from their systems and harness the true power of the Internet. Firstly, the company’s ExoStructure empowers end-user customers to implement scalable and converged IT/OT solutions to deliver innovation at every level. This architecture and interoperable technology platform unites energy automation and software, ensuring that end-users enjoy enhanced value around safety, reliability, efficiency, sustainability and connectivity.

The company’s commitment to innovation in digitalisation over the last twenty years has also inspired the development of IIoT solutions for edge control. The Modicon M580 is its flagship controller with Ethernet at its core.

A platform that optimises open networks, the M580 ePAC, provides industrial plant operators with the power to design, implement and run a process that actively employs the benefits of open networking, helping customers to access consistent and accurate data for timely decisions, and reduce downtime with detailed insight into alarms and events. In addition, it enables customers to quickly diagnose and identify the root causes of issues, as well as make informed decisions about plant operations and energy management.

The M580 with Achilles Level 2 Certification was built with security, performance, and sustainable evolution in mind, and is the most advanced PAC ever designed by Schneider Electric in terms of industrial cybersecurity. It is tested according to Ethernet services and protocols such as ARP, ICMP, TCP and IP, and firmware integrity is checked at every startup and is compiled and stored in memory, preventing its decompilation by an outsider.

Mark Williams, director of the Plant Solutions Competency Centre at Schneider Electric, says: “The M580 ePAC is leading the next generation of PACs that leverage open and fast Ethernet communications. Powerful performance is a core feature of the M580 ePAC, and the PAC delivers an incredibly high level of computing power through a multicore processor, allowing high speed connectivity to network devices, while enhancing resistance to cybersecurity threats.

In addition, upgrading to the M580 ePAC requires no additional investment in wiring, software development, or training.”

The M580 ePAC is also compatible with the xBus communications of the Modicon M340 and Premium PLC. Users can easily switch between the different controller sizes in the Modicon range without changing their I/O racks and cabling. Modicon M580 ePAC has been built for PlantStruxure, a collaborative and integrated automation architecture developed by the manufacturing giant. PlantStruxure brings together the telemetry, PLC/scada, and DCS offerings with complete lifecycle services to help make operations more efficient and seamless. From initial design to modernisation, PlantStruxure transparently connects the control, operation and enterprise levels of the business.

For more information contact Silindelokuhle Dumakude, Schneider Electric South Africa, +27 11 254 6400, sli.dumakude@se.com, www.schneider-electric.co.za

A new era of automation control

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For more information contact Silindelokuhle Dumakude, Schneider Electric South Africa, +27 11 254 6400, sli.dumakude@se.com, www.schneider-electric.co.za

Gear units and motors from SEW-EURODRIVE Pty (Ltd) have always set the trend and established new standards in drive technology. For this reason, the quality label “made by SEW” has become a hallmark of quality in the drive industry. Market-oriented products developed and manufactured in-house, as well as uncompromising quality, are the cornerstones of our success.

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A new servo motor

The new MS2N synchronous servo motor range is Tectra Automations’ latest product offering to break new boundaries in the electric drives and controls industry. It combines high dynamics with compact dimensions and excellent energy efficiency, with more torque, higher speeds, a practical single-cable connection and extensive options for the highest servo mechanism requirements.

The new range includes over 50 motor types in 6 motor sizes, 5 motor lengths, and more than 20 fully configurable options, covering maximum torque up to 360 Nm and maximum rotational speeds up to 9000 rpm. It is 30% smaller than its predecessor, has a low rotor inertia for maximum dynamics and high rotor inertia for optimal adaption motor masses.

Intelligence progresses all the way up to the motor by storing the individual readings of every single motor as well as the saturation and temperature data into the motor data memory.

It comes equipped with a certified SIL3 encoder, which allows for maximum level of safety for all safety functions. This includes safe absolute end position which replaces the hardware limit switch by software, 31 configurable safe cam areas, reduced commissioning due to semi-automatic support and PC-free device replacement when servicing. The motor has a maximum torque error range of 5%, which compares very well with the standard torque error range of ±5 and ±35%. Applications include force and pressure control in robotics and production machines and condition monitoring.

For more information contact Wiets Pretorius, Tectra Automation, +27 11 971 9400, wiets.pretorius@boschrexroth.co.za, www.hytecgroup.co.za/company/tectra-automation

VSDs drive cost saving in pumping systems

WEG variable speed drives (VSDs) offer the agricultural sector the ability to reduce the operating cost on automated water collection systems with a reduction in motor energy consumption when the motor speed is reduced. In addition, they allow the monitoring of all functionalities of a pumping operation, including special functions that not only save operating costs, but optimise, control and protect the entire irrigation system. Just as significant is the ability to send commands automatically to the electric motor, thereby facilitating optimum control of the pumping installation. This allows greater effectiveness when irrigating.

The WEG CFW 700 frequency inverter provides accurate speed variation for the electric motor, ensuring it operates according to the irrigation system pressure needs, and with the necessary field telemetry it can also take different land inclinations into account. Another important benefit is the ability to detect low pressure indicating leakage in a pipeline.

Where water is being pumped from a river to the dam for further irrigation, use of the WEG VSD will allow optimum control of the water level. It will prevent overflow situations, and dry pumping can be set up without the addition of flow sensors. The VSD can also be used to facilitate sleep and wake modes in the pump operation. This facilitates significant cost savings as pumping can then be done on a demand driven basis only.

For more information contact Zest WEG Group Africa, 27 11 723 6000, info@zestweg.com, www.zestweg.com
Specialist rigging company, Film Riggers, was recently called upon to ensure the safety of Alain Robert, aka the French Spiderman, while he scaled a skyscraper in central Johannesburg to create an advertisement for an international tyre manufacturer.

Film Riggers, a long-time user of automation and mechatronics technology from SEW-Eurodrive, was approached by a production company to execute logistics and safety during filming for the advertisement. The idea was to have Robert climb the building while it was raining, as a metaphor for the extra grip provided by the tyres on display.

Partner Graham Terrell, who established Film Riggers with Alard Hüfner in 2012, explains that Robert had two ropes attached to a harness, controlled by SEW-Eurodrive drives using a custom program based on torque control to belay the climber.

The winches devised by Film Riggers use the Movidrive inverter, including the IPOSplus integrated positioning and sequence control system. The drive inverters have a wide power range, large overload capacity, and a modular design. In addition, they facilitate unrestricted application of AC drives, featuring the most modern digital inverter technology, according to Maxolution Engineer. Dylan Enslin.

For this particular project, Film Riggers used CM112 synchronous servomotors. Two 11 kW drives were used to secure the climber, and a 30 kW drive for the accompanying camera system.

Terrell was given access to the OEM’s electronics workshop to configure a miniature setup of the system, based on a 0,55 kW Movidrive drive inverter. This allowed for more controlled and refined testing, allowing Terrell to ultimately scale up the solution to the specific requirements of the project.

Commenting on the challenges, Hüfner says that Film Riggers had the dual responsibility of winching the camera platform up and down, in addition to securing Robert and ensuring his safety during filming. “The idea was for the camera to be seen to be almost in pursuit of him, then tilting as it went past and tracking him,” elaborates Terrell. “Due to changes made at the last minute, we had to adjust the programming in order to cater for the new reference points needed for the rigging. While this is a unique application of the Movidrive inverter technology, it is an excellent example of the flexibility and innovation of SEW-Eurodrive in responding to specific customer requirements and offering tailor-made solutions capable of adapting to the latest developments.”

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
Hytec in partnership agreement with GS-Hydro

Hytec South Africa, and GS-Hydro, a multinational non-welded pipe manufacturer, have entered into a non-exclusive partnership agreement. This endorses Hytec South Africa as a sub-Saharan Africa distributor for all GS-Hydro components and piping systems above 42 mm. GS-Hydro is a leading supplier of non-welded piping solutions for hydraulic and other low and high pressure applications with a high demand on quality, reliability and cleanliness. The distributorship increases the company’s product and service capabilities and presents new opportunities for distributing non-welded, leak-free piping systems.

Cost savings through the lifetime of the piping systems are gained because there is a lower total installed system cost, a shorter installation time, less flushing time and reduced need for maintenance and repairs. “These benefits lead to fewer production interruptions and much shorter downtime when interruptions do occur,” says engineering manager, Andre Lindeque. “The flexibility facilitates fast and easy installation, which translates to significantly lower installation costs when compared to a welded piping system.”

The superior technology used, which provides the high-quality, leak-free piping system, is approved by classification agencies. The environmentally friendly pipes provide consistent quality due to machined and prefabricated assemblies, they are suitable for different materials, and they offer the highest level of cleanliness. “As there is no welding involved in manufacturing these pipes, there is no need for post-weld cleaning or costly weld inspections such as X-raying,” Lindeque explains.

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Intermot radial piston motors

Axiom Hydraulics has added another high quality brand to its impressive range of hydraulic components. With proven high quality Italian engineering, Intermot’s IAM radial piston motors are perfect for slow speed shaft output applications. Backed by progressive research and development, they have peak pressure ratings up to 350 bar, so greater torque capabilities are easily achieved, even at low rpm. Displacement availability ranges from 80 up to 8000 cc/rev. Various shafts and porting selections are also available throughout the range.

Sustainability and cost efficiency are critical in these challenging economic conditions, and companies are continuously searching for the best way to reduce consumption. Thanks to over 30 years’ experience in the hydraulics industry, Intermot radial piston motors offer excellent mechanical and volumetric efficiency at higher speeds and pressures compared to competitors. The brand is one of the most well known in the hydraulic motors sector, especially within the plastic injection moulding industry.

The company’s core focus is the development, production and distribution of high quality radial piston hydraulic motors with a distinctive ‘star’ design. Its comprehensive research and development centre is highly regarded in Europe for its expertise and speed of development. With eight production sites worldwide it produces motors that feature unique quality standards, with speed and excellent lead time.

Axiom Hydraulics boasts a comprehensive stock-holding of all aftermarket spares and in-house repair services.

For more information contact Fritz Kern,
Axiom Hydraulics, +27 11 334 3068,
fritz@axiom.org.za, www.axiomsa.co.za
New pressure sensor with IO-Link

Besides continuous process value monitoring via IO-Link, the new PV type pressure sensor from ifm electronic offers two switching outputs. It also features a compact design with G ¼ process connection and is distinguished by a switch point accuracy of < ± 0.5% and a repeatability < ± 0.05%.

Miniaturisation for industrial applications
The new sensor features a thin-film measuring cell directly welded with the process connection. This technology guarantees high accuracy in a very compact housing with only 19 mm across flats at an optimum price/performance ratio.

With the sealless design of the process connection, the sensors can be used not only in hydraulic applications but also in inert gases. In industrial applications, the laser labelling on the housing is advantageous. Even in adverse environmental conditions, the sensor remains permanently identifiable. Another benefit is the integrated IO-Link interface. Thanks to IO-Link, the new pressure sensor continuously transmits process values and other important data, e.g. a pressure peak counter. Moreover, the digital measurement results are more accurate because there are no conversion losses by D/A converters or external influences (e.g. cable lengths). So thanks to IO-Link, the user is well prepared for Industry 4.0.

For more information contact ifm – South Africa, 086 143 6772, info.za@ifm.com, www.ifm.com

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The Hydraulic Centre (Pty) Ltd - Head Office, 1227 Leader Avenue, Robertville, Randburg | info@thc.co.za | www.thc.co.za
Making the move to weld-free piping

There are numerous issues associated with modern welded pipes, not least those concerning accuracy, reliability and cost. Although welded connections have been the traditional solution, there are a number of inherent problems with welded pipe joints that are driving demand for an alternative solution. Moving to a weld-free piping solution presents many potentially advantageous opportunities, particularly if this can be backed by onsite support to help optimise system performance and uptime.

Inherent problems with welded joints include the potential for stress cracking and subsequent corrosion, while ongoing weld integrity can only be proven with regular, expensive and time consuming X-ray testing or other non-destructive methods. Then there are the costs to consider. Not only does welding consume high levels of energy, but there are numerous time and cost issues around cleaning, degreasing agents and anti-corrosion resources. Safety is another concern, particularly those relating to welding fumes and fire risks. Indeed, increased system pressure, especially in hydraulic systems, means there is growing industry focus on safety, a fact supported by a new European directive for pressure vessels. For these reasons, some industries, such as oil and gas, shipbuilding and mining, have already started specifying the use of weld-free technology.

Go weld-free
It is well documented that weld-free technologies such as flange connection systems deliver superior performance in comparison with welded joints, especially where compressive strength, reduced leakage and contamination-free lines are critical. Furthermore, cold forming is much quicker, enables conformity with regulation and facilitates integrated connection into existing hydraulic systems. Unlike welding, such solutions can also be prefabricated off-site to further accelerate on-site installation, while flanges that can be oriented make assembly easier and quicker.

Additional benefits include the elimination of degreasing or anti-corrosion agents, increased safety with no dangerous gases or fire risks, reduced energy consumption, less downtime and extended piping lifespan.

Onsite support
Ensuring the effective delivery of these advantages, however, can only be assured through the support of onsite services/solutions. Considerable added value can be achieved using a complete onsite solution provider. This single point of contact can offer everything from expert advice, design and pre-configuration, to delivery and installation, not only saving time and money through faster installation and reduced downtime, but maximising system efficiency and reliability.

Technical competence
Onsite resources offer up a number of technical competences, not least regarding the development and design of new systems or upgrades. This task can be supported by the latest CAD and simulation software to optimise pipe layout and dimensioning, as well as advanced measurement systems, the data from which can be used to enhance quality control and reliability further.

Additional technical competencies offered by reputable onsite support providers should include pipe bending, tube-end processing, tube cleaning and flushing, and pressure testing – all backed with expert assembly, installation and customer training.

Parker Engineered Service Centres
One such service is the Complete Piping Solutions (CPS) programme from Parker. This global service network has been established in response to identified market needs for service partners with expert knowledge of weld-free piping and connector solutions, providing both MRO services to large OEMs and to end-use customers via distributors.

By appointing distributors, the service can quickly be delivered at a local level. Accredited certified distributors can offer specific competencies – including bending, end forming using Parker Parflange onsite at larger customers for pipe diameters up to 50/60 mm; from the distributor’s own premises for pipes up to 120-170 mm; and supported by a specialist at Parker’s Engineered Services Centres for pre-bending larger pipe sizes and for complex design and solutions support.

Parker’s Engineered Services locations utilise the latest IT-based design and offer workshops that can process pipes with external diameters up to 220 mm on the latest CNC bending machines. These machines can realise 2xD to 3xD bending radii defined for relevant pipe diameters. The connections of Parker’s Parflange F37 system comply with standards that include ISO 6162-1; SAE J518, 3000 psi interface (Code 61); ISO 6162-2; 6000 psi interface (Code 62); and ISO 6164 flange pattern. The manufacture of other system components, such as blocks or manifolds, can also be undertaken.

Among the latest additions to CPS are onsite containers and hot oil flushing containers. The containers house all of the assembly machines required for pipes up to an outside diameter of 170 mm. Hot oil flushing units ensure that pipeline systems are clean and debris-free before going into operation.

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Mines require a range of hire equipment from time to time. Precisely what equipment is needed depends on the type of mine. For instance on an open-pit mine, generators and lighting plant are most frequently hired. “Some of the mining contractors also use our high pressure diesel compressors for exploration as well as blast-hole drilling,” explains business development manager for long term rental, Henry Fourie.

On surface during shaft sinking, the mines use electric or diesel 1500 cfm machines. Once the mine is established, then Rand-Air is also capable of supplying air from surface for the underground mining operations to power rock drills of various types. “For this, a popular choice is the 1765 – 2119 cfm electric machines which we have supplied in various quantities, from as few as two units up to 10 units on a compressor bank,” he continues.

Rand-Air also has specially modified electric units for use underground. A major deep-level gold mine, for example, will have a two kilometre deep shaft down to a certain mine level. From the shaft, it can then be as far as a kilometre or more to the rock face where drilling is actually happening. Many older South African mines have been in existence for decades. Over time, the compressed air pipe systems have deteriorated, allowing air to escape and pressure to dissipate from numerous leaks before air actually reaches the driller.

Some of South Africa’s older mines also have surface compressors feeding air underground which have been operational for some time. With these compressors, there is a much greater chance of periodic failures which can take some time to repair. During these periods, hire compressors can play a cardinal role in keeping the mine operational.

Fourie explains that there is no given rental period, although the minimum is usually 12 months, which can be extended to some years. “We have one mining company on our books that has had long-term rental equipment from us for 12 years,” he continues.

Long-term rentals come with the benefit of a lower rate to the mine. With long term rentals, Rand-Air offers very favourable service level agreements which it takes pride in honouring. “Our rapid response times, which we take pride in meeting, form a key part of these agreements,” continues Fourie.

A further factor in favour of long-term rentals is that the mine does not have to employ skilled people specifically to service and maintain compressors or generators. The challenge that faces Rand-Air with long-term rentals is that production pressures on mines are invariably immense and both men and machinery sometimes have to work in exceptionally harsh environments. However, with both short-term and long-term rentals, customers are always assured of a Rand-Air machine that will look and perform as well as a brand-new unit. Rand-Air service technicians are assiduous in supporting both short-term and long-term rentals. Should a customer ever experience difficulty with a rental unit, the Rand-Air service technician is prepared to drive to the mine and rectify any issues.

In terms of any responsibility the mines have for Rand-Air’s hire equipment on a long-term rental, Fourie explains that apart from not intentionally damaging the machines they have none. “Rand-Air takes full responsibility for maintenance as we pride ourselves on our service levels, response times and knowledge of our equipment,” he explains.

Depending on the number of machines on site, Rand-Air will have a dedicated staff member on site to ensure continuous faultless functioning of any hire equipment.

“Anyone who works in the mining environment will know what a challenging environment it is to meet demanding production targets,” adds Fourie. “So having someone to provide trouble-free compressed air, power or lighting benefits the mine in every way. Should the mine expand, and it needs more equipment, this is a phone call away without having to find additional capital first.

When this happens, we will give the mine a solution that is custom-made exactly to its requirements,” he says.

“There are many benefits to mines hiring equipment on a long-term basis. Ultimately, by looking to a third party to provide ancillary services, mining operations can conserve operational cash flow as well as capital. In the longer term, this promises the mining company a viable sustainable future with increased profitability horizons,” he concludes.

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Refrigeration compressed air dryers

The R Class range of compressed air refrigeration dryers and RSXW chemical adsorption dryers have consistently low dew points, with an attractive entry price and a low cost of ownership once in operation. The design of the Mimic display panel is deliberately simple, showing the status of the essential temperature. Along with the freon HP and LP pressure gauges, it provides all the information that is necessary for the operator or service engineer. The Mimic panel does not control the dryer, it merely provides operator information. The actual control of the dryer is through a simple electromechanical system that is very easy to maintain and exceptionally reliable, with a low cost for replacement parts. There are no complicated control panels or PLCs on these dryers that can lead to downtime through control panel or controller malfunction.

The smaller R class units are fitted with a 3-pass stainless steel plate-to-plate heat exchanger and condensate separator. The larger PD series has a proven nano-coated aluminium plate and 3-pass exchanger. Nano-coating repels dirt that would otherwise coat the inside of the exchanger. Nano-coatings also assist in keeping the pressure drop to a minimum. The exchangers have an agglomerator pad type separator. This design of condensate removal provides superior liquid condensate extraction performance under a wide variety of compressed air flow rates. Condensate drainage is through an intelligent level controlled or timed automatic drain. Both dryers are fully supported by Artic Driers.

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Power solutions for load shedding

From mines to factories and even the small business and residential sector, Cummins has a full range of alternative power solutions on offer. The technology is particularly suited to dealing with load shedding due to features such as full load acceptance for critical equipment.

In addition, its energy-efficient engines not only comply with international emission standards, but also have a high fuel tolerance level, which makes them ideal for arduous African operating conditions. In terms of automatic start-up, Cummins gensets have one of the best response times on the market.

Cummins can also supply one-stop solutions for multiple backup power requirements for large scale clients such as mining operations or factories. It not only provides the gensets themselves, but all ancillary components, from air and oil filters and even coolant.

Another significant benefit for Cummins clients is that it can supplement its gensets with maintenance contracts of varying duration, depending on the application and specific requirements. Clients also have peace of mind because only certified installers are used, in addition to the company being able to offer the type of warranty that sets an industry benchmark. Cummins can even become involved with the design phase of alternative power solutions, all the way through to installation and commissioning. Fully-trained technicians are located throughout South Africa, in addition to an extensive dealer network that can also accommodate remote locations.

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Worm gearboxes for solar tracking systems

BMG has extended the supply of Varvel gearboxes and variators for small and medium power applications to include customised worm gearboxes for installation in photovoltaic (PV) solar tracking systems. Customised Varvel worm gearboxes – designed to minimise efficiency losses associated with the energy conversion process – are incorporated in PiA Solar’s ContouR+ single-axis trackers. These compact gearboxes, which are maintenance-free and sealed for the life of the unit, maximise efficiency by ensuring solar panels are always in the optimal position to track the sun.

The PiA Solar tracker solution consists of a horizontal single-axis tracker that is capable of contour tracking the sun, both along and between rows of solar panels. The modular design requires no cutting, drilling or welding on-site and forms a mass-balanced system, reducing wear and self-consumption of the PV plant. The spring structure eliminates deviations in tilt within the rows, reduces peak power requirements of the electrical push-pull drive system that provides a constant tension drive beam and also protects against oscillation of the system at low tilts.

BMG’s lightweight Varvel worm gearboxes are installed on solar panels to ensure that they are constantly in an optimal position to be able to effectively track the sun. They have numerous advantages for PV installations, including an ingress protection rating of IP66. Other features include a high ratio of 1:120:1 and the non-back driveability design for locking the solar panels in place to resist external forces from moving the panels off their stopped position.

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Innovations will allow construction companies to break free from diesel dependence and focus on energy, efficiency and the environment.

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Energy-saving drives and motors

Vert Energy is the exclusive distributor in southern Africa of Leroy Somer electric motors, geared motors, drives and alternators. Managing director, Grant Robertson says that with the implementation of variable speed and the optimisation of mechanical speed reduction efficiencies, maximum saving of electricity consumption can be obtained in any power transmission system.

“Feedback from our customers indicates that by combining Leroy Somer Dyneo permanent magnet technology with variable speed technologies, they have not only significantly reduced energy consumption, but also enjoy a good return on investment and lower overall cost of ownership,” he says.

“Through Dyneo permanent magnet solutions with sensorless control and interchangeability with standard IEC mechanisms, we are able to offer our customers the benefits of the high performance of permanent magnet motors with the simplicity of mounting and installation equivalent to traditional asynchronous motors.”

The Dyneo range, which is manufactured in France, includes the option of an aluminium frame size up to 500 kW. Benefits include European quality standards, with certified ratings and efficiencies from approved regulatory bodies; better heat dissipation than with traditional cast-iron frames; and fewer losses due to improved thermal characteristics.

Leroy Somer’s Dyneo permanent magnet solutions enable the construction of lighter units with a reduced footprint, which is particularly beneficial to OEMs. The compact design and fewer mechanical components mean a reduced size of the chassis supporting the motor. This design also facilitates easy installation of the motor onsite, the simplification of lifting equipment required and reduced transport costs. The motor-drive unit ensures high efficiency levels over the whole operating speed range, especially at speeds below the synchronous speed, where efficiency is higher than with asynchronous motors.

Dyneo technology, which also guarantees optimum torque over wide speed ranges without de-rating or forced ventilation, significantly improves the drive’s efficiency and enhances specific output power, offering better performance than conventional technologies. Other important features include adaptation of the motor speed to the speed of the driven machine, improved speed performance of the driven machine, potential elimination of gearing, a low rotor temperature rise and better bearing performance.

The permanent magnet motors are built using the same high quality European mechanical components as Leroy Somer asynchronous motors, to offer reliability and flexibility. This interchangeable range, with standard dimensions in terms of frame size, flange and shaft extension, provides an immediate energy-efficient solution, without the need for modification of the existing system.

Advantages of the sensorless control design include less wiring and fewer connections for simplicity of installation. Encoders or long cable lengths are not required and there are no environmental constraints like vibration, temperature and abrasive dust affecting the machine. These high performance, energy-efficient variable speed solutions are designed for applications requiring high torque at high speed. They enhance power transmission performance in pumping, ventilation, compression, conveying, extrusion, process control and generators.

In a recent project, a variable speed screw compressor equipped with a Dyneo permanent magnet solution was added to the existing four fixed-speed screw compressors used in refrigeration during the production of beer. This upgrade achieved energy savings of 600 000 kWh/yr, an increase in the maximum speed and improved performance of the system.

In a drinking water plant, the replacement of two asynchronous motors with a single 350 kW Dineo motor-drive unit reduced energy consumption by 10% per m³ transferred. The pump has also increased water flow by 15%. The payback period for this system was 14 months.

Another successful installation formed part of a modernisation programme at a rubber extrusion facility, where Vert Energy’s Dyneo solution eliminated the machine off-centre pulley and belt system. The motor can now withstand operation at 50°C above ambient temperature and because of its compact design, it has been installed under the screw.

Another Dyneo solution was selected for a ventilation axial fan upgrade for air treatment towers due to its high specific output power and direct coupling to the impeller. This system had an optimised motor-drive assembly, with sensorless control, ensuring high efficiency over the entire speed range.

Vert Energy’s service to the electromechanical power transmission sector, encompasses the supply of dependable products that combine high performance, energy efficiency, reduced downtime and extended service life, to meet stringent quality, safety and environmental standards. Field services include re-assembly, installation and commissioning, inspections and diagnostics, as well as onsite maintenance and repair work. The company’s factory and OEM trained technicians travel throughout Africa to assist customers with any electro mechanical breakdown situation or routine preventative maintenance procedures.

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In a lighthouse the structures may appear old and dignified, but the technology inside is modern and robust. Availability, low operating costs and long maintenance intervals are the decisive criteria for the electromechanical design of the lamps. Anyone who takes a look inside a lighthouse along the French coast has a good chance of experiencing drive technology from Faulhaber.

The beam from the lamp room must be visible at least 40 km away. Particularly in areas near the coast, visual navigation signs cannot be replaced by anything else. Some 120 lighthouses with rotating lights are operated, monitored and maintained along the French coast by the government agency, Cerema.

The typical flash of the lighthouses can be achieved with three technical methods: through constant lighting with a flashing light, a constant light source with rigidly arranged lenses and a circumferential aperture, or the combination of continuous light and a circumferential lens system. Cerema makes use of LED technology, which results in a long-lasting and robust lighting system. An availability rate of 99% is achieved. “Reliability was a very important criterion for the choice of drive and led us to Faulhaber,” says Laurent Bernicot from the department for navigation and positioning systems at Cerema.

The design made use of DC-micromotors of the Faulhaber 2342 and 3257 series, as well as brushless DC-servomotors of the 3268 series – each combined with appropriately matched Faulhaber planetary gearheads. In addition to the general functionality of the drives, intensive test runs determined their behaviour in salty air.

The high demands on operation reliability are reflected in a drive unit with two motors. Two motors are connected to one gearhead and run alternately. The alternating operation harmonises the operating hours and ensures availability, as longer periods of downtime often lead to startup difficulties. Should one motor fail, the system in the lighthouse automatically switches to the second motor and reports the malfunction to the control centre. “We use remote monitoring, particularly with the large lighthouses”, explains Dirk Berger, spokesperson of the Stralsund Waterways and Shipping Office. “A two-stage escalation level is integrated in the control, prewarning in the event of impending malfunctions and failure.”

Reliable operation is monitored with a sensor that measures the time per revolution. The lighthouses must turn at the exact speed specified in their identifier. Hidden behind the identifier is a special type of flash sequence that is listed in the nautical charts and, particularly when navigating at night, allows a lighthouse to be identified unmistakeably. “Our goal is to achieve a constant rotational speed on the optical level,” continues Berger. “Thus our motors must be precise.”

The French lighthouses use a control developed by Cerema. The intelligence in the lamp room specifies how frequently and at what rate the light is to be visible within a given unit of time. A sensor measures the rotational speed of the optics and transmits the information to the control. After performing the calculation, the controller adjusts the motor speed via the analog set value directly with the motor supply voltage. The speed is constantly monitored and adjusted. Should a problem be detected, the automation solution saves the error and starts the second motor.

During the design process, Cerema employees selected three different motor types as the standard drive solution. The DC-micromotor of the DC2342 series is tailored for small optics that require only low motor power. Medium-sized optics are put into motion by the graphite-commutated motors of the Faulhaber DC3257 series. For powerful systems with high light intensity and correspondingly heavier construction, the brushless, four-pole servomotors of the 3268BX4 series are used.

During design, it is therefore important to ensure that, apart from normal operation, the motors deliver powerful peak torques in order to safely handle the high starting torques of between 5 and 8 Nm. “This was also an important factor in selecting the Faulhaber motors,” explains Bernicot. “If, however, a standstill occurs because the lighthouses are only operated at night, the optics are decoupled from the motor via a freewheel integrated in the rotary machine when the lamp is stopped.”

With respect to the high requirements on availability with long maintenance intervals, the framework conditions in a lighthouse are demanding. This is why it is so important to maintain a close project partnership. Cerema and Faulhaber have been working closely together since 2011.

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Condition monitoring for maritime sector

The SKF Enlight Centre is an Internet enabled, condition based maintenance and condition monitoring system designed for the global marine industry. This first of its kind, asset based machine health monitoring system (as opposed to measurement focused) has been designed to meet the changing needs of today’s marine asset management professionals.

The web based ‘software-as-a-service’ tool represents the first phase of a multi-segment software development strategy from SKF’s machine health software team. The goal is to roll out this comprehensive, standardised machine condition monitoring offering across all sectors of industry where remote monitoring and operation is required. The new software, which features a radically simplified user interface, will eventually replace SKF’s existing @ptitude Asset Management System.

Easy and intuitive to use, this next-generation system identifies potential machine anomalies before they can cause malfunctions or damage, with data being transmitted via cloud-based technologies to land-based sources of advice and expertise. The Enlight Centre allows data to be accessed from anywhere around the world, regardless of the location of a vessel. The system enables ship operators and engineers to implement an effective condition-based maintenance strategy, scheduling repairs or overhauls to minimise disruption and operational costs and improve safety and reliability.

Using built-in work flows, SKF Enlight Centre provides even relatively inexperienced maritime users with pertinent diagnostic information and analysis. If required this can be shared with SKF staff, who can offer knowledge-based services via the Internet in the event that an impending machine malfunction is detected and further guidance be required.

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Environmentally friendly wire rope lubricants

In a rapidly changing global climate with every industry under pressure to mitigate environmental damage, even wire rope lubrication can play its part. Wire ropes need to be well lubricated to withstand increasingly harsh climate conditions, especially in the maritime and mining industries, but the lubricants used on them can negatively affect the environment. Thankfully, products are now available that help to minimise adverse effects.

The value of products like the Earthwise range supplied by Lubrication Engineers (LE) is immense because of their focus on non-toxicity. LE’s Earthwise EAL Wire Rope Grease (3353) is a certified environmentally acceptable lubricant and is recommended for use in applications on or near waterways. It is readily biodegradable, exhibits minimal aquatic toxicity and will not accumulate in the cells of aquatic life forms. LE also supplies a wire rope lubricant, Wirelife Almasol Coating Grease, for the mining sector. This lubricant is highly tacky, ensuring that it sticks to the rope and doesn’t fall onto the ground.

The Viper lubricator comes in three different sizes to accommodate different rope thicknesses. As the wire rope is passed through the Viper system, the lubrication is applied to the rope. It provides grease penetration, displaces moisture from the rope’s core, provides total coverage, even for large ropes, prolongs the lifespan and improves the performance of the ropes. The reduced risks compared to manual greasing include it being safer to use, using smaller volumes of lubricant, and less leakage and mess. These all have a positive long-term benefit for the environment.

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Modern vessels are equipped with dozens of ancillary items, such as winches and loading cranes, which must all incorporate braking systems to ensure their operation is reliable and effectively controlled. Stromag, part of Altra Industrial Motion, has designed and manufactured marine braking systems for decades, and the company’s products are installed on vessels operating across the globe. That experience has given Stromag unparalleled insight into the demands placed on equipment that operates at sea, and of the evolving needs of vessel owners.

Increasing productivity
“In marine applications, time is money,” explains product specialist, Michael Frank. “The faster vessels can complete loading and unloading operations, the sooner they can be on their way.” He adds that pressure for increased productivity has led to a continual increase in the capacity and speed of ancillary equipment. That in turn has significant implications for braking systems. As cranes and hoists run faster and move larger loads, the amount of kinetic energy in the system increases, and the braking system needs to be able to manage that energy to keep the equipment under control. Over time, Stromag engineers have continually adapted and upgraded their existing range of marine brakes to handle increased loads, but the company recognised that these incremental improvements were reaching their limit. It was time for a new approach.

Increased power handling
A team was established to create an entirely new series of brakes, designed to meet the requirements of current and future generations of fast, high powered marine equipment. Braking systems for marine equipment face a number of significant constraints. They have to fit into a limited space envelope, offer standard mechanical and electrical interfaces for shafts and control systems, and withstand all the rigors of the wet, corrosive marine environment.

“The key to better brake performance is improved thermal characteristics,” explains Frank. “It is the braking system’s ability to dissipate heat that determines the power available.” The thermal behaviour of a braking system is a complex design process, determined by the interaction between multiple components. To get the performance it was looking for, the Stromag team had to apply its in-depth experience of advanced friction system design, to make extensive use of computer-aided simulation and optimisation tools, and to test multiple prototypes on rigs and in the field.

Optimised performance
The outcome of all that work was the most highly optimised friction package the company has ever produced for a dry electromagnetic brake. For customers, that means a significant step change in performance. The improvement can be seen most clearly in the speed ratings of the brakes in the new High Performance Brake (HPB) range.

A 100 Nm HPB brake, one of the smaller units in the range, is rated for operation at 6500 rpm, while its predecessor had a maximum rated speed of 3000 rpm. The difference becomes even more significant as the brakes get larger. The 4000 Nm variant of the HPB is rated to 3250 rpm, while its predecessor was designed to operate at 1000 rpm.

But what about the cost issue? Frank points out that the new design also provides significant benefits here. “The higher power rating of the new brakes means that customers can often select a unit one or two frame sizes smaller for a given application,” he says. “In addition, every part of the new braking system is designed to be simple, robust and easy to assemble.”

Streamlined designs
The overall part count has been reduced, for example, by replacing separate covers with a part integrated into the body of the brake. The HPB series also uses a modular design that shares components between different models, to simplify the manufacturing supply chain. Those changes don’t just mean lower production costs, they also help to streamline maintenance and support activities. In addition, the internal components of the range are all designed to resist corrosion and offer enhanced durability under exposure to salt water or other contaminants.

The HPB series is available in two-face or four-face configurations and with a brake torque range of 80 to 5000 Nm. While the new range of brakes was inspired by the demands of marine customers, the range is also suitable for use in industrial environments where long-term reliability and resistance to harsh environments are a priority.

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Four questions to ask before choosing a drivetrain for heavy industries

When it comes to performance and durability, not all power and motion transmission solutions are created equal. Harsh environmental conditions in certain markets, such as the metallurgical and marine sectors, can heavily damage the drivetrain. In these cases, exceptional performance, durability and reliability are essential.

Power transmission components are critical pieces of equipment, and choosing the right equipment can be daunting. To avoid early breakdowns that can result in failures, it is important to opt for solutions that satisfy the specific needs of the industry. This can be achieved by asking some basic questions prior to specification.

What conditions should the drivetrains withstand?
One of the main aspects to consider is the environment where the equipment is going to be used. Many industries present particular environmental challenges that can take a toll on the equipment. In these cases, the service life of drivetrain parts can be heavily compromised unless they have been designed to meet these specific challenges.

For example, splashes or immersion in saltwater, as often occur in marine environments, can cause gradual corrosion of metal components. Similarly, the metallurgical industry is characterised by bulk material handling in dirty environments under extremely high-pressure, high-temperature conditions. In fact, the rolling equipment in steel mills is exposed to hot, semi-molten metal slabs. Finally, metal shredding machines feature high misalignment angles, vibrations and movements when grinding big metalworks, such as cars, into small pieces.

Are standard solutions good enough for the intended application?
It is always worth investigating standard solutions that are available on the market. If a component from a manufacturer's standard catalogue meets all of the application's demands then this will often be favourable as it is likely to be more cost-effective, offer better availability and better access to spare parts. However, for many specialist applications a degree of customisation – or even bespoke design – may be necessary to ensure maximum performance.

By identifying the conditions that the power transmission equipment should withstand, as well as the properties that the equipment should exhibit, power transmission specialists will develop engineered solutions that provide optimal performance and durability for specific applications.

They can design, prototype and test innovative solutions that meet the needs of their customers and their industrial applications. In particular, they are able to develop solutions suitable for applications such as corrosive marine environments. An example is floating shaft couplings that are designed for use in applications where the coupling shaft needs to span lengths of 10 metres or more. By using carbon fibre construction, the couplings weigh up to 80% less than steel counterparts and do not need any bearing supports or similar structures.

Are maintenance services included?
Before investing in drivetrain solutions, it is also important to consider who will conduct maintenance operations and how simple the process is. While specifying the most appropriate component designs will greatly improve the product's service life, the challenging conditions experienced in heavy industries means the maintenance and repair work will remain a certain necessity for optimum performance.

When preventative or responsive maintenance activities are required, responsiveness, expertise, time- and cost-efficiency are key parameters to consider. If the original equipment supplier is able to include maintenance and repair services with a local field service team, then the likelihood of a component being maintained to the correct standards increases. In addition, having a single point of contact for the supply and maintenance can be highly beneficial.

Ongoing support makes the difference between a supplier and a partner. Look for a supplier that has invested in a service infrastructure that is available to all of its end-users and even offers specialist service contracts for specific industries, such as offshore maintenance service for wind turbines.

What experience does the supplier have?
The harsh conditions found within many heavy duty industries require power transmission solutions with high performance, durability and reliability. Highly skilled drivetrain specialists should be able to assess the sector- and location-specific features to identify the most suitable solution. This also means being able to develop bespoke products and provide an effective maintenance service.

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The high tech company’s Grenzebach’s portfolio includes the simulation of material flow in complex plants in the glass industry. To achieve this, Grenzebach uses Siemens simulation solutions. Together, the two companies have developed the most recent product from Grenzebach, the tin-air speed stacker, a machine for stacking all types of glass sheet. This expertise has produced a Siemens digital twin for the first time, as well as the motion control. This allowed all the functions and permutations of the stacker to be simulated while simultaneously developing the initial motion control program to provide an optimum starting point for virtual commissioning. By running what were previously sequential development steps in parallel, it was possible to reduce both development times and costs significantly.

The tin-air speed stacker is a three-axis rapid stacker which can selectively pick up glass sheets from the tin side or the air side and rapidly place them vertically on a glass rack – up to 20 times a minute. This represents a 30 percent improvement in stacking performance and makes the tin-air speed stacker the most powerful stacker in its class. The motion control is provided by a Simotion D445 motion control system with the Handling Advanced universal library as well as Sinamics S120 modular converters and Simotics S servomotors. Grenzebach was venturing into completely new ground with this development. “In order to get to grips with the potential singularities of the kinematics, which were similar to those found in articulated robots, we decided to build a digital twin for the first time,” explains Roland Jenning, head of Innovation at Grenzebach.

Erring on the side of caution
The digital twin was produced using the NX Mechatronics Designer software from Siemens PLM Software. The initial motion control programs were created at the same time as the digital twin, which reduced the development time and time to market significantly. To make the simulation of the programmed movements in the digital twin as close to reality as possible, Grenzebach chose a ‘hardware in the loop’ design in which the control is connected to the kinematic modal in NX via a Simit simulation unit. The program is then tested using the Simotion Scout engineering system; Simit picks up errors and highlights weak points. This allows processes to be optimised long before the first actual commissioning. However, this is not the end of the digital twin’s usefulness. Future modifications to the plant or changes to the product can be played out virtually in advance and checked for errors without disrupting continuous operation.

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Stepping carefully into the Fourth Industrial Revolution

By Aalia Manie, partner, Webber Wentzel.

Rapid advances in technology and artificial intelligence in the mining industry raise issues like data protection, intellectual property ownership and legal liability. In the current absence of specific legislation to govern emerging technologies like artificial intelligence, businesses must continue to rely on existing laws and ensure that they enter into robust contracts.

In December, government invited the public to nominate candidates to serve on the Presidential Commission on the Fourth Industrial Revolution (4IR). This development should be of interest to the mining industry, where artificial intelligence, big data and technology are rapidly converging in various ways.

Need for regulation
The 4IR is creating a need for regulation on issues such as unemployment, intellectual property (IP), data privacy and security, and liability for defects and loss of control.

The commission, announced in President Cyril Ramaphosa's state of the nation address earlier in the year, will identify what strategies, policies and plans SA should put in place to position itself as a leading country in the technology revolution. However, these regulations have yet to be drafted and their nature and scope is not yet known.

In the mining sector, some companies are using digital twinning, a virtual reality environment that mirrors the mining environment and is used for training employees on potential risks in the workplace. They are increasingly investing in autonomous vehicles and equipment. There are also intelligent data analytics systems enabling valuable analysis of data, which are collected using the Internet of Things (IoT) technology. For example, the latest mining equipment can be fitted with sensors that generate messages about breakdowns or safety issues. With better data, capital and labour can both be optimised, allowing for better decision making.

Artificial intelligence legislation
Artificial intelligence is being deployed in a number of other industries too. Yet at present there is very little specific legislation, either in South Africa or anywhere else, to manage its effects. For companies wishing to access the latest emerging technologies, there are key issues that need to be addressed, no matter what business model is used.

When using or licensing technology systems or services owned by a third party, companies must be particularly cautious when they become reliant on that third party's system or services in order to operate. Where the third-party technology is integral to ensure effective or ongoing operations, companies must protect their interests through careful contracting around issues such as scope of use, termination rights, service levels, liability for loss of access or defective service delivery and insolvency of the third party.

Contractual negotiation also presents challenges. When the technology owner is aware of the company's reliance on the system, it has greater bargaining power in setting pricing and terms.

Be aware of the implications of IP ownership
Companies can also access or develop technology through commercial partnerships and joint ventures. A critical issue from an intellectual property perspective is ensuring clarity on ownership of jointly developed intellectual property and databases, and who owns and/or may use them if the relationship terminates – which may be particularly problematic if the termination happens on acrimonious terms.

A third way of procuring technology is through acquiring or ownership of the IP in the technology, which gives rise to typical merger and acquisition issues such as the necessity for a due diligence to confirm the rights of the seller in relation to the technology. Companies can also build new technology by developing it in-house or with an academic institution, as some mining companies are already doing.

Companies using university facilities for research and development must be aware of the IP implications of engaging in publicly funded research and development through academic institutions, which are governed by the Intellectual Property from Publicly Funded Research and Development Act (IPR) Act.

Align with global best practice
The technology evolution is exciting, but it also presents challenges which must be carefully considered and addressed as part of effective business planning and strategy. Whatever approach SA takes towards regulating artificial intelligence and emerging technologies, it should align itself as closely as possible with global best practice to ensure uniformity. SA has to remain competitive as a jurisdiction for technology investment, research and development.

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Thanks to increased processing power and the availability of increasing volumes of data (sensitisation of the industry), the discussion about artificial intelligence (AI) in the mechanical engineering sector is gaining momentum.

In the case of the advancements required for Industry 4.0, such as predictive maintenance and networked, efficient production, the use of adaptive algorithms offers enormous potential. Many manufacturing companies are realising that AI presents an opportunity to increase overall equipment effectiveness (OEE) and therefore combine reduced costs with increased productivity.

However, there is still something of a chasm between the desired status and the reality of the situation. Many of the AI solutions advertised on the market, which are often cloud-based, have significant requirements in terms of infrastructure and IT. These solutions also work with an overwhelming amount of data that is laborious and time-consuming to prepare and process. The question of added value often remains somewhat murky for providers, who cannot determine whether and how the investment in AI will provide a return.

The fact that system designs for the mechanical engineering sector are generally complex and unique is another contributing factor. As a result, it is not a matter of simply transferring learnt experiences from other machinery as you might see for mass-produced products in the consumer goods industry. The majority of systems are generally so complex that it is not possible to map out the entire system mathematically as a white box and maintain costs at an acceptable level. It is Omron’s view that a black box approach is more common. The available data in these systems for typical AI algorithms is underdetermined, and reliable operation can only be confirmed through testing, optimisation and, frequently, over-dimensioning.

Given these conditions, how do we go about designing and integrating AI that creates tangible added value in the production process? Instead of laboriously searching a huge volume of data for patterns, in addition to the processes that are running, Omron tackles the problem from the other direction. The required algorithms are integrated in the machine control system, thus creating the framework for real-time optimisation – at the machine, for the machine. In contrast to edge computing, where individual manufacturing lines or sites are analysed using limited processing power, the AI controller used by Omron, which features adaptive intelligence, is closer to the action and learns to distinguish normal patterns from abnormal ones for the individual machine.

The AI controller integrated in the Sysmac platform is a complete solution for factory automation. It features modules for control, motion and robotics, image processing and machine safety and is primarily used in the manufacturing process at the points where the customer is experiencing the greatest efficiency problems – bottlenecks. The processes gain intelligence based on previous findings and improvements that have been made and subsequently drive holistic optimisation of the entire manufacturing process.

Although OEE values of 80% and above have been achieved in isolated cases, in the automotive industry in particular, many of the systems currently in live usage have been generating figures of around 50%. If quality is improved and predictive maintenance is used to prevent machine downtime, it is possible to make significant efficiency gains. The AI controller provides optimisation in exactly these areas. It is driven by practical requirements and aims to improve the OEE noticeably. It is important to note that an improvement of just a few percentage points can result in significant efficiency gains and cost reduction. With its new AI solution, which is currently in the testing phase with pilot customers, Omron hopes to drive added value and practical improvements, thus helping to create a smarter industry.

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Innovation and intelligence for the smart factory
There's long been a global movement under way towards highly automated factories equipped with largely unmanned robots, and in which many different items of equipment communicate with each other digitally – the so-called Industry 4.0 approach.

However, a new phenomenon is now already emerging, aiming to bring the human touch back into a wide range of manufacturing and production contexts. This trend has been dubbed Industry 5.0 – a term used to denote contexts in which robot capabilities and human skills converge.

Whereas Industry 4.0 setups are largely about consistency of quality, consistency of flow and data collection in larger scale manufacturing contexts based around largely unmanned robots, Industry 5.0 is about highly skilled people and robots working side by side to create individualised products, services and experiences – by pairing the technical capabilities and consistent repetitiveness of robots with the unique skills of craftspeople and other human specialists.

Unlike Industry 4.0 robots, Industry 5.0 collaborative robots (cobots) also have the big indirect advantage of keeping valuable knowledge in-house, close to the artisan, the producer and the manufacturer. For any commercial operation, this know-how and the painfully, slowly acquired experience and the craftsmanship touch represent a crucial, high value asset that's a key differentiator from the volume production focus at the heart of Industry 4.0 robotics.

Best of both worlds
In most production processes, automation can be used to its fullest potential only when there's also a spark of human creativity influencing and driving the more repetitive, routine processes. On its own, an automated production setup featuring traditional industrial robots will do only what it is told – and often only after long, complex and expensive programming efforts.

Cobots, however, work in sync with human employees. These two different kinds of workforce complement each other, because the human can add the 'secret sauce' of human skills, experience and judgement, while the robot moves things around, prepares the product for human attention or processes the product further. This empowers the human worker and enables him or her to use the cobot as a multi-functional tool – as a screwdriver, pizza dough mixer, seedling separator, packaging device, palletiser, etc. The robot is not meant to replace the human workforce, but to take over strenuous, repetitive or even dangerous tasks and to enable human workers to use their creativity on more gratifying tasks and more complex projects.

Transformation of modern manufacturing
The agenda behind Industry 5.0 is all about the transformation of modern manufacturing as well as a wide range of other processes – commercial as well as non-commercial – to enable man and machine to work collaboratively, pairing the exact and repetitive technical capabilities of robots with the unique, cognitive skills of workers.

This collaborative approach is essential for tackling new kinds of market requirements and consumer expectations, which often involve small batch exclusivity and greater degrees of personalisation, as well as customisation to individual preferences. The personal touch is both fashionable and an extremely effective way to match production capabilities with countless different configurations of customer preferences and requirements.

Creating value
At Universal Robots, the Industry 5.0 moniker is basically a question of cobots and skilled humans working closely together in myriads of different ways – many as yet unthought of and unexplored – to create maximum human value by getting the best of both worlds and both types of capabilities.

It is about combining people's creativity and craftsmanship with the speed, productivity and consistency of robots, and exploring how to make the very best of the many possible overlaps to mould hitherto unseen commercial and societal capabilities – from more people-centric, individually customised products to craftsmanship and specialist skills made much more widely available.

With the Industry 5.0 mindset, robotic capabilities become a personal tool that members of any workforce can use to apply their distinctive creative skills more effectively, to provide greater human value.

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Pneumatic robotics meets artificial intelligence

Whether its grabbing, holding or turning, touching, typing or pressing – in everyday life, we use our hands as a matter of course for the most diverse tasks. In that regard, the human hand, with its unique combination of power, dexterity and fine motor skills, is a true miracle tool of nature. What could be more natural than equipping robots in collaborative workspaces with a gripper that is modelled after this model of nature, that solves various tasks by learning through artificial intelligence? Festo’s pneumatic robot hand BionicSoftHand, combined with the BionicSoftArm, a pneumatic lightweight robot, shows that future concepts are suitable for human-robot collaboration.

The BionicSoftHand is pneumatically operated so that it can interact safely and directly with people. Unlike the human hand, the BionicSoftHand has no bones. Its fingers consist of flexible bellows structures with air chambers. The bellows are enclosed in the fingers by a special 3D textile coat knitted from both, elastic and high-strength threads. With the help of the textile, it is possible to determine exactly where the structure expands and generates power, and where it is prevented from expanding. This makes it light, flexible, adaptable and sensitive, yet capable of exerting strong forces.

Artificial intelligence

The learning methods of machines are comparable to those of humans. Either in a positive or a negative way they require a feedback following their actions in order to classify and learn from them. BionicSoftHand uses the method of reinforcement learning. This means that instead of imitating a specific action, the hand is merely given a goal. It uses the trial and error method to achieve its goal. Based on received feedback, it gradually optimises its actions until the task is finally solved successfully.

Specifically, the BionicSoftHand should rotate a 12-sided cube so that a previously defined side points upwards at the end. The necessary movement strategy is taught in a virtual environment with the aid of a digital twin, which is created with the help of data from a depth-sensing camera via computer vision and the algorithms of artificial intelligence.

Proportional piezo valves for precise control

In order to keep the effort of tubing the BionicSoftHand as low as possible, the developers have specially designed a small, digitally controlled valve terminal, which is mounted directly on the hand. This means that the tubes for controlling the gripper fingers do not have to be pulled through the entire robot arm. The BionicSoftHand can be quickly and easily connected and operated with only one tube each for supply air and exhaust air. With the proportional piezo valves used, the movements of the fingers can be precisely controlled.

BionicSoftArm: One robot arm, many possible variations

The strict separation between the manual work of the factory worker and the automated actions of the robot is being increasingly set aside. Their work ranges are overlapping and merging into a collaborative working space. In this way, human and machine will be able to work together simultaneously on the same workpiece or component in the future, without having to be shielded from each other for safety reasons.

The BionicSoftArm is a compact further development of Festo’s BionicMotionRobot, whose range of applications has been significantly expanded. This is made possible by its modular design. It can be combined with up to seven pneumatic bellows segments and rotary drives. This guarantees maximum flexibility in terms of reach and mobility, thus enables it to work around obstacles even in the tightest of spaces if necessary. At the same time, it is completely flexible and can work safely with people. Direct human-robot collaboration is possible with the BionicSoftArm, as well as its use in classic SCARA applications, such as pick-and-place tasks.

Flexible application possibilities

The modular robot arm can be used for a wide variety of applications, depending on the design and mounted gripper. Thanks to its flexible kinematics, the BionicSoftArm can interact directly and safely with humans. At the same time, the kinematics make it easier for it to adapt to different tasks at various locations in production environments. The elimination of costly safety devices such as cages and light barriers shortens conversion times and thus enables flexible use, completely in accordance with adaptive and economical production.

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Digital factory market to grow at 33%

Automotive manufacturing leads the way as digital factory market grows to $673 billion in 2030.

The digital factory market will grow at a compound annual growth rate of 33% to reach $673 billion in 2026. According to a new report published by ABI Research, these sales include the actual hardware revenues for entire industrial robots, collaborative robots, connected PLCs, intelligent industrial battery management systems, electric motors, pumps, tank management systems and smart glasses.

“Currently, most manufacturing equipment still communicates in proprietary protocols and connecting it in a cost-efficient way without too much custom code often requires the expertise of IIoT integration specialists,” says principal analyst Pierce Owen. “For new factories, we have started to see how telcos and network infrastructure vendors can deploy private LTE, but so far it only works if the plant owner has the negotiating power to demand cellular connected equipment from all its suppliers.”

The automotive industry leads the way in the adoption of most digital factory technologies and represents the largest opportunity globally with $139 billion in digital factory revenues forecast for 2030.

“The automotive industry has demonstrated a willingness to scale transformative technologies ranging from generative design and additive manufacturing to IIoT connectivity and robotics of all kinds more than any other industry, but other industries will start to catch up over the next decade. The companies that first follow the automotive OEMs’ lead and scale technologies with proven value will gain a competitive advantage,” Owen concludes.

V-lock system and co-operative robots

Metal Work has developed applications for the automation of the assembly process together with producers of co-operative robots. These are robots of the very latest generation, designed to interact with humans in total security. They integrate perfectly with the handling products of Metal Work’s V-Lock series, marked by the fact that they can very easily be assembled, disassembled and reconfigured.

The V-Lock system is a complete system for manipulation. All components are equipped with a standardised dovetail interface, which makes the assembly, design, configuring and reconfiguring processes easier and faster when building kinematic assemblies. Each component is connected to the other by means of V-Lock brackets that adhere to the dovetail profile; the locking of the brackets occurs through the clamping of two easily accessible lateral screws using a common Allen wrench.

This intuitive system equipped with V-Lock allows the user to make the most of the potential of a co-operative robot and enables the operator to change diverse collet sets, rotary and linear actuators in a fast and simple way. Moreover, through the utilisation of universal adaptors called V-Lock Transformers, it is possible to add components coming from other producers, such as suction cups and gripping systems.

Among the applications developed so far, there is a recent and very interesting one, concerning the assembly of components for industrial automation. In this case, a two-arm Cartesian SCARA type robot carries out the assembly of two different components. Each component is picked from a departure stand by means of a Metal Work P4K type gripper belonging to the V-Lock series, together with a mechanical compensator which can counteract eventual mismatches with the stands.

What specifically characterises this application is the fact that the two arms, besides obviously being synchronised, can interact with humans without constituting any source of danger. The robot is equipped with sensors that immediately stop it in case of collision. The cycle time is minimised thanks to the optimisation of the motion trajectories.

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**Vibration warning indicator paste**

A tamper-proof vibration warning indicator paste that can improve safety and reduce inspection time across a number of industries is now available locally from Bearings International (BI). Applications for the DYKEM Cross-Check Torque Seal ranges from haul trucks to head gaskets in vehicles, gearboxes, and even conveyor belts, BI product manager Richard Lundgren explains. “When a piece of equipment vibrates there is always the chance that the torque of any nuts and bolts may loosen. It is essential to be on the lookout for this when servicing equipment or carrying out routine maintenance, in order to prioritise safety and reduce downtime.”

With the DYKEM Cross-Check Torque Seal, the artisan literally draws a line of the paste from the bolt head and along the threads of the screw, once perfect torque has been achieved. At the next inspection, the artisan checks to see if the brightly-coloured mark is still in alignment. If not, action can be taken there and then on that specific bolt, instead of having to retighten all of the bolts, thereby speeding up the process dramatically and reducing the possibility of any loose bolts being missed. With its excellent adhesion to all types of materials, including steel, the indicator paste comes in a range of eight colours for high visibility, and is also fluorescent under UV lighting. “The safety aspect of this product cannot be overstated, especially when you consider the potential danger of a bolt coming off a kilometre long conveyor belt in a factory where people are working,” Lundgren says.

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**Advanced bolt securing system**

BMG’s Nord-Lock bolt securing system is based on advanced wedge-locking technology, and is designed to safely secure bolted joints that are exposed to severe vibration and dynamic loads in extreme conditions – including the railways industry. Nord-Lock wedge-locking washers ensure there is no bolt loosening in safety-critical areas of railway bogies, coupling devices, brake systems, rail dampers and housings. They improve personal safety, reduce the risk of lost production or material damage due to bolt failure, and lower maintenance requirements.

The multi-functional design offers the highest security against spontaneous bolt loosening and slackening – even at the highest levels of vibration caused by rail traffic, which normally puts bolted joints at risk. The wedge-locking construction is enhanced by an integrated spring effect that compensates for the loss of preload due to slackening. Nord-Lock washers are used by many rail companies globally to replace conventional locking-wire mechanisms on wheel sets, providing maximum bolt security. They are quick and easy to install and remove with standard tools, and have been certified by TÜV, a leading international institute in quality and safety certification.

Each washer pair has cams on one side and radial teeth on the opposite side to secure the bolted joint with tension rather than friction. The conical shape of these washers creates an elastic reserve in the bolted joint to compensate for the loss of preload and prevents slackening. These multiple functions continuously act on the bolted joint to maintain preload and prevent spontaneous bolt loosening, providing an effective solution for vibration, dynamic loads, settlement and relaxation.

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**High-speed manual chain hoist series**

Becker Mining South Africa has recently launched Kito’s new high-speed CB manual chain hoist series. These hoists, which offer swift lifting and lowering speeds for increased productivity, are designed to safely handle rated loads between 2.5 and 50 tons.

“The Kito high-speed CB series is based on Kito’s original automatic high/low-speed clutch technology and is suitable for heavy duty applications, where a load is repeatedly positioned and the empty hook is returned,” explains senior general manager, Rick Jacobs.

“This versatile hoist encompasses a reliable load-sensing magnetic clutch and high performance planetary gear system, which switches automatically from normal operation to seven times the lifting and lowering speeds of conventional hoists, when repositioning an unloaded hook – if the load is up to 10% of the working load limit. A mechanical brake activates instantly and holds the load securely, for greater safety on site.

The load-sensing mechanism of this advanced hoist provides the user with significant time and cost savings, as well as improved worker productivity and reduced operator fatigue. Other key features of these robust hoists include an impact resistant housing and a double pawl with double spring system. Maintenance-free sealed bearings increase reliability and reduce hand chain pull. Heat treated gear and load bearing parts are hardened for dependable performance, minimal maintenance requirements and extended service life. Highly abrasion resistant, heat treated Kito nickel-plated DIN EN 818-7 load chain grade 100 for high uniform strength is supplied in lengths to suit exact requirements.

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Multi-jackbolt tensioners

BMG’s Superbolt multi-jackbolt tensioners reduce downtime and eliminate unsafe and laborious bolting methods, particularly in harsh operating conditions and in areas with limited working space. The quick and efficient bolting method is based on a design which splits one big torque into a number of smaller ones. Superbolt, which has numerous advantages over conventional bolting products, ensures joints can be tightened with high accuracy, without the need for specialist skills or heavy tooling. Tightening in pure tension allows higher preloads on the same size bolt than conventional tightening methods.

Generating a preload high enough above the separating force means bolting will not vibrate loose on properly designed joints and the added elasticity increases fatigue life of the bolted joint, which eliminates costly downtime. Only small hand tools are required for installation. This means there are no safety hazards from immense hydraulic pressures, no pinching hazards, no lifting of large tools and no risk of sockets breaking under high pressure.

Superbolt tensioners are used in diverse industries, including hydropower, wind turbines, gas and steam turbines, nuclear, steel, mining, shipbuilding, offshore, chemical and transportation. OEMs specify Superbolt multi-jackbolt tensioners in their design, to improve performance of equipment.

The high preload capacity and accuracy of this system has resulted in the design of smaller bolt sizes. Compact dimensions and decreased tooling sizes allow for a reduction in the size of machinery, reducing material and machining costs.

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Superior quality festoon systems

Superior quality festoon systems from Powermite deliver a reliable, efficient and uninterrupted feed of energy, data, air and fluids to electric mobile bulk materials handling machinery operating in mining and industry across southern Africa. As the carriers of these resources, this machinery is fundamental to a wide spectrum of industries, from open cast and underground mines to quarry, stockyard and port operations.

“Our specialised Conductix festoon systems incorporate state-of-the-art, world-class technology, taking them to next level quality, reliability and efficiency,” says director, Donovan Marks.

“Above-average operational life, easy installation, uncomplicated operation and cost effective maintenance with subsequent lowest total overall operational and ownership costs are some of the key benefits our Conductix festoon systems deliver to customers and end-users.”

The Powermite/Conductix festooning range presents an extensive array of configurations for straight runs, bends and circular configurations, making these feeding systems ideally suited for virtually any type of moving equipment including bulk material conveyors, stackers, reclaimers, travelling hoppers, rail car dumpers, plating lines, water treatment and even car wash systems. The company also supplies festoons that run on diamond tracks or square rail which are specially engineered to prevent dirt build-up and reduce dust accumulation.

Irrespective of the particular cable or hose package, the running speed or the location of the machine, Powermite/Conductix-Wampfler has the appropriate ISO 9001:2008 certified festooning solution for diverse industries such as mines, steel mills, ports, power plants, airports, warehouses and automotive facilities.

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A unique service whereby lifting machines and lifting tackle can be examined and tested on-site, giving clients peace of mind that they comply fully with all regulatory requirements, as well as ensuring the safety of all personnel, is available from the newly established Mandirk Lifting. The company is part of the Mandirk Group, a specialist supplier of engineering tools and equipment for maintenance, repair, and operating (MRO) applications in a wide range of industrial sectors. The internationally renowned brands represented by Mandirk Lifting include KITO, Ingersoll Rand, Enerpac and Liftall. Lifting tackle brands available are Myte, McKinnon Chain, and Umoya. All brands are SANS- and SABS-compliant and subscribe to all relevant international regulations and accreditation.

The importance of the on-site service offered by Mandirk Lifting is that testing and certification of lifting equipment is not only a legal requirement in South Africa, but must be carried out by qualified specialists with access to calibrated testing equipment. Mandirk also issues certificates for all new equipment sold, in addition to inspecting, testing, and certifying equipment that is already in the field.

Here Mandirk Lifting complies fully with all relevant regulatory requirements. The scope of approvals offered includes lever hoists, chain block, and lifting tackles. The equipment range catered for includes mechanical ratchet jacks, hydraulic pumps and cylinders, chain and lever blocks, geared and plain crawls, pneumatic hoists and winches, Tirfors and ropes, mechanical grabs and clamps, and slings (chains, polyester, and steel wire rope), together with inspection and proof load testing services.

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Unique 360° lifting solutions

A unique service whereby lifting machines and lifting tackle can be examined and tested on-site, giving clients peace of mind that they comply fully with all regulatory requirements, as well as ensuring the safety of all personnel, is available from the newly established Mandirk Lifting. The company is part of the Mandirk Group, a specialist supplier of engineering tools and equipment for maintenance, repair, and operating (MRO) applications in a wide range of industrial sectors. The internationally renowned brands represented by Mandirk Lifting include KITO, Ingersoll Rand, Enerpac and Liftall. Lifting tackle brands available are Myte, McKinnon Chain, and Umoya. All brands are SANS- and SABS-compliant and subscribe to all relevant international regulations and accreditation.

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