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COMTEST has available the new TiS60+ thermal camera with patented Fluke IR-Fusion™ technology which reveals problems that cannot be detected with other tools. *(Read more on page 3.)*

Editor: *Leigh Darroll*
Design & Layout: *Darryl James*
Advertising Manager:
Heidi Jandrell
Circulation: *Karen Smith*
Editorial Technical Director: *Ian Jandrell*
Publisher: *Karen Grant*
Deputy Publisher: *Wilhelm du Plessis*

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Taking stock, moving forward

Sectors of our economy have been decimated by this pandemic and many business owners and entrepreneurs found themselves to be spectators watching as things fell apart – in most cases, it would seem, through no doing of their own.

It is interesting that the partial reopening of the economy (from Level 3 lockdown to Level 2) was based on economic needs, and not on the risk of infection. The risk remains high (and I suspect everyone here understands that) – but the economy was in such a bad place that the decision was to allow more activity. This is, of course, completely pragmatic.

One wonders why it took so long to recognise this. It seems fairly evident that we understand the infection well enough to know how to manage the risks. Not everyone complies, of course, but they could be made to.

Another interesting point that emerges from this pandemic is how the way business is done has changed – no doubt for ever.

As mentioned, there are sectors of the economy that are decimated; but there are others that are thriving. It seems fairly clear that in the less skilled sectors of the economy many, many individuals and firms will take a long time to recover from this dreadful situation; whereas there is evidence, in highly skilled and often digitally transformed areas of industry, of remarkable growth.

The other troubling trend that will surely emerge is that it seems (unless incredibly well managed and resourced to a specific purpose) future economic growth will be driven by the (let's call it) higher-tech sectors of industry where we will need to be internationally competitive. There are many sectors of our economy, such as the financial sector, where these skills already reside, and where we are at the forefront. Inevitably, this will not necessarily provide jobs for those most vulnerable.

Then we need to reflect on the good and the bad that is Eskom. It certainly seems that the future trajectory is being well planned and that much of what went wrong previously is being addressed. But writing this comment, as I do, during load shedding, it starkly reminds me that as we begin to see the economy recover – so Eskom still finds itself unable to meet the country's energy needs.

Once again the energy-hungry sectors of the economy will be hardest hit – affecting jobs for sure (although I do note careful load management practices now being implemented by Eskom). This does of course present opportunities in emerging alternative energy options – with associated engineering, manufacture, equipment supplies and management systems – if we embrace these.

Here's to finally seeing an electric light at the end of the tunnel …

Ian

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

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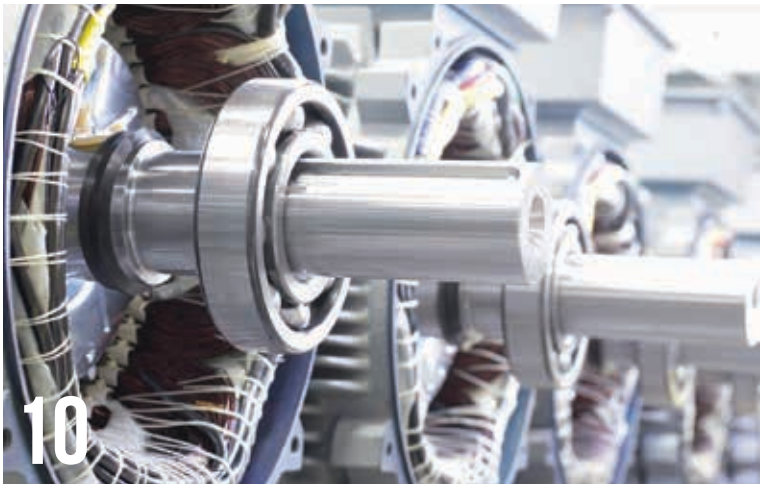


Thermal camera gets the job done right first time

COMTEST, local representative of Fluke, has available the new TiS60+ with patented Fluke IR-Fusion technology that allows users to see things that are otherwise invisible to the eye and reveals problems that cannot be detected with other tools. The unit establishes a baseline for equipment and is simple for the entire team to use to detect temperature differences. Fluke TiS60+ further boosts team performance with an impressive image resolution of 320 x 240. The infrared images taken with the TiS60+ capture smaller temperature differences from further away. So, if users are new to thermal imaging, or if the camera is being used by a team with varying levels of thermal imaging experience, the TiS60+ offers easy-to-use fixed focus.

Some of the key features of the TiS60+ are:

- 320 x 240 resolution for clarity and image details that are crucial for a good result
- 9 cm (3.5 inch) LCD screen allows for easy 'in-field' issue recognition
- Fixed focus means the Fluke TiS60+ is easy to use, just point and shoot
- Temperature up to 400°C can be measured and this covers most application variations
- One-handed image capture, review and 'save' capabilities

The new Fluke TiS60+ Thermal Camera.

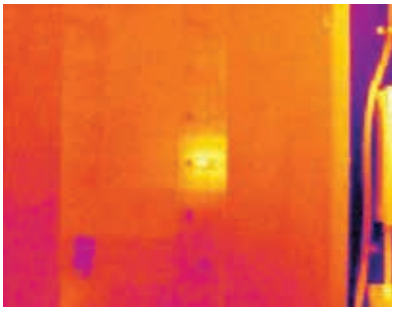
See the problem and the location in one image with IR-Fusion™ technology

IR-Fusion technology, patented by the Fluke Corporation, automatically captures a digital visible light image at the same time as an infrared image. The camera blends the two images together, pixel for pixel, in a single display. Users can then view the image in full infrared, full visible light or at several degrees of blending in between. The location of an infrared target can be precisely identified even if the infrared contrast is low and there is very little structure in the infrared image.

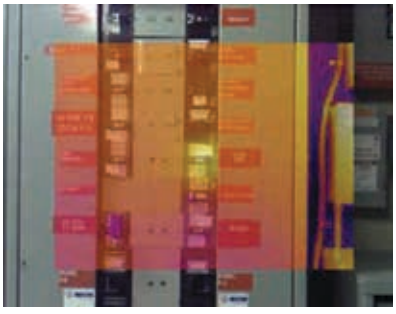
Fluke's TiS60+ thermal camera is compatible with Fluke Connect with its modern visual design and intuitive navigation, making it easier to learn and easier to work faster. Simplified work flows and reporting as well as better report templates, are all part of Fluke Connect's powerful, easy-to-use software.

Comtest offers seminars and demos on the Fluke TiS60+ thermal camera.

For more information contact Comtest.
Tel: +27 (0)10 595 1821, or
email: sales@comtest.co.za



Full infrared image.



50% blending, picture-in-picture mode.

50% blending.

SCADA systems as an enabler for IT/OT connectivity

Christian Nomine, Factory Automation EMEA, Mitsubishi Electric Europe

The role of SCADA is changing, moving from simply a convenient tool for managing a plant or process to a vital part of the digital make-up of a factory or utility site. This is raising today's SCADA platforms to a prominent position in the digital transformation of industry and the new business models it creates.

For many, the primary barrier to digital transformation is the lack of transparent network paths between the operational technology (OT) on the plant floor and the information technology (IT) in the enterprise systems. The commercial success of a business in today's competitive environment depends on both OT and IT staff having quick and easy access to timely relevant data for efficient plant operation and management decisions.

The questions that then arise are: what will form the bridge between these separate levels of the enterprise, how will it deal with the mix of new and legacy technologies on the plant floor, and how will it interface seamlessly with a range of database technologies and management software platforms such as MES (manufacturing execution system) and ERP (enterprise resource planning)? How, too, will it interface with the cloud to enable remote plant monitoring and data analysis?

These are not trivial questions when developing a new bridging technology from scratch. Knowing there are multiple data sources from many different manufacturers with which it needs to interface might seem an insurmountable challenge. However, to address this part of the challenge SCADA systems (supervisory control and data acquisition systems) have long offered the ability to interact with new and legacy software systems and hardware components. They continue to evolve to meet the interfacing needs of the latest systems.

Addressing the other part of the challenge, it is becoming clear that OPC UA (Open Platform Communication – Unified Architecture) is the preferred protocol for connectivity between the separate OT and IT worlds. But a conduit without a gateway to manage the data flow would quickly become overwhelmed, particularly given the trend of the Industrial Internet of Things to have all devices linked and communicating. SCADA can provide the bridge between OT and IT, aggregating plant floor data, filtering it and translating it into the required OPC UA format for transmission to the next level of systems.

With its huge library of connectivity options for new and legacy components, third party automation controllers and associated systems – plus, its data translation capabilities, SCADA is the enabler for seamless communications between the plant floor and the wider enterprise. As a bridge between the plant floor and the higher-level systems, SCADA provides the means to contextualise data, adding meaning to the raw information. At the same time, it is able to transform that data into an easy-to-understand graphical representation, enabling users to reap the benefits of improved visualisation and enhanced productivity.

The same SCADA bridge can also be an enabler for the transmission of data to and from the cloud, again taking advantage of OPC UA as the network protocol of choice. Today's SCADA applications can even be hosted in the cloud, supporting web services plus MQTT and IT connectivity such as SNMP (Simple Network Management Protocol) or ICMP (Internet Control Message Protocol) to monitor IT assets.

A further challenge of digital transformation is that increased connectivity brings increased cyber risk. Again however, the latest trends in security within SCADA can help, enabling system developers to implement a robust defence strategy against cyber attack. This can be achieved as part of the design process, without any compromise on usability. As a result, SCADA becomes the platform for creating advanced, integrated and secure solutions that deliver real value to the business.

These trends and requirements reflect the development work that singles out Mitsubishi Electric's proven MAPS 4 SCADA platform as a viable foundation for digital transformation. Built on a strong service oriented architecture (SOA), it enables users to develop sophisticated visualisation applications more quickly and provides optimised features to support IT/OT connectivity. □

For more information visit: eu3a.mitsubishielectric.com/fa

With optimised features to support IT/OT connectivity, the MAPS 4 SCADA platform enables users to develop sophisticated visualisation applications quickly.

[Images courtesy of Mitsubishi Electric Europe B.V.]

Accessing design data in the cloud

Director Cloud Business Master Data Timm Hauschke.

The newest version of EPLAN Data Portal provides users with component and device data for design engineering over the web. Released in June 2020, the portal is now integrated into the EPLAN ePulse cloud environment. Electrical engineers and fluid design engineers can select the device data they need and transfer it directly into their EPLAN Projects, reducing the effort needed for design engineering and ensuring standardised data for documentation.

Users of the current EPLAN Platform, Version 2.9, can access the new EPLAN Data Portal after registering on the ePulse website and they benefit from immediate online access to high quality product catalogues from a continually growing pool of well-known component manufacturers.

Director Cloud Business Master Data, Timm Hauschke says: "The direct transfer of the offered component data into the EPLAN documentation reduces the effort required for designing for our customers and increases the quality of documentation for machines and plant systems."

All solutions anchored in the EPLAN platform have equal access to the web service.

Working faster

A completely new user interface with intuitive search and smart suggestion functions makes it easier for design engineers to use and navigate through the comprehensive range of stored device data fast and conveniently. The intuitive search function offers prompt and practical support. The suggestion function – for instance, for product groups, components or manufacturers – is similar to common search engines. This saves time for users when they are designing and enables quick results. Another practical benefit: calculation programs such as Rittal Therm, or selectors from Schneider Electric, have already been integrated with the manufacturers' designs, making it easier to select the right product. Users can find what they´re looking for in a more targeted way and can discover useful additions or alternatives easily.

Current data in the cloud

The integration of EPLAN Data Portal into EPLAN ePulse offers a number of immediate advantages. Updates can be imported at any time – whether it be in the application itself or in the portfolio of more than three hundred component manufacturers that already offer data on around one million devices for direct download. Additionally, more than 1.5 million variants of devices can be called up via integrated configurators. Another practical benefit for users is that their software is always up-to-date in the cloud environment.

Standard ensures depth of data

Standardised component data is indispensable for creating efficient processes. When control cabinets are being designed in 3D, wire lengths automatically calculated, or mounting plates processed by machines, standardised device data is required.

As Hauschke explains: "The EPLAN Data Standard supplements proven classification standards for device data, such as eCl@ss Advanced, by making them suitable for practical use. It ensures the consistent use of data throughout engineering and manufacturing processes – moving towards a fully integrated value chain."

With the representation of a device in various system diagrams being based on a uniform data source, users gain considerable time savings that have an effect from the start of project planning through to commissioning. □

The new data portal is integrated directly into the EPLAN ePulse cloud environment. The new user interface makes using the portal easy, fast and convenient.

EPLAN Data Portal is a portal for exchange between component manufacturers and electrical engineers and fluid design engineers, providing master data for downloading. As well as alphanumeric component data, it includes schematic macros, device information, preview images, documentation and additional information.

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

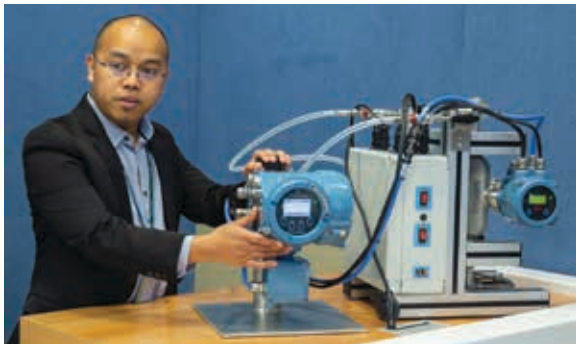
Digital classroom training for EMEA region

Emerson has launched a new Digital Classroom, a virtual training facility that provides virtual instruction combined with hands-on learning to teach users remotely and offer companies greater flexibility in how they upskill their workforce.

The new Digital Classroom connects students throughout the Middle East and Africa region with Emerson experts who train them on use of a wide range of field instrumentation and automation control technologies. As well as enhancing collaboration among peers, the approach allows customers to tailor their training programmes to their budgets, schedules and travel constraints, especially during the coronavirus pandemic.

The Digital Classroom provides an experience comparable to that of a normal face-to-face classroom setting. Using a new, purpose-built audio-visual studio at the Emerson facility in Dubai, certified instructors broadcast lessons over a dedicated high-speed network, either to a customer's site or to the Emerson training facilities which are located in a number of countries in the region: in Iraq, Nigeria, Kuwait, the United Arab Emirates, Qatar, Saudi Arabia, Nigeria and Angola. Depending on the respective current quarantine restrictions, students attending these facilities can follow the multimedia presentations and participate in live, interactive hands-on training sessions with real process equipment.

"As our customers look for greater flexibility in how they train personnel, our Digital Classroom empowers companies to elevate the skills and experience of their workforce on their terms," said Vidya Ramnath, President of Emerson's Automation Solutions business in the Middle East and Africa. "Our goal is to fit training into workers' daily schedules while they are working remotely by enhancing engagement and minimising travel, at the same time improving productivity across users' organisations."



One of Emerson's training team members demonstrating equipment from the digital classroom.

In addition to hands-on demo sessions, the Digital Classroom programme will offer theoretical training in a number of courses and webinars covering field instrumentation, measurement, final control, process control, safety systems, reliability, digital solutions, IIoT strategies and more. With the virtual instructional approach, Emerson is better able to meet diverse learning styles in the workplace and ensure that new and experienced personnel can easily update their skills as technologies and market demands change over time.

Emerson Educational Services courses have been approved by the International Association for Continuing Education and Training (IACET). Students who complete Emerson courses are eligible to receive continuing education units for programmes that qualify under the IACET standards.

For more information contact Devesh Roopnarain at Emerson Automation Solutions.
Email: Devesh.Roopnarain@Emerson.com
Visit: Emerson.com/MEA/Education

Tool-free wiring of M12 power connectors

The M12 power connectors with Push-Lock connection from Phoenix Contact allow conductor connections to be made in ac and dc applications up to 16 A and 690 V easily and, for the first time, without tools. This is because the clamping chambers of the connector for assembly are opened and closed easily using a lever. The user then has both hands free to insert the conductor, and installation is simplified significantly.

The Push-Lock connection on M12 power connectors from Phoenix Contact simplifies installation.

The colour and numerical coding in the connection area ensure intuitive assignment of the individual conductors. The long-term durable, vibration-resistant PE connection to all metal components provides protection against electric shock. The optional 360° shielding ensures reliable operation of the system in environments that are subject to high levels of electromagnetic interference. The metal housings are reliably sealed up to IP65/IP67 degree of protection and can be used in demanding industries or special applications.

For more information contact Phoenix Contact SA.
Tel: +27 (0)11 801 8200
Email: info@phoenixcontact.co.za
Visit: www.phoenixcontact.co.za

Easy cost-effective robot control

To programme robots with ease, igus has developed control software for its Low Cost Automation solutions. igus robot control is available online free of charge and offers the user an easy introduction to automation. Different robot kinematics can be programmed and controlled. A digital twin simulates the movements. In this way, the user can programme a suitable solution before purchase. The robot hardware – for example, a linear robot with switch cabinet – is also available from igus.

Picking up goods from a box, helping to take samples and dispensing cans from a machine – all this can be done by robots. Articulated arm robots, delta robots or linear robots: igus offers all three kinematics in its Low Cost Automation solutions portfolio. To enable users to try out in advance which robot is best suited for their application, igus now offers its robot control software for the simulation and programming of all igus robots.

"As a mechanical engineering company we are familiar with the different kinematics, so the next logical step for us was to develop a correspondingly simple and intuitive robot control system," says Alexander Mühlens, Head of Automation Technology at igus GmbH. The software is available online, free of charge and licence-free. The software incorporates a digital twin for all igus robots, which can be simulated and taught like the real robot. The robot control system is also used subsequently to programme the robot intuitively. Every programming can be applied to the real robot once it is in place. igus offers the complete hardware package, including the robot with integrated control system in the switch cabinet, at cost-effective price levels.

With igus robot control available free of charge, the user can simulate, programme and control the robot they choose.

With igus robot control, the user can move all axes of the digital twin freely via a 3D interface. With a teach-in function the robot can be programmed easily, even without a robot connection. To do this, the user must manually move the robot to the desired position and define how it is to be moved. The process is repeated until the desired motion profile is created. Matching end effectors, such as grippers, can be added easily and the tool centre point adjusts automatically. Virtual boxes can also be installed, to prevent the robot from colliding with a machine, for example.

igus robot control can be connected to a higher-level control system, either via interface communication with digital IO or via Ethernet communication using an IP address. The igus developers plan to expand the control system. "In future we want to offer cloud services such as vision integration, remote commissioning, and online training for a small cost. Further services such as image evaluation via webcam or bin picking solutions are planned as cloud-based solutions," says Mühlens.

For more information contact Ian Hewat, MD, Igus SA.
Tel: +27 (0)11 312 1848, mobile: +27 (0)82 655 8579
Email: ihewat@igus.co.za
Visit: www.igus.co.za

Starter kit for IO-Link

Turck is offering a compact starter kit for users wanting to discover the benefits of the IO-Link digital communication protocol. The IO-Link devices contained in the kit enable users to set up their own system and gain hands-on experience in the technology.

As well as Turck's TBEN-S IO-Link master with four universal PNP channels, the set includes one RGB indicator light and two sensors: the BI10U Uprox inductive sensor and the RU40U ultrasonic sensor. The IO-Link devices supply maintenance data for the condition monitoring of machines and plant as well as user data.

The starter kit also contains a 230 V power supply unit, compatible cables (M12-M12 and M8-Ethernet RJ45) as well as a USB memory stick for easier commissioning. The memory medium contains the PACTware operating software as well as all IO device descriptions (IODD) and an IODD DTM Interpreter.

The Simple IO-Link Device Integration (SIDI) software also enables devices to be integrated in PROFINET systems without the need for any additional software. The SIDI library on Turck's IO-Link masters not only includes all the company's IO-Link devices as well as those of optoelectronics partner Banner Engineering, but also several devices of well-known manufacturers. Other manufacturers can be integrated on request. This means that the IO-Link devices can be selected from the hardware catalogue of a programming environment such as a TIA (total integrated automation) portal as if they were sub-modules of an I/O system. Important features and parameters, such as measuring ranges, output signals or pulse rates can be changed in the plain text field.

The IO-Link starter kit enables users to experience the benefits of the IO-Link digital communication protocol.

For more information contact Brandon Topham at Turck Banner.
Tel: +27 (0)11 453 2468
Email: brandon.topham@turckbanner.co.za
Visit: www.turckbanner.co.za

Compact motor controller for conveyor systems

The new EP7402 EtherCAT Box from Beckhoff has been developed to make the control architecture and cabling of roller conveyor systems significantly more efficient. The integrated, compact motor controller reduces cabling effort and increases diagnostic capabilities for roller conveyor systems.

With a high IP67 protection rating, the motor controller for BLDC (brushless dc) motors is ideal for conveyor tasks in intralogistics and assembly technology as well as in the packaging, food and beverage industries.

The EP7402 EtherCAT Box offers two outputs with integrated motion controller for the direct connection of 24 V dc conveyor roller motors or other BLDC motors (up to 3.5 A). Eight additional digital inputs/outputs enable connection of photoelectric switches, for example, and communication between the different box modules in operation without a PLC.

The EP7402 takes complete control of a roller motor, independently of the conveyor or motor manufacturer. The control of the motors is sensor-less. Maximum rated current, acceleration or deceleration ramps and various other parameters can be configured, allowing optimal adaptation to different applications.

In conveyor operation the EP7402 can also be operated without a PLC and provides functions such as zero pressure accumulation (ZPA), and single or block discharge. Further EtherCAT devices such as digital and analogue I/Os, barcode readers or safety devices can be connected to the additional EtherCAT junction.

The EP7402 EtherCAT Box from Beckhoff boosts efficiency and space saving in roller conveyor systems.

The EtherCAT Box measures only 174 mm x 60 mm x 36.5 mm and can be mounted easily in standard C-channel or L-brackets on the conveyor frame. It does not require any additional protective covering, which also saves on installation space. Power supply and EtherCAT communication take place via a single cable with a B23 ENP hybrid connector (28 A/45°C current carrying capacity).

For more information contact Beckhoff Automation.
Tel: +27 (0)11 795 2898
Email: info@beckhoff.co.za
Visit: www.beckhoff.co.za

A solutions site for resistor-based current sensing

Current sensing is a key requirement for the development of smart motor controls and high-efficiency power supplies. Mouser Electronics, Inc., leading new product introduction distributor in its field, is offering customers a new resource site dedicated to current sensing solutions from Microchip Technology and Vishay Intertechnology. The new site features a range of controllers, resistors and amplifiers from Microchip and Vishay and provides a single resource for designers seeking reliable resistor-based current-sensing solutions.

The Microchip and Vishay Current Sensing Solutions reference site on the Mouser website offers links to a comprehensive selection of products from these companies, including product descriptions and ordering information. The site also provides a link to an informative white paper on using current-sense resistors to measure current for closed-loop power control. The white paper, titled Basics and Trade-offs of Resistor-Based Current Sensing, examines high-side versus low-side sensing, with information on associated amplifier electronics, and provides information on determining the resistor value, selecting the right type of resistor, and physical connection factors.

The new Current Sensing Solutions site presents a selection of eight products designed to provide a reliable current sensing solution for motor control applications. Current sensing resistors often provide the most appealing solution when compared with Hall-effect devices and current sensing coils, and the combination of current sensing resistors and amplifiers meets the demanding requirements of rugged industrial applications.

The Vishay/Dale WSLF power metal strip resistors support voltage division, current sensing, and pulse applications. The resistors feature low thermal electromagnetic fields (EMF) and very low inductance, and offer a resistance range of 0.003 Ω to 0.0003 Ω. Microchip's MCP6C02 high-side current sense amplifiers provide input offset voltage correction for very low offset drift, making them a suitable choice for motor control, industrial computing, and battery monitor applications. The MCP6C02 amplifiers feature a zero-drift architecture, enabling design flexibility while minimising input errors.

For more information visit: www.mouser.com

The new site provides a single resource for designers looking for reliable resistor-based current sensing solutions.

Automation and digitalisation enable flexibility

The current situation creates major challenges for industrial companies worldwide – and highlights the value of digitalised and highly automated production when it comes to gaining a competitive edge. This is the way that companies can react to current and future challenges with the required degree of flexibility.

Successful solutions were presented at the Digital Enterprise Virtual Summit hosted by Siemens on July 16. As part of the conference, representatives from a number of companies from the discrete and process industries discussed strategies and technologies for future success under the new operating conditions which have resulted from the social and economic shifts caused by the coronavirus pandemic. The focus was on topics such as the horizontal and vertical integration of the value chain, with simulation and optimisation from product creation to servicing and from field level to the cloud. Other topics included online and remote solutions, edge and cloud computing, additive manufacturing, industrial 5G and artificial intelligence.

The Digital Enterprise Virtual Summit received around 12 000 registrations from customers and partners and 6 300 people attended on the day of the event. The summit is now also available to be viewed on the Siemens website.

Klaus Helmrich, Member of the Board of Siemens AG and CEO Digital Industries says, “Digital and automation solutions have proved themselves during this crisis. Companies that had already invested in digitalisation were better equipped to handle the new requirements, such as quickly scaling back production, in the automotive industry for example, or ramping up production, as in the pharmaceutical sector. In future, these technologies will ensure that companies can react effectively to crisis situations and changing market requirements because they can adjust their production quickly and flexibly. This flexibility is also another step towards autonomous production processes.”

Siemens is integrating future technologies such as artificial intelligence, edge computing and cloud technologies, additive manufacturing and industrial 5G into its Digital Enterprise portfolio, helping industrial companies to work under the new conditions and to meet the requirements of today and tomorrow. Helmrich says, “No company can meet the current challenges on its own. It’s all the more important that industrial companies act in ecosystems. All stakeholders – developers, users, partners and integrators – can share their own strengths and increase the value of these ecosystems.”

For more information visit: www.siemens.com

Flexibility for food and beverage packaging

Food and beverage manufacturers are under pressure to package a wider variety of products in different types of packaging without compromising productivity. The new iTRAK 5730 small-frame intelligent track system from Rockwell Automation provides a solution, enabling improved throughput in multi-product applications. The expanded linear motion control system uses independent cart technology to support smart, flexible and efficient machines.

Independent cart technology offers a number of benefits over traditional gear, chain and belt conveyors, including increased machine flexibility, better traceability and increased uptime. Using magnetic propulsion, it allows for the individually controlled carts to start and stop quickly and with high precision, which reduces machine wear and is highly energy-efficient. The technology also manages changeovers quickly, using preconfigured move profiles that can be implemented with the push of a button from an HMI.

The iTRAK 5730 system has the smallest footprint in the Rockwell Automation independent cart portfolio. It has a 50 mm minimum pitch that makes it ideal for primary packaging applications, such as flow wrapping, end load cartoning, and form-fill-and-seal pouching. The system can also be integrated easily into a manufacturer’s architecture and provides analytics that help optimise energy use, monitor parts wear and reduce downtime.

Michaela Kaufmann, iTRAK Product Manager at Rockwell Automation says, “The iTRAK 5730 system extends the flexibility and productivity benefits of iTRAK to meet the growing demand for customised food and beverage products. The technology is scalable: the system can have a 50 millimetre pitch in a small, standalone machine, or be as large as 100 metres and part of a large, complex line.”

As well as delivering a smarter form of motion control, the iTRAK 5730 offers integrated safety. Features such as safe torque off, Safe Stop 1, a SIL 3, PLe safety rating and the ability to create safety zones support machine safety.

In addition, simulation capabilities allow users to calculate throughput on the iTRAK 5730 system. Users can also create a digital twin that can be used to design, commission and demonstrate the system virtually, and similarly, to train workers virtually.

For more information contact Michelle Junius at Rockwell Automation.
Email: mjunius@ra.rockwell.com
Visit: www.rockwellautomation.com

Optimising cost of ownership on motors and drives

By assessing the cost of ownership as a whole, it is possible to eliminate process interruptions, save money, and gain peace of mind. Leading global engineering company in the fields of electrification, robotics, automation and motion, ABB, advocates an inclusive perspective to optimise performance and costs in production plant.

For plant engineers, one of the most important challenges they face is to ensure that production – whether that be an entire process line or an individual pump or fan – is running at its most efficient performance levels. Clues that things may not be running smoothly might be noted in an excessively high energy bill, or the fact that the maintenance team is constantly being called to check various aspects of the system.

The further concern is always to prevent a breakdown and eliminate the risk of unplanned stoppages.

ABB puts forward the view that each of the above scenarios revolves around two very different cost considerations: the cost of running and the cost of NOT running, let's say, the pump system. These two aspects, together with the purchase price of the equipment, make up the 'cost of ownership' of the pump system.

The cost of running the pump system comprises associated energy costs and the costs of operating and maintaining the pump and motor, including clearing blocked or clogged pumps and replacing worn or broken parts such as seals, bearings or eroded impellors. Maintenance costs can also include major overhauls undertaken to extend the useful life of the system.

By taking account of the cost of running – and the cost of not running – plant and equipment, plant engineers can optimise performance efficiencies and total cost of ownership.

The cost of not running the pump system – and of a consequent forced outage – presents a direct cost to a process and the company. It can mean tens or hundreds of thousands of rand, or more, for every hour in lost production. Such forced outages can also have a negative impact on the company's reputation.

These two costs can be so substantial that they dwarf the initial purchase cost.

In order to control such costs, a good step is to invest in premium, leading-edge technology and the inherent reliability this brings. By using a reputable manufacturer like ABB, plant owners can be assured that the technology has been thoroughly tested, not only in the laboratory but also in plants and processes around the world. Selecting components with known reliability from a trusted supplier offers a good level of insurance against the cost of not running equipment or plant becoming unmanageable.

Improving operational costs

To improve the cost of running equipment and plant, ABB advises plant owners and engineers to look at improving energy efficiency, optimising operating performance and reducing maintenance demands. For instance, a pump system may not be operating anywhere near its best efficiency level. This can cause cavitation and vibration issues, resulting in impellor erosion and excessive wear to the bearings and seals.

Often, pumps are fixed-speed, with the flow being controlled by a mechanical valve. As such, pump-flow rates are inefficient and the pump is subjected to unnecessary stresses.

A more efficient approach is to control the pump's speed using a variable speed drive (VSD). As well as eliminating damage, which then lowers the cost of not running by boosting reliability, adjusting the pump's rotational speed can result in significant energy savings, thereby lowering the cost

High-efficiency motors can contribute to energy and cost savings and improved productivity.

of running. Although the initial outlay may be higher, a VSD pays for itself many times over, and in a short time, through energy savings and productivity improvements.

Its soft start, smooth process control and safety features, among other factors, play a significant role in improving the overall reliability of the entire process – and contribute to a lower cost of running.

It also pays to replace old motors with modern high-efficiency ones. This further contributes to energy saving and has the additional advantage that their durable design leads to less downtime, which lowers the cost of not running. And they pay for themselves surprisingly quickly. For example, upgrading to ABB's IE5 ultra-premium SynRM motors which offer up to 50% lower energy losses compared to IE2 motors, would deliver valuable energy cost savings. VSDs, combined with ABB's high-efficiency motors, can drive efficiency across applications while ensuring the highest reliability and safety standards.

Improving maintenance efficiencies

Once the latest technology is in place, it is important that the overall system is looked after. This is the role of a predictive maintenance or condition monitoring programme.

Being able to predict when critical motors will fail by knowing their condition allows the plant engineer to plan effective maintenance and get it done during scheduled plant outages. Condition monitoring, which informs predictive maintenance, helps to identify the problems and shortens the time taken to fix them, again bringing down the cost of not running.

Smart sensors convert traditional motors, pumps and bearings into connected devices that monitor the condition of equipment and inform maintenance needs.

At a glance

- The cost of running and the cost of NOT running plant or equipment both form part of the total cost of ownership.
- Selecting the right equipment, energy efficiency, predictive maintenance and long service life are all factors that contribute to optimising plant performance and operational costs.

To improve the cost of running equipment, ABB advises plant engineers to look at improving energy efficiency, optimising operating performance and reducing maintenance demands.

A key element in advanced analytics and maintenance planning is the ABB Ability™ Smart Sensor, which converts traditional motors, pumps and mounted bearings into smart, wirelessly connected devices. It measures key parameters from the surface of the equipment, which can be used to gain meaningful information on the condition and performance of the equipment, enabling users to identify inefficiencies within the system and to reduce risks related to operation and maintenance. Maintenance can be planned according to actual needs rather than based on generic schedules. This extends the lifetime of equipment, cuts maintenance costs and reduces or prevents unplanned downtime due to breakdowns.

Advanced services – such as integration of the ABB Ability™ Cloud Interface for drives, ABB Ability™ Condition Monitoring for motors and ABB Ability™ Condition Monitoring for powertrains – allow customers to access the data acquired and integrate it in their own monitoring systems.

Further benefits lie in sourcing motors and drives from one supplier. It reduces purchasing administration, fewer parts need to be stocked, and maintenance personnel need only to familiarise themselves with a range from one vendor, all of which contribute to reducing cost of ownership.

These various tools and services together offer a lowest cost of ownership. Plant engineers have an efficient and reliable system, operating at optimum efficiency, resulting in higher productivity. □

For more information visit: https://new.abb.com/africa

Comprehensive MV switchgear replacement at Tutuka

Eskom has awarded ACTOM a R1.18 billion contract to undertake the comprehensive replacement of medium voltage switchgear at Tutuka power station near Standerton in Mpumalanga. ACTOM here outlines the scope of the contract and the specific contract packages to be handled by different divisions within the company. ACTOM Contracting's Contracts Manager, Kevin Saunders and the team responded to some further questions from* Electricity + Control *about this major undertaking.

The six-year contract, one of the largest value contracts ever won by the group, was signed by Eskom in December 2019, after a prolonged tendering and negotiation process dating back to mid-2016. It involves replacing and upgrading the medium voltage (MV) switchgear and all associated equipment and systems in the power station's six generator units and its common plant.

The six-year programme is intended to align with Eskom's planned maintenance schedule for Tutuka. It entails tackling one generating unit at a time, in order to minimise disruption to generating capacity.

Tutuka, one of many Eskom coal-fired power plants that have been in operation for more than 30 years, has been selected by the utility for comprehensive refurbishment to extend the life of the station. Five ACTOM divisions are involved in the project, with ACTOM MV Switchgear as main contractor and ACTOM Contracting taking overall responsibility for the project management and coordination of the contract as a whole.

The contract comprises six contract packages which are allocated to ACTOM MV Switchgear, ACTOM Protection & Control, Static Power and ACTOM HVAC Systems.

Eskom's Tutuka power station in Mpumalanga.

- The first contract package – designated Package 3A – covers MV switchgear, which ACTOM MV Switchgear together with its longstanding international technology partner, France-based Schneider Electric, will manufacture, supply, assemble and install. It entails the replacement of a total of 615 panels comprising 395 of Schneider Electric's well-proven PIX air-insulated switchgear (AIS) and 220 units of its GHA branded gas-insulated switchgear (GIS), which is also widely in use and well-proven worldwide. Both the PIX and GHA switchgear will be supplied with rated voltages of 17.5 kV (for use at 11 kV) and 12 kV (for use at 3.3 kV). The equipment to be supplied will also be used for provision of power for the refurbished and upgraded dust-collection and gas-cleaning filtration plant that is planned to replace the existing facility at Tutuka.
- ACTOM Protection & Control (P&C) is responsible for three contract packages – Packages 3B, 3C and 3E – covering the protection, automation and control & instrumentation (C&I) systems respectively. Here again Schneider Electric is the main international technology partner, as it is responsible for the manufacture and supply of the protection and automation equipment due to replace the power station's existing systems. This will comprise Schneider's well-known MiCOM protection IEDs and its similarly widely used C264 and PACiS automation system.

  The replacement equipment for internal arc protection within the MV switchgear, however, will be manufactured by P&C's other international protection systems technology partner, Arcteq of Finland, which is contracted to supply its internal arc protection units.

  The C&I package for which P&C is responsible also involves a partnership arrangement with international companies ABB and Yokogawa, which will produce and supply the required control and instrumentation engineering equipment respectively for Tutuka's units 4, 5 and 6 and the common plant. The manufacture, supply

At the installation of Schneider Electric's GHA gas-insulated switchgear at eThekwini's Umlazi substation in 2018 are Guillermo Camino, Schneider Electric's Senior Manager, Sales Support for Africa, and Itumeleng Nkasi, Site Services Technician for ACTOM MV Switchgear. Camino is involved in the current Tutuka refurbishment contract to oversee the supply of GHA switchgear from the Schneider Electric factory in Regensburg, Germany.

At a glance

- This six-year project will see the replacement of all MV switchgear and associated equipment and systems in the power station's six generator units and common plant.
- It comprises six contract packages which bring together local and international players.
- ACTOM Contracting is responsible for the overall project management and coordination of the contract as a whole.

and installation of the C&I equipment for units 1, 2 and 3 are not included in the ACTOM contract.

- Static Power is responsible for Package 3D of the contract, involving the supply and installation of all standby battery chargers for the above systems. The chargers and battery cabinets are 100% locally designed, engineered and manufactured, with ALCAD Vantex Ultra Low maintenance valve regulated nickel cadmium battery banks providing four-hour backup time. Static Power's scope also includes the supply of uninterrupted power supply (UPS) systems, one of which is a locally manufactured modular UPS and another an imported Statron UPS, for automation installations.
- ACTOM HVAC Systems' contribution – Package 3F of the contract – accounts for 25% of the contract value and consists of an extensive upgrade of the existing HVAC plant throughout the power station and the provision of nine new HVAC systems for existing outside plant substations, constituting a total installed capacity of just over 9 MW of mechanical cooling. Major equipment to be supplied includes 14 new water-cooled chillers for run and standby conditions totalling 4 203 kW cooling capacity and three closed-circuit central cooling towers with a total heat rejection of 5 550 kW. New steel pipework, 2.5 km in total, will be installed for the chilled water and condenser water systems in the power station. ACTOM HVAC Systems will design, supply, install and commission 22 low-voltage MCC switchboards to operate and control the HVAC plant equipment. A central building management system will be used to manage and control the new HVAC system. New controls consisting of sensors, PLCs and field equipment will ensure an efficient system of control.

Kevin Saunders, ACTOM Contracting's Contracts Manager is the Principal Project Manager for the total Tutuka refurbishment contract and the respective contract managers responsible for each of the six contract packages will report to him. Saunders said: "We devised the overall management structure to handle the contract on and off site. It covers, among other things, the overall coordination of the business units involved and establishes a single point of contact with Eskom. It is also aimed at ensuring there is no duplication of facilities within the group.

"All the design responsibilities rest with the individual business units, including each being responsible for the interface between them and the other units," he added.

ACTOM Contracting's contractual and project management responsibilities include contractual due diligence, scheduling and time management and the commercial and financial aspects of the contract. In addition, it is responsible for human resources and industrial relations functions for the entire contract, as well as attending to all quality, safety, health and environmental requirements. "We also have to conduct the scheduling and timing to align with the outages, which involves fitting in with Eskom's requirement of when outages take place," Saunders said.

Commenting further he noted: "It is a complex task on critical equipment and it is essential that we get each unit done in the window that is available. With six disciplines being brought together, coordination needs to be particularly well orchestrated."

Saunders said in closing, "Some surveying work has started on site and we have started establishing a laydown area and offices on site. The first unit is planned for May 2021." □

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

Reliable technology and trusted support

Leading provider of industrial automation solutions, Nidec Control Techniques, delivers the reliable technology and trusted support services that businesses look for in today's competitive environment. The company attributes its growing customer base across South Africa this year to three key qualities: "It comes down to flexibility, support, and uncompromised quality," says Regional Manager Bruce Grobler.

Nidec Control Techniques provides engineered drive solutions designed to meet the technical requirements for each application. "These solutions are tailored by our engineering team, who will assist the customer with the design and seeing it through to implementation," says Grobler.

The company can also provide a pre-assembled, ready-to-install freestanding drive in a fast turnaround time. Nidec Control Techniques' DFS (Drive Free Standing) is supplied ready to use with no additional engineering required and is designed to integrate with existing cubicle setups. It provides for energy-efficient motor control and is suitable for use in high ingress-prone environments. With fast, easy installation, the DFS ensures maximum plant availability.

Nidec Control Techniques' team of application engineers is at the ready to provide support to customers when they need it, and the company prides itself on delivering cost-effective high-quality solutions, fast.

Grobler highlights three projects the company is currently working on in different environments. One

The company holds substantial stock and its team of application engineers is geared to meet customers' needs flexibly and efficiently.

is a desalination plant in Oman. While the water pumping application is fairly standard, the engineering required a specific turnkey solution which couldn't be solved by an off-the-shelf product. The Nidec Control Techniques team custom-built the solution – amid language barriers and the global Covid-19 pandemic. "Key to this project is that our solution is very simple but delivers a high-level task," Grobler explains.

In South Africa, the team has been working with Inpro in Durban on a complete automated conveyer loading and box storage system for a fertiliser operation. "We equipped the warehouse with a maze of conveyors which work in synchronicity, in conjunction with a SCADA system and data transmission over industrial WiFi."

Closer to headquarters in Johannesburg, Nidec Control Techniques has been working with a refuse bag and bin liner manufacturer since 2015, providing 130 machines to

Building business across Africa

"The key to sustainable growth in Africa is partnering with locally owned companies that have proven track records, are technically sound, have a strong market knowledge and a business culture aligned with our own," says Taylor Milan, Africa Business Development Executive at Zest WEG.

The company, a fully owned subsidiary of WEG,

Zest WEG on site at a copper mine in Kitwe, Zambia.

currently has 28 appointed partners in 22 sub-Saharan African countries outside of South Africa, and is expanding its footprint into new sectors across the region. With extensive manufacturing and assembly facilities in South Africa, Zest WEG is driving its African growth strategy through local partnerships with carefully selected value-added resellers (VARs).

"The local content mandate is playing an increasingly important role in the supply of equipment and services into the formal business sector across the African continent," says Milan. "It brings services closer to the customer, empowers local business and builds local economies."

He highlights that the company selects its VARs also for their technical and operational capability and capacity to offer customers more of Zest WEG's portfolio of products and services.

"While initially we focused primarily on electric motors, we are now promoting a comprehensive portfolio of Zest WEG electrical products and solutions," he says. "These include geared motors, low and medium voltage drives and automation solutions, panels, MCCs, E-houses, power and distribution transformers, mini-substations, a selection of traditional and renewable and hybrid power generation solutions as well as electrical infrastructure and mobile solutions."

Milan notes that the business is also diversifying beyond

the operation since it was established. "The customer has standardised operations with our range of drives, which help it manufacture 120 refuse bags per minute. We have provided all single-servo axis and dual servo-axis solutions, the panels and ac motors, all neatly controlled via the drives' onboard apps modules. Added to this, our technical support and high availability has been key to maintaining prime levels of customer satisfaction, keeping them coming back."

Aside from equipping industrial operations and manufacturing plants with competitive automation solutions, Nidec Control Techniques has its own manufacturing operation, ongoing since the 1990s, locally producing the GPS2 soft starter. Built from scratch in South Africa, the soft starter is still used today, mainly for heater controls and pump applications, and is produced at 30 A up to 800 A. "This demonstrates the longevity and quality of our products," says Grobler.

"As our customers continue to strive for success in this uncertain period, we are dedicated to seeing them through and ensuring they get the best return on investment. Our dedicated team, quality products and efficient delivery time mean we can give South African industries the best chance at reliable operations and minimised downtime," he concludes.

For more information contact Nidec Control Techniques.
Tel: +27 (0)11 462 1740
Email: bruce.grobler@mail.nidec.com
Visit: www.nidecautomation.com

mining into sectors such as oil and gas. On a global level, WEG has been active in this industry for many years and has built a strong industry-specific product portfolio and knowledge base. Other sectors where gains are being made in sub-Saharan Africa are agriculture, general industry, water, cement and utilities.

The company's on-the-ground presence has been strengthened recently with the appointment of established local company Panaco as its VAR in the Katanga region of the Democratic Republic of Congo, Magare Company Limited in Tanzania, and Repelectric in Kenya. A number of other appointments are currently being finalised across sub-Saharan Africa.

"Zest WEG's Africa network is also increasing the number of local repair facilities that meet OEM standards," Milan says.

"It is a great benefit for customers to have localised WEG-accredited repair facilities in-country," he says. "This increases local support and ensure equipment repairs are carried out in accordance with WEG specifications to deliver the performance and longevity that customers and OEMs expect from WEG products."

For more information contact Zest WEG Group.
Visit: www.zestweg.com

Providing critical supplies to sugar mills

From the growing of sugar cane to sugar refineries, leading supplier Bearings International (BI) plays a key role in this important economic sector. With 60 years' experience servicing the industry, it has extensive expertise that underscores its contribution as a critical supplier.

A fan application in a local sugar mill.

"The sugar industry remains a major focus for our portfolio," says Nick Allanson, Branch Manager for Sugar Chain in Durban. As a distributor of quality brands in the industrial power transmission sector, BI can incorporate these products into the drive solutions it supplies to the sugar industry.

Typical solutions provided relate to the conveyor equipment used to move the cane through all the stages of processing required to extract the sucrose, to the movement of the waste by-product which is used as a fuel source for the boilers.

Reliable conveyor systems are critical for sugar mills to maintain productivity, as any stoppages have a knock-on effect on the entire process. "Mill operations are dynamic in nature, with so many stages being interdependent. Hence the production time that can be lost is substantial. It also takes considerable time to get a mill up and running again and its throughput balanced," Allanson comments.

BI focuses on stocking loose components, which is important to its role in servicing the sugar industry. "Without loose components, we do not have the flexibility to respond timeously to the demands of a particular sugar mill – and mills have differing chain requirements," Allanson explains.

Loose components are key for the refurbishment of used chains, a particular focus for BI for many years. As profitability in the sugar industry has come under increasing pressure over the past five years, extending the life of chains is essential to assist in reducing the operational costs of the mills. Without a large stock of loose components, BI would not be able to contribute to reducing the total cost of ownership of the chains as it does.

Allanson elaborates that every year in the off-crop season, which is when the sugar mills have stopped crushing, particular chains are sent to the Durban facility for stripping, inspection, refurbishment and re-assembly. BI can also conduct on-site inspections of chain conveyor equipment to assist sugar mills in assessing whether or not a particular chain can be used for the next season without placing any undue risk on production output.

For more information contact Bearings International.
Tel: +27 (0)11 899 0000, email: info@bearings.co.za
Visit: www.bearings.co.za

Sensors ensure a smooth brewing process

Skanderborg Bryghus in the Danish town of Skanderborg produces a variety of individual beers and unlike large commercial breweries, this brewery is largely promoted and operated by beer lovers on a voluntary basis. The demand for its products proved so substantial that three years after its foundation the brewery had to be expanded significantly. At the time, sensors from ifm were selected and installed to monitor the numerous tanks.

Allan Pedersen, Technical Manager of Skanderborg Bryghus, present from day one, explains. "In 2015 our company started with a brewing capacity of 125 000 litres of beer per year. In 2018 and 2019 we expanded the brewery significantly so it now has a capacity of four million litres per year."

The expansion of the plant was carried out by the company GEA. Kåre Hjortkjær, GEA Denmark, was responsible for the electrical work. "GEA is an international engineering company. We make process systems for different industries. For this project we developed a completely new brewery," he says.

"It was our responsibility to decide on all sensors to be used in the process. The customer did not require specific product brands, although the price was, of course, part of the decision. All the factors we considered pointed to ifm.

"We selected the sensors needed for process monitoring because of their flexibility and focus on the hygienic design. One requirement, for example, was to detect the level in a tank and to differentiate between beer and CIP liquid. We decided on sensors from ifm because we know the company from many years of good and close cooperation.

Pressure sensors for hydrostatic level detection (left) and temperature transmitters (right) are used to ensure a reliable brewing process.

Skanderborg Brewery is characterised by its many different beers.

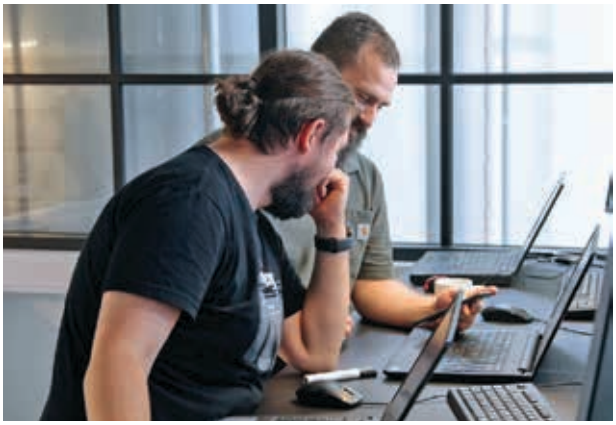
"We measure pressure and temperature at several points in each tank and also monitor level. To do this, we installed several ifm sensors at each tank. The controller visualises how much beer is in the tank and what temperature it has. The many sensors make it possible to run the brewing process automatically so production can be controlled with a minimum of employees."

Allan Pedersen adds: "GEA installed more than 300 ifm sensors. We can remotely set, calibrate and monitor them via IO-Link. We are happy that we can use the complete solution of one supplier instead of having to buy components from different manufacturers."

Most ifm sensors are installed at the numerous tanks. Three types of sensors are used especially frequently.

Pressure sensors ensure a smooth process

An ifm pressure sensor, type PI2795, is mounted at the bottom of the tank. The level is determined via the hydrostatic pressure the beer in the tank exerts on the sensor's measuring cell. The measuring range of the sensor is -1 to 4 bar. It is resolved in steps of 0.005 bar. The measured value is transmitted to the plant controller via an analogue signal or IO-Link. Since the tank geometry is known, the controller calculates the exact contents in litres from the measured pressure.



With IO-Link, measured values can be reliably monitored at the control desk. Parameter setting and diagnostics of each sensor are also centralised.

The measuring cell is mounted flush in the process connection, especially for use in food applications. This prevents build-up at the measuring point and allows residue-free cleaning, during CIP cleaning, for example. An important feature for the brewery is that the sensor is designed for medium temperatures up to 80°C. The sensor housing is made of stainless steel and has a protection rating IP68/69K. It is therefore resistant to high-pressure cleaning with aggressive cleaning agents.

Intelligent level sensors

The LMT102 is an electronic point level sensor for hygienic applications. When installed at the lower end of the tank, it signals empty state, when installed in the upper part it is used for overflow prevention. A second function of the sensor is that it can differentiate between different media. For the brewery this means the sensor detects if beer or CIP liquid is in the tank. In addition to point level detection, this information adds to the process reliability because a mixture of product and cleaning agents can reliably be excluded.

Especially in the food industry build-up and foam often make reliable level detection difficult. As opposed to the vibration forks often used, the LMT electronic point level sensor from ifm ignores build-up. In the brewing process this ensures that foam does not affect level detection.

The smooth surface of the PEEK tip does not allow dirt or medium residue to adhere. High quality materials such as stainless steel and PEEK meet all requirements for demanding hygienic areas. Flush sealing is ensured by pressing the measuring probe onto the metal sealing edge of the adapter. This avoids dead space and contamination. Approvals such as EHEDG and 3-A certify conformity for the food industry.

Precise temperature sensors

The temperature of the beer is monitored precisely in the upper, middle and lower part of the tank using ifm temperature transmitters of the series TA22 which have a high accuracy over the whole temperature range. They react quickly to temperature changes. The sensors also feature a hygienic design to meet the requirements in the food and beverage industry.

At a glance

- Skanderborg Bryghus has a brewing capacity of 4 million litres a year.
- The engineers that designed the plant selected ifm sensors to monitor the process.
- More than 300 pressure, temperature and level sensors can be set, calibrated and monitored remotely via I-O Link.

Level sensor LMT prevents overflow at the top of the tank.

IO-Link for intelligent control

All sensors used in the brewery feature IO-Link. The main advantage of this is that, as an alternative to the analogue signal, they also transmit the measured values as digital values. This avoids, for example, inaccuracies which may occur when AD converters are used. In addition, IO-Link allows extensive and easy parameter setting. Thus, for example, the LMT level sensor can be adjusted to different media via IO-Link. For the pressure sensors it is possible to adjust switch points via the controller. This offers maximum flexibility for instance when formulas are changed.

Furthermore, IO-Link transfers the diagnostic data of the sensors to the controller. The LMT level sensor, for example, signals heavy build-up that prevents a reliable detection or differentiation of media.

A strong partner

Apart from providing high-performance products, ifm distinguishes itself by its close contact with customers. Kåre Hjortkjær from GEA emphasises: “Since the planning phase to the present day ifm has proven a valuable partner. We know the process and ifm knows its devices, so we can work well together.”

Allan Pedersen from Skanderborg Bryghus sums up the ongoing cooperation: “I have been working with ifm since 1999 and I am very satisfied. We get support on site at all times and inspiration to implement our applications easily and reliably.”

ifm offers a wide range of powerful sensors to monitor the processes in the brewery reliably and at low cost. IO-Link sensors enable maximum automation and safety as well as optimum product quality. □

For more information visit: www.ifm.com/za

Wireless level measurement in transportable tanks

Florian Kraftschik, Endress+Hauser

Digitalisation in production systems provides more and better data for analysis as well as enabling access to data that before now they have been unable to capture. In combination with Endress+Hauser's Netilion IIoT ecosystem, the FWR30 level sensor makes it possible to measure the fill levels in transportable containers, a task previously not possible. The 80 GHz radar level sensor, which can be mounted on intermediate bulk containers in just minutes, sends the measurement values to the cloud at regular intervals using wireless technology.

The FWR30 is housed in an inconspicuous gray enclosure that is mounted on the intermediate bulk container (IBC) with the help of an installation kit. IBCs are stackable containers used in many countries for the storage and transportation of liquids. They have numerous applications in the chemical and food industries and are widely used in the water and wastewater sector. The common factor is that the containers are often used at decentralised locations and frequently transported, when they have to be refilled, for instance. Typical media found in IBCs includes cleaning agents, additives, concrete liquefiers or precipitators for phosphate in wastewater treatment plants. Some of these liquids are perishable and are therefore held only in smaller reserves.

Until now, IBC operators could only approximate the levels in the containers for these applications as they couldn't be measured automatically. The same applies for the suppliers and distributors responsible for ensuring the availability of the stored media in the IBCs at the production sites. In cases where the fill levels did need to be determined, employees had to drive to all the IBCs and manually carry out the measurements, a time-consuming activity that, furthermore, could not supply data to the minute, hour or even day.

For operators, transparency regarding the fill levels or inventories is important. IBCs are typically used at sites where there is little opportunity to carry out measurements, either due to a lack of cable connectivity to the process control system or because running dedicated cables for the level measurements is too costly.

In combination with the Netilion IIoT ecosystem, the Micropilot FWR30 makes it possible to access the fill levels and know where the container is located, at any time and from anywhere. This wireless instrument runs on a battery with a battery life of up to 15 years.

The FWR30 level measuring device is installed on an IBC using a mounting kit and works wirelessly, no cabling is needed.

Quick set-up of digital measurement points

The instrument design and wireless connectivity to the cloud via the mobile phone network make set-up and digitalisation of the measurement point fast and easy, even when compared to the commissioning of a conventional level measurement point connected to the process control system. After three minutes of installation and set-up work, the data is visually available, accessible via the cloud and ready to be used by various applications. The instrument requires no cabling and operates entirely via wireless communications. If necessary, it can also be removed from the IBC, to swap out the battery, for example. An intelligent monitoring system for liquids can thus be established with little effort.

Level measurement via radar technology

The non-contact measurement is based on 80 GHz radar technology. The instrument's microwave beam penetrates

the plastic tanks and supplies reliable measurement values. Even if foam build-up occurs in the tank, the measurements are not influenced. The instrument provides the position of the tank via the mobile phone network, providing reliable location information even when multiple IBCs are stacked on top of each other. The Micropilot FWR also features a sensor for measuring the outside temperature, and the battery status is sent to the cloud as well.

At a glance

- 80 GHz radar level sensors, used with IIoT technology, make it possible to measure fill levels in mobile containers at remote sites.
- Cloud connectivity via a mobile phone network allows for the measurement data to be retrieved by the end user at any time.

Cloud connectivity via mobile phone network

The Micropilot FWR30 sends the measurement data via the mobile phone network. Together with other information captured by the instrument, this is transferred to the cloud where it can be retrieved via mobile end-user devices or desktop PCs from anywhere, at any time. The cloud connection does not require additional equipment or separate cabling. The solution relies on a 'cloud only' approach without any connectivity to the process control system.

Software for various application scenarios

A key part of the level measurement solution for mobile tanks is the Netilion IIoT ecosystem, which accesses the data stored in the cloud, processes it so it can be used for various application scenarios and uses it as a basis for further calculations. The Netilion applications are offered as part of a 'freemium' model, allowing users to connect up to five measurement points at no charge. Costs are incurred for additional measurement points.

Users enjoy the flexibility to choose from three service modules: Netilion Value, Netilion Inventory and SupplyCare Hosting. They can also successively adapt the services to their own needs.

Measurement values and instrument parameters

The simplest application is the digitalisation of the level measurement point to maintain an overview of the measurement values in various IBCs. These applications, covered by the Netilion Value module, involve simply bringing the measurement points into operation, after which the fill levels can be visualised clearly. The functions range from information regarding the current measurement values to historical data that allows users to track the development of the fill levels over time. Information related to the position of the tanks, instrument and battery status, as well as the ambient temperature, can also be retrieved. Fill level alarms can be set up so users are notified if the minimum or maximum levels, which users configure, have been reached. Additional measurement points can be added easily. The data is available immediately after commissioning.

Simple clear inventory management

Netilion Inventory offers expanded functionality. Beyond the simple display of measurement values, it enables simple and clear inventory management, which is realised with a function for calculating the volume of the IBCs. Netilion Inventory can also generate forecasts for calculating free storage capacity. The application thus offers more information about the status of tanks, silos and containers.

Comprehensive inventory management

Users looking to monitor more complex logistics chains and forward the measurement data to third parties, such as suppliers, customers or partners, can choose the SupplyCare Hosting module. It offers a range of functions beyond those available with the other service options, including role-based user management and the ability to configure third-party access rights. As well as displaying the event history, SupplyCare Hosting provides an overview and analysis of the key parameters such as average inventory, efficiency or the inventory turnover of the transported liquids. To increase the efficiency of the logistics processes, SupplyCare Hosting enables user-friendly requirements planning. Another feature of this solution is that the data can be synchronised with all common ERP systems.

Replacing assumptions with measured values

The wireless solution from Endress+Hauser for the digitalisation of level measurements using the 80 GHz radar-based FWR30 in conjunction with the Netilion IIoT ecosystem is simple. The modular offering provides scalable solutions for various application scenarios, especially for portable IBCs. This allows the secure transfer of information regarding the fill levels, position of the tanks, outside temperature and instrument and battery status to the cloud, where it can be retrieved at any time and from anywhere. The solution is well suited for the cost-effective digitalisation of level measurement points and supplies reliable data where once only assumptions were possible. □

For more information visit: www.endress.com

With Netilion Value, levels can be displayed quickly and clearly from several measuring points.

Historical data is also displayed.

Position data lets users know where the IBC is located.

New level sensors in radar instruments

A few years ago, when VEGA introduced the VEGAPULS sensors based on 80 GHz technology, it began a new era in radar level measurement. With the more precise focusing of the radar beam, the sensor virtually eliminates any unwanted or interfering reflections – making level measurement much easier and more reliable. Many difficult measuring tasks for ultrasonic sensors are becoming standard practice with radar technology.

VEGA has now added a new compact 80 GHz instrument series to its portfolio of radar sensors. It is especially suitable for price-sensitive applications, such as those found in the water/wastewater industry and in auxiliary process loops in process automation. VEGA designed a new radar microchip especially for this purpose – it is characterised by its very small size, fast start-up time and low energy consumption. This makes for a particularly compact and versatile radar sensor.

Robust and weatherproof

The new VEGAPULS instruments are suitable for use with both liquids and bulk solids. They are available in a compact version with cable connection housing, and a standard version with a fixed IP68 cable connection. The radar sensors maintain steady, accurate measurements without effect or loss of echo from external influences such as solar gain, air temperature fluctuations or weather conditions causing vapours, or condensation. Users can choose from 4 ... 20 mA, HART, SDI-12 or Modbus as the direct output signal. ATEX versions are also available.

The VEGAPULS series of instruments can be complemented by the optional VEGAMET controllers. The controllers feature a large graphic display which can be used to visualise all measured values. They have also been designed to meet the special requirements of the water/wastewater industry. VEGAMET controllers allow simple implementation of pump control, flow measurement in open channels and overfill protection according to WHG. They are designed for operation in outdoor environments and are supplied in a weather-resistant housing.

The VEGAPULS instrument series is available in a compact version with cable connection housing (left) and a standard version with fixed cable connection (IP68), with the VEGAMET controller (right).

Simple setup and wireless operation

The sensors and the controllers can be operated easily via Bluetooth with a smartphone or tablet. This makes setup, display and diagnostics easier, especially in harsh environments or hazardous areas.

The new VEGAPULS series of radar instruments offer a number of advantages compared to current ultrasonic level measurement technologies. Due to their better all-conditions reliability, ruggedness, simple operation and low price, they offer a preferred choice for water industry applications.

For more information contact VEGA Controls SA.
Tel: +27 (0)11 795 3249, email: info.za@vega.com
Visit: www.vega.com

New check valve with redundant sealing

The new model CV check valve from WIKA is designed for a wide range of applications in the process industry.

The CV check valve is designed to suit wide ranging applications in the process industry.

Its sealing system with a self-centring piston reliably prevents backflow of liquid and gaseous media.

The reliability of the new instrumentation valve is mainly due to its redundant sealing, consisting of an O-ring and a metal cone. Its leak tightness has been tested in accordance with BS6755/ISO 5208 leakage rate A. The solid-machined, robust design of the model CV ensures high repeatability and a long service life, even in heavy-duty applications. The pressurised parts correspond to the safety factor of 4:1.

For the new check valve, WIKA offers an application-specific assembly with a measuring instrument. Such instrument hook-ups are delivered ready-to-install and leak tested.

For more information contact WIKA Instruments.
Tel: +27 (0)11 621 0000, email: sales.za@wika.com
Visit: www.wika.co.za

Upgraded electromagnetic flowmeters

The upgraded Kobold magnetic inductive flowmeters MIM and MIS are available from Instrotech.

The Kobold MIM, for measuring and monitoring of conductive liquids, is available for nominal sizes ½" to 2", and measuring ranges from 15 ml/min to 350 l/min. The new remote version, still manufactured in stainless steel, is designed to withstand temperatures from -40°C to +140°C and is supplied with a 20 m cable.

The new Kobold MIS is a suitable choice for nominal sizes ≥3", and with a range of linings, electrode materials and flange connections (ISO, ANSI, JIS), it is suitable for most applications.

Both the Kobold MIS and Kobold MIM are equipped with electronic C3T. IO-Link and two independently configurable analogue outputs are included with the standard unit, as is an extensive function package which includes flow measuring, counting, dosing, alarm, hotkeys, optical buttons and a rotatable display.

MIM features

- Accuracy: <+0.8% of reading +0.5% of full scale
- Pressure max: 16 bar; Temp max: 140°C
- Bidirectional measuring.

MIS features

- Accuracy: <+0.5% of reading +0.3% of full scale
- Pressure max: 16 bar; Temp max: 70°C
- Connection flange 3", DN 80, 4", DN 100.

Both the Kobold MIM and MIS include an extensive function package that provides for flow measuring, counting and dosing, among other features.

For more information contact Instrotech.
Tel: +27 (0)10 595 1831
Email: sales@instrotech.co.za

Expanded range of motorised valves

German valve specialist GEMÜ is expanding its product range of motorised globe, angle seat and diaphragm valves.

The GEMÜ R629 eSyLite motorised diaphragm valve is available in diaphragm sizes MG 10 and MG 40, covering nominal sizes DN 12 to 50. The GEMÜ eSyLite is available alongside the GEMÜ eSyStep and GEMÜ eSyDrive motorised valve range as a basic actuator for open/close applications in the entry-level market. An optical position indicator and a manual override are installed as standard on the eSyLite, and an integrated emergency power supply module is optionally available. The R629 eSyLite motorised 2/2-way diaphragm valve is a cost-effective alternative to solenoid valves made of plastic or to motorised ball valves made of plastic. Due to the GEMÜ HighFlow body, the valve has good flow characteristics and is insensitive to particulate media. The GEMÜ eSyLite actuator can also be mounted on M-block valves.

The GEMÜ eSyStep universal actuator has also been extended by one size. This means that the GEMÜ 543 and 533 eSyStep globe valves are available in nominal sizes DN 6 and 15 to 50. In future, the nominal size range from DN 4 to 32 will be covered with the GEMÜ 639 and R639 eSyStep diaphragm valves. Valves with the GEMÜ eSyStep actuator are available in open/close or positioner versions. An IO-Link interface allows process data and parameter data to be exchanged easily. This makes them suitable for open/close applications and simple control applications. With its slim design, the GEMÜ eSyStep actuator is also suitable for use on M-block valves.

The new motorised valves include, from left, R629 eSyLite and R639, 639, 543 and 533 eSyStep.

By expanding the range of motorised valves to additional nominal sizes, GEMÜ is extending its offering of energy-efficient alternatives to compressed air systems.

The GEMÜ Group develops and manufactures valves, measurement and control systems for liquids, vapours and gases and is a global market leader in providing solutions for sterile applications.

For more information visit: www.gemu-group.com

Reliable transmitter for Pt100/Pt1000

The APAQ 130 from INOR is a modern transmitter with high reliability and performance. Due to its robust design, external influences such as ambient temperature, vibration, moisture and EMC interference have minimal effect on the measurement results.

The APAQ 130 is characterised by simplicity. Users can easily configure the transmitters wirelessly via NFC with a smartphone or tablet. There is no need for expensive configuration tools or fixed workstations to do this.

In addition, with the INOR Connect app, users can easily save and share configurations with colleagues. They can also generate configuration protocols in PDF format for easy documentation. All these options make configuration easier than ever.

With its compact design the head-mounted variant of the APAQ 130 is only 10.5 mm high and can be installed easily in all DIN B connection heads. The rail-mounted variant is only 6.3 mm wide, allowing users to save valuable space in the cabinet.

The APAQ 130 is built on INOR's latest transmitter platform to leverage efficiencies and to meet the customer's need for digitalisation. Building on this already established and well-proven platform, ensures that the transmitters meet INOR's trademark of quality.

The APAQ 130 transmitter is easy to configure and offers great performance at an attractive price.

Mecosa (Pty) Ltd is the sole agent for INOR Process AB in South Africa.

For more information contact Mecosa.
Tel: +27 (0)11 257 6100, email: measure@mecosa.co.za
Visit: www.mecosa.co.za

Safety codes for embedded generation installations

Frank Spencer, Board Member of SAPVIA, the South African Photovoltaic Industry Association, highlights some key points with regard to the upcoming SANS 10142-1 standards for embedded generation installations.

As the energy landscape shifts from centralised power plants towards decentralised power generation, discussion grows on the potential of embedded power generation installations. In South Africa new standards are being developed with the aim to create a more stable system, particularly when decentralised systems are connected to the larger grid.

The SABS, supported by industry, has been developing codes for the safe connection of small-scale embedded generation (SSEG) to low-voltage (LV) grids. The extension to the SANS10142-1 SA LV wiring code (SANS 10142-2-1 for LV SSEG), was last drafted for comment on 5th of May 2020. It defines embedded generation (EG) as devices which are synchronous with the grid. The whole EG plant is referred to as an embedded generation installation (EGI).

One problematic item is that the code says that EGIs with batteries cannot operate in island mode without first disconnecting from the grid. This is far from ideal, as it implies a short grid interruption is required during changeover. The disconnection from the grid and switch to island mode should happen simultaneously (or within 2 seconds). It is hoped that this will be resolved before the final code is published.

Further, the code covers a significant amount of detail across the whole EGI (including signage, earthing, cable sizing, fusing, roof wind loads, and more). A few important aspects to be noted are highlighted below.

- It is a requirement that all systems be isolated from the grid in case a utility technician is working on the plant. This can be accomplished in two ways:
  - A Utility Safety Switch, which is an isolator at the POC that a technician can use to isolate all downstream customer infrastructure, including the EG, or
  - A Dead Grid Safety Lock, which is a device that automatically disconnects the EGI from the grid during a grid-loss event and is incapable of reconnecting to the grid until the grid returns to normative conditions. This device needs to be separate from the EGI itself; it cannot be the inverters.
- All transformer-less inverters must have built-in residual current fault detection of type B.
- EGI systems with batteries are required to have a neutral-earth linkage switch to engage when transitioning from grid-supply to island-supply. Be careful not to end up with earth loops.
- Overcurrent protection (fuses) for strings is required if cable rating is less than 1.56 x I_SC (string short circuit current), and only on one phase, unless they run next to each other, in which case both phases are required. Reverse current protection on the strings is also required when three or more strings run in parallel.
- The ability to isolate is required on both the ac side and dc side of the inverters; fuses cannot be used for this, switch-based isolators (or breakers) must be used. The exception is if the installation has a combiner box with a dc isolator switch within 2 metres of the inverter.
- Dc cables longer than 50 metres are required to be in earthed metal conduits or to be armoured cable.
- All EGI plants are required to have a planned maintenance schedule, and a maintenance manual is to be included in the handover of the plant.

Many of the requirements mentioned above will also become part of the required Certificate of Compliance SANS 10142-1 inspection where there are LV SSEG installations. □

The South African Photovoltaic Industry Association (SAPVIA) is a not-for-profit organisation which represents active players in South Africa's photovoltaic market that have a genuine, invested presence in the country. The association is committed to promoting the growth of the country's solar photovoltaic electricity market and aims to contribute to the country's renewable energy roll-out.

For more information, visit www.sapvia.co.za

Synchronised power generator units for ZAC

Babcock has been a significant player in the provision of standby and prime power generation solutions in southern Africa since 2006. It recently reported the installation of the largest Volvo Penta-powered synchronised standby power generator solution in South Africa at Zululand Anthracite Colliery's (ZAC's) mine near Ulundi. Electricity supply for three mining sites – Outcrop, Deep E (DE) and Ngwabe – is now backed up by a series of synchronised Volvo Penta-powered generators to maintain operations when grid power supply is interrupted.

Ngwabe is the largest of the three sites, where eight 700 kVA generators feed a 400 V to 11 kV step-up transformer, which in turn supplies electricity to the site. The Babcock-designed and built power generators have been installed at all three mines which are underground, deep level, narrow seam operations that use continuous drill and blast mining techniques to extract anthracite ore.

Critical for ensuring sufficient ventilation underground, fans supplying fresh air to below-surface mining activities cannot be interrupted for any period of time. In the event of a power failure, the synchronised generator units using 16-litre Volvo Penta diesel engines, combined with 630 kVA and 700 kVA Engga alternators, will provide backup power. The power generators respond well to massive impact loads and are capable of generating sufficient power for the entire mine's power needs, initially firing at full capacity to deal with the impact load, and switching off units as demand stabilises.

Managing Director of Babcock's Industrial business, Deon Verreyne, says Ngwabe is the first South African mining operation to use eight Volvo Penta-powered synchronised power generators. He adds that Babcock is also providing backup and support services to the mines. "The units are monitored remotely using a telemetry system that facilitates predictive maintenance on the generators and assists with the early detection of faults, as well as compiling detailed reports as required by the mine," he says.

Babcock's telemetry solutions make use of locally developed 'machine to machine' (M2M) remote platforms designed to provide proactive status and possible failure visibility of engines and generators deployed in the field. They also make critical generator and engine data available within moments of an event. "Babcock's telemetry system will link all 16 of ZAC's generator units to a central network that is broadcast to anyone with the application on their computer or mobile device. ZAC can diagnose the generators' status and performance remotely, without physically needing to go to the mine," says Verreyne.

Owned by Menar, a mining resources investment company, ZAC is South Africa's sole producer and exporter of prime anthracite coal. Menar's relationship with Babcock began in 2017 when the mining enterprise purchased Volvo Construction Equipment supplied by Babcock, including articulated haulers, crawler excavators and wheel loaders, for ZAC's discard processing plant in KwaZulu-Natal.

"We proved we can be trusted to deliver, providing a flexible equipment package that suited ZAC's particular needs," Verreyne comments. "The successful partnership with Babcock's construction equipment business paved the way for establishing a relationship between ZAC and our industrial business for the generators."

Volvo Penta offers world-leading diesel technology and efficient, powerful engines that optimise functionality and operations. This benefits customers in terms of uptime, economy, flexibility and emission compliance. The Volvo Penta engines supplied by Babcock range from 5-litre 4-cylinder, to 16-litre 6-cylinder fixed and variable speed, producing 75 to 700 kVA.

Babcock's industrial business is a trusted supplier of customised standby power generation solutions that meet prime or backup requirements for applications ranging from large industrial and mining to commercial installations. The company's generator solutions are flexible and cost-effective and specifically designed to meet individual customer's requirements, with an expert team of engineers providing innovative solutions and aftermarket support. Babcock designs, manufactures and assembles mobile and static power generator units and can assist customers in monitoring the systems, addressing performance concerns and helping to streamline and improve business operations.

For more information contact Babcock.
Tel: +27 (0)10 822 8780
Email: Deon Verreyne@babcock.co.za
Visit: www.babcock.co.za

Babcock has installed a synchronised standby power generator solution to serve three ZAC mining sites near Ulundi in KwaZulu-Natal.

Mines choose dry-type transformers for safety

Transformers housed in high protection enclosures, rated to IP44 or NEMA 3R, at an oil and gas plant.

Underground mines across southern, central, and west Africa are recognising the safety benefits of dry-type transformers from Johannesburg-based Trafo Power Solutions. According to Managing Director David Claassen, these include collieries, where the strictest safety regulations apply with regard to fire hazards.

"The high risk of fire in underground coal-mining environments has led to a high demand for dry-type transformers," says Claassen. "Among the fire risks that coal mines face are transformer short-circuits as well as fires reaching the transformer." He notes that dry-type transformer technology is rated Class F1 in terms of fire protection, ensuring that transformers supplied by Trafo Power Solutions are flame-retardant.

"Oil-cooled transformers, on the other hand, are a fire risk due to the oil they contain to cool the windings," he says. "The risk is heightened by the harsh operating conditions in which many transformers must function on mines."

Oil-cooled transformers also require regular maintenance. Oil samples must be taken at prescribed intervals, and these must be tested at a laboratory with the appropriate accreditation. Testing must be conducted to ensure that oil purity is within set limits, and to check for gas levels and pressure build-up in the oil tank.

"This maintenance can present challenges and added costs if the equipment is located far from a source of expertise and the right equipment," says Claassen. "With dry-type transformers, it is really only the temperature that needs monitoring. The equipment generally requires servicing only twice a year."

These inspections take just a couple of hours. Key aspects to be checked are the physical termination connections – which must be tightened to the right torque – and any dust that has gathered around the core and windings must be cleaned away.

Trafo Power Solutions has supplied dry-type transformers, together with ancillary power equipment such as low and medium voltage switchgear, to mines in South Africa, Mozambique, Zambia, the DRC, Ghana and Sierra Leone.

For more information contact Trafo Power Solutions.
Visit: www.trafo.co.za

Successful testing of 500 MVA transformer unit

SGB-SMIT Power Matla is an established South African company with strong regional advantages, strengthened with the global knowledge and expertise of the SGB-SMIT Group. The company has a track record of more than 70 years of successes in the design, manufacture, testing, installation and commissioning of a range of power and distribution transformers.

The Pretoria plant manufactures transformers from 10 MVA up to and including 800 MVA and up to 420 kV. The range covers power and specialist application transformers such as furnace transformers, rectifier transformers, traction transformers, shunt reactors and related equipment. The production facility includes a fully accredited testing facility, currently the largest of its kind in Africa. This testing facility represents a strategic advantage for SGB-SMIT Power Matla and all transformers manufactured are tested according to international standards (IEC 60076).

SGB-SMIT Power Matla has marked the successful FAT testing of a second 500 MVA transformer unit for Eskom this year.

As well as its manufacturing and testing facilities, the Pretoria plant is home to a fully equipped laboratory which handles testing and analysis of various materials (including transformer oil), complementing the project and service department. It also provides lab services to external companies.

The company's Cape Town plant manufactures distribution transformers from 16 kVA up to and including 5 MVA 36 kV, miniature substations, LNERs (liquid neutral earthing resistors), NECRTs (combined neutral earthing resistors) and other related equipment for customers in Africa.

SGB-SMIT Power Matla has a track record of manufacturing and testing high voltage transformers with the most recent 500 MVA/400/132/22 kV unit passing all factory acceptance tests at the end of July 2020. This was the second 500 MVA 400 kV unit for Eskom to pass the FAT successfully in 2020. The Pretoria plant has three further similar units now in production, all for the national utility to support and augment the power grid.

The latest success of SGB-SMIT Power Matla is the result of great teamwork – in the Pretoria factory and within the wider SGB-SMIT Group. The international cooperation involved group members in all steps, from design to production through to the test phase. This achievement demonstrates the commitment, knowledge and experience within the South African team, supported by the group's technical specialists. The technical support of the group represents a significant competitive advantage for SGB-SMIT Power Matla and is a crucial aspect in the South African team's drive for continuous improvement. The latest success also demonstrates the South African capability to provide sustainable solutions for the African continent.

With its regional strengths and global expertise, SGB-SMIT Power Matla builds relationships with its customers as a dedicated partner.

For more information contact SGB-SMIT Power Matla.
Tel: +27 (0)12 318 9802
Email: jacqui.burn@sgb-smit.group
Visit: www.sgbsmitpowermatla.com

Quick installation of substation replacement switchgear

WPI Power Solutions, a division of ACTOM (Pty) Ltd, brought together all management and technical personnel from three of its branches to form a single team to perform an unusually rapid installation of new switchgear panels at Secunda's Albany substation early this year.

WPI technicians conduct final checks on one of the new sets of switchgear panels in Albany substation.

The substation is the main supplier of power to Secunda residents and businesses, including the town of Trichardt. All its aging medium voltage switchgear had to be replaced by new switchgear, comprising a total of 32 panels – 14 for its Main Sub 1 and 18 for its Main Sub 2.

Sasol, as the town's largest employer, arranged by agreement with the town council to foot the bill and two years ago commissioned ACTOM MV Switchgear to manufacture and supply the 11 kV replacement panels comprising its SBV4E switchgear. WPI, ACTOM's business unit specialising in repair, maintenance and installation of electrical networks, was contracted to remove the old panels and install the new ones.

The installation was however put on hold until early this

Protecting SA's power supply infrastructure

Eskom is embarking on a communications drive to educate the public about illegal connections, the load reduction drive and other issues impacting the national power grid – infrastructure theft, meter tampering and illegal vending.

Over the coming months, Eskom will be focusing on three primary areas in Gauteng and KwaZulu-Natal where electricity theft through illegal connections and network overloading is rife, and the education drive will be rolled out nationally. The aim is to educate the communities on the dangers of illegal connections, network overloading and the impact these have. Since mid-May Eskom has implemented load reduction and, unlike load shedding, this is not due to a shortage of electricity generation capacity.

Group Executive for Eskom's Distribution Division, Monde Bala, says, "Load shedding is implemented when the national grid is constrained and there isn't sufficient capacity to generate electricity. Eskom then announces which stage of load shedding it will be implementing across the country in order to limit electricity use and protect the integrity of the national grid. Load reduction is when Eskom switches off power to localised areas where illegal connections cause overload and as a result could damage infrastructure."

Illegal connections are a crime: they amount to theft of electricity and interference with Eskom's infrastructure.

"The objective of load reduction is to protect Eskom's infrastructure by reducing electricity usage during peak times, which is when the most damage occurs, and managing the impact on the transformers and mini-substations in that area," Bala explains. "Once a transformer or mini-substation is overloaded, it explodes and as a result that entire area will be out of power. When a transformer explodes, it can't be fixed, it has to be replaced and replacing a transformer is costly. These replacements are costing Eskom billions of rand annually. However, Eskom's primary concern is that illegal connections are a danger to the community and often result in serious injury or even death, as well as damage to property."

When the excessive use of electricity resulting from the illegal connections overloads the transformers and causes explosions, these result in prolonged unplanned outages that can last for many days and leave all homes, businesses and traffic lights in the area without power. Unfortunately this also negatively affects even those customers who do pay for their electricity consumption.

Eskom's solution therefore is to implement load reduction for a few hours a day in these areas, in order to protect the transformers and ensure continuous supply of electricity. The utility is urging its customers not to phone the Contact Centre during these hours, as supply will be restored once the demand stabilises.

Another key component of the communication drive is to address the issue of non-payment. In the Eskom customer base alone, some 1.7 million known customers out of a total of 6.6 million are not paying for electricity consumed. Added to this, the municipal debt of R30.9 billion places Eskom in a precarious financial position. The utility is urging all users to pay for the electricity they use, and not to engage in illegal connections. "Your behaviour could cost you your life or someone else's. Act responsibly, pay and be legal," Bala warns.

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

year, when Sasol and Govan Mbeki Municipality gave WPI the go-ahead to proceed with it, but stipulated an extremely tight timeframe in which to carry it out.

Marius Lombard, Regional Manager for WPI's eMalahleni (Witbank) and Secunda branches, said, "Under normal circumstances each set of installations – for Main Sub 1 and Main Sub 2 – would take five to seven days, but we were given only two days for each separate shutdown to limit the inconvenience to the community and businesses. This necessitated deploying a much larger installation crew than normal, working around the clock and required very careful planning and coordination to ensure the work was completed as required."

A total of 39 managers and technical staff – 16 from WPI's eMalahleni branch, 12 from its Secunda branch and 11 from its Carletonville branch – were assigned to the project. The old switchgear panels in Main Sub 1 were removed and the 14 new panels installed and commissioned within a shutdown lasting 43 hours between February 18 and 20. The same procedure was completed within a 40-hour shutdown to install the 18 new panels in Main Sub 2, from March 17 to 19.

"Taking into account the limited time allowed for all the work involved, which also included replacing three 33 kV outdoor circuit breakers and repairing an earthing system, this contract can be rated as one of WPI's largest projects," Lombard commented.

Sasol issued special Certificates of Recognition to all team members to convey its appreciation to them. "These very competent WPI teams really showed dedication and commitment, which ensured the success for this project," said Ryno Oosthuizen, Area Manager: Electrical Contractor Management, Secunda Synfuels Operations.

For more information contact WPI Power Solutions.
Tel: +27 (0)11 820 5260
E-mail: dewald.loretz@actom.co.za
Visit: www.actom.co.za

Co-creating engineering solutions for Africa

Zutari, formerly known as Aurecon and newly launched as a proudly African engineering firm focused on co-creating solutions for Africa, is uniquely positioned to partner with its clients to deliver fit-for-purpose infrastructure across the continent.

The pressing need for infrastructure development in Africa is evident. The Covid-19 crisis has spotlighted this in stark relief. According to the African Development Bank, the continent requires a minimum of US$130 billion annually for infrastructure development and maintenance. At the same time the bank highlights a financing gap of around US$68 to $108 billion.

In South Africa, the government, looking to build a new and inclusive economy, proposes a massive, infrastructure-led economic recovery for the country, including expanded public-private partnerships and a strengthening of the District Development Model at the local government level.

At the Sustainable Infrastructure Development Symposium of South Africa (SIDSSA) hosted by the Presidency in June, President Cyril Ramaphosa underlined the importance of infrastructure development as a growth driver for the country and the continent.

Just one month later, speaking at the launch of Zutari in July, CEO Dr Gustav Rohde highlighted the firm's deep historical roots on the continent and its experience and understanding of the need for uniquely African solutions in Africa's development. Zutari has in fact evolved from one of the oldest engineering firms on the continent. As Aurecon, the company was part of the merger of Africon, Connell Wagner and Ninham Shand in 2009, and Ninham Shand traces its history back to 1932 – in effect it has been operating for almost nine decades. Landmark projects over the later years include the Lesotho Highlands Water Scheme, the development of Freedom Park in Pretoria and the renewal and extension of OR Tambo International Airport, among many others. As a champion of renewable energy the company has been involved in about 70% of utility-scale renewable energy projects in SA's REIPPP programme, as well as projects across the continent.

In October 2019, the owners of Aurecon Africa took the bold decision to demerge from the global business, headquartered in Melbourne, Australia. This led to the formation of Zutari – a name derived from the Swahili words for 'invent' and 'nectar': *mzulia* and *nectari*.

"Of course, back in October," said Dr Rohde, "no one could have predicted that the beginning of 2020 would see the emergence of a global pandemic, with Covid-19 having

Cookhouse Wind Farm, one of the REIPPP projects in South Africa.

a devastating impact on both a macro-economic and a community level." He highlights however, that management could already see the winds of change pushing back against globalisation as early as September 2019.

"We could see the market shift and decided then to demerge from the global company to be a proudly African company. It is interesting how the pandemic has accelerated this drive towards localisation, especially as borders remain closed and international travel is restricted. The fact that we are a private, management-owned company, with African owners, makes our commitment real – we have a vested interest in our clients' success."

Kashimbila Dam and Hydropower project in Nigeria.

About 75% of Zutari's 1 900-strong employees are professional engineers, technologists or scientists and its multidisciplinary teams include economists, planners, digital practitioners and others. "I think there are very few companies that can match our local capacity, longstanding presence and understanding of the challenges on this continent," says Dr Rohde. It is these assets and its deep skills base that Zutari draws on to make a tangible difference in Africa.

"Making a difference is all about responsible infrastructure projects that generate employment, improve local communities, and contribute to the wider society," Rohde says. Zutari aims to achieve these goals by partnering with its clients in a process of co-creation to develop joint solutions that matter.

At the launch, Jo Ndala, CFO at Zutari emphasised the concept of co-creating engineered solutions to complex problems: "We work with our clients, rather than going away and designing what we think to be the answer and then presenting it as a fait accompli.

"Although as engineers we are trained to focus on the technical aspects, it is essential to factor in the environmental and social impact of design. The best way to embrace these is through co-creation, where we also look at the end users of infrastructure – and the end users are always the local community and wider society. This perspective enables us to deliver the most impactful engineering that we can."

Infrastructure development must also be sustainable, which is why Zutari is a leading player in Africa in renewable energy solutions such as solar and wind power. Rohde emphasises that true sustainability for any asset owner or operator centres on responsible development. As well as including social and environmental factors, it embraces appropriate new technology.

"It is also about well-rounded operations and a safe and motivated workforce. We work with our clients to deliver solutions that help them stay in business and thrive."

The 'new normal' ushered in by the Covid-19 crisis saw the whole company transition successfully to remote working in March – a week before South Africa's hard lockdown came into effect. The company had steadily introduced digital technologies over the past decade, an investment now clearly paying dividends. Zutari is well positioned to take on the challenges of working in Africa, where many project sites are remote and access is difficult.

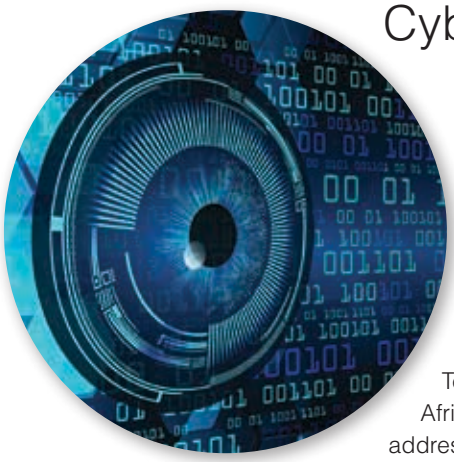
Rohde says the new company will focus exclusively on "solutions that are appropriate for the continent. What might be feasible for highly developed markets like the US or Australia may not be affordable, let alone viable here. Our vision and our commitment are to enabling Africa to achieve its full potential."

He sees the main infrastructure deficit on the continent as revolving around basic amenities such as water and wastewater services, energy and transport. "Building a road, for example, is not an end in itself. As Zutari we recognise that a road provides access, which facilitates economic development that, in turn, helps alleviate poverty and empowers communities. To address the infrastructure deficit, we need to approach both public and private sector priorities as integrated and holistic solutions.

"Infrastructure has been rightfully identified as a catalyst for growth and development. Many global companies that attempt to enter the African market do not know the best way to tackle its problems. We are right here at the coal face, where we can make the most effective impact," Rohde concludes.

For more information visit: www.zutari.com

Cyber safety for working remotely



Home-based workers are at increased risk of cyber-attack, but there are several measures they can take to reduce risk. Bryan Baxter, a corporate IT Business Development Manager and KZN Chapter Committee Member of the Institute of Information Technology Professionals South Africa (IITPSA), highlighted this in addressing a webinar recently hosted by the IITPSA KZN.

The webinar, focusing on cybersecurity and etiquette for remote work and meetings, outlined a significant shift in cyber risk facing companies and their employees.

"The abrupt move to remote working and cloud services has driven many companies to try and do in a matter of months what others have taken years to achieve," Baxter said. "This move has strained IT resources and highlighted vulnerabilities in some home IT environments, which cyber criminals can take advantage of. Security and communications at home are typically not sufficient for corporate use," Baxter cautioned.

Reducing cyber risk for home workers

Corporate data is at risk in home user environments due to common vulnerabilities in home networks, and the fact that many users are unaware that their personal information may already have been compromised, Baxter said. Key risks among remote workforces include vulnerable endpoints, data leakage, password compromises, the use of shadow IT, a lack of corporate VPNs and insecure meeting solutions.

"A layered defence approach is needed to protect users, data, networks, devices and technology," he said. "IT professionals need to make users' lives easier and they must make it easy for end users to stay secure, or we will see the emergence of shadow IT and greater risk."

He recommended a number of ways to mitigate risk in home user environments. "Enhance user awareness training, implement stronger two-factor authentication and keep personal and work systems separate.

"Corporates should ensure that they have classified their data and that sensitive data is adequately protected from employees working at home.

"Regularly backing up both work and private data is essential. Use a VPN to access important systems, and secure home routers and wireless devices. Updated endpoint protection such as anti-virus and host-based firewalls are important. These are now moving to more advanced threat protection such as ERD or endpoint detection and response. This is important because standard AV does not pick up shell scripting compromises. Home systems must be patched and kept up to date, and ideally home users should create separate admin and user accounts on their home computers."

Baxter also emphasised the need to change the default admin password on the home router; enable WAP2 encryption; and use a strong password for the home wireless network.

Safer virtual meetings

With a webinar participant poll revealing that: 42% of participants most often use Zoom, 38% use Microsoft Teams and 9% use Google Meet for video conferencing, Baxter noted that selecting the right solutions for business use was crucial for security and data protection.

He highlighted cases in which meetings had been compromised and videos of meetings posted online. "If you're going to have a board meeting or talk about your financial results, you need to think about the solution you're using," he said.

"Enterprises need to look first at the vendor – asking what is their support like, and can you trust them. Then consider the solution – asking how good is the product, how is it rated and how secure is it?" Considerations should include whether the solution is fit for purpose, its cost and the ease of integration and mobility options.

Further considerations should include whether the video conferencing solution offers full end-to-end encryption, where data is to be stored and whether this data would remain private, if meetings can be password protected, the level of host control to mute, block and drop attendees, the visibility of attendees, and if information can be protected from unauthorised modification, access and disclosure.

Etiquette for online meetings

Baxter recommended several basic measures to improve the security and effectiveness of online meetings. "Test the technology before the meeting; have a plan and agenda; appoint a moderator; only invite participants who need to be there; and lock the conference and put passwords on entry. Inform participants if you are recording the meeting and introduce everyone at the beginning."

The webinar hosted by the IITPSA KZN Chapter was one of a series the institute is rolling out to enhance communication and knowledge-sharing among members. The IITPSA CEO Tony Parry noted that the institute is also increasing the frequency of its new Tabling Tech webinars, designed to offer members in-depth insights into emerging technologies.

For more information visit www.iitpsa.org.za

Sustainable cooling and cold chain in Rwanda

A new African Centre of Excellence for Sustainable Cooling and Cold Chain based in Rwanda aims to support farmers and rural communities – helping farmers get produce to market quickly and efficiently, reducing food waste, boosting profits and creating jobs.

Based in Kigali and inspired by the University of Rwanda's existing African Centre of Excellence in Energy for Sustainable Development, the new centre – already operational and conducting feasibility studies – aims to link the country's farmers, logistics providers and agri-food businesses with a range of experts and investors. In future phases, the scope will be expanded to cover interested partners in Africa.

Rwanda's Cooling Initiative (RCOOL), supported by the United Nations Environment Programme (UNEP) through its United for Efficiency (U4E) programme, provides the foundation for the new centre, which is part of the country's National Cooling Strategy, launched in 2019.

''The African Centre of Excellence in Energy for Sustainable Development is delighted to be part of this important work on sustainable cold chain for food and medicines," said Professor Etienne Ntagwirumugara, Director of the centre. "Energy-efficient, climate-friendly and affordable cooling and cold chains can improve agricultural efficiency and boost farmers' incomes, driving real environmental and economic change. The new centre will allow us to expand, building on the existing efforts of the University of Rwanda. We look forward to collaboration with partners on the African continent and beyond."

Researchers from the University of Birmingham and Edinburgh's Heriot Watt University are joining RCOOL to apply their expertise with rural cooling that can be used for food and medicines. The new centre will build on their work in India with non-profit, commercial and academic partners investigating cold chain opportunities. The UK Department for Environment, Food and Rural Affairs (DEFRA) is funding these efforts.

"Sustainable cooling can improve our food security, reduce food waste, protect vital vaccines, and reduce emissions of climate-damaging refrigerant gases. It underpins our mission to promote sustainable development around the world. The UK is a pioneer of innovative, climate-friendly cooling solutions and we look forward to working with others to advance this important work," said Lord Goldsmith, UK Minister of State for Pacific and the Environment.

Farmers often do not have effective ways to manage the distribution of their produce after harvest and get it to market. Ineffective delivery systems limit farmers' ability to sell goods beyond a local area. For example, tomatoes are widely produced and consumed in Rwanda, but because they are highly perishable and have a short shelf-life, 25% of production is lost post-harvest. This is due to a lack of temperature management – as tomatoes are stored on the ground covered by canvas rather than in modern cooled stores, and they are transported in poor quality containers.

Project Co-developer and Technical Lead Toby Peters, Professor of Cold Economy at the University of Birmingham, said: "The cold chain is about ensuring an integrated, optimised and managed network of temperature-controlled pack houses, pre-cooling operations, vehicles, cold stores, and distribution hubs which seamlessly maintain the safety, quality and quantity of food, delivering it swiftly from farms to consumption centres across geographies.

"Farmers need robust means of getting perishable produce to urban markets. But we must ensure that cold chain logistics are sustainable. We need local and global 'field-to-fork' connectivity to feed 10 billion people nutritiously, from hundreds of millions of small-scale farmers, all without using fossil fuels."

The new Centre of Excellence will help Rwanda's policymakers shape a sustainable cold chain blueprint for the country and the continent. [Photo credit: Alamy]

Data is required to make this investment economically sustainable. As countries face the economic crisis caused by the Covid-19 pandemic, maintaining economic activity, creating jobs and supporting the most vulnerable people becomes an urgent priority. Cooling and cold chains support these economic necessities. Specifically, the centre will be a boost for Rwanda, where farming accounts for some 30% of national GDP and 73% of the workforce is directly employed in agriculture.

The Centre of Excellence for Sustainable Cooling and Cold Chain is a partnership involving Rwanda's Ministry of Environment, the University of Rwanda, UNEP's United for Efficiency initiative, the University of Birmingham and Heriot Watt University, and DEFRA, to support the roll-out of sustainable post-harvest management and cold chain pan-Africa.

The centre aligns with a portfolio of Rwandan and UK policies and economic growth strategies as well as international commitments to the Sustainable Development Goals, Nationally Determined Contributions (NDCs) in terms of the Paris Agreement, and the Kigali Amendment of the Montreal Protocol.

Professor Phil Greening from Heriot Watt University said: "Most post-harvest losses occur close to the farm gate, where there are no facilities to process perishable produce because farmers often can't afford to invest in these and many don't have the financial expertise and technical knowledge to do so.

"However, cold chain processes are energy-intensive, often relying on fossil fuel-based power generation, and use refrigerants with a high climate impact. The centre will help Rwanda's policymakers shape a sustainable cold chain blueprint for the country and the continent."

The project supports Rwanda's National Agricultural Export Development Board's five-year strategy to double agricultural exports by 2024-25 and significantly increase exports of aquaculture, beef and other temperature-sensitive products.

"Efficient, affordable cooling is an important element in efforts to curb climate change. Without action to address energy efficiency, energy demand for space cooling is projected to more than triple by 2050," said Inger Andersen, Executive Director of UNEP. "The new Centre of Excellence in Rwanda will support the development of sustainable cold chains that are essential to respond to the Covid-19 pandemic. As we seek to build back better, sustainable cooling can help deliver vaccines, ensure food supply, and reboot the economy by generating employment and investment opportunities."

With the support of the new Centre of Excellence, farmers can benefit from best practices on business models, training facilities, and 'Living Labs' where the latest technology is demonstrated and proven with those intended to use it.

For more information visit: www.birmingham.ac.uk

DIARY DATES – With almost all conferences and exhibitions being cancelled, rescheduled or staged virtually, as a result of the global coronavirus pandemic, *Electricity + Control* will reintroduce the column of Diary Dates once the global outlook regains a level of stability.

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