Innovations will allow construction companies to break free from diesel dependence and focus on energy, efficiency and the environment.
High-quality build and elegant design: Multi-touch panels for Ex Zone 2

Robust:
All CPX models have a high-quality, resistant aluminium housing.

Adaptable:
All CPX models impress with a wide variety of mounting concepts.

Intuitive:
All CPX models offer the advantages of the Beckhoff multi-touch technology.

www.beckhoff.co.za/cpx

By systematically integrating advanced multi-touch technologies into its Control Panel and Panel PC portfolio, Beckhoff has provided manufacturers and other industries with forward-looking operator interface concepts for years. With the company’s new CPX Control Panel series, applications in hazardous areas, classified Zone 2/22, can now also benefit. The high build quality and robust aluminium enclosures ensure reliability and durability in harsh and potentially explosive environmental conditions. This delivers significant advantages in terms of operation, look and feel, and design to applications in hazardous areas.
There is virtually no room for error when it comes to mining construction machines. The aim of the industry is to construct new fleets of fully electrified machines to increase total machine efficiency by reducing energy losses in all hydraulic subsystems. Read our cover story on page 10 to find out about Parker Hannifin’s solutions for mobile construction machine builders and mining companies that decrease human involvement, offering a safe working environment as well as higher equipment utilisation and lower operational costs.

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

parker.com/za

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Gates Industrial, Hytec South Africa, Dosco Precision Hydraulics, Instrotech, Axiom Hydraulics

Artic Driers International, SKF South Africa, Parker Hannifin SA, Rand-Air

Lubrication Engineers, BMG, SEW-Eurodrive

NSK South Africa, Powermite, BMG

Parker Hannifin SA, Countapulse Controls

Siemens Digital Industries

www.motioncontrol.co.za
What’s driving 4IR?

When the fourth industrial revolution (4IR) first came onto our radar, and it wasn’t that long ago, there was mainly a focus on the technology, backed up by a couple of killer apps like condition monitoring. This was followed by a large amount of hype, with more speculation going on than real progress. It appears to me that this megatrend is becoming more mature. Recently there has been more of an emphasis on the contribution of people to making 4IR work. For example Motion Control has run features on cobots, with people and robots working alongside each other. This has led to a debate on the attributes needed to make it in 4IR.

I recently attended a fascinating talk by Kobus Neethling, who has six degrees in creativity (I don’t think you can get more qualified than that). He outlined the essential skills you need to thrive in 4IR, and creativity was high on the list. The other ones he described were complex problem solving, critical thinking, people management, emotional intelligence (the ability to read people’s emotions and react accordingly), decision-making, service orientation, negotiation and cognitive flexibility. Whew! “Don’t make yesterday better,” he said. “You have to create a whole new tomorrow.”

The World Economic Forum (WEF) has called the driving force for 4IR ‘a fusion of technologies that is blurring the lines between the physical, digital and biological spheres.’ It says that by 2020 creative thinking will be third on the list of the most important skills needed to survive and thrive in 4IR. The top three skills needed will be complex problem solving, critical thinking and creativity. These are qualities where algorithms and robots can’t compete with humans.

But these skills are out there. A great example is the story about South African engineer, Neo Hutiri, who won the Africa Prize for Engineering Innovation founded by the Royal Academy for Engineering. This is for a smart locker system designed to dispense medicine to patients with chronic conditions; and I love Elon Musk’s “fail fast, then fix” motto. His SpaceX Crew Dragon capsule is aiming to take humans, not love Elon Musk’s “fail fast, then fix” motto. His SpaceX Crew Dragon capsule is aiming to take humans, not

companies are also using 4IR creatively on the service side, and we are hearing about servitisation, equipment-as-a-service, subscription and pay-per-use. Traditional technology-focused businesses are moving into service. With increasingly complex, high-tech equipment, customers need their equipment dealers to let loose the potential of 4IR. Servitisation decreases the cost of owning a machine. It combines service costs into a monthly fee. It can guarantee constant machine uptime. By renting equipment rather than buying it, customers can shift capex costs to opex costs. This leads to improvements in taxes, support infrastructure and a machine’s lifecycle.

An example of servitisation is Rolls-Royce’s aeroplane engine programme. Customers pay a set amount of money based on the number of hours the plane is flown. In return, Rolls-Royce repairs, replaces broken parts, and modifies and monitors the engine remotely. This new package creates a long-term relationship with its customers and is bringing in more than 50% of its revenue. This innovative approach shows the power that creativity and imagination have to let loose the potential of 4IR. Harvesting data is just square one, and even analysing that data with state-of-the-art technology is basic. The real business outcomes are when you put those insights into motion in new ways that benefit both companies and customers.

As companies are using 4IR creatively on the service side, and we are hearing about servitisation, equipment-as-a-service, subscription and pay-per-use. Traditional technology-focused businesses are moving into service. With increasingly complex, high-tech equipment, customers need their equipment dealers to let loose the potential of 4IR. Servitisation decreases the cost of owning a machine. It combines service costs into a monthly fee. It can guarantee constant machine uptime. By renting equipment rather than buying it, customers can shift capex costs to opex costs. This leads to improvements in taxes, support infrastructure and a machine’s lifecycle.

We have become used to being in a state of flux as economic systems stagnate, people migrate and leadership gaps widen. Talk about the future reflects uncertainty rather than clarity. Governments and industries are often unsure of exactly what 4IR means for the future, while people try to adjust to increasingly complex and automated ways of life. The WEF says that creativity thrives in three conditions: when we apply uncertainty rather than clarity. Governments and industries are often unsure of exactly what 4IR means for the future, while people try to adjust to increasingly complex and automated ways of life. The WEF says that creativity thrives in three conditions: when we apply creativity thrives in three conditions: when we apply
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

For more information visit our website www.safpa.org.za or call +27 (0)11 888 7163
Greetings,

As we enter the last quarter of the year, I can almost already see all the Christmas decorations and hear the ever-cheery sound of carols at the shopping mall. I hope the year has been a successful one for you and your relevant company, even during these hard times in South Africa.

The SAFPA subcommittee on pressure vessels has been very busy over the past few months, and a substantial amount of information has been collected and collated for specifically piston and bladder accumulators. The sub-committee has moved onto hydraulic and pneumatic cylinders and the current standards and regulations that may or should apply to their design, fabrication and operation within the industry.

The chairman of the sub-committee, Chris Arbous has made a commitment to present a draught of the initial pressure vessel guideline booklet by the end of the year to the SAFPA committee for comment followed by publishing and distribution to the members.

With regards to education, the recent push to consolidate all the efforts of past council members to form an occupational qualification/trade certification is finally gaining traction with QCTO. A specialist, Lynell Farrell has been brought on board to assist with expediting the process to have the SAQA and NQF level documentation aligned to the new QCTO occupational qualification/trade certification. I would like to stress the requirement for industry participation through formal requests to SAFPA to have hydraulic/pneumatic occupational qualified or trade certified graduates available within the industry for employment, therefore the requirement for on the job training will fall away. A letter will be circulated from SAFPA to please put in writing the need for certified skilled people within the industry.

On the lighter side, the SAFPA golf day took place on the 5th of September at a new location, Glendower Golf Course. The feedback for the change of venue was positive, and I believe a great day was had by all. Congratulations to Parkerstore Aeroport for winning the day.

The SAFPA cycle race took place on the 23rd of August. Well done BMG for winning the race. A few comments regarding the venue and date of the event have been received from various participants. These include a request to relocate the venue to the East Rand and have it when work interruptions may be minimal to increase participation. Please feel free to send suggestions to the SAFPA secretary for new venues and dates.

I wish you a great end to the year, may you and your family have a restful and enjoyable festive season.

Kind Regards
Dustin Pereira

A recent SAFPA technical evening had a different format when the chairman of SAFPA’s Pressure Vessels Sub-Committee, Chris Arbour held a briefing session to get stakeholders involved. The goal is to assemble a focused group to consult with the fluid power industry, look at the legislation and the engineering principles surrounding pressure related equipment and create a document or handbook which will serve as a guide for importers, suppliers and end-users. This will be revised as legislation changes or as circumstances require, and will illustrate good hydraulic principles and the minimum requirements for designing and installing such equipment.

From l: Chris Arbour, chairman of SAFPA Pressure Vessels Sub-Committee; Dustin Pereira, SAFPA president.

www.safpa.org.za
Tel: +27 11 888 7163 Fax: 086 503 4524 e-mail: ctr@safpa.org.za
SAFPA Annual Golf day 2019
Glendowner Golf Club

1st place: ParkerStore Aeroport, 2nd place: Festo 1,
3rd place: Hydromobile SA (pic unavailable at time of going to print)

ParkerStore Aeroport
Festo 1
Shane Koemerson was nearest the pin
Jonathan Scott had the longest drive

The weather behaved and the day was thoroughly enjoyed by all.
SAFPA NEWS

SAFPA Cycle Race

The very successful SAFPA Cycle Race was held on Friday 23rd August. First place went to the BMG team, and second place to Bosch Rexroth. Congratulations to all the participants.

SAFPA technical evening

At a recent SAFPA technical meeting, Daniel Cattell and Matteo Michelin from SAI Motors gave a presentation on SAI’s unique electronically controlled, variable displacement radial piston motor. They introduced the concept of the technology and showcased the performance gains over traditional motor technology.

Appointments

Vert Energy has appointed Jacques Opperman as sales and support engineer.

ATEQ has appointed Bernhard Gerrits as national sales manager.

Bearings International has appointed Keith du Preez as business development leader.

SAFPA members at the recent technical meeting.

SAFPA UPCOMING EVENT

Good Day Members,
Join us on the upcoming event, and network with your industry whilst having some fun.

SAFPA Soccer six-a-side
Sunday 10 November 2019
in Benoni

Diarise the event, contact Angie to find out more. Tel: +27 11 898 7163,
atif@safpa.org.za or www.safpa.org.za
The Bloodhound project is back on track. The British team developing a car capable of reaching 1600 kmph is in South Africa for several weeks of high-speed testing on the dry desert track at Hakskeenpan in the Northern Cape. This is key to preparing for an attempt at a new 1200+ kmph land speed record next year. By the end of 2019, Bloodhound aims to demonstrate speeds above 800 kmph. The next step is to break the existing world land speed record of 1228 kmph.

The Bloodhound is powered by a rocket bolted to a Eurofighter-Typhoon jet engine. Commander Andy Green, who is doing the driving, says that the team is fitting high-speed metal wheels, brake parachutes, pressure sensors and wheel fairings ready for speeds well in excess of 800 kmph in order to test the aerodynamics.

The first thing to test is the high speed desert wheels. Each weighs 95 kg and is forged from solid aluminium. At 1600 kmph, a wheel experiences 50 000 times the force of gravity tearing the rim apart, so it has to be solid metal; nothing else will cope with the extreme loads.

We don’t know how these wheels will behave on the desert surface. Metal rims running on the hard mud surface of Hakskeenpan will have very little grip due to friction,” he explains. “Normal cars rely on tyre grip for their stability and safety but 50 000 g would destroy any rubber tyre, so we are working with the unusual and poorly understood dynamics of solid metal wheels. We have given them some lateral grip on the desert surface by making them with a shallow V profile.”

As the car runs along the track, the wheels cut ruts in the mud surface, providing the sideways grip needed. Unfortunately, the faster the car goes, the shallower the ruts become. At supersonic speeds the wheels will be making tracks less than 5 mm deep, which will provide almost no sideways grip. However, as the aerodynamic grip will be huge, the car will get its directional stability from the supersonic airflow. This should give it some very lively steering at high speeds, with the front wheels acting like rudders in the supersonic airflow, producing very rapid steering responses.

The bad news is that as the car accelerates, the mechanical wheel grip goes down quickly, but the aerodynamic forces (which depend on the square of the speed) build up more slowly. This means that at medium speeds between 500 and 800 kmph there is very little surface grip from the wheels and very little aerodynamic response. “Just to make things more complicated, we also need to assess the lateral stability as we increase the speed, so I need to control the car and try to measure its stability, all at the same time. Luckily, I love a challenge,” he says.

Another key thing is how to stop the car from high speeds. “We’re using airbrakes and two separate brake parachutes, any one of which can stop the car by itself, to give us plenty of fail-safe. Going faster is optional, but slowing down is compulsory, so we have to get this right every time,” he adds. “At the maximum deployment speed of around 1100 kmph, the chute will produce a drag force of 9 tons, with an opening shock load 12 or 13 tons. This is a very rapid and violent process, which is why it is vital to test the whole system this year, before we go supersonic next year.”

The airbrakes are a more civilised way of slowing down. Large perforated panels open up on either side of the bodywork towards the rear of the car, gradually increasing the drag in a way that doesn’t try to tear the driver’s eyeballs out. The downside is that the airbrakes will produce a huge amount of turbulence and vibration at the back of the car, which needs to be measured to make sure it won’t break anything.

The next key area is the aerodynamics. This is such a complex subject that the detailed measurements still have to be done by building parts and testing them. This year’s testing will validate the computer modelling and yield very accurate drag figures. To help with this process, there are 200 pressure sensors fitted to the car to confirm the exact pressures across the bodywork, with and without the airbrakes. This is key to making sure the right size of rocket is fitted next year when Bloodhound takes aim at 800 kmph and beyond.

For more information visit http://www.bloodhoundslr.com
**The joy of teamwork is clearly evident in the partnership between engineering specialists, BMG and entrepreneurs, Agri Arts & Construction (AAC).**

“Everyone likes a good news story. Through this match, which was made in the bustling suburb of Jeppestown – home to both companies – the area looks so much better,” says group HR executive, Ruth Black. “The gardens and pavements around BMG’s head office and warehouse facility, BMG World, are now regularly cleaned and manicured by the eight man AAC gardening team, all of whom were previously unemployed. With BMG’s assistance, AAC now has a corporate identity design, working uniforms and tools selected from the Tools & Equipment division.”

BMG also enjoys a close association with Jeppestown’s urban developers, who are committed to improving the quality of life for this community. The Bjala Foundation is developing affordable housing and a healthy urban environment in the city. Many BMG staff members now reside in revamped apartments in the area.

A key motivator of these initiatives, Malibongwe Sithole, who is director of AAC and Bjala’s community liaison officer, had this to say: “Our partnership with BMG has changed our lives for the better. The company has offered more than we expected. We feel important and we are proud to play an active role in keeping our environment clean. We have recognition and a sense of belonging to a community. BMG makes us feel part of a family.”

**For more information contact**

Darryn Wright, BMG, +27 11 620 7597, darrynw@bmgworld.net, www.bmgworld.net

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**BionicOpter**

Each year Guinness World Records presents thousands of exciting records from all over the world. Festo’s BionicOpter will be included in the 2020 edition. The ‘Robots’ chapter presents the most amazing records from the world of super robots and artificial intelligence. The Festo BionicOpter, an ultra-light flying object based on the dragonfly, has scooped the world record for the biggest flying robotic insect.

The BionicOpter is an ultralight flying object. Just like its model in nature, it can fly in all directions and execute the most complicated flight manoeuvres. Its ability to move each of its wings independently enables it to slow down and turn abruptly, to accelerate swiftly and even to fly backwards. This means that for the first time there is a model that can master all the flight conditions of a helicopter, plane and even a glider. Despite its complexity, the highly integrated system can be operated easily and intuitively via a smartphone.

The principles of ultra-lightweight construction are applied throughout the flying object. With a wingspan of 63 cm and a body length of 44 cm, the model dragonfly weighs just 175 grams. The wings consist of a carbon fibre frame and a thin foil covering. The intelligent kinematics correct any vibrations during flight and ensure flight stability. In order to stabilise the flying object, data on the position and the twisting of the wings is continuously recorded and evaluated in real time during the flight of the dragonfly.

**For more information contact**

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

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**News & Events**

Minning and Technical Exhibitions (MTE), holds monthly shows at mines across South Africa and the African continent. Hytec recently exhibited at travelling MTEs in Witbank and the Northern Cape.

Its Witbank branch attended the MTE Mining Show and displayed a wide range of products including pumps, valves, filters and cylinders, while staff was on hand to answer questions. “We had a Perspex display cylinder from Hytec Engineering to show our capabilities,” said Hytec Witbank’s branch manager, Frikkie de Klerk. Hytec Witbank’s objective was to reach new customers and to extend its client base and product reach.

Frikkie says this was definitely one of the busier expos and Hytec Witbank received a reasonable amount of attention.

Hytec Kuruman attended the MTE expos in the Northern Cape in Kathu, Hotazel and Beeshoek. “One of the biggest advantages of attending the MTE exhibitions is that we can display our cylinder repair capabilities,” said Hytec Kuruman branch manager, Emile Markram. The team displayed products which included Dabeb-Elram actuators, Hytec power packs and various pneumatic products.

**For more information contact Willem Gijzelaar, Bosch Rexroth South Africa,**
+27 11 979 4630, info@hytec.co.za, www.hytecgroup.co.za
Hydrasales is a specialist distributor of hydraulic filtration and accessories, providing value-driven solutions to its clients and building mutually beneficial relationships with its long-standing suppliers. The ethos of ‘go together’ is inculcated into the company’s service-driven culture. Hydrasales recently celebrated its fortieth anniversary with team members, stakeholders and friends. Representatives from MP Filtri, Faster and Mintor shared happy memories and stories going back over the decades.

Managing member, Haroun Pochee said: “We celebrate and remember the many who contributed to our achievement, especially our founding father, Maurice Allenby, whose dream it was to create a specialist hydraulic filtration and accessories business.” Pochee also honoured the dynamic leaders from MP Filtri, Mintor and Faster, who acted as mentors, role models and inspiration for the Hydrasales team with foresight, drive and wisdom.

From this innovative and visionary move in 1979, Hydrasales has grown into an expert solution provider for contamination prevention and allied control monitoring systems. Over the years, it has also championed the cause of women in a male dominated industry and has created opportunities for them in various levels of leadership. Today’s management team comprises women with exceptional talents, and Pochee paid tribute to them and celebrated their contribution to the company’s sustained growth over forty years. With the collaboration and continued support of leading international manufacturers, Hydrasales continues to be the link between manufacturer and the local market. “This is a matrix of win-win, competitiveness and securing the solution,” said general manager, Elvira Caripis.

To celebrate the occasion a new corporate logo and brand were unveiled, encompassing the concept of a fresh, clean earth that is green and environmentally friendly. The logo represents the challenge of new frontiers and opportunities, with Hydrasales relying on the support of its suppliers in overcoming challenges. General manager of MP Filtri UK, Phil Keep complimented Hydrasales on reaching forty years. “Our special and close relationship with Hydrasales dates all the way back to 1979,” he said.

Hydrasales will continue to provide training on filtration and contamination control for field service professionals and workshop technicians. “Many learn on the job and they need an understanding of the importance of filtration and contamination control within a hydraulic system,” said Lucas Thela. “To achieve this, technical experts from our suppliers provide skills and technology transfer when they visit southern Africa, and Hydrasales team members also undergo training overseas.”

Mike Wilson from Concept Oil recently won a trip to visit MP Filtri, Faster and Mintor in Milan with members of the Hydrasales team. “It was a mind-blowing experience,” he reflected. “The training was excellent and I learnt from world renowned experts, who deal with major OEMs and leaders in the field. I was impressed with the test laboratories, the investment in technology and how these market leaders strive for product perfection.”

Hydrasales carries an extensive range of filtration equipment, quick release couplings, flowmeters, sight glasses, contamination monitors and a full range of hydraulic accessories.

For more information contact Cheryl Johnson, Hydrasales, +27 11 392 3736, cheryl@hydrasale.co.za, www.hydralse.co.za
On the way towards fully electrified mining machines

There is virtually no room for error when it comes to mining construction machines. Used almost exclusively underground, often in small, restricted areas, the machines and their exhaust emissions directly impact construction workers. Any solution employed to reduce emissions requires as little human intervention as possible due to the harsh conditions and poor accessibility. The more time humans spend working in mining conditions, and near mining vehicles, the more likely they are to be injured, contract illnesses or die in accidents. According to the UN’s International Labour Organization, the mining industry employs 1% of the world’s workforce but is responsible for 8% of fatal accidents in the workplace. A study published by Occupational and Environmental Medicine found that diesel emissions can cause fatal lung cancer at a rate up to 38 times what is accepted as the normal occupational risk.

With this in mind, construction machine builders are actively searching for solutions to reduce emissions immediately, with the greater goal of automating their machines so that humans are entirely removed from the process. Not only will this save lives, but it will greatly reduce the cost of the average underground mining worksite.

Mining machines are heading in a new direction. The aim of the industry is to construct new fleets of fully electrified machines. The focus will be to increase total machine efficiency by reducing energy losses in all hydraulic subsystems, including the drive line. By doing this, it will allow the machines to increase performance with less power, extending duty cycles and the time spent on the job between charges. By moving in this direction, companies can optimise four specific areas of their mining operations.

A fully electrified fleet means that fewer operators will be needed, which means lower ventilation costs and lower risk to human life. Mining machines will not cost as much to maintain and the cost of fuelling them would drop dramatically, resulting in lower operational costs. There will be a safer working environment with higher equipment utilisation.

To pave the way for these new fleets, energy losses from diesel powered machines will need to be reduced. To cut the losses down, existing hydraulic parts will need to be replaced by more efficient ones. The result will be a fully electrified fleet providing greater efficiency levels at a reduced cost. With a fully electrified fleet, estimated energy savings of up to 50% can be made on ventilation versus diesel-driven machines.

As mining machines become fully automated, they will also become fully electrical. The ability to control them from the surface will require a combination of cameras and sensors that will take the place of the human operator. Until now, human operators have used their senses, knowledge and experience of the type of work being done. Sensors will make the process much more efficient and will include a range of cameras, speed sensors, angle sensors, pressure sensors and position sensors.

These machines will require fully electrical steer- and brake-by-wire solutions, allowing manufacturers to make them lighter, safer and more compact by removing as many mechanical components as possible. There are several industries already using this approach.

Parker Hannifin offers solutions to mobile construction machine builders and mining companies that work to decrease human involvement. Offering a safe working environment as well as higher equipment utilisation and lower operational costs, mining technology and smart machines represent the future of the industry. Parker Hannifin’s vehicle electrification technologies include vehicle traction systems, auxiliary systems and hydraulic implements.

In vehicle systems, power density is a key design factor. The torque density and speed capabilities of Parker's GVM internal permanent magnet AC (PMAC) motors, combined with voltage-matched GVI inverters, provide the speed and torque required to achieve breakthrough performance in a variety of vehicle platforms, including construction platforms, to advance vehicle traction systems available to design engineers. Parker can assist in the development process of electrified machines with baseline testing and energy mapping for optimised sizing of components and systems across a range of battery voltages and control systems.

In the case of hydraulic implements, through the combination of electric motor-inverter systems with hydraulic pumps, in addition to an onboard battery system, the user is able to achieve significant fuel savings, with the ability to operate equipment with the internal combustion engine off, and to capture energy from the vehicle.

For more information contact Lisa de Beer,
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Innovations will allow construction companies to break free from diesel dependence and focus on energy, efficiency and the environment.

parker.com/za
Hydraulics and pneumatics are widely used for power transmission: hydraulics for moving heavy loads with highly controlled motion, and pneumatics for lighter loads and rapid, repetitive motions. Many machines use hydraulic and pneumatic systems with electromechanics, and pneumatic or hydraulic systems integrated with electromechanical drives are now common. But it is very rare to see hydraulic and pneumatic systems working in an integrated system.

In a complete break from tradition, a Disney Research team at Northeastern University’s College of Mechanical and Industrial Engineering in Boston has come up with a beautifully engineered hybrid hydraulic-pneumatic system that can create amazingly lifelike motions without losing precise force control. In its latest development, Disney Research built a human-safe, humanoid robot called Jimmy, consisting of an upper torso with two arms and a head carrying stereo cameras. Each arm has four degrees of motion.

**Very fluid motion**
The system has a series of rolling-diaphragm cylinders that use hydraulic power to move in one direction and compressed air to move in the other.

Two single-acting cylinders are paired to form a single rotary actuator. The actuator weighs only 120 grams, and can deliver up to 4.5 Nm of continuous torque with a 135° range of motion. Essentially, force from the air cylinder creates a preload against the hydraulic cylinder. The compressed air in the one cylinder provides the return force that would otherwise be provided by a spring. Each cylinder then requires only one hydraulic line and one pneumatic line.

The result is a system that the team describes as light, fast, and dexterous, with low friction and no backlash. Assistant professor, John Whitney says the device has greater torque density than highly geared servos or brushless motors coupled with harmonic drives. It is also compliant and back drivable, making it intrinsically safe, and thus ideal for human-robot interaction applications. Another advantage of this kind of actuation system is that, unlike motors or servos, you don’t have to place the entire system inside your robot’s limbs, so you can make them smaller and lighter.

While humanoid robots can be painfully slow, Jimmy moves with lifelike speed and grace and is capable of waving at people, doing a little dance and drumming on a table. Jimmy can also safely operate in contact with people and can play patty-cake with a kid and even pat her cheeks, something you don’t see very often in human-robot interaction experiments. Whitney says that when people meet Jimmy for the first time, most feel a strong emotional connection with the robot.

**Mimicking human movement**
An operator manipulates the arms of a remote controller, and the robot follows the moves precisely in real time using a virtual-reality headset for visual input from the robot’s stereo cameras. To make Jimmy’s arms move, the operator uses a replica of the robot as a controller. The replica is coupled to the actual robot through a series of air and water transmission lines, which transfer forces from one side to the other. Not only can the operator move Jimmy’s arms but it is also possible to haptically feel when the robot’s arms touch things or get pushed.

The stereo camera on Jimmy’s head streams video to the head-mounted display worn by the operator, who can then see through the robot’s eyes, and dual-axis motion of its head follows the movements of the operator’s head via electric servos. Eventually, a control system and a set of motors could be used to make Jimmy’s movements fully autonomous.

This low-impedance hydraulic system can give haptic feedback for precise control in delicate tasks such as picking up a raw egg or even threading a needle. It consistently transmits contact forces to the operator while generating a high-fidelity remote sense of touch using haptic feedback.

Whitney says the transmission provides Jimmy with incredibly smooth and fast motion, while also allowing life-like interaction with people and the handling of delicate objects. Although for now, the robot is remotely controlled by a human operator, the team expects the same level of mechanical performance once the motions are automated.

“There is huge potential in the personal robots space. The haptic benefits to a human operator are equally valuable for autonomous control,” Whitney says. “Also, the back drivable and lightweight properties of the transmission are great features to have when you adopt manipulation and ambulation strategies that leverage rather than avoid contact with the environment.”

*For more information visit [https://tinyurl.com/y5rpkrxt](https://tinyurl.com/y5rpkrxt)*
The DeltaV PK Controller brings faster logic execution, built-in native Ethernet device protocols, and many scalable sizes, enabling it to address a wide variety of applications such as Ethernet device control, wellpads, and a wide variety of system sizes. From small-scale applications like skid-units, to your large-scale traditional control operations, the multi-purpose, multi-functional controller can handle your toughest demands no matter the size or stage of your operation.

**Features**

- Runs standalone or as part of a DeltaV system
- Seamlessly merge into a DeltaV system resulting in one native database and system
- Eliminates the cost and time-consuming data mapping exercises
- Saves cabinet space by leveraging the six built-in Ethernet ports
- Supports 1:1 redundancy without adding footprint or configuration changes
- Flexible I/O enables you to choose from M-series traditional, S-series traditional Charms I/O Card and Wireless I/O cards to best suit your needs
- Integrated safety with DeltaV SIS Electronic Marshalling and DeltaV SIS 1508 Safety Logic Solver

**Complete Process Control Solutions and Services Provider**
Varispeed VSDs now available from Bearings International

From bearings to variable speed drives (VSDs), motors, gearboxes, sprockets and chains, Bearings International (BI) is able to offer total solutions for a diverse range of customers, applications, and industries. Being part of the broader Hudaco Group allows BI to leverage synergies across a broad range of companies, meaning it can offer a complete product basket at its extensive branch network countrywide. One of these areas is electronic motor control solutions from Hudaco Group company Varispeed, which has just launched the VDrivePlus and AlphaDrive-Micro VSDs.

“For BI, it is all about the breadth of our product offering, which extends far beyond our customers’ core focus. This is because we look at customer requirements holistically. It is also a great way to introduce our customer base to the larger Hudaco Group,” says offer marketing manager, Victor Strobel. “While the customer bases are different, there are definite synergies that we can tap into. It is all about positioning ourselves as a total solutions provider that is a single point of contact for all of our customer needs, as well as making them aware of everything else we are able to offer them. This is where BI’s focus on customer service and support is critical, as it is able to back-up all of the products it supplies with the necessary technical expertise and experience.”

The AlphaDrive-Micro VSD from Varispeed is a compact frequency inverter ranging from 0.2 to 5.5 kW, and available in 240 V and 400 V. Together with the VDrivePlus, these VSDs offer the best performance-to-cost ratio on the market, without compromising on quality and reliability. “Due to the current economic environment, the market is very price-sensitive. Therefore, any energy efficiencies or cost savings we are able to offer are hugely beneficial,” Strobel notes.

Certified in accordance with the latest European standards and regulations, the Alpha Drive Micro and Micro Plus are ideally suited to most applications in the South African market, including mining, food and beverage, manufacturing, and agriculture.

The compact design of the AlphaDrive-Micro VSD means it is easy to integrate into an electrical panel, as it mounts directly onto a DIN rail. A built-in software menu caters for optimised parameters for basic functions and applications such as fans, belts, conveyors, and pumps. Applications range from mining plants to water reticulation, HVAC, food and beverage, canning and bottling plants, and injection moulding plants.

The AlphaDrive-Micro VSD is based on the MODBUS protocol for open networking, with an EMC filter as standard. An innovative feature of both of the drives is a parameter copy stick that allows for an automatic backup of parameter settings in the event of load shedding. It also means that the same set of parameters can be transferred to many drives and even multiple sites. The VDrivePlus from Varispeed is a much larger drive, ranging from 0.4 to 400 kW, available in 240 V and 400 V. This more advanced VSD features advanced motor control based on DSP technology, together with smart auto-tuning. Additional features include flexible inverter control, dual high resolution analogue inputs, and free mappable I/O channels.

A universal function set is available for a range of industrial and residential applications, including integrated PID/pump controller routines. Smart PC tools allow for quick inverter control, parametrisation, and troubleshooting. Here the size and range of the VSD makes it ideal for harsh operating environments from mining to industrial and even agricultural.

Strobel adds that BI staff have received training on the new VSD products, while further information can be gleaned from the BI website. Looking at future scope for synergy, he points out that the VSDs can be easily supplemented with the Bauer electric motor range from BI.

These aluminium three-phase 380 V motors are ideal for industrial applications such as fans, compressors, pumps, sanding machines, and pedestal drilling machines, among others. The main benefit is that the motors are far lighter than their cast-iron equivalents due to the aluminium casing and end shield. The multi-mount design has the added benefit of being able to change the feet on-site. This gives customers the option of having the terminal box on the top or on the left- or right-hand side, depending on the specific requirements. In addition, Bauer motors can be fitted with an external brake of either an AC or DC type.

For more information contact Bearings International,
+27 11 899 0000, info@bearings.co.za, www.bearings.co.za
The latest technology unveiled by German drive engineering specialist SEW-Eurodrive at Hannover Messe 2019 has finally made its way to South African shores. Raymond Obermeyer, MD of SEW-Eurodrive, personally attended the launch of the Generation X.e series at the world’s largest trade fair for industrial technology.

Generation X.e represents the latest iteration of the highly successful X Series of industrial gear units, which has gained significant traction globally in industries as diverse as mining, cement and sugar mills, and power generation. “It was decided to introduce the latest series to South Africa in response to the overarching industry need for energy efficiency and optimisation,” Obermeyer explains.

The specific client requirements addressed by the new series are maximum drive utilisation in the event of continuous operation under specified conditions; peak load, in the case of an irregular travel profile, frequent start-up, or occasional blocking; temperature and environmental factors such as the permissible surface temperature, degree of protection, permissible noise level, accessibility, and serviceability; minimum service life; and extended service intervals.

Such is the quality of the new Generation X.e series that it is particularly suited to harsh operating environments such as mining and general industry. Here an increased thermal saving of 32% has been achieved, mainly by reducing the periods between oil changes. Other advances include an improved bevel pinion housing, optimised bearing preload, a non-contact sealing system, a universal cover with a fan system and optimised gearing topology.

Obermeyer highlights that the main benefit of the Generation X.e is that it introduces a customer-orientated focus into the tried and tested X Series solution. This has been achieved by enhancing the hardware, together with an entirely new computation suite, embracing simulation, which means that a standard product can now be matched to specific modifications and settings for different client requirements and operating conditions.

This smart combination of separate measures and networked software tools now allows users to configure their own customised gear units. It means that all industrial drives supplied by SEW-Eurodrive now have the full potential for specific optimisation – a key factor considering the constraints, rising costs and tight margins faced by many industrial sectors globally.

The Generation X.e is suited to a temperature range from -40 up to 50°C, and is available with a torque rating from 65 to 500 kN. The industrial gear units will be assembled in Nelspruit for the entire African market, which guarantees a fast turnaround time and readily accessible parts support and service backup.

“It is no longer sufficient to merely sell products to customers. We must look at their holistic requirements, and how best we can provide a complete solution that optimises all of their processes, as well as allowing for the introduction of our ancillary technologies and value-added services,” Obermeyer concludes.

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The increased move towards the use of IE3 electric motors has made it increasingly important that the most appropriate starting method be selected to ensure optimum performance. With this move it is essential that the motor switching and protection components are engineered to meet the demands of the IE3 motor.

Generally, the most basic starting method for an electric motor would be a direct online starter or star delta starter, however older generation switchgear has not been engineered for IE3 motor compatibility. Older generation switchgear may generate nuisance tripping. Not only is this undesirable, it can also have a severe knock-on effect in terms of operational productivity and efficiencies.

WEG IE3 compliant low voltage switchgear has been engineered to offer absolute reliability when using WEG switchgear to start and operate WEG IE3 motors. Users can be confident that when using WEG IE3 compliant switchgear, their drive system will provide the highest levels of energy efficiency over a long service life. This will, in turn, translate into a reduction in the total cost of ownership (TCO) while complying with current environmental regulations.

WEG motor protective circuit breakers
Typically, motor protective circuit breakers are affected most when starting electric motors because of sensitivities to transients and instantaneous values of current. WEG circuit breakers were evaluated specifically in terms of this and the multiple of short circuit release was changed from 12 to 13 times the rms value of the rated current. Following this modification, extensive testing was conducted to verify that, with these modifications, the whole range of WEG circuit breakers was IE3 compliant.

WEG contactors
The entire range of WEG contactors is IE3 compliant. The application of sound engineering principles ensured that there is no mechanical or electrical lifespan reduction, or an increase in the contactor’s coil consumption.

WEG overload relays
Overload relays are designed to protect motors thermally against overload conditions and unlike motor protective circuit breakers these are not sensitive to instantaneous currents. WEG solid-state and thermal overload relays conform to IE3 motor application.

Significantly, as a leading manufacturer of premium (IE3) and super-premium (IE4) electric motors, WEG has developed extensive expertise in IE3 equipment conformity and all WEG’s current switchgear and protection devices can be used without restriction to ensure the reliable operation of IE3 motors.

Zest WEG Group’s technical team is able to assist customers in the appropriate selection of IE3 compliant control and protection components to optimise the efficiency of motor installations.

New products are continually being added to the WEG low voltage switchgear range, leveraging off the ongoing research and development conducted by WEG Brazil. These products are available off the shelf from the Zest WEG Group and include contactors, motor protection relays, motor circuit protection breakers, push buttons and indicating lights, field isolator stations, motor starters in either polycarbonate or sheet metal enclosures and other associated products.

Backed by SABS certification, the WEG switchgear product range is gaining popularity in the mining, general industry, commercial and domestic sectors. Among the leading products in the range is the WEG CSW range of push buttons and pilot lights, now available in complete sets; contactors and thermal overload relays; direct online starters; a full range of miniature circuit breakers and the most intelligent product in the range – the innovative SRW01 smart relay for protecting motors of high value and preventing extended downtime. This low voltage electric motor management system incorporates state-of-the-art technology and network communication capabilities, and its modular concept makes it suitable for a variety of applications.

A full catalogue of WEG switchgear products is accessible online through the Zest WEG Group’s website. These products are sold out of a sales centre at the company’s Linbro Business Park facility in Sandton, easily accessible from Johannesburg, Pretoria and Krugersdorp.

For more information contact Zest WEG Group Africa,
+27 11 723 6000, info@zestweg.com, www.zestweg.com
Control for additive manufacturing

Colossus is a startup enterprise in Belgium, and possesses one of the largest transportable plastic 3D printers on the market. It was developed in cooperation with machine builder IMA. The printer’s trailblazing controls come from Beckhoff and not only control the traversing axes in the machine, but also the temperature of the extruder in the print head.

Colossus plans to manufacture large functional or decorative objects such as outdoor furniture and ornaments with a new 3D printer that processes recycled plastics, and this creates further special requirements. In addition, the 3D printer will be installed in a container and transported to trade shows and festivals as an eye-catcher. The products must therefore be created quickly – much faster than standard technologies. In short, Colossus tasked machine manufacturer IMA with a very ambitious project.

The recycled materials are processed using the Fused Granular Fabrication (FGF) process, in which a plastic granulate is melted in an extruder and the end product is created by applying layer after layer of the material. In this application, the extruder’s print head is moved through space by a special linear portal.

The drive control data for the linear portal are determined in two steps. First, G-code is generated from the 3D model of the end product. The controller processes the G-code and computes the movement of the print head in space. Both of these computing procedures require high processor power.

The IMA team developed an XYZ portal as the drive for the 3D printer. Toothed belts drive both the X- and Y-axes so that the Y-axis does not require a motor. The goal was to save weight, because the extruder alone weighs 70 kg. The XYZ portal itself is mounted on four spindles, each equipped with its own drive. In this way, the printing plane can be kept in perfect parallel to the plane of the X and Y-axis.

PC-based control from Beckhoff was chosen for the control of the printer. One of the components is the heating zone control of the extruder. IMA utilises the TwinCAT 3 Plastic Processing Framework software for this purpose. The extruder has six heating zones with 3-point control. Each zone has a heater band and a fan for cooling. To achieve a stable process, these devices need to be precisely controlled. A shut-off nozzle is used to start and stop the melt flow. This is a motorised valve, which is used to control the flow rate. “The extruder operates with a constant throughput. This means the movement of the print head must be controlled in relation to the geometry of the end product. Users must be able to adjust the corresponding parameters themselves.

The solution developed by IMA is based on a C6030 ultra-compact industrial PC as well as three double actuators and one single actuator implemented via AX5000 servo drives. The visualisation program is written in .NET so that the visualisation layout can easily adapt to the customer’s wishes.

The control software can read in and process large quantities of data in G-code format. TwinCAT CNC takes care of the interpolation and kinematic transformation of the virtual X and Y-axis to the A and B-axis of the XYZ portal. The temperature of the extruder is controlled with the TwinCAT 3 Plastic Processing Framework. The control parameters are determined automatically. With the help of these optimised parameter settings, fast heating with low overshoot is possible.

In order to read out the temperatures of the individual zones and to control the heating and cooling elements, the extruder is equipped with IP67 EtherCAT Box I/O modules. The operator panel is regarded as highly important to optimally convey the exciting possibilities of 3D printing to the public. IMA chose the CP2912 multi-touch control panel with 30 cm display as the visually appealing hardware for that purpose.

The 3D printer from Colossus is a superlative device in every respect and delivers astounding results. Its creative design allows the best possible use of available space inside the shipping and display container. The printer also boasts an impressive output capacity of up to 15 kg per hour.

Colossus presented the first printer at multiple events and trade shows in 2018. There was great interest in the 3D giant and its new method of recycling. More of these printers will be implemented to manufacture products on an industrial scale in the future.

For more information contact Michelle Murphy, Beckhoff Automation, +27 11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
Cummins engines power expansion projects in Ghana

A pair of Cummins QSK95 engines is helping power expansion projects at the Ghana Ports and Harbours Authority (GPHA). GPHA is the national port authority of Ghana, responsible for the governance, maintenance and operation of the country’s ports. These ports have seen a dramatic increase in total cargo traffic, transit cargo, and container traffic, which has prompted expansion projects. To increase its handling capacity, a major expansion and infrastructure upgrade will require bigger vessels and higher capacity engines.

The addition of three RAstar 3300 series tugs is currently on order. Turkey-based Torgem Shipyard is constructing the new ship-docking tugs. Torgem Shipyard is at the forefront of modern ship construction, serving as the construction site for over 100 new building projects. The facility is equipped to handle the building, repair, maintenance, and conversion of a wide range of vessels, including chemical tankers, cargo ships, tugboats and mega-yachts.

Each of the new tugs will be powered by a pair of Cummins QSK95 engines. The three custom-designed tugs will enter service with the GPHA on the west coast of Africa, where shipping volumes are increasing, creating a requirement for powerful modern tugboats. They will be equipped to fulfill a multitude of tasks for the GPHA, including ship-assist, fire-fighting, and pollution response. Commander Stephen Abane Ayeo of GPHA said, “We know Cummins engines. They are durable, economical and strong, and provide good maintenance support. We’ve been a partner for over 30 years.”

Motors, drives, alternators and ATEX induction motors

Vert Energy is the sole distributors for Leroy-Somer in southern Africa and supplies and supports the entire LS range, which includes standard and adapted AC and DC motors, geared and brake motors, variable speed drives and alternators. “Leroy-Somer’s motor, drive and automation solutions focus on maximising energy savings, enhancing performance and safety and optimising productivity in diverse sectors,” says Vert Energy managing director, Grant Robertson. Included in the LS range are LS ATEX induction motors designed for safe use in hazardous areas, including gas zones 1 and 2 and dust zones 21 and 22. These multi-purpose fixed and variable speed-compatible motors, which comply with stringent quality and safety specifications for operation in explosive, gas and dust atmospheres, provide the highest guarantees of safety and reliability in extreme conditions. Further advantages are energy efficiency, reduced CO₂ emissions and short-term return on investment.

The ATEX motors can be adapted to several configuration variants and finishes to meet exact requirements of the manufacturing or automation application, with variable load factor limitations, extreme operating cycles or the need to increase productivity. This range is particularly well suited for pump, ventilation, agitator and mixer applications in refineries, pipelines, petrochemical and food industries. LS ATEX motors meet IE2 high efficiency and IE3 premium levels as standard in 2,4 or 6 poles and frequencies of 50 Hz or 60 Hz. Frame sizes range from 80 to 355 and power ratings are between 0,75 and 400 kW. Ratios between rated power, speed and frame size for LS ATEX motors comply with the applicable standards IEC 60034 and 60072.

Apart from the online Leroy-Somer ATEX technical catalogue, which comprises critical information on efficiency and mechanical/electrical data, the company also has an online configurator to assist in the selection of motors, brake motors or geared motors, combined with variable speed drives.

Vert Energy’s service encompasses the supply of quality branded products that combine high performance, energy efficiency, reduced downtime and extended service life, to meet the highest performance, safety and environmental standards. Factory and OEM trained technicians assist with any electromechanical breakdown situation or routine preventative maintenance procedures throughout Africa.

Vert Energy is also the authorised sales and support partner for DEIF generator controls, API/Covrad GT Heat Transfer, ASCO automatic transfer switches and Avatron and Froment load banks, as well as Allight Lighting towers.

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At Snow Space, a winter sports resort near Salzburg, Bergbahnen Wagrai operates the Sonntagskogelbahn 2, a chair lift for taking skiing enthusiasts to the piste. New innovative drive technology guarantees the comfort and the safety of the customers. To provide the most comfortable ride possible to the summit for the skiers, the new chair lift has been fitted with efficient Siemens drive technology by the system integrator Frey Austria. The core element in the solution is ultra-modern frequency converter technology in which the frequency converters are optimally matched to the new synchronous servo motors. The redundant design of the system increases not only the availability of the chair lift but also the passenger safety.

Since the 2018/2019 winter season, it has been possible to transport eight skiers to the summit in each gondola on the new high-tech Sonntagskogelbahn 2 chair lift instead of just four. This has been made possible by, amongst other things, the use of modern Siemens drive technology, which has dispensed with a transmission between the electric motor and the pulley. Comfort is increased by precision speed control with encoder feedback. This is the first time this combination has been used. It makes transmission maintenance a thing of the past and offers optimum control options, and it also differentiates the Sonntagskogelbahn 2 from the other chair lifts.

At the heart of the drive for the new ski lift are redundant Sinamics S120 Cabinet Modules-2 from Siemens. Synchronous motor (90 pole) from Doppelmayr.

Ultra-modern, new drive technology
The gearless drive solution, consisting of a synchronous motor (90 pole) from Doppelmayr and two Sinamics S120 Cabinet Modules-2 redundant frequency converter cabinets, form the technical heart of the chair lift. The system comprises two Sinamics S120 Active-Line Modules and two recently developed S120 Chassis-2 Motor Modules. The most significant benefits of these new devices are the smaller footprint, the sturdy overall design, and efficient operation combined with easier service. In addition to this, there is a considerable reduction in weight – ultimately each of the Sinamics S120 Chassis-2 has a reduced weight, from 450 kg down to 160 kg.

The sturdy overall construction of the frequency converters also significantly reduces the derating and the noise generated by the motors. The control is provided by a fail-safe Simatic S7-1500F controller combined with a distributed I/O Simatic ET 200S. Frey uses a TP-700B touch panel to operate the system. Frey is Siemens’ solutions partner from Innsbruck and is responsible for the electrical engineering solution for the drive, automation and visualisation, as well as the system engineering. The engineering for the whole solution is completed in the Siemens engineering framework, the Totally Integrated Automation (TIA) portal.

Redundant system design for maximum safety
The Sonntagskogelbahn 2 has two identical direct motors arranged concentrically and vertically above each other. They are mechanically connected to each other via a central shaft. Two Sinamics S120 power supplies and two Sinamics S120 Chassis-2 motor modules can be alternately connected to each other so that the required double redundancy is provided not only for modular drive but also for drive control. “If a part fails, the operators are still able to run the system empty to ensure the safety of people in the lift,” explains Karl Prammer, CEO at Frey.

Project success launches future plans
“The Sonntagskogelbahn 2 is currently the most innovative chair lift we operate here,” says Wolfgang Hettegger, CTO at Snow Space Salzburg. The chair lift transports approximately 3600 people in 38 gondolas per hour up over 200 metres to the Sonntagskogel – around 25 percent more passengers than the previous arrangement. It is therefore understandable that the next two projects are already on the drawing board – the Sonntagskogel 3 and the Flying Mozart.

For more information contact Jennifer Naidoo, Siemens Digital Industries, +27 11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
Addressing evolving hydraulics challenges

Using materials science and design technologies, Gates’ engineers come up with innovative hydraulic hose solutions for ever-changing needs and challenges.

Mobile fluid power applications have become more complicated as the power output requirements on these systems have increased. At the same time, engine compartments have become more compact. Overall weight has been reduced, despite the addition of new features and systems such as emissions control, climate control and hydrostatic drive lines. The challenge for hydraulic hose manufacturers has been to design better solutions that can perform more efficiently in environments that have become increasingly hostile. A successful result can only be achieved with advancements in composite rubber elastomer, manufacturing processes, and tools for hydraulic assembly applications. Gates is leading the charge to meet emerging challenges head-on with solutions that accelerate our partners’ growth and development.

Extensive experience and investment in innovation

As a global manufacturer of highly engineered power transmission and fluid power solutions, Gates has accumulated a wealth of manufacturing expertise through long-term partnerships with Original Equipment Manufacturers (OEMs) across a wide range of industrial sectors. This experience, coupled with the company’s continued investment in materials science and the engineering team’s extensive standards, industry and applications know-how, allows Gates to drive design standards forward and develop innovative hose solutions that not only satisfy the needs of equipment manufacturers, but also positively influence the overall standards of hose manufacturing by the most recent Gates’ hose innovations. This impact can be seen in the Gates Megasys MXT hose, launched late last year.

A lighter and more flexible hose

Setting new standards for modern fluid power systems, the Gates MEGASys MXT family of hydraulic hoses are the latest example of Gates’ commitment to innovation. MXT hoses leverage breakthrough materials science and advanced process engineering to offer customers a lighter and more flexible product that is not only easier to handle, but also improves the customer experience. A hose up to 30% lighter than earlier alternatives costs less to ship. The weight reduction also improves the application’s fuel efficiency, while greater flexibility makes them more ergonomic to handle. They are easier to route around increasingly tight engine compartments, placing less stress on the mechanics. It also makes for a quicker install reducing downtime, ultimately lowering the overall cost of ownership of capital equipment for end-users. Approximately 90% of the wire braid product applications are covered by this cross-functional, multi-spec hose solution, making MXT a truly universally applicable product, and allowing Gates’ customers to consolidate inventory and save precious floor space.

“Our customers have been telling us they want lighter, more flexible and easier to handle products that address multiple industry standards. They are seeking to enhance the performance of their machines, simplify their engineering processes, improve operational efficiencies and streamline inventory with a simplified selection of products that can be used on virtually any original equipment platform,” said Tom Pitstick, CMO and SVP of product line management for Gates. “MXT delivers on these needs and adds value to our customers beyond our premium product performance.”

In summary, Gates is seeing strong demand for this hydraulic hose innovation because MXT hoses deliver:

- More flexibility (up to 35% decreased force-to-bend compared to similar Gates’ compact products), allowing for faster and more ergonomic installation.
- Lighter weight (up to 30% compared to similar Gates’ compact products), for improved fuel efficiency, easier handling and reduced shipping costs.
- A coverage of approximately 90% of the hydraulic wire braid product applications (meeting or exceeding multiple industry standards).
- All the benefits of the Gates MegaSys product portfolio such as longer lifetime and shorter minimum bend radii.
- Compatibility with Gates MegaCrimp (crimp specifications available).

From a hydraulic customer perspective, these are significant advantages – no matter the operating environment or equipment.

To read the full story go to www.motioncontrol.co.za/9572a to find out more about hydraulic hose innovations resulting from changes in international standards; the importance of hose construction, selection and performance; and the equipment manufacturers that are benefitting from innovative hose solutions from Gates.

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Ausco LC Brake System
Wet Brake Solution for Toyota Land Cruisers

SAFER
LOWER COST
WORRY-FREE PERFORMANCE

Axiom Hydraulics is pleased to represent the Ausco LC brake, a true multi-disc wet brake solution for the Toyota Land Cruiser. The LC brake combines independent hydraulic service and failsafe parking into one simple package that bolts to the existing hub while using the stock OEM master cylinder. The brake also features a unique cooling chamber design for long life and fade-free performance, even at highway speeds.

The LC brake's field history from Canada, Australia, Europe, and Africa demonstrates unrivaled performance compared to all other Land Cruiser braking solutions. In a recent study at a South African mine, the LC brake outlasted a competitive product by 17:1, lasting 34 months compared to the competitive brake's 2 months. Customers enjoy trouble-free, worry-free performance.

The LC brake is approved for both mining and on-road use in South Africa and has SABS 1689 and ECE R13.08 approval. Stock is available locally at Axiom's facility in Johannesburg.

For more information or to find a dealer near you, please contact Axiom Hydraulics at +27 11 334 3068 / 86 or visit us on the web at https://axiomsa.co.za
Dosco Precision Hydraulics is a member of the Hudaco group, which was established in 1989. The company has been specialising in pump and motor remanufacturing for the past 30 years. With a world class assembly and test facility Dosco ensures that all components are remanufactured to OEM specifications.

The company is certified in the following standards:
• ISO 9001:2015 SABS.
Dosco is a gear pump specialist and an authorised Kawasaki/STAFFA distributor, with a certified repair centre in South Africa.

The company will be extending its product range with the bellhousing and drive coupling ranges to complement the Kawasaki K3VL pump series.

Custom-designed 6000 ton power pack

Hytec South Africa recently custom designed and manufactured a 6000 ton power pack for a mine in Lephalale. Supplied in a three metre shipping container, the solution is equipped with a pressurisation unit, control electronics and automated lighting. The power pack was designed, manufactured and commissioned at the Rexroth HUBB in Kempton Park.

The containerised power pack controls the belt feeder on a coal conveyor to determine the amount of coal feeding into the line using proportional control. Independent knife gate control systems control the chute closing with a 350 kN force. Its pressurisation unit supplies clean filtered air at a positive pressure to the inside of the unit, ensuring dust is kept out, and all filters have a 100% backup system to prevent downtime.

“In using a shipping container, we are able to offer the customer a movable hydraulic room,” says Hytec projects manager, Neil Griezel. The 6000 ton power pack has an automated lighting system, which is activated when the door is opened, and the inside of the container acts as a secondary containment system in the event of hydraulic liquids being expelled from the system. Sliding mounts for the electric motor and pump combinations are fitted for ease of maintenance. The whole system consists of transducers and switches, which continuously monitor system performance, and is equipped with an integrated air blast cooler.

The plug-and-play unit will be connected on site to all the hydraulic actuators, switched on and be ready for use.

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Precision hydraulics for the local market

For more information contact
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+27 11 452 5843,
wimpiep@dosco.co.za, www.dosco.co.za
UNCHAIN YOUR OPERATIONS

Roller chains remain a popular choice. Yet it is worthwhile to look beyond this outdated solution. After all, there is a better alternative on the market that helps to simplify your life. Belts are a rust- and oil-free alternative that outperform roller chains, lasting up to 3 times longer and weighing up to 96% less. Discover the superior capabilities, uptime, and performance of Gates belts.

GATES® BELT-DRIVE SOLUTIONS
FREE YOUR BUSINESS FROM OUTDATED ROLLER CHAIN

GATES.COM

3X LIFETIME  NO RUST & OIL  96% WEIGHT LESS

DRIVEN BY POSSIBILITY™
SIKO’s SGH wire-actuated encoders measure cylinder stroke as well as speed in a hydraulic cylinder with impressive efficiency, flexibility and robustness.

The technology
SGH sensors use a wire draw mechanism that is integrated directly into the cylinder to measure the stroke. The wire of the wire draw mechanism is secured to the piston head. When the cylinder extends, the wire wound on a wire drum is pulled out. The resulting rotation of the drum is detected by the contactless sensor system and converted into a linear position. This means that precise and absolute position or speed tracking of the cylinder is possible at any time. The magnets used to measure the rotation are scanned by the contactless sensor system through the pressure resistant base plate of the SGH sensors. The electronic components are fully encapsulated and located on the non-pressurised side of the system. The entire measuring system is therefore incorporated into the cylinder and optimally protected against external environmental influences. The clear advantage is that in contrast to measuring systems mounted externally on the cylinder, the sensor system cannot be damaged, negatively affected or even destroyed by environmental conditions.

Developed for the tough conditions in mobile hydraulic applications
The SIKO SGH sensors were designed and developed in line with the strict specifications of renowned hydraulic cylinder manufacturers. Market demands ensured that SIKO met their requirements regarding robustness, durability and functionality. SIKO worked closely together with cylinder manufacturers to define and satisfy the specifications regarding service life, shock and vibration resistance, EMC and compatibility with various hydraulic media. All specifications were tested and confirmed in endurance tests at the facilities of cylinder manufacturers or in external accredited laboratories.

Intelligent sensors for smart cylinders
The SGH technology transforms hydraulic and telescopic cylinders as well as piston accumulators into smart cylinders and hydraulic systems. A suitable sensor is available for all applications. With measuring lengths of up to 5000 mm, a wide selection of interfaces as well as high flexibility for integration of the sensors, the SGH family offers a wide range of possibilities. Redundant options and sensors for performance levels of up to PLd are available for safety critical applications. The safety versions of the SGH25 and SGH50 sensors meet the requirements for use in applications up to Performance Level d (PLd). Safe and redundant design in compliance with CAT3 as well as a safe mechanical design means SIKO products are pre-destined for use in safety-critical applications, also under unusual conditions.

In addition, the sensors supply process data which not only serve to satisfy safety requirements, but also offer an added value for the machine. The process data can therefore provide insight into an impending seal maintenance interval. Flexible support tracking in crane and lifting applications extend the working ranges of the machine. Memory functions in industrial trucks save time and make work safer. All these are examples of how SGH sensors not only make machinery safer, but also more efficient.

For more information contact Instrotech,
+27 10 595 1831, sales@instrotech.co.za,
www.instrotech.co.za

Reliable position tracking
Smart sensors take mobile hydraulics to a new level of safety and efficiency. ‘Functional safety’ is a term that is being widely discussed. Safety concepts for mobile machinery has been a topic of interest since the implementation of the new Machinery Directive EN 13849. Sensors of the SIKO SGH range help implement intelligent safety concepts for mobile machinery and meet the requirements of the specific safety standards for different utility vehicles.

To summarise, advantages of the SGH encoder include:
• Absolute detection of the cylinder position.
• Direct integration into the cylinder.
• Measuring range up to 5000 mm.
• Can be used in safety applications up to PLd.
• No drilling of the piston required.
• Can also be used in telescopic cylinders.
• Perfectly protected due to protection category IP69K.
• Durable and robust – developed in line with mobile hydraulic requirements.
• High EMC.

For more information contact Instrotech,
Adjustable priority flow control solutions

Sun Hydraulics has developed a range of customisable, adjustable priority flow control solutions. These provide simple, efficient control of auxiliary hydraulic power to a range of mobile equipment attachments. They also have wider application in general attachment controls and applications where priority flow control is required, for example in steering control and concrete mixing. The new circuits provide a simple, efficient way to supply auxiliary hydraulic power to attachments like rock breakers or hydraulic hammers attached to skid steers, backhoes or excavators. They can also function as an unloading valve for fixed displacement pumps in applications requiring two or more functions operated by a single pump.

These adjustable priority flow control solutions provide several significant advantages:

- High-quality, durable valves made with all hardened parts.
- Significantly reduced pressure drops from valves and cavities.
- Zinc-nickel coating for improved corrosion resistance.
- Wide range of options available for different applications.
- Solenoid-selectable pressure options.
- Manually adjustable XMD with electro-hydraulic flow control.

Examples of adjustable priority flow control solutions that leverage Sun technologies for efficient control of mobile equipment attachments are:

- An adjustable orifice ensures a stable flow rate for a given needle valve setting. The flow sharing is achieved with very low pressure losses across the needle valve and modulating element and is independent of the pressure.
- Selectable priority flow with pressure limiting option, allowing the operator to switch the priority flow on and off easily.
- Electro-proportional priority flow control for very stable, continuous flow for a given command signal to control demanding applications like hydraulic hammers and rock breakers.

For more information contact Fritz Kern, Axiom Hydraulics, +27 11 334 3068, fritz@axiom.org.za, www.axiomsa.co.za

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Identifying energy wastage in compressed air

The biggest energy consumer in many factories is the compressor station. A 200 kW air compressor when serviced by a main line compressor company and with a power cost of R1,10 kWh, will cost R1,3 million a year when operated continuously. Auditing is a real need and the cost savings that can be achieved are huge. What do the various components of a comprehensive air audit tell you?

Air flow testing
Often older compressors deliver air flows well below the rated catalogue figures, yet still have high power rates. A good air flow audit will present a multi-axis graph over a number of days, showing air flow, pressure, velocity and power in one document.

Air velocity
While velocity may not be the final pointer for poor pipeline design and layout, it often identifies a problem found in many facilities. Many compressor manufacturing companies supply compressor packages with small discharge ports. This practice can lead to high air line velocities. Undersized air piping strangles the air mains. It creates back pressures that are enough to push compressors into an off-load position, while within the factory, production lines are suffering from a lack of pressure. This scenario misleads compressor operators into starting up yet another compressor to make up for the lack of pressure in the plant. This just adds to the problem of too much air being forced down too small a pipe, wasting more energy.

High line velocities can carry over waste condensate into the air line from the quiet zones within a dryer, thus re-polluting the air line. High velocities also carry air line contamination straight to the point of use. A good auditor will survey the plant room and not only monitor the compressors and pipe line pressures within it, but also downline in the plant to check the air distribution piping’s ability to transmit compressed air efficiently without pressure losses.

Pressure
Along with the velocity, pressure is an indicator of what’s really going on. On occasions we have found that the compressor’s discharge pressures have been increased in the plant room to overcome a poorly designed or overloaded distribution system, causing even more demand for power.

Dew point and air dryness
A blocked condensate drain, an open bypass valve, or worse still a fractured heat exchanger are causes of water pollution in a factory. A dew point probe identifies a water contamination problem faster than any machine minder. Many dryers are on line showing a dew point of 3°C but are passing thousands of litres of water a week into the plant due to a simple fault such as a stuck auto drain.

Air dryers are not fitted with dew point probes as these are quite expensive. The dryer’s fascia merely monitors the air temperature in the main heat exchanger or the suction gas line to the freon compressor. A fault can be present and the dryer will still indicate a 3 or 4 degree dew point. A dew point meter will identify the problem in minutes and can sound an alarm. Dew point probes can also be connected to a factory’s scada system. A good air audit will show the flow, pressure, relative humidity and dew point in one concise graph.

Leak detection
Leak detection is also an area where speed, quality of ultrasonic detection equipment and methodology are critical. Equipment should have the ability to estimate leak losses via sampled sound bites. The leak sites have to be tagged, photographed and documented in a clear and concise manner. If at all possible, the leak loss total value should be verified by a separate leak rate check with the plant in shutdown mode. The total leak loss should be expressed in a volume and in kW and a cost for the kilowatts used.

Auditing is a science
Auditing has now become a science, it’s no longer just a look at a compressor system. Many companies can capture data, but few have insight into the status of their compressed air system and the potential for optimisation and power saving. Auditing is the first step in achieving an optimised compressed air system.

Artic Driers has the ability to carry out full audits, as well as the experience and knowledge to analyse and interpret the data to provide a meaningful report to the client.

For more information contact Allen Cockfield, Artic Driers International, +27 11 420 0274, allen@articdriers.co.za, www.articdriers.co.za
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Ultrasonic leak detector

SKF’s TKSU 10 ultrasonic leak detector helps users to quickly find leakages in compressed air or vacuum systems. The instrument is very simple to use and features adjustable sensitivity and intuitive guidance for superior leak detection results. Any compressed air system can experience leaks, which amplify the load on compressors and increase costs. The TKSU 10 helps users to easily find leaks from a distance, even in noisy industrial environments, via its ultrasound measurement sensor. The built-in LED display assists the user in adjusting sensitivity and shows the measured ultrasound noise from leaking air, allowing the quantification of leaks and prioritisation of repairs.

It is easy to use and no training is required. The leak detection can be done from a distance in noisy industrial environments. The colour LED display assists in adjusting sensitivity settings and shows measurement values. The unit reduces energy and maintenance costs via leak identification and repair. It is a lightweight, handheld device with industrial headset included. It has an independently adjustable sensor sensitivity and headset volume. The flexible probe helps find leaks in difficult-to-access locations. The headset features a neck-band design to wear with a protective helmet.

The TKSU 10 is designed for use in all industries utilising compressed air, and it is particularly recommended for paper and chemical industries, as well as workshops with air-driven power tools.

For more information contact Samantha Joubert, SKF South Africa, +27 11 821 3500, samantha.joubert@skf.com, www.skf.com

Externally monitored pneumatic safety exhaust valve

Parker Hannifin has introduced a new safety exhaust valve that rapidly exhausts compressed air in the event of a fault condition or when a machine has an emergency stop. The P33 is designed for two-channel control architectures and is externally monitored. The new safety valve has a patented failsafe design and is suitable for use in applications up to category 4 performance level e.

The P33 safety exhaust valve is available with adjustable soft-start and high flow exhaust performance to ensure rapid exhaust of compressed air when required. Designing a control system with a high diagnostic coverage provides a high means of fault detection within the valve, while LEDs provide operators with a clear status indication of sensor power, main solenoid operation and fault condition.

The design of the P33 safety exhaust valves has been optimised for long service life (B10d), very high flow rates, high faulted flow rates, compact design and high mean time to failure (MTTF) values. Connectivity is via two M12 connectors that provide solenoid and pressure sensor interfacing. Compatibility with devices from popular manufacturers such as Rockwell, Omron, SICK and Siemens underlines the versatility and flexibility of the valves.

Being externally monitored gives greater control at the safety device for the customer’s application. It also reduces the complexity of the machine for startup or resetting of the valve. The failsafe design of the P33 family is maintenance-free and requires no additional silencers or mufflers that can clog creating potentially unsafe exhaust conditions.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za
Class 0 oil-free versus technically oil-free air

Oil-free compressed air is used throughout industry, where the purest compressed air quality is critical to the end product and to the processes involved – in the pharmaceutical or food and beverage sectors, for example. “As the leading provider of portable power and air solutions in the country, Rand-Air has the right solution for our customers, in that we are able to supply oil-free compressors which have a TUV Class 0 certification under the ISO 8573-1 standard. With this assurance, customers can have peace of mind that they are guaranteed 100% oil-free compressed air,” explains Rand-Air’s fleet manager, Craig Swart.

The evolution of this stringent standard reflects the ever-increasing requirement for quality air for processes and end products. Class 0 is a more stringent industry standard where the total oil content is measured – not only aerosols and liquids but vapours as well – by the internationally recognised TUV organisation.

Rand-Air sources its oil-free compressors from Atlas Copco, which puts these units through the most rigorous tests available, and which is now the first manufacturer to receive Class 0 Certification for all its oil-free products.

Swart adds that in the field of air compressors there are two terms which need to be understood – Class 0 and technically oil-free. The latter term means that oil is injected into the compressed air and then removed afterwards using a filtration process. This involves an oil separator in the compressor, coalescing filters to remove most liquid oil, and then an activated carbon filter to remove oil vapours.

With technically oil-free compressors, during the filtration process failures can potentially occur – for example separators can break and filters can become saturated. These factors are exacerbated when the operating temperatures are high. When using a technically oil-free system, there are also other issues to consider, such as ensuring that filters are regularly changed, treatment of the condensate and higher energy costs.

“At Rand-Air, all our PT-, PN- and Z-range of compressors are Class 0 oil-free, TUV-certified and we have a range of oil-free compressors to suit most applications,” he adds. “So if your requirement is for oil-free compressed air, one has to ask why its necessary to take the risk of potential damage to equipment or reputation. A Class 0 oil-free compressor from Rand-Air is your optimal solution.”
Food grade lubricants

Food safety precautions and regulations need to extend to every component in the food and beverages processing environment. This includes the lubricants used in machinery. Callum Ford, national marketing manager at Lubrication Engineers (LE) South Africa, explains that the food and beverage industry requires specialised lubrication solutions that consider not only the complexity of the equipment, but also specific operating environment challenges. Most food processing machinery requires lubrication for bearings, gears, slides or chains. Lubrication solutions in this environment need to be able to protect against wear, friction, corrosion and oxidation. They have to withstand moisture, hot and cold conditions, shock loading and impact. They also need to comply with non-toxicity regulations. In addition they have to resist degradation from any chemicals in the environment, from the pH of the food components themselves to chemicals used in sanitation and cleaning processes. They also cannot allow for any microorganism growth.

“As the licensed distributor of LE products for southern Africa, all our food grade products are certified by the United States Department of Agriculture (USDA) or National Sanitation Foundation (NSF) International,” Ford says. “Our LE Quinplex additive makes many LE lubricants an easy and appropriate choice for food applications, while our USDA and NSF certified greases are well suited for applications in sealing and waterproofing machinery. All LE H1 lubricants – except for H1 Machine Oil – are also certified Halal by the Islamic Food and Nutrition Council of America, as well as Kosher Pareve by the Orthodox Union.”

Belting products for food processing

BMG supplies and supports a comprehensive range of belting products suitable for the food processing, bottling and packaging sectors. New to its range of belting certified for safe food handling is the KleenEdge non-fray series, developed by Ammeraal Beltech to minimise the problems of belt-edge fray and associated contamination issues, ensuring absolute hygiene in food processing. Another popular product in the food handling sector is the new Ammeraal Beltech Pop-up flight solution for inclined food conveyors, which reduces waste, enhances efficiency and minimises costs.

Easy-to-clean KleenEdge belting has been designed with a high strength, low stretch fabric reinforcement, which is held securely in a tough, non-cracking thermoplastic structure. This durable assembly prevents the risk of contamination, belt shrinkage and distortion that may occur from belt-edge wear during use. The Pop-up flights for inclined food conveyors are integrated into modular belt systems to prevent product residues being left on the belt and they also minimise droppage onto the floor. They operate in conjunction with discharge belt-scrapers, without the need for secondary drive motors or complex controls. They are suitable for direct food contact, and improve efficiency and hygiene levels in various food processing and packing applications. They are especially suitable for products that stick to conveyor belts.

All products for food handling, bottling and packaging applications meet the highest conveying and packaging standards in terms of reliability and consistent quality and hygiene controls. BMG food grade belts comply with stringent EC and FDA requirements for pristine hygiene standards.

For more information contact Callum Ford, Lubrication Engineers, +27 11 464 1735, callum@lubricationengineers.co.za, www.lubricationengineers.co.za

For more information contact Ryan Forsyth, BMG, +27 11 620 7422, ryanf@bmworld.net, www.bmworld.net
SEW-Eurodrive is assisting the bakery industry in improving efficiencies and reducing its energy consumption by means of the introduction of its Movigear mechatronic drive system. The drive specialist has enjoyed a longstanding relationship with Dale Spiral Systems & Bakery Automation of Johannesburg.

“The main advantage of Movigear is that the combination of servo motor, gear unit, and electronics are combined in a single unit that is highly reliable and hygienically designed. Apart from reducing startup costs, it also plays a vital role in cutting total operating costs in an industry where pricing is the main factor,” says Dale operations director, Adam Sweeting.

The company was established in 1998 by Chris and Jill Dale, who sought to transfer their considerable expertise in bread conditioning and cooling gained in the UK to South Africa. Twenty years later, the company is an acknowledged global leader in its field, holding a number of patents, and continually developing new equipment and systems in response to client requirements.

Conditioning or cooling extends the shelf life of bread significantly, as well as limiting the weight loss during the process, with much less handling required than traditional systems. The OEM has evolved from supplying conveyor systems only to a turnkey solutions approach that encompasses all ancillary equipment, from ovens to provers, spirals, conveyors, mixing and robotics. “We have taken 20-year-old machines and reconditioned them to an ‘as new’ condition. Our extensive experience in this regard has allowed us to develop our own equipment that improves on existing systems, under ten different trademarks such as Bakermation, Coolermation, and Mixermation,” Sweeting explains.

Dale initially approached SEW-Eurodrive to supply drives for its conveyor products, including its own Blue Belt range in either acetyl or polypropylene. Teething problems with suppliers eventually resulted in the company standardising on the German drives due to their reliability, range of power options and ability to maintain a constant torque rating.

The drive to promote Movigear in the bakery industry will allow the OEM to increase its market penetration by focusing on refurbishing existing systems, many of which are out-of-date, and hence not equipped with the latest energy-saving and monitoring equipment. “While the initial capital outlay is perceived as the main stumbling block for such a conversion, we educate customers as to the long-term benefits and the impact on total cost of ownership and return on investment,” explains sales representative, Nick McKey.

Energy-intensive industries such as bakeries and food and beverage plants are increasingly looking to reducing their energy consumption, which is where the one-fit Movigear systems stands to play a major role. Features include a high overall efficiency of all components, from the motor to the gear unit and electronics, an optimised interface between the motor and gear unit, a permanent field synchronous motor, highly efficient gearings, smart control methods, IE4 (Super Premium Efficiency) compliance, and a compact design and optimised housing.

Another major benefit of the Movigear system is that any future automation that may be required can be integrated seamlessly. Additional options such as trouble-shooting and problem-solving can also be accommodated if need be. Bakeries often have limited space, which means that the reduction in cabling and smaller cabinets required by Movigear is a major benefit.

“There are proactive clients in the bakery industry who are keen on moving forward with new technology such as Movigear, which will definitely give them a leading edge in this highly competitive and price sensitive industry,” Sweeting comments. Another major benefit for customers is the aftermarket support and technical backup offered by the drive supplier.

The strong relationship between the two companies is testament to how SEW-Eurodrive focuses on the specific requirements of a particular industry, focusing on the best products that can be used for a turnkey solution that is also modular and adaptable to future needs.

Commenting on the current state of the bread industry, Sweeting concludes that while there has been a lull in Greenfield projects such as new production lines and facilities, there is a definite opportunity for sustained growth in the southern African region for upgrades to the latest mechatronics technology and automation systems.

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
The symptoms of bearing damage known as White Structure Flaking, which occur in wind turbines as well as other drive systems, typically become noticeable very early, well before the end of the bearing’s expected service life. The causes have long remained unknown, but now, new findings are being made available by bearing specialist NSK, the results of which have led to the development of a new bearing material that offers significant benefits for wind turbine longevity.

Drive components for wind turbines have to meet tough requirements in terms of durability and resistance, and these requirements are becoming increasingly stringent. Onshore turbines traditionally require bearings that are designed to last for a service life of 175 000 hours, which is equivalent to 20 years. However, in the rapidly expanding market for offshore wind farms, where high levels of investment and difficult location access are common, a lifespan of 25 years is required.

**Longer lifespan, higher dynamic loads**

With extreme dynamic loads acting on the drivetrain of a wind turbine, this requirement presents a real challenge. In onshore wind turbines, the main bearings undergo loads of approximately 1 MN. At sea, however, due to very high wind speeds, even stronger static and dynamic loads act on the rotor and, consequently, on the whole drivetrain.

At the same time, the size and performance of the systems in both onshore and offshore applications grows continuously. NSK currently manufactures bearings for 9.5 MW turbines, which will soon be in full scale production. Moreover, the company is now developing bearings for offshore wind turbines with even higher nominal power output.

**Condition monitoring**

Higher performance and the growing market share of offshore turbines are key drivers behind increasing demands for longer bearing lifespan. As a result, wind energy technology is an ideal application area for online condition monitoring systems, which continuously measure and analyse vibrations in the drive system. If bearing damage occurs, the faulty components (inner or outer ring, rollers or cage) can be detected early by analysing the measurement profile.

A condition monitoring system (CMS) developed by NSK has recently been installed at an offshore wind farm in Japan. The role of the CMS is to detect anomalies sufficiently early to facilitate predictive maintenance strategies. NSK sees a large market potential for solutions of this type.

**Intensive materials development**

However, useful condition monitoring may be a secondary measure in critical application areas. The primary engineering goal when developing bearings for wind turbines is still, and will remain, to ensure a high level of reliability. In this respect, manufacturers have already made considerable advances. For instance, an important contributor to progress has been the development of new materials and heat treatment processes, such as NSK’s proprietary Super Tough (STF) special steel. Bearings made from this material last twice as long as those manufactured using conventional steel. In fact, the related load rating increase was confirmed and certified in December 2017 by DNV GL.

STF's long-lasting characteristics have been achieved by using a particular chemical composition and a special heat treatment process. Typical symptoms of damage, such as fatigue life related cracks in the bearing raceways caused by non-metallic inclusions in the bearing steel, are virtually eliminated in bearings manufactured using STF.

**Researching the causes of White Structure Flaking**

One issue that still afflicts the industry is the type of damage known as White Structure Flaking (WSF) or White Etching Cracks (WEC). In the case of both failure modes, certain areas of the material under the bearing’s raceway show local embrittlement. The brittle structure cannot withstand the loading and are thus the nucleus of cracks. Eventually, these cracks grow up to the raceway and finally the bearing fails. It is typical for this type of damage to appear relatively early; sometime shortly after the system has been put into service. After conducting a picral etching, these entities show a white appearance and are thus called white structures.

Intensive tests in NSK’s research and
development department have been able to replicate the damage and give some hypothesis about its origin. Various rolling contact fatigue tests have demonstrated that white structures are caused by hydrogen penetration. This hydrogen penetration is most likely affected by several factors and their combination, including axial or circumferential slippage between rollers and raceways, electricity, and certain types of lubrication.

Hydrogen subsequently penetrates the raceway and forms the typical white etching structures that lead to crack formations and eventually result in flaking. These cracks can be several millimetres long and spread from the interior out to the surface. Destructive tests of used bearings that showed no visible signs of surface damage demonstrated that white etching areas can even be present here.

When the damage is examined in more detail, it can be observed that under the influence of hydrogen, the originally martensitic microstructure degrades into a very fine-grained, brittle ferrite. This mechanism can be explained by the Hydrogen Enhanced Localised Plasticity (HELP) theory. One of its characteristics is that plasticity only occurs locally and that the global fatigue of the bearing is slight, so it is not one of the classic types of fatigue damage which originate either below the raceway (due to the inclusion of non-metallic particles) or in the raceway (due to severe contamination).

**Comparison of new and used bearings**

So where does the hydrogen come from? By comparing new and used bearings, NSK’s central research team determined that hydrogen only forms while the bearings are in operation. It is probable (at least this is the initial supposition) that the hydrogen comes from the hydrocarbon chains of lubricants and their additives. This theory was substantiated after the typical damage symptoms of the white structures could be reproduced in the laboratory with certain types of oils and greases. Similar damage was reported by the automotive industry in the 1990s, further supporting the theory. Here, the bearings of belt tensioners and alternators failed prematurely, yet changing the grease and the belt material solved the problem. However, the influence of electricity (current flow) on this failure mode has yet to be determined.

**New alloys, specific heat treatment**

NSK has developed new alloys that yield better results during rolling contact fatigue tests. In tests with hydrogen charging, the optimised chemical composition led to a five-fold increase in WSF resistance compared with conventional bearing steels.

A significant improvement is also achieved by optimised heat treatment. Here, residual stress under the raceways can be increased by carbonitriding instead of through-hardening. Although this measure does not prevent the formation of the white structures, significantly fewer cracks develop from these structures, and they spread to the surface more slowly.

**AWS-TF, a new bearing material**

Based on these findings, NSK introduced a new material for bearings called AWS-TF (AWS stands for Anti-White Structure), which combines the optimised chemical composition with optimised heat treatment.

Tests have shown that while bearings made of AWS-TF do not totally eliminate the risk of WEC, the delay before damage appears is seven times longer compared with conventional bearing steels. Initial field tests in critical installation sites are currently ongoing and seem to confirm these test results.

For more information contact Geraldene Govender, NSK South Africa, +27 11 458 3600, nsk-sa@nsk.com
Powermite has been a leading supplier of EKD Kolibri energy chain to the southern African market for more than three decades. The company shares a combined knowledge of over 50 years in drag chain applications with EKD, the globally renowned energy chain manufacturer based in Germany.

“EKD energy chain is uniquely engineered to deliver substantially reduced operational costs and extended component life for lowest total cost of ownership,” says Powermite managing director, Rolf Lung. “It therefore comes as no surprise that the energy chain, also known as drag chain, has found wide acceptance in a wide range of industries such as ports and harbours, materials handling, industrial as well as water treatment plants. The unrivalled wear resistance of the durable and efficient energy chains provides reliable and cost-effective protection of cable, hose or hydraulic supply on a fixed plane over a required distance at a fixed or variable speed, ensuring the seamless operation of mobile equipment such as cranes, milling and boring machines.”

The exceptionally reliable EKD Kolibri energy chain reduces the need for spares and requires very little maintenance. Additionally, the robust chain can operate long term in extreme temperatures ranging between -20 and 100°C.

Powermite’s comprehensive EKD energy chain range includes galvanised steel, stainless steel and carburised (hardened) steel. The company’s energy chain product portfolio also extends to a plastic range consisting of self-extinguishing, ATEX, anti-static, steel-coated and robotic bi-directional chain. All plastic chains are equipped with integrated connectors, thus requiring very few spare parts. “We also offer chains designed for ultra-long distances. Known as the Marathon System, these chains use roller sets and are capable of maintaining speeds of up to 200 m/minute,” adds Lung.

Powermite supplies three different types of EKD Kolibri energy chains to the African market, namely the one part link or flap-open link range, a wide range of bending radii which facilitates largest cables, as well as chain with separate end-connectors where each link can be used as an end-connector. Lung explains that the bars of the flap-open range ensure easy access for on-site installation of hoses or cables. The EKD Kolibri series ranges from external sizes of 15 mm x 15 mm through to 65 mm x 225 mm while the EKD PKK range can handle external sizes up to 100 mm x 340 mm. Steel external sizes start from 50 mm high up to 1500 mm wide.

Lung points out that one of the biggest challenges when it comes to recommending the most optimum energy chain solution is that customers may not always provide the most accurate or comprehensive information about the machines. “In order to recommend the best solution, we ensure that we grasp the customer’s exact needs and, through regular interaction and development of solid long-term customer relationships, we in turn assist our customers in getting to better understand their equipment.”

Powermite, a division of Hudaco and ISO 9001:2000 certified, was established in the late ’60s as a one stop supplier of electrical crane materials and flexible cable reeling drums to the local market. The company has since expanded and is today a market leading supplier of electrical and mechanical equipment and energy supply systems. Products include a comprehensive range of industrial and mining cables, industrial and mining plugs and sockets, cable reeling equipment and accessories as well as energy supply systems such as Downshop lead systems and insulated conductor rails.

A countrywide branch and distribution network in Johannesburg, Witbank, Cape Town, Durban, Richards Bay and Rustenburg carries a full range of spares for the entire EKD Kolibri drag chain range, perfectly positioning Powermite to provide after-sales and service support to customers and end-users in approximately fifteen African countries, as well as in Mauritius.

For more information contact Rolf Lung, Powermite, +27 11 271 0000, rolf.lung@powermite.co.za, www.powermite.co.za
Garlock seals and sealing systems

BMG supplies and supports the full range of Garlock seals and sealing systems, including specialist fluid sealing products for the oil and gas industry. “BMG’s Garlock seals and sealing systems, which meet stringent safety and emission compliance standards in the hydrocarbon processing sector, are enhanced by customised solutions for efficient plant operation and maintenance. Sealing services extend from simple solutions to critical applications, ensuring safe, sustainable and dependable sealing integrity in every application,” explains Marc Gravett, BMG’s business unit manager, Seals and Gaskets division. “BMG’s Garlock products and technical expertise – including on-site maintenance, emission monitoring and repair programmes – ensures reduced operational costs, improved efficiency, minimal downtime and uninterrupted production.”

Garlock products, which have been developed especially for the oil and gas industry, include Klozure oil seals, Gylon and Gylon Epix gaskets, pipeline isolation products and Link-Seal modular seals. Garlock expansion joints and Klozure oil seals ensure that fluids run smoothly, making the transition of loading or offloading of gas and liquid safe and efficient in offshore buoy applications.

Garlock Klozure oil seals and bearing isolators are designed to retain lubricants, but exclude contaminants like moisture, dust and dirt from penetrating the primary seal or bearing houses. These components play an important role in protecting bearings, preventing downtime and extending the service life of the system, even in arduous operating conditions. Klozure oil seals are available from BMG in numerous shaft sizes, materials and designs, including solid and split configurations.

Seals with a reverse bevel lip allow installation in either direction without rollover and stainless steel garter and finger spring configurations provide tension to create an effective seal against the shaft. Klozure oil seals with a Gylon lip material offer reduced creep and cold flow, compared with the standard PTFE material. Gylon sealing products are used for many applications in hydrocarbon refineries, including flanged connections and tube and shell heat exchanger flanges. Gylon gaskets are suitable for media like hydrocarbons, acids, caustics and solvents.

Newly-developed Gylon Epix gaskets are manufactured from the same PTFE material as standard Gylon products, but with one universal thickness of 2,4 mm. The consolidation of two thicknesses into one product reduces the need for users to stock gaskets with multiple thicknesses. These colour-coded gaskets, which have been designed for increased compressibility and conformability, improve performance in misaligned flanges and are suitable for a broader range of applications than conventional PTFE gaskets used in worn and pitted flanges.

This range features a hexagonal surface profile that combines the torque retention and blowout of a thin gasket and the conformability of a thicker gasket, for optimum sealing performance. The patented profile surface design reduces the contact area during initial compression to concentrate the compressive force of the flange for improved sealability. Various high-performance sheet materials in this range are suitable for use in different applications, including acids, steam, chlorine, water, solvents, gases, refrigerants and hydrocarbons.

Garlock pipeline isolation products include new ElectroStop fittings that complement PSI/Pikotek isolation joints, to ensure the security of flange connections by providing electrical isolation, extreme temperature electrical isolation and high integrity sealing. ElectroStop monolithic isolation fittings provide a positive leak-proof, long-lasting block against the flow of electric current in all piping systems. They eliminate short circuits and provide a maintenance-free welded in-line isolation joint in below-ground pipe systems.

Many applications involve connections where the pipe is penetrating a wall, floor or ceiling, and sealability is required between the pipe and the penetrated surface. In these through-wall piping applications, BMG recommends the use of Link-Seal modular seals. Link-Seal – suitable for ductile iron, pre-stressed concrete and metal or plastic pipe, conduit and cables – effects a hydrostatic seal capable of holding 40 kPa between the pipe and the penetration cylinder through which the pipe passes.

BMG’s full range of Garlock seals and sealing systems include metallic and Gylon gaskets, oil seals, bearing isolators, expansion joints and butterfly valves. Components extend from a standard sealing ring, available from BMG’s stock and ready to install, to customised designs, which are fabricated to specific requirements.

Garlock sealing products, with a user-friendly design and advanced materials, ensure dependable sealing in all sectors. These industries include chemical and petrochemical, pulp and paper, power generation, electronics, food and pharmaceuticals, as well as steel mills, mining and OEMs. All Garlock seals and sealing systems undergo stringent field and in-house testing to ensure safe and reliable use, as well as extended service life in all industries.

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marcg@bmgworld.net,
www.bmgworld.net

www.motioncontrol.co.za Fourth Quarter 2019 35
Smart sensors for motion control

The term ‘smart sensor’ has been much used in recent years to describe a new breed of sensor that helps facilitate the manufacturing sector’s shift to Industry 4.0 ideology. While many might think that smart sensors are little more than conventional switching sensors or measured process parameters, in reality they are far more. For instance, the latest smart sensors are able to share information with the controller, typically via technologies such as IO-Link. They can also receive commands and parameter information from the controller and thus adapt to new requirements on a continuous basis.

Two-way data flow helps facilitate what can be defined as a true Industry 4.0 environment. The upshot for manufacturers is considerable gains in efficiency, alongside greater flexibility and better planning with regard to maintenance.

This very thinking applies to all kinds of smart sensors, including those used for pneumatic and hydraulic cylinders. The latest sensors for applications of this ilk feature intelligent functionality and make up one of three parts of what is commonly termed ‘smart pneumatics’, namely sensors, processors and communications protocols.

Smart sensors on cylinders offer fast, accurate, high resolution and contactless sensing of the piston’s position. Of particular note, direct detection of the piston magnet is achieved without the requirement for separate position encoders or additional mechanics.

Cylinders with intelligence
Among the latest sensors are those such as the new PBS CPS sensors from Parker Hannifin, which continuously supply data via analog signals, IO-Link process data or flexible switching point (an LED indicates the output state). The continuous transfer of position data serves to upgrade the functionality of pneumatic cylinders, making them more intelligent and, as a result, more versatile.

With this in mind, it is possible to solve engineering challenges in areas such as quality monitoring and process control, particularly in consumer goods markets like packaging.

Included among the principal benefits of continuous position sensing is the ability to monitor quality, deliver process control and support optimisation, especially in tensioning applications like paper or film processing, where quality, repeatability and speed are vital to profitable operations. Here, the remote reading of data from position sensors permits process deviations to be seen fast and acted upon, therefore retaining process optimisation and promoting predictive maintenance strategies.

Numerous other applications will also benefit, including materials handling, consumer packaging, small component assembly, machine building, and even tasks in the renewable energy industry, such as the positional control of solar panels as they track the sun. Offering the appropriate resistance to shock, vibration, moisture, chemicals and water ingress, continuous position sensing can be deployed reliably in demanding operating environments over extended time periods.

Two-way communications
The key to smart functionality is two-way data flow. Using traditional discrete or analog signals, the monitoring of sensor data is simply one-way communication, which may be sufficient to allow the remote monitoring of automated processes, for instance. However, in order to adopt Industry 4.0 strategies, two-way communication is required, meaning connection to a network, such as Profinet or IO-Link. With regard to CPS sensors on pneumatic cylinders, implementation would include not only monitoring, but automatic configuration at startup and/or during replacement as part of maintenance routines.

Indeed, the shift to predictive, rather than preventative or reactive maintenance is one of industry’s principal current trends, and it’s an area where smart sensors can add significant value. After all, if smart sensors can warn users of an impending issue or failure before it occurs, then maintenance personnel can schedule repairs accordingly and avoid any costly downtime, typically when production throughput is either low or can be stopped.

This ethos can be applied across all fluid power systems (pneumatic, electro-pneumatic, hydraulic, electro-hydraulic). Ultimately, every process has a heartbeat, so the question to ask is: has that heartbeat changed over a certain period of time? Maybe it has become slower or faster, for instance. This is where smart sensor technologies really begin to pay dividends.

The potential application benefits of smart sensors are significant and clear. However, to maximise the gains, engineers need to consider several factors.

Firstly, the sensor needs to be able to fit securely on the cylinder body. External profiles may include linear slides, T-slots and dovetails. The sensor body of course needs to correspond to the profile, and the use of adaptors or some form of gripper may be needed to secure the sensor in place. Alternatively, a combination screw combining an Allen key head and slotted screw can provide a convenient, simple and fast method of locating and securing the sensor. Alternatively, retaining ribs on the side of the sensor are a feature that can hold the device in the desired position even before the screw is tightened. By using this approach, sensors can be quickly and accurately secured in the cylinder slot with just a single quarter turn of the fixing screw.

Rugged design is perhaps an obvious requirement for a smart sensor that will likely spend its working life in an environment that may see wide variations in temperature, vibration, and even exposure to aggressive fluids or chemicals.
Smart sensors may be offered with specific IP ratings to denote suitability for use where different degrees of exposure to moisture are an issue. In addition, automated applications in which the smart sensor might be used may be operating 24 hours per day, seven days per week. As well as making operation more demanding, this also means that sensor failure leading directly to downtime can be extremely costly in terms of lost production. So, as well as having a long service life in the toughest use scenarios, smart sensors must be quick to change or swap-out in order to keep any downtime – scheduled or unscheduled – to an absolute minimum. This type of operation must be able to be completed without the requirement to remove the cylinder end caps or any other strip down of the assembly. During installation and at points in the sensor’s operating life, adjustment and configuration of operating parameters will be necessary. For systems, designers, how they wish to do this is an important consideration. Typical approaches are either via the IO-Link, or some kind of portable teach pad.

From an electrical standpoint, the ready availability of a supply voltage for the sensor is an absolute requirement. And finally, knowing that the sensor is working is of course important, and therefore a visual cue of an active state or output in the form of an LED can be of value to operators.

Hengstler incremental encoders offer users optimum flexibility. With an encoder available for every application, there are over 20 standard models from which to choose, including encoders for solid or hollow rotating shafts from 4 to 42 mm in diameter and up to 10 000 PPR. A choice of heavy or light duty is available and there are multiple connection options facilitating a fit-for-purpose encoder. The RI32-O is popular for light duty applications. The shaft is aluminium and the 30 mm diameter housing is constructed of plastic material with protection class ratings of IP40 and resolutions of up to 1500 PPR.

A 6 mm diameter solid shaft version is available with a protection class rating of IP40 and resolutions of up to 1024 PPR. The R58-O is a universal industry standard encoder. The 58 mm diameter housing is aluminium, while the shaft is stainless steel. Designed for direct mounting onto rotating shafts, the through-shaft design allows for unrestricted mounting depths as the shaft passes completely through the encoder body. The front clamping ring version is available with shaft diameters of 10 mm and 12 mm, and a protection class rating of IP64 with resolutions of up to 5000 PPR.

Also, directly mounted onto rotating shafts, the RI76TD is secured by a front flexible tether allowing for mechanical stresses caused by angular, axial or radial misalignment between the rotating shaft and the encoder. Again, the design of this encoder allows for unrestricted mounting depths as the shaft passes completely through the encoder body.

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Incremental encoders with optimum flexibility
Zipline International designs and builds autonomous flying drones that transport medical supplies in hard to reach regions. The company uses design solutions from Siemens PLM Software. This enables the easy and cost-effective manufacture of the drones, which can travel at around 100 kilometres per hour, and brings together the individual disciplines involved in the process, such as electrical engineering, mechanical engineering and aero engineering. Simulations enable virtual test flights, making it easy to identify and remove faults and to optimise the drones.

The flying drones are designed with the CAD software NX from Siemens PLM Software to deliver lifesaving products to rural areas faster and more reliably than ever before. In many countries around the world, for example Tanzania or Rwanda in Africa, the supply of medical products is a major challenge – particularly in an emergency. Areas are often remote and hard to reach. Above all, a lack of blood supplies frequently leads to fatalities. In 2016 CEO of Zipline, Keller Rinaudo and his team developed a new delivery system for medical supplies. “Our first-generation aircraft and logistics system allowed us to create the first drone-only delivery service in the world”, says Rinaudo. “And it is helping to save lives in Rwanda every day.” Since the first drone took off, Zipline has completed over 7000 flights and delivered 13 000 units of blood. This success is due in no small part to the careful design of the drones, where Zipline relies on NX software from Siemens PLM Software.

Virtual tests for real-life rescue missions

In addition to maximum weight reduction – each kilogram saved increases the range of the drone by five percent – test flights also play a key role. With virtual test flights, Zipline can simulate the heat characteristics of the battery or the thermal performance of the drone cost-effectively and without physical prototypes. Jeremy Schwartz, roboticist at Zipline, sums up what this work means to the team: “When one of our drones takes off in Rwanda, it’s delivering blood to somebody who needs blood. It’s saving somebody’s life, and just thinking about that is an incredible thing.”

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Split elastic couplings for low speed, high torque applications

The Ringfeder-Henfel-Henflex HDFB split elastic couplings, available from Bearings International (BI), are ideal for the most demanding applications and aggressive environments in mining, ports and steel factories, among others. They are suitable for all low speed, high torque applications where minimal equipment downtime is essential.

Developed under the most modern concepts of application engineering and advanced 3D project and Finite Element Analysis (FEA) techniques, the HDFB split elastic couplings allow efficient torque transmission through the compression of its flexible elements, which also absorb shocks and vibrations from the drive and driven machine, besides compensating angular, radial and axial misalignments.

They can operate within a broad temperature range of -30 to 85°C. Advantages include a long lifespan and simple, fast, low cost maintenance. Due to the simple construction, installation is both fast and safe. The couplings are available in many sizes for applications up to 600 mm, and a torque capacity from 96,7 to 1147,6 Nm. Features include radial mounting and dismounting; on-site maintenance; reduced operating costs; no need for special tools, drive or driven machine displacement; alignment preservation; lubrication-free operation; and interchangeability. This makes it easier for customers already using buffer roller couplings to change over to the new split coupling design with ease.

They are interchangeable with most of the traditional elastic couplings on the market. With minor changes, these can replace grid and gear couplings.

For more information contact Bearings International, +27 11 899 0000, info@bearings.co.za, www.bearings.co.za

Flexible, affordable light crane systems

Super light, highly flexible and affordable, Demag’s KBK light crane systems are easily adaptable to individual lifting requirements. With their modular system they can be combined to create individual suspension monorail, suspension crane, pillar and wall-mounted slewing jib crane solutions. They can also be modified at any time and be integrated easily into any production line.

One of the most popular in South Africa is the KBK Aluline light crane system. This extremely low weight aluminium overhead crane system enables the design of almost any overhead suspension crane or monorail system with outstandingly smooth operation. Single or double-girder suspension cranes allow fast and reliable overhead handling and exact positioning of a wide variety of goods. Larger loads can also be moved beyond the crane runway using overhang and extending cranes fitted with crane girders that extend beyond the width of the crane runway, up to 2500 mm beyond the runway span.

The KBK manipulator cranes meet the exact needs of a wide variety of loads, processes and production conditions. They reliably accommodate kick-up forces with great positioning accuracy at high operating speeds. Another option is the KBK suspension monorail, which is specifically designed for linear overhead handling for complex installations.

Demag’s KBK stacker cranes make it possible to complete all storage and handling tasks in one operating cycle without the need for ladders, order-picking trolleys or similar equipment. Unit loads, containers or pallets weighing up to 500 kg can be safely and reliably transported, sorted and stored.

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Electrical window for safe compliance

Fluke’s new PQ400 electrical measurement window, with a permanently installed interface, gives technicians safe and near instant access to electrical panels for making critical power quality and energy measurements. The PQ400 installs using a standard step drill bit and electro-hydraulic hole punch and allows users to make three-phase voltage, current and ground connections covering most measurement configurations. Once installed, users can simply unlock the window cover, lift the lid, and connect the voltage leads of the logger or analyser. Then, connect the leads for the current sensors and start making critical measurements. Once complete, the voltage and current connections are simply removed from the front panel interface and the window lid locked, leaving the internal connections in place for future use.

The Fluke PQ400 electrical measurement window enables the connection of three-phase measurement equipment to energised panels, without the need to open the panel door or wear personal protective equipment (PPE). It can:

• Reduce the risk of arc-flash and electrocution, while increasing the safety for personnel.
• Decrease maintenance costs and reduce downtime by making critical power quality and energy measurements without opening the panel door, enabling logging and monitoring at any time without disrupting operations.
• Reduce work permit requirements and processes by reducing the hazards associated with taking measurements on open panels.
• Increase measurement efficiency and reduce the need for arc-flash PPE, saving time, increasing efficiency and increasing operator comfort.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za
**Lube oil filters**

Power stations, pipelines, and marine engines work hard, with run times of 98% standard in many industries. Winslow lube oil filters from Fleetguard provide engines with contaminant protection and extended service life unmatched by other systems. Hytec Fluid Technology (HFT) is a Mega Distributor of Fleetguard’s filtration products in South Africa and Africa.

Repair statistics show that the majority of engine problems stem from contaminated fuel. Condensation, leaking filler pipes, caps, inspection covers and breathers, and emulsified water generated during the filling process or movement of the fuel in the storage tank results in water contamination. Due to water contamination, fuel loses its lubricating properties, which makes the fuel system inefficient. When water combines with sulphur it forms acid, which is highly corrosive to engines.

Fleetguard filtration solutions are ideal for diesel and fuel engines in industry, construction, marine and consumer applications. They ensure optimal fuel system protection in line with demanding OEM specifications. The Winslow Stationary Multiple Element Design Fuel Coalescer removes 99% of water and dirt from fuel. Cleaner fuel means prolonged engine life, lower maintenance costs and reduced exhaust emissions.

It follows a two-stage process. Through fibrous media, emulsified water is attracted and held. Water droplets unite into larger droplets to form free water. The free water is released during the water repellent second stage. Separated water drops into the water collection sump, effectively cleaning fuel of water contamination. It removes 99% per SAE J1488 of emulsified water with 99% efficiency per SAE J1839 of free water.

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**Solutions for bulk materials handling on mine conveyors**

BLT World offers dependable solutions for specific problems at the transfer points of conveyor systems in bulk materials handling on the mines. One of these is ScrapeTec Trading’s German-engineered products, which have been specially developed for the prevention of dust formation and material spill and for more efficient belt cleaning at critical sections along the conveyor route and transfer points. AirScrape, DustScrape and SpeedScrape systems, which are easy to assemble and operate, form part of BLT World’s custom-designed solutions service to meet bulk material conveyor project requirements.

The DustScrape dust filter system, which is used in conjunction with the contact-free AirScrape conveyor belt skirting system, is a highly effective, energy-free dust emission prevention system. This compact and lightweight system minimises product loss by effectively preventing material from being blown into the surrounding environment.

Selection of the correct AirScrape size depends on the loading width of the conveyor belt and the required load-free zone of the belt edges. The AirScrape conveyor belt skirting system is installed above the load-free zone and generates the air intake from outside, into the system. The generated airflow from above the conveyed material then gets filtered through the filter cloth, retaining any dust particles, which are redeposited back into the material flow.

BLT World’s extensive portfolio of bulk handling equipment also includes Samson material and boom feeders for loading and high capacity stockpiling, link conveyors and grab hoppers, as well as mobile shiploaders. The company also distributes MDS trommel screens and apron feeders for mineral processing and recycling applications.

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**The benefits of oil analysis and monitoring**

Even when using top quality lubrication products and following correct storage and usage programmes, a lubrication solution can fall flat without consistent, accurate monitoring of the condition of your oil. Oil analysis is critical to understand how well your lubrication programme is working, and to tweak it as and when required.

Callum Ford, National Marketing Manager at Lubrication Engineers (LE), says that oil analysis is important, regardless of whether the oil is in an engine, gearbox, circulating system or mainline power generation turbine. “What people tend to underestimate is the role that implementing an oil analysis programme plays in improving their bottom line,” he says. “An effective oil analysis programme can help you to ensure you purchase the correct quantities of lubricant and use less of it, as well as keeping fewer items in inventory. Furthermore, it optimises your lubrication cycle, from procurement to disposal. It means you use less labour and you experience less downtime.”

Ford says oil analysis allows people to understand and manage the mechanical, operational and environmental factors affecting their equipment and oil lifespan. “For example, we’ve found that one of the biggest problems our customers face is oil contamination, which compromises product effectiveness and increases the rate at which oil degrades, and can ultimately damage equipment,” he says. “Regular oil analysis can detect increased levels of contamination before it becomes a problem.”

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