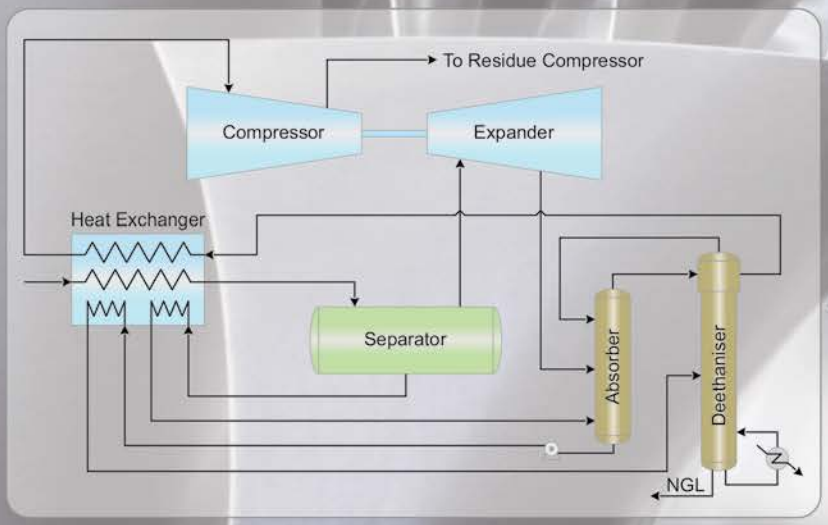
11/2024

ELECTRICITY + CONTROL

FEATURES:

- Control systems + automation
- Drives, motors + switchgear
- Sensors + switches
- Plant maintenance, test + measurement

- SIL & ATEX
- ANTI SURGE CONTROL
- ENGINEERING AND SERVICES
- OVERSPEED PROTECTION
- VIBRATION MONITORING & ANALYSIS
- LIQUID ANALYSIS



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The cooling process in large-scale LNG production facilities involves highly sophisticated heat exchanger and refrigeration compressor applications in which anti-surge control is critical to their safe, reliable, and efficient operation.
(Read more on page 3.)

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Recognising the reasons for measurement

What gets measured gets done – as the famous saying (variously quoted and attributed) goes.

And this month we focus on test and measurement, coupled also to maintenance.

All these aspects of how you manage and look after your plant are, of course, crucial. But let's focus for a moment on measurement.

Measurement has many sides to it: it can be part of a controlled system, and you can use that measurement to make control decisions on the plant; it may be in a lab (testing and sampling); or you can use measurement to check various plant parameters manually as part of a regular survey.

It is always encouraging to see people on the plant, armed with hand instruments, checking and conforming various parameters – as needs be, and as can be done.

It presumably adds a second layer of management to how the process is run, and it allows you to record and track performance. I fondly recall, as a young engineer, being shown various meters and being advised of what sort of a reading should be expected – and why.

I realised very quickly that the people monitoring a plant are critical – no matter how much we've tried to exclude them from that path!

It does remind me of a lovely story about a plant that began the gentle move to automation and installed various meters all over the show – the idea being to learn what reading was expected and then to monitor that. Pressure, temperature, flow, volume, you name it, they measured it.

If all was well, then no action was required.

Of course, this was long ago and there was little ability to rely on central control, and certainly not distributed control. But good use was made of PID controllers in the field, among others.

At the start of the day shift, an operator armed with a pencil and a clip board would walk the plant and record every single meter reading. He'd report that to a room full of people in white coats – and they'd decide what action to take.

For many years the plant ran perfectly. The product quality was excellent. The plant became an exemplar of stability.

And then the operator retired. A new operator began to walk the floor with the clip board. And chaos broke out. None of the readings was stable, and none seemed to be repeatable.

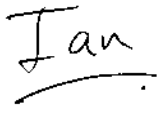
It took those folk in white coats a while to realise that the old operator had simply written down a number – being careful, in each case, to ensure it was within some margin that did not send the white coats into a tailspin.

It's a funny story, and you'll no doubt find various versions of it. But the message is clear: understand why you take measurements, understand the implications of the parameter – and be mindful before you conclude that any measurement is truly out of parameter.

This, in turn, emphasises the importance of monitoring the quality of the product. If it is a process you are running, be sure to evaluate the composition of the product. None of this is that hard to do – it just must be done.

But it must be done for a reason.

Sampling various meters across the plant is much easier now as all the data becomes available as information in your various platforms. But it is still refreshing – and reassuring – to wander past a meter, read it, and be able to conclude that all is well.



Ian Jandrell

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

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REGULARS

Optimising operation and profitability of compressor trains

Anti-surge control from Compressor Controls Corporation, and available locally from PREI Instrumentation, is designed to optimise the operation and profitability of multiple, multi-section compressor trains.

The cooling process associated with large-scale LNG (liquified natural gas) production facilities involves some of the most highly sophisticated heat exchanger and refrigeration compressor applications found anywhere in the world. The safe, reliable, and efficient operation of the multiple, multi-section compressor trains found in these facilities is critical to the profitability of the operation as a whole. Specific process challenges include:

- Unnecessary machine trips caused by surge and excessive recycle
- Split shaft compressor designs that are susceptible to cascading trips due to interdependency between refrigeration loops and rotating equipment
- Parallel compressors can create instability in the process if not properly set up for load sharing
- Control loop interaction can drive adjacent compressor sections towards surge
- Adjustment of gas composition on Mixed Refrigerant compressor trains can reduce the effectiveness of the surge control system.

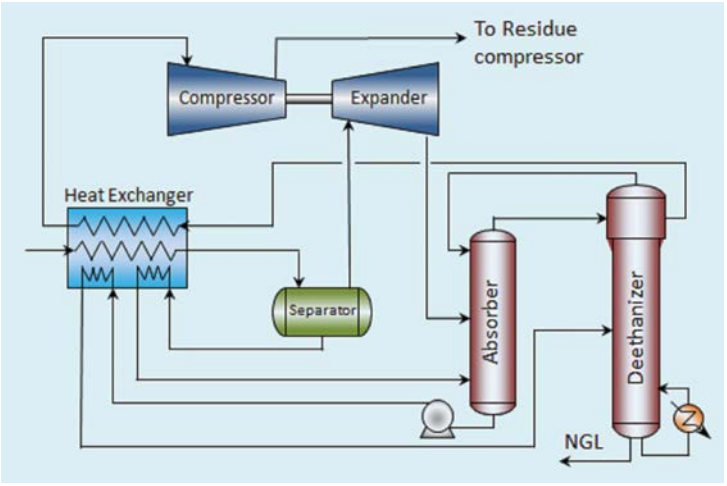
Solution

Cascading trips – Multi-section trains in split shaft arrangements must work in highly interactive configurations to ensure prevention of compressor surge and cascading trips. To avoid tripping without over aggressive tuning, CCC developed a modification to the control system to prevent surging as well as driver overload of a running compressor when the other has tripped. This is achieved by allowing the anti-surge valves of the running string to open temporarily to a predefined position when the other string has tripped or is shutdown, and the anti-surge valves on the string would fully open in an effort to protect the machine. Sudden full opening of the MR HP anti-surge valve will drive the MR MP stage and sequentially the MR LP stage into surge. The aggressive tuning needed to prevent surging results in the anti-surge valves opening almost fully, which leads to overloading of the compressor driver causing an under-speed trip. The new CCC control command opens the anti-surge valves of the MR LP and MP stages temporarily, to a configurable predefined position, and holds the position for the disturbance to pass. The MR would continue to run under full recycle and shutdown due to surge or under-speed would be prevented.

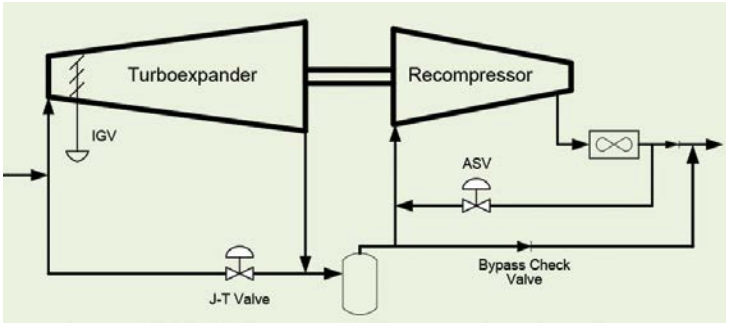
Load sharing – High speed inter-controller communications allow for decoupling of controller interactions. Parallel refrigeration machines traditionally used in the LNG process can be successfully operated by controlling suction header pressure of the individual refrigeration circuits and using load-sharing control to balance the parallel compressor strings. Load sharing is accomplished by equalising the individual compressors' distance from surge parameter. In addition, by using proper load-sharing control, the individual compressor strings are easily and safely sequenced online and offline automatically.

Results

Avoiding surge of individual compressor stages is the end result – effectively preventing a shutdown of the compressor string due to excessive surging or speed reduction caused by driver power limitations. □



Schematic of a typical gas processing plant.



Schematic of a typical turboexpander train.

For more information contact PREI Instrumentation.
Tel: +27 (0)11 867 5001
Email: sales@prei.co.za
Visit: www.prei.co.za

Marco Sutter, MD, Bühler Southern Africa.

Supporting food security in sub-Saharan Africa

Bühler has been operating in South Africa since 1972. The company is an independent entity within the Bühler Group, which is headquartered in Switzerland and operates globally. Bühler Southern Africa provides services and support to customers across sub-Saharan Africa, primarily in the FMCG, food and feed industries, as well as in non-food sectors like mining and others. Leigh Darroll caught up with Marco Sutter, MD of Bühler Southern Africa, at Electra Mining Africa, to find out more.

At its Johannesburg manufacturing facility, the regional hub, the company manufactures equipment for the mining and power industries in its local workshop and refurbishes certain equipment.

The company also has a service and support office in Cape Town, and one in Lusaka, Zambia, staying close to its customers to ensure efficient, responsive service and – as Sutter says – working in the market, for the market.

The FMCG (fast-moving consumer goods), food and feed sectors constitute about 60% of its customer base. Feeds include feed for livestock, for pets, and more recently, aqua feeds for a growing aqua farming market.

In the mining sector, Sutter says, demand is growing, particularly in some Southern African Development Community (SADC) countries such as Angola, Malawi, Zambia and Zimbabwe, as well as countries further north, where demand for critical minerals – to supply new technologies being used in the energy transition – is driving exploration, extraction and processing.

As the global electric vehicle (EV) market is growing rapidly, the demand for batteries with enhanced storage capacities and efficiency is growing in parallel. The role of lithium as a key component in improving energy density and longevity is essential. Bühler provides advanced technologies that contribute to the production of high-performance batteries, to ensure they meet the evolving needs of the EV industry.

Sutter highlights that a key advantage for customers is Bühler's commitment to manufacturing locally and matching global standards. A further advantage is that the Bühler Group has developed its own Mercury process automation and control system in-house. This modular system includes all the elements of PLCs, control panels, MCCs, plus software which can be customised to each application. Cloud-based digital solutions can be incorporated to monitor processes and machine performance, with sensors tracking key parameters like level, pressure, vibration and temperature, depending on the process, in order to optimise performance, inform predictive maintenance planning and constantly monitor stock holdings. Furthermore, the regional office has access to the R&D resources of the group head office and the expertise of some 300 software engineers globally.

Food security and food safety

Sutter emphasises that food security and food safety are priorities for Bühler globally – and are particularly important in Africa where food security is a very real concern. He notes that in Africa, inefficiencies in harvesting, storage, and getting goods to markets see a 30% loss of production annually, on average.

He notes too that although different parameters may apply to different crops, the fundamentals of efficient drying, cleaning and storage apply broadly across most

Bühler's chain conveyors are used in many different industries, from mining to milling and food processing.

crops – from maize to wheat, sorghum, coffee, cocoa and others. Here, automated plant and machinery can make a valuable difference in achieving greater productivity and higher returns.

And he adds that processes need to be adaptable because the raw materials change from season to season: crops are weather dependent. The harvest may be drier or wetter, for example, depending on the weather, and machines need to be adaptable to get the best from each harvest. This is for the benefit not only of the farmers or agricultural companies, but essentially for all the downstream industries they serve and, fundamentally, to increase food security for a growing population.

Food safety is another critical factor in production. In this regard, products such as wheat-free or gluten-free foods, or production environments that exclude any risk of allergy-creating ingredients contaminating production, need to be considered. Sutter emphasises how critical it is for food processing companies producing such specialist products to run separate production lines accordingly – and to ensure traceability 'from field to fork'. Here, automated production and integrated digital systems are key.

Skills training and support services

As part of its focus on increasing food security and food safety, Bühler runs three training centres in sub-Saharan Africa: in Kano, Nigeria, where the focus is on ancient grains such as sorghum and millet; in Abidjan, Ivory Coast, where the focus is on cocoa and chocolate; and in Nairobi, Kenya, where the focus is on grains and wheat.

At its Johannesburg facility the company manufactures equipment for the mining and power industries and refurbishes some equipment.

Sutter says there is a huge demand for training and each centre offers training in maintenance of mechanical equipment, in electrical and control systems, and process technologies – all related to the machinery and equipment it supplies. It also offers executive training. At each centre, the trainers are local people who understand local needs. Where necessary, trainers with specific expertise can be brought in from other Bühler centres internationally – the group runs 13 training centres globally. Most training is conducted at the centres but can also be done on-site for customers.

He highlights that developing and improving skills is a global concern, across a broad spectrum of industries. "We need to continue apprenticeships, to train the next generation of engineers, artisans and technologists to sustain and improve food production into the future," he says.

At its training centres, Bühler also conducts research and development tests and final product tests for customers working on new product developments. Its customers range from small family-owned enterprises, to multinationals, to state owned organisations.

Bühler Southern Africa operates as the sub-Saharan Africa hub within the MAI (Middle East, Africa and India) region and reports through the MAI regional office in Dubai, to the group head office in Switzerland. The Bühler Group includes eight regions globally, operates in 140 countries and it is still a family-owned business, now 160 years old and run by three sisters who represent the fifth generation of the family.

The group employs some 12 500 people globally. In Johannesburg, Bühler Southern Africa employs 220 people. The company moved from its original premises to a bigger manufacturing facility in Honeydew in 2004, and in 2012 it doubled the capacity of its manufacturing line there. And demand for its services continues to grow. □

For more information visit: www.buhlergroup.com

Process control software solutions for tough challenges

PPCL – Process Plant Computing Limited – based in the UK and operating globally – has developed a suite of advanced process control software products using its unique Geometric Process Control (GPC) technology to offer solutions to some of the process industry's toughest challenges. The company also offers regular webinars addressing various aspects of process control or particular challenges. Over the past few months, for instance, it has looked more closely at statistical process control and what it does and does not do, and at effective alarms and alerts to support safety and efficiency. More recently, in October, it considered the use of Geometric Process Control in complex processes.

Alan Mahoney, Technical and Operations Director at PPCL, commented, saying: "Most examples in our webinars are single-mode continuous processes, but in reality, all processes are more complex. There are separate operating modes for startup, shutdown, catalyst regeneration, reduced rate running, grade transitions, as well as alternative equipment configurations."

For batch processes a product recipe defines the start and end conditions of phases. These phases map onto modes in Geometric Process Control. There are benefits in extending process understanding by exploring, visualising, and modelling the operating envelopes of modes (or phases) visually, individually as well as in aggregate, to discover variable and quality interactions.

GPC allows engineers to combine their process knowledge with data already captured in plant historians, LIMS (Laboratory Information Management Systems), electronic batch records and KPI (key performance indicators) history to visualise, manipulate, and understand process operating envelopes spanning many modes and hundreds to thousands of process variables in a purely visual environment. It requires no explicit mathematical knowledge, allowing users to query and discover relationships faster, and creates real-time geometric models of each of the modes without requiring further user involvement other than configuring OPC (open platform communications) connections to DCSs (distributed control systems), PLCs (programmable logic controllers) and historians.

PPCL supports intelligent operations with its advanced GPC software.

In the webinar, PPCL described and demonstrated how its GPC technology handles multimode and transient processes, including startup, grade-transition, and batch processes. Dividing process data into individual operating envelopes corresponding to each mode of operation is easily done, and the speed of analysis makes handling each mode individually efficient.

It also looked at explicit time-dependence, based on time in transition between grades, catalyst use, batch time or phase time. Case studies served to demonstrate alarm rationalisation, process operating limits, and dynamic operator feedback. □

Adrian van Wyk, Managing Director, Referro Systems.

Automation solutions for customers in the Northern Cape

Referro Systems has been recognised as an Authorised Official Partner Candidate for Festo in the Northern Cape, a significant step for the company in its commitment to delivering best-in-class automation solutions to customers.

The Festo Official Partner Candidate Network ensures that customers can access the full range of Festo's product portfolio and receive consistently high levels of technical knowledge and support.

"This partnership aligns with our mission to enhance our direct sales operations and will bring a broader range of solutions to our customers in the remote Northern Cape, where clients often face difficulties in sourcing specialised equipment and components for their operations. Quick access to essential components means they can now maintain operations without facing major downtime," says Adrian van Wyk, Managing Director of Referro Systems.

To become an Official Partner with Festo, stockists like Referro Systems must undergo extensive audit and training processes. "This rigorous programme ensures that we can provide local stock holding and service and introduce our customers to cutting-edge innovations in automation. As an Official Partner, we are dedicated to meeting Festo's stringent requirements," van Wyk adds.

Referro Systems will also gain access to the latest technology and application advice that Festo has to offer. "Hence, we will be able to enhance our productivity and maintain a competitive advantage in today's fast-paced market," he says.

Addressing the logistical and support challenges inherent in serving clients in the Northern Cape, Referro Systems can now ensure timely service and expert support, empowering local industry with support close to their operational sites. □

High performance CNC solutions for EDM and additive manufacturing

TwinCAT 3 CNC now includes new functions and two new technology packages.

With two new functions and two additional technology packages, Beckhoff streamlines the specific application of TwinCAT 3 CNC (TF5200) for EDM (electrical discharge machining) and additive manufacturing. These latest features include online adaptation and extended interpolation, plus a technology package for additive processes and another for wire-erosion and die-sinking EDM machines.

TwinCAT 3 CNC Online Adaption (TF5262) offers TcCOM interfaces to integrate customer-specific modules for the online control of interpolation functions.

- Dynamic contour control (DCC) compensates for contour errors caused by physical deformation of the toolbox by modifying the tool centre point path based on the current and previous contour elements. The normalisation factor, compensation direction, and compensation factor are all calculated within the TcCOM object.
- The tool radius compensation function offers online tool radius compensation based on factors such as the current tool radius, path position, and path tangent. Two-path interpolation is also supported here.
- The geometric feed rate adjustment is used to calculate a feed override factor to achieve a constant surface feed.

TwinCAT 3 CNC Extended Interpolation (TF5263) enables two-path interpolation, allowing two independent contours to be described in a single NC channel, which is particularly advantageous for EDM wire erosion. With conical coupling, the synchronisation of path 1 and path 2 can also be used to compensate for additional blocks inserted by the tool radius compensation. The originally programmed connection between the two paths remains unchanged.

TwinCAT 3 CNC AM Plus (TF5291) is a technology package for additive processes. Its extended contour preview makes programmed contour elements available to the PLC in advance and can be activated in the NC program or via the PLC interface. The TF5291 also makes it possible to access future dynamic data, such as axis positions, velocities, and accelerations, at configurable intervals.

TwinCAT 3 CNC EDM Plus (TF5292) is a special technology package for wire-erosion and die-sinking EDM machines. It combines functions from the TF5262, TF5263, and TF5292 with cylindrical compensation for EDM wire erosion, a single real-time cycle per channel, and retraction strategies for die-sinking EDM.

For more information visit: www.beckhoff.com

New, compact multi-level pallet stocker

Nidec OKK Corporation has launched a new multi-level pallet stocker that claims best-in-class space efficiency and is installed in the Nidec five-axis vertical machining centre VB-X350. Engineered to meet the automation and labour-saving needs in the limited-lot production of diverse products such as EVs, semiconductor equipment, and electronic components, the system combines a high-speed five-axis processing machine with a multi-level pallet stocker that can replace processed materials (work pieces) automatically. It contributes to improving the productivity of increasingly complex component machining.

Nidec OKK launched the new system at AMB2024, the international exhibition for metal working held in Stuttgart, Germany in September.

This latest multi-level pallet stocker, which automatically moves work-attached pallets into and out of a machine, was developed based on a space-efficient, easy operations concept so that it can be installed to suit the user's production style.

To save space, the pallet stocker adopts a stereoscopic (vertical stacking) system and a minimum layout for the drive of the automatic pallet changing device. In addition, the system offers a minimum pallet rack combination unit of 16 pallets (4 lines x 4 columns) and a maximum pallet rack combination of 28 pallets (7 lines x 4 columns). It uses compact components and mechanical units to achieve a top-level space efficiency.

Automation system equipped with 5-axis vertical machining centre VB-X350 (left) and a multi-level pallet stocker (right).

Making it easy to use even for inexperienced operators, the system incorporates a control board with a simple, intuition-oriented screen. For easier machine setup, the operator can use an operation program to perform various tasks – from entering and viewing work manuals, system 'knowhow', and other support information, to managing work-changing timing and machining schedules. With the combination of the machines and the stereoscopic pallet stocker, and hardware and software, this new system enables night-time autonomous operation, reduces labour manhours to lessen the burden on the operator, and improves productivity.

Nidec OKK is committed to developing and providing machines and peripheral equipment to facilitate automation, labour-saving, and other challenges faced on manufacturing sites. □

Manufacturers know they can do more with their data; the research will investigate what is being done and can be done.

Drawing value from AI and analytics

The Manufacturing Enterprise Solutions Association (MESA) is again working with Tech-Clarity, Inc. on the next iteration of its Analytics that Matter research programme. Formally launched during the recent MESA Smart Manufacturing NOW virtual event, the research will review manufacturers' progress in performance metrics and analytics and explore the value manufacturers and producers can gain from using artificial intelligence (AI).

MESA and Tech-Clarity will conduct a survey to understand the goals, challenges, and successes companies have or have experienced in their analytics and AI initiatives. They will share the findings in a research report, infographics, and a webinar during the first half of 2025. The survey will be open for manufacturers' responses later in 2024. To date, the programme has three sponsors: Aegis Software, Epicor, and GE Vernova. It will be capped at six sponsors, so additional sponsors are welcome.

Making Analytics and AI Matter is the continuation of an 18-year MESA initiative focused on uncovering the value of analytics through an online survey of manufacturers and producers worldwide, across process, batch, and discrete industries. Tech-Clarity, MESA, and the sponsors will collaborate to develop the survey. The 2024-25 study continues work that began in 2006 under Julie Fraser's guidance. This round extends it to reflect the growing role of metrics and analytics as well as AI and generative AI in manufacturers' success.

Fraser will again lead the research programme, supported by MESA's Knowledge Committee and Analytics Working Group. Some questions will be based on previous MESA Analytics studies so the team can analyse trends and progress. In the last study, industrial analytics showed the quickest time to impact among various IT projects, and more respondents had live advanced analytics projects in 2022 than in previous surveys. New questions will focus on the impact of GenAI, what types of analytics work best where, and what helps AI to deliver its full value in production companies.

MESA's International Knowledge Committee and Analytics Working Group Chair, Chris Monchinski of InflexionPoint says, "We have seen the value of this analytics research over the years. It shows progress in manufacturers' technology use and business understanding. Now, we will explore traditional metrics and analytics and the uptake of the newest AI and GenAI technologies to deliver manufacturing insights. MESA's Analytics Matter podcast has supported these topics for several years. With this survey we will have new quantitative research to understand where the value lies."

"Manufacturers have long known there is more they could do with their data. This research aims to demonstrate what they are doing to analyse their data to create actionable insights and high-value improvements from descriptive, diagnostic, predictive, and prescriptive analytics and current AI approaches. MESA members and study sponsors will benefit from sharing their experiences," says Julie Fraser, Tech-Clarity's Vice President of Research for Operations and Manufacturing.

MESA conducts this study with a research partner every few years. During November 2024, manufacturers and producers will be invited to take the survey. The results of the survey will be made available in 2025. MESA members will benefit from special access.

For more information visit: https://mesa.org/

Joining forces in part marking and labelling

Gravotech, an international leader in the marking and engraving markets for over 80 years, has been acquired by Brady Corporation, an international manufacturer and marketer of solutions to identify and protect people, products and places.

Arnaud Linquette, President and CEO of Gravotech commented on this move, saying: "The sale of Gravotech to a market leader in printing and high-performance adhesive material solutions provides us with an opportunity to expand into new markets and generate long-term profitable growth. Over the past several years, we have enhanced our new product development and manufacturing capabilities and broadened our portfolio of precision direct part marking and engraving solutions. We look forward to developing and growing our business further with Brady."

Specialist in precision direct part marking and engraving, Gravotech, has joined the long established Brady Corporation.

Former President of Gravotec, Gérard Guyard, who helped develop and drive the company over the past 28 years, said: "The acquisition of Gravotech by Brady, a strong and innovative industrial company, opens a new era of development for Gravotech. Complementarities between Brady and Gravotech are strong, and I am convinced the combination of both companies will generate significant and robust value."

From Brady's perspective, President and Chief Executive Officer, Russell R Shaller said: "We are pleased to welcome the Gravotech team to Brady. Gravotech offers speciality laser and mechanical engraving capabilities for direct part marking in various industries and applications. With the addition of Gravotech we expand our product offering into precision direct part marking and engraving, which aligns with Brady's market-leading position in product identification solutions and speciality adhesive materials." □

Upgrade of turbine automation systems for nuclear power plant

Fortum's nuclear power plant in Loviisa, Finland.

Valmet is to deliver its DNA Turbine Automation Systems with DNA User Interface for both power plant units at Fortum's nuclear power plant in Loviisa, Finland. It will also renew the automation interface signals of the training simulator at the plant. The upgrades of the steam turbines' protection and control systems are part of the lifetime extension-related investments and continuous improvements to ensure reliable electricity production.

Working from the orders received in Q2 of this year, the turbine automation deliveries are scheduled to be taken over at the Loviisa 2 reactor in October 2026 and at the Loviisa 1 reactor in October 2028. Fortum will take over the training simulator delivery in April 2026.

"The existing turbine protection and control systems are reaching the end of their technical service life, and the availability of spare parts is diminishing. The automation upgrade project is aimed at ensuring the functionality of the systems until the end of the power plant's lifetime. Valmet was selected because it's a technologically advanced Finnish company, and we have collaborated well on several projects at Fortum's power plants," says Sasu Valkamo, Senior Vice President of the Loviisa power plant.

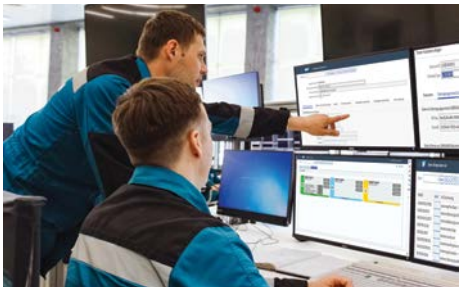
Tom Bäckman, Sales Manager for Valmet's Automation Systems business line, says, "This is a big step for Valmet to supply the automation upgrades for the steam turbines and the training simulator of the Loviisa nuclear power plant. Valmet's technical and cost-effective solutions and a high level of local input proved to be strong points for us in getting the order. In addition, three of Valmet's service centres are less than an hour's drive from Loviisa, so support is close by."

The government of Finland has extended Fortum's operating license for the Loviisa 1 and 2 units, allowing the plant to continue generating power until the end of 2050.

The turnkey delivery from Valmet includes replacing the existing control and protection systems in four turbines with Valmet DNA Turbine Automation. The Valmet DNA User Interfaces will be delivered for both control rooms. In the separate delivery for the training simulator, more than 16 000 interface signals will be replaced with Valmet DNA technology. The training simulator is an independent system operated from a separate control room.

Fortum is one of the cleanest energy producers in Europe. The company's actions are guided by its ambitious environmental targets. Fortum generates and delivers clean energy reliably, helping industries decarbonise their processes. □

'Plug & Print' for SAP Shop Floor environments



In the user-friendly SAP Shop Floor dashboard, all printer status data and messages are accessible.
[Source: Paul Leibinger GmbH & Co. KG]

SAP ranks among the leading ERP systems worldwide. Especially in the food and packaging sectors, SAP plays a key role in the efficient organisation of supply chain processes. To support its customers in these sectors, industrial printer specialist LEIBINGER will be offering SAP users greater convenience, security and efficiency when connecting printers to SAP Shop Floor in future.

Collaboration for simple printer integration

In collaboration with the Freiburg-based SAP digitalisation experts at 4IoT GmbH, the SAP Shop Floor Connect add-on has been expanded to include a LEIBINGER printer library. This enables all LEIBINGER printers to be connected to SAP Plug & Play in a standard application. Michael Wöhrmann, Director of Business Development at LEIBINGER, commented on this successful integration. "This represents a significant advantage for our customers, as LEIBINGER printers can now be integrated into the SAP world much more quickly and efficiently. With this work as a foundation, customers' essential printer-related business processes can be automated. All printer data and messages are directly available. This means, for instance, automated order releases or production feedback into the SAP system are conceivable."

LEIBINGER customers who use SAP also benefit from a clearly organised dashboard where they can view all status data, error messages and process data, including consumables levels (ink and solvents).

The interface fulfils all requirements for operation in the cloud via the 'LEIBINGER Connect' portal as well as on-premises. LEIBINGER's latest flagship product, the IQJET, provides an OPC UA interface for the on-premises connection. This is especially of interest for security-sensitive industries such as semiconductors, pharmaceuticals, security and defence.

Availability and support package

Customers interested in the SAP add-on can obtain it from LEIBINGER now. The connection of LEIBINGER printers is free of charge. If additional guidance and support is required, LEIBINGER offers a special support package in collaboration with 4IoT GmbH. However, this offer is initially only valid for Europe due to the binding support times. □

Optimising efficiencies in drives and motors

Energy efficiency is a concern for industrial facilities worldwide. A recent survey conducted by the government in the UK showed that around 66% of manufacturers are taking steps to improve energy efficiency at their sites. However, another related concern is power quality and the need to reduce harmonics. John Mitchell, Global Sales & Marketing Director at CP Automation looks at options that allow operators to balance the two.

According to the survey[1], manufacturers are making various improvements to boost energy efficiency. These include investing in building improvements, encouraging cultural and behavioural changes, and replacing industrial equipment. Many operators have tried to optimise energy efficiency and power quality by installing variable speed drives (VSDs). These sit in front of motors, controlling their speed and torque and providing good power factor.

Although they are effective, standard 6-pulse VSDs distort the sine wave, which creates harmonic distortion – another challenge for operators. A standard pulse drive without built-in harmonic mitigation can easily impact neighbouring equipment, reducing equipment life and causing unexpected downtime. There is also no regen (regenerative braking) function, and operators will typically divert the energy from the drive and dump it into a resistor – wasting it as heat. In effect, this constitutes a double loss.

The value of modularity

By adopting a modular approach, operators can gradually retrofit and replace regen and harmonic mitigation solutions when needed. Additionally, when the drive no longer works, they can simply replace it without needing to re-engineer the entire solution. This provides valuable cost savings and reduces the time that equipment is out of action.

Comsys Active Dynamic Filtering (ADF) is a patented technology that makes energy more efficient for operators in process and other industries.

Using a modular approach, operators have a few options. For example, they can install a passive harmonic filter in front of the drive instead of the choke. This will reduce the total harmonic distortion (THDi) to < 5%, even in an unbalanced system, unlike single-stage passive harmonic filters. Or, they can add an active harmonic filter and achieve the same result.

Another option is to add a regen unit to complement the brake resistor (keeping the resistor for redundancy or a grid outage during regen) and connect it on the dc bus directly, rather than the brake chopper terminals. Once installed, this will divert energy from the motor back into the system, so it can power other applications on site. Consequently, the site will draw less power from the grid, bringing energy bills down.

AFE solutions

Rather than taking a modular approach, some operators may opt for an active front-end (AFE) drive – often seen as an all-in-one solution. AFE drives use insulated gate bipolar transistors (IGBTs) instead of diode-based rectifiers to convert the alternating current (ac) to direct current (dc). The IGBTs turn on and off rapidly, allowing for precise control of the input current waveform and a smooth ac current to pass into the drive.

However, substituting diodes for IGBTs can result in unwanted energy losses. While diodes are almost lossless, IGBTs are vulnerable to current and switching losses, which occur when the rectifier is transitioning between the 'On' state and the 'Off' state and vice versa. This can add an extra 2% in losses when operating below full load, which is often not accounted for.

Be aware of hidden costs

In our experience, operators often overlook the hidden costs associated with power quality, focusing only on the upfront costs of the AFE, harmonic filter or other solutions. There are hidden costs, for example, in the time it takes to get all the equipment up and running and the time needed to migrate. Sometimes, an AFE unit may be faster to install because it's an all-in-one solution, but if replacement parts are hard to acquire and take weeks to arrive, this could negatively impact productivity.

If the operator takes a modular approach, they should be able to replace the regen unit or harmonic filter without halting the running of the 6-pulse drive – they can remove and then reinstall it once the replacement arrives. Likewise, they can replace the VSD with any OEM version as the regen unit and harmonic filters are universal.

Power quality and energy efficiency are both growing concerns for industrial facilities and plant operators and balancing the two can be a challenge. In summary, there are two main options: equip a 6-pulse drive with the necessary solutions, or go for an all-in unit like an AFE. Both approaches have their merits and disadvantages, and the choice will depend on the needs of each application. □

References

[1] https://assets.publishing.service.gov.uk/media/657f754783ba380013e1b6a5/energy-efficiency-in-the-manufacturing-sector-2021.pdf

For more information visit: www.cpaltd.net

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Drive-based solutions enhance operational efficiency

BMG's NORD predictive maintenance solutions offer fast, efficient and comprehensive evaluation of analogue and digital data, to enhance the operational efficiency and safety of machines. This intelligence is collated via the PLC in NORD drive technology, which forms the basis for condition monitoring and predictive maintenance.

NORD DRIVESYSTEMS – developed by *Getriebebau Nord* and assembled locally by BMG – bring together optimum drive configurations to ensure high performance of mechanical speed control for specific applications, in almost every industry. Local assembly at BMG World in Johannesburg supports prompt delivery of drive systems and the quick availability of spare parts.

"BMG specialists use predictive maintenance as a methodical continuation of condition maintenance, with the prime objective of proactively maintaining machinery and equipment by detecting operational changes," says Deon Crous, National Sales Manager – Gears, for BMG's Electromechanical Drives division. "Our NORD status-oriented maintenance system replaces traditional time-based maintenance to enhance the performance of the gear unit, electric motor and frequency inverter, for increased efficiency of the entire plant and reduced downtime," he adds.

"Digitalisation in drive technology boosts the value our customers derive from drive data. This is especially so in drive systems in demanding production environments, where industrial gear unit installations are usually used in critical applications and their failure could cause severe damage. They are used, for example, in mining, wastewater, intralogistics and the food industry, as well as in general heavy-duty applications."

Crous explains that BMG's NORD drives for condition monitoring use intelligent algorithms and software. In an Industrial Internet of Things (IIoT) environment, networked drive units collect condition data in the inverter's integrated Programmable Logic Controller (PLC) and pre-process it, together with data of connected sensors and actuators.

The intelligent PLC in NORD drive technology forms the basis for condition monitoring and predictive maintenance.

"An important advantage of the system is that it offers our customers dependable data analysis, rather than just reading the data. Results of pre-processing or complete data can be optionally transmitted to an edge device, from which the data of all subsystems is managed and evaluated. This information is then available as preselected and edited smart data for further use and clear visualisation," says Crous.

A common application, for example, is the determination of the optimum oil change time, without needing to use sensors and based on the oil temperature – which is the key indicator of oil ageing in gear units. This information is assessed together with gear unit parameters and specific operational parameters, to calculate the appropriate oil change time.

BMG's electromechanical specialists can extend and adjust NORD drive equipment to serve specific automation tasks, including drive monitoring, drive control and process control. The team can also advise customers about the correct PLC software architecture for each application.

For more information visit: www.bmgworld.net

New solar-powered VSD for agri applications

Schneider Electric South Africa has launched its Altivar Solar ATV320 variable speed drive (VSD), a solar-powered drive solution that is compatible with a wide range of water pumps. It helps to ensure consistent water supply and supports the decarbonisation of irrigation pumping and agri-processing machinery.

The Altivar Solar ATV320 variable speed drive harvests maximum solar energy to run the pump for the maximum duration in a day.

The Altivar Solar ATV320 is Schneider Electric's replacement offer for the Altivar Solar 312 model, which will no longer be produced. The Altivar Solar ATV320 drive is robust, simple to commission and easy to integrate for pumping applications.

Luthando Makiwane, Industry Automation Marketing Manager at Schneider Electric South Africa says, "This product is part of our Access to Energy portfolio, so it is designed for use in remote areas or areas without access to grid electricity. However, it can also reduce energy costs if used in applications where there is electricity, because it is solar-powered. When it is not connected to solar panels, the drive can be connected to the grid," he explains.

The Altivar Solar ATV320 VSD is suitable for use with different types of pumps, including submersible, surface-mounted and water storage tank pumps. It is designed for both residential and agricultural applications.

Agricultural applications

"The Altivar Solar variable speed drive has seen significant

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WEG boosts local manufacturing capabilities

Consolidating its commitment to continuous improvement in its local manufacturing processes, WEG has taken delivery of two laser cutting machines and three bending machines for its sheet metal cutting operation, which forms part of its manufacturing facility in Robertsham, Johannesburg. The state-of-the-art machines have already increased productivity and efficiency, reducing internal delivery times and, in turn, lead times for customers.

Over recent years, WEG has bolstered its capacity across its various manufacturing facilities in South Africa. The Robertsham factory, which specialises mainly in the production of medium voltage switchgear, motor control centres (MCCs), medium voltage soft starters, low voltage variable speed drives and soft starter enclosures, is the latest facility to benefit from a significant capital investment in new manufacturing technology.

Anderson Kohler, General Manager at WEG Africa, says the facility previously operated two conventional punching machines and these have been replaced by the two fibre laser cutting machines – 3 kW and 4 kW units. "The decision was made to replace the old punching machines in order to move beyond the challenges of breakdowns and quality issues. Previously, we experienced less than 50% availability, which meant significant production downtime," says Kohler.

With their exceptional high-precision accuracy, the new fibre laser cutting machines have revolutionised manufacturing processes. The speed at which the machines cut metal is about 50% faster than punching, and the precise slitting ensures cut surfaces have no rough edges, increasing product quality and reducing waste, based on the best use of raw materials.

"Our machine availability is now between 95% and 99%, a big step up from the old machines," says Arno Broodryk, Mechanical Supervisor at WEG Africa.

The machine operator inputting data into the new laser machine at WEG's Robertsham facility.

Kohler adds that fibre laser technology eliminates the need for setup and tooling time because it does not entail physical tooling. These efficiencies mean more time is spent on production, resulting in super swift internal delivery times and shorter lead times for customers.

In addition, WEG has replaced its two old bending machines with three modern units. "Again, the productivity with the new bending technology is unmatched and the quality is outstanding. Previously, we had to set up the bends manually, but the programming software on the new bending machines reduces the need for human intervention," explains Broodryk.

As WEG continues to expand the range of products manufactured locally, the new top-of-the-line bending technology and laser cutting machines offer new capabilities and allow for the addition of new product lines to the sheet metal factory.

"The next step in our investment strategy is the acquisition of a new copper busbar punching machine, which is expected to arrive this year," says Kohler. "Continuous improvement means we can do better today than yesterday, and we can do even better tomorrow."

For more information visit: www.weg.net

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uptake in the agricultural sector, where farmers are looking to reduce energy costs and to adopt green technologies in their operations," says Makiwane.

He notes that Schneider Electric's Access to Energy portfolio is focused on supporting connections to green electricity for 100 million people by 2030 through dedicated product offerings and solutions which are aligned with the company's purpose and mission, as a company that builds to deliver a positive effect in the long run.

The Altivar Solar ATV320 offers several advanced features compared to the previous ATV312 range. These include:

- The dual power supply mode (solar and grid) and a wide dc voltage range which enables users to connect high-wattage panels to the ATV320 solar drive
- Remote On/Off of the pump through SMS or EcoStruxure Energy Access – Livelihood platform and,
- As a dedicated solar drive it incorporates built-in maximum power point tracking (MPPT) and solar-specific functions for multiple solar applications.

"The Altivar Solar ATV320 variable speed drive harvests the maximum solar energy to run the pump for the maximum duration in a day by controlling the speed of the motor based on the power available from solar panels," says Makiwane.

"The built-in MPPT function helps to ensure that the user gets the most power out of the solar panels and that the pump operates optimally throughout the day."

Energy savings

Because the Altivar Solar drive can connect to the grid and solar PV source, it helps to ensure water pumping can be done at night as well, and on cloudy days. The drive is optimised for pumping applications and can achieve up to 30% energy savings. □

Hands-on experience with LV equipment for Wits students

Siemens South Africa has donated low voltage electrical equipment, valued at half a million rand, to the University of the Witwatersrand (Wits). This forms part of Siemens' ongoing commitment to bridging the gap between academic learning and industry needs in South Africa's key sectors, empowering students with critical hands-on skills in engineering.

Sabine Dall'Omo, CEO of Siemens South Africa and Sub-Saharan Africa said, "This donation aligns with our focus on developing skills and empowering local talent. By providing Wits students with access to industry-standard technology, we are preparing them for the demands of real-world industrial environments."

The handover included a range of low voltage equipment, products that are widely used across industries from mining to food and beverage production. The equipment will give Wits students the chance to gain practical experience in working with systems which are best in class and that are commonly used in these industries.

"The various components are integral to controlling and safeguarding industrial processes, such as those used in mining and manufacturing," Dall'Omo added. "Students will benefit from hands-on exposure to real-world technology, which enhances their understanding of the practical application of their academic knowledge and better prepares them for their future careers."

The donation includes low voltage equipment that is widely used across diverse industries.

The equipment will be integrated into training programmes that focus on critical technical skills such as wiring, controlling, and operating motor systems. This practical training will give Wits students an edge in industries where Siemens products are widely used, boosting their employability and technical expertise.

For more information visit: www.siemens.com/za/en

Energy efficiencies can move mining closer to decarbonisation

The global industrial group, Danfoss, participating at Electra Mining Africa this year, shared some of its latest innovations and sustainable solutions, reinforcing its commitment to supporting the African mining industry's journey towards decarbonisation.

Speaking at the event, Craig Rapson, Global Business Development Director for Mining, Minerals, and Cement at Danfoss South Africa, said: "The mining sector around the world finds itself striving to reach net-zero emissions before 2025 and, at the same time, having to increase production to meet growing demand.

"The International Energy Agency (IEA), in its report on *The role of critical minerals in clean energy transitions,* notes that mineral requirements for clean energy technologies would need to quadruple by 2040 to reach the Paris Agreement goal of a global temperature rise limited to well below two degrees centigrade. Mining and minerals processing are energy-intensive industries, and with mining production expected to take a significant upward trajectory, this energy demand will also rise," he said.

"Changing the way in which we deliver energy to the mines will be essential to achieving these sustainability goals. However, it will take enormous investments for a large-scale transition to alternatives, such as solar PV, wind, electrolysers and energy storage systems, and it's important to keep in mind that none of these energy alternatives – on their own – will make mining processes operate in a more energy-efficient way," Rapson continued.

He said this can seem like an overwhelming challenge, but there are steps that can be taken today, with minimum investment, that will pave the way to a sustainable increase in productivity. "This can be achieved through improvements in system reliability, proactive maintenance programmes, intelligent performance monitoring of critical assets and system level optimisation to deliver premium performance and efficiency."

The Danfoss team at Electra Mining Africa 2024.

Looking specifically at the role of variable speed drives (VSDs), Rapson maintains that this technology holds the potential to help reduce energy consumption worldwide, particularly considering that electric motors account for between 50 and 75% of global electrical energy consumption, depending on the region and industrial area.

"VSDs are not new technology, but the technological advances in this space in recent years have been significant, including for example, increased efficiency, smaller footprints and intelligent functionality. Although VSDs are

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A wider choice in industrial gearboxes

As SEW-EURODRIVE in South Africa extends its offerings for customers, the SEW PPK and SEW P2.e industrial gearbox ranges introduce solutions that are well suited to the local business environment.

"As part of a well-established global business, we have the advantage of drawing from the group's production plants in various parts of the world," says Jonathan McKey, National Sales and Marketing Manager at SEW-EURODRIVE. "This allows us to select products that have been tried and tested in sectors relevant to our own, and under operating conditions that are closely comparable."

It means the company is opening up a wider range of choices for customers in South Africa and across the continent, as it 'closes the loop' with the addition of new offerings to complement its successful portfolio.

A valuable recent addition is the SEW PPK planetary gearbox range, originally designed and produced by SEW-EURODRIVE in Brazil – with the country's world-class sugar industry as a key user.

"The depth of the group's research and development capability enabled Brazil to develop the SEW PPK concept, to offer sugar mills access to a low torque solution which complies with SEW-EURODRIVE's stringent global standards and specifications," McKey says. "Later, engineers in Germany additionally developed the SEW P2.e series for larger applications."

SEW-EURODRIVE's newly launched planetary gearbox solutions are available in South Africa.

Both the SEW PPK and the SEW P2.e ranges are now available to customers in South Africa and Africa. McKey highlights that planetary gear units are particularly valuable for applications that require a compact solution in conditions where space is limited, and that also demand high torque and low speed outputs.

"Our SEW PPK range is well suited to southern hemisphere markets, delivering 2 to 18 kNm of torque with a ratio range from 65 to 10 700:1," he says. "The ratio can be further reduced by the addition of a primary reducer before the planetary head, to reach ratios up to 10 650:1 – for a much lower speed capability."

Developed as the 'big brother' to the SEW PPK options, the SEW P2.e series encompasses higher torque ratings from 2 to 124 kNm with ratios from 15.2:1 to 332:1. McKey explains that the SEW P2.e was developed with all the benefits of the SEW PPK, and a broader spectrum in its speed – up to 100 rpm – as well as in ratio and torque. While most planetary gearboxes have a three-stage design, the SEW P2.e can also be supplied in a two-stage model.

"What is exciting for local customers is that we have now brought a complementary range of the SEW PPK and SEW P2.e to this market – presenting a wide selection that will suit many new applications," he says. "This allows us to compete well with other planetary gearbox manufacturers, as we can now offer customers most of the capabilities of other brands – all within the SEW-EURODRIVE stable."

This means customers need spend less time searching across different OEMs for a solution as they will likely find what they need within the expanded SEW-EURODRIVE offering.

McKey adds: "We are the only manufacturer that provides for direct electric motor coupling to a planetary gearbox; this is unique to our SEW P2.e solution," he points out. "Our units also accommodate radial labyrinth solutions, which provides an extra layer of protection for the sealing systems on the output shaft – a valuable feature in corrosive and dusty environments like mining."

For customers wanting to upgrade from previous P-series models of planetary gearboxes to the new SEW P2.e, SEW-EURODRIVE has been careful to retain the same critical dimensions. Greg Lewis, SEW-EURODRIVE Sales Manager, says this means customers don't need to alter their existing infrastructure.

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

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not a cure-all for our CO_2 challenges, if they are used optimally in industrial applications, without compromising production, the benefits become clearer."

Practical solutions for the local mining industry

"Danfoss's contribution to the mining sector is focused on improving operational efficiencies, reducing environmental impact and ensuring the longevity and reliability of mining equipment," says Sikantha Naidoo, Senior Country Sales Manager for Sub-Saharan Africa at Danfoss.

Working as a technology partner with customers wanting to decarbonise through energy efficiency, machine productivity, lower emissions and electrification, Danfoss offers a suite of mining solutions. At Electra Mining Africa 2024 the company showcased its iC7 series, which represents a significant advance in VSD technology and is particularly suitable for use in harsh environments.

The iC7 series is designed to enhance efficiency and reliability. It will enable mining companies to meet their energy efficiency targets and maintain operational excellence, with a focus on reducing CO_2 emissions and saving energy. Compact and easy to integrate into existing solutions, the iC7 range provides efficient heat management, with back-channel cooling, and intelligent security, ready for industrial IoT, with hardware-based protection that prevents unauthorised access and a crypto chip ensuring end-to-end encrypted data transfer.

Danfoss's wider range of mining solutions includes harmonic filters and advanced power systems that are key to improving performance and reducing downtime. □

Reliable temperature monitoring in dairy processing

Milk is a high-quality natural product and, in its processing, precise temperature settings are required. The* Berchtesgadener Land *dairy uses innovative temperature sensors from ifm in key process areas. As well as monitoring process temperatures, these special sensors continuously monitor themselves, to ensure compliance with the highest safety standards and optimise the quality of the dairy products.

The *Berchtesgadener Land* dairy, a cooperative organisation located between the Watzmann and Zugspitze mountains in the foothills of the Alps, processes around 300 million kilograms of milk from its farmers every year.

At the production site in Piding, in the BL district, the milk is used to make premium products with the utmost care. *Berchtesgadener Land's* portfolio includes products such as traditionally produced fresh bottled milk, whipping cream, butter, quark, natural yoghurt, kefir and buttermilk. Lorenz Engljähringer, Plant Manager at the *Berchtesgadener Land* dairy, explains the orientation of the business: "Quality is our top priority. We process the raw milk as carefully as possible and try to produce high-quality products in as few process steps as possible."

The TCC temperature sensors from ifm are used to ensure high product quality.

Temperature monitoring

The quality of all milk products depends on maintaining precise temperatures throughout the dairy process. High-precision sensors guarantee defined temperatures along the entire process chain, from the inbound delivery of the milk in the tankers, to processing and intermediate storage, to outbound delivery of the processed final products.

The Berchtesgadener Land *dairy is a cooperative organisation located in the foothills of the Alps. Every year, it processes around 300 million kilograms of milk supplied by the cooperative's farmers.*

The continuous temperature monitoring also extends to secondary processes such as cleaning and sterilisation, to ensure compliance with statutory regulations and hygiene standards.

Reliable measured values

Sensor manufacturer ifm has developed the TCC temperature sensor for monitoring temperatures at particularly critical points. What distinguishes it is its integrated permanent self-monitoring function.

Christian Doll, Technical Sales Engineer at ifm, explains: "The TCC temperature sensor uses two thermally coupled sensor elements, a sensing element and a reference element to conduct precise measurements in the sensor tip. The measured temperature value is generated by the sensing element and provided via the analogue output or IO-Link. The reference element is used for comparison purposes and to verify the process value.

The effects of ageing can cause inaccuracies in temperature measurement and these can be identified by a drift between the sensing element and reference element. A warning is triggered if the temperature difference ex-

ceeds the predefined calibration check limit. In this case, the LED display on the sensor switches from green to blue and the diagnostic output sends a warning signal to the controller. This permanent self-monitoring across the whole measuring range creates trust in the accuracy of the measured value."

Another advantage of this integrated diagnostic function is that there is no need for a second monitoring sensor to be installed at critical points. This significantly reduces the costs of hardware, installation, and calibration.

The TCC temperature sensor also revolutionises the conventional cyclical replacement of sensors at sensitive measuring points. Instead of being replaced regularly and preventatively, the TCC can be replaced cost-efficiently, as needed. The sensor automatically detects when its accuracy tolerance is reached and alerts the user. Only then is replacement necessary, which means unnecessary preventative replacement can be avoided.

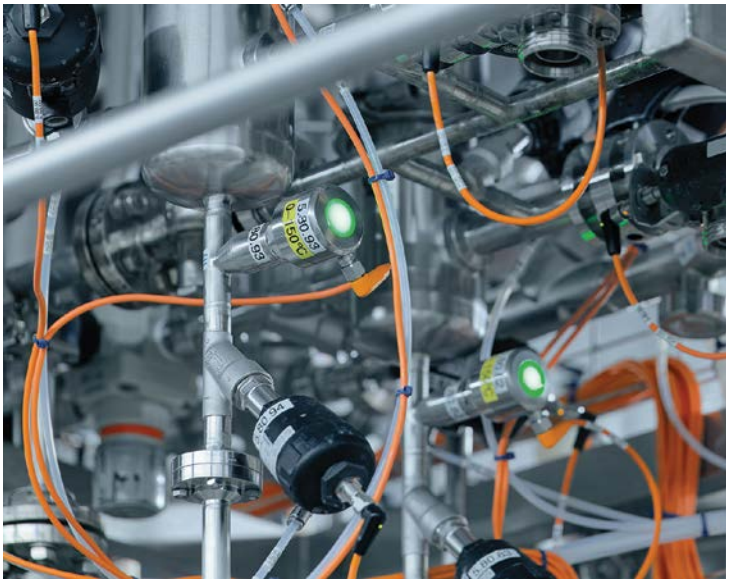
The calibrated process values of the TCC sensor can be considered reliable until the accuracy tolerance is reached. This way, the sensor guarantees maximum measurement value reliability and contributes to maintaining consistently high product quality. Every TCC is delivered ex works with an ISO 3-point calibration certificate, which also contributes to quality assurance. For maximum reliability, the device serial number can be monitored via IO-Link, representing a new dimension for quality assurance and documentation of the process values.

Digital data transmission and diagnostics

In addition to the conventional integration of the sensor via analogue output (4–20 mA) and the diagnostic switching output, the TCC can be connected via IO-Link. This digital communication offers advanced diagnostic options such as being able to read the temperature values of the two measuring elements separately. This allows the user to recognise trends in drift behaviour early, regardless of the set limit. Hence it enables early identification of calibration requirements and timely planning of device replacement. In addition, IO-Link is used conveniently to set the parameters for the sensors, for example to determine the drift limit.

Winning advantage

The dairy has been won over by the advantages offered by the TCC. "The temperature sensors from ifm can be used to ensure high product quality. We use the TCC sensors for in-process measurement of product temperature, cleaning temperature and sterilisation temperature. Because the sensor contains two temperature probes, the process remains stable even if one of the measurement probes is ineffective, because the sensor continues to send the measurement signal of the other measurement element to the controller. The sensors were chosen based not only on their functionalities and the attractive price, but also on their food-safe resistance to alkalis, acids and disinfectants," says Andreas Holleis, Head of Process Engineering & Automation at the *Berchtesgadener Land* dairy.



100% reliable measurement values: self-monitoring temperature sensors from the TCC series with on-board diagnostics in dairy processing.

Automated processes ensure maximum efficiency.

All images courtesy of ifm.

Working with ifm

In addition to the temperature sensors, the dairy uses numerous other ifm sensors including pressure sensors in pipes and tanks and inductive sensors on valve manifolds. Plant Manager Lorenz Engljähringer comments: "We've been working in close partnership with ifm for decades. For us, this is an important building block in achieving our goal of manufacturing high-quality products and being able to make the process safe and efficient."

Having trust in measured values is important,but only continuous self-monitoring guarantees a 100% reliable measured value. This is essential in sensitive processes such as milk production that demand the highest quality. In the *Berchtesgadener Land* dairy application, the TCC from ifm is a key contributor to this. □

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

Industrial sensors and Single Pair Ethernet

Over a series of blogs, a team from Belden including Dr Michael Hilgner, Senior Technology Architect; Cornelia Eitel, Senior Systems Architect; and Lukas Bechtel, Technology Architect, have shared a lot about Single Pair Ethernet and SPE networks. Here they consider how SPE can complement Ethernet networks at the sensor/actuator level, along with the obstacles that need to be overcome so manufacturers of active components (switches and routers) and end devices (sensors and actuators) can expand their SPE portfolios.

From left, Dr Michael Hilgner, Cornelia Eitel and Lukas Bechtel from Belden.

This follows from previous blogs where they identified the core features of SPE[1] technology, explained how adoption will vary across market segments[2] and described the advantages it offers to different stakeholders[3] in industrial automation. Here they focus on the true cost of implementing an SPE network.

Calculating the total cost of ownership for SPE

There are four phases to consider throughout the lifecycle of a network:

- Acquisition
- Commissioning (a distinction could be made here between hardware installation and software setup)
- Operation
- Maintenance

When comparing implementation costs for an SPE network versus a conventional network based on a fieldbus or serial interfaces, acquisition costs are often the only expenses considered. Costs and benefits for subsequent lifecycle phases, such as commissioning, operation, and maintenance, are rarely included. When calculating device costs, prices for Ethernet transceivers and additional circuitry (magnetics) are often compared to the prices for simple RS-485 or RS-232 interfaces.

To determine the true total costs of owning an SPE network, however, a more detailed consideration of all four installation phases is needed.

Conducting cost-benefit analyses across the entire network lifecycle allows sensors to be classified in terms of the probability of SPE adoption.

Single Pair Ethernet (SPE) is on its way to becoming the foundation of the fully automated smart factory.

Analogue sensors

Analogue sensors that have currents (for example, 4-20 mA) or voltages (for example, 0-10 V) proportional to measured variables (pressure or temperature), converted in analogue I/O modules and packaged in Ethernet frames, are rarely, if ever, equipped with SPE due to the low benefit-to-cost ratio this scenario offers.

Simple digital sensors

Simple digital sensors, where the conversion of the measured variable into a digital signal takes place in the sensor and is coupled to an Ethernet network via digital I/O modules, will integrate SPE to a small extent. This allows the sensors to take advantage of the consistent implementation of Ethernet. Moving the Ethernet transceiver from the I/O module into the sensors is particularly useful for applications with a small number of sensors or where there are large distances between them.

Intelligent digital sensors

Intelligent digital sensors connected via fieldbuses or serial interfaces benefit from the higher bandwidth that SPE offers. They also benefit from the security features available for Ethernet. In this respect, a significant level of SPE adoption can be expected for intelligent digital sensors.

Intelligent sensors

Intelligent sensors with high bandwidth requirements are already connected via Ethernet systems today. Consider cameras that require a native bandwidth of between 1.6 Mb/s and 4.3 Mb/s (depending on video quality), with a standard codec (H.264) at a resolution of 2 MP and a frame rate of 20 f/s. This bandwidth requirement increases when additional vital data is transmitted, enabling value-added services, such as maintenance.

SPE adoption is most likely in this sensor category not only because of this requirement, but also (and especially) because of the long ranges of 10BASE-T1L and 100BASE-T1L (the goal of IEEE 802.3dg is 100 Mb/s over 500 m) and the remote power supply via PoDL/SPoE.

Barriers to SPE adoption

To meet the diverse requirements of different target markets for SPE, device manufacturers have defined standards with different bandwidths, cable lengths, and topologies for the physical transmission layer.

There are a variety of industry protocols used for the higher layers, along with diverse connectors that complement different industrial environments[4] and their requirements for features like:

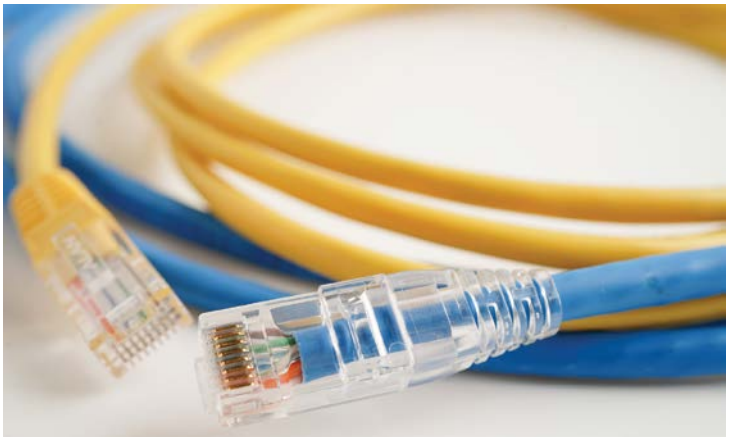
- Impermeability to dust and moisture
- Resistance to chemical substances
- Robustness against mechanical stress and electromagnetic interference (EMI).

Because of the number of possible combinations of requirements, manufacturers of active infrastructure components and end devices will likely counter this complexity by offering solutions that apply only to certain applications that offer an economically viable cost/benefit ratio. While this could slow the overall adoption of SPE networks and technology, early standardisation and establishing common industry standards are possible ways to overcome that.

Manufacturers must also contend with the fact that electronic components have already been developed for automotive applications. Their implementation requires additional effort. A prominent example of this is suitable switch and multi-port transceiver (PHY) chips for SPE being offered by semiconductor manufacturers.

It is currently necessary to connect switch and single-port PHY chips using RGMII, RMII, or MII, which are medium-independent interfaces. With their high number of signals, these interfaces, as well as the use of single-port PHY chips, lead to greater complexity in signal routing on the PCB and increased space requirements.

While modern interfaces, such as SGMII, require four signals per port, 16 signals are required for an MII interface and 8 signals for an RMII interface. In addition, MDIO and MDC management interfaces are required for each single-port PHY chip.



SPE is still a relatively young technology, set to prove itself in more complex sensors before reaching simpler sensors.

SPE multi-port PHY chips with suitable media-independent interfaces, such as SGMII or QSGMII, are currently not available. Specifically, for 10BASE-T1L, these interfaces, which are designed for gigabit operation, are not a focus area for semiconductor manufacturers.

But the development of switch ASICSs (application-specific integrated circuits) is being driven by rapidly increasing bandwidth requirements and, as a result, corresponding MAC-(media access controller)PHY interfaces with multi-gigabit bandwidths are being optimised.

Interface incompatibility must be overcome by additional chips for protocol conversion, making the development of suitable field switches more expensive.

SPE Is set to prove itself

SPE brings innovation potential to the various professionals involved in the four phases of a network installation's lifecycle. This is also strongly reflected in the various standardisation activities in the IEEE (Institute of Electrical and Electronics Engineers) and user organisations.

Despite the IEEE's long standardisation history, SPE is still a relatively young technology that will prove itself primarily in more complex and intelligent sensors before reaching more simplified sensors. With the increasing availability of components and hardware, SPE will continue to assert itself in the direction of the cheaper sensor segments and ensure harmonisation of network components. □

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For more information visit: www.belden.com

Dr Mats Gökstorp (left), Chairman of the Executive Board at SICK AG, and Dr Peter Selders, CEO of the Endress+Hauser Group.

A new partnership in process automation

German sensor company SICK and the Swiss measurement and automation technology specialist Endress+Hauser have agreed on a strategic partnership. In terms of this agreement, Endress+Hauser will take over worldwide sales and service of SICK's process analysers and gas flowmeters, with a joint venture to be established for their production and further development. The aim of the partnership is to provide customers with better support in increasing their efficiency and sustainability.

SICK and Endress+Hauser initially signed a Memorandum of Understanding for a strategic partnership in October 2023. Since then, the project has been examined and plans for implementing the cooperation have been drawn up. Following approval by the respective supervisory bodies, representatives of both companies have now signed a corresponding agreement. The closing of the transaction is planned for the turn of the year 2024/2025 and is subject to approval by antitrust authorities.

Worldwide sales and service

Endress+Hauser will take over sales and service for process analysis and gas flow measurement technology completely. Around 800 specialised sales and service employees in 42 countries will transfer from SICK to Endress+Hauser. Customers will benefit by receiving more products from a single source. The global Endress+Hauser sales network will enable additional customers to be acquired, more industries to be reached and new applications to be developed.

Joint venture for development and production

From 2025, the production and further development of process analysers and gas flowmeters will be the responsibility of a joint venture in which each partner will hold a 50% stake. It will employ about 730 people at several locations in Germany. The joint venture will work closely with Endress+Hauser's competence centres to drive product innovations forward efficiently.

For process automation

The two companies' offerings in process technology complement each other. SICK's products are currently used, in particular, in waste incineration plants, power, steel and cement plants, in the oil and gas industry, in chemical and petrochemical plants and in shipbuilding, for example, for analysing emissions in flue gas cleaning or for measuring the flow of natural gas and hydrogen.

Mutual benefit

"This strategic partnership opens up opportunities for growth and development for SICK and Endress+Hauser. We are taking this path because by collaborating and networking we can achieve more together in a reasonable amount of time than either company could achieve on its own – for the benefit of our customers, employees and both companies," says Dr Peter Selders, CEO of the Endress+Hauser Group.

© Endress+Hauser

Process instrumentation plays a pivotal role in energy and resource efficiency, protecting the climate and environment.

"Our further aim is to drive the sustainable transformation of the process industry and to support our customers in leveraging the opportunities presented by decarbonisation. In the interest of our customers and employees, we look forward to the strategic partnership and to shaping the future of process automation together," says Dr Mats Gökstorp, Chairman of the Executive Board at SICK AG.

Both companies see the sustainable transformation of the process industry as a business opportunity. Together, they want to provide a higher level of support to customers in important areas such as energy and resource efficiency and climate and environmental protection as well as assisting with the decarbonisation of their production processes. SICK and Endress+Hauser have worked together often on an order, project and customer basis. The two family-owned companies also share a long-term corporate approach.

"We look forward to welcoming our new colleagues with their valuable expertise. The planned transition will be carefully prepared so that we can continue to grow together," says Peter Selders.

Factory and logistics automation

SICK is one of the world's leading solutions providers for sensor-based applications in the industrial sector. With 60 subsidiaries and shareholdings as well as numerous agencies, it maintains a presence around the globe. The company has over 12 000 employees. The core business of factory and logistics automation, which accounts for more than 80% of SICK's sales, will not be affected by the partnership.

Business continuity

Both companies are currently working on ensuring a seamless transition of the business at the turn of the year. Until the closing, SICK and Endress+Hauser will continue to support their process automation customers independently.

For more information visit: www.endress.com

Simplifying battery management for dual voltage systems

Power supplies to support remote monitoring stations are often limited in field environments. Most of the telemetry industry uses 24 V or 12 V systems, and this can be a challenge when designing battery backup systems. When instrumentation and radio communication devices run on different voltage supplies, having technology that can adapt to the different voltage requirements is convenient and cost-effective. Here, Ian Loudon, International Marketing and Sales Manager at remote monitoring specialist Omniflex, outlines the advantages of dual voltage power supply.

Telemetry equipment is often used in the field to relay information back to control systems, but one of the big challenges is that there is often a disparity between radio and instrumentation equipment power supply voltages. Providing both 24 V and 12 V in battery standby systems can be expensive and inconvenient.

Radio equipment is often powered on 12 V dc supply – the most readily available batteries. However, analytical equipment, control relays and others often require 24 V dc power. Traditionally, companies have used two power supplies to address this issue. This increases complexity, with more wiring and more maintenance time, typically involving twice the cost in cabling and requiring twice the amount of time for checking on any signals.

Omniflex developed the PTL120C-D dual voltage charger – with 12 V and 24 V dc output – to simplify the challenges of maintaining power supply and backup for remote monitoring stations.

The traditional approach would also require two power supply chargers and batteries for remote monitoring, adding more components to the system. In addition, the draw on the 12 V dc system is different to that on the 24 V dc system, which means the batteries drain at different rates and that raises another maintenance challenge.

Many maintenance teams would carry backup batteries with them, but the most common backup battery is the sealed lead acid battery, because it is relatively cheap and readily available. In high ambient temperature conditions, however, a charger, operating even at trickle charge, will damage the batteries and shorten their lifespan. All sealed lead acid battery manufacturers specify a maximum charging current for the correct life and safe operation of sealed lead acid batteries. The PTL120C-D takes battery protection to a new level by providing a temperature sensor input – where the sensor is attached to the battery – which allows the charge controller to compensate the charging rate according to the temperature of the battery. This extends the battery life significantly.

The maximum charging current for a battery is based on the Ampere-hour capacity of the battery.

A further consideration is that many conventional switch mode power supplies do not control their maximum delivered current and can cause batteries to be charged from flat with current levels that exceed the manufacturer's recommendation.

In addition, during prolonged power outages, backup batteries will eventually discharge. If the load remains connected, the batteries can enter their 'deep' discharge phase, which can cause irreparable damage to the batteries, and reduce their capacity and life expectancy.

To simplify the challenges of power supply and backup for remote monitoring, Omniflex has developed a single product solution in the PTL120C-D dual voltage charger – with both 12 V and 24 V dc output. It provides true split rail battery charging for balanced charging to both batteries, even when 12 V loads are tapped from the battery set.

This protects the batteries from deep discharge events as it contains mains output that is connected as an alarm to indicate loss of primary power – notifying a supervisory system. The battery level is monitored through the charger and the load can be set to prevent damage. Furthermore, an alert will signal that a specialist is needed to fix the problem.

With a simplified design in a compact, single unit solution, the PTL120C-D dual voltage charger makes maintenance easier and flexible, avoiding the need to involve certified wiremen to change power supply through a mains safe IEC connector. □

For more information visit: www.omniflex.com

Jacques Maritz, Quyn International Recruitment & Staffing Solutions.

Streamlining shutdowns – outsourcing specialist skills

Shutdowns in the mining and petrochemical industries are complex, high-stakes operations that require meticulous planning and execution. Procuring specialised skills, managing remote workforces, and handling complex administrative tasks pose significant challenges. Jacques Maritz, National Sales & Service Manager at Quyn International Recruitment & Staffing Solutions says, to overcome these hurdles and ensure the success of shutdowns, many companies are turning to human capital outsourcing.

By working with specialised resource providers, organisations can gain access to a skilled workforce, streamline their operations, and enhance the overall efficiency and safety of the shutdown processes.

Challenges in shutdown execution

Mining and petrochemical companies rely on periodic shutdowns to ensure the optimal performance and safety of their operations. The shutdowns typically involve a comprehensive inspection, maintenance, and repair process for critical equipment. The primary goal is to prevent unplanned equipment failures and subsequent production downtime. Shutdowns allow for in-depth assessments and refurbishment to prepare for future operations.

Outsourcing shutdown activities to third-party OEMs and suppliers is a common practice. However, securing the necessary skilled workforce for these projects presents different challenges. The demand for specialised skills, coupled with the often-remote locations of the operations, can make it difficult to assemble the required teams promptly.

The human capital outsourcing solution

Given the limited duration of a shutdown, it is necessary to bring in workers for a temporary period only, but the cost and administrative burden to the company can be overwhelming. Human capital outsourcing is a practical solution to such challenges and here, specialised outsourcing providers offer a strategic advantage by drawing from a pool of pre-qualified skilled workers. This approach accelerates the recruitment and placement processes, critical factors given the tight timelines of shutdown projects. Specialised outsourcing providers have extensive networks in the mining and petrochemical industries, so they can quickly identify and deploy the skills sets required for specific roles, even in remote locations.

As well as securing the required talent, human capital outsourcing providers offer comprehensive administrative support. Assuming responsibility for human resources, industrial relations, payroll, and compliance functions, they liberate internal teams to concentrate on core shutdown activities. This streamlined approach enhances operational efficiency and yields substantial cost savings, by optimising labour costs and reducing overhead expenses. It also mitigates the risk of errors and delays associated with managing complex HR processes during high-pressure periods, and alleviates the demands on the company's own internal HR resources.

Facilitated by outsourcing, the efficient execution of projects leads to reduced downtime, maximising productivity and ensuring project completion within budget. Beyond these immediate benefits, long-term partnerships with human capital outsourcing providers enable companies to cultivate a reliable workforce with in-depth knowledge of their operations, which allows organisations to use the same workers for multiple mining or petrochemical projects. In doing so, organisations can develop a culture of knowledge-sharing and continuous improvement, leading to enhanced performance and reduced downtime in future shutdowns.

Human capital outsourcing offers a strategic solution for mining and petrochemical companies seeking to optimise shutdown operations. By providing access to skilled talent, assuming end-to-end responsibility for the management of resources required for the duration of the shutdown, and fostering long-term working relationships, outsourcing partners can enhance safety, efficiency, and overall operational performance. □

Outsourcing specialist skills can make complex plant shutdowns more efficient and help save costs.

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

A path towards predictive asset performance management

Charles Blackbeard, Business Development Manager for ABB Ability™ Digital Solutions outlines the evolution from reactive or time-based asset performance management (APM) to Genix APM. He highlights that working with a reliable technology provider can help industrial operators mitigate costly downtime and optimise profitability.

Charles Blackbeard, ABB Ability Digital Solutions.

In today's industrial processes, assets are fundamental to keeping the production cycle turning, avoiding unplanned shutdowns, and ensuring strategic business outcomes. Managing and maintaining these assets dictates the efficiency of industrial operations and companies' capacity to meet customers' needs. With digitalisation, asset performance management (APM) is moving away from traditional time-based maintenance approaches, which can lead to high costs, low output, unplanned work, safety risks, environmental damage, regulatory issues, and energy inefficiencies.

The ABB Ability™ Genix APM suite is a comprehensive asset performance management platform powered by artificial intelligence (AI), the industrial internet of things (IIoT), and model-based predictive data analytics. It enables a paradigm shift towards a more proactive and predictive asset management approach.

Maximising performance, minimising failures

Data is central in APM. Access to data on operational technology systems (OT), information technology (IT), and engineering technology (ET) is helping industries such as oil and gas, refining, and power generation to monitor critical assets proactively.

Applying this data-driven approach, the Genix APM suite leverages advanced analytics and predictive algorithms, and provides insights into asset health, identifies potential issues or failures, and recommends proactive measures to avert unplanned downtime – building reliability. It also reduces maintenance costs and wastage, optimises energy usage, and helps enterprises meet their business and sustainability targets. And it engenders greater confidence among plant operators to act proactively, based on insights obtained, to avoid production incidents.

A lack of visibility across assets can raise risks and potential costs. However, with the Genix APM suite, if triggered by an initial event – such as a process upset or asset degradation – protective measures are automatically implemented to prevent further failures. These measures start with rules-based monitoring, ranging from simple sensor alerts to more complex conditional statements based on multiple sensors.

Genix APM also includes various risk and predictive analysis models. Predictive System and Analytics integrates technologies into a unified APM solution for the process automation industry and facilitates predictive maintenance by contextualising OT, ET, and IT data.

The Genix APM platform can be integrated into ABB's Distributed Control System.

Furthermore, Genix APM goes beyond routine-based predictive maintenance schedules and equipment condition monitoring by providing role-specific actionable insights, assisting plant operators in tactical decision making. ABB's experience indicates that efficient asset maintenance based on real-time data can reduce maintenance costs by more than 15% and downtime in industrial contexts by more than five per cent.

Safety and productivity

Genix APM plays a key role in ensuring safety and helping reduce energy usage by providing data on assets' energy consumption and enabling plant operators to prioritise and optimise productivity. It has been implemented across various industries worldwide.

One significant example is with Norwegian oil and gas producer OKEA, which has a Memorandum of Understanding (MoU) with ABB to deploy digital solutions that help drive smarter, safer and sustainable operations. As part of the MoU, signed in 2019, OKEA has been using ABB's digital offerings, including APM.

Strong domain expertise

ABB is a pioneer in automation, electrification, and digital solutions and is making a difference in enhancing asset performance and extending asset lifespan in diverse industry sectors. In July 2024, ABB was recognised by Verdantix[1] as one of the top ten providers of APM solutions based on the APM capabilities of the Genix suite.

The research firm, which evaluates software suppliers across 18 capability areas and nine strategic success factors, recognised ABB for the advanced functionality and strategic advantages offered by its solutions.

As production processes become more complex, the evolution of more proactive and predictive APM is widely welcomed by industrial companies. Collaborating with a leading solution provider like ABB can help them achieve operational excellence and optimise productivity.

Reference:

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For more information visit: go.abb/processautomation

Advancing thermography – a focus on practical skills development

The Asset Reliability Care – ARC – team at WearCheck continually strives to improve the accuracy and effectiveness of its condition monitoring services. To help customers get the most benefit from thermography, the ARC team has developed a new course highlighting the best ways to capture thermographic imagery. The InfraFocus course, which is mandatory for all WearCheck's ARC technicians, aims to assist users of thermographic cameras within customers' teams to gain new skills.

Operations Manager for the ARC team, Annemie Willer, outlines the merits of the course.

"In thermography, a thermal camera captures and creates an image (thermogram) of an object by using infrared radiation emitted from the object – this is an example of infrared imaging science. The amount of radiation emitted by an object increases with temperature. Hence, thermography allows us to see variations in temperature. When viewed through a thermal imaging camera, warm objects stand out well against cooler backgrounds.

"In industry, thermography highlights machinery components that are outside of the normal or standard operating temperature, indicating a potential problem with the machine. Capturing the correct details in a series of images over time is important, using thermography to gain the best insight into a machine's condition."

InfraFocus: elevating industry standards

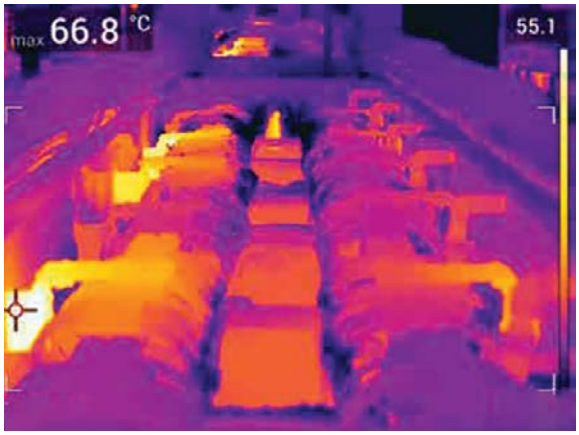
The two-day InfraFocus course reflects the WearCheck ARC team's commitment to excellence. This specialised course, developed in partnership with well-known photographer Francki Burger, addresses key aspects of thermographic imaging that are often overlooked in traditional thermography training: focus, composition, and angle.

In thermography, the precision of thermal images is paramount for accurate diagnostics. Focus ensures that the thermal images are clear and detailed, allowing for precise identification of potential issues. Composition and angle are also important as they influence the contextual accuracy of the images, ensuring they capture the relevant thermal anomalies in a consistent way.

Without proper focus, even the best thermographic equipment cannot deliver reliable results. Composition and angle further ensure that each image provides a true representation of the thermal profile of the equipment being monitored. This is especially critical when comparing images over time to detect changes or trends.

Repeatability confirms data accuracy

Repeatability in thermographic surveys is essential for accurate data analysis. Consistent imaging practices allow for reliable comparison of thermal data across different time periods, enabling the detection of gradual changes that might indicate developing faults. Inconsistent imaging, with variations in focus, composition, or angle, can lead to misinterpretations and incorrect diagnostics, potentially compromising the entire condition monitoring programme.



Focus, composition and angle are important aspects in ensuring accurate and consistent thermal images to guide equipment maintenance.

Practical skills

WearCheck ARC developed this course because traditional thermography courses, although they are comprehensive, often do not offer sufficient practical training in these critical areas. Many of the courses are designed for people with advanced technical backgrounds, leaving a gap for artisans and technicians who may not have the same level of formal education or familiarity with technical terminology.

Recognising this gap, WearCheck ARC developed a focused photography course tailored specifically for thermographers. Working with Francki Burger, a highly regarded photographer known for her meticulous approach to capturing images, the team crafted a course that emphasises practical skills in capturing thermal images with precision.

Francki Burger's expertise in photography has been instrumental in transforming WearCheck's in-house thermographers' approach to capturing thermal images. Her experience in various photography domains, where precision and consistency are critical, has provided valuable insights especially on the importance of focus, composition, and angle.

Since implementing this specialised training internally, the WearCheck ARC team has noticed a significant improvement in the quality and consistency of thermal images captured by its thermographers. This has enhanced the repeatability of data, leading to more accurate diagnostics and more reliable condition monitoring reports.

As the team continues to develop and employ machine learning algorithms to expedite its analysis processes, the consistent quality of the thermal images will

Continued on page 25

Routine maintenance for dry-type transformers

One of the benefits of dry-type transformers is the limited maintenance they need, which means considerable savings on costs and time for owners. Dry-type transformers also offer reliable performance over lengthy lifespans, with few of the risks and hazards associated with oil cooled transformers.

David Claassen, Managing Director of dry-type transformer specialist Trafo Power Solutions, explains that because the units are air cooled, much of the limited servicing required relates to maintaining clear air channels, which can be compromised by the accumulation of dust layers.

"To allow for the transformer to cool effectively, it is important to check regularly that there is not an excessive build-up of dust on or around it. Depending on the ambient conditions, dust can build up in these confined spaces and start to impede the free flow of air."

An accumulation of dust can be easily cleared using a leaf blower or similar appliance to remove the dust from the transformer. This method quickly disperses the dust, leaving the surfaces clean and allowing for more efficient heat transfer.

He highlights that a regular maintenance schedule is especially important in applications such as coal mines, where there are often high dust levels. Where dust layers prevent adequate cooling, the transformer could run at temperatures higher than its design parameters. This, in turn, degrades the insulation material faster and could significantly reduce the unit's lifespan. Even where a completely sealed enclosure is used (≥ IP55), dust can enter the enclosure when the doors are opened, or if the doors are left open accidently.

"It is also important to check that the temperature probes are measuring accurately," Claassen notes. "This, of course, ensures that any unexpected rise in temperature will trigger an alarm, and that the feed-in circuit breaker to the transformer is tripped in the event of overheating."

Terminals on the transformer should also be checked, as it is possible for these connections to loosen over time due to vibrations or other factors. This is a simple process of checking the torque on the connection points, as any looseness could lead to partial discharge, heat build-up and further damage.

To guide the customer in maintenance planning, Trafo Power Solutions provides a maintenance manual with each installation. This details the required frequency of service interventions, which in a clean indoor environment is usually only once a year. Under dusty conditions that might be encountered outdoors, the maintenance should normally be conducted every six months.

One of the benefits of dry-type transformers is that they need only limited maintenance.

"Beyond our standard requirements, we also provide our customers with site-specific servicing guidelines that suit the application and environment," says Claassen. "We can provide the maintenance service too, should the customer require this, ensuring they have access to a detailed log of the maintenance results and recommended interventions."

He explains that, although the maintenance tasks are generally straightforward, the transformer does need to be de-energised by a qualified technician before the work is conducted. This ensures compliance to regulations relating to medium voltage equipment, including procedures for lock-out and isolation.

"A key advantage of dry-type transformers is that the maintenance procedures are relatively quick and simple compared to those required for oil cooled transformers," he says. "One difference in the servicing of these two technologies is that conventional oil cooled transformers require oil samples to be taken regularly and sent away for testing and analysis. This can be a costly and time-consuming addition to the total cost of ownership."

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

Continued from page 24

be crucial. Enhanced repeatability will ensure the algorithms can interpret the data accurately, leading to quicker and more precise fault detection.

For customers, the course can be run on-site at a customer's premises, or at WearCheck's offices. The course is already in demand and can be held wherever requested. To date, customers in Mozambique and around South Africa have completed the course.

Annemie Willer says, "We are excited to offer this training to the industry and look forward to seeing the positive impact it will have for customers in their thermography practices."

For more information customers can contact Louis Peacock, WearCheck Technical and Training Manager, at Louis@wearcheckrs.com.

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

Testing, inspection and training services together

Dekra Industrial and its training division, the Dekra Institute of Learning (IOL), recently moved into new premises in Naledi Industrial Park outside Sasolburg and the company has extended its existing premises in Secunda – establishing a 'one-stop' shop offering non-destructive testing (NDT), inspection, lifting inspections, vendor certification and adult-based occupational training.

The new and upgraded premises reflect the company's focus on growth and its commitment to enhancing client relationships, operational efficiency and community engagement.

The expanded premises also mark a strategic shift to bring DEKRA Industrial and the IOL operations together, rather than having them operate as two separate entities.

Johan Gerber, Managing Director of Dekra Industrial says, "By co-locating under one roof and consolidating NDT, inspection services and training, the company can offer a holistic, safe and seamless service to clients, as the 'heroes of safety' which we strive to be. This is in line with our parent company Dekra's commitment to being a global partner for a safe and sustainable world by 2025," Gerber says.

By consolidating its testing, inspection and training services, the company is already attracting new business and strengthening its relationships with longstanding clients in key sectors.

Enhanced proximity and efficiency

Gerber also highlights the operational benefits of the expansion explaining that the move was essential to accommodate the company's growing footprint and scope of services. "The new premises in Sasolburg and expanded premises in Secunda have brought us physically closer to our clients, so our response times are reduced from 45 minutes to just 15 minutes, to be on site. This leads to significant improvements in operational efficiency for Dekra Industrial and our clients."

The new Sasolburg premises in the well-known Naledi industrial park positions both Dekra Industrial and the IOL close to key clients in the petrochemical and other sectors.

Gerber also notes that the consolidation of DEKRA Industrial and the IOL under one roof allows for the delivery of a stronger and comprehensive service offering: "By combining our services, we can offer a unified solution to our clients, which was previously not possible due to space constraints," he adds.

The Secunda branch has also expanded its offerings and capabilities, particularly in the area of NDT replica services, which are crucial for assessing the structural integrity of components under stress.

A stronger community focus

Christopher Mörsner, Head of Training and Consulting at the Dekra IOL, says the move supports the IOL's Vision 2028, which is centered on making a difference – and a sustainable impact – through adult-based occupational training and skills development. He points out that the consolidated services in Sasolburg will help to meet the needs of the local industry by bringing training services directly to clients in the Vaal Triangle region.

Dekra Industrial RSA's new premises in Naledi Industrial Park outside Sasolburg.

"Our ability to offer QCTO*-accredited safety and occupational training, adopting a flexible, hybrid approach, allows us to provide tailored solutions to meet our clients' requirements," says Mörsner.

[*QCTO Quality Council for Trades & Occupations]

He emphasises that as well as supporting local businesses, "this model fosters employment opportunities for the community by providing affordable, accessible training for those already in industry seeking to grow, and for school-leavers who cannot go to university."

Client engagement

The initiative to expand the premises was motivated by Donovan Vermeulen, Dekra Industrial Vaal Triangle Branch Manager, who recognised the strategic benefits of moving closer to key clients in the region.

He notes that this proximity means Dekra Industrial can respond to client requirements far more swiftly, particularly during critical situations such as breakdowns.

He also highlights the beneficial effect that the new and expanded premises have had on the company's employees, saying that the move to larger premises has boosted morale and productivity. "The team is more motivated, and the improved working environment has led to better service delivery. Happy employees work better! As the business grows, we aim to create more local employment opportunities, further contributing to the community," he says.

Holistic industrial solutions

Gerber makes the point that clients increasingly prefer working with a single provider that can meet all of their needs. "Our new and expanded premises demonstrate our commitment to offering a comprehensive, integrated NDT, inspections and training service to our valued clients." □

Safety is key in monitoring mining environments

ACTOM Industry, which is well known for its expertise in mine winder hoists within the ACTOM group, is expanding its portfolio with the introduction of fire detection and safety solutions designed for explosive atmospheres. Leveraging its advanced power electronic drive, control, and switchgear technology, ACTOM Industry continues to lead the industry in providing enhanced safety and protection in hazardous environments.

Intrinsically safe fire detection systems

Janna Kapp, General Manager at ACTOM Industry, says the company's fire detection systems, rigorously tested and certified by the South African Bureau of Standards (SABS) to meet the stringent criteria of SANS 1515, are intrinsically safe for use in explosive atmospheres. This approval underscores ACTOM Industry's commitment to safety and quality. Its comprehensive range of fire detection systems includes:

- Air Velocity Detectors
- Carbon Monoxide Detectors
- Methane Detectors
- Particle Smoke Detectors.

In 2023, ACTOM Industry acquired sole ownership of the Safdy Air Velocity Detector and the Safdy Methane Detector, consolidating its position as the premier provider of safety solutions. The acquisition gives it exclusive rights to manufacture, market, and distribute these products.

Formerly known as the Safdy flow meter, the ACTOM Air Velocity Detector features a solid-state airflow sensor designed specifically for monitoring airflow rates in challenging environments typical of mining operations. Using the reliable VORTEX method, it ensures precise measurements, independent of small particles, to ensure optimal performance even in dusty or high-moisture conditions.

ACTOM Industry supplies a range of intrinsically safe fire detection systems to support safety in mining environments.

In underground mining, proper air circulation is vital for safety. The ACTOM Air Velocity Detector quickly detects any decrease in airflow, alerting operators within seconds through SCADA systems. The detector is housed in a robust metal enclosure to withstand impacts during handling and minimise the effects of crossflow, ensuring consistent and reliable performance.

Extensively tested in the South African mining sector, the Air Velocity Detector has proven to be the top choice for underground applications. It delivers a measurement accuracy of about 89% and is unmatched in durability and precision. Its resilience against water mist and dust minimises maintenance demands, ensuring continuous safety in hazardous environments.

With its advanced solutions delivering proven performance, ACTOM Industry confirms its commitment to safety in industrial settings.

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

Advanced digital circuit breaker analyser

The CT-8000 S3 is Vanguard Instruments' fourth generation EHV (Extra High Voltage) circuit breaker analyser. The CT-8000 S3, with integral 200 A source, is available with three or six contact timing channels. It can fully analyse a circuit breaker's performance by measuring the main contact and resistor contact time, stroke, velocity, over-travel, bounce back and contact wipes.

Another outstanding feature of the CT-8000 S3 is the ability to perform dynamic resistance tests on circuit breaker contacts. It is also capable of performing dual side grounded tests on circuit breakers, enhancing safety and accuracy by grounding both sides of the apparatus during testing and helps to reduce test set up time.

As well as the USB computer interface and flash drive interface, the analyser can be supplied with an optional

The CT-8000 S3 is an advanced digital circuit breaker analyser used to test EHV installations.

Bluetooth wireless computer interface. It can store up to 200 test records and 100 test plans internally. □

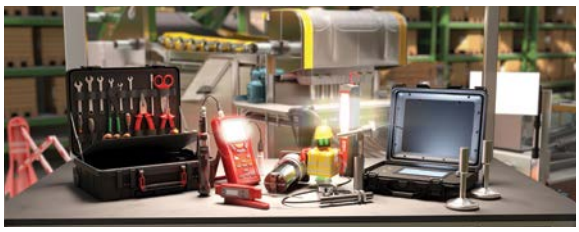
Comprehensive solutions for planned maintenance

RS PRO, the own brand of RS, offers a comprehensive selection of over 80 000 products spanning diverse industries and technologies. Well-known for its quality and extensive range, RS PRO offers a smart choice for businesses and working environments.

Planned maintenance is a crucial aspect of every production cycle, and manufacturing companies regularly schedule downtime for this purpose. To support these maintenance activities, RS PRO is expanding its Planned Maintenance range. It will add over 850 new products across more than 24 categories to its portfolio, providing all the components and materials needed to optimise the maintenance process.

Building on the existing range of over 55 000 products, with the additional products RS aims to offer its customers a comprehensive selection at a competitive price.

The new range offers solutions for minimising downtime, increasing productivity, and reducing costs. This extends from monitoring equipment to assess machine performance to having the right parts available when needed. Test & measurement, automation components, lighting, cable accessories, batteries, fasteners & fixings, lubricants & greases, tools, PPE, site safety, and cleaning solutions – RS PRO offers a comprehensive one-brand solution for diverse maintenance needs.



RS is expanding its own brand of solutions for maintenance across diverse industries.

The expansion of planned maintenance solutions caters to a broad spectrum of sectors, including discrete and process manufacturing, energy and utilities, facilities and intralogistics. With this new range expansion, RS PRO ensures that its solutions can address the needs of each customer.

In the ever-changing industrial environment, RS PRO is committed to quality and choice, offering customers a comprehensive range that meets design and compliance specifications at all stages of the product lifecycle.

For more information visit: https://za.rs-online.com/web

Prioritising safety for maintenance teams

The VKB Group, a leading agricultural enterprise and key employer in the rural Eastern Free State, has chosen SafeGauge, a wireless, digital measurement tool, to enhance the safety of its service and maintenance teams at its Reitz service centre. This decision highlights VKB's commitment to prioritising safety, using advanced technologies to protect its workforce and maintain efficiency while ensuring the smooth operating performance of its farming equipment. It also sets a new safety standard in the farming sector and underscores VKB's dedication to continuous improvement.

Supplied by Booyco Electronics, the official South African distributor, SafeGauge's wireless monitoring solutions are designed to eliminate the need for technicians to work close to potentially dangerous equipment.

Louis Venter, Area Sales Manager at Booyco Electronics, says using SafeGauge's innovative wireless measurement tools, VKB's service and maintenance teams can measure hydraulic and pneumatic pressures as well as wear tolerances or alignment from a safe distance.

"This changes the traditional way of working and minimises the risk of injury during routine maintenance, or in situations where equipment failure could pose a hazard," he says. "The adoption of SafeGauge's technology is particularly significant for VKB's servicing operations in Reitz, where heavy machinery such as Case tractors and combine harvesters are routinely serviced and repaired. With the SafeGauge kit, technicians can perform the necessary checks and measurements without coming into direct contact with the machinery, enhancing overall safety."

SafeGauge's wireless monitoring solutions are designed to allow technicians to work at a safe distance from potentially dangerous equipment.

Venter says in addition to safety benefits, the implementation of SafeGauge will support improvements in operational efficiency. The wireless measurement tools enable faster and more accurate data collection, which reduces downtime and ensures machinery is maintained at optimal performance levels. This aligns with VKB's goals of maximising productivity and minimising the impact of equipment failure on its clients' farming activities.

"By selecting SafeGauge, VKB is addressing immediate safety concerns and investing in its service operations. The technology can be easily integrated with digital platforms, providing for enhanced data analysis and predictive maintenance capabilities," Venter says. "This proactive approach will help VKB to continue operating efficiently while maintaining a strong focus on the well-being of its employees." □

SA's next generation of skilled artisans

Addressing the skills shortage, boosting inclusive economic growth, reducing unemployment and aligning with South Africa's National Development Plan (NDP) aim to produce 30 000 skilled artisans annually to 2030 – these are the objectives of the Sasol and Kagiso Trust National Skills Competition. The national finals took place in the last week of September in Johannesburg.

Through this annual skills competition, the partners intend to contribute to boosting the vocational skills pool of the country. The initiative is dedicated to the promotion of skilled trades and technologies as viable, first-choice career options for South African youth. The competition aims to encourage young people to consider a career in specific technical skills, develop their craftsmanship and make use of the latest technologies, and it highlights the many opportunities open to people trained in these fields of specialisation.

August and September saw learners and teachers from various schools across the country compete against each other and demonstrate their skills in welding and metal work, woodwork, civil services, construction, automotive engineering, electronics, electrical work and power systems, and engineering graphics and design (EGD). At the end of the finals week, the top students and teachers from each province competed for the winner's title in each category, with prizes including apprenticeships worth some R300 000 from the Artisan Training Institute and scholarships worth R20 000 from CAD4ALL and StemLAB, as well as robotics kits, toolsets, courses and vouchers with other prize sponsors including Modena and Old Mutual.

Dr Mankodi Moitse, CEO of the Kagiso Trust, said: "We recognise that addressing South Africa's skills gap, particularly in artisanal trades, is essential for the economic empowerment of the country's youth. By partnering with the Sasol Foundation and the Department of Education in this initiative, we are promoting vocational training as a viable career option and directly contributing to the future of the country's economy. Programmes like these build a pipeline of skilled individuals who will drive innovation and growth and help us overcome the pressing issue of youth unemployment."

Gao Mothoagae, Vice President for CSI and the Sasol Foundation noted the increasing number of girl learners year on year as an exciting trend, "and they are not only participating, but winning their categories. This is a trend worth celebrating as more women become skilled in various trades and equip themselves to become more financially independent," Mothoagae said.

"As a transformational pathfinder in education, fuelling the growth of human potential in the fields of engineering, science and technology, Sasol bridges the skills gap to foster adaptability in a transitioning world. Skills competitions raise professional standards, and they raise awareness of the potential of a skilled career, opening up the possibilities to a much wider range of people," Mothoagae continued.

Winners in the various categories of the Sasol and Kagiso Trust National Skills Competition were recently announced. Electrical work and power systems is one of the categories in which learners, and teachers, compete.

She said that for sustainable development to happen, there is an urgent need to pay attention to training highly skilled human resources to serve as drivers of the economy.

Running for seven successive years already in some provinces, the Sasol and Kagiso Trust schools national skills competition has the potential to develop the skills of more than 10 000 participating learners and their teachers.

Sasol itself benefits from encouraging skilled youth in its fence-line communities who can participate in shutdown processes and other technical community projects. This further benefits the communities in which it operates too. Kagiso Trust benefits for its many programmes advocating for access to in-demand skills that will empower the youth and their communities.

This Junior Skills competition this year came at the conclusion of the World Skills Championships, a biennial competition that sees various countries compete. It takes about five years to prepare the national team that participates in these global competitions, and the schools skills competitions contribute towards this preparation for the South African team.

For more information visit:
https://www.sasolfoundation.com/

Cybersecurity in South Africa's public sector

Following a series of cyber-attacks on state owned enterprises and government institutions it seems that South Africa's public sector has become a prime target for cybercriminals. Cybersecurity specialists at ESET Southern Africa, say more robust security measures and greater awareness among public sector workers are needed to help close the gaps in cybersecurity.

One of the most significant issues in the public sector is the lack of comprehensive security management. The public sector, and municipalities in particular, remain among the most unmanaged environments in terms of cybersecurity. Although most entities have basic antivirus systems in place, these solutions are inadequate for the scale and complexity of their operations and often miss other critical elements which are necessary for an overarching cybersecurity strategy.

This lack of tailored cybersecurity solutions leaves public sector entities vulnerable to a range of threats, which are increasingly complex and sophisticated. From ransomware attacks to data breaches, the consequences of cyber-attacks in the public sector can be severe.

Financial and operational impact

The financial toll of cybercrime on South Africa's public sector is a major concern. The Department of Public Works and Infrastructure recently reported that R24 million was stolen in a cyber-attack in May 2024, adding to the R300 million stolen over the past decade. Such incidents are not isolated. The Council for Scientific and Industrial Research estimates that cybercrime costs the South African economy up to R2.2 billion annually.

Beyond financial losses, the operational impact can be just as severe. The 2021 attack on Transnet's ports caused widespread disruption to critical import and export activities. These incidents don't only affect the targeted entity. They have far-reaching consequences that can disrupt entire supply chains.

Policy and governance

In response to the growing threat, the South African government has introduced the Directive on Public Service Information Security. Issued under the Public Service Act, 1994, this directive provides much-needed guidance on information security governance for national and provincial departments. However, more needs to be done to enforce these policies and ensure compliance across the public sector.

There is a need for stronger governance and accountability. Public sector entities should have dedicated security teams, including Security Managers and Chief Security Officers, who can oversee the implementation of cybersecurity measures and ensure systems are regularly audited for vulnerabilities.

Securing South Africa's public sector in cyberspace requires robust technology, the right mindset, and appropriate skills.

Stealth and sophistication

One of the most concerning aspects of cyber-attacks today is the ability of hackers to remain undetected within systems for extended periods and use sophisticated tactics to get employees, unwittingly, to release company payments into the wrong hands. Hackers can lay dormant in a network for up to 298 days. During this time, they can collect passwords, banking information, and other sensitive data, only to strike when the moment is right.

There are other examples where hackers duplicate the mailbox of a director, convincing personnel to make unauthorised purchases. These relatively low-level breaches can quickly escalate into major financial losses and operational disruptions.

Proactive cybersecurity

A proactive defence strategy is extremely important for public sector organisations to stay ahead of cyber criminals. This includes implementing advanced technical solutions and developing a culture of security awareness among employees. Moving away from a reactive mindset towards a more proactive, preventive approach is a step in the right direction.

Cybersecurity is not a one-time solution; rather, it's an ongoing process that requires vigilance, adaptation, and a willingness to invest in people and technology to keep entities safe.

ESET Southern Africa's cybersecurity team has the expertise to offer guidance that will help government institutions strengthen their defences and implement proactive cybersecurity strategies.

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

Waste to wealth: critical material recovery from secondary sources

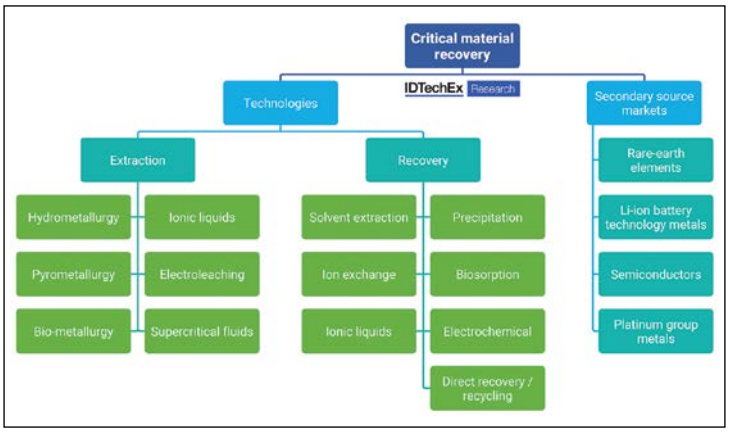
Dr Jack Howley, Technology Analyst at UK-based research organisation IDTechEx, says end-of-life equipment from automotive vehicles, electric vehicles, e-waste and decarbonised energy technologies is rapidly emerging as a secondary raw material source for valuable critical materials. Howley refers to IDTechEx's new report, *Critical Material Recovery 2025-2045: Technologies, Markets, Players,* which forecasts that US$110 billion of critical materials will be recovered annually from secondary sources by 2045, with a combined weight of over 3.3 million tonnes. The report looks closely at secondary source critical material recovery technologies, markets, key players, and evolving value chains. Technical innovations are explored across four prominent critical material segments, including lithium-ion battery technology metals, rare-earth elements, platinum group metals, and semiconductors. IDTechEx predicts that the critical material recovery market will grow at a CAGR (compound annual growth rate) of 12.7% from 2025 to 2045.

Critical material recovery from secondary sources seeks to alleviate growing global material supply risks and their impact on regional economies. Critical materials, such as lithium, nickel, cobalt, rare-earth elements, platinum group metals, silicon, and other semiconductors underpin all modern technology. However, the high level of localisation geographically of critical material market supply chains – both primary critical mineral deposits and processing steps – presents major risks to many economies. These factors are creating a strong market pull for critical material recovery technology that uses secondary raw materials as an alternative to primary sources.

Secondary raw materials are valuable sources for critical material recovery. Global megatrends in mass digitalisation across consumer, transport, energy, communication, and industrial sectors have consolidated large volumes of critical materials into devices and equipment. As a result, the content of critical materials in anthropogenically derived sources is often higher than in primary mineral deposits. As the volume of critical material containing equipment reaching end of life increases year-on-year, the secondary source stream for critical material recovery becomes more valuable. The IDTechEx report evaluates the critical material market, analysing the content of key secondary sources and forecasting the volume of secondary raw materials recoverable by 2045.

Howley highlights that critical material recovery technologies are largely ready to go; it is just a question of how easily they can be repurposed for secondary material sources. Critical material extraction and recovery technologies pioneered for primary mineral processing are scalable with high recovery efficiency, so they are well-positioned for deployment in secondary source streams.

A major challenge in deployment remains adapting the processes to the distinct composition of secondary materials, which contain complex mixtures of critical materials with plastics, adhesives, films, low-value metals, and inorganic material. This report evaluates 13 critical material extraction and recovery technologies, providing case studies on their commercial application in secondary sources.



Critical material extraction and recovery technologies and key critical material market segments covered in the report. [Source: IDTechEx]

Looking forward, critical platinum group metals (PGM) recovery from secondary sources will dominate market value share in 2025, but Li-ion battery technology metal and rare-earth elements markets will emerge soon after that. The high market value of palladium, platinum, and rhodium and their high density in automotive scrap has defined the established PGM secondary source market for decades. However, growing consolidation of critical materials in decarbonised energy and transport technologies will drive a significant value transfer into their associated applications. As growing quantities of electric vehicles reach their end of life by 2045, lithium, nickel, cobalt, and manganese from batteries and rare-earth elements from drive motor magnets will emerge to represent the largest source of recoverable value.

The new report *Critical Material Recovery 2025-2045: Technologies, Markets, Players* leverages IDTechEx's cross-discipline expertise in critical advanced materials, sustainability, and recycling technologies. The team of analysts builds on decades of experience covering emerging technology markets dependent on critical materials, including batteries, energy storage, electric vehicles, the hydrogen economy, and semiconductors.

The report provides market intelligence about critical material recovery technologies for four key secondary source segments. It also characterises globally identified emerging critical materials and the associated emerging secondary source recovery opportunities. This includes:

- A review of the context and technology behind critical material recovery from secondary sources
- Full market characterisation of critical material recovery technology in key secondary source segments
- Market analysis throughout.

For more information visit: www.IDTechEx.com

Renewable energy for Limpopo water partnership

Sustainable Power Solutions (SPS), a leading asset management company in the renewable energy sector, has been selected as the preferred bidder to provide a renewable energy solution to power key infrastructure for the first stage of a critical water infrastructure development programme in Limpopo: the Olifants Management Model Programme (OMMP). The contract was awarded by the Lebalelo Water User Association (LWUA), soon to be known as Badirammogo Water User Association. SPS will provide a solar photovoltaic (PV) and Battery Energy Storage System (BESS) solution for this first stage of the programme.

Public-private collaboration

The OMMP is a public-private collaboration between institutional members (government) and commercial members (the private sector, including mining companies and industrial users), and is being implemented by the LWUA.

The OMMP involves construction of 200 km of bulk raw water pipelines and 675 km of potable water pipelines, as well as several pump stations, reservoirs and water treatment works. To be rolled out in phases, the programme is designed to fast-track bulk raw and potable water supply infrastructure for communities and commercial users in Sekhukhune and Mogalakwena, optimise existing infrastructure and water supply of the De Hoop and Flag Boshielo Dams in the Middle Olifants catchment, and enhance water supply to Polokwane Local Municipality, which faces a 30 Ml/day water shortage.

Renewable energy-powered water supply

As part of the contract, SPS will employ leading-edge solar and battery technologies to power key infrastructure that forms part of Phase 2B and 2B+ of the OMMP, for a duration of 25 years. Phase 2B and 2B+ include a new pipeline that will transport bulk raw water from the Flag Boshielo Dam to reservoirs across the Northern Limb of the Bushveld Igneous Complex. From there, 40% of the water will supply mines, and 60% will be treated at water treatment plants in Mokopane and Sekuruwe, to provide potable water to 140 000 community members and address Mokopane's water shortfall.

The solar energy capacity will start at 16 MWp, increasing over two further phases over the next 10 years to 23 MWp in the final phase. The BESS, with a capacity of 13.3 MWh, will ensure reliable and sustainable power supply for the three pump stations under construction, each to be equipped with two 3.5 MW pumps. The hybrid solution will provide all operational and auxiliary power to the three pump stations, as their locations currently prevent connection to the national grid.

Phase 2B and 2B+, which include the energy supply, the construction of the bulk raw water pipelines, pump stations, reservoirs and two water treatment works in the Northern Limb, are expected to be completed within 28 months following final contracting. The renewable energy solution from SPS will be one of the largest off-grid solar initiatives in South Africa to date, providing electricity to underpin water distribution. Valued at R800 million in its initial investment, the SPS contract constitutes an integral part of the larger OMMP, which is optimising and accelerating the completion of the government-conceived Olifants River Water Resources Development Project and expanding its scope to include potable water infrastructure.

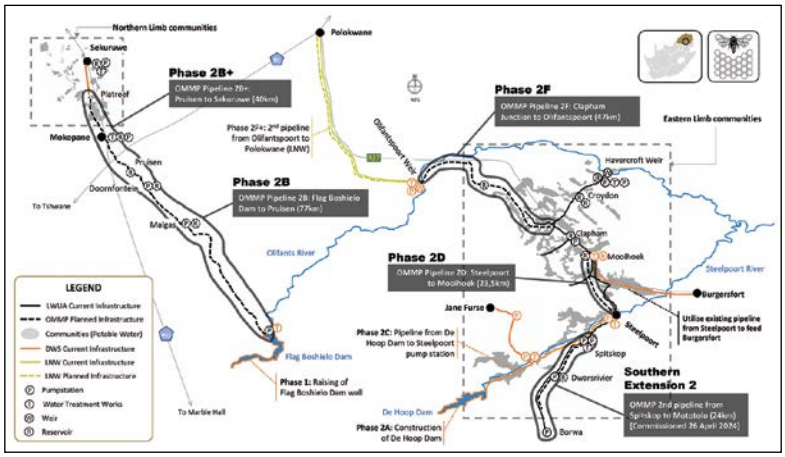
LWUA, with more than two decades of experience, already serves communities in Sekhukhune through its bulk raw water supply to the Department of Water and Sanitation's infrastructure, and commercial users, including platinum and chrome mining operations. The steady water supply provided by the OMMP will be crucial for current and future mining processes in the areas to be served. It will support improvements in production efficiency, operational reliability and potential expansion, and, importantly, contribute to local economic growth.

Bertus Bierman, CEO of the Lebalelo Water User Association comments: "SPS emerged as the successful bidder in a competitive tender process, showcasing their extensive expertise, flexibility and ability to tailor funding solutions. Their innovative approach to integrating renewable technologies and sustainable practices positions the company well to meet the energy needs of this project."

Paul Rosenbrock, Business Developer at SPS, says, "We are leveraging our renewable energy expertise to make a real difference in communities that need it most. By supplying a renewable energy solution that will pump bulk raw water into areas currently lacking access, we are supporting the mining sector and fundamentally improving the quality of life for thousands of people."

The energy supply solution will also have a significant environmental benefit, reducing carbon emissions by over 13 million kilograms annually, by eliminating the need for diesel generators.

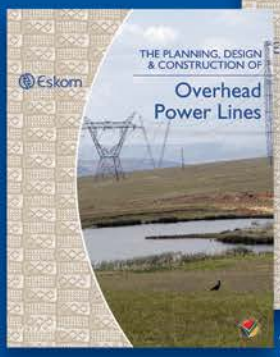
For more information visit www.sps.africa



A map of the OMMP area in Limpopo.

Eskom

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



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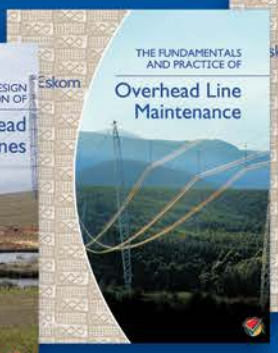

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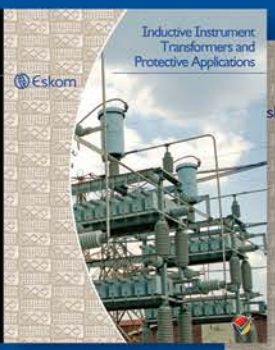

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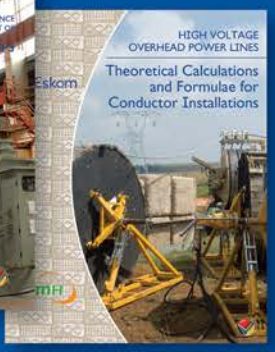

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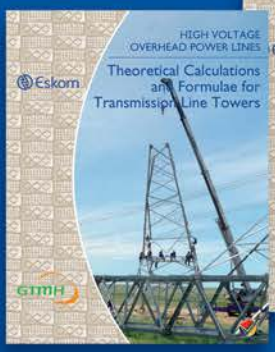

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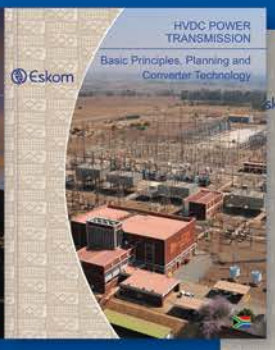

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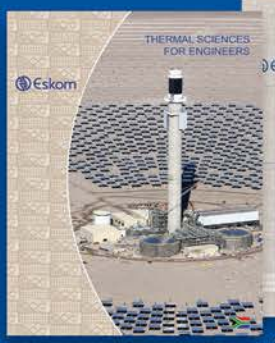

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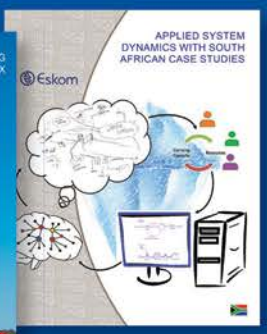
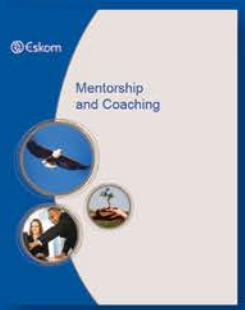


Volume 13: Applied System Dynamics with South African Case Studies

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



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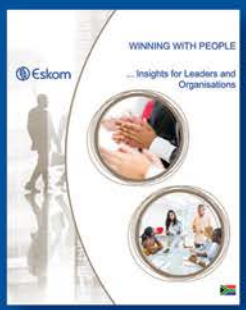

Volume 2: Winning with People ... Insights for Leaders and Organisations

Volume 1: Procurement Management Key Concepts and Practices

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

Eskom has also published: GENERATION, TRANSMISSION AND DISTRIBUTION: A large Southern African utility. This is an introduction to the technology that has developed, over time, in response to growing demand in the electricity utility industry in South Africa. It provides a 'soft-landing' for those who need, or want, to engage with the technology in a large electricity utility.

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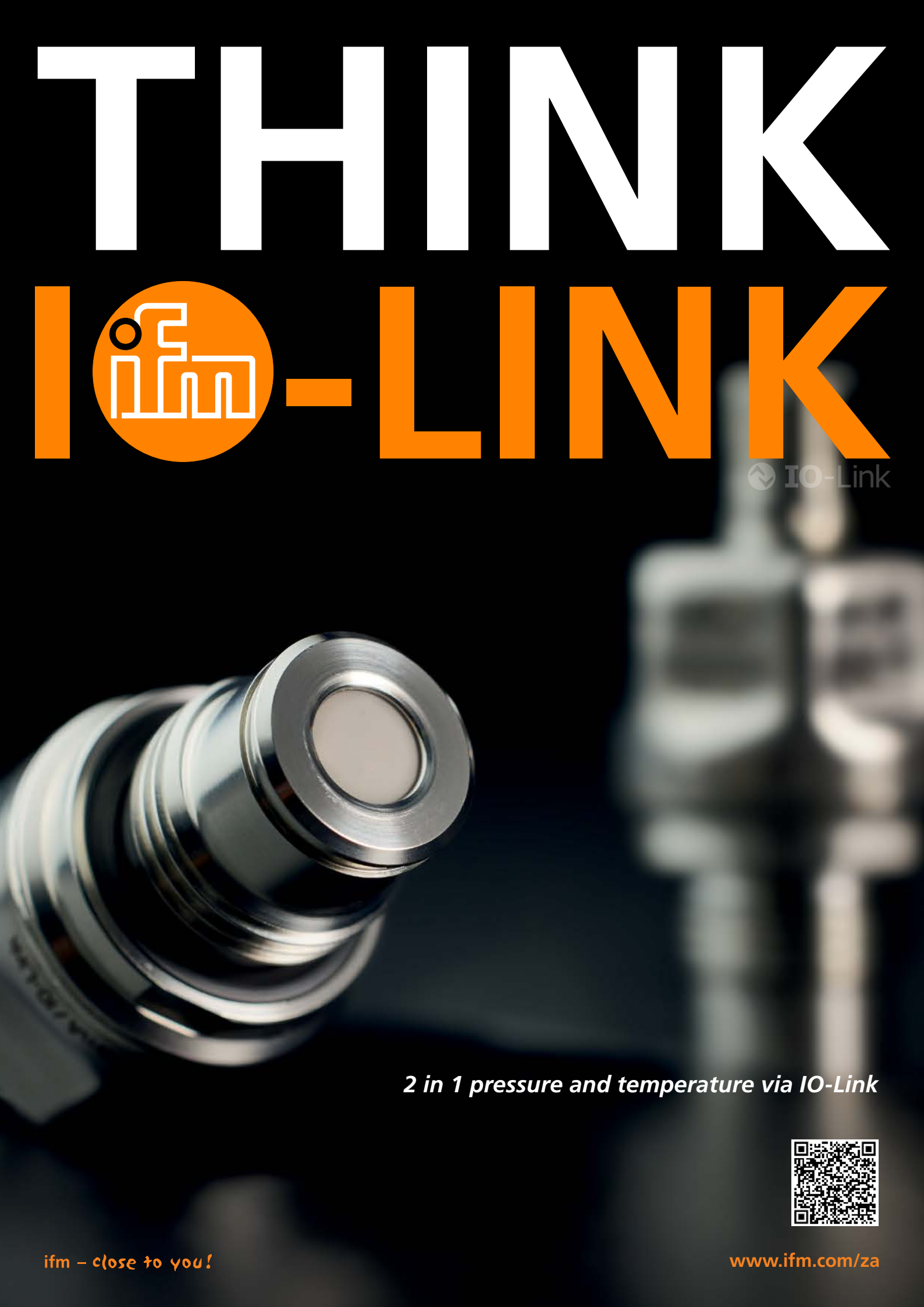

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