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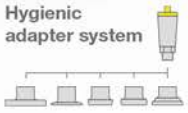

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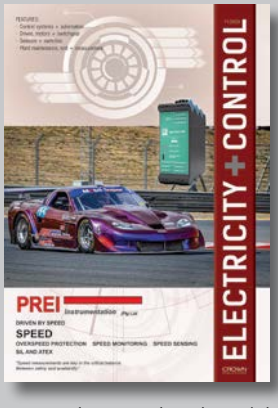

energy + information in industry

Rotating equipment is pivotal in various industries, in pumps, turbines, compressors, motors, and more. Prei Instrumentation advocates continuous condition monitoring to ensure the smooth operation of these critical machines.
(Read more on page 3.)

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Looking to a brighter future

I opened one of my office drawers the other day and found an unopened covid mask! It does rather remind one of the resilience of the human race – in general.

But it brought back to me too, memories of those dark days when it was not clear there would ever be an end to it all. Would the world ever be the same again?

There was an end to it – and the entire thing now seems to be a vague memory. Not a good one, mind you, but a memory that includes a deep concern about a pandemic (or pandemics in general) as well as how the world reacted to it.

We have learned recently that Katalin Karikó, along with collaborator Drew Weissman, were jointly awarded the Nobel Prize for Physiology or Medicine. It was their work, which Karikó began in the late 1980s, that led to enabling the rapid development of vaccines. The information I have is that Karikó's path was not an easy one – in some ways mimicking what so many must have felt during the pandemic.

One of the sectors most affected by the lockdown was, of course, education. Many schoolchildren did not even have access to an online learning environment. Learners at all schools were not exempted from the hardships wrought by the pandemic. There were schools that pivoted effortlessly – essentially putting their existing support systems onto turbo chargers. But many others struggled.

As some of you would be aware, I am involved in the Eskom Expo for Young Scientists – an organisation that promotes extracurricular science activities and projects across all regions and provinces of the country. The Eskom Expo programme was one of those that were significantly affected by the bad days of the pandemic – which meant regional and even the national events were convened in an online mode.

Back then it was evident that many, many in the school systems simply had very limited access to the tech needed to navigate the environment. Many organisations put effort into assisting and doing all they could to make online learning a real possibility.

However, what has made me so very happy is that, recently, I had the privilege of attending the Eskom Expo for Young Scientists National Finals – the Eskom Expo for Young Scientists International Science Fair – with South African learners participating, as well as a significant number of their peers from across the continent and around the world.

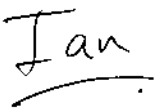
It was a face-to-face event – just like it used to be. There is something exceptionally special about being able to engage a learner face to face, to better understand their work.

The other positive point is that, slowly but surely, over the years, we have seen an upgrading in all the projects making it to the final science fair. The standard is remarkably encouraging. And that is the key.

When we sit back and think about the state of our nation, it becomes even more important that our youth are properly equipped to face the challenges that they surely will.

Having attended the three-day event, I am, once again, completely certain that the future is bright. These young leaders of tomorrow have a real grasp on what has to be done, and how to do it. They have thought about the challenges, understood them – and feel no need to repeat the mistakes of the past.

The future is bright indeed. □



Ian Jandrell

PrEng IntPE(SA), BSc(Eng) GDE PhD,
FSAAE FSAIEE SMIEEE

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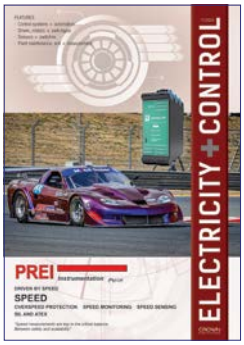
Five tips to prevent rotating equipment problems



Rotating equipment is pivotal in various industries, powering everything from manufacturing processes to energy production. These critical machines include pumps, turbines, compressors, motors, and more. However, as workhorses of industry they are not immune to problems, which can range from minor inefficiencies to catastrophic failures. To ensure smooth operations and extend the lifespan of rotating equipment, it is essential to implement condition monitoring and allied measures. Rotating machinery specialist, Prei Instrumentation, provides some crucial tips to prevent common problems.

Vibration monitoring and control

One of the primary challenges faced by rotating equipment is excessive vibration. Vibrations can arise due to imbalances, misalignments, mechanical looseness, worn components, or resonance. If left unchecked, such vibrations can lead to increased wear and tear, decreased efficiency and, potentially, catastrophic failures.

Rotating machinery specialists recommend implementing robust vibration monitoring systems. The systems employ sensors to detect vibrations at various points on the equipment and provide real-time data. By continuously monitoring vibration levels and trends, operators can identify early signs of problems and take corrective action before the problems escalate. Prei Instrumentation offers cutting-edge anti-vibration solutions that help mitigate vibrations, minimising the risk of equipment damage and downtime.

Condition monitoring and machine protection

Condition monitoring goes beyond vibration analysis to encompass a broader range of indicators that can reveal the health of rotating equipment. Temperature, pressure, lubrication, and other measured parameters provide valuable insights into the machine's operational state. Rotating machinery specialists advocate the integration of condition monitoring systems that track multiple variables simultaneously.

Prei Instrumentation's expertise lies in providing comprehensive condition monitoring solutions that enable predictive maintenance. Closely monitoring various parameters and comparing them to established baselines allow operators to detect deviations and take proactive corrective measures. Early intervention based on accurate data can prevent equipment failures, reduce unplanned downtime, and extend the equipment's life.

Overspeed control

Overspeed occurs when a rotating machine operates at a speed higher than its design limits. This can lead to equipment failures, resulting in safety hazards and costly downtime. Preventing overspeed requires precise control mechanisms and monitoring systems.

Rotating machinery specialists recommend the implementation of overspeed control systems, including overspeed protection devices and automatic shutdown mechanisms. These systems detect deviations in rotational speed and trigger appropriate responses to prevent the equipment from exceeding safe operating limits. Prei Instrumentation offers advanced overspeed control solutions tailored to specific equipment types and industry requirements.

Anti-surge control

In compressors and certain turbines, surge is a phenomenon where the flow of fluids becomes unstable, leading to pressure fluctuations and potential damage to the equipment. Surge can occur due to sudden changes in load, process conditions, or system disturbances. Preventing surges requires sophisticated control strategies and rapid response mechanisms.

Anti-surge control systems are recommended to actively manage compressor or turbine operations to avoid surge conditions. Using real-time data, the systems adjust the machine's operating parameters and maintain stable flow conditions. Prei Instrumentation's anti-surge control solutions are designed to enhance the safety and reliability of rotating equipment in complex industrial environments.

Regular maintenance and training

Even with advanced monitoring and control systems, regular maintenance remains a cornerstone in preventing rotating equipment problems. Scheduled inspections, lubrication, alignment checks, and component replacements are essential to prolonging machine life.

Rotating machinery specialists also emphasise the importance of training for operators and maintenance personnel. Well-trained staff can detect early signs of problems, operate equipment efficiently, and respond appropriately to alarms and alerts from monitoring systems.

Preventing rotating equipment problems requires a holistic approach encompassing vibration monitoring, condition monitoring, overspeed control, anti-surge measures, and diligent maintenance practices. Rotating machinery specialists like Prei Instrumentation offer a comprehensive suite of solutions to address these challenges. By implementing these five tips and partnering with industry experts, businesses can ensure the smooth operation of their rotating equipment, enhance safety, and maximise operational efficiency. □

Prei Instrumentation offers a range of solutions to monitor rotating equipment, including speed monitoring and control systems like the SpeedSys200.

For more information contact Prei Instrumentation.
Visit: www.prei.co.za

High-performance motion control for flexibility and speed

Frank Würthner, Global Business Management Packaging, Beckhoff Automation

Have you ever wondered how tea gets into those tiny bags, or how the leaves stay inside when the tea is brewed? Teepack has been making machines to do that since 1948. In what they describe as the company's masterpiece – the Perfecta 450 – Franz Andel and Sascha Theine rely on PC-based control and drive technology from Beckhoff to set new benchmarks for speed and precision in their tea-bag packaging machines.

Up to 450 tea bags per minute are filled, folded, and sealed with the utmost precision by this top model from the Meerbusch-based manufacturer of tea-bag packaging and form-fill-seal machines. However, Franz Andel, head of automation technology at Teepack, emphasises: "It's important to bear in mind that speed is by no means the only way to measure things." For Andel and his colleagues, the tea-bag packaging machines always have to produce flawless tea bags, from a standing start or with changes in speed. This calls for process expertise and precise automation technology.

The production process itself is tricky enough, and this is compounded by the fact that the filter paper used for the tea bags has to be as thin as possible. "Our customers are looking for sustainable and efficient production processes, which – in addition to an accelerated machine cycle and lower energy consumption – also means minimal material usage," Andel explains.

Sascha Theine, who is responsible for hardware and software development at Teepack, adds, "The thinner the filter paper, the more sensitive it is to fluctuations in tension – as a result of different web speeds in the individual production areas, for example."

Motion control replaces mechanical cam plate

The higher speed and precision in the latest machine, compared to the previous model, stems from switching to an electronic coupling of the main axes via servomotors and software. "Previously, we had the main process mechanically linked via cam plates," says Andel. In the Perfecta 450, this is now handled by the AX8000 multi-axis servo system and AM8000 servomotors in conjunction with TwinCAT NC I.

Beckhoff as a system partner: before the Perfecta 450, Teepack has never used so many components from a single supplier in any of its tea-bag packaging machines.

© Beckhoff

Control of the sophisticated kinematics via TwinCAT NC I and AM8000 servomotors increases the machine cycle as well as flexibility for bag geometry and different packaging materials.

"The web tension control implemented with Beckhoff technology across all drive axes prevents the filter paper from tearing – even with dynamic speed changes," says Theine. Where previously the filter paper transport was rigidly coupled to the main movement, for example, the motion sequence is now controlled by two separate servo drives. "This allows us to vary the paper length of a tea bag, for instance, and to adjust the speed in relation to the other drives," Andel adds. This offers Teepack and its customers more options when processing different types of tea and materials.

With up to 450 tea bags being processed per minute, the process is no longer visible to the naked eye. The filter paper is drawn in from the feed unit and passes under the dosing station. Here, the tea is fed from the top and distributed via a dosing station with various dosing chambers onto the filter paper. Teepack is renowned for the unmistakable shape of its tea bags: "We were the ones who invented the double-chamber principle," Andel points out.

More surface area, more taste

In contrast to simple tea bags, the tea in double-chamber bags is steeped from four sides; the larger surface area allows it to release its aromas into the water more effectively. Experts have reportedly recorded up to 30% more flavour for the same brewing time. This is why a cup with the same amount of tea is tastier, or will develop the same intensity with less tea.

© Beckhoff

The CP39xx multi-touch control panel with push button extension enables optimum operation and monitoring of machine processes.

© Beckhoff

The compact AX8000 multi-axis servo system and OCT connection technology save valuable space in the control cabinet.

Once the portioning phase is complete, the filter paper is folded to form the double-chamber tea bag, a process which is performed exclusively by means of mechanical forming and folding in the downstream station. This is also where the thread is fed and knotted through the bag. "We manage the whole process without the need for metal clamps," Andel highlights. The individual tea bags are then lined up and packed in the packaging cartons that have already been set up and glued in the Perfecta 450. This saves valuable space in production, and increases process reliability, as the tea packs are already sealed when they are discharged via a conveyor belt.

The software-based axis synchronisation also increases flexibility in development and reduces the effort required for fine-tuning the motion sequence. Previously, the process involved calculating, milling, and hardening a cam plate, which typically took three weeks. "Today, kinematics experts can calculate such a curve in two days and give us a table that is loaded into the servo drives in two minutes," says Theine, adding, "This means we have to wait only two days to find out whether the motion sequence fits and where readjustments could still be made." Andel also

© Beckhoff

Franz Andel, head of automation technology at Teepack (left), with Sascha Theine, responsible for electrical design and software development (centre), and Wilm Schadach, head of the Beckhoff branch in Monheim, in front of the Perfecta 450.

notes, "We get results much faster and can optimise our processes much better than before." With a performance increase of up to 20%, this optimisation is clear to see.

More time for applications

The Perfecta 450 is the first machine generation to be implemented completely with the Beckhoff platform. Teepack was looking for a supplier that could offer the entire portfolio of components: PLC, safety, motion, including IPC technology and an operator panel. Andel comments, "Before we turned to Beckhoff, we were 60 percent concerned with the automation system and only 40 percent with the application. Now, we can devote 98 percent of our time to the application."

This is also due to the high level of support provided by Beckhoff, which extends to the development department if necessary. Application experts from Beckhoff can also provide support with the implementation and selection of suitable components and systems as required. "Our specialists provide support in all technical areas for the implementation and optimisation of customer concepts," says Wilm Schadach, manager of the Beckhoff branch in Monheim.

In the Perfecta 450, all applications – from the control and synchronisation of all servo drives, safety and HMI, to data acquisition and database application for monitoring – run on a single CX2043 Embedded PC with a multi-core CPU (AMD RyzenTM with four cores and a 3.35 GHz system clock). "The ability to run an HMI and a database along with the demanding motion control application without compromising real-time capability is not something we take for granted," Schadach emphasises. In the maximum configuration, up to 30 AM8000 servomotors are controlled via the AX8000 multi-axis servo system or via the servomotor terminals in the ELM72xx series. Safety technology is system-integrated with TwinSAFE. The entire TwinCAT automation project and the HMI can be flexibly assembled according to the selected machine configuration.

© Beckhoff

Dynamic synchronisation of all axes, safety, HMI, and individual database application – the complete automation project runs on a single CX2043 Embedded PC.

"Flexibility in project planning was a key objective when we were selecting our automation platform," Theine highlights. Teepack can scale the hardware to match the machine configuration without having to change the control platform.

The benefits of compact automation technology are often underestimated. "Control cabinet volume is a big issue with packaging machines, and we are always short on space," Theine says. This is where the AX8000 multi-axis servo system and the compact ELM72xx drive technology in combination with OCT connection technology provide significant relief in the control cabinet and during assembly. Schadach confirms these advantages: "Over 90 percent of our drives are now supplied with one cable technology."

The next expansion stage

Further relief for crowded control cabinets can be expected from the distributed drives in the AMP8000 series with integrated servo amplifiers. Andel also sees the potential for further innovations based on Beckhoff technologies in the carton erector. XPlanar offers a host of different approaches for the different packaging formats.

Using the free-floating movers, the cartons could be moved flexibly in front of the glue nozzle to apply individual glue dots, for example. This would simplify the mechanical structure of the gluing station and reduce the effort required for the heating station. Ideas for the next Perfecta generation include the use of an image processing system for in-line quality control. "Integrated into the system and coupled with the machine cycle in real time via EtherCAT, Beckhoff Vision would be an ideal fit," says Schadach, "especially as the system does not take up any additional space in the control cabinet." TwinCAT Analytics and TwinCAT Scope are also under consideration for the next expansion stage. The plan is to collect additional operating data for machine status and key performance indicators. Andel is thinking of aspects such as motor temperatures, motor currents, and torques: "We want to use the correlations to gain knowledge about wear and tear so we can trigger preventive maintenance if necessary." □

For more information visit: www.beckhoff.com

Low-cost automation can assist SMEs

Fast-developing automation systems including artificial intelligence are generating new ideas for smart factories. However, many traditional smaller and medium-sized enterprises are at risk of falling behind. Low-cost automation can help them keep pace with changing technologies and market demands.

According to the International Federation of Robotics (IFR), more and more robots are carrying out work in factories. In 2022, the global stock reached a new record of 3.5 million robots, worth an estimated €15.7 billion. Yet the world is a long way from rapid growth.

Low-cost automation solutions that are inexpensive and undemanding enable SMEs that may so far have had little contact with these technologies, to participate in the future of AI automation. A growing number of low-cost automation providers have entered the market in recent years, offering robots at a fraction of the price of classic industrial robots. They use web shops to allow solution configuration in 'a few clicks' – without expensive integrators. And, using so-called no-code technology, robots can be controlled as easily as a computer game. IFR figures indicate that these factors can easily be adjusted. They show that programming and integrating a robot application currently accounts for up to 70% of the total costs.

A collaborative online marketplace

igus GmbH is one provider of low-cost automation. To enable SMEs to enter the automation age, the Cologne-based plastics company builds robots at competitive prices. The ReBeL, for example, the 'made in Cologne' cobot is made almost entirely of high-performance plastic and suitable for applications such as loading and unloading machines in industry and serving beer in automated services.

To help interested parties find the right automation solution for a given application and budget, igus has created RBTX.com. This is an online marketplace that brings together manufacturers and users of low-cost robotics. At present, over 100 partners offer their products here. Online tools provide for the combination of robots, machine frames, grippers, conveyor belts and other elements, as well as the testing of movement, very simply, with 'drag and drop' in a 3D model on the computer. In future, these functions will also be available in virtual reality. igus has already created its own metaverse for this – the iguverse. No programming knowledge is required.

Low-cost robotics offer an entry platform to automation for small and mid-sized enterprises.

"Several thousand SMEs from all over the world have already implemented automation solutions on RBTX.com – from an earthworm farm to a baker who packs doughnuts," says Alexander Mühlens, Head of the Low Cost Automation Business Unit at igus. "95% of the more than 400 possible solutions involve an investment of less than €12 000. Since the launch of RBTX, we have seen increasing interest. The platform offers more low-cost solutions than any other we know of. We have now provided consultation on over 2 500 projects and sent several thousand robots to the global market.

"Of course, not every task can be automated with low-cost robotics – especially when very heavy loads need to be moved or extreme precision is required. However, a wide range of work steps can be automated cost-effectively."

Mühlens says, "The advantage of RBTX is that users can source low-cost robotic components from different manufacturers on a single platform – and always with a price and compatibility guarantee. Providers have the opportunity to open up new market groups and sales channels for their products. It's a win-win situation for everyone involved."

For more information visit: www.igus.co.za

Online catalogue changes simplify product selection

TME, or Transfer Multisort Elektronik, which offers an online service to supply electrical and electronic products and components worldwide, has updated its online catalogue.

Customers have been testing the new version of the TME catalogue for some time, with a number of changes introduced to simplify the process of searching for and comparing different products, as well as support for browsing the catalogue on mobile devices. Having collected users' suggestions and implemented them where appropriate, the new version is now the default catalogue site. TME invites all its customers to visit its website to see the changes in the catalogue and how they assist in product selection. Changes include, among other things:

- a new layout of product presentation
- an option that hides the overview of categories to create more space for browsing through the catalogue
- optimised filters which are easier to apply
- a filter search engine to help users choose the most relevant filters
- dynamic loading of products as the user scrolls the catalogue, so they don't need to go to subsequent pages
- a few convenient changes in access to product information, including photos and documentation
- comfortable access to the catalogue on any mobile device.

Customers can send any suggestions or remarks for further changes or improvements on the website to TME via email.

With its home base in Poland, TME operates globally.

For more information visit: www.tme.eu/za/en/

The new catalogue introduces changes to make product selection easier.

Locally manufactured for the global market

With a history of delivering large engineering projects globally, Iritron has over 20 years' experience in designing motor control centres (MCCs) built to the highest international specifications, says CEO, Alwyn Rautenbach.

Iritron is an engineering, integration and manufacturing company providing solutions in the fields of electrical, instrumentation and control systems and decision support systems.

Rautenbach highlights that the company is driven by quality standards: it holds ISO 9001:2015 quality management system accreditation and, with respect to the wellbeing of its staff, customers and contractors and of the environment, it also holds ISO 45001:2018 (Occupational health & safety) and ISO 14001:2015 (Environmental management systems) accreditation. Iritron's panels also carry the SABS mark.

"We always engineer solutions that contribute to the effectiveness of operations according to the client's specifications. Investment needs to be justified in terms of the return it delivers, and that is where Iritron excels," he adds.

As a member of the Electrical Switchgear Association of South Africa (ESASA), Iritron is a custom panel and MCC manufacturer with a manufacturing facility in Gauteng; and as a level 7 Engineering and Procurement (EP) company registered with the Construction Industry Development Board (cidb), provides construction installation management.

Rautenbach says the company is recognised for its professionalism and quality compliance, and for its successful execution of multifaceted projects.

Internationally, Iritron has completed a number of complex control and automation projects that have included the design and manufacture of custom panels and MCCs.

A multimillion rand project in Gabon

Among these is a recently completed expansion project for a manganese mine in Gabon. The mine is the world's second largest producer of high-grade manganese. Iritron has extensive experience in the manganese mining market.

As a specialist in electrical, instrumentation and control systems, Iritron also manufactures customised panels and MCCs.

In Gabon, the project – designed by a global multidisciplinary EPCM consultancy – tasked Iritron with delivering a solution that encompassed several engineering disciplines with tight deadlines. Electrical MCCs, a control system, CCTV and network cabinets formed part of the delivery. Rautenbach says the project was awarded to Iritron based on its proven engineering expertise in this type of delivery.

"A project of this magnitude included some unique challenges. The company was affected by worldwide semiconductor shortages and supply chain disruptions that created logistical challenges. At the time, the ongoing pandemic and port congestion compounded the problem. This required the Iritron team to turn their operations 'upside down', in the literal sense, to keep to timelines," he explains.

The team worked on the MCCs in reverse sequence – activities usually scheduled for the end of a build were completed first.

"This meant the engineering team wasted no time in waiting for equipment to arrive. Using their technical expertise and proven design methodologies, they reduced overall project risks posed by the supply chain bottleneck.

Continued on page 9

REVAMP simplifies and speeds transition to a modern automation architecture, reducing capital costs at the same time.

New engineering software accelerates plant modernisation

A global leader in technology and software, Emerson, is helping customers transition legacy technology to modern DeltaV™ automation architecture to modernise and digitise operations more quickly and efficiently. Emerson's REVAMP advanced software solution uses cloud computing and artificial intelligence (AI) to automate up to 70% of system configuration, reduce errors and manual conversion work, and reduce capital costs by up to 15%.

"Too often, modernisation projects surprise teams late in the process with cumbersome, unanticipated work and errors from manual conversion," said Claudio Fayad, Vice President of Technology for Emerson's process systems and solutions business. "Emerson's REVAMP helps project engineering teams modernise their systems more easily, on time and within budget, minimising errors and disruptions to production."

Organisations looking to modernise control and safety systems often start with decades-old code that has to be transitioned to current software. Manually converting and documenting this code is an arduous process that increases the time and capital requirements for such projects substantially.

Emerson's REVAMP advanced software combines an extensive knowledge base from similar modernisation projects with Emerson's experience library to develop continuously updating AI models. Each modernised control system feeds back into the REVAMP software, creating learning algorithms that perpetually get smarter and faster

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Iritron successfully delivered the project on time and within budget, and in the process, secured additional larger projects."

Makeover for packaged goods plant

This estimated R7.5-million project for a major South African packaged-goods company required refurbishing and upgrading a plant with the latest optimised control systems. The scope of work revolved around replacing the programmable logic controllers (PLCs) for 11 wheat mills, with one Siemens S7-1500 PLC.

The PLC panels were replaced by remote IO panels. The old PLC programs were reverse-engineered and reprogrammed into the new Siemens PLC. The eleven-storey plant comprises more than 4 000 instruments which are all connected to the control system. Iritron was responsible for replacing all the panels, switchgear and PLCs connecting to the original supervisory control and data acquisition (SCADA) system. New communication cables and power cables were supplied and installed.

Redundant PLCs and other equipment were replaced with modern equipment, ensuring a modern plant control system with available spares. The new equipment will reduce unplanned downtime resulting from control equipment failure, and will increase plant reliability and throughput. It also ensures a reduction in control equipment and potential points of failure and maintenance over the long term.

"New technology was implemented, for example, in the roller mill electrical works, with a new MCC designed, manufactured, fitted, supplied and installed by Iritron. The MCC is equipped with automation company ABB's switchgear and OEM-supplied free issue variable speed drives (VSDs). The MCC is equipped with 45 direct online starters and 26 VSD starters," Rautenbach highlighted.

For more information visit: www.iritron.co.za

Continued from page 8

at converting legacy code.

The applied AI in REVAMP informs project teams of the engineering requirements before migration projects begin, making planning easy. The AI engine analyses native files from the existing distributed control systems, safety instrumented systems or programmable logic controller backups and uses a global library of thousands of successful projects to sort, select and automate engineering tasks. The modernisation project is automatically fully documented, and significant portions can be generated in the DeltaV control system, enabling the latest capabilities and using modern standards.

Emerson project teams around the world have access to the most recent functionalities and libraries of this secure, cloud-native tool. And with embedded machine learning, the libraries grow and improve as projects become more efficient over time. □

Robots can advance automation

The use of robotics in automation offers benefits particularly for high-output low-mix manufacturing.

In today's fast-changing industrial landscape, integrating cutting-edge technologies is important to the competitiveness and efficiency of many businesses. According to Andrew Crackett, Managing Director at Yaskawa Southern Africa, one of the largest manufacturers of industrial robots, businesses are recognising the benefits of advances in technology that make production more efficient and productive and, at the same time, reduce safety risks for employees and allow them the freedom to upskill in other areas relevant to their roles.

Crackett says there are many benefits to automating production lines with robotics such as "lowering manufacturing costs, improving workers' safety, increased repeatable quality, reduced lead times and enabling operations to become more competitive through increased production output".

Robots have for some time been used to optimise processes, making them quicker, or taking on mundane tasks, such as picking and placing. Their ability to optimise productivity and efficiency reduces cycle times and labour costs, but Crackett emphasises that robots allow for "human labour to be relieved from repetitive tasks and reallocated to strategic tasks". This affords employees more opportunities to focus on their unique talents, upskill and advance in their careers.

The adoption of a robotic workforce can minimise errors and waste, leading to cost-savings by reducing the need to purchase replacement materials or parts. It also supports the improved quality of the output produced. "By performing precise and consistent work, robots can produce high-quality results," Crackett says, adding that human error is inevitable in any manufacturing process.

Robots follow pre-programmed instructions to ensure precision and minimise errors. Some make use of sensor technologies that enable them to detect and rectify potential issues, ensuring exact output.

Industrial robots can also serve to protect people working in hazardous environments. Manufacturing plants and factories require strict safety protocols and practices to ensure the safety of their employees, Where robots are adopted, companies can move people away from hazardous areas, prioritising workers' safety.

He adds that, "Mechanical and electrical safety systems help protect operators, engineers, programmers and maintenance personnel by moving them away from contact with the robots. Vision systems mixed with force monitoring sensors help keep workers out of harm's way when robots are in use."

Collaborative robots, or 'cobots' are beginning to become a welcome addition to the industrial workforce to relieve the employees of arduous tasks, Crackett says. □

The online purchasing portal allows for customers to be in touch from anywhere at any time.

Online purchasing platform for drives, motors and more

As the market moves towards streamlining of procurement through digital platforms, SEW-EURODRIVE South Africa has launched an online purchasing platform for its customers. Training Manager Zander Claassens highlights that in addition to various useful tools and functions, the service offers in-person support to assist customers with their requirements.

Hosted on SEW-EURODRIVE's website, the online purchasing platform allows customers to order products or parts and to find support in the form of documentation and CAD data. Maintaining the personal touch, there is a dedicated person available to assist customers with their online requests from 07h00 to 21h00 every day.

Claassens says, "The online purchasing portal also offers users valuable information and practical assistance."

He says, "It became clear that many customers are embracing online procurement platforms, especially since the Covid-19 lockdowns, and we are excited to enhance our sales and support channels in this way."

He highlights that the wide and dynamic range of configurations in SEW-EURODRIVE's offering required that the functions of the shopping cart be specially developed to make it as user-friendly as possible.

"We have developed four different functions that customers can choose from when adding a product to the shopping cart," he explains. "The first is through the product configurator, which guides customers in configuring their required equipment – using drop down options from our extensive range."

The next channel would be to use the spare parts or replacement product selection function, where one of two routes can be chosen. The customer can make use of the SEW-EURODRIVE serial number found on the product nameplate. Entering that serial number is a quick and simple way to request a replacement – and ensure that the exact configuration is replicated.

"Another route enables customers to find an SEW-EURODRIVE replacement product for a third-party drive – that is, one which is not an SEW-EURODRIVE item," he says. "The online tool will not understand a non-SEW-EURODRIVE serial number, of course, but if the specific criteria are provided, we will know what the customer needs and we will supply to meet those criteria."

Registered customers that have already been trading with SEW-EURODRIVE can also use a third option – a customer transaction overview – to help them select what they are looking for. "When they log into the online purchasing portal, they can view their history of quotations and orders. This makes it simple to re-order a component that has been purchased before, as they can select the item from a previous transaction or quotation," Claassens says.

"Lastly, customers can use the drive selection assistant – a smart online tool that guides the user through three simple steps to find the right drive," he says. "The first step is to select the application, and the second requires more application-related information; the third step then presents the customer with product configurations and suggestions – from which they can choose."

He reiterates that customers wishing to transact on the portal can find support from a real person behind the portal, who can provide hands-on advice and assistance.

Customers can also be assured that the security of the portal is world class. "Our cybersecurity is handled by a dedicated IT team at our group headquarters in Germany," he says. "Customer and transaction data is double-encrypted when working online, and the online support is run on hyper-text transfer protocol secure (HTTPS) and is backed up on a geographical redundancy cloud-based system."

Another security precaution is that online purchasing is not permitted using credit cards, as the company still follows its normal payment protocols with customers once they have placed items in the online shopping cart.

For more information visit: www.sew-eurodrive.co.za

Expanding supply of motors and drives in Uganda

WEG is working with Petrok as its Value-Added Reseller to extend its market presence in Uganda.

As part of its drive to expand the WEG footprint in East African markets, WEG is taking steps to increase its presence in Uganda, partnering with Petrok as its Value-Added Reseller (VAR) in the country. Petrok's local presence and technical expertise, together with the popularity and reliability of WEG products in the market, is expected to facilitate this expansion.

Theodul Mwema, WEG's Regional Sales Manager for East Africa, says the anticipated economic growth from projects like the East African Crude Oil Pipeline (EACOP), as well as the established strength of sectors such as agriculture, manufacturing, utilities, cement and oil and gas in Uganda, offer opportunities for WEG to extend its supply of products and solutions.

"For us, this is an exciting step. We look forward to reaching more customers in Uganda with WEG's range of electric motors as well as medium and high voltage solutions," he says "We have been supplying customers in Uganda for over a decade, and this appointment builds our support for them and opens new markets for us. Our commitment to delivering efficient, reliable products with a low total cost of ownership, as in the W22 IE3 motor, shows our customer-focused approach, which is appealing to businesses in Uganda."

Mwema highlights that the coffee sector, for instance, already has a strong reference base as many coffee fac-

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Optimising efficiency in electric motors

The electric motor is known as the workhorse in the mining and other industrial sectors and plays a critical role in ensuring optimum productivity at every plant. However, a major problem associated with electric motors is that most often they are not optimised for maximum efficiency.

"It is estimated that almost two thirds of the power consumed by the mining sector is associated with electric motors, particularly those used for pumps, fans and conveyors," says Graeme Neilson, Business Unit Manager, Electric Motors, at electromechanical specialist company BMG. "This is a concern for the mining sector – particularly at a time when the country's power crisis is deepening.

"At BMG we work closely with our customers to meet their needs for continuous operation and high productivity in arduous mining conditions, through the development of energy-efficient electric motors. Our team of electric motor designers and engineers has collaborated with global electric motor specialists to develop Synergy IE3 electric motors that meet strict quality standards and set the benchmark locally for heavy-duty high-efficiency motors.

"As well as critical energy-saving features, BMG's Synergy IE3 motors offer important advantages over other electric motors on the market. These benefits include lower cost of operation, suitability for voltage variation applications, reduced temperature rise and minimal maintenance requirements. Synergy motors also offer greater reliability, reduced noise and vibration levels, more flexibility and longer service life."

Additionally, standard features of the BMG range of Synergy IE3 motors – developed specially for harsh mining conditions in Africa – include IP66 protection against dust and water ingress and Class H insulation, with a Class B temperature rise. This means the insulation can handle much greater heat than the motor's operating temperature at full load. "An important performance feature," Neilson points out, "is that Synergy motors are most efficient when running at between 75% and 100% of full load.

"The motors have a rated voltage of 400 V and 525 V and rated frequency of 50 Hz. The efficiency and power factor values make the motors cost-effective, with an ROI of between three and five years."

BMG's team of electric motor designers worked with international specialists to develop Synergy IE3 electric motors, setting a benchmark locally for heavy-duty high-efficiency motors.

An electronic soft starter, which controls parameters like current and voltage, ensures the starting sequence is efficiently controlled. Whereas standard motors operate at fixed speed, irrespective of the actual output required, Synergy motors can operate efficiently, without cogging at low speed, in conjunction with a variable speed drive (VSD), reducing energy consumption by over 50%.

VSDs are designed to manipulate power from a constant 3-phase 50/60 Hz supply, converting it to variable frequency. This enables the speed of the motor to be controlled to achieve maximum efficiency at the required load.

Synergy IE3 motors are surface treated to ensure extended service life in the tough mining environment. For maximum flexibility during installation, integrated or removable feet are available. Solid motor feet provide a more resistant structure against vibration, whereas removable feet can be placed in different positions of the motor frame. The latest design allows the terminal box to be mounted top, right or left and the cable entry can be rotated 360°, without disassembling the complete motor. This minimises modification time and reduces stockholding requirements.

BMG specialists also recommend installing an SPM bearing monitoring device for continuous monitoring of the bearing condition.

BMG offers a full range of Synergy IE3 motors ex stock and can also supply IE4 and IE5 units from the factory, to meet specific requirements on individual mines.

For more information visit: wwww.bmgworld.net

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tories use Brazilian processing machines which are fitted with WEG motors, drives and soft starters.

Agriculture is the biggest contributor to Uganda's economy and other significant sectors include manufacturing, utilities, cement and oil and gas, Mwema says. There has also been considerable investment in power and water projects in East Africa, notably from Asian countries.

Commenting on the EACOP Mwema says, when completed, this major project will see the transportation of Uganda's crude oil over a distance of almost 1 450 km from Kabaale in Uganda to Tanga in Tanzania.

"We selected Petrok as our VAR following a strict vetting process, and we are confident they will deliver the high standard of support to our customers that we expect," he says. "The company has the necessary experience in our field of operation and a strong technical team of engineers and technicians with the right product knowledge."

He says Petrok's premises in Kampala provides for local warehousing of WEG low voltage products such as electric motors, drives and others, as well as workshop facilities for small works. The company's sales team and customer base across Uganda also ensures customers will be well served and distribution channels expanded.

"With the quality and reputation of WEG products, we can ensure players in the Ugandan market will benefit from the same low total cost of ownership as our customers everywhere," says Mwema. "This includes the five-year warranty on the popular WEG W22 IE3 motor, a promise of reliability that few of our competitors can match."

For more information visit: www.zestweg.com

HV switchgear market growing globally

The global high voltage (HV) switchgear market is forecast to reach $30.34 billion in 2027 from $25.02 billion in 2022, growing at a compound annual growth rate (CAGR) of 3.54% between 2023 and 2027. This is reported by GlobalData, a leading data and analytics company.

GlobalData's latest report, *Switchgears for Power Transmission*, covers market size, share and trends analysis by technology, installed capacity, generation, key players and the forecast 2022 to 2027. It reveals that in 2022, the Europe, Middle East and Africa (EMEA) region held the largest share of the market for HV switchgears globally, with 44.60%. The region's market share is expected to increase to 48.24% in 2027, higher than the growth expected in all other regions.

Bhavana Sri Pullagura, Senior Power Analyst at GlobalData, comments: "The growing demand for electricity is giving rise to the need for new power plants, particularly those modes of generation that have minimal impact on the environment. Several countries have begun to address deployment barriers to create a market conducive to increasing the use of renewable energy technologies and gas-based generation. The falling capital cost and low gas prices also resulted in increased development of renewables and gas power plants. This contributed to the growth of the switchgear market, which is expected to continue as countries seek to increase the share of renewables and gas in their generation mix."

According to GlobalData's 2023 Switchgears Market Report, the HV switchgear market in the EMEA region was estimated to be $11.16 billion in 2022 and is projected to reach $14.63 billion, registering a CAGR of 5.03% from 2023 to 2027. The economic boom in countries in the Middle East led to an increase in demand for power, contributing to the growth of the market.

In 2022, the value of the Asia-Pacific market stood at $10.77 billion, accounting for a 43.05% share of the global HV switchgear market. In the Americas the HV switchgear market is expected to reach $3.11 billion by 2027, as the grid requires upgrades to replace aging assets and to accommodate the increasing sources of renewable energy.

China, one of the fastest-growing economies with the largest fleet of transmission substations, topped the global HV switchgear market in 2022 with a value of $7.73 billion, accounting for a 30.90% share. The country is expected to hold its leading position during the forecast period, reaching $9.19 billion in 2027.

Pullagura adds: "The need to build transmission infrastructure to deliver power from renewable sources in remote regions, the increasing domestic demand for electricity, large-scale renewable energy deployment, the projected growth in the gross domestic product, and rural electrification initiatives are some of the major factors driving the growth of the HV switchgear market in China. The country is the world leader in ultra-high-voltage transmission, having made considerable investments in the development of transmission systems of 765 kilovolts (kV) and above."

The other major countries in the Asia-Pacific gas-insulated switchgear market include India and Japan. □

New distributor for industrial equipment in Nigeria

Bosch Rexroth Africa Development, a company within the Bosch Rexroth Africa Group of Companies, has welcomed the Fairtex Group (Fairtex) as a new Nigerian distributor in its African network. Fairtex is recognised as one of the largest engineering, procurement and construction (EPC) companies in the West African region, with most of its work conducted in the oil and gas, water treatment, and power generation industries. Fairtex will distribute the group's drive and control technologies throughout the region, including the full range of hydraulic components that can be used in various applications.

The distribution agreement, starting this year, will help serve Bosch Rexroth Africa's aim to expand its footprint on the continent. By being closer to its customers, the group is committed to meeting customers' specific application and technical requirements – quickly, conveniently and cost-effectively. Training for Fairtex will be provided by Bosch Rexroth Africa Development, which will also provide full support for the new distributor.

Bosch Rexroth Africa management with members of Fairtex staff.

Both companies have expressed their enthusiasm about the new partnership. Bosch Rexroth Africa Development Manager, Louis Potter says: "We are proud to be expanding our business in Africa with Fairtex. We believe this collaboration will yield great opportunities and results for both parties."

Bosch Rexroth Africa is a leader on the continent in the supply of hydraulics, pneumatics and automation systems. The Bosch Rexroth Africa Group comprises eight specialist companies: Bosch Rexroth South Africa, Hytec South Africa, Tectra Automation, Bosch Rexroth Smart Mine, Hytec Fluid Technology, Hydraulic & Automation Warehouse, Hytec Engineering and Bosch Rexroth Africa Development. The companies collectively manufacture, source, market and distribute over 30 international brands of hydraulics, pneumatics and automation systems. The group operates through a network of over 35 branches and 20 strategic distributors across Africa. □

A good time to implement a motor management strategy

Christo Kotze, Power Products Division at Schneider Electric.

Motor management plays an important role in controlling motor energy costs in various industries and applications. Christo Kotze, Product Application Leader – TeSys, in the Power Products Division at Schneider Electric, notes that research and practical experience have consistently shown that effective motor management practices can result in significant energy savings, reduced operational costs, and improved overall system reliability.

This also makes a sound case for organisations to use a motor management strategy to control motor energy costs and maintain operational resilience. From plant stoppages, damage to equipment, and risks to people or the environment, motor failure can be costly.

Kotze says implementing a holistic motor management strategy requires careful planning and the right combination of technologies. In the past, some companies have been reluctant to implement a complete motor management system due to the perceived technical complexities. However, with the advent of IIoT, digitisation and advanced connectivity, Kotze says effective motor management is now more accessible. He highlights some important steps to be considered.

- Implement application-oriented tools: for machine builders who source many of the motorised solutions, efficiencies increase when core machine components are easy to select, install, wire, commission, and can be remotely maintained.

Taking it one step further, automated configuration tools now allow OEMs, panel builders as well as end users to generate quick and comprehensive solutions. These tools have proven to reduce design and selection time by up to 40%.

- Optimise energy performance: connected services-orientated devices have the intelligence to operate motors at the optimum efficiency points, which in turn reduces electrical consumption by at least 30%.

Furthermore, intelligent motor starters, such as Tesys Island, and digital load management solutions make it much easier to optimise machine performance.

Each load feeder can provide asset data to optimise the machine and the process, as well as provide actual line current data. These devices offer machine builders the option to monitor installed devices remotely and to provide their clients with a cloud-based predictive maintenance service – and in that a means to monetise the newly accessible load asset data.

- Improved software analytics: with intelligent motor management solutions in place, maintenance personnel can troubleshoot equipment remotely. Abnormal occurrences can be addressed before they become critical and cause production interruptions. Intelligent pre-alarming is based on preset behavioural parameters.

The data gathered can be combined and analysed with a dedicated software solution such as Schneider Electric's EcoStruxure Asset Advisor, which allows for predictive asset performance into the future.

By implementing a sound motor management strategy, organisations can accurately estimate how long a motor has been in use, when maintenance is needed, and how efficiently the motor is being used.

There are motor management solutions available that are tailored to specific industry sectors and prioritise uptime, safety, and efficiency. At Schneider Electric we provide the tools and data needed to make informed decisions about motor management and energy consumption across various industries, says Kotze. □

High-performance miniature circuit breaker

The S800P high-performance miniature circuit breaker.

The S800P series from ABB offers a top-class compact solution for line protection up to 50 kA, with expandability for the most challenging requirements across diverse industries. Ettienne Delport, Vice President and Channel Manager for Smart Buildings and Smart Power, ABB Electrification, emphasises: "It combines size and performance to protect customers' installations."

Due to its intrinsic characteristics and the range of available accessories, the S800P series is suitable for different types of applications in railways, data centres, telecommunications, renewable energy, and general industrial installations. The miniature circuit breaker guarantees safe electrical isolation of the circuit in compliance with IEC 60947-2. The range was designed with specific materials for traction and classified with a R26/HL3 hazard level in accordance with EN45545-2. The plastic materials used also comply with fire and smoke requirements according to EN45545-2.

The S800P range offers high-rated current protection (80 A, 100 A, 125 A) at a high breaking capacity level up to 50 kA. It is available in all pole configurations (1P, 2P, 3P, 4P) and B, C, D, K tripping curves.

The mechanical drive of the S800P is equipped with a trip-free release. The trip position display reliably indicates the exact position of the moving contact. It also provides additional trip detection allowing for easy identification of the reason for any cut-off. The switch lever moves to the middle position in case of thermal or magnetic tripping.

The S800P functions as a protection device and allows for remote control and monitoring of the installation.

For more information visit: www.abb.com

Accurate measurement is critical in mining

The mining and refining of precious and base metals involve many precisely coordinated processes in a harsh environment. Accurate measurement plays a critical role in these operations. It ensures precise reagent dosing and level monitoring and a high-quality end product. Equally important is the safeguarding of mining equipment from potential damage. Kansanshi Mining PLC in the Zambian Copperbelt relies on VEGA Instruments to provide custom solutions to meet its measurement needs.

Africa holds substantial reserves of metals and minerals; gold, diamonds, iron ore, and copper being particularly notable. Two of the world's top 10 gold/copper-producing countries are in Africa, with their production centred predominantly on the Copperbelt.

This is a geological region in Central Africa that spans the border of northern Zambia and the southern DRC (Democratic Republic of Congo) and is well known for its mining activities. The Kansanshi copper-gold deposit is located in the area and has a rich history dating back over 1 500 years to a time when the indigenous people extracted copper from its abundant veins. Near Solwezi, the Kansanshi copper-gold deposit remains a vibrant mining area with active open-pit sites.

Kansanshi represents a vein-style deposit where valuable copper and gold mineralisation are present in three distinct ore types: primary sulphide, mixed supergene, and oxide. Mining operations are conducted in two open pits, known as Main and Northwest, using conventional open-pit mining techniques.

The process used for treating ore has the flexibility to accommodate variations in the ore composition. This flexibility includes options for oxide leaching, sulphide flotation, and a circuit for transitional ore. Oxide ore undergoes a multi-step treatment process, including crushing, milling, flotation, leaching, and the solvent extraction process. This process leads to the generation of a flotation concentrate rich in sulphides and gold, as well as the production of cathode copper through electro-winning.

Kansanshi was facing measurement challenges in the gland water tanks, slurry hoppers and raw materials in the stockpiles and crusher bins. The Instrumentation Supervisor at Kansanshi, Japhet Ng'andu Mutambo, confirms that accurate measurement plays a critical role in mining operations. "Ensuring precise reagent dosing and level monitoring, it enables us to produce a high-quality product, and it is important in protecting our mining equipment from potential damage. This is a priority for us," Mutambo says.

Although the mine had sensors and measuring instrumentation installed, the readings received were not accurate and manual and visual inspection were needed to verify the levels in the tanks, hoppers, piles and bins. The

VEGA supplied the measurement solutions to provide consistently accurate and reliable measurement in a range of process applications at Kansanshi's mining operations.

inventory management system used for the crusher bins and the stockpiles also needed to be improved. In the gland water tanks, non-contact ultrasonic level sensors had been installed and they presented various problems for the mine, resulting in considerable inaccuracies and increased maintenance costs. The challenge experienced with the slurry hoppers was the amount of foam created because of the reagents added to the refining process. VEGA offered a solution to these challenges.

Preventing mixed signals

Effective stockpile management depends on accurate, timely readings of the volume and content of piles and crusher bins. Until fairly recently, operators at Kansanshi Mine did not have the instrumentation to meet both criteria and had to assess the stockpiles visually and manually. It was a tedious and labour-intensive job. To use all its assets, including human resources, effectively, the producers are taking advantage of new technology available from VEGA.

"The merits of using VEGA instrumentation are multifaceted. They offer cost-effectiveness, reliability, and accuracy. What tipped the scale for us was the customisation option that VEGA provides, tailoring instruments to match our precise requirements. For instance, the instrumentation reduces labour intensity, as there's no need to allocate personnel specifically to clean the instrument before obtaining reliable measurement results," Mutambo notes.

Reliable level measurement

One of the challenges the mine faced was the measurement of crushed material in the stockpiles and crusher bins. This is a difficult task due to the dust created during the materials handling process. The irregular surfaces of the crushed ore and rock also needed to be taken into account. VEGA had the solution to this in its VEGAPULS 6X radar sensor. These sensors are best suited for non-contact level measurement of bulk solids and they can be installed at the top of the stockpile or from a distance of up to 120 m to provide continuous and reliable level readings.

"The environment where these sensors are deployed can be described as 'challenging'. Although some areas, like the gland water tanks, remain relatively clean, instrumentation in the crushing bins has to contend with dust and particles, and the hoppers are inundated with slurry. This combination of conditions poses a challenge for any measurement instrumentation," Mutambo explained.

Slurry hoppers provide a holding area for the slurry mixtures before they are directed to other stages of the refining process. This temporary holding stage helps to maintain a continuous flow of material through the system to the further treatment units. Proper control of the slurry level in the hoppers ensures a consistent and controlled flow into the downstream systems. Monitoring the slurry level within the hoppers is essential to prevent overflow or emptying.

"We opted to transition from our previous supplier primarily because the sensors they installed proved to be unreliable. Since we implemented the VEGA sensors, we have had more confidence in the readings of the installed instrumentation. We initiated the upgrade process in 2019, focusing on numerous flotation cell hoppers, as a direct response to the issues we faced with the instrumentation from our previous supplier," Mutambo added.

Slurry is an abrasive substance, so the ceramic measuring cell on the VEGABAR 82 pressure transmitter proved invaluable here as this pressure transmitter can withstand contact with abrasive materials. The VEGABAR 86 is a hydrostatic pressure transmitter and can double up as an electronic differential pressure sensor and it is not affected by the foam in the hopper, making it a suitable solution and ensuring accurate readings time and again. The submersible VEGABAR 86 is suitable for level measurement in wells, basins and open vessels such as the floatation cells at Kansanshi Mine. The sensor's front-flush abrasion-resistant ceramic diaphragm allows it to operate in harsh conditions where there are chemically aggressive liquids as well as dust and grime build-up.

Gland water tanks are a crucial component of equipment used to prevent the ingress of contaminants like dust and water into mechanical systems, such as pumps and agitators. These systems typically have rotating shafts that require proper sealing to prevent leaks and maintain efficient operation.

"We faced challenges here too with the measurement instrumentation we had in place. The equipment did not provide accurate readings to predict levels in the gland water tanks." Mutambo noted.

Monitoring the water level is of the utmost importance as levels need to be maintained for the equipment to function optimally without breakdowns. The VEGABAR 38 as a universal pressure transmitter provided the solution here. It is fitted with ceramic measuring cells guaranteeing durability, especially in a closed, moist environment.

Installation and commissioning

The installation of the sensors and commissioning of the instrumentation was done by the employees at Kansanshi Mine. They were impressed by the sensors and by the service and support they received from VEGA. "We undertook the setup of the sensors and instruments independently. While VEGA in South Africa provided us with guidance and support, we took charge of the installation process ourselves. This proved to be a valuable exercise and a positive experience," Mutambo said. VEGA technicians provided support every step of the way, assisting in eliminating measurement disturbances.

VEGA supplies reliable, high-quality sensors and measurement instrumentation, and the staff at Kansanshi appreciated the experience and technical competence provided by the VEGA technicians. Overall, though, it was VEGA's attention to detail and persistence in searching for the right solutions that made a lasting impression. □

For more information visit: www.vega.com

Sustainability from farm to table

In the global calendar October is marked as World Food Month. It is a month dedicated to raising awareness about food security, hunger, and the importance of sustainable agriculture. In this digital age, technology plays a pivotal role in addressing these challenges. Technology is revolutionising the food industry: enhancing productivity, reducing waste, and contributing to the global effort to eliminate hunger.

Sustainable farming

Sustainability was a central theme of World Food Month. Sustainability in food production encompasses a holistic approach to harmonising the steps and processes from the field to production and distribution and, in parallel, mitigating environmental impact and promoting long-term wellbeing. It involves managing resources and processes meticulously to achieve energy efficiency, resource optimisation, waste reduction, innovative production techniques and continuous improvement. Ifm's smart sensor solutions support sustainable farming practices by helping farmers use resources more efficiently. Sensors help farmers to optimise irrigation, fertilisation, and pest control, and thus reduce the environmental impact of agriculture while increasing yields.

Precision agriculture

One of the key aspects of modern agriculture is precision farming. Here, Ifm electronic's sensor technology and automation solutions enable farmers to optimise their agricultural processes, improving efficiency and productivity. Efficiency in food production entails a strategic and systematic approach that aims to optimise processes, resource use and overall operational efficiency to achieve higher productivity, reduce costs and improve product quality. With greater efficiency, food manufacturers can gain a competitive advantage, reduce environmental impact, and contribute to a more sustainable and resilient industry.

Water management

Freshwater is a precious and limited resource. The irrigation of fields and greenhouses still accounts for around 70% of water demand. Food producers are under pressure to improve productivity while maintaining animal welfare, sustainability, and profitability. ifm provides water cost saving solutions suitable for outdoor and indoor farming, livestock, aquaculture, and the production of alternative proteins. It also provides solutions for the production and storage of raw materials. For a water-saving, productive and sustainable future, ifm's digital solutions support intelligent agriculture. Its smart sensor solutions help farmers optimise their water usage by providing accurate data. This information allows farmers to irrigate their fields when and where necessary, reducing water wastage and conserving this vital resource.

Ifm's smart sensor solutions support sustainable farming practices.

Food safety and reducing food waste

Prioritising food safety and minimising food waste are global concerns. Food safety in food processing means automated systems, technologies, and processes used in food production need to maintain or improve the safety and quality of the final products. Ifm's range of process sensors with IO-Link technology are used to monitor various parameters during food processing, transportation, and storage. The sensors used can self-monitor their status to ensure accuracy and reliability in meeting food safety standards. Holistic digitalisation solutions can improve traceability by accurately recording and tracking the flow of ingredients and products. This real-time monitoring helps maintain the quality and safety

of food products, reducing foodborne illnesses and food waste. Continuously monitoring environmental factors like temperature and humidity throughout the transportation and storage of food can also assist in reducing spoilage and prolonging the shelf-life of the products. This, in turn, minimises the amount of food that goes to waste.

Supply chain optimisation

Efficient supply chains are crucial for delivering food from farm to table. Ifm's sensors are used to track and monitor goods throughout the supply chain. This technology enables better inventory management, reduces spoilage, and ensures that food products reach consumers in optimal condition. The ifm track and trace gate offers a complete solution for automated and transparent logistics for incoming and outgoing goods. By directly transferring all goods flows to the IT level, users can organise the interlocking of production, inventory, and suppliers more efficiently than before. The cost saving comes on top of this: goods that are not picked properly generate consequential errors. With digital transparency, such errors can be avoided, the process speed, especially in order throughput time, can be increased and thus the quality of order fulfilment can be improved. This relieves internal resources and increases customer satisfaction. Some call it Logistics 4.0, or Smart Distribution. The decisive factors are in the advantages that ifm track and trace solutions deliver.

IIoT integration

Ifm's sensors and software solutions play a pivotal role in advancing the food industry. With IO-Link technology, the sensors enable real-time data collection and monitoring. This helps ensure food safety and quality by facilitating quality control and predictive maintenance. Additionally, by implementing IIoT software solutions such as ifm's Moneo, production efficiency can be improved, waste minimised, and productivity increased, while ensuring strict industry regulations are followed. The data collected from the sensors can be integrated into farm management systems. Farmers can access the data remotely via smartphones or computers, so they can make timely decisions and adjustments in their farming practices.

Sensor technology serving the agricultural and food sectors is constantly evolving. Ifm's cutting-edge sensor technology offers food manufacturers an opportunity to secure a competitive edge, diminish their environmental footprint, and actively participate in building a more sustainable industry – supporting the initiatives and goals of World Food Day. □

For more information visit: www.ifm.com

A new unified group in measurement technology

GHM Group CEO, Christian Unterberger.

Managing Director of GHM Messtechnik South Africa, Jan Grobler.

The GHM Group, a leading sensor technology company active in the fields of flow, level, portable and environmental measurement technology, is taking a further step towards internationalisation. It will merge its five brands into a single company – Senseca – with effect from 1 January 2024. Establishing one company, one brand, one purpose, Senseca will have the agility to respond to customers' needs and market trends quickly and contribute to a sustainable future.

The five GHM Group brands (Honsberg, Greisinger, Martens, Val.Co and Delta OHM) will combine their expertise to continue on their global path within Senseca, maintaining the same entrepreneurial spirit with which they were founded and their well-recognised standards of design and manufacturing excellence.

"The transition from a group with five brands to a single company will see a major change in how we approach the market and develop our products," says GHM Group CEO Christian Unterberger. "In an ever-evolving world, we want to create an agile company that can respond quickly to customers' needs and emerging trends."

Senseca's philosophy is clear: to place the customer at the heart of every decision and help them grow through an application-based approach. The new 'one face to the customer' focus aims to offer customers an improved experience with easy access to the entire product range.

"Concentrating our efforts on a single brand, we can build stronger and longer lasting relationships with our customers, exploit synergies between sites and differentiate ourselves in a sometimes, complex market," says Stefan Langer, Vice President of the Industrial Business Unit.

Jan Grobler, Managing Director of GHM Messtechnik South Africa (to become Senseca South Africa) said, "In today's industrial world with its increasing demand for environmental standards to be met, measurement, sensors and monitoring instrumentation will be key to the delivery of accurate data that meets the requirements of an integrated information supply. High-quality reliable instrumentation plays a crucial role in solving the complexities of industry as we now know it.

"In South Africa, Senseca will offer solutions to the challenges our customers face from one centralised source. We will be able to customise and tailor solutions more quickly," Grobler said.

"At Senseca, with the expertise vested in each of the former brands coming together, we will enhance customers' engagement with us and continue to build on the confidence the South African market has in our design, technologies and manufacturing capabilities."

The know-how of each brand is pooled in multidisciplinary teams working in three business units: Environmental, Industrial and Portable. People remain at the heart of the business, and their contribution of skills, knowledge and commitment will continue to be crucial to the new opportunities arising with this change.

"By bringing together our individual and complementary value we can generate a positive impact on each other, on the people around us and, in this case, on this new opportunity," says Gianluca Maestroni, current CEO of Delta OHM and Vice President of the Environmental Business Unit.

The name Senseca is a neologism with several meanings. First, 'sense' stands for sensors, the core business of measuring, monitoring, testing and control equipment. But 'sense' also represents the new shared purpose that sets Senseca's future direction: to provide reliable data and facts that support businesses and society to improve the ecological and economic status quo with custom-made technology solutions.

"At Senseca, we strive to safeguard our planet by balancing economic interests with environmental goals. There can be no economy without a healthy planet, and companies can make a vital contribution," says Roland Baeuml, Vice President of the Portable Business Unit. We want to rise to this challenge and become a role model in sustainable measurement technology." □

New universal temperature transmitter with drift detection

The T38 incorporates Wika's newly developed True Drift Detection, which signals any deviation of measured value from the characteristic curve.

The new model T38 digital temperature transmitter from WIKA enables flexible and stable temperature measurement. The instrument offers a maximum of sensor connection combinations and a new type of drift detection. Head-mounted and rail-mounted models are available in SIL and various Ex versions.

The temperature transmitter, fully developed in accordance with IEC 61508, is designed for general application. With the T38, users can monitor processes more efficiently. In addition to a number of standard sensor characteristic curves, WIKA's newly developed True Drift Detection is incorporated in the T38. This function signals any deviation of the measured value from the characteristic curve, immediately.

The T38 has six sensor connection terminals that can be configured

Continued on page 19

Ensuring quality in cast metals

During the process of metal casting, the liquid material is poured into a mould and then cools to become a solid body. If the casting temperature is either too high or too low, this can lead to quality defects in the cast product. If the temperature of the liquid metal is too low, it may cool down too quickly in the mould and stop melting. As a result, the mould is only partially filled. If the liquid metal is too hot, this promotes gas porosity and delays the solidification process. This can lead to grain coarsening in the microstructure of the cast part. Temperature monitoring of the liquid casting material is therefore indispensable for quality assurance.

Instrotech, a local representative for Optris, offers infrared cameras to monitor the temperatures in the casting process. The temperature of the liquid metal and that of the mould are constantly monitored so that the quality-critical cooling phase can be adjusted if necessary.

The compact Optris PI 05M thermal imaging camera is primarily used for this purpose. Due to the spectral range and continuous measuring range from 900 to 2 450 °C, it is especially suitable for the temperature measurement of molten metals.

The compact Optris PI 05M and PI 1M infrared

Optris IR cameras are designed to monitor temperatures in the metal casting process continuously.

cameras have been designed specifically for metal industry applications. The short wavelength PI 05M is ideal for measuring molten metals in the casting process, as the new spectral range of 500 nm provides more accurate measurement with changing emissivity and is less sensitive to atmospheric influences. The Optris PI 1M is used mainly in metal processing, monitoring temperatures during hardening, forming and welding of metals, for example.

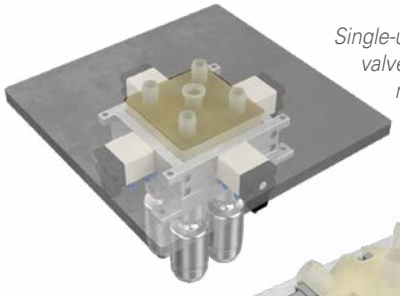
For more information visit: www.instrotech.co.za

Connecting multi-port valve blocks

Ingelfingen-based valve specialist, GEMÜ is launching two new solutions for connecting single-use multi-port valve blocks.

One of the solutions makes it possible to control the pneumatic locking of the valve block via locking cylinders, with a valve block sunk into the skid surface. The other solution entails use of a valve block placed onto the skid surface, where the valve body is manually connected to the actuator unit via a detachable hand lever. This second solution offers greater flexibility for the spigot layout. The connection between the actuator and the diaphragms welded onto the valve block is created reliably within a few seconds, using the familiar clamping principle of the GEMÜ SU40 SUMONDO. The blocks themselves are produced by machining and thus can be tailored to each specific application.

There are several benefits to using single-use technology: eliminating the need for conventional cleaning cycles and the associated costs for power, cleaning media, waste disposal and peripherals while increasing protection against cross-contamination between different manufacturing drives. It also minimises downtime in factories, which significantly improves the flexibility and effectiveness of single-use solutions in the medical and pharmaceutical technology sectors, in comparison with conventional solutions. In addition, by eliminating energy-intensive cleaning cycles, the use of single-use technology reduces negative environmental effects. □



Single-use multi-port valve block with manual locking device.

Single-use multi-port valve block with pneumatic locking device.

Continued from page 18

as required, giving users a wide scope for combinations. With the head-mounted transmitter, specially designed trapezoidal terminals with a large clamping area and access from the outside simplify the connection of sensors and the current loop.

All variants of the new transmitter can be programmed using the HART® protocol with a number of open configuration tools. The T38 can also be parameterised quickly and easily via the USB interface using the PU-548 programming unit and WIKAsoft-TT software.

For more information visit: www.wika.co.za

Checking power quality at the service panel

Voltage sags, tripping breakers, overheated electrical panels, and excessive voltage levels indicate possible trouble in an electrical distribution system. Understanding that these symptoms tell us something is wrong with the power system is helpful. But where do we begin the search to isolate the cause of such power quality problems. Here, measurement tools specialist Fluke, locally represented by Comtest, sets out a step-by-step process to locate and fix potential trouble spots.

Just like cars have a single connection point to monitor core functions, an electrical system has a similar connection point: the electrical service panel. As a common point for branch circuit distribution, the service panel is also a convenient place to take the pulse of an electrical system.

Several problems can be located in the service panel itself. For issues elsewhere in the system, measurements at the service panel can tell the maintenance technician where to look next. A quick visual inspection can catch some problems; others require measurements to be taken.

Finding the cause of the problem

The basic steps to locate and fix possible trouble spots call for checks on:

- Voltage level (steady state) and voltage stability (sags)
- Current balance and loading
- Harmonics
- Grounding hotspots: loose connections/terminals
- Inadequate or marginal branch circuit breakers.

Tools like digital multi-meters and power quality analysers can be used to check and locate power quality problems from the service panel.

Depending on the voltage and measurement requirements, maintenance teams can use various tools to troubleshoot power quality issues, from digital multi-meters to handheld single- and three-phase power quality analysers which perform many calculations automatically.

Voltage level and stability

The first step in checking if voltage levels and stability are problematic is to measure voltage levels of the branch circuits, phase-to-neutral, at the load side of the branch circuit breakers. Importantly, for safety, when making voltage measurements the maintenance technician should always keep a circuit breaker between himself and the fault current ampacity of the feeders.

If voltage levels are low at the breaker, they will be lower at the receptacle. This could be caused by low tap settings at the transformer. Other likely causes include loose connections, long feeder runs, and overloaded transformers, which create excessively high source impedance (impedance from the load to the source). Source impedance and voltage drop are two sides of the same coin.

If intermittent voltage sags are suspected, the technician should start at the panel to isolate the cause of sags: are the sags the result of loads on the same branch circuit, or are they caused by loads elsewhere in the distribution system (including utility-generated sags)? The technician can start isolating the sag's source using a multi-channel recording instrument, such as a Fluke power quality analyser, which can trend voltage and current simultaneously.

Upstream, downstream

What information can be revealed in the trend plots?

If a voltage sag occurs simultaneously with a current surge, the sag is caused by a load on the branch circuit. In other words, the cause of the sag was downstream of the measurement point and, therefore, can be considered as a load-related disturbance.

If, on the other hand, the voltage sag coincides with a very small change in current, the sag was likely caused by something upstream of the measurement point and can be considered as a source-related disturbance. Typical source-related disturbances are heavily loaded three-phase motors started across the line, or sags originating on the utility feed. If the sag is deep and approaches an outage, the cause is more likely to be the utility. The event probably reflects a fault and breaker trip followed by automatic breaker reclosure.

Current balance and loading

To check the current balance and loading, each feeder phase and current on each branch circuit should be measured. When making these measurements, it is critically important to use a true-rms clamp or true-rms digital multi-meter (DMM) with a clamp-on accessory. An average

responding clamp-on meter will not provide an accurate measurement as the combination of fundamental and harmonic current makes this a distorted waveform. A lower cost average-sensing meter will tend to read low, leading to the assumption that the circuits are more lightly loaded than they are.

Harmonics

To check for the presence and level of harmonics, the current on the feeder neutral must be measured. This will typically be in the 80 to 130% range of the feeder current because the third harmonic will add up in the neutral. Readings of waveforms can be captured using a power quality analyser. Although most of us are increasingly aware that third harmonic currents (also called triple or zero sequences) generated by non-linear, single-phase loads add up in the neutral, we often wonder why.

Grounding

Neutral ground bonds in subpanels are a violation of the NEC and of power quality performance wiring, but they are also quite common. Neutral ground bonds should be made at the transformer (although the NEC permits that they can be made at the main panel). Neutral ground bonds should never be made downstream of the main panel, whether at a subpanel or a receptacle. When a neutral ground bond is made at a subpanel or receptacle, the ground path becomes a parallel return path for normal load current, resulting in measurable current on the ground.

Hotspots

Poor connections and the resulting heat losses are the single most significant source of system inefficiency (according to a 1995 study by the then Washington State Energy Office). From the power quality perspective, loose terminations contribute significantly to excessive source impedance. Fortunately, they are easy to locate with a simple infrared thermometer. Infrared (IR) measurements, using tools like the Fluke 60 Series, offer a safe and effective means for the non-contact detection of panel hotspots. However, there are some key concepts that are crucial to understand in making these measurements.

Circuit breakers

Many people don't think of breakers as having a finite lifetime. In reality, contacts and springs wear out. Measurements of circuit breaker voltage drop can help to determine the condition of the breaker. The technician should measure across the line-to-load side of the branch breaker. If the voltage drop exceeds 100 mV, the breaker should be replaced. Readings should be documented and trended in the 35 to 100 mV range.

In summary, the service panel is the crossroads of a facility's electrical system, where an experienced electrical troubleshooter can start on the right path to locate and fix any problems. □

For more information visit: www.comtest.co.za

Locating cables accurately and safely

New wire tracer kits available from Comtest as the local representative for Fluke, make the process of troubleshooting energised and de-energised cables in residential, commercial and industrial environments simpler and safer.

Well known as a global leader in compact, professional electronic test and measurement tools and software, Fluke has introduced the 2052 Wire Tracer and the 2062 Advanced Pro Wire Tracer kits. Each kit comprises a receiver and a transmitter and includes the i400 ac current clamp accessory to induce a tracing signal safely on cables, without contact to live wires. Test leads, alligator clips, outlet adapters, magnetic hanger and batteries are also included in the kits.

Both kits work by detecting signals transmitted via an electromagnetic field, rather than locating metal parts or voltage, and in this way, they deliver higher levels of accuracy and safety for the user. They are designed to serve electricians and technicians who need to locate electric cables quickly in walls, ceilings and floors, find out if there are any breaks or open or short circuits, or identify breakers and fuses. The devices can also be used to trace non-metallic pipes and conduits as well as low voltage wires and data cables.

The new advanced wire tracers provide two methods to detect signals in wires and cables: using passive tracing without a transmitter for non-contact voltage detection and active tracing with the Fluke 2000T transmitter for all other modes. The transmitter automatically senses whether the system is energised or de-energised and selects a 6.25 kHz or 32.768 kHz output signal frequency accordingly.

Fluke's 2052 Advanced Wire Tracer simplifies the process of tracing and troubleshooting energised and de-energised wires.

In line with the Fluke philosophy of offering the maximum number of features and capabilities at an affordable price, the new advanced wire tracers incorporate three transmitter modes (high signal, low signal and loop), four receiver tracing modes and eight sensitivity levels for greater flexibility and accuracy when tracing. Additionally, durability and ruggedness are built in: all units are one-metre-drop tested, IP40 rated and backed by a one-year warranty.

With the CAT IV 600 V safety rating, both Fluke devices are designed to protect users from the most dangerous levels of transient overvoltage (spikes up to 8 000 V) that can occur in industrial and utility environments.

For more information visit: www.comtest.co.za

Power supply considerations for wireless monitoring systems

Wireless remote monitoring technology provides a cost-effective method for plant and asset managers to monitor and manage important system data across their sites, particularly over large areas. However, wireless system performance is often limited by power availability and many site managers are unsure how to select a system that runs efficiently with limited power supply and still transmits all key data. Ian Loudon, International Sales Manager at Omniflex, sets out the key power supply considerations for wireless systems and how to select the right system for the job.

Wireless telemetry systems are essential for monitoring and control applications in various key industrial sectors, including mining, utilities, petrochemical, nuclear and oil and gas. In many of these applications, laying cables for a traditional wired network is not feasible because of strict regulations and planning permissions required. Furthermore, the cost of cabling can often be prohibitive.

Therefore, in many cases, wireless telemetry systems represent the only way to retrieve and manage critical data from the field safely and efficiently.

Power considerations

Generally, the further we want to send data, the more power we need to do it. For licence-free radio, which operates at 868 MHz in the UK and South Africa and 900 MHz in Australia, installations generally need to be under 500 mW. However, licence band radio systems, which are more expensive to operate due to ongoing licensing costs, operate effectively at up to 25 W. Therefore, high power installations are better suited to using licence band radio.

Power can impact system availability and is usually a high priority in terms of systems specification. Often, wireless systems are deployed in remote areas without access to mains power, so alternative supplies must be explored. This adds another layer of complexity for site managers unsure of what they need to get systems up and running.

In the age of Industry 4.0 and the widespread deployment of remote installations, it is often assumed that battery-powered systems will more than suffice as many modern battery systems can run for five years or more. However, this can get costly in terms of battery replacements if implemented on a site with, say, 100 units or more. Many plant-wide applications may use more than 1 000 wireless units across a large area.

Replacing 1 000 industrial batteries at one time would represent a significant outlay, so it is important that site managers relying on battery-powered systems plan ahead and devise a maintenance plan to replace them on time, before the system degrades.

Using solar-powered units generally allows site managers to sidestep the issue of costly battery replacements, improving cost efficiency and reducing maintenance requirements. However, these units are only effective in areas with sufficient sunlight to keep the unit powered up and operational.

With these various factors to be considered, it is important to engage a reliable wireless partner who can assess the system requirements and operational restrictions, and recommend the most suitable and cost-effective system to serve the client's needs.

A knowledgeable wireless partner

Omniflex's wireless telemetry modules allow users to configure inputs as either analogue or digital inputs and outputs,

Wireless telemetry systems are widely used for monitoring and control applications in key industrial sectors such as mining and utilities where assets are dispersed over a large area.

depending on the application requirements. Engineers can integrate the modules with SCADA systems to achieve secure wireless links on different licence-free bands. The modules also offer various power options, such as mains or dc-powered, with battery backup, or solar powered, so no matter where wireless monitoring needs to work in the plant, the modules can be deployed accordingly.

The Omniflex Teleterm M3 module is a mains-powered RTU, featuring an onboard 100 Mb Ethernet and RS232/485 ports, enabling communications with a range of devices using most network options, including GSM, radio, ethernet, Modbus, 3G, satellite and Conet. Furthermore, it is equipped with twelve digital or analogue configurable I/Os, which enables full environmental monitoring covering parameters like temperature, pressure, humidity, water levels and more. It is also fitted with an onboard SD card for data logging, which is important for data auditing purposes, especially for post-event analysis.

The Teleterm D3 is supplied with built-in lithium batteries, so it has battery backup in the event of mains power failure. It has eight digital or analogue configurable I/Os and can communicate using Ethernet, Modbus, radio, satellite and 3G options. It also has a built-in LCD display, allowing the user to view data locally.

The Teleterm S3 is solar powered, which makes it well-suited for remote area applications where power is an issue and the plant operator wants to collect data and send it back to a central control station. The S3 is equipped with five digital or analogue configurable I/Os and can communicate using Modbus RS232/485, radio, satellite and 3G options. While it has fewer available I/Os than the M3 or D3, five are normally more than enough as these units will often be connected to a single sensor, where only one I/O is actually required. Having fewer I/Os available makes the unit more power-efficient, which is important for a solar-powered installation.

The Teleterm S3 module is solar powered, which makes it well-suited for remote area applications.

All three of the Teleterm units feature full IEC 61131 programming as an option, allowing local control functions or remote control via any of the communications ports. □

For more information visit: www.omniflex.com

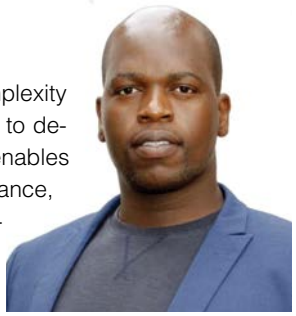
Maintenance of infrastructure is fundamental

Infrastructure collectively constitutes an asset that is at the core of a functioning society; it shapes economic growth, enhances the quality of life of citizens, and provides the platform for a nation's growth. Nyiko Chabalala, Building Services/Research & Development Engineer at Citadel here lays out the value of infrastructure and the importance of maintaining it.

Neglected and decaying infrastructure has far-reaching negative consequences, undermining economic growth, the health and wellbeing of society, and raising risks for citizens' safety. Inadequate basic services impede commercial and public investment, hindering the potential for a thriving economy. To provide access to healthcare, education, and opportunities for all, the first premise is to ensure access to and protection of the assets that provide safe drinking water, proper sanitation, functional transportation systems and a stable power supply.

The importance of maintaining essential infrastructure such as roads, water supply, sanitation and electricity is clear: as well as providing beneficial services for so many citizens, it makes economic sense to maintain the assets rather than to rebuild and replace them, and avoids costly disruptions. This long-term benefit is illustrated in lifecycle costing – a process that informs and monitors overall project cost and indicates, strategically, when maintenance must be done.

Recognising the benefits of coordinated project implementation, monitoring, budgeting and planned maintenance, and at the same time realising the complexity of the task, led Citadel House of Technologies to develop its Fortress software program. Fortress enables effective management of inventory, maintenance, and operations as well as holistic lifecycle planning for today and into the future.



Nyiko Chabalala, Building Services/Research & Development Engineer at Citadel.

With the ability to manage project implementation as well as the asset life cycle in a single application, the program provides the principal with a powerful tool, or a practitioner with a strategic advantage, in that it enables them to offer a value-added service to their clients. By initiating a project with Fortress, the principal or practitioner can start collecting data on the asset from the outset and, over time, can provide insightful reports to inform maintenance planning and related decisions.

Numerous technical studies confirm that regular maintenance of assets results in a substantially longer lifespan of the assets. Furthermore, if the maintenance is carried out at optimal intervals, it results in much more cost-effective maintenance, leading to substantial savings for the asset owner.

Fortress can be used by diverse organisations or institutions. It can assist national, provincial and local government in maintaining public assets and institutions, as well as private industrial and commercial enterprises and organisations – all have assets to be maintained. □

Steinmüller Africa and Bilfinger Intervalve Africa worked together to improve the operational efficiency of the steam system of a paper mill.

Improving output quality in pulp and paper

Sister companies Steinmüller Africa and Bilfinger Intervalve Africa worked together recently on a project to improve output quality in the paper industry.

Valve supplier Bilfinger Intervalve Africa improved the steam system of a paper mill to increase efficiency and productivity and reduce operational costs.

"Top performers in the paper and pulp industry are constantly striving to increase productivity and quality while minimising costs," says Peter Underhill, Technical Sales Consultant of BIA. The main aspects that typically need to be addressed to achieve operational excellence are a reduction in energy costs, chemical use, production downtime, and process variability. "The functions of control valves in the paper and pulp industry are diverse and the correct selection, monitoring, and servicing of control valves can result in financial rewards for clients," he says.

The use of smart positioners on control valves, as well as emergency shutdown valves, has additionally enabled clients to gain greater benefits. "The Fisher DVC2000 and DVC6200 series digital valve controllers add the accuracy of the valve position along with valve diagnostic capabilities that determine the health of the valve," Underhill notes.

Using the information downloaded from the device, either from advanced diagnostics or online performance diagnostics, maintenance programmes can be adjusted to focus on the more problematic valves. This will prevent the need to remove and strip valves that are in good condition, which in turn reduces costs and time spent on repairs. Overlaying downloads obtained from valves over time can assist the client in moving to predictive maintenance and reducing expensive stock holding of spares.

In the initial stages of a project, Steinmüller Africa undertakes the careful selection of control valves for its clients, ensuring that the valves perform the correct function, and are of the correct style and size. As certain valves have been specifically designed to operate in different applications – valves used in incorrect applications can lead to unwanted process variability. The use of incorrect valves can lead to cavitation or flashing damage, excessive plant noise and poor control in areas such as basis weight, affecting paper quality. Incorrect sizing of the control valve can result in the valve not operating in a suitable control range, leading to the possibility of excessive wear and loss of controlability.

With Steinmüller Africa's expertise, all three prime components of the control valves – the valve body, actuator and positioning – work in harmony with one another to meet the client's control requirements. Poor performance of any of these components can lead to poor control of the process, leading to unacceptable process variability that can seriously affect the user's bottom line, Underhill explains.

"In conjunction with control valves, it is important to be aware that good quality, hand-operated or automated isolation valves should be used in certain applications to protect the control valve," Underhill says. "Bilfinger Intervalve Africa has a wide range of quality products to serve this role," he says.

Steinmüller Africa and Bilfinger Intervalve Africa are members of the Bilfinger group of companies. They provide comprehensive solutions for power, mining, petrochemical and pulp and paper industries. □

Turck Banner's new K100 series offers multicolour beacons for advanced indication applications.

Programmable LED Indicators

Turck Banner is expanding its portfolio of LED lights with the robust LED indicators of the K100 series and the 100 mm beacons are available in two configurations. Both units are designed to improve workflow and reduce downtime by providing clearly communicated status information.

The Pro Daylight Visible beacon model offers 12 audible options. It has a clear lens that provides distinct indication, in indoor and outdoor environments, and even in sunlight, preventing false indications,

The model features three colour options (green, yellow, and red) for status indication, operator guidance, and other functions.

The K100 Pro Indicator is suitable for most outdoor applications. This model has a diffused lens that appears white when inactive, preventing false indication. It features 14 colour options that can be used for status and indication applications. Animations include options such as flash, intensity, sweep, and wave.

Both beacon models can include an optional audible alarm and have an IP66 environmental rating for protection in dust, rain, and snow.

The K100 beacon series is discretely controlled and ideal for users that do not have IO-Link but want control and customisation capabilities to communicate information visually. Banner's proprietary Pro Editor software enables users to program device status, colours, and animations. The PC-based interface makes it easy to configure a beacon for a range of applications, such as displaying machine warm-up time, indicating unique steps in an assembly process and communicating multiple machine states.

For more information visit: www.turckbanner.co.za

Complex steam air heater replacement completed

As the original equipment manufacturer (OEM) of hundreds of steam boilers in Africa, Babcock had played a part in the build of one of South Africa's largest power stations, focusing mainly on the construction of the high-pressure (HP) piping systems. When one of the steam air heaters was damaged, the Babcock crew was awarded the contract to undertake repairs. These involved specialised rigging and welding expertise. The steam air heater repaired is a multi-row fin tube heat exchanger, consisting of three tube bundles and two bypass dampers installed in the air ducting of the boiler.

Tommy Scheepers, Senior Piping Engineer at Babcock, explains the significance of the rotary air preheater. In combination with the steam air preheater, it works sequentially to control both primary and secondary air temperatures before the air enters the boiler furnace through the burners. Precise control of the combustion air temperature is crucial in regulating the combustion process, ensuring efficient burning to minimise environmental emissions.

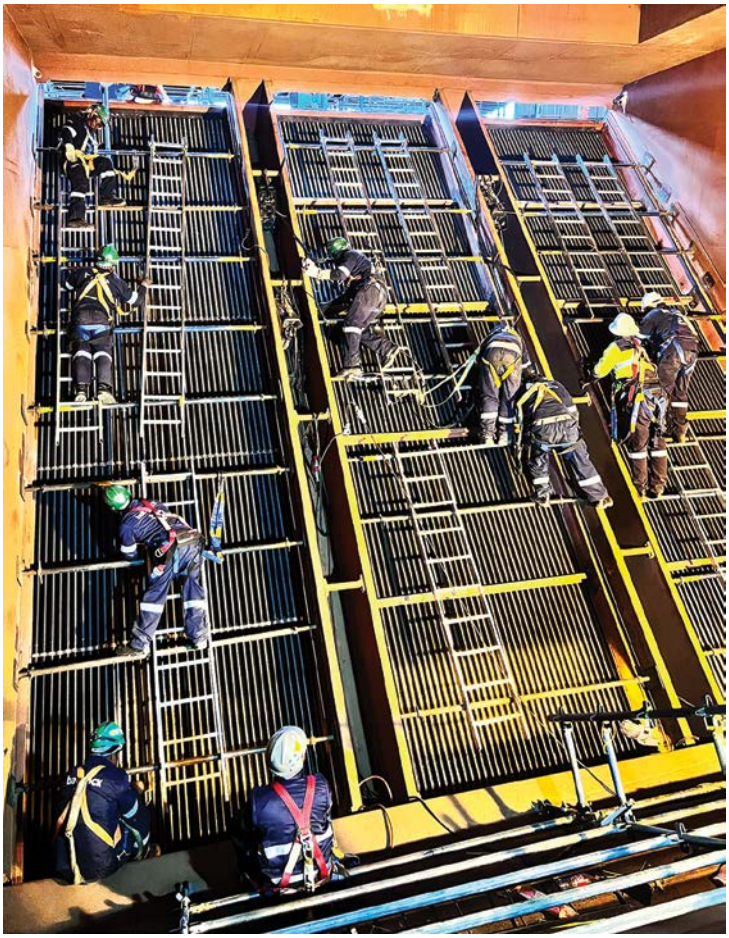
The damaged steam air heater could not be removed from the plant as that would have required extensive and costly rigging, together with additional structural support to maintain the integrity of the boiler ducting. Consequently, the replacement of the fragile nine-metre-long finned tubes had to be performed on the tubes individually in situ. Specific rigging methodology, routes and lifting aids were identified and developed prior to the replacement.

Before starting the refurbishment work, the Babcock crew had to remove the existing damaged finned tubes from the steam air heater frames inside the ducting. This involved cutting out and removing the connecting auxiliary steam and condensate drain piping to provide access for rigging activities on the outside of the ducting. The inlet and outlet air chambers were also removed, followed by the removal of the steam headers and tube sheets.

The air heater finned tubes are made from carbon steel with embedded aluminium spiral fins. These finned tubes are sourced offshore, with related delays in supply and high costs. The style of tube used is required for efficient heat transfer between the internal steam-heated tubes and the secondary air flowing over the fins.

Scheepers explains that special precautions were taken to prevent any damage to the fragile finned tubes during handling, rigging and installation, bearing in mind the consequences for the team in terms of time, cost and quality of the overall repair. "The handling of these delicate materials in a confined area required meticulous planning, sequencing and control of all actions by the staff involved during the replacement process, making this a complex and detailed undertaking," Scheepers says.

Babcock Construction Manager, Luis Ferraz De Almeida, emphasises the company's commitment to providing safe and effective solutions throughout the lifecycle of power plants. Babcock is renowned for its expertise in welding special creep-resistant alloy steels, and the front-end design of steam generation plants and pressure equipment.



The fragile nine-metre-long finned tubes in the steam air heater had to be replaced individually, in situ.

"Our customer had confidence in Babcock's boiler knowledge and in-house expertise, which assured them that we could perform this specialised steam air heater replacement project successfully within the specified timeline," adds Ferraz De Almeida.

As an original equipment manufacturer with over 130 years' experience, Babcock has the expertise to design, build, maintain and operate complex and critical steam-generation infrastructure. Its products and services additionally include boiler cleaning and optimisation, ash handling, wet and dry flue gas desulphurisation, bubbling and circulating fluidised bed boilers, and industrial and chemical recovery boilers.

With its specialised expertise, Babcock has consistently provided advanced world-class power generation and environmental technology solutions to industrial and utility customers in South Africa. It has helped businesses optimise operations and reduce environmental impacts, assisting them in aligning their operations to contribute to global decarbonisation and climate change objectives. □

Developed in Australia, SafeGauge testing solutions are being distributed in South Africa by PDS specialist, Booyco Electronics.

Live testing of large equipment

Although it is essential in effective maintenance, the live testing of mining vehicles and equipment can be hazardous and time consuming. The SafeGauge range of digital testing systems, developed in Australia and now distributed in South Africa by Booyco Electronics, changes this.

Booyco Electronics is a leader in promoting safety on mines with its proximity detection systems (PDS). Graeme Jardine, Booyco Electronics' Chief Sales Officer says the SafeGauge range aligns closely with the company's safety focus.

"As the mining industry works towards Zero Harm in the workplace, mines are always on the lookout for technologies that can make their sites safer," says Jardine. "SafeGauge helps to achieve this by addressing an important area of maintenance: live testing."

Live testing is the testing of large equipment like articulated dump trucks (ADTs), rigid frame dump trucks, load haul dumpers (LHDs) and hydraulic shovels, while they are running, to generate essential data on the machines' condition. Jardine says this is traditionally conducted with hoses and handheld gauges, to test variables such as pressure, fan speed and wear on rotating equipment such as slew bearings. The practice often means maintenance staff need to be close to an idling machine, working near high pressures and rotating components.

"With the Safegauge sensors and products, which are fitted to large equipment with quick couplers or magnets, the necessary readings and measurements can be taken from a distance of up to 50 metres," he explains. "This removes personnel from any hazardous areas where they might, for instance, be positioned in crush zones of unplanned movement."

The wireless monitoring system allows workers to test live machines from a safe distance and does it up to seven times quicker. This translates directly into less downtime, which improves the productivity of mobile plant.

"The innovations by SafeGauge eliminate the need for hoses and gauges when conducting tests on running machines, and this eliminates the risks associated with traditional handheld gauges, such as the dangers of overpressure causing hose or gauge bursts," Jardine says. "Instead, SafeGauge provides compact and portable kits that can be easily transported to the site or used in a workshop."

The Workshop Kit, for example, has up to seven connectable transducers for measuring pressure. Jardine notes that the SafeGauge Field Service Kit has been particularly popular as an all-in-one kit for field technicians. It includes a dial indicator for wear measurement and two pressure transducers for pressure measurement.

"In our engagement with markets in South Africa and north of our borders, customers have been enthusiastic about putting SafeGauge to work," he says. "They have been impressed by how easy it is to use the equipment, with just a relatively short induction."

He highlights that the advanced technology of the SafeGauge range makes it a suitable addition to Booyco Electronics' offering – as it leverages Booyco's depth of electronic and digital expertise.

"Our established resources and market footprint equip us well to support SafeGauge in South Africa, and we look forward to taking these solutions into other parts of Africa," Jardine says. □

Neil Robinson, WearCheck Managing Director, cut the ribbon opening the new Durgapur laboratory with team members from the lab.

SA condition monitoring specialist extends services in India

Condition monitoring specialist company, WearCheck, recently opened the doors to its second laboratory in India – this one in Durgapur. Its Chennai-based laboratory has operated successfully since 2010.

The South Africa-based company, recognised as a leader in the preventive maintenance sector across the African continent and beyond since 1976, offers an extensive range of world-class condition monitoring services in 16 state-of-the-art laboratories in Africa, the Middle East and India.

The new lab in Durgapur in India's West Bengal region will provide fast turnaround analysis and reporting across its range of services, supporting efficient plant maintenance.

WearCheck's fundamental goals are to save time and money for customers by ensuring that industrial machinery operates at peak performance, with reduced maintenance costs. The company services clients in sectors ranging from power generation and renewable energy to mining, fleet management, aviation, maritime and more.

Its core business is the scientific analysis of used oil, fuel and other fluids. Samples from customers' plant and equipment are analysed in the laboratory for trace particles, which indicate what component is experiencing unusual wear patterns. This information is assessed by highly trained diagnosticians, who make recommendations on the required remedial action for the component in question. WearCheck's diagnosticians have access to a huge database of information on performance trends for different machinery components – data that has been carefully collected and collated since the company's inception over 45 years ago.

The new Indian laboratory, strategically located in the major industrial city and mining hub catering to the Eastern Region, West Bengal, addresses the growing demand for top-quality condition monitoring services in the region. Durgapur is home to various industrial operations, includ-

Continued on page 27

Condition monitoring in power utility systems

In a recent blog, Kenneth Elkinson in Condition Monitoring at Doble highlighted that power and utility companies today are facing a slew of new challenges – and outlined how condition monitoring technology can help them manage their power systems.

Among the challenges, an aging workforce and aging infrastructure are leading to knowledge gaps and skills shortages. Growing cybersecurity concerns plague the industry, with cyberattacks on the grid's critical infrastructure happening frequently. And the rise of renewables makes the operating model of the power system more complex as organisations increasingly integrate wind and solar energy sources into the grid.

These challenges are driving organisations towards digitisation and a search for technology to provide data-driven insights that enable better decisions. (In the USA the Department of Energy has estimated outages cost the US economy $150 billion annually. Elkinson notes that this makes the need to leverage technology to safeguard the optimal health and performance of transformers and new critical infrastructure all the more important.)

With that in mind, he sets out three ways in which the latest addition to Doble's Calisto® Condition Monitoring Platform, the Calisto® N1, can help users reach their digitisation goals and gather the asset-health data they need to ensure reliable power for all.

Quick access to asset health data

Today's power and utility teams are tasked with what some would consider impossible – to proactively monitor assets, spot signs of failure and take action by scheduling maintenance or other interventions before it's too late. Traditionally, it would take teams countless hours to install, collect and read insights from multiple sensors in the field, slowing data interpretation and fault identification. With the Calisto N1, teams can check the readings directly on site from various devices and immediately act on the data to ensure asset performance. With this new insight, power and utility teams can be confident in their asset management decisions.

Condition monitoring of power systems enables early identification of faults and effective mitigation.

Seamless Integration with existing systems

As power grids continue to grow and evolve to include new technology, sensors and other third-party devices in the field, it can become difficult to visualise critical asset health data that lives in various formats and systems. The Calisto N1 provides teams with centralised access to asset health data from any third-party data source in the field – such as sensors, dissolved gas analyses (DGAs), power meters and other intelligent electronic devices (IEDs) that use standard protocols including Modbus and DNP3. The device also integrates with engineers' current applications across multiple assets simultaneously to support proactive event investigation, troubleshooting and enhanced decision making. This overcomes the need to leverage multiple systems across multiple assets due to varying system requirements.

Enhanced collaboration via cloud-based technology

The Calisto N1 also enables teams to collaborate on event detection and mitigation. A built-in webserver makes it easy to manage user access, alert settings and data visualisation for sensors installed in the field. This way, engineers can be alerted to potential faults automatically, seamlessly visualise the data and share it with other stakeholders, and take action to prevent failure. In addition, the new technology makes it easy for supervisors to get a clear view of asset health in the field via the cloud, while complying with the cybersecurity constraints of the organisation.

Condition monitoring of the future

The best way to prevent asset failure is to intervene early. But with skills gap issues, the rise of renewables, cybersecurity concerns, and other factors adding to an already complicated monitoring landscape, detecting faults early has become more challenging. It is time for teams to digitise and leverage technology to increase confidence and success in identifying failures so they can effectively mitigate asset health issues as they arise. □

Continued from page 26

ing manufacturing, power generation and more. The WearCheck team will provide world-class condition monitoring services to the Bengalese mechanised sector.

WearCheck Regional Managing Director, Sundip More, outlines the concept of proactive maintenance: "By monitoring a component's condition regularly over time, our scientific techniques provide reliable data which enables our diagnosticians to predict accurately whether and when that component will potentially fail.

"We identify a potential failure before it occurs and recommend a remedy. This way, catastrophic failure can be avoided and machine availability and performance are enhanced. The repair work to the component can be scheduled for a time that suits the work programme.

"With forewarning about potential component failure, our customers avoid unnecessary maintenance costs and maintain efficiency by upholding optimum production levels."

For more information visit: www.wearcheck.co.za

Young scientists win support for further studies

The 43rd Eskom Expo International Science Fair (ISF) kicked off on 4 October with an electric start as young scientists were treated to robotics and coding activities, as well as science shows as they prepared to present their projects.

Sci-Enza, from the University of Pretoria, entertained the young scientists with its science shows and STEMulator, in collaboration with the National Science and Technology Forum (NSTF), demonstrated the STEMulator in action. This is a digital tool designed to inspire children of all ages to explore science, technology, engineering, and mathematics (STEM) subjects and careers. In addition, career-guidance talks were offered to the youngsters, to provide insights into the exciting world of STEM.

At the ISF, 330 young South African scientists stood shoulder-to-shoulder with 20 of their peers from Ghana, India, Kenya, Lesotho, Mexico, Mozambique, Namibia, Zimbabwe, Indonesia, and Turkey, to compete in the show, presenting their projects. The Eskom Expo ISF was held at a venue east of Johannesburg in Gauteng. The winners were announced on 6 October and celebrated the results of their hard work with the bursaries, cash prizes, laptops, tablet computers and opportunities for work-based exposure during their school holidays that they were awarded.

Special awards

Title sponsor, Eskom, awarded 23 full bursaries valued up to R450 000 each, and four Special Awards to the Best Project by a Girl, Best Development, Best Energy and Best Innovation projects. The Eskom Special Award winners are set out below.

Top Senior Scientist and winner of the Special Award for Best Project by a Girl, Likitha Chundru with Dr Krishnie Naidoo, Eskom Expo Academic Director.

- Best Project by a Girl: Likitha Chundru, a Grade 11 learner from Bryanston High School in Johannesburg, won this award. Likitha also won the Meiring Naudé Award for the most inspiring project. She used a novel method to increase the germination and growth of non-legume plants using Rhizobium spp. bacteria.
- Best Development Project: this award was won by Amogelang Mampane from Soshanguve Automotive School of Specialisation, a Grade 12 learner from the Northern Gauteng Region. Mampane impressed the judges with his technical knowledge of electric cars.
- Best Innovation Project: Keerthana Nair from Bryanston High School in Johannesburg won this award. Nair found a quick and easy way to detect tuberculosis in sputum. Her innovation will be most significant for early tuberculosis detection in areas with limited medical resources.
- Best Energy Project: this award was won by Kabelo Sekoere and Simthembile Hlehliso from Senakangwedi High School in Bloemfontein in the Free State. This Grade 12 team investigated ways to improve the efficiency of solar panels.

Eskom Development Foundation Acting CEO, Mologadi Motshele, congratulated the young scientists for the exceptional talent they displayed and their steadfast commitment to scientific inquiry and innovation.

"Your achievements are a testament to your hard work, dedication, and curiosity. We are thrilled to see a growing number of young women scientists emerging as true change agents in the fields of science, technology, engineering, mathematics, and innovation. Your accomplishments serve as an inspiration to others, demonstrating that gender should never be a barrier to pursuing one's passion and making a significant impact on society. As you enjoy your well-deserved awards, know that you are shaping the future of STEMI and contributing to a more inclusive and diverse scientific community. This is just the beginning. The journey ahead is bound to be filled with greater discoveries, and we eagerly anticipate the contributions you will continue to make," Motshele said.

Eskom Expo Executive Director, Parthy Chetty said: "I wish to thank the many partners and sponsors who share our vision of promoting STEMI education by rewarding deserving young scientists for their hard work and dedication. While all the finalists are already winners by making it to the ISF, and some will walk away with fantastic rewards, all will leave this event enriched with new experiences from the week, new friends from across the world and will now be Expo ambassadors back home."

Through their generous sponsorships, Siemens Pty Ltd, Innomotics and Siemens Energy supported previously disadvantaged schools at the ISF with their prizes; FFS, Babcock International, Ekurhuleni Drums, Trisim Logistics, Berea Plumbers and the National Institute for Theoretical and Computational Sciences (NIThECS) supported learners with laptop computer sponsorships. Institutions like the University of the Witwatersrand, the University of Pretoria and the Durban University of Technology provided academic support in the form of bursaries and mentorships.

A few of the many other awards

Siemens Energy awarded two full bursaries worth close to R1 million (including tuition fees, textbooks, accommodation, meal allowances and a laptop) for the winners to study towards a Bachelor of Science in Engineering at any South African university of their choice. The winners were: Kabelo Sekoere and Simthembile Hlehliso from Senakangwedi Secondary School, who represented the Bloemfontein region.

Kabelo Sekoere and Simthembile Hlehliso, winners of the Best Energy Project Special Award and the two full bursaries awarded by Siemens Energy.

Amogelang Mampane, winner of the Best Development Project Special Award and a gold medal, captured the limelight at the ISF with his research project on dynamic charging for electric vehicles.

As noted above, the pair also won the Eskom Special Award for Best Energy Project. From Siemens' perspective, the awarding of bursaries reflects its commitment to nurturing young talent in the fields of engineering and science, which, over time, will contribute to the development of future leaders and innovators.

"Our project is based on improving the efficiency of solar panels, not by changing the structure, but by enabling the panels to function at their best," said Sekoere, who had wanted to study medicine, but now plans to become an engineer.

"It has been estimated that by the year 2050 or 2060, about 70% of the world will be using solar panels; so instead of waiting to solve the problems of the solar panels by then, we're solving them now. We found that debris on top of the panels can prevent about 30% of the energy from being absorbed, and, as most solar panels are placed at height to receive sufficient energy, there need to be safe ways for people to clean them there," said Hlehliso, who plans to become an engineer.

The gold medal winning duo said, participating in the ISF they enjoyed their interactions with other young scientists from around the country and from countries like Mexico and Mozambique, as well as their excursion to the Johannesburg Zoo and Botanical Gardens.

Amogelang Mampane from the Automotive School of Specialisation in Soshanguve, captured the limelight at the ISF with his groundbreaking research project. Winner of Eskom's Special Award for the Best Development Project, Mampane also won a gold medal. His research project focuses on dynamic charging for electric vehicles, presenting a pioneering system that enables electric vehicles to charge while in motion on the road, using wireless energy transfer facilitated by two coils employing mutual inductance.

"My passion for cars inspired me to create this project. I came up with an idea to charge electric vehicles wirelessly, in a way that is comparable to fast cable charging. My passion for science and technology started when I investigated how Albert Einstein revealed the formula of relativity. That made me ask questions of how can I add scientific features to electric vehicles," said Mampane.

"I feel honoured for the awards I have won because the competition was tight. I saw that myself, and I thought my chances of getting something were slim to none. Even though I was overwhelmed, I had faith in the work I had put in. I never thought I could win the Best Development Project award, because of the number of projects in the engineering category. I am grateful for the award, and proud of my hard work," he said.

Looking to the future, Mampane aspires to establish his own car company and craft vehicles that capture the hearts of people, combining futuristic elements with an enjoyable driving experience. To turn his vision into reality, he is actively seeking sponsors who share his passion.

Lethabo Molobi from Zinniaville Secondary School, who represented the Bojanala region, was awarded the prestigious University of Pretoria/Dr Derek Gray Memorial Award for her research project entitled: 'Can humans recognise text produced by AI chatbots?'. The award includes the Derek Gray Gold Medal, attendance at the Stockholm International Youth Science Seminar during Nobel Week, and a three-year study bursary in the sciences or engineering at the University of Pretoria, provided she meets the required criteria.

Likitha Chundru, winner of Eskom's Special Award for Best Project by a Girl, also won the cash prize of R75 000 for the 2023 Top Senior Scientist. The judges commended Chundru for her meticulous attention to detail and rigorous research methods and noted that her findings will help farmers produce major crops within shorter time frames, making a significant contribution to global food security.

Inge Higgins from Die Hoërskool Menlopark in Gauteng was recognised as the 2023 Top Junior Scientist, winning a R50 000 cash prize. Higgins's research was in the Environmental Studies Category. She investigated the effect biodegradable olive-pulp plant pots had on the germination and early growth of Afrikaner, Namaqualand Daisy and Sunflower seeds. In addition, she found that probiotics further accelerated the germination of these seeds. The Grade 9 learner impressed the judges with her scientific investigative approach and novel research method.

For more information and the complete list of 2023 Eskom Expo ISF winners, visit: www.exposcience.co.za

BAS technology: the key to continuous cybersecurity

Cybersecurity is crucial in any industry sector with a reliance on digital connectivity and communications – and for companies embarking on digital transformation. Furthermore, Patrick Evans, CEO of SLVA Cybersecurity, points out that companies need to validate their security controls on a continuous basis. Breach and Attack Simulation (BAS) technology can help businesses do this.

"BAS technology enables a business to simulate complex cyberattacks automatically and continuously – which allows for the business to test the effectiveness of its security prevention and detection controls," Evans explains.

"BAS platforms are ideal to help businesses ensure that the security tools they have invested in implementing are working as they should. The technology identifies, assesses, and rapidly remediates gaps in the coverage provided by a business's security controls - before attackers can exploit them."

Security control validation

In BAS, security control validation (SCV) is the primary use case. BAS platforms that specialise in SCV allow users to measure and benchmark the effectiveness of their prevention and detection controls. These might include firewalls, email gateways, intrusion prevention systems, security information and event management (SIEM) tools, extended detection and response (EDR) solutions, and others.

SCV checks whether these controls are blocking and alerting on attacks. It also analyses event logs generated by existing controls and can offer recommendations to assist a business in addressing identified weaknesses or failures.

Using a BAS platform with SCV will help a business to accomplish three important goals.

- Assurance: BAS tools simulate threats to test and validate the effectiveness of established security controls. Data, insights, and reporting empower the in-house IT teams to answer what may be tough questions from the board about security posture and resilience.
- Return on Investment (ROI): BAS platforms help the business gain the greatest return on security control investments, via continuous validation of performance and mitigation of issues, ensuring all tools work as they should.
- Compliance: Leading BAS solutions can also assist with compliance with regulations and standards, such as the General Data Protection Regulation (GDPR), Protection of Personal Information Act (POPIA) and Payment Card Industry Data Security Standard (PCI DSS), by providing metrics that can be shared with auditors.

Breach and Attack Simulation technology enables businesses to test the effectiveness of their cybersecurity controls and mitigate issues identified – on a continuous basis.

In the past, security teams have used a range of methods to simulate attacks and identify weaknesses in their security defences. These may include vulnerability scanning, penetration testing and 'red teaming' (where a red team of cybersecurity professionals act as adversaries in an attempt to overcome cybersecurity controls). Each method has some value but all have drawbacks – and many of these are addressed by BAS.

Comparatively, BAS platforms provide greater speed, scope, and uniformity, coupled with fewer resource demands and less risk of error.

BAS conducts automated, consistent, and continuous (24/7) attack simulations, helping to validate security control effectiveness, generate quantifiable metrics for analysis and reporting, and deliver insights to aid mitigation of threat coverage and visibility gaps.

As the pioneer of BAS technology, Picus Security – one of SLVA Cybersecurity's key partners – offers a cloud-native, software-as-a-service (SaaS) SCV solution that helps measure and strengthen cyber resilience, by automatically and continuously testing the effectiveness of a business's network security controls.

The Picus platform provides a real-time snapshot of a company's security posture and generates alerts when security scores fall below a predefined threshold. It offers comprehensive visibility into cybersecurity threats and risks across networks and endpoints, all from a centralised dashboard. It produces actionable vendor-specific mitigation recommendations to help the in-house team address the gaps swiftly and effectively.

It is important to note that the potential damage a cyberattack can cause within those organisations reliant on digital technologies extends beyond monetary losses and data theft. It also encompasses, potentially, reputational damage, the value of the business to stakeholders, and the erosion of trust in its integrity. This is why it is valuable for organisations to implement BAS as a means to ensure continuous, automated threat simulation, control testing, and validation of effectiveness.

BAS technology can assist digital-forward organisations gain greater confidence that their existing defences and protections are strong enough, and it can help them to improve oversight, risk identification, decision making and future planning.

For more information visit: https://slva-cs.com/

California's fusion energy industry steps ahead

In early October 2023, California Governor Gavin Newsom signed landmark legislation, Assembly Bill 1172. Authored by State Assembly member Lisa Calderon (D-Whittier) and spearheaded in the Senate by Senator Josh Newman (D-Fullerton), the bill supports California's fusion energy industry by recognising this cutting-edge technology's safety and environmental benefits while setting the stage for the state's future regulatory framework. Fusion pioneer, TAE Technologies, points out that the signing of the bill makes California the first US state to enshrine in law the fundamental distinction between fusion energy and traditional nuclear fission. AB1172 also recognises, for the first time, the diversity of scientific approaches to achieving fusion's transformative potential for the California grid.

The legislation states: "Fusion energy can advance California's progress towards its statutory renewable energy and climate mandates. Fusion energy development presents an opportunity to further promote California's workforce development within the renewable energy sector."

As the nation's first private company to pursue the commercialisation of fusion energy, Southern California-based TAE Technologies applauds the passage of this legislation for its recognition of fusion energy's potential contributions to providing clean energy and for recognising that this groundbreaking industry requires bespoke regulation. Just as fusion and fission rely on opposite reactions – where fusion combines atoms, fission splits them – there are fundamental differences in how these nuclear technologies need to be regulated, and California's lawmakers are addressing those needs for the first time. Fusion is inherently safe and deserves a well-considered regulatory path that allows fusion to be developed safely and expediently.

"With this bill's passage, California's governor and legislators are recognising the potential of commercial fusion energy to be a part of a clean energy solution that brings carbon-free energy, jobs and much-needed innovation to our state, and to our world," said TAE Technologies CEO, Michl Binderbauer.

AB1172 can help California ensure the highest standards of safety and public trust in the development of fusion energy, differentiating it from unrelated technologies like traditional nuclear fission. Notably, fusion, unlike fission, does not produce long-lived radioactive waste and with fusion energy, nuclear meltdown is impossible.

TAE Technologies is the global leader in commercial development of aneutronic fusion power, an advanced form of fusion that does not produce neutrons in its primary reaction and has several key benefits, including no radioactive waste and longer-life devices that result in lower energy prices for producers and consumers. The new law specifically requires the California Energy Commission to define and examine this distinctive, impact-forward form of fusion.

Fusion also complements renewables, because it is a zero-emission energy source that is consistently available throughout the day and seasons, regardless of the weather, wind or sunshine. By comparison to any other source of renewable or clean energy, fusion has substantially greater power density, requires little fuel, and has minimal environmental impact.

'Norman', pictured in the company's California HQ, is the fifth-generation experimental device on TAE's path to develop commercial fusion energy.

"Controlled thermonuclear fusion is one of the few long-term, environmentally friendly and inherently safe options," the International Atomic Energy Agency wrote in a recent report (September 2023). It noted: "In principle, fusion could generate four times more energy per kilogram of fuel than fission and nearly four million times more energy than burning oil and coal."

TAE is developing aneutronic fusion that will rely on hydrogen-boron (also known as proton-boron or p-B11) fuel, which is safe, abundant, non-radioactive and inexpensive. Slated to enter the marketplace in the early 2030s, TAE's planned commercial hydrogen-boron fusion energy plants will play a key role in meeting Governor Newsom's ambitious plan to power California with 100% clean energy by 2045. At the federal level, the Nuclear Regulatory Commission is drafting new regulations defining fusion energy. And around the world, leaders are recognising the safety benefits of fusion and drafting rules and recommendations on how to regulate it with a lighter touch than other forms of nuclear energy.

As regulations develop, TAE is working towards creating the fusion energy machines that will power the future. Earlier this year, the company broke ground at a new 100 000 square foot facility in Irvine, CA, to house its next fusion research machine, Copernicus, which is expected to demonstrate the viability of net energy generation from TAE's proprietary configuration around the mid-2020s. Beyond that milestone, TAE will develop its first prototype hydrogen-boron fusion power plant, Da Vinci, to deliver electricity to the grid by the early 2030s.

For more information visit: www.tae.com

Jason van der Poel, Partner, and Hannah Milner, Candidate Attorney, at Webber Wentzel.

Virtual wheeling 101

Eskom has run a successful pilot of virtual wheeling, a platform that will enable companies with multiple offtake sites to connect to generators using the Eskom or municipal grids. This saw Vodacom sign the first Eskom Virtual Wheeling Agreement in August 2023. Jason van der Poel, Partner, and Hannah Milner, Candidate Attorney, at Webber Wentzel, set out the practicalities and potential for wheeling electricity to serve widespread low voltage loads.

Electricity wheeling mechanisms play a key role in facilitating the optimal integration of renewable energy resources into the grid. Wheeling across high voltage and medium voltage lines has been the focus of Eskom's wheeling strategies to date, but the proposed introduction of virtual wheeling, as a new option, opens opportunities for companies with multiple smaller and low voltage loads scattered across South Africa to participate in the market.

What is wheeling?

Wheeling is the delivery of energy from a generator of renewable energy to an end user (the off-taker or buyer) situated in another area. This is done using Eskom's existing transmission or distribution networks, or existing municipal distribution networks.

In South Africa, wheeling arrangements have traditionally been concluded between larger generators and buyers of electricity connected at medium and high voltages (higher than 1 kV). In this approach, there is a direct relationship between the generator and the buyer. Eskom charges the generator and the buyer for the use of the Eskom grid and credits the buyer's bill for the electricity delivered to the buyer but not supplied by Eskom, at the end of each month.

The traditional wheeling methodology works for larger buyers. However, it needs to be adapted for two primary reasons. Firstly, it is designed to service large consumers of electricity, typically one generator selling to one or two buyers. It does not adequately cater for several low to medium voltage consumers. Secondly, traditional wheeling has been inaccessible to buyers in most municipal distribution networks. Many municipalities lack the wheeling protocols required, including use-of-system tariffs, and do not have the infrastructure to accommodate the necessary billing, metering and data processing systems for wheeling transactions using both Eskom and municipal distribution networks with a buyer supplied by the municipality.

In an endeavour to overcome these complexities, in July 2023, Eskom announced a new virtual wheeling platform.

How will virtual wheeling work?

The virtual wheeling platform connects buyers that have multiple offtake sites to generators via Eskom or municipal grids. This requires an automated process to collect, aggregate, and report time-of-use data for energy generated and consumed by generators and buyers in order to provide a refund to the buyer for wheeled energy delivered to all its offtake sites on a consolidated basis.

We have identified three important differences between the traditional wheeling mechanism currently being implemented and the virtual wheeling platform.

Instead of processing a credit to an account for each offtake site of a buyer for the electricity sold by a private generator, a buyer must settle its Eskom bill in full and at the end of the month a single refund will be processed to one account of the buyer. The consolidation exercise will be undertaken through Eskom's virtual wheeling platform to measure the energy produced by generators and used by buyers. The platform will enable Eskom to aggregate time-of-use energy generation and consumption data across multiple distributed off-taker sites to calculate the monthly refund payable to the buyer. Thus it will facilitate access to wheeling for low to medium energy buyers and off-takers with a distributed consumption base.

The virtual wheeling platform will be able to aggregate energy generation and consumption data into Eskom time-of-use periods (standard, peak, and off-peak) in hourly intervals. Traditionally, energy generation and consumption data has been aggregated at monthly intervals. Eskom has stated that it is developing an API interface to generate hourly data which will be used for calculating refunds.

Eskom also requires buyers that participate in virtual wheeling to conclude a Virtual Wheeling Agreement and a back-to-back Virtual Wheeling Platform Agreement with a virtual wheeling platform vendor, who is appointed by the buyer and certified by Eskom to inter-operate with Eskom's systems. This differs from traditional wheeling, which requires an amendment to the buyer's Electricity Supply Agreement and the generator's Connection and Use of System Agreement to identify the generator and the buyer, and to provide for the tariff offset. Under virtual wheeling, these documents remain in place and are referenced in the Virtual Wheeling Agreements.

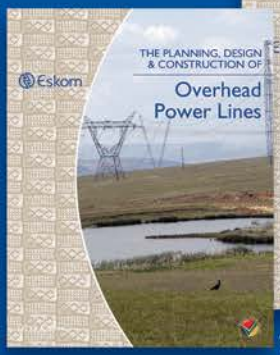
What is required of the buyer?

In addition to the Virtual Wheeling Agreements noted above, buyers will be required to establish meter access for Eskom and the virtual wheeling platform with generators under their existing power purchase agreements. Meters will need to be linked to the virtual wheeling platform via Eskom's meter vendor cloud. The buyer will be expected to run pre-production verification testing and produce a report for Eskom's approval. Once approved, a production account will be activated and the virtual wheeling platform will automatically produce scheduled monthly reconciliation reports, which will determine the refund to be paid to the buyer at the end of each month.

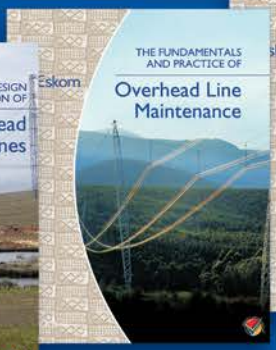
For more information visit: www.webberwentzel.com

Eskom

The Eskom Power Series was conceived in response to the continuing worldwide loss of critical technical skills and experience. The aim of the series is to promote international best practice, including experience acrued by Eskom over the years, as a guide and legacy and to serve as a source of reliable, reputable and highly technical information.

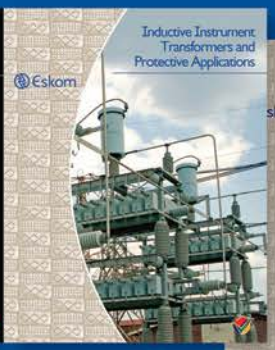


Volume I: The Planning, Design and Construction of Overhead Power Lines



Volume 2: The Fundamentals and Practice of Overhead Line Maintenance

Volume 3: The Practical Guide to Outdoor High Voltage Insulators



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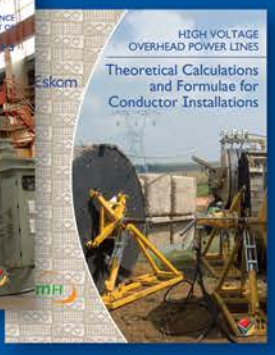
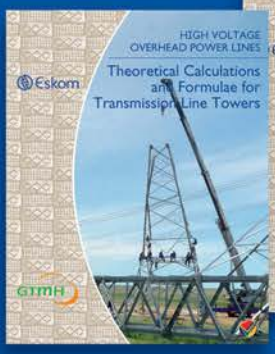


Volume 6 (Part 1): High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Conductor Installations



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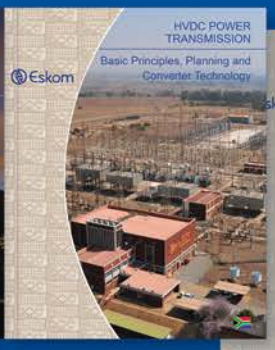

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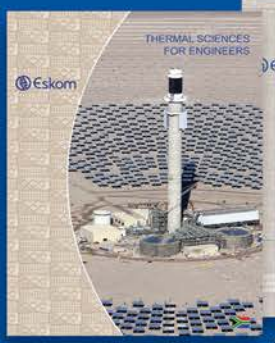
Volume 9 (Part 2): HVDC Power Transmission: Lines Book

Volume 10: Thermodynamics for Students and Practising Engineers



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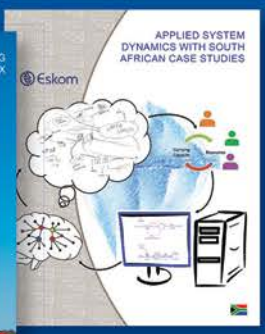
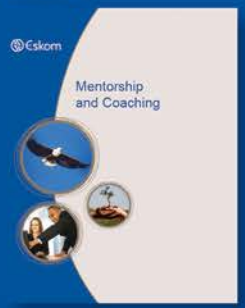
Volume 12: Basic Engineering Toolbox

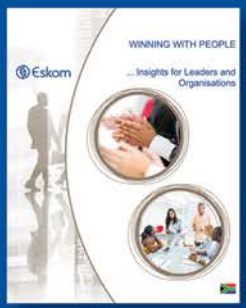


Volume 13: Applied System Dynamics with South African Case Studies

The Eskom Leadership & Management Series was introduced by Eskom at the request of readers and stakeholders of the Power Series who felt that the series should be expanded to include non-technical topics. These topics are often not well understood by technical practitioners and can pose a risk to the sustainability of their businesses. To date, the Power Series team, with assistance from experts in the various fields, has produced two volumes.



Volume 1: Mentorship and Coaching



Volume 2: Winning with People ... Insights for Leaders and Organisations

Volume 1: Procurement Management Key Concepts and Practices

Based on the success of the Eskom Power Series and the Eskom Leadership & Management Series, the Professional Development Series was created. It aims at developing various professions within South Africa so that large state-owned enterprises and the private sector can grow and facilitate job creation in the country. Unlike the Power Series, both the Eskom Leadership & Management Series and the Professional Development Series have a broad readership, including those residing in the private sector, State Owned Companies (SOCs) and academic institutions.

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