

FEATURES:

- Control systems + automation
- Drives, motors + switchgear
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03/2024

RADIOMETRIC MEASUREMENTS

Simple handling of extreme
process conditions

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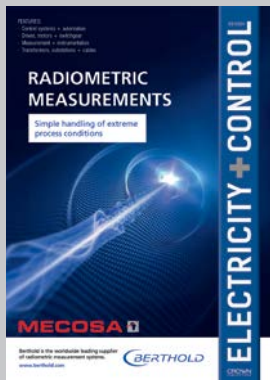


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Radiometry presents the best measurement technology for safe, reliable process monitoring in the extreme environmental conditions typical of many industrial sites and Berthold's radiometric measurement systems are long proven in performance.

(Read more on page 3.)

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This is how change is made

I have been in several meetings of late where genuine concern was raised regarding how one keeps an industry running while so much around it is collapsing. I completely understand what this means – but the implications of this kind of conversation are deeply concerning.

It is linked to so many wonderful initiatives to work with local government, with cities, and with other public entities. And what emerges, after some well-meant discussion, is the realisation that private citizens are banding together to try to do what – quite frankly – should be done by publicly funded individuals and organisations whose job it is to do those things and provide those services.

What are the takeaways we need to have an eye on?

Firstly, in our own businesses, it is essential that we form community engagements that can assist in making the areas in which we work better. Make them safe, get the lights working again, maybe even get lines that can be seen on the roads.

This type of community involvement is not only a great thing to be part of, but it is the only way we will really be able to get our neighbourhoods up to spec, no matter how faithfully we pay our rates and taxes.

Secondly, it reminds us that we need to find ways of ensuring business continuity under the most extraordinary conditions. For instance, we know about load shedding – and we also know that no one believed the various narratives suggesting this would suddenly be a thing of the past.

The reasons for load shedding, and the path to recovery, are easy to understand. It does seem, however, that some misleading

information may have been shared that has led to some confusion around how quickly the matter can be resolved.

What this results in is a stark realisation that for a company to succeed – to become more efficient, to be world class, and to be internationally competitive – we need to invest in the things that many of us naively believe should be provided by the state. These include safety and security, energy, water, healthcare and, increasingly, even services like education for the children of staff.

So, my message this month is to find ways to extend the excellence that you hold dear within your own organisation to maybe one block – or even the width of a road – around your own area. Reach out to the neighbours if you have not done so already – and make it your mission to extend your ethos beyond your boundaries – and to do this with the belief that this is how change is made.

You and your organisations hold the competence, so use it for the betterment of society around you.

And measure what you achieve outside of your own boundaries. See if a vibrant economy of vendors and the like can safely emerge; check if painted walls and repaired fences can stay in place; and, if you can, see if crime in the area begins to decrease.

You may be surprised at what you see beginning to happen. But own the area, own the solution – and involve your whole company.

Ian

Ian Jandrell

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



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Radiometry – the best measurement technology when others fail

High temperatures and pressures, aggressive atmospheres, phase formation, changing gas densities, build-up on vessel walls – extreme process conditions are not unusual in many industries. Processes that take place under such conditions must be monitored reliably. Monitoring is not only important for safety reasons, but also supports process optimisation. Measurements of density, level or level switch play a key role in ensuring that critical processes are safer. If you compare the available measurement technologies, you will inevitably come across radiometry in the face of extreme measurement conditions. For more than 75 years Berthold has been providing such systems, installed in thousands of applications, and proven under the most demanding conditions.

The principle of attenuation

Typically, a radiometric measurement system consists of two components: a source that emits gamma radiation and a detector that can detect the incident radiation. In most cases, these two components are positioned on the opposite sides of the geometry to be measured, such as a vessel or a pipeline. The measuring principle is based on a simple but ingenious concept – the principle of attenuation. The gamma radiation passes through the vessel, as well as its contents, and is then detected by the opposite detector. Depending on the amount and density of the material to be penetrated, the radiation is attenuated to a greater or lesser extent – more material and higher density lead to more absorption. The radiation arriving at the detector is thus a measure of the attenuation and, with the use of appropriate calibration, the relevant measured value, such as density or level, can be determined.

Individuality thanks to a broad portfolio

To be able to meet a wide variety of measurement geometries and requirements, there is no single, universal radiometric solution. Only through a combination of different sources and detectors is it possible to find the perfect, customised solution for each measurement task.

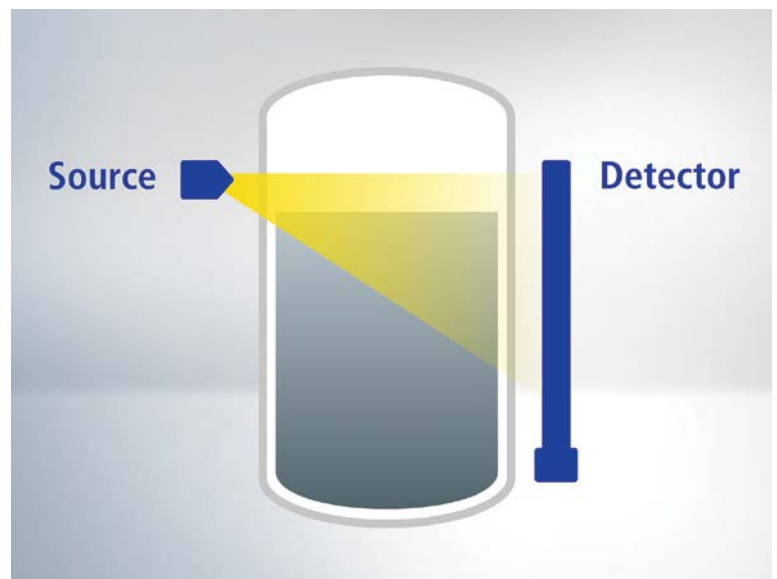
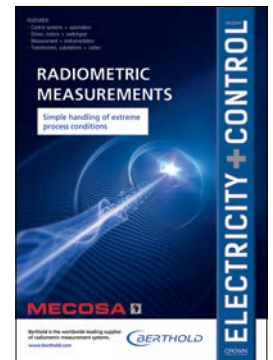
Advantages of contactless technology

As noted above, radiometry is implemented widely in extreme process conditions. One of the reasons for this

is the noncontact technology, whereby the measuring components themselves have no contact with the material being measured. Due to the external mounting, installation is remarkably simple and measuring equipment can easily be retrofitted to existing vessels or pipelines.

One of the biggest advantages of radiometry is that it is maintenance-free and does not require recalibration. The operating costs are therefore low compared to other technologies. Other characteristic properties of this technology are its temperature and long-term stability. Most users have been applying radiometric measurements for many years without any performance problems.

Mecosa (Pty) Ltd is the sole business partner for Berthold in Southern Africa and has cooperated with Berthold for more than 35 years. □



Typical setup of a radiometric measurement.

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Providing flexibility in automated batch processing

When the International Society of Automation first published its ANSI/ISA-88 standards in 1995, the goal was to provide processors with standards and recommended practices as appropriate for the design and specification of batch control systems. This spurred the development and release of S88-based software solutions designed to simplify the process of implementing and modifying recipe procedures without complex software programming.

The goal of the software was to allow recipe creators or operators to modify recipe parameters, procedures, production schedules, batch start rules, equipment use, or to scale batch amounts more easily and at any time. The S88 standard also served effectively to separate the role of the control engineer (for programming) and recipe developers at the plant. At a chemical processing facility, for example, that might be a chemist; at a brewery, it is the master brewer.

“For years, the person responsible for creating recipes in a plant also had to know how to program the control system. So, if it was your job to build recipes, that task always involved programming as well, until the S88 standard was introduced,” explains Bob Ard, Senior Advisor at Valmet.

Valmet is a leading global developer and supplier of process technologies, automation, and services for the pulp, paper, energy, marine, and other process industries.

Ard says today, with flexible batch control software, programming is completed ahead of time and only for the lowest level of control tasks, such as opening and closing valves, increasing temperature, pH control, adding materials, and suchlike. These fundamental building blocks are called ‘Phases’ in S88.

A recipe developer can then group the phases using a

drag-and-drop interface to create an ‘Operation’. The order of operations for a processing unit is defined in the ‘Unit Recipe’. All the unit recipes required to make the batch from start to finish are grouped in the ‘Master Recipe’.

The result of this S88-style approach is a safer, more intuitive process that reduces the amount of programming required, simplifies the implementation and modification of new recipes, and ensures batch cycles are executed more consistently with the proper timing and procedure.

Automating batch processes

Looking at automation options, Ard says the two primary automation methods used by Valmet are state-based control and S88 control using Phase logic and FlexBatch®, the company’s proprietary software.

State-based control generally works best for continuous processes, and FlexBatch is preferred for batch processes. However, some continuous processes operate like a batch process. Similarly, all batch plants contain some processes that are continuous or run sequences that do not require recipe control.

Nonetheless, Ard says the general rule of thumb is to use flexible batch control for recipe-driven units and state-based control for all others.

“State-based control is ideal for running the infrastructure in the plant, such as the boilers, air compressors, and glycol chillers,” he says. “These are needed for whatever product is to be made, so they can be automated using state-based control. But FlexBatch control should rather be used for the units that process the material to make the batch.”

Challenges in batch processing

With batch processing, one of the challenges is the communication and coordination between units – a task that state-based control can only resolve with significant programming.

Many batch processes consist of a ‘train’ of units, where the batch material is introduced in the first unit and passed from one unit to the next. Each unit is designed to process the material in some way, for instance by heating, cooling, adding other materials, blending, or separating it.

“With a batch process, activities need to be constantly coordinated between units, and that typically



Experience has demonstrated that FlexBatch implementation requires up to 30% less programming than state-based control; Phases are easier to design, create and maintain.

requires a lot of programming if it is done using state-based control," Ard explains.

Beer brewing offers a good example. In a brewery, grain, water, hops, and sometimes several other ingredients, are processed by a series of units. The units would include a weigh scale, a mash tun, a lauter tun, a brew kettle, a whirlpool, and a fermenter.

The batch process would begin with milling and weighing the grain at a weigh scale. The program in the weigh scale follows a predefined series of steps to mill and weigh the recipe amounts of grains into the scale hopper.

In the next unit, the mash tun, the starches from the grains are converted into sugars. When the mash tun is loaded, a recipe amount of water is metered into the vessel at a recipe temperature. The mash tun produces a mash of sweet water with precisely the right sugar profile for the style of beer to be made.

The mash is then transferred to a lauter tun, which separates the grain from the mash and keeps the extract suspended in the water. The result is called wort, which is then transferred to the brew kettle.

The brew kettle boils the wort to evaporate enough water to reach the specific gravity determined by the recipe. Various hops are added to the kettle during the boiling process, some earlier and others near the end of the process. Some beers might require the addition of fruit, honey, dextrose, spices, and other flavourings or sugars. The brew kettle then coordinates the transfer of wort to the whirlpool.

The whirlpool allows the coagulated proteins suspended in the wort to settle to the bottom of the tank. This material is called trub and needs to be excluded from the beer. The wort is carefully decanted from the side of the tank (the trub excluded) and pumped through a cooler on its way to a fermenter. Yeast is pitched into the wort stream as it exits the cooler. The yeast activates the fermentation process in the fermenter to change wort into beer.

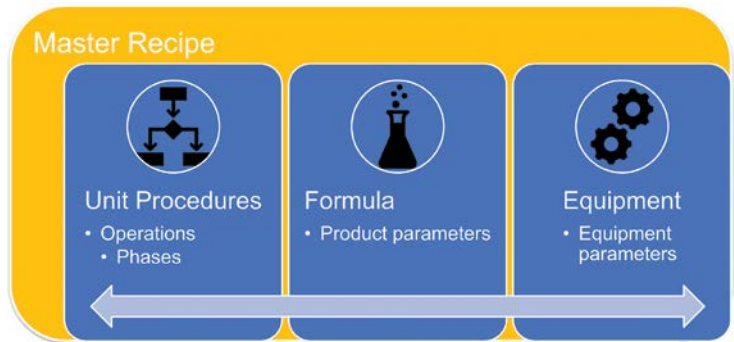
So, what are the benefits of using flexible batch control – rather than state-based control – for this and other such processes?

State-based control

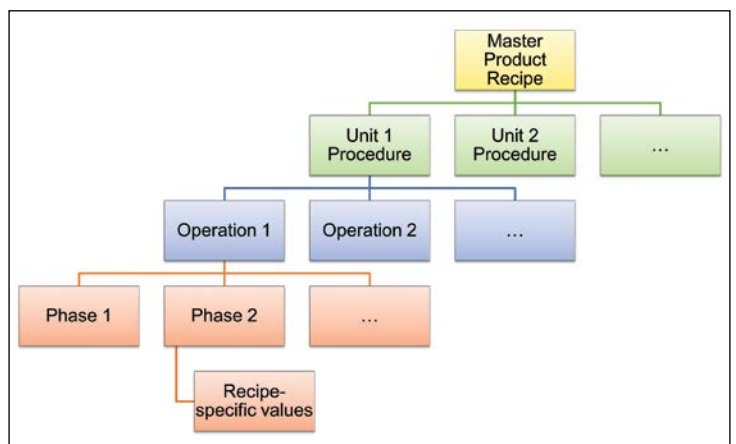
The Valmet D3 DCS system is readily capable of state-based batch control of a process like brewing beer with – or without – FlexBatch software. However, with state-based control, the procedures are hard-coded into a series of 'states' within a program. The program sequences through the states to process material within the unit. State-based control uses 'recipe data files' to provide the recipe formula values.

Each recipe data file is loaded into the first unit in the sequence and passed down the line. Each upstream unit monitors its downstream unit to know when to transfer the recipe. The upstream unit allocates the downstream unit to the batch, and each unit deallocates itself from the batch when its part of the process is completed.

Although state-based control techniques work well, the programming required to achieve the necessary coordi-



The master recipe integrates unit procedures with product parameters and equipment parameters to automate the process without additional programming.



In accordance with the ISA-88 standard for batch control, the software builds on phases and operations to constitute unit procedures and in turn the master recipe, enabling flexible processing.

nation level can be extensive. If the products being made require different procedures, it can be even more labour intensive.

Flexible batch control

What benefits does the FlexBatch software provide beyond the baseline DCS system? The FlexBatch software integrates recipe management and the manufacturing process so product developers, engineers, and production staff can quickly develop, produce, schedule, and manage documented, executable recipes using intuitive graphic tools. The software is designed in accordance with the ISA-88 standard for batch control and reduces dependence on control engineers.

The FlexBatch procedure editor gives recipe developers the ability to draw up procedure charts using a drag-and-drop interface to combine phases into operations, operations into unit recipes, and unit recipes into a master recipe.

"The recipe developer can mix and match phases using a procedure editor and draw procedure charts to establish the sequence of phases and operations in series or in parallel, as needed," Ard explains. "There is no need to be able to program a DCS to draw or redraw the procedure chart," he adds.

New recipes or modifications require no programming. Operators (with appropriate access privileges) can force transitions, schedule batches and equipment allocations, and watch live recipe procedure charts for greater awareness of batch execution.

"The live view of the FlexBatch procedure chart shows what is happening with the process. Operators can see clearly which part of the recipe procedure has been completed, which part is currently being executed, and what comes next." Ard notes: "Providing that kind of visibility with state-based control requires a lot of graphics and additional programming."

Although there is a cost for the FlexBatch licences and server, it is offset by reduced DCS implementation time. Even the fundamental building block that still requires programming, the FlexBatch Phases, is easier to design, create, and maintain compared to state-based programming.

"Decades of experience have demonstrated that a FlexBatch implementation requires up to 30% less programming," Ard says.

Increasing demand for S88 flexible batch software

He adds that today, most processors expect an S88-aligned flexible batch control software solution, or they will go elsewhere to source one.

This increasing demand was a key factor in Valmet's decision to acquire NovaTech Automation's Process Division – the original developer of FlexBatch – in January of 2023.

"What we were looking for was NovaTech's batch control capabilities, and the FlexBatch software is an essential part of that," says Kari Huovila, VP, North America Automation Systems at Valmet.

Valmet expects that adding the batch control capabilities of FlexBatch will only strengthen its own Valmet DNA system and help the company enter new industries with a competitive solution.

"At this point, there are no disadvantages to using FlexBatch for batch control," Ard says. □

For more information visit: www.valmet.com

CONTROL SYSTEMS + AUTOMATION : PRODUCTS + SERVICES

Online training in MESA methodologies

MESA – the Manufacturing Enterprise Solutions Association – in its Global Education Programme (GEP) provides training to manufacturers, producers and solution providers to help them establish a baseline of knowledge around smart manufacturing. Over 1 000 industry professionals have already participated in MESA's education and training courses and are driving value back to their businesses and advancing their careers.

MESA's Certificate of Awareness (CoA) and Certificate of Competency (CoC) training programmes combine courses based on a broad spectrum of relevant subject matter into a single learning event. Certificate of Awareness Programmes are taught at a higher level without the depth/detail of the Certificate of Competency Programmes.

MES/MOM Methodologies Certificate of Awareness (CoA)

This certificate aims to educate and build awareness of potential MES/MOM solutions, which are essential for ad-



MESA's online training programmes provide manufacturers, producers and solutions providers with a baseline of knowledge around smart manufacturing.

vancing to Industry 4.0 and Smart Manufacturing. Participants will learn best practices in industry standards such as ISA-95 and ISA-88; how to create a solid business case; how to make the right MES/MOM selection for their manufacturing needs; how to transform their business to operational excellence with MES/MOM deployment and more.

Online courses will run March 19 to 21, and May 14 to 16, 2024.

MES/MOM Methodologies Certificate of Competency (CoC)

This comprehensive set of courses shares a more in-depth look at topics such as best practices in industry standards like ISA-95 and ISA-88; designing the MOM solutions landscape and architecture; creating a solid business case; making the right MES/MOM selection for specific manufacturing needs; and helping to transform a business to operational excellence with MES/MOM deployment.

Online courses are scheduled for April 8 to 10 and June 3 to 7, 2024.

B2MML and Integration Fundamentals CoC (B2MML)

This certificate programme details the elements involved in business-to-manufacturing integration using the MESA B2MML (Business To Manufacturing Markup Language) and ISA-95 standards. This is a comprehensive programme for MES/MOM consultants, system analysts, industrial IT architects, programmers, and project managers.

Online courses are scheduled for April 25 to 26 and October 25 to 26, 2024.

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

More power and modularity in control cabinet-free automation

The MX-System from Beckhoff offers a flexible and efficient control cabinet alternative in the form of a modular and pluggable automation toolkit. The new baseplates and modules in size 3 can be combined with size 1 and 2 modules, expanding the range of applications in which the MX-System – which provides for control cabinet-free automation – can be used.

The MX-System baseplate in size 3 offers an additional row of data slots, opening up a new set of possibilities. With significantly more slots available, more function modules can be accommodated within the same width. The baseplate is compatible with all function modules in the existing sizes, as well as the new 3-row function modules.

The principle of passive cooling remains the same in size 3, although the larger cooling surface means other performance ranges can be achieved. The first size 3 modules are a 600 V dc supply with 40 A nominal current, a servo controller with 28 A nominal current, and a power supply for up to 63 A. More options based on size 3 will be added in future – such as modules for switching ac loads of up to 16 A or frequency inverters with up to 15 kW. It will also be possible to implement

feeds of up to 125 A.

This addition to the portfolio increases the range of applications in which the MX-System can be used. Up to now, for machines requiring high power inputs the modular MX-System could only be implemented to a limited extent and in a hybrid manner. However, the 3-row baseplates can now replace the control cabinet for power distribution that was previously required in these cases, allowing more and larger machines to be configured entirely control cabinet-free.

In the topology of a machine, a 3-row baseplate will likely always be positioned above the 1-row and 2-row baseplates that have been provided previously, serving as a central point in a combined star and daisy-chain topology. For a small, compact machine, the 3-row baseplate can be used to fit as many size 1 and 2 modules as possible on a minimal surface area, providing a full replacement for the control cabinet and making it possible to benefit from the MX-System's wider range of functions.

For more information visit: www.beckhoff.com



The modular MX-System, with its new 3-row baseplate and associated function modules, adapts to more applications.

Fast positioning for energy chains

If machines or systems are at a standstill, this costs production companies valuable time and money. To make it easier for customers to install energy supply systems and reduce installation time, igus offers the readychain service with pre-assembled systems consisting of chain, cables, connector and other components. Customers can thus obtain all the elements from a single source. The energy chain is filled, fully harnessed with connectors, quality checked and delivered ready for connection – on request – in the required installation position. igus is supplementing this service with a new 'assembly helper': the fast positioner. This simple tool makes handling ready-to-install e-chains easier.

In today's fast-paced world, time is valuable, especially in operating machines and systems. Efficient workflows and innovative solutions that save time and resources are essential. "This is why we offer the readychain service," says Markus Hüffel, Product Manager readychain and readycable at igus. "Customers benefit from our work, such as in cutting to length, assembling and testing the cables. And assembly time is reduced, which increases productivity."

Hüffel adds: "It is important to us to deliver a complete solution. So we also consider the customer's upstream and downstream processes and how we could actively improve them. Hence, we have added a simple tool to our service that offers added value: the fast positioner. It makes handling and precise positioning of the ready-to-connect energy chain systems even easier, safer and faster."

igus supplies the readychains, including fast positioner, in a preset installation position. For the customer, this means simply: unpack, position, detach the fast positioner – and the e-chain is ready for connection. There is no need for any other tools or double handling by different people. This makes it easier and faster to install.

Customised and sustainable

"We manufacture the individual parts of the fast positioner using 3D printing. They are tailored precisely to customer requirements – including individual colour selection and imprints as an identification aid," Hüffel emphasises. They can be placed easily between the upper and lower part of an energy chain and fixed in place with cable tie wraps. Removal after placement is equally simple. In addition, the material can be regranulated and recycled. The fast positioner can also be made from sustainable materials, such as corn starch. The material is robust and lightweight, it cannot rust and, depending on the source material, it is compostable.

Complete solution from a single source

A key advantage for customers is that they get everything from a single source. igus carries out design, production and harnessing on site. Its throughput times are short and delivery is fast. The fast positioner, the latest addition to the readychain service, is in effect a carrying handle, and serves also as a fixing device so the chain is always in the ideal installation position. □



The fast positioner makes handling and precise positioning of the ready-to-connect energy chain systems easier, safer and faster.

CC-Link IE certifications open new opportunities

With rapid advances in industrial automation, staying competitive becomes more important for device vendors. As companies seek to set up increasingly demanding Industry 4.0 applications, offering state-of-the-art devices that are compatible with the relevant industrial communications solutions is key. To address market demand and deliver value-adding products to its customers, Lika Electronic chose to develop new encoders compatible with network technologies from the CC-Link Partner Association (CLPA).

In the era of smart manufacturing, industrial automation device vendors play a pivotal role in the digital transformation of shop floors and entire enterprises, providing the enabling technologies to succeed in this journey. As interconnected factories become the norm, these vendors need to equip their devices with suitable communications solutions. They should be able to support the reliable transfer of growing volumes of data across multiple network components, some of which may come from different equipment providers.

Identifying market opportunities

Lika, based in Italy and operating internationally, is a leading developer of solutions for the automation industry and well-established manufacturer of optical encoders, magnetic measurement systems and positioning units. The company regularly updates its product portfolio to address market and customer-specific needs. Looking at how best to support its customers in the creation of smarter systems, the company identified compatibility with the CC-Link family of open industrial networking technologies as an important factor.

Marco Calabrese, Managing Director - Sales & Marketing at Lika, says: "This latest development project started when one of our customers asked our specialists for a reliable encoder solution that could communicate through the CLPA's standards. This also aligned with our ongoing plans to strengthen our portfolio by adding products that are interoperable with a variety of solutions offered by other CLPA partners. It also helps us to expand the support we offer our customers in creating advanced Industry 4.0 operations."

Lika started its journey with adding CC-Link IE Field Basic compatibility to some of its existing products. This is a popular, 100 Mbit version of the CC-Link IE open industrial Ethernet. It offers compatibility with a range of other products, such as controllers from Mitsubishi Electric. The move would also help the company progress to developing new devices that would support CC-Link IE TSN. Thus, it could grow its capabilities without overwhelming its teams and balance its investments sustainably.

Lika equipped its well-established high-performance, compact EXM58 fully magnetic encoder and EXO58 optical sensing devices with the CLPA's software stack to ensure compatibility with CC-Link IE Field Basic. As a



Lika equipped its EXM58 fully magnetic encoder and EXO58 optical sensing devices with the CLPA's software stack to ensure compatibility with CC-Link IE Field Basic.

result, end users can now easily leverage the EXM58 and EXO58 devices within a CC-Link IE Field Basic network architecture.

Streamlined development

As Lika leveraged the CC-Link IE Field Basic solution, it could implement this network on any existing 100 Mbit device solely through an established software implementation route, without any additional hardware or changes required. This option simplifies and streamlines the development process, shortening time-to-market and reducing required investments.

Another element that supported the rapid development process was the use of the netX 90 System-on-Chip (SoC) from another CLPA partner company, Hilscher. Lika had been using the solution for a long time on several products, so the ability to use it to support CC-Link IE Field Basic was highly beneficial. Lika is also typical of the strong user base of companies that use Hilscher's solutions, which are served by the portfolio of existing CC-Link IE Field Basic development options they offer.

Once the prototypes were ready, the company proceeded to certify them through the CLPA's conformance testing process to ensure interoperability and compatibility with other CC-Link IE devices. For CC-Link IE Field Basic, CLPA members can conduct a self-assessment to prove compliance through an approved certification tool that evaluates if the product being investigated meets key requirements. This option helps vendors reduce testing times and costs, empowering them to address market demands quickly.

Alberto Griffini, Business Developer at the CLPA Europe, comments: "The process to implement and prove compliance with CC-Link IE Field Basic is particularly easy, enabling new partners to kickstart the release of products that incorporate our network technologies. In this way, companies like Lika can embrace our solutions in a step-by-step approach that doesn't overwhelm their teams."

Marco Calabrese adds: "We found the development and certification processes intuitive and accessible, with plenty of resources available to support us. To meet our customers' demands, we offer encoders that use different standards, and implementing CC-Link IE Field Basic has certainly been the most straightforward and uncomplicated. Additionally, the CC-Link IE Field Basic certification was done in-house, enabling us to offer these new encoder options quickly and benefitting end users looking for such solutions." □

Manufacturing services and solutions

Bühler Johannesburg, established in 1972, celebrated its 50th anniversary in 2022 as part of the Swiss family owned Bühler Group, which itself is 163 years old. In 2004, Bühler Johannesburg moved to its current manufacturing facility and offices in Honeydew, north of Johannesburg, consolidating its presence in the country and as the regional hub for the company's manufacturing solutions and aftersales services across sub-Saharan Africa.

Francois Knoetze, Head of Manufacturing and Logistics, says Bühler Southern Africa has over 220 employees and offers sales and service, project execution, and manufacturing and logistics. It has service stations in Johannesburg, Cape Town, Lusaka, and Maputo, offering its clients spare and warehouse parts, as well as roll refuting and die refurbishment services.

Manufacturing at the Johannesburg facility ranges from small steel construction to heavy processing equipment. A major focus is on chain conveyors designed for grain collection points, grain terminals, and processing plants. The chain conveyors are compact and provide a high conveying capacity over long distances due to the premium quality of the drop-forged chain. They also provide gentle handling of granular and floury bulk goods. Bühler chain conveyors claim new standards for service life, sanitation, and versatility, with throughputs of up to 1 200 t/h.

The manufacturing setup in Johannesburg is an independent entity operating as a standalone Bühler business, supplying assemblies for machines and production plants globally. Value-added services include drafting, prototyping, general steel fabrication (with a specialisation in mild steel, stainless steel, and aluminium), bending, rolling, welding, boiler making, sheet metal work, laser cutting, powder coating and painting, pickling and passivating, and assembly.

Notably, Bühler Johannesburg manufactures and exports mining equipment. "For example," says Knoetze, "we assist Brazil with expertise and knowledge because it has a lot of woodworking plants, which use equipment similar to that used in the mining industry." The company also supplies equipment for the power generation

sector as well as, among others, the sugar industry, bottling, brewing and smelting, and agricultural processing spares.

With its modern manufacturing facility, plus a full stockholding of essential spares, Bühler Johannesburg strives to meet its vision of 'if you can imagine it, we can make it'. Knoetze highlights that customisation is the norm, and this is mainly due to the lack of greenfield projects in South Africa, he says.

"We often have to work in an existing building and ensure our equipment fits into the established footprint and layout, and that is where much of the customisation comes in. We also carry out equipment replacement, as part of our value-added service offering to our clients," he says.

"From a manufacturing perspective to a group perspective, Bühler Johannesburg is committed to ensuring its clients get the best value, from planning to logistics, and assisting with energy efficiency and optimisation," Knoetze adds.

Where required, Bühler Johannesburg conducts an audit of a client's production line or process and makes recommendations in terms of either new equipment or possible refurbishment to the latest technology. This is increasingly important as organisations move towards Industry 4.0, where digitisation and automation are key to predictive maintenance and maximum throughput.

Knoetze says, "Industry 4.0 is no longer a 'nice to have' but is becoming essential. For remote monitoring, for example, you can be anywhere in the world and check on production quality and output rate. The new generation machines also allow for remote monitoring of bearing temperature as an indicator of any potential problems," he adds.

Looking to the future, Bühler Johannesburg offers merSETA-accredited apprenticeship programmes for boilermakers, fitters and turners, mechatronics, and welding – to ensure a skills pipeline for itself and the wider industry. "We aim to equip the next generation with vocational and practical on-the-job training," says Knoetze. □



Bühler Johannesburg operates as a regional hub, providing manufacturing solutions and services to industries across sub-Saharan Africa.

T-slot cylinder sensors with IO-Link

New IO-Link cylinder sensors from ifm monitor two end positions for short-stroke cylinders, keeping both end positions in view. The two hardware outputs can be configured to each application's requirements.

A high-resolution process value with a detection range of 50 mm enables continuous monitoring plus digital transmission via IO-Link. With the teach function and the Bluetooth adapter, the installed sensor can be easily adjusted from outside the machine.

Combined functions, such as the stroke counter (switching cycle counter), time monitoring between both

end positions, or device temperature, provide servicing assistance and enable maintenance to be carried out as required.

In general cylinder sensors are used for position detection of pistons in pneumatic cylinders. They are directly mounted onto the cylinder. The ring magnet attached to the piston is sensed through the housing wall of non-magnetisable material (such as aluminium, brass or stainless steel). They can be fixed to almost any T-slot, C-slot, clean-line, tie rod, integrated profile or trapezoidal slot cylinder.

For more information visit: www.ifm.com



One sensor instead of two: On short-stroke cylinders, one IO-Link cylinder sensor (upper groove) is now sufficient to detect both end positions instead of two conventional sensors (lower groove) as was previously the case.



Fanie Steyn,
Manager Electric
Motors at WEG
Africa.

New energy efficiency standards for industrial motors

South Africa is soon to see Minimum Energy Performance Standards (MEPS) applied to low voltage electric motors. Fanie Steyn, Manager Electric Motors at WEG Africa, says this positive step will bring a range of benefits to businesses, industry and the country, including lower energy costs for companies, reduced carbon footprints and less stress on the country's national power grid.

In a country where most electric motors are not energy efficient, the announcement by the South African government of its plans to introduce Minimum Energy Performance Standards (MEPS) comes not a day too soon. Steyn says WEG Africa has argued for these MEPS for many years. He emphasises that this step will be important in helping to drive corporate and national priorities.

"Since 2018, WEG Africa has been involved in assisting in an in-depth study into the likely impacts of MEPS for electric motors in South Africa, and whether it would make sense to regulate these products," he explains. "The results and calculations confirmed that significant energy savings will be made by users – and for the power grid generally."

Reducing GHG emissions

Research in South Africa indicates that about 200 000 electric motor units are sold each year, with almost 70% of them between the 0.75 kW and 11 kW size range. Up to half of these have no stated energy rating, which implies that they are the most inefficient motors available. The country's predominantly coal-fired energy base – which results in a high emissions factor of 0.9488 for the electricity produced – means low efficiency motors (using more energy than need be) add substantially to carbon emissions.

"With the application of MEPS, the reduced power consumption will lead to a welcome decrease in greenhouse gas emissions," Steyn says. "There has been a general

consensus among stakeholders, who include users and suppliers, that the application of MEPS will be good for everyone concerned and the environment."

Only IE3 premium efficiency motors

On 5 October 2023, the Department of Trade, Industry and Competition announced the intention to proceed with MEPS, subject to a month-long window for public consultation. It is expected that the standards will be applied and enforced early in 2024.

"This will not affect the hundreds of thousands of motors already installed in industry, but will focus on the import channels," Steyn notes. "This will ensure that only motors with a minimum of IE3 – classified by the International Electrotechnical Commission as 'premium efficiency' motors – will be permitted into the country."

The products that will be affected are three-phase motors with ratings between 0.75 kW to 375 kW; these are predominantly two-pole, four-pole, six-pole and eight-pole motors. Steyn adds that the larger slower 10-pole motors will not fall into this specification. Most motors sold in the industry are on the smaller end of the scale – up to around 90 kW.

"Motors destined for hazardous locations – such as gas or petrochemical plants and coal mines – will also be required to comply with these efficiency standards," he says. "This includes flameproof motors which, for the first time, will have a premium efficiency level."

A win-win solution

He emphasises that MEPS is a win-win solution, as government is reducing the strain on the grid and at the same time supporting its climate change commitments, and companies can make immediate savings on their energy costs.

"Although there is a small premium on the price of a more efficient motor, this pales into insignificance compared to the electricity the motor consumes over a year, let alone over its lifespan of up to 20 years," says Steyn.

Research conducted globally has shown that almost 97% of the total cost of owning and operating an electric motor arises from the electricity the motor consumes. The purchase price makes up just 2.3% of the cost to the owner, and maintenance costs add up to only 1% on average.

Reducing energy demand and saving costs

For government, this is an important step in addressing



A WEG W22 IE3 motor driving a pump.

South Africa's energy shortfall, Steyn adds. Once MEPS is applied, the country could save around 840 GWh per annum, as about 60% of power consumed by industry is through the use of electric motors.

"WEG Africa has for many years championed the benefits of high efficiency motors," he says. "We have made our customers aware of the saving on energy costs with an IE3 motor. With South Africa's steadily rising electricity prices, the payback period for these products is as little as nine or ten months."

To support the use of IE3 motors, WEG Africa established dedicated assembly lines for these units at its Johannesburg facility. This facility will assist in meeting the rapid demand growth that will result from MEPS and facilitate easy access to these motors for the market.

There is another reason that higher energy efficiency is beneficial as a feature of electric motors, Steyn says, and that is longer life. Better efficiency means lower heat losses, and the heat of a motor gradually degrades the insulation on the copper windings. The more heat in a motor, the more the insulation will deteriorate – and high efficiency motors reduce this heat build-up considerably.

He points out that other African countries such as Ghana and Mozambique are also looking at the application of MEPS within their boundaries. Although low efficiency motors will still be sold into Africa for the near future, the trend is towards a more regulated environment to reduce unnecessary levels of power consumption.

"We applaud the step taken by government to apply MEPS to low voltage electric motors in the country," says Steyn. "While this does not force motor users to make any changes immediately, it encourages them to replace old, inefficient motors systematically with those rated IE3 or above."

The clear financial incentive is the saving on energy costs, so it makes sense for companies to upgrade their technology when older motors need repairing or rewinding. He concludes that this makes economic sense, because the cost of rewinding can be up to 60% of the price of a replacement unit. When the lower operating cost is factored into the equation, the decision to upgrade to IE3 is easy. □

For more information visit: www.weg.net

DRIVES, MOTORS + SWITCHGEAR : PRODUCTS + SERVICES

A new range of power transmission solutions in SA

During November 2023, I-MAK, a premium brand under the umbrella of Bearings International (BI), conducted a country road show around South Africa.

I-MAK specialises in the innovation and manufacturing of gearboxes, geared motors and power transmission solutions, a focus it has maintained for over 50 years.

Robert Sillis, General Manager - Products at BI, said: "The Road Show served to introduce I-MAK's leading products across BI's extensive local branch network. It enabled the team to share the solutions it offers and the value they present for customers in supporting production uptime. These solutions are expertly delivered by our internal technical advisors, ensuring a personalised local approach to customer service."

Hosted at various BI branches, the road show included product training sessions and the distribution of sales tools to managers and sellers. Invitations were extended to all company managers and sellers to facilitate a comprehensive and diverse spectrum of participation.

Focusing on support for the industrial sectors grappling with downtime challenges, the I-MAK solutions presented will serve mining, food and beverage, general industry, utilities, agriculture, as well as automotive sectors. I-MAK showcased a spectrum of products, featuring the complete standard geared unit range, comprising inline, bevel, and shaft mount helical units. The products were presented to Bearings International representatives and senior managers in the geared units division; product features and benefits were highlighted together with the brand's positioning within Bearings International and in the market.



Road show presentations, introducing I-MAK gearboxes and drive solutions, were hosted at BI branches around the country.

Starting in Johannesburg on 1 November 2023, the road show travelled around the country with stops in Klerksdorp, Witbank, Polokwane, Durban, Cape Town, Port Elizabeth, and Kimberley by the end of the month.

Building on its legacy of developing and producing an extensive range of gearboxes and drive solutions, I-MAK aims to provide customers with top-level reliability and flexibility in all applications. Around the world, I-MAK solutions power hundreds of thousands of machines daily across diverse applications.

Kobus Groenewald, Business Unit Leader: Industrial Geared Units at BI said the road show provided the opportunity for branch managers and sellers to understand the I-MAK products and the tailored solutions they can offer customers.

Sillis says road shows are also planned going forward, to introduce the new solutions to neighbouring countries. □

Scaling up drive production with incremental improvements

Variable frequency drive (VFD) manufacturer Inverterk Drives is a leader in the innovation and development of electric motor control technology. Over the past ten plus years, a series of incremental improvements have enabled the company's growth and helped it improve its energy efficiency.

It first approached power quality specialist CP Automation in 2012 and, over the years, CP Automation has supported Inverterk Drives by supplying innovative regenerative braking and harmonic mitigation technology.

Based in Wales, Inverterk Drives specialises in the design and manufacture of electronic variable frequency drives (also referred to as variable speed drives, or VSDs), which it supplies to customers around the world. Using VFDs to adjust the speed of an electric motor to match the actual load requirements provides several benefits, such as energy savings, improved process control and reduced maintenance costs.

The company assembles, customises and tests the VFDs on a bespoke process line, or global assembly cells (GACs). A GAC is a chain of connected workstations, each performing a step in the production and testing process. GACs are modular, enabling Inverterk Drives to scale up production by adding more workstations when it needs to meet increased demand.

Originally, Inverterk Drives used third-party dc drives and motors and braking resistors on its GACs to test the VFDs it manufactured. However, dc motors require more maintenance than ac drives, particularly with regard to replacing the brushes.

The dc motors were also creating noise and heat, requiring a blower motor to keep them cool when running. As Inverterk Drives expanded and added more GACs to its facility, the team found that power consumption was a growing challenge and contacted CP Automation for assistance.

CP Automation initially recommended switching to ac motors and fitting a REVCON regenerative braking unit to each GAC, to capture and recycle energy otherwise lost to the braking resistors. The move to ac motors also allowed Inverterk Drives to use its own VFDs to test its products, reducing reliance on third-party suppliers.

"As our production process evolved, energy saving became a key priority for us," said Peter Evans, Manufacturing Engineering Manager at Inverterk Drives.

"Initially, we were pulling 30 amps of current from the supply during the load cycle, but after working with CP Automation, we were pulling only 25 per cent of that.

"This saving meant we could install more GACs to match increased demand without needing to upgrade the mains power supply," Evans continued.



In the production facility at Inverterk Drives.

Scaling up

As Inverterk Drives' products grew larger, the company needed to scale up its GACs while maintaining high energy efficiency. At that point, CP Automation worked with Inverterk Drives to create a second, much larger system with a capacity of 200 A and recommended installing REVCON harmonic filters on the GACs used for the testing of the drives.

"After working with CP Automation to install harmonic filters on the larger system, we saw improved quality and reliability in our internal testing," said Brian Walker, Senior GAC Engineer at Inverterk Drives. "The dc bus remained stable, the control side for loading was more consistent and the input phases were more balanced, all of which helped when we tested our drive products."

John Mitchell, Global Sales and Marketing Director at CP Automation highlighted: "The design height of the GACs meant space was an issue. However, by installing two smaller harmonic filters in series we met this space constraint.

"The units also provided incremental improvements – like reducing heat losses, improving phase angle and boosting the dc bus on the load drive, which all added up to improve efficiency," Mitchell noted.

"The braking units boosted efficiency and the harmonic filters improved reliability," added Evans. "The production process is more streamlined and has helped us manufacture an even more reliable product for our customers."

He said too: "The reliability of CP Automation's systems has been great; one of the first units installed around ten years ago is still running now. One of the reasons we've kept working with CP Automation is because the technology is so reliable.

"The equipment CP Automation supplied worked really well on the small system, it worked well on the large, and now we're going extra-large and working together on a third system that will go up to 450 A," Evans said.

CP Automation emphasises that by making small changes progressively, introducing regenerative braking systems, harmonic filters and other effective energy management equipment, industrial facilities can boost productivity and remain competitive. □

Inverterk Drives uses General Assembly Cells in the production, assembly and testing of its VFDs.



South African engineering provides customised gearbox solution

Replacing one of a pair of planetary gearboxes for a mine in South Africa's Mpumalanga province recently gave SEW-EURODRIVE South Africa the opportunity to pioneer a global innovation. It adopted an electronic solution to match the speed of an existing gearbox in a high-torque application and provided significant savings for the customer. This solution attracted the interest of the global SEW-EURODRIVE group.

When a mining operation found that one of its planetary gearboxes on a high-torque conveyor was failing, it called SEW-EURODRIVE – and SEW-EURODRIVE used its latest intelligent technology to provide a replacement that will deliver reliable performance.

Greg Lewis, Business Development Manager Projects for SEW-EURODRIVE, says the application at the mine required a customised and carefully considered approach.

“The application was in the plant where a steel-belt transfer conveyor moves extremely slowly – with the 4-metre-diameter head pulley turning just one revolution every 25 minutes,” Lewis explains. “Two planetary gearboxes drive the pulley, with one on each side. The mine was facing the impending failure of one of the gearboxes, and that needed to be replaced.”

With the original installer of the gearbox unavailable, the mine approached SEW-EURODRIVE directly. The company already has a good relationship with the mine and has provided most of the power transmission equipment on the site.

“One of the main challenges was that only one of the two gearboxes that drive the conveyor needed to be replaced at that stage,” Lewis says. “In this application, it is important to understand that the two gearboxes must run together, at exactly the same speed and torque. There can be no allowance for any variation in the speeds.”

SEW-EURODRIVE was able to match one of its units very closely with the unit being replaced, but there was still a slight difference in the ratios. This led to a 0.001 difference in the revolutions per minute.

“Although this may sound insignificant, it makes a difference when the gearbox torque is a couple of hundred thousand Nms,” he says. “At this high torque level, any misalignment or desynchronisation can affect the foundation and potentially cause catastrophic failure.”

With the expert input of one of SEW-EURODRIVE's in-house mechatronics engineers, a solution was developed using the company's MOVI-C technology in a way that has never been done before. The new planetary gearbox supplied will match the torque of the original gearbox – ensuring that they turn at precisely the same speed. This solution involves removing the existing base plate and providing a new, drop-in solution with an SEW-EURODRIVE planetary gearbox – designed to match the current infrastructure in the plant.

“The technology on the new planetary gearbox constantly changes the torque to match the existing equipment,” Lewis says. To prove this intelligent design,

SEW-EURODRIVE built a small-scale working mock-up for the customer to witness. Together with its own customised base plate, the ‘model’ arrangement was taken to site and demonstrated to the customer's satisfaction.

It proved so successful that colleagues around the world in the SEW-EURODRIVE group asked to see it, so they could learn from the achievement.

Lewis adds that the project was designed and delivered by SEW-EURODRIVE as a complete solution – from the fully customisable panels to the electronics and the installation of the gearbox. The installed unit is an XP planetary gearbox with shrink disk, with a primary X-series gearbox as a further reduction unit to achieve the required ratio.

“We engineered the steel base to fit onto the existing concrete foundation without any modifications required from the customer's side,” he says. The significance of the project is enhanced by the scale of its elements. At about 1.7 m in height – and measuring 2.1 m wide and long – the gearbox weighs about 6 tonnes. Moving at 0.07 rpm, it moves the steel belt that carries a fine cake of raw chrome material.

“There are not many companies that can produce a solution to meet such slow revolutions,” Lewis says. “At SEW-EURODRIVE, we are proud to be among those that can. This project has been especially rewarding too, in that it demonstrates our capability in matching another footprint, eliminating the need for the customer to break down existing structures and build new ones.”

The project called for extensive on-site engagement with the customer and detailed measurement of plant requirements. SEW-EURODRIVE's engineers in Johannesburg produced the working drawings and from these, their global counterparts in the group could begin manufacturing the unit in Germany.

Lewis highlights the assurance that SEW-EURODRIVE can give the mine in terms of support, as the company has a long-established presence in the mining sector and the country. The customer was very happy with the creative solution and may consider similar replacements at other plants in the coming years.

“We are already assisting with our full-service technicians, and we can provide experts in electronics, mechanical engineering and mechatronics, if the need arises,” Lewis says. “The electronics in this solution will allow the mine to implement a range of enhancements in future, including safety features and monitoring of operations.”

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



Input from one of SEW-EURODRIVE's in-house engineers led to the use of MOVI-C technology in the customised planetary gearbox in a way never done before.



Tim Keegan, MD, Winder Controls.

50 years of progress for shaft hoisting specialist

In 2023, shaft hoisting specialist Winder Controls celebrated 50 years of progress in its operations, which has led to a large installed base across a number of countries. MD Tim Keegan says the company provides flexible, effective solutions to its clients. Large enough to take on the significant bonding and risk requirements of large projects, it also remains agile, committed to maintaining a dynamic approach to problem-solving and specialised solutions.

As 2023 marked a significant milestone for Winder Controls, Keegan said: "We are most grateful for the support of our clients and, while celebrating our 50 years of experience in the design, manufacture, supply, installation, commissioning and servicing of high-quality hoisting and associated equipment, we reflect on the depth of our rich mining history."

Integrated engineering expertise

Further to targeted mergers and acquisitions, Winder Controls today comprises the best elements of the original Winder Controls, Blane & Co Engineers, and Siemag South Africa. It incorporates the company's industry-leading technical excellence in electrical and automation engineering, mechanical engineering, and hydraulic engineering, retaining and building on the installed product base and specialist knowledge it has established in the hoisting industry.

The company's association with the Siemag Tecberg Group broadened its product base to include state-of-the-art rope-handling equipment, pressure exchange energy recovery systems, specialised winder brake callipers, and other equipment. Engineering and management collaboration has ensured global knowledge transfer and ongoing interaction with clients internationally.

Ethical standards

Keegan emphasises that the company's management team fiercely pursues its commitment to maintaining the highest ethical standards. "Although this has sometimes led to challenges, we are pleased to have the support of our clients in this and are confident that it is a criti-

cal element of conducting a sustainable business in the modern world," he says.

The Siemag Tecberg Group, based in Europe, requires all processes to be audited in line with International Financial Reporting Standards. "Our management and governance systems are pitched at the highest level with a focus on transparency, compliance with the principles and practices of King IV, and diligent separation of duties," Keegan adds.

The company also places a strong focus on SHE, with a strong safety team ensuring the wellbeing of personnel and operational compliance with all legislated and client requirements.

Recognising stakeholders

In addition to providing effective solutions to its clients, Winder Controls places high value on its employees, the requirements of shareholders, and the communities in which it operates. "We have experienced significant peaks and troughs in the hoisting market over the years. Our decision to focus primarily on an excellent core of technical skills has enabled us to ride out the storms on the basis of delivering valuable expertise to our clients," he says.

As a certified ISO 9001:2015 company, Winder Controls strives to enhance its client service and experience by implementing improvements to its systems and tools.

Multiple brands, single point responsibility

"We are not exclusively committed to any single brand of equipment and, because we have a thorough technical knowledge of various equipment brands, we can implement complex solutions using our clients' preferred brand. This facilitates standardised spares holding and training of mine personnel," Keegan adds.

Winder Controls' in-house electrical manufacturing facility, large machining and assembly capabilities, and industry leading in-house services department support its ability to provide a focused, specialist product line through a single point of responsibility.

Developing industry experts

The company has played a significant role in the training and experience of many current industry experts, and

Continued on page 16



The company provides a range of equipment including, from left: drive systems, and a rope tensioner.

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Gearless conveyor drives will enable increased energy efficiency

Towards the end of last year, Swedish mining company LKAB, awarded ABB a contract to install two ABB Gearless Conveyor Drives (GCDs) on the existing conveyor belt system at its Malmberget mine near Gällivare, Norrbotten County, Lapland, the most northern province in Sweden.

The existing system carries up to 15 million tonnes of iron ore every year and uses a 2 800 kW wound rotor induction motor (WRIM) with gearbox to drive the conveyor. This will be replaced with ABB's latest GCD technology, two 1 600 kW models with permanent magnet motors (PMMs), to enable an increase in annual production and, at the same time, reduce energy use.

ABB's installation engineers and project management team face the challenge of working in a tight space at around 1 250 metres underground to remove the large equipment and replace it with the new units. Once the upgrade is complete in 2025, LKAB will be able to achieve energy efficiency savings of between 6 and 10%, which will translate into considerable OPEX savings per year.

ABB GCDs have a motor power of between 0.2 MW and 8 MW, removing the need for a gearbox and thereby lowering maintenance costs and improving overall reliability, leading to greater uptime. A unique ABB



LKAB is currently running a conveyor system that carries 15 million tonnes of iron ore every year, hauling 80% of the Malmberget mine's iron ore.



[Source: LKAB]

An overview of LKAB's Malmberget mine, one of the largest operations of its kind in Europe.

innovation, they are known to provide the most energy-efficient conveyor drive solution.

Pär Sundqvist, Engineer and Project Owner, LKAB, said: "We are managing the largest iron ore mines in Europe where productivity must remain high while we increase energy efficiency. This important upgrade will improve the throughput on the conveyor and help us to meet our energy targets. ABB's technology will also enable us to reduce OPEX per tonne and ongoing lifecycle costs."

Ulf Richter, Product Manager Conveyor Solutions, at ABB added that the new ABB equipment will allow for an improved working environment in the mine – cleaner and safer. "Gearless Conveyor Drives are known to be the most energy-efficient solution for conveyors, enabling reliable transportation of ore. The upgrade will also mean reduced noise and heat in the conveyor drive area."

The GCDs' permanent magnet motors are directly coupled to the existing conveyor's drive pulley and can be adapted to meet the demands of this underground installation. The main advantages are energy savings, health and safety improvements, reduced maintenance costs and higher reliability – enabling steady production.

The installation will be done during scheduled maintenance stops with the final commissioning due in August 2025. □

Continued from page 14

ongoing training of personnel goes beyond CPD and other legislated requirements. Theoretical training includes formal qualifications, short courses, and equipment- or subject-specific training, and practical training includes internal technical procedures, trade test and safety related training. The company also offers specialised training courses for client personnel – in complex engineering theory, as well as operation and maintenance of its equipment.

The company stays at the forefront of changing technologies while maintaining its ability to work on legacy systems. With cutting-edge products from supply chain

partners it keeps up with changing trends and develops new trends in the hoisting industry.

"Our focus is on providing solutions and systems integration, tailor-made to address our clients' specific requirements. Although we have introduced a degree of modular engineering where appropriate, our projects are mostly custom engineered to address the operational needs of our clients," Keegan says.

Throughout its history the company has developed a reputation for innovative engineering, which can be seen in the many products in operation today as a result of Winder Controls' ingenuity. □

Measuring electrical installations safely

Fluke, a global technology leader in the manufacture of compact, professional electronic test and measurement tools and software, and represented locally by Comtest, has developed a range of thermal imaging and wireless testing tools designed to ensure safety is prioritised for engineers working in potentially dangerous arc flash zones.

In every company, electrical safety should be based on limiting workers' exposure to serious electrical hazards such as arc flash and electrocution. In Fluke's view, the best way to keep operators out of harm's way is to give them access to the right non-contact tools that protect them – and significantly reduce (by up to half) the amount of time they are required to work on live circuits in arc flash zones.

Arc flash is the term used to denote the light and heat created from an arc fault explosion; temperatures can reach up to 19 000°C, which can ignite an operator's clothing and burn the skin of anyone within a few feet. Arc flash is a serious hazard. It can melt metal, cause lung and eyesight damage and lead to hospitalisation, even death.

Engineers and health & safety teams are familiar with establishing arc flash boundaries and wearing arc-rated safety clothing and rubber insulating gloves. However, using non-contact test and measurement tools means operators can minimise the level of personal protective equipment (PPE) they need to wear and the amount of time they need to spend inside the boundary.

Fluke's PQ400 electrical measurement window (EMW) is designed to be permanently installed into cabinets with voltage and current connections inside the panel. The PQ400 gives workers access to critical power quality and energy data and at the same time maintains a high level of safety and decreases testing time required. Users can plug their power quality tools directly into the EMW to collect all the data needed.

As well as the safety aspects, other advantages of the PQ400 include lower maintenance costs and reduced downtime – by enabling critical power quality and energy measurements to be made without opening the panel door. The EMW also enables logging and monitoring to be done at any time, without disrupting operations, increasing measurement efficiency.

Also from Fluke, the CV400 ClirVu 4-inch window – is a permanent infrared window that provides a view of what is on the other side of a panel without workers being exposed to live voltage or needing full PPE. Offering the most visibility into a panel for a thermal camera (simplifying the inspection process by allowing measurements to be taken without having to open a cabinet), the widest Fluke window option available also helps to reduce the time and costs involved in preventive maintenance.

Similarly, Fluke's TiS75+ thermal camera enables operators to capture and measure heat energy emanating from a source without having to make physical contact.



Above: Fluke 376 FC Wireless Logging ACDC Clamp Meter – this enables technicians to set up measurements and transmit the data from inside the arc flash boundary while maintaining a safe distance.

Right: Fluke TiS75+ Thermal Imagers enable operators to capture and measure heat energy emanating from a source without having to make physical contact.



This means they can see instantly what is running too hot or too cold before anything breaks down. Offering single-handed image capture, review and save capabilities, the camera helps operators keep a safe distance from an arc flash boundary. Using the Fluke Connect app they can compare thermal scans over time.

Another instrument that supports safety – the Fluke 376 FC clamp meter – makes it possible to set up measurements and transmit the data from inside the arc flash boundary. This allows a technician within 20 m of the equipment to open the Fluke Connect app and read the figures from outside the boundary. As well as reducing the time technicians spend in the hazard zone of the arc flash boundary, the clamp meter helps them log, trend, and monitor measurements remotely so they can pinpoint intermittent faults.

Also in Fluke's range of safe testing tools is the 3000 FC digital multimeter, a flexible DMM that allows users to read results through the Fluke Connect app outside the arc flash boundary. Using this equipment technicians can reduce their time inside the boundary and they have an easy-to-read display with large digits and a bright backlight.

Eric van Riet from Fluke says: "There's no need for engineers to put themselves in an arc blast zone if they can avoid being there. Products such as wireless and non-contact tools and remote displays can help place them as far away as possible from risk and danger while allowing them to take accurate, instant readings that can be analysed remotely. Arc flash safety is essential, and the latest thermal imaging and wireless testing tools are the best way to offer operators maximum protection."

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

Upgraded spectrometers with advanced ED-XRF technology

SPECTRO Analytical Instruments recently introduced the latest generation of SPECTRO XEPOS spectrometers, representing another leap forward in energy-dispersive X-ray fluorescence (ED-XRF) technology and outpacing standard ED-XRF instruments with performance often matching that of wavelength-dispersive WD-XRF models, at a much lower cost of ownership.

The newest SPECTRO XEPOS features a number of advanced upgrades. These are noted below.

- Improved spectra handling for increased screening method accuracy, even for challenging samples emitting complex sample spectra.
- Up to 2x shorter measurement times than the previous model at comparable precision levels. Speed can be a decisive advantage for applications with high count rates, and analyses of many samples can be completed in as little as one to two minutes.
- New capabilities in layer analysis can now analyse the thickness (down to nanometre scale) and composition of up to 8 layers on one substrate, for up to 55 elements. Measurements are greatly simplified, eliminating the need for layer calibration samples. Reference-free analytics are delivered based on solid bulk samples.

The latest SPECTRO XEPOS excels at critical tasks from rapid screening analysis to precise product quality control for at-line processing in applications such as petrochemicals, chemicals, environmental and geological samples, ores/concentrates/tailings, clinkers/cements/slugs, cosmetics, foods, pharmaceuticals, and more.

Four different versions of the SPECTRO XEPOS provide optimum performance for selected element groups in targeted matrices.

Additional features of the SPECTRO XEPOS include



The latest generation of the SPECTRO XEPOS ED-XRF features advanced upgrades that deliver new capabilities.

an innovative 50 W / 60 kV X-ray tube and adaptive excitation technology to deliver high sensitivity, optimised to target chosen elements. The instrument's SPECTRO XRF Analyser Pro operating software provides ease of use, an array of optional pre-calibrated application packages, and power. TurboQuant II software delivers analysis of unknown samples – quickly and accurately analysing almost any unknown liquid, powder, or solid sample.

Other improvements range from a low-energy window detector to improve routine analyses, to updated calibration ranges that match the SPECTRO XEPOS capabilities, to easy calibration transfer from instrument to instrument.

In addition, to ensure maximum uptime, optimum performance, and a long service life for all SPECTRO elemental analysers, AMECARE Performance Services offers customised support with experienced service engineers on hand in 50 countries. □

Compact valve position indicator

Emerson has launched the TopWorx™ DVR Switchbox, a compact, high quality and durable valve positioner that provides reliable open/close valve position feedback. This entry-level addition to the DV Series of valve position indicators combines a durable resin enclosure, compact size and a patented cam design. It offers a useful tool in managing water and wastewater systems, food and beverage production lines and industrial utilities.



The TopWorx valve position indicator is designed for quick, easy commissioning.

The TopWorx DVR Switchbox uses a low-profile indication to provide easy-to-read local position feedback. This is important real-time data that helps technicians and plant operators keep processes on track. The DVR Switchbox is engineered for harsh

environments, with stainless steel components to provide a corrosion-resistant valve indication solution.

Without taking up additional production line space, the unit provides clear and reliable feedback of valve position which helps process industry plants, platforms and pipelines operate at optimum efficiency and maintain safety.

The TopWorx DVR Switchbox cam design enables swift position configuration for faster, easier installation and maintenance. For many process industry applications, the TopWorx DVR provides a versatile design well suited for use in confined spaces. In addition, the enclosure has an ultraviolet (UV) F1 rating, providing UV resistance which ensures the DVR performs reliably over the long term in outdoor conditions.

The TopWorx DVR Switchbox adds to the valve intelligence and proximity sensing portfolio from Emerson, designed to help process industry plants manage and control operations more intelligently and efficiently under demanding conditions. □

The gold standard in pressure sensors for H₂ applications

Hydrogen holds considerable promise as a future energy fuel and as the development market grows, demand for suitable measurement instrumentation is growing too.

KELLER, with its home base in Switzerland and represented locally by Instrotech, manufactures isolated piezoresistive pressure sensors for the type of pressure measurements first conceived by KELLER founder Hannes W Keller. The great advantage of the piezoresistive measuring principle is its stability. The chip that measures the pressure is installed in an oil-filled cylinder, sealed by a steel diaphragm. This ensures optimum isolation from the medium in which it is operating.

The piezoresistive pressure sensor is also considered one of the most stable for hydrogen applications. Without additional actions, however, an oil-filled sensor can also present a disadvantage. Under certain circumstances, and at high temperatures, hydrogen molecules can split into two hydrogen atoms. These atoms are smaller than the pores of the steel membrane, which means the atoms can penetrate through the membrane into the oil chamber of the pressure sensor. In the oil chamber, they fuse again to form a hydrogen gas molecule (H₂), which leads to offset errors – or signal deviations of the target value – due to the expansion. This phenomenon is called ‘permeation’.

For this reason, KELLER uses gold-plated steel membranes for hydrogen pressure sensors. Gold has much smaller pores than stainless steel. The hydrogen can hardly penetrate the gold layer. This action, together with fully welded sensors without internal seals, confirms KELLER’s competence and strength in the pressure sensor market, including for hydrogen applications. The typical pressure ranges for applications with hydrogen are from 0...2 bar to 0...1 000 bar. KELLER offers suitable sensors for these applications. In addition, the hydrogen pressure sensors are compatible with the EC79 standard for automotive applications.

For more information visit www.instrotech.co.za



KELLER’s gold-plated OEM pressure sensors are designed for hydrogen applications.



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Dwibin Thomas,
Cluster Automation
Leader at Schneider
Electric.

Creating flexibility in the power grid

The concept of grid flexibility is assuming new dimensions in the changing energy landscape. As power generation shifts towards the use of renewable energy and distributed energy resources, power transmission and distribution systems need to adapt and establish a future-oriented flexible, optimised grid. Dwibin Thomas, Cluster Automation Leader at Schneider Electric, points to digital solutions.

Traditionally, grid flexibility involved utilities enrolling large industrial energy consumers in load curtailment and demand-response programmes to help adjust the balance between supply and demand. Those electricity-intensive users would reduce or shift their energy use during peak periods.

However, today, grid flexibility has become far more complex. For one, an increasing investment in renewables means energy flow becomes bi-directional, with decentralised energy coming from multiple distributed energy resources (DERs).

Furthermore, as organisations and individual households move to generating their own electricity, there is a growing sector of prosumers that produce and consume energy, further amplifying the need for grid flexibility.

Traditional demand-response shows its limitations in balancing an evolving grid. This presents a critical paradigm shift for utilities and, given the pace of innovation, it is challenging to plan for a future that includes rapidly growing DERs.

Plus, there is the fundamental challenge of upgrading a decades-old grid, which takes time and requires significant capital expenditure. Grid-connected prosumers, an increase in electrification, and climate uncertainty also mean energy demand will continue to be variable and uncertain.

Digitisation enables flexibility

A digitised grid – one that adapts to variable energy sources and responds to dynamic challenges – is needed to identify, enrol, and aggregate distributed energy resources.

The grid of the future supports sustainability as it can incorporate DERs in a more flexible and optimised way to build-in grid resilience. It adapts faster and is more responsive to weather crises, is more sustainable, more reliable, and can reduce operational costs by

enabling predictive maintenance strategies.

With digitisation, operators can benefit from a consolidated view of the various energy resources that are feeding into the grid and ensure the energy is managed and distributed methodically, based on real-world demand and supply. This requires careful management to maintain grid stability.

Change requires flexibility

In order to establish a more flexible grid we have to keep pace with the evolving energy landscape.

Firstly, at the prosumer level we are seeing a hybrid future taking shape. Here, more IoT-connected assets (buildings, houses, EVs, and such) are moving online, ready to be dispatched and aggregated.

These assets are looking for the right 'flex' – a compromise between efficiency through more automation, and freedom of choice enabled by customer engagement platforms.

Secondly, utilities responsible for grid management need to optimise each hybrid prosumer and other suppliers of DERs by incorporating the necessary technology (directly or via services vendors) that will enable the grid to operate in a more agile and flexible way.

At the level of the distribution system operator, there are DER management software solutions available that are tailored to enable the efficient planning, design, and operation of a flexible, dynamic grid.

These solutions maximise the connection of renewables by leveraging DER flexibility – an approach that supports small proof-of-concept projects to full-scale deployment rollouts that require direct device monitoring, control, and integration with third-party aggregators.

DER management solutions provide energy suppliers and distributors with smarter, more efficient ways to manage the integration of various energy sources into the grid.

At Schneider Electric, for example, our DER management software options incorporate AI and machine learning algorithms, to analyse historical and contemporary data and, for instance, to consider weather patterns and forecasts that will give utilities additional insight into the renewable energy supply. □

For more information visit: www.se.com



Digital solutions provide energy suppliers and distributors with smarter, more efficient ways to manage the integration of various energy sources into the grid.

The digital substation

Thinking 'outside the box' could play a valuable role in the future of substation automation. Here, NovaTech Automation outlines the possibilities that digitalisation and the virtualisation of substations present.

An increasing number of utilities are looking to the possibility of redefining substations via virtualisation. This would mean a significant reduction in the hardware used in substations. Instead, tasks would be carried out on cloud servers, marking a noticeable shift from the current reliance on extensive racks of hardware.

The appeal for utilities is a substantial cost reduction for substation design and engineering, reduced use of copper wiring, and the ability to replicate substation designs easily for future expansions.

"Consider that a substation today can have 200 or more independent [hardware] boxes, each performing a dedicated task," says Jeremy Anderson, Senior Vice President of Product Development at NovaTech Automation, a leading US-based provider of automation and engineering solutions for power utilities. "That's a tremendous amount of wire to pull, hardware to maintain, and it continues to become more and more congested. In a virtual digital substation, two or three servers run everything."

With a vision for an intelligent grid that is adaptive and resilient, requiring less hardware and leveraging a higher level of virtualisation, the utilities industry has formed the Virtual Protection and Control Alliance (vPAC) to explore how it can be done. The focus is to accelerate the creation of a standards-based, open, interoperable and secure architecture to host protection, automation, and control solutions for power system substations. NovaTech is one of its over 20 member organisations.

"From our standpoint, we wanted to help define the future of substation automation," says Anderson. With this in mind, NovaTech has spent the past year creating a virtual version of its Orion Substation Automation Platform to run on any server. The system is hosted on a host machine known as a hypervisor and servers powered by Intel CPUs (central processing units).

The company's flagship product, Orion is a communication and automation processor that can connect to nearly any substation device in its native protocol, perform advanced maths and logic, and securely present the source data or calculated data to any number of clients in their own protocol.

Orion can be integrated with almost any equipment, including that of competitors, and is often connected to microprocessor-based relays, meters, event recorders, IEDs (intelligent electronic devices) and RTUs (remote terminal units). It is then connected to an existing enterprise network or SCADA system.

An emerging substation model

According to Anderson, there is a coordinated push by some large investor-owned utilities in the United States and globally to move to what is called the 'digital substation'. However, not all utilities are ready to pull the plug on the traditional substation design quite yet.

"Most utilities are not moving in this direction right now,"



Some utilities are starting to move towards increased virtualisation in a digital substation model; most are still investigating the potential benefits.

Anderson says. "But they are certainly investigating it thoroughly with the plan to move in this direction in the coming years."

Cost savings are a leading driver for utilities' interest in virtualisation.

"It is a lot less expensive to build multiple substations once a virtual design is established because you won't have to pull tonnes of copper wire everywhere," says Anderson. "When it is based on the Ethernet, you can build a substation that is more or less standardised in design and easily replicable. This represents a significant cost saving in design and engineering."

The cost outlay for hardware is also reduced. "Two or three servers that cost \$10 000 each can potentially replace up to 200 hardware devices that average \$10 000 per device. The savings are significant, even if you factor in licensing fees for virtual machines," says Anderson.

Recent supply chain challenges are also increasing the appeal of hardware agnostic solutions.

"The pandemic certainly tested the supply chains in our sector," he adds. "There were serious concerns around the world in trying to buy hardware, especially custom-built devices. With virtualisation, if a server ever fails, it is easier to find a replacement and the utility is not limited to proprietary hardware."

Designing the virtual system

In creating the virtual Orion, NovaTech wanted to ensure the system functioned identically to its current hardware-based system.

Anderson highlights, "The biggest challenge was taking a system that was developed over many years as embedded software for purpose-built hardware and make it run on any server."

He adds that in some ways it was easier than initially thought. "The virtual Orion looks and operates the same as every unit we have sold," says Anderson. "It just happens to run on hardware that we didn't build."

He adds that NovaTech was intent on ensuring the customer experience would be unaltered.

"Our customers know the Orion, how to program it, and how to interact with it. So one of our main goals was to ensure that whatever we do in this virtual environment, the Orion would operate identically from the customer's perspective."



Substation virtualisation will result in significantly reduced hardware needs, with tasks being carried out on cloud servers instead.

The virtual Orion system is currently in beta test at a utility in Arizona with the full release planned for early 2024.

Looking ahead

“We are still in the early days of the deployment of the virtual digital substations,” says Anderson. “There are some early adopters, but I anticipate that we are at least five years away from broad-based market adoption.”

However, there is an opportunity to solve a more immedi-

ate issue in substation environments. As more IoT devices are installed in utility distribution systems, a single virtual Orion on a server could be used to collect and manage data from thousands of sources. When all these devices must be hardwired, it can take several racks of Orions to collect all the data.

A similar scenario could drive the use of the Orion beyond the substation environment and into any enterprise where thousands of devices are collecting data.

With cloud computing and virtualisation changing the contours of many industries, momentum continues to build behind virtualising more of the work of a substation. The blueprint for tomorrow’s power system substation has yet to be fully written, but we will likely see more virtual environments emerge through the collective expertise of industry stakeholders. □

NovaTech Automation, headquartered in Quakertown, Pennsylvania, is represented in South Africa by ACTOM.

For more information on the vPAC Alliance visit: www.vpacalliance.com.
For more information on NovaTech Automation visit: www.novatechautomation.com

Supporting the move to digital substations

Digital substations deliver gains in safety, reliability, and productivity for grid operators, reducing overall substation costs.

In this field, Hitachi Energy is advancing its pioneering digital substation technology with the new SAM600 3.0, a process interface unit (PIU), to help transmission utilities accelerate the adoption of digital substations.

The new one-box, modular SAM600 consolidates three units in a single device, enabling it to be configured as a merging unit, a switchgear control unit, or a combination of both, supporting different installation approaches. With only one device to engineer, wire up, test, and commission, customers gain improved device flexibility and simplified maintenance as well as lowering the carbon footprint of their operations.

As a merging unit, SAM600 advances the upgrade of conventional substations to digital substations. The unit bridges the gap by converting analogue signals and digitally distributing current and voltage information throughout the substation and to the control centre. With digital substations, utilities and power system operators benefit from higher safety, lower capital costs, smaller footprints,

and greater overall sustainability, reliability, and productivity. As a switchgear control unit, the device directly interfaces with circuit breakers, disconnectors, and earthing switches in the field. This helps to reduce

wiring to the control building substantially by providing an IEC 61850 digital interface to operate and monitor the equipment.

“As the complexity and dynamics of power generation, transmission, and distribution continue to grow, modern digital substations provide the control and efficiency needed to address these challenges. The new SAM600 helps operators extend the life of their existing assets, delivering much-needed investment protection and new levels of system performance,” said Claus Vetter, Head of Automation and Communication at Hitachi Energy.

“The compact and advanced product design meets our customers’ need for a solution that functions reliably in harsh environments, and its modularity facilitates on-site service and repairs, which minimises downtime and related expenses,” said Vetter.

New features of the SAM600 3.0 include:

- State-of-the-art redundant communication architectures and the latest industry standards, including IEC 61850 Ed 2.1 and IEC 61869
- Two compact form factors for installation in indoor and outdoor panels
- Modular hardware architecture to adapt to different application needs
- Direct breaker tripping with trip coil supervision and a high-accuracy analogue input system

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The new, modular SAM600 PIU consolidates three units in a single device, to serve as a merging unit, a switchgear control unit, or a combination of both.



Relay protection testing in a changing substation environment

In this blog piece by Joe Stevenson at Doble Engineering Company, he shares some insights from his longtime colleague, Blake Harris, on adopting the IEC 61850 standard and how it changes the professional journey of relay technicians. The experience among US utilities offers a relevant perspective and some helpful lessons for the power transmission and distribution sectors in South Africa.

Digital substations require technicians to develop a keen understanding of intelligent electronic device (IED) communications over Ethernet and gain expertise in virtual protection and control environments. The knowledge and skills they develop along the way will become invaluable as the power industry modernises and expands going forward.

Stevenson notes that Blake Harris has 25 years of experience in substation maintenance and protective relay testing and has taught courses on these subjects at a local community college for several years. In his role at Doble, he works with utility and industrial relay testing and engineering professionals daily, providing support and consulting remotely from his office in Tulsa or during on-site visits across the country.

Briefly, the IEC 61850^[1] standard defines protocols that modern relays and other IEDs can share to enable uniform communications over Ethernet. With proper programming, IEC 61850-compliant substation devices exchange immense amounts of data that are consistent in format, irrespective of devices on the network that may be from different manufacturers. Automation schemes with fast response speeds and status information updated microsecond by microsecond can be engineered, and being networked, IEC 61850 implementations can be monitored and managed remotely.

Implementing IEC 61850

Utility-scale wind and solar facilities coming online at unprecedented levels and electricity demand continually increasing year-on-year, present good reasons for adopting IEC 61850 in substation networks. At the same time, costs of rolling trucks and performing maintenance on copper-wired substations are only rising. However, in North America, companies that have implemented IEC 61850 are far fewer than those that have not. Asked why this is the case Harris said:

“In my experience it’s the smaller organisations that are kind of ‘staying away’ – they’re letting the larger utilities and engineering firms do all the heavy lifting, get everything vetted, and when technology comes closer to plug-and-play with established industry practices, they might migrate. It will take some time to establish what the industry will adopt as required testing criteria.

“People are scared to let it do its thing, so they’re putting



An electrical technician checking voltage on switchgear in a solar PV plant.

it in as SV^[2] or GOOSE^[3]-only, or as a redundancy to a copper system. They don’t ‘trust’ it yet ... there are many new pieces of the puzzle that can go wrong. It’s trusting that the engineering is solid and we’ve done our job testing it.”

Preparing the workforce

Relay technicians take years to reach a qualified level of knowledge and ability. There is plenty of maths and protection theory to comprehend as well as the relays themselves and sets of test software and equipment. How does IEC 61850 impact the work of technicians? In answer to this question Harris said:

“Take an average technician, one who can walk in and figure out everything in a substation. Maybe he or she can’t fix every problem, but at least they can figure out where the problems are and they know what needs to be done to address them. A technician of this calibre needs a great deal of training and exposure – dedicated hands-on time – on top of their day-to-day work. Learning something new is a really tall order, especially if they are good at what they do and they are needed at their company.”

Working with the technology

Stevenson also asked: What does testing and troubleshooting look like in protection and control environments that are based on the IEC 61850 standard and what advice can you offer? In this regard, Harris responded:



Electrical technicians who have the specialist knowledge required to monitor and diagnose faults in analogue systems are being called on to learn new skills as the digital grid takes form.

“The average technician isn’t going to know about a ‘superspecial’ command on the relay to see if the communications are synchronised through IRIG-B^[4] or through the satellite and if everything’s happy. Another type of technician will have to be trained, someone who learns the communications and substation level items as well as protection. He or she will need to be sitting closer to the engineer than before. There will need to be a new process, a new line of communication between the engineer and the end technician that is not there now. It’s one thing to look at a set of prints and respond to incorrect logic or wiring, but with IEC 61850, depending on at what point an error occurs, there is a good chance the technician is not going to feel comfortable addressing it.

“I have seen relays of the same model, one using SV and the other using analogues, both using the same settings, operate at significantly different points. Technicians may not be in a position to model relays side by side and see what they can figure out. If it’s the SV relay that is operating ‘incorrectly’, it will need a new troubleshooting technique to be employed. We have a lot of digital circuitry converting volts, amps, and angles to the process bus that, for an analogue technician, can be difficult to understand.

“We are changing the type and number of failure points, whereas with analogue, there are established methods to identify the issues. For companies considering IEC 61850,

training is great, but dedicated hands-on time will be the best method to learn. Having the technicians involved with the engineering process ... companies will be thankful for that in the future.”

Looking ahead

Investments and regulations are currently driving the decarbonisation of electricity and demand continues to increase. Power networks will have to be more available, reliable, and resilient going forward. Many companies are implementing IEC 61850 to respond to these challenges, but many more are not, or at least not yet, and some are not planning to at all.

Time will tell the level of adoption IEC 61850 reaches in the US. The standard makes game-changing protection and control automation solutions possible, but technical, financial, and regulatory concerns persist. The role of the relay technician is key to modernisation initiatives and is consequential to the energy transition already under way.

It is the relay technician who is on the frontline of protection system performance, the one who finds points of failure and addresses them. In IEC 61850 implementations, the relay technician will be the one to discern if issues are physical or virtual and will be the person to validate the engineering and technologies in play.

The insights shared above give us a clearer, real-world view on IEC 61850 from the relay technician’s perspective. Next, Doble plans to look at IEC 61850 from the perspective of the protection engineer. □

Notes

- [1] IEC 61850 is the international standard that defines communication protocols to provide communication between different equipment located in a substation, such as protection, control, measurement and monitoring equipment, as well as intelligent electronic devices.
- [2] IEC 61850 (IEC 61850 – Communication Networks and Systems in Substations) defines Sampled Values (SV) protocol as a publisher/subscriber type communication. This protocol is used for information exchange over the Ethernet between merging units and IEDs in a substation.
- [3] GOOSE, or Generic Object Oriented Substation Event, is another of the communications protocols included in IEC 61850.
- [4] The IRIG-B time protocol is widely used by electric utilities, industry, and others to ensure precise time synchronisation of power system devices, such as breakers, relays and meters.

For more information visit: www.doble.com

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- Supports IEC 61869 by default and legacy sampled value publishing profiles simultaneously
- Integrated disturbance recorder with 4.8 kHz recording frequency
- High level of security, including secure boot, user management, and role-based access control
- Browser-based user interface (WebUI) and device diagnostics
- Consistent configuration, operation, maintenance,

and a shorter learning curve and time to deploy with the well-established PCM600 tool.

As digital substation technology continues to evolve, the SAM600 will play an important role in accelerating its adoption and enabling advanced automation and communication applications to help utilities tackle the challenges of future power grids. It also serves as the foundation for utilities to embrace digitalisation more widely and integrate greater amounts of renewable energy for an energy system that is more sustainable, flexible and secure. □

AI-powered video monitoring of remote utility sites and more

Viasat Inc, a global leader in satellite communications, recently announced it will be integrating Videosoft Global's video streaming technology into INTELIE, its advanced operational AI platform which provides operational intelligence and predictive analytics for industrial applications, in energy and mining for example. With Videosoft's live streaming capabilities, Viasat will deliver industrial monitoring that offers utility companies and others increased situational awareness of their assets, to inform and improve response efficiency to events in real time.

Research shows aging infrastructure is a key concern for many electrical utilities, given that surging consumer demand is putting power grids under increased pressure. The Viasat-Videosoft partnership will enable utility leaders to use INTELIE to gain a real-time view of what is happening in the field, tracking remote infrastructure and allowing them to mitigate downtime risk and the related potential financial losses.

Videosoft Global's live video streaming solutions use adaptive video compression and transmission technology to deliver high-quality low-latency streaming over satellite communications. With streaming capabilities from as little as 4 kbps over satcom, cellular, and mesh networks, the

technology ensures stability in challenging network conditions, and at lower data costs.

The integration of Videosoft's video streaming capability into INTELIE will create a next-generation AI-driven real-time monitoring and analytics solution to deliver mission-critical communications from remote locations around the world.

The agreement demonstrates the value of Videosoft's technology as a key enabler in advancing monitoring solutions to drive industrial operational efficiency. As a leading live video streaming solution provider with an established reputation in serving the oil and gas sector, Videosoft's partnership with Viasat will extend the reach of Videosoft's solutions beyond its current customer base to wider industrial applications. □



The integration of Videosoft's video streaming technology into Viasat's advanced operational AI platform will enable real-time video monitoring of remote facilities.

Compact elbow connectors

The latest modular and smaller switchgear units used in the power industry require more space-efficient connectivity solutions. TE Connectivity's first IEEE-certified smart-compatible compact elbows respond to the needs of data centres, wind and solar farms, and underground power networks to make the best use of the space available.

The Raychem ELBA asymmetric compact elbow connector can reduce stacking length by 40% and is currently the most compact design on the market. Its smaller footprint is complemented by increased range and installation flexibility. One standard body size can cover up to 1 500 Kcmil, making it possible to use a single unit rather than two, and streamlining the design and installation process.

It is TE's first compact connector compatible with smart voltage detection systems to be certified to IEEE 386-2016 standards and offers easy and flexible installation. These features make it an optimum connector for use in power networks and other installations where space is tight and rapid project rollout is a priority.

"Compatibility with our Kries CAPDIS smart grid monitoring product opens up opportunities to install smart systems in existing infrastructure. The reduced footprint means it is well suited to facilities where there is pressure on space, and it offers seamless integration with both new and existing medium voltage equipment," said TE Product Manager, Wentao Yao.

Customers can choose the configuration best suited to their needs and benefit from dedicated local support through the design and implementation process. □






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Casbah Zwane,
Divisional CEO at
ACTOM High Voltage
Equipment.

Local support for expansion of SA's transmission network

South Africa's electricity landscape is undergoing a significant transformation, driven by the introduction of new generation capacity from independent power producers (IPPs) and the integration of renewable energy sources. ACTOM High Voltage Equipment, a division of the ACTOM Group and a leading South Africa-based manufacturer and supplier of electro-mechanical equipment in Southern Africa, is active in this evolution and is well positioned to play a significant role in shaping the nation's future power grid.

In line with its latest Transmission Development Plan, Eskom has approved "the execution of R26 billion in capital investment" with two priority programmes already in the pipeline to accelerate the delivery of the transmission infrastructure. There have also been indications that government is looking at involving the private sector via public private partnerships to action the planned – and much needed – extension of the grid. ACTOM High Voltage Equipment is committed to providing cutting-edge solutions that will ensure the reliable and efficient transmission and distribution of electricity, enabling the nation to harness the full potential of its diverse energy mix.

ACTOM High Voltage Equipment specialises in the supply of products that are core to electricity transmission, manufacturing equipment locally as well as importing equipment from its global technology partners. The company is positioning itself to participate in Eskom's planned rollout of transmission infrastructure. TDP 2022 calls for a significant acceleration in grid-related investments to facilitate the integration of 53 GW of new generation capacity, mostly from renewables, over the next 10 years. The plan outlines the construction of 14 218 km of new high voltage transmission lines, the construction of 170 transformers, 40 capacitors and 52 reactors.

Casbah Zwane, Divisional Chief Executive Officer at ACTOM High Voltage Equipment, says, "We are looking at various options to increase our capacity and resources to meet the demand for products and services in terms of Eskom's TDP 2022. We are already looking at expanding the manufacturing capacity of our local factories by about 40% and are in discussions with our global partners to increase our import volumes, by having access to more of their factories than we have currently."

An established track record

Zwane highlights that ACTOM High Voltage Equipment has a long and solid track record in South Africa and on the continent, having supplied transmission and distribution equipment to Eskom and other utilities over the past 50 years. Despite being deployed decades ago, a lot of this infrastructure remains functional, with the division performing regular maintenance and upgrades when needed by its customers.

"This confirms the reliability of the products we man-

ufacture locally and those we source from our partners. We pride ourselves on the high quality of our products and the aftersales support we provide to customers from within our organisation," he says.

"ACTOM High Voltage Equipment has played a role in countless electrification projects in South Africa – and our products are instrumental in powering 80 to 90% of grid-tied renewable projects locally," Zwane adds.

The company's locally honed expertise, quality products and ability to offer local support are, in his view, factors that will give ACTOM High Voltage Equipment the edge over foreign competitors, expected to enter the local market to participate in Eskom's TDP 2022. According to Zwane, ACTOM High Voltage Equipment is in a strong position as a manufacturer, supplier, and service provider in the transmission space to take a leading role in implementing the expansion of the national transmission grid.

Green energy solutions

To meet the demands of the TDP 2022, Zwane says the company is also investing significantly in green energy solutions and products as part of its contribution to a sustainable future and Eskom's decarbonisation initiatives.

"The TDP 2022's plans for expanding grid access for renewable energy generation will impact new transmission infrastructure. So, we are making quite a substantial investment, in research and development as well as new manufacturing processes, aftersales support, and new testing procedures," he says.

Zwane further notes that the implementation of the TDP will provide tremendous opportunities for business growth and promises significant positive socioeconomic impacts, in terms of reindustrialising the country and creating employment.

"Over the past four or five years, there has been very limited investment in the country's transmission network, forcing many businesses in this space to downscale their operations. As the TDP 2022 comes into effect, we expect to see a substantial ramp-up in activity and capacity expansion, which will be positive not only for the industry but for the entire economy," Zwane says.

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

Choose locally manufactured transformers

In the fast-evolving power generation and distribution space, speed and efficiency are important. However, the prolonged lead times associated with acquiring transformers – key components in any electrical infrastructure – often present a significant challenge. Such delays can result in project setbacks, increased costs and, crucially, a slower response to the country's power demands.

David Sullivan, Divisional CEO at LH Marthinusen, highlights the advantages presented by local manufacturers. He notes that, typically, the transformer is the longest lead time item in a transmission or substation project, so there is usually high pressure to purchase this piece of equipment to ensure the entire project can be delivered on time, whether it is a refurbishment, upgrade, or new build.

Many transformers for local use are acquired from overseas suppliers, but most transformer factories are currently extremely busy and have overloaded order books. Projections indicate this trend will persist for the next five to eight years, driven by continued growth in global energy demand. This in turn is driven by the uptake of renewable energy – from solar, wind or geothermal sources – growing demand in China and India, and the replacement of older, inefficient transformers in the US and Europe. Additionally, the electrification of motor vehicles requires power to be distributed to a network of charging stations.

Shorter lead times

Sullivan says it is therefore prudent for South African industrial organisations that require transformers for energy projects to engage with local manufacturers, as end-to-end lead times can be significantly shorter than those presented by international suppliers. For example, aside from the manufacturing period, sourcing a transformer from an international manufacturer requires it to be shipped to South Africa, processed through customs, and then transported by road to the project site. This can easily add up to eight weeks to the lead time – which amounts to a significant delay – an additional two months before the project can start generating profit and a return on investment.

What is more, acquiring a transformer from an overseas

supplier also increases the risks associated with the transportation of the electrical equipment. Sullivan makes the point that even though they may look sturdy, transformers are fragile pieces of equipment.

Invariably, there are risks in loading and unloading large transformers and, often, shipping is routed first through a central hub before the equipment is transferred onto another vessel headed to a South African port.

The risks associated with transportation are compounded by the current logistical challenges at our local ports, which increase both technical and time-related risks. Any business decision must take risk into account and relying on local manufacturing certainly reduces transport-related risk.

Local aftersales support

Local aftersales support for transformers is also a key factor and this should take the form of locally based skills and equipment, as well as feet on the ground. When there are problems with a transformer during the warranty period, there is only so much that can be done on site when the units are big. What is required is a workshop where proper repair work can be conducted, using the right equipment and tooling – and many international suppliers are unlikely to have that level of local support and workshop space.

When sourcing transformers locally, a lot of effort usually goes into a quality assurance programme, the vetting of suppliers and products and progress inspections to ensure the customer receives a product designed and assembled to last 25-plus years. However, this falls away significantly, if not totally, when transformers are procured internationally.

Owners of energy projects should apply the same rules and principles to the acquisition of transformers as to any other equipment. By sourcing equipment locally they retain more control.

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



Local manufacturers of transformers offer the advantages of shorter lead times, fewer transportation risks, and on the ground aftersales support.



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SA manufactured substations delivered to DRC copper mine

Trafo Power Solutions has supplied 40 dry-type mini-substations and seven standalone ring main units to one of Africa's largest and fastest growing copper operations, in the Democratic Republic of Congo.

Commenting on this significant contract, David Claassen, Managing Director at Trafo Power Solutions says, "We are immensely proud to be involved in this mega project. Considerable design work and planning went into this contract, with demanding lead times to keep up with the mine's rapid expansion."

The mini-substations include units of between 630 kVA and 1 600 kVA capacity with primary voltages of 11 kV and 33 kV. The secondary voltage configurations are 400 V, 690 V and 1 000 V – and some units have dual-ratio secondaries. Protection against the ingress of water and dust was also designed into the units, with an IP54 ingress protection rating.

Fully designed and manufactured in South Africa, the mini-substations were completed in a streamlined production process that facilitated fast track delivery in batches of five to six units every 10 days. After the manufacturing and assembly process, each unit went through a programme of intensive testing before it was ready for dispatch.

Claassen adds: "The units are designed to be as compact as possible. Although many will be used for surface infrastructure, the design had to ensure they could be used underground, where space is limited."

The underground environment is governed by strict safety regulations and standards and dry-type transformers are, accordingly, an ideal choice. The technology uses air rather than oil to cool the windings, making it safer with less risk of fire, explosion or environmental contamination through leakage. Additionally, the windings in dry-type transformers are encapsulated in cast resin, which protects them against humidity levels up to 95%.

Undertaking both the electrical and mechanical design, Trafo Power Solutions has ensured a limited footprint for the units with the use of air-to-air heat exchangers. In this cooling system, air is channelled through the transformer windings and flows over the aluminium tubes of the heat exchanger, while a fan blows air through the tubes to cool the air on their outer surface.

"The substation design also includes arc protection, which will shut the unit down in the event of an electrical arc occurring – before any further damage can be caused," Claassen says. Each mini-substation is equipped with a control system that allows for the protection functions to be monitored remotely.

The contract was conducted through a leading South African engineering, procurement and construction management (EPCM) firm, and



Each mini-substation is equipped with a control system that allows for the protection functions to be monitored remotely.

Trafo Power Solutions ensured all the units were delivered by the end of 2023.

"Our early engagement with the EPCM was important on this project, as it allowed our team to understand the project requirements and develop a cost-effective solution," Claassen says. During this process, all documentation was strictly managed in an online system, including designs, specifications and test certificates – to which the EPCM and end-client had easy access. In this way, designs could be uploaded, shared and signed off using the online platform, further streamlining activities for the fast pace of the project.

"The ring main units are fully motorised and controlled externally by remote pendant switching," he says. "This enhances safety and ease of management, so personnel seldom have to open the panel doors – which requires the necessary safety equipment to be used and protocols to be followed."

The transformers are rated for Class H insulation – for temperatures up to 180 degrees – and the dual-voltage boards are sized for a relatively complex voltage distribution system on each mini-substation.

"The detailed design and variety of solutions within the complete contract package highlights the technical capability of the Trafo Power Solutions team," Claassen says. "This can be seen in the mini-substation from the medium voltage side and its control and protection functionality, through to the low voltage distribution and the customised transformer design for these applications."

He emphasises that the standard attributes of dry-type transformers allow them to operate reliably with very little maintenance. With air rather than oil for cooling, for instance, they do not require any regular oil testing or oil changing.

The robust nature of dry-type transformers makes them well-suited for mining applications, surface or underground. Claassen notes that Trafo Power Solutions' extensive experience in Africa reflects that dry-type technology is becoming more popular in the mining sector, due to the transformers' inherent safety, reliability and ability to operate without much maintenance, among other factors.

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

Trafo Power Solutions has supplied 40 dry-type mini-substations to one of Africa's largest and fastest growing copper operations, in the DRC.



Bridging the gender gap in digital skills

Technology and ICT careers are on the rise, increasing the need for digital skills. Despite this surge, a significant gender gap exists in the industry, where women are either marginalised or overlooked for job opportunities, and the skills shortage persists.

Siemens and UN Women joined forces to bridge the gender gap by upskilling young African women in South Africa, Senegal, Rwanda, Kenya, and Uganda through the African Girls Can Code Initiative (AGCCI).

Last year, Siemens and UN Women launched the AGCCI programme which, during the year, successfully trained over 600 young women from the five African countries. Through coding camps covering various IT, cybersecurity, and coding training sessions, participants gained valuable work-readiness skills, mentorship and exposure to potential employment opportunities at Siemens.

With the first phase of the AGCCI concluded, Phase 2 kicks in. This will see Siemens sponsor additional IT and cybersecurity training and provide a comprehensive six-month mentorship programme, SieMent EmpowerHer. Participants will have access to individual and group mentoring sessions and masterclasses taught by subject matter experts.

Sabine Dall'Omo, CEO of Siemens Sub-Saharan Africa, said, "We realise that there are still countless barriers preventing young African women from exploring careers in the technology sector, which hinders us from bridging the gender inequality gap that exists across the continent in this sector. That's why we've invested in facilitating access to education and technology to empower more young African women to become agents of change within their communities and on the global stage."

Making an impact across Africa

The launch of SieMent EmpowHer was accompanied by a panel discussion, where representatives from UN Women Germany, UN Women South Africa, and Siemens participated in the 'Power of Mentorship' discussion. In the first phase of the AGCCI, two-week coding camps covering various aspects of IT, cybersecurity, and coding, were rolled out in the five participating countries. Allianz is the official sponsor of data access for participants, and Mendix has created a mentorship platform to track learning goals. Siemens, Stiftung, LawPilots and MetaCompliance have also sponsored additional learning content.

An update on progress

- South Africa completed its first AGCCI coding camp in July 2023, with 40 young women and completed its second coding camp in October 2023, involving 50 girls. All the participants gained invaluable skills.
- Uganda saw 50 young women finish their coding camp in July last year.
- In Senegal the coding camp was conducted in May 2023, providing IT, coding, and cybersecurity training for 47 girls.
- In Kenya the first coding camp wrapped up in August 2023, with 50 participants completing the programme. The second coding camp will run this year.



Young girls in a coding class – part of the AGCCI which will reach 600 school-going girls in five African countries.

- In Rwanda the coding camp concluded in November last year, having trained 50 girls.

Siemens says the young women who completed the initial camp can now register directly with the multinational technology group to continue with the additional sponsored content and the mentorship programme. This second phase will include a six-month extended training programme covering additional IT and cybersecurity training and the SieMent EmpowHer mentorship programme.

The programme offers young women a range of benefits – they gain hard and soft skills and lessons from experience in the working environment.

- Learning from other's experiences
- Learning new skills and new ways of doing things
- Developing strong communication and interpersonal skills
- Broadening their networks
- Increasing self-confidence and self-awareness
- Learning to self-reflect
- Improving goal-setting.

Creating long-term change

According to Siemens Sub-Saharan Africa, the SieMent EmpowHer programme has, over time, benefitted countless women, including two beneficiaries the company employed permanently in 2022.

"SieMent EmpowHer changed my life. It empowered me to find permanent employment as a System Engineer at Siemens. My career has progressed significantly, and I am now part of a team building a Siemens Learner Management System using Mendix, and I'm a SieMent Peer Mentor. This initiative has been a turning point in my professional journey," says Vuyiswa Gwadiso.

Another beneficiary, Kayla Thompson, adds, "SieMent EmpowHer empowered me to secure permanent employment at Siemens and helped me advance rapidly in my career. The soft skills development included in the programme has also proven invaluable, making me a well-rounded professional."

Sabine Dall'Omo concludes: "We look forward to continuing to make an impact in the lives of young African women through the next phases of our AGCCI. By investing in initiatives that empower and upskill the future generation through mentorship across the continent, we can equip them with skills that will help them generate an income, help improve their employability, help them develop resilience, and contribute to rebooting transformative growth in Africa."

For more information visit: www.siemens.com



Virodh Sunderlall,
Product Manager at
Tarsus On Demand.

Cybersecurity in 2024 – what to expect in SA

As was widely reported last year, South Africa received the most cybersecurity threats on the continent, by far – 230 million, compared to second-placed Morocco's 71 million in 2022.

Virodh Sunderlall, Product Manager at Services and Solutions Aggregator Tarsus on Demand, says South Africa is particularly vulnerable because of affordability challenges. "More developed countries have more funds

available to buy multiple security systems. Our economy has not been at its strongest, so people try to lower expenditure by cutting expenses that don't generate money, such as security and insurance. This leaves enterprises open to attack."

South Africans are, however, learning that cybersecurity is not a luxury; it is essential. As the country ramps up its safeguards, Sunderlall outlines five top trends to look out for in 2024.

Multilayered security

Multilayered security was a key strategy for Tarsus On Demand and its partners in 2023, and will remain so in 2024. "With cyber threats becoming more sophisticated and diverse, relying on a single security layer is no longer sufficient," says Sunderlall. "Multilayered security involves combining different security measures such as firewalls, encryption, access controls, behavioural analytics, and endpoint protection to create robust defences against potential breaches."

This strategy also allows for adaptation to new threats – if one layer is breached, others can mitigate the risk, reducing the chances of a successful attack.

"Multilayered security has become so important that security vendors are creating APIs (application programming interfaces) to communicate to other vendors' products on systems. This helps them leverage each other to bolster security strength. Forward-thinking companies will implement these APIs in 2024," Sunderlall says.

Better email protection

Between 90 and 95% of all security breaches happen through email. "As with home security, the most-used entry points are also the most vulnerable. Usually, that's email. Almost every security vendor is trying to solve this, and we expect to see the most movement in this area in 2024."

Additionally, Sunderlall notes that new regulations on Domain-based Message Authentication, Reporting and Conformance (DMARC) compliance, which governs how emails are sent, also come into effect from March 2024 and will affect security products going forward.

More options with more flexibility

Fixed-term contracts are falling out of favour, with many vendors now offering customers more flexibility, says

Sunderlall. "Vendors are no longer tying customers and partners into 12-month security contracts. Instead, they're restructuring offerings around monthly payments, and making products easier to integrate and to scale up and down as needed."

Vendors are also offering multiple solutions, where they used to focus on one or two products. "Consumers want more choice, and vendors are giving the market what it wants. Tarsus On Demand, for example, is now offering AWS alongside Microsoft and multiple cybersecurity stacks, making us one of only a few authorised AWS distributors in Africa."

Cyber insurance

As threat vectors increase and more companies are being held to ransom by attackers, cyber insurance products will become more necessary, says Sunderlall. "These products have only recently started emerging, but we expect they will become commonplace quickly. Soon, cyber insurance will be a standard and necessary business expense, like building insurance is."

AI defences

AI has been the most talked-about topic in security globally this past year, and we'll see more real-world use cases in 2024, he says. "We've seen some great AI-based defensive tools introduced, especially in email security. And it became much more accessible this past year, with products like Mimecast becoming available to end users.

"But the converse is that AI is also being used to attack systems. It's a double-edged sword and it's not quite clear what it's capable of yet. We can expect to see some big developments in the field this year, both good and bad. It's going to be interesting to keep an eye on these developments as they shape the future."

The challenges posed by the sheer volume of cyber threats, combined with economic constraints, have catalysed a strategic shift in the approach to cybersecurity. The adoption of multifaceted security measures, improved email protection, flexible vendor options, the emergence of cyber insurance, and the use of AI in defence mechanisms, underscore a proactive and dynamic response to the growing complexity of cyber threats. Although these developments herald a more secure digital environment, they also signify a new era of continuous adaptation and vigilance.

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

E-fuels offer a more realistic alternative than EVs

“It is unrealistic to believe that the global vehicle population of over one billion cars with combustion engines can be replaced by electric cars in the foreseeable future.” This is the view of Frank Obrist, founder of the Obrist Group, which focuses on sustainable energy concepts and calls for “more realism and less ideology in energy policy”. Obrist points out: “Many countries around the world lack the political will, public acceptance and financial resources to switch to e-mobility for decades to come.”

As an alternative, he calls for the increased use of environmentally friendly synthetic fuels (e-fuels) in combustion cars. Obrist argues: “It’s about the overall carbon footprint, including battery production, power generation, the construction of new infrastructure, the potential scrapping of more than a billion vehicles and the production of synthetic fuels from renewable energy sources – and electromobility performs significantly worse than modern e-fuels in the overall balance.”

A global methanol economy

Frank Obrist refers to the concept of a global methanol economy presented by science journalist Jean Pütz in his latest book *Prosperity and Economic Growth Without Regrets: Climate Rescue Yes! Deindustrialization No!* (ISBN 978-3-98674-104-4). The book outlines how synthetic fuel can be produced on a large scale in the earth’s sunbelt with the help of photovoltaics and converted into methanol. This so-called ‘green methanol’ has two major advantages: firstly, the efficiency of fuel production does not play a significant role because the sun is infinitely available around the equator, and secondly, methanol can be transported via all existing global infrastructures for fossil fuels such as oil.

Put simply, in a two-stage process, hydrogen is produced using solar energy and methanol is then produced from hydrogen. The frequently voiced argument against this process – the high energy input required – is invalidated by the fact that the solar energy required for production is available in abundance around the equator. The water required for hydrogen production is obtained from the air in the process; even in deserts, the humidity is sufficient for this.

Methanol production plants in desert areas

In his book, Jean Putz outlines, among other things, the construction of huge methanol production plants in desert areas and on barren wasteland. He also describes how the synthetic fuel can be transported via conventional tankers, pipelines and tanker trucks to the pump at the filling station. Further, methanol is suitable not only for the transport sector, but also as a universal energy source.

“We have already implemented this concept in several prototypes and are in a position to set up industrial production plants on a large scale,” says Obrist, speaking on behalf of his group of companies. The book and concept were presented at the COP28 world climate conference

in Dubai, and have been presented elsewhere. “Since then, we have seen a lot of interest from Asia, Africa and the Arab world,” he says. Delegations from several countries, such as India, have already visited the company’s headquarters in Lindau, Germany, to find out about the feasibility of large-scale methanol production in their countries.

In discussions with foreign delegations, Obrist has established that the economic viability of the methanol concept plays a key role. He explains: “It becomes clear that all existing infrastructures, from transportation to cars with combustion engines, can continue to be used and that the costs are therefore much lower compared to electricity-based e-mobility. Instead of getting fossil fuels out of the ground, methanol is produced as a substitute fuel and everything else remains unchanged.”

Methanol production serves climate protection

For Obrist, it is important to note that synthetic fuels are not the second-best solution for climate protection for cost reasons, but also the best from a technical point of view. He says: “Methanol production using our patented process removes more carbon dioxide from the air than is released during subsequent combustion. In other words: every kilometre that a vehicle fuelled with e-fuels travels, improves the climate.” The Obrist Group uses the term ‘atmospheric fuel’, or aFuel for short, to emphasise the removal of carbon dioxide from the atmosphere in the overall CO₂ balance.

For more information visit: www.obrist.at

The Obrist Group, founded by inventor and entrepreneur Frank Obrist, focuses on innovations for global, sustainable and CO₂-neutral energy concepts. The spectrum ranges from the global supply of renewable energies to atmospheric fuels (aFuels) and innovative CO₂-neutral drive concepts for the automotive industry. With over 200 patents, the Obrist Group is one of the world’s leading innovators in the field of sustainable energy concepts.



Frank Obrist, Founder and President, Obrist Group.

(Source: Obrist Group)

SA entrepreneur wins Africa Prize anniversary medal



Neo Hutiri, winner of the Africa Prize 10th anniversary medal.

Outstanding alumnus of the Royal Academy of Engineering's Africa Prize for Engineering Innovation, Neo Hutiri from South Africa, has been awarded an anniversary medal and £50 000, providing further support for his business, Technovera. His product, Pelebox Smart Lockers, is designed to improve access to chronic disease medication.

The award was presented by

HRH The Princess Royal, the Academy's Royal Fellow, at a ceremony on 31 January 2024, celebrating some of the most successful innovators and businesses from the programme's past 10 years.

The two runners-up were: Aisha Raheem, with Farmz2u from Nigeria and Kenya, a business that increases efficiency for market players in the food sector through seamless operational systems; and Samuel Njiguna with Chura Limited from Kenya, for the web-based, multinet network system that allows users to move airtime between their different SIM cards regardless of carrier, buy airtime from service providers that can be used on any network, send airtime to family members or employees, or exchange airtime for cash. Both runners-up received £15 000 to develop their innovations further.

This year the Royal Academy of Engineering is investing over £1 million in alumni of the Africa Prize for Engineering Innovation through grants, prizes and accelerator programme awards, to facilitate the long-term success of the innovations it has recognised as addressing local challenges. The programme, which marks its 10th anniversary this year, offers Africa's biggest prize dedicated to engineering innovation and supporting entrepreneurs to maximise their impact.

The balance of 10th anniversary funding will be awarded through grants and activities to boost the growth and sustainability of African-founded businesses. These initiatives include legal support, digital skills enhancement, and global networking opportunities.

Over its first decade, the Africa Prize for Engineering Innovation has supported more than 140 entrepreneurs across 23 African countries with a rigorous business training programme, offering them lifelong support through its vibrant alumni network, as well as engineering mentoring, communications support, and pitching opportunities. Alumni are working to tackle many of Africa's most pressing development challenges, including access to power, food, and water security, adapting to climate change, and improving public infrastructure.

Since 2014, the alumni have collectively raised over US\$39 million in finance, created over 28 000 jobs, and have introduced more than 470 products and services to

the market in more than 40 countries across five continents. Over 10 million people have benefitted from the engineering innovations and employment opportunities created by Africa Prize alumni.

Neo Hutiri, winner of the 10th anniversary medal, said: "I am honoured to have been recognised by the Royal Academy of Engineering and to have been selected alongside such an accomplished group of innovators. The prize initially was instrumental in accelerating Technovera-Pelebox Smart Lockers over the past five years. It has provided a community that has – and continues to support and inspire us as we move forward. Thanks to this further award, we aim to scale up the work we have done to reach more communities."

Rebecca Enonchong FEng, Africa Prize judge, commented: "The impressive Africa Prize for Engineering Innovation entrepreneurs have created solutions that are actively shaping a sustainable and inclusive future for over 10 million people on the continent. The Africa Prize started a decade ago to enhance engineering capacity within Africa. Over this time, the continent's engineering ecosystem has continued to grow and thrive and we're proud to have supported its vibrant landscape of innovation and collaboration."

About Technovera Pelebox Smart Lockers

Technovera is a social venture focused on inclusive technology with the aim of improving access to chronic disease medication in Africa. Founded in 2016, the enterprise currently employs 12 people.

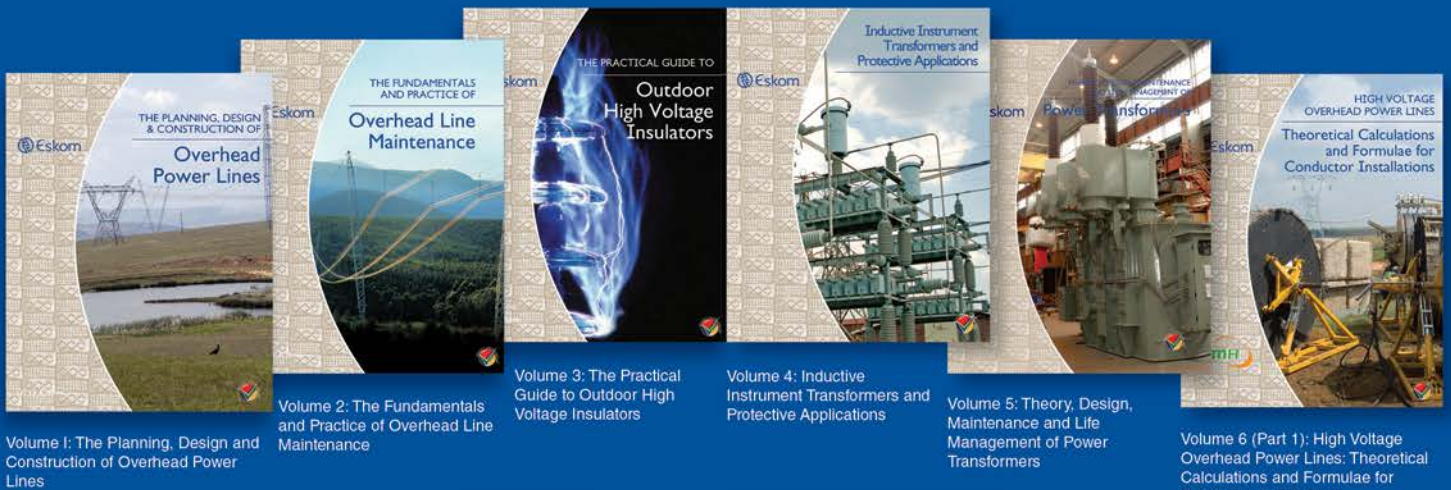
South Africa has the world's biggest antiretroviral therapy (ART) programme for patients living with HIV and AIDS, and there has been a steady increase in the number of patients with non-communicable diseases requiring chronic therapy. A patient's experience tends to be one of long waiting times, typically above three hours. Hutiri says Pelebox was developed as an internet-enabled smart locker dispensing system that allows clients to collect their repeat chronic medication in under 30 minutes, instead of waiting hours in queues at healthcare facilities.

Pelebox smart lockers work in African countries where national health ministries need to reach more people but are limited by the number of healthcare facilities, staff shortages and high patient numbers. Pelebox smart lockers offer convenient collection points and the enterprise is now operational across South Africa, Botswana, and Namibia, reaching 123 communities and impacting the lives of 32 000 patients per month. The enterprise has processed over a million chronic scripts to date.

Applications for the next cohort of the Africa Prize for Engineering Innovation will open in April 2024.

For details of the 10th anniversary medal shortlist and more information on the Africa Prize visit: <https://africaprize.raeng.org.uk/>

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 accrued 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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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.

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

Volume 1: Mentorship and Coaching

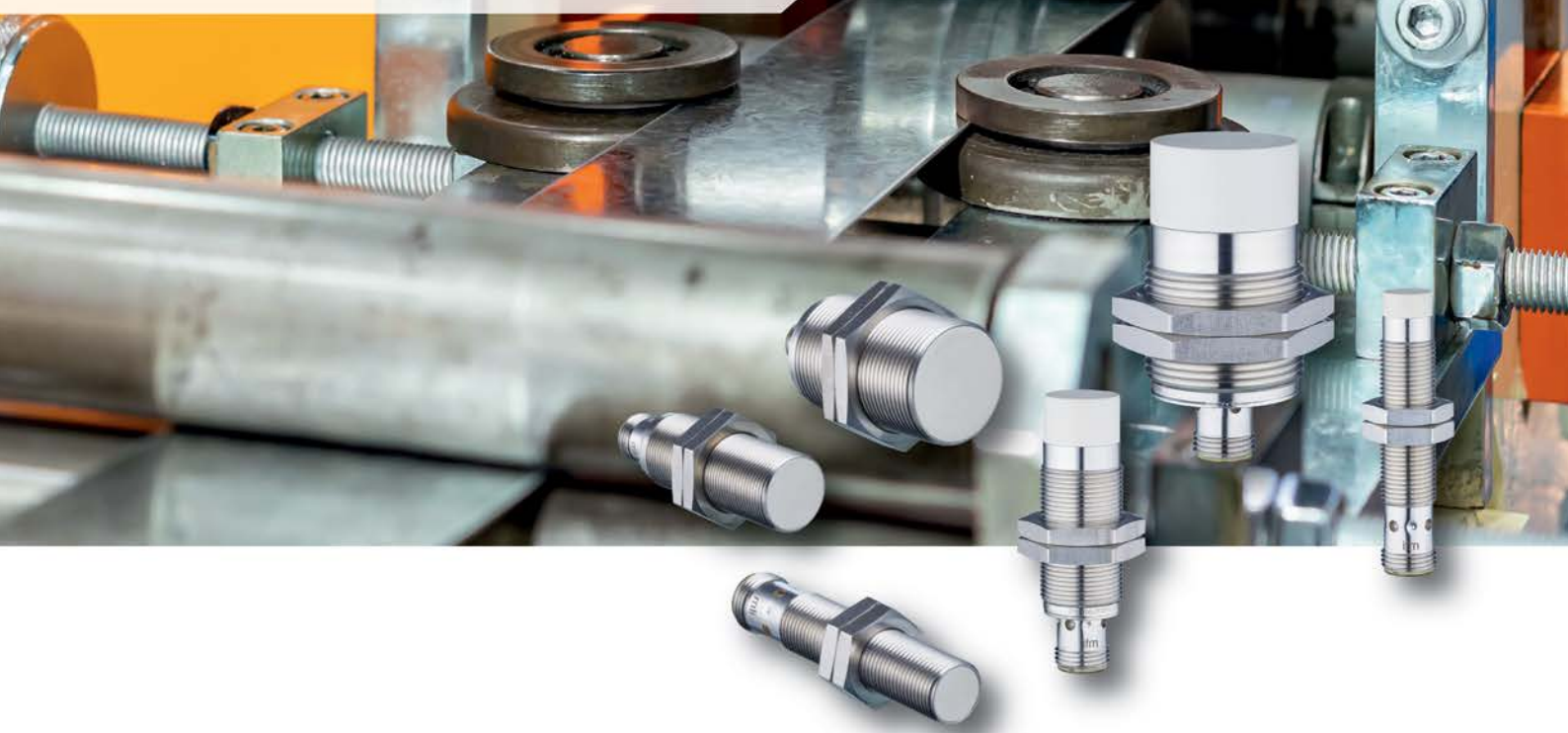
Volume 2: Winning with People ... Insights for Leaders and Organisations

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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