FEATURES:

- Control systems + automation
- Drives, motors + switchgear
- Measurement + instrumentation
- Transformers, substations + cables

TRANSFORMER & MEDIUM VOLTAGE SUBSTATIONS MANUFACTURING

ON SITE TRANSFORMER & MOTOR MAINTENANCE

TRANSFORMER & MOTOR FACTORY REPAIRS

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ACEM medium voltage substations have been developed to meet clients' needs and are designed mainly for heavy-duty applications in mining and other industrial operations. *(Read more on page 3.)*

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Critical components in every plant

In this edition of *Electricity+Control* we feature a magazine packed with ideas and thoughts on some of the important topics relevant to our industry, including Drives, Motors and Switchgear as well as Transformers, Substations and Cables.

These are both rugged topics. But let's reflect for a while on how things have changed – yet have stayed the same.

Lest we forget, motors still play a crucial role in any manufacturing plant – whether it is simply for 'heavy lifting' or for more delicate operations such as manoeuvring various components of a manufacturing process – motors (which drive the conversion of electromagnetic forces into mechanical movement of one kind or another) are the bedrock of industry.

It is therefore important that we continually remind ourselves of the basics of motors, and how we can continue to improve their operation – and the way we use them.

Whereas many of the motors of old were large and heavy (the sort of device you could hit with a hammer and not alter it at all ...) we are now seeing smaller motors in every robotic device as these become more and more common in our plants.

So, as time has progressed, we have seen two trends in motors: a move to far better efficiency and a move to miniaturisation. We have also seen an increase in the use of linear motors – where one essentially rolls the stator flat and uses the motor to move things linearly (much as seen in a maglev train).

The point, of course, is that the fundamental engineering of the machine remains the same: it is the same interacting magnetic fields that produce the mechanical motion – and thus the engineering remains grounded in the very same rules that defined the development and refining of the electric motor more than a century ago.

Perhaps we have figured out how to reduce the need for maintenance on some of these units? But they are still, in essence, mechanical devices that need to be looked after.

As we reflect on how much things have changed, and yet stayed the same, we should not forget the role of cables in the plant; another topic in this edition – where we look at Transformers, Substations and Cables.

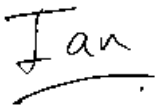
The linking of these three topics is logical, of course, as we cannot bypass the need to ensure that we have electrical energy available to all the equipment at our site. And this is why the role of cables is so important.

Again, one point to be made is that very often cables are out of sight and out of mind. This must be guarded against as the condition of cables (certainly those transmitting high levels of energy) should be regularly assessed.

The other aspect of cables relates to their use for the transmission of data around the plant. Increasingly we are seeing fibre optic cables being used – but the backbone of our control systems is still largely based around the ubiquitous copper cable.

These cables, too, need to be carefully routed and they need to be looked after. Failure to do so can result in significant downtime and troubleshooting while we work to get the plant up and running again.

Enjoy the information presented in this edition, and remember this: some decades ago it was the motors that consumed the most energy at our plants; now it's the data centres.



Ian Jandrell

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

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REGULARS

Medium voltage substations

ArmCoil Electric Machines (ACEM) medium voltage substations (MVS) are designed mainly for heavy-duty applications across all types of mining operations. ACEM MVS solutions have been developed to meet clients' needs, responding to our clients' views regarding the safety of mining personnel, environmental challenges, quality, and operational requirements. At ArmCoil, we listened, and we developed a solution.

Getting it right

We faced many challenges: in design, in determining the suitability and availability of protection systems, in the interfacing of various parts, and in the manufacturing process. These pushed us – through many internal management meetings – to go 'back to basics'. The lessons we learned along the way have proven well worth it. ArmCoil is now equipped to integrate various types of transformers, enclosures, IP Ratings, MV and LV protection systems, and to meet SANS/IEC standards and others in line with clients' requirements. Internally, all our operations are managed according to ISO management systems, endorsed by our ISO accreditations. This has established ArmCoil as a specialist manufacturer in the medium voltage sector in South Africa.

MVS solutions

Medium voltage substations are robust miniature substations with voltages up to 33 kV and a step-up or step-down configuration, typical power ratings from 315 kVA to 10 MVA, and IP ratings up to IP65. MVS are typically used in mining and heavy industrial environments. ACEM MVS can also be used for solar and wind renewable energy applications.

The MVS can be equipped with different types of transformers, such as cast resin, dry type and ONAN/F oil cooled transformers. The transformers meet IEC and SANS specifications, and others where applicable. Losses are calculated for prior to manufacture and these calculations are available on request.

MV protection and various types of switchgear can be specified up to 36 kV and incorporated into the modular design of the MVS. This allows for clients' specific requirements to be met, with components sourced from various OEM suppliers in South Africa where necessary. Cable entry is another key consideration for ACEM and can be located where required for ease of installation and cabling. Various IP ratings are available for the MV protection cubicle to suit the application environment.

LV protection is another ACEM value-add: different brands can be accommodated on the panel and additional 380 V/220 V/110 V sockets can be included, for welding machines for example. Various IP ratings are also available for the LV protection cubicle to suit the respective application. Busbars and internal wiring are suitably manufactured, fitted, and insulated for additional safety.

Enclosures are typically of robust design in 3CR12 or mild steel mounted on a sturdy steel frame. The transformer compartments are also IP rated to suit the transformer and the application environment. Pest control is built-in and for ONAN transformer applications, oil bund walls are included with a valve that allows for managed drainage in the event of an oil spillage.

Various locking and security mechanisms are available for the MV and LV cubicles and transformer compartments, and various monitoring or warning systems can also be included.

Typically, the power and IP ratings dictate the physical size and weight of the MVS. A 2 500 kVA, IP55 unit will be much larger and heavier than a 630 kVA, IP55 unit. All MVS units can be placed as temporary or permanent installations, on suitable plinths.

Locally designed and manufactured

ArmCoil has a fully equipped facility in Roodepoort, west of Johannesburg, with a factory space of 6 500 m2. Enclosures are manufactured in the company's newly added steel works area; the copper LV and HV coils are manufactured in the established coil manufacturing area. The cores are designed by ArmCoil and purchased locally. MV and LV protection parts are also sourced locally from various well-known OEMs in South Africa; the more specialised MV protection units which are available locally are imported by these OEM suppliers. Assembly and testing are all conducted in-house in ArmCoil's test facility. □

ArmCoil manufactures ACEM medium voltage substations to meet clients' requirements.

Cast resin transformers.

Dry-type transformers.

For more information contact ArmCoil. Tel: +27 (0)11 763 2351, email: sales@armcoil.co.za, visit: www.armcoil.co.za

Gary Bradshaw, Omniflex.

Integrated solutions support operational efficiency

When a company buys an industrial monitoring and control system, it obviously wants the system to last. However, it is quite often the case that when systems are purchased from third-party sellers, the relationship ends at the point of sale and ongoing support is minimal. Here, Gary Bradshaw, Director at Omniflex, presents the benefits of buying integrated solutions directly from original equipment manufacturers, a choice that protects investments and ensures reliable ongoing support.

Whether it is fire alarms and automatic door locks in a high security manufacturing operation, or radiation monitors and local alarm annunciators in a nuclear power plant, integrating systems seems like a common sense approach to improving operational efficiency across a facility.

However, facilities managers often face a dilemma when purchasing monitoring and control systems: should they purchase all-in-one solutions directly from OEMs, or should they buy different parts of the system individually from different suppliers?

An all-in-one solution

Buying whole systems directly from the people that made them ensures that each part of the system works seamlessly with the rest. This means the user does not need to worry about things like how the local alarm annunciators will interact with the top end supervisory control and data acquisition (SCADA) system, or if the annunciator is compatible with the network infrastructure. Even questions such as whether it's better to connect the equipment over a cable network or a wireless one can be easily answered by opting for a fully integrated all-in-one solution.

This could be a case of installing all local area alarm annunciators and connecting them to the SCADA system using an industrial network, then providing the monitoring system, which can be used to consolidate all systems into one easy-to-use interface. This would serve to monitor all incoming data across the facility as well as to produce reports, including data trends and statistical analysis.

Buying whole systems directly from the people that made them ensures that each part of the system works seamlessly with the rest.

There are several key benefits for businesses that implement all-in-one solutions like this to handle their networking, data capture and analysis needs. Significantly, it lowers project costs substantially and reduces operational disruptions relating to implementing the solution, compared to a traditional approach where, typically, a number of different companies would be involved in providing different parts of a solution. Furthermore, ongoing support from OEMs is generally better than that provided by third-party sellers.

Protecting your investment

I often hear stories from people who have bought systems from third parties and found that the sellers are subsequently unable, or unwilling, to provide the support needed to fix any issues that occur. This is seldom the case when equipment has been purchased from OEMs, who generally take pride in ensuring that their systems do not let the user down, often going the extra mile in resolving issues to get their customers' operations back up and running if problems arise.

Another consideration is that in dealing with OEMs, the customer can pick up the phone and speak directly to engineers with a detailed knowledge of the systems installed; in many cases they may be the same engineers who put the systems together initially. The level of service this allows cannot be matched when dealing with third-party sellers who, despite any technical expertise they might have, simply will not know the customer's systems as well as the people who made them.

This is equally true when it comes to software support. In the event of a software bug, the people most likely to identify and fix the problem are those who wrote the software. This means any problems that arise with systems in operation, will best be fixed quickly and thoroughly by the original suppliers.

Buying directly from OEMs helps to protect equipment investments by helping customers stay operational, more efficiently and with less downtime. □

For more information visit: www.omniflex.com

Simplified motion control in tile manufacturing equipment

As a material for the home, workplace, retail environment, and other applications, ceramic tiles are robust and durable and can be both practical and elegant. The earliest examples of tiles date back to the 13th century; well-made tiles last for decades, with minimal loss in patterning or colour. As good conductors of heat, clay tiles adapt to the warmth of a space and they are sustainable, made from natural materials.

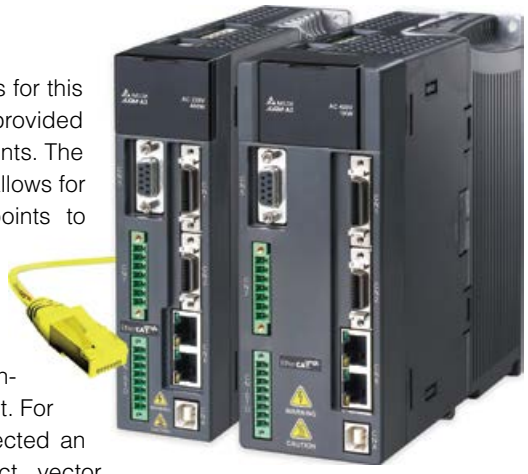
A core step in the manufacturing process is the application of engobes (the coloured slip applied pre glazing), glazes and other crystalline protection. These provide adhesion to the tile body along with high abrasion resistance and anti-slip coatings needed for locations like restrooms or kitchens where water is present.

In the 'ceramic valley' of Maranello, in northern Italy, the ceramic industry today is highly automated. Companies such as E.G. Sistemi s.r.l YES! focus on systems integration for the manufacturing equipment used in the industry. The company recently retrofitted a multi-axis airless station with independent translators.

The equipment is coupled with a conveyor belt that delivers tiles to the airless station, where they are processed according to one of a number of recipes. Once the process is complete, the tiles are transported, by the conveyor belt, to the next stage. In this dirty and dusty environment, multi-axis motion controllers and motor drives for the servos need to be reliable – and a robust and easy-to-use human-machine interface (HMI) is essential.

At the core of the implementation is a Delta DVP50MC series motion controller. Capable of controlling up to 24 axes in one millisecond, this solution supports single-axis motion instructions, such as velocity, torque, and position, as well as multi-axis instructions, such as electronic cam (E-CAM) and gear. G code can also be used. On the connectivity side, CANopen, RS-232, and RS-485 are available in addition to EtherCAT for the motion control, plus an Ethernet port. Other signals can be wired to the 16 high-speed inputs, and eight high-speed outputs provide additional control options. The DVP50MC also supports an SSI absolute encoder and two incremental encoders to provide servo position feedback.

The multi-axis airless station requires only three axes for its three independent translators. Accordingly, three ASDA-A2-E series servo drives with a 'safe torque off' (STO) safety function were coupled with three 180 mm, 3 kW ECMA series servo motors with integrated encoders. The servo drives link back to the motion controller via EtherCAT. By combining these two components, the team benefits from precise control provided by the 1 kHz frequency response and 1 ms settling time. This provides optimum vibration suppression to ensure accurate material application during tile processing. A further benefit of the ASDA-A2-E servo drives for this design is the support provided for up to 720 E-CAM points. The configuration software allows for smooth interpolation points to be defined automatically, simplifying programming.



The ASDA-A2-E series servo drives with a 'safe torque off' safety function were coupled with 3 kW ECMA series servo motors and link back to the motion controller via EtherCAT.

The DVP50MC is also responsible for controlling the conveyor belt. For this task, the team selected an MS300 series compact vector control drive to couple with the chosen motor. This variable frequency drive (VFD) series supports motors from 0.2 kW to 22 kW and is available in single- and three-phase options for applications from 115 V to 460 V systems. At 40% smaller than comparable drives, the MS300 saves space and simplifies installation and wiring within the electrical cabinet. The unit is linked to the motion controller via RS-485.

In addition, a 15-inch, DOP-100 series HMI was installed. This enables the operator to select the correct recipe for the tiles being manufactured. Part of Delta's advanced design offering, this display provides a narrower frame that presents more room for displaying the input controls and system feedback. It has an IP65 rating, which makes it suitable for the wet and dirty facilities of tile manufacturing. The HMI's power isolation means the display is also well protected from accidental surges caused by other equipment on the same electrical supply.

The Delta DVP50MC series motion controller is at the core or the control system.

The tiles are transported through the manufacturing process by conveyor belt, automated via multi-axis motion controllers.

Beyond the hardware's capabilities, the short learning curve for the software development of the DVP50MC was a key feature for the E.G. Sistemi s.r.l YES systems integration team. The ease of defining E-CAM and gear control made it possible for the team to complete around two-thirds of the software implementation within a single day.

Furthermore, with all the components coming from Delta, interoperability is built in and this makes for a smooth development path. It also provides the benefit that, should an issue arise, only one contact is required to resolve it.

"Sorting out development problems can also be done remotely," says Giuliano Castioni, Field Application Engineer. "For example, when a vibration issue occurred, by leveraging our ASDASoft servo software, we could trace the source of the vibration back to the mounting bolts used. Such rapid problem resolution saves the customer much time."

Following the success of the initial four prototypes, E.G. Sistemi s.r.l YES! is working on building more machines. The combination of easy-to-program motion controllers and ready support from Delta's team will help to ensure that Maranello retains its status as Italy's ceramic valley – and its reputation for outstanding tiles. □

For more information visit: www.delta-emea.com

Overcoming the odds to deliver into Africa

Iritron has defied the odds brought on by supply chain challenges as a result of the Covid-19 pandemic. With a history of delivering large engineering projects globally, the company won a multi-million rand, cross-border project that will assist Comilog, a Gabon-based manganese mining company, to increase its annual tonnage.

In this project, designed by Hatch, the global multi-disciplinary EPCM consultancy tasked Iritron in late 2021 to deliver systems and equipment across multiple engineering disciplines with tight deadlines. Electrical motor control centres (MCCs), a control system, CCTV and network cabinets, formed part of the delivery.

Frits Stoop, Iritron Engineering and Project Manager, explains that a project of this magnitude presents unique challenges. "Iritron was affected by worldwide semiconductor shortages, which created logistical challenges, and by supply chain disruptions and other capacity shortages. The then ongoing pandemic and port congestion did not alleviate the problem. This required the team to turn our operations 'upside down', in a literal sense, to keep to timelines."

The team started work on the MCCs in reverse: activities usually scheduled for the end of a build were completed first. This demonstrated the ingenuity of the project and engineering team as no time was wasted waiting for equipment to arrive.

Using its technical expertise and proven design methodologies the team got ahead to reduce overall project risks posed by the supply chain bottlenecks. "They implemented the most innovative action plans to deal with these challenges. We assembled what we could and shipped it off in sections to site, ready to have the outstanding equipment installed on site when it arrives," says Stoop.

He adds that the floods in KwaZulu-Natal in April also presented logistical challenges at the Durban harbour. This posed a problem to get the MCCs packed, inspected, and shipped to Gabon. Stoop says the team worked to ensure that its operations were not impacted and, with the assistance of its logistics company, Iritron saw the first portion of the equipment shipped to the client in May.

"Engineering projects of this scope and scale will present challenges, and only companies with experience and a proven track record get the opportunity to execute them successfully," Stoop adds. He says this project was awarded to Iritron due to the company's proven engineering expertise and experience in this type of delivery, which it had demonstrated on a previous project for the client

"Three aspects positioned Iritron above the rest for this portion of the project bid: price, previous experience, and quality. We had good experience with the client on a previous engagement, and the quality of our technical expertise and manufacturing is trusted."

The second shipment to Comilog in Gabon was scheduled for mid-2022, and Frits Stoop and the team plan to be on-site to assist with installation and commissioning in October 2022.

The project includes electrical motor control centres as well as other systems and equipment.

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Email: info@iritron.co.za, visit: https://iritron.co.za

Fully automated production of supercapacitors

Skeleton Technologies, Europe's leading manufacturer of supercapacitors, and Siemens have agreed on a far-reaching technology partnership for the development, planning and implementation of fully automated, digital manufacturing technology for the production of supercapacitors in Germany. The production line is to be used in a new Skeleton factory in Markranstädt, Leipzig, and will help to reduce production costs by around 90% within the five-year project.

The collaboration aims to achieve the digitisation of Skeleton's entire value chain – from supercapacitor cell design to production and services – and expand to the production of next-generation supercapacitors. Siemens supports this with its comprehensive Digital Enterprise portfolio as well as domain know-how in the area of industrial battery cell production. The collaboration will also expand the business relationship between the two companies.

Skeleton's supercapacitors are used in automotive, transport, grid and industrial applications and provide for the reduction of CO_2 emissions and for energy savings. With the use of its patented 'curved graphene' material, Skeleton produces supercapacitors that offer the highest power density on the market, almost instant charging and discharging, high reliability, and long lifetimes. They contribute to improving power quality and protecting equipment and infrastructure by lowering the power fluctuation, and to powering electrification. "Supercapacitors are a key element in significantly reducing emissions in the power generation, transportation and industrial sectors," said Taavi Madiberk, CEO and co-founder of Skeleton Technologies.

The new factory for the next generation of supercapacitor cells in Markranstädt is scheduled to start production in 2024 and produce up to twelve million cells a year. It will be built in two phases, with the second phase to be completed in 2025. The factory will have a production output forty times higher than Skeleton's current production site in Großröhrsdorf, and it is expected that 240 jobs will be created.

Guido Feind, Head of Siemens Digital Industries Germany said, "With our holistic automation and digitalisation portfolio, we can use the appropriate tools and our industrial know-how, working with Skeleton, from greenfield planning to factory simulation and optimised high-end production, to realise a highly efficient, fully automated production line that will be unique in the world."

Skeleton Technologies and Siemens have agreed on a technology partnership to enable the fully automated production of supercapacitors.

Dr Linus Froböse, Chief Operating Officer of Skeleton Technologies said, "Skeleton already has a strong business relationship with Siemens, and with this partnership, we will now also benefit from their world-class expertise in electrification, automation and digitalisation to expand our manufacturing. This ramp-up will allow us to meet market demand for our next-generation products and make our new factory the largest and most modern supercapacitor factory in Europe."

"With our supercapacitors with the highest power density in the industry, we see great potential for further cooperation with Siemens, especially in the areas of mobility, grid stability and heavy-duty applications. Siemens already uses Skeleton Ultracaps for high-power energy storage. Skeleton and Siemens both believe that the global economy is undergoing structural changes in some of the largest sources of CO_2 emissions, such as power generation, transport and industry. Supercapacitors are a key element in reducing emissions in these sectors. In the field of energy storage and saving, technology and innovation play a key role in enabling the global economy to achieve climate goals," added Taavi Madiberk.

For more information visit: https://new.siemens.com

The new supercapacitors factory in Markranstädt is expected to start production in 2024.

Telemetry systems streamline water management

Merweville is a small town in the heart of the Great Karoo. Like many parts of South Africa and especially the Karoo, the town has been badly affected by drought in recent years. The town has a population of less than 2 000 inhabitants and until recently they had to get by with a frequently interrupted water supply. The water supply was switched on and off as part of a managed programme to allow time for the reservoir to refill. This left the town's residents without water for many hours a day.

In 2021 some existing boreholes were equipped with pumps and control equipment to improve the existing infrastructure. Some of the boreholes were also equipped with solar power to assist in overcoming the power outages experienced during recurring load shedding.

As part of a collaboration between local contractor, TG Elektries, and Integ System Integration a modern telemetry and control system was installed. The software platform is hosted in a data centre and the information can be viewed as a web page. This system means the client can access the SCADA (supervisory control and data acquisition) system on any laptop, tablet or smartphone with an internet connection. This marked a big mind shift from the traditional on-site SCADA system and the benefit of the system being hosted in a data centre has proved to be bigger than expected.

The hosted SCADA system takes over the responsibility for SCADA PC hardware and provides a service where the client can look at the system's data being run on up-to-date hardware and software, which supports its long-term reliability. Many rural municipalities have theft problems and by removing the SCADA system from site, this problem has been eliminated. The SCADA hardware is regularly checked for software updates, and security is kept up to date to ensure secure and reliable operation.

Tabateq supplied the Elpro 415U-E-C4 as a communications solution to connect directly to the PLC via Modbus TCP/RTU. All the data from the various outstations is sent to a central site, from where it is sent to the hosted SCADA system via the MQTT protocol. The MQTT

A modern telemetry and control system enables more efficient real-time management of scarce water resources.

protocol was selected due to its low data requirements. It is ideal for slow (UHF) networks or networks where the data is billed, like LTE. The Elpro 415U-E-C4 operates as a traditional UHF radio for telemetry use, with the added benefit of giving the user cloud access if required. When data is sent to the hosted SCADA system, the typical interval from a change happening in the field to the data being seen on a cellphone/laptop was well within the accepted norm for telemetry systems in the water industry, even though the SCADA system is not on site.

The person responsible for the Merweville water network is based in Beaufort West, more than 100 km away. The ability to monitor the SCADA system in real time is a big help to the client as he can now monitor the critical water network for Merweville from anywhere. The local water management team can respond to low water levels, pipe leaks and pump trips much more quickly than before. The same data can also be shared with other government departments that handle water management at provincial or national government level.

The interventions undertaken have improved water availability for the town's residents significantly, and the system enables the client to make data-driven decisions based on real-time data.

For more information contact Tabateq.
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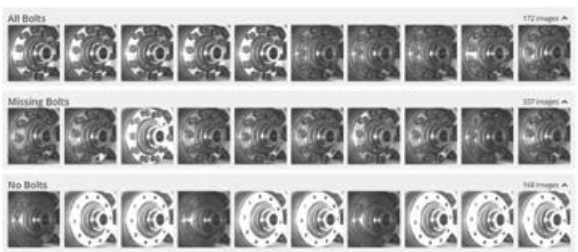
Email: info@tabateq.com, visit: www.tabateq.com

AI solution enables automated quality inspection

SICK Automation recently supplied a local system integration specialist with an intelligent solution for a product inspection application. The solution – the dStudio web service and the Deep Learning software from the SICK portfolio – has proved highly accurate and reliable, creating a more accurate, efficient and productive inspection system for the customer.



The inspection system can successfully identify incorrect product assemblies, even in low lighting conditions.

This is the first AI-powered application for SICK South Africa. The customer, Jendamark Automation, was building a ring gear and diff cap assembly inspection system for its client, using SICK InspectorP621 camera sensors. The system was required to identify ring gear with missing bolts and incorrectly assembled diff caps. But it had limited success in training the InspectorP621 system to identify bolts and diff caps correctly (a fruitless process

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that took several weeks). The highly reflective nature of the products and the low lighting of the plant environment meant that the InspectorP261 sensors failed to function effectively, as they could not 'see' the products.

SICK Automation Market Product Manager and Market Applications Engineer, Anton Bresler, consulted with the customer over several days, to provide technical support during the programming process. Realising the shortcomings of the existing system, he proposed the use of SICK's dStudio together with the Deep Learning software.

dStudio is a web service which enables the user to upload pre-sorted product images to the cloud. The Deep Learning software has the capability to analyse the images and 'train' the user's neural network (comprising SICK sensor systems) to make decisions, quickly and accurately.

Bresler worked alongside the customer, providing training on the functionality of the dStudio web service. He also guided the customer's selection of product images for the system's neural network – a process that took less than two hours.

Following the implementation of the AI-powered neural network, programmed by the Deep Learning software, the customer's inspection system can successfully identify individual product assemblies, even in conditions with low lighting. This has allowed the customer to automate the system's inspection process, achieving greater productivity and efficiency, without the need for technicians or engineers to supervise or manage the process.

"dStudio and Deep Learning deliver an inspection solution with high reliability, plus faster and more accurate processing. The fail rate for Jendamark Automation's inspection system is now almost zero," says Bresler. This has proved a cost-effective solution, which delivers measurable ROI, fast.

dStudio and Deep Learning have been designed for use with SICK sensors. Both products are intuitive and users do not need technical skills or AI knowledge to complete their implementation. However, the SICK team provides user training and technical support, to facilitate seamless adoption of the technology.

"This combination of web service and AI software is usable across a range of industries. The solution is especially well-suited to the automotive and FMCG industries, where products are often highly reflective and accurate inspection is critical to ensuring product quality," Bresler says.

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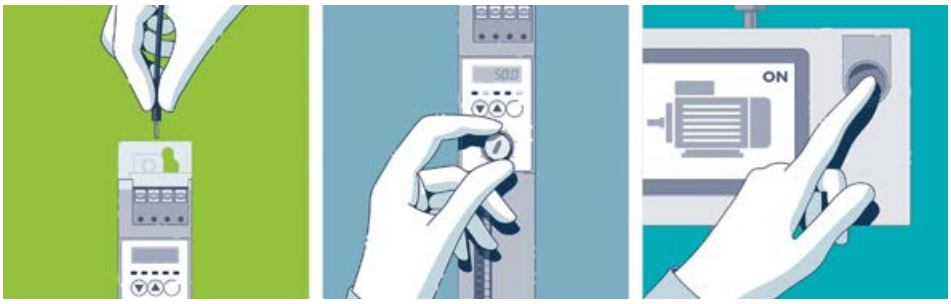
Fast startup for asynchronous motors

Johannes Happe, Product Manager Contactron, Phoenix Contact Electronics GmbH, Bad Pyrmont, Germany

Johannes Happe, Phoenix Contact Electronics.

Asynchronous motors are often supplied with overdimensioned frequency converters. This costs money and often time as well. In simple applications with just a few functions, a speed starter is ideal because, as the name suggests, its outstanding features include fast installation and startup.



The new speed starters provide a device class between motor starters and frequency converters, to enable simple motor tasks.

Industrial plants usually incorporate a large number of electric motors. Most of the motors perform simple tasks: they need to transport objects or liquids from one place to another or execute the corresponding processing steps. Many such tasks are performed in logistics centres and on machines and systems. There are different ways of starting and operating a motor. These days, frequency converters (FCs) are used for most applications – especially if different speeds or soft starts are required. Frequency converters are complex devices that handle numerous functions, but they are often overdimensioned. At present, the applications where they are most commonly used typically involve simple tasks that require only two fixed speeds and/or a ramp function with a soft start and soft stop of the motor.

The Contactron speed starter and its main functions.

Safe shutdown up to SIL 3 and PL e

The new speed starter from Phoenix Contact's Contactron product family provides a device class between motor starters and frequency converters. The compact solution, which offers intuitive operation, includes all the necessary functions – integrated in a single housing: direct start of asynchronous motors, reversing start, full motor protection, different speed settings, soft start and soft stop of the motor, and safe stop with safe torque off.

The device offers a number of advantages for the user, especially safe shutdown up to safety level SIL 3, PL e, and Cat. 4 with the built-in safe torque off (STO) functionality. The compact housing dimensions with an overall width of just 35 mm provide space savings in the control cabinet. In addition, easy wiring and an intuitive operation concept allow for quick installation and startup. Hence, the speed starter from the Contactron product family provides a cost-effective solution that includes all the necessary functions for various speeds and soft start.

In the most common applications, it must be possible to shut down rotating and moving parts safely via an emergency stop switch, if parts become jammed, for example, or if there is an emergency situation. However, a fault must not result in the loss of safety, which is why the machine or system must have a redundant design. This can be achieved directly with the Contactron series speed starter. An additional contactor is therefore not required for safe shutdown of the motor. There is also the option on the controller side to perform a two-channel shutdown via connections STO+ and STO-. The Contactron speed starter thus achieves safety categories SIL 3, PL e, and Cat. 4, all in a small installation space.

Quick startup

When constructing machinery and systems, time is a cost factor: the easier and quicker it is to install the application, the lower the financial outlay for the machine manufacturer and the more competitive the solution will be. The speed starters from Phoenix Contact enable startup to be completed in less than a minute. To get the motor running, the user needs only to wire the load input and output, and ap-

The intuitive operator interface of the speed starter.

ply a control signal to an adjustable fixed speed. The motor can then be immediately set to work. Settings can be adapted to the relevant application via the user-friendly settings concept made up of a display, five LEDs, two up and down buttons, a set/reset button, and a rotary switch.

The first step is to set the nominal current of the motor in order to protect the motor against overload. This means it is no longer necessary to install an additional motor protection relay. The rotary switch is simply turned to the 'Current' position and the corresponding value is entered using the up or down button, and then saved by pressing the set/reset button. And that's it. As soon as the user changes a value, it starts flashing in the display. Once saved, the value is permanently displayed. The ramp time, that is, the time until the motor is running at the set speed, can also be easily adapted. To do this, the user turns the rotary switch to the 'Ramp' position and, as previously described, enters the new value using the same sequence of steps.

Different versions for different requirements

If the rotary switch is set to 'Status', electrical values such as frequency, current, voltage, temperature, and other data can be read. If the speed needs to be adjusted, this too can be done in the same way as previously described. The rotary switch is set to the 'Speed1' position, adjusted to the correct frequency value again using the up or down button, and confirmed by pressing the set/reset button. The direction of rotation – 'R' or 'L' – flashes in the LEDs, and this can also be specified in the settings. If a second speed is required, the procedure is repeated.

The speed starter is available in different housings.

Additional settings can be saved by turning the rotary switch to the 'Options' position.

The speed starters are available in a performance class ranging from 0.25 to 1.5 kW – for a single-phase and three-phase load input, with or without integrated EMC filter. The devices with a built-in filter include a plug-in, replaceable fan, and the devices without a filter are equipped with a heatsink without fan

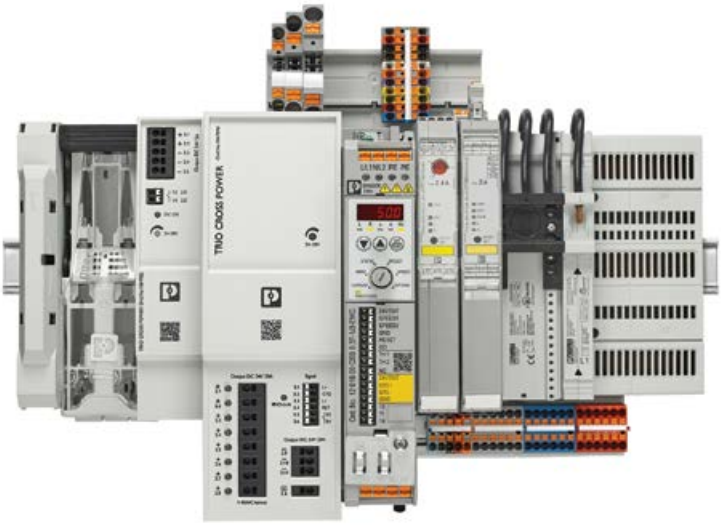
The speed starters offer an easy-to-use solution suitable for a range of applications. Users benefit from a device class that is positioned between motor starters and frequency converters. □

For more information visit: www.phoenixcontact.com

Plug-in connection to the three phases

The speed starters in the Contactron product family can be easily mounted on the CrossPowerSystem for power distribution by means of plug and play. First, the three phases are connected to the power distribution board via a connection module or a disconnector with integrated fuses. The 5 A or 20 A version of the TRIO POWER power supply is then used for the 24 V feed-in, while PTFIX terminals or terminal blocks are used for distribution in the control cabinet or field.

The compact hybrid motor starters start, reverse, and protect motors safely and reliably, and can be networked if required. If a soft start or different speeds are also required, the speed starter can be easily installed on the power distribution board using an adapter. The intuitive device thus also provides quick, plug-in connection to all three phases. This enables quicker implementation of modular, functional control cabinets.



The CrossPowerSystem power distribution system includes a range of components for modular and functional control cabinets.

Supervised stator rewind of zone certified 17 MW motor

One of the big local petrochemical companies approached Marthinusen & Coutts (M&C) in mid-2021 to take the lead in the redesign and quality management of a stator rewind process for a 17 MW compressor drive synchronous motor that had failed during operation.

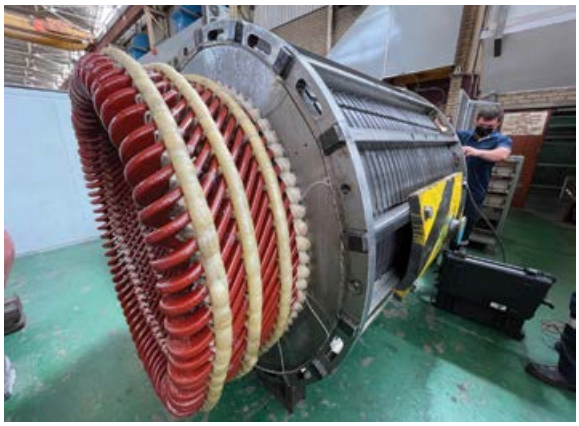
The motor is zone certified for use in a hazardous area as it operates in a potentially extremely explosive environment of hydrogen and acetylene gas.

"A company performing any work on a zone certified motor is required to be specially certified to do so," says Craig Smorenburg, M&C's Works Executive. "As M&C itself is not certified for such work, we partnered with a local OEM that has the required certification and they performed the work under our supervision and in close consultation with us, the client and an independent zone certification authority."

In addition to overseeing and managing the quality of all the work done, M&C's engineering team assigned to the project was required, at the client's request, to recalculate the modified winding and core design for the stator.

"A complicating factor was that a new specification for motors of this type had been introduced recently, and this meant we had to obtain guidance from the inspection authority to ensure that the new spec was properly adhered to," Smorenburg added.

The work performed by the zone certified OEM entailed manufacturing a new stator core and coils in accordance with the applicable voltage and zone certification requirements, and performing the rewind as designed by M&C and the OEM.



The 17 MW stator in preparation for testing.

Significantly, this was the first stator core rewind for a zone certified compressor drive train motor to be performed in South Africa. The work culminated in a successful test run of the repaired and reassembled motor in M&C's Cleveland plant at the end of February this year.

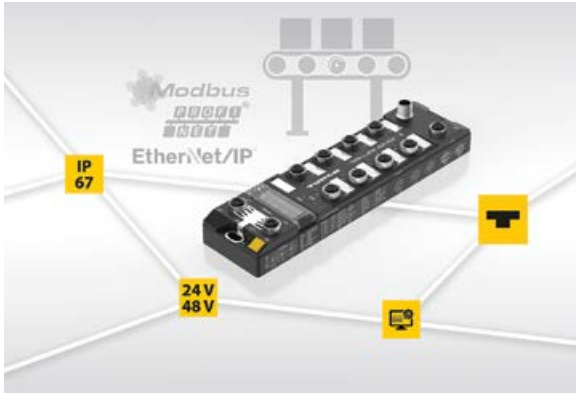
The project again demonstrates M&C's design, engineering and test capability and its flexibility in partnering with various OEMs to assist customers by providing the best possible quality solution.

For more information contact Marthinusen & Coutts.
Visit: www.mandc.co.za

Flexible drive control of roller conveyors

Turck Banner is expanding its TBEN-L Ethernet I/O family to include modules for the drive control of roller conveyor motors.

The compact TBEN-LL-4RMC controls up to four RollerDrive EC5000 48 motors from Interroll, with the special feature that 48 V motors can also be used. Four digital inputs and four universal digital channels, which can also function as inputs or outputs, are used for direct integration of trigger signals or other actuators. The flexible TBEN module encapsulates the CAN protocol and enables simple parameterisation and control of the roller motors as well as communication. Support of other motor types with a CAN interface is planned with future device versions.



Turck Banner's new TBEN I/O module with on-board logic simplifies parameterisation and control of roller motors.

Parallel to the roller motor control, digital signals can be used and processed directly on the block module by Turck Banner's ARGEE on-board logic. This relieves the network and the central controller. Via the multiprotocol Ethernet interface, the device can be connected to controllers with Profinet, Ethernet/IP or Modbus TCP, without user intervention.

The robust multiprotocol block module with IP67/IP69K protection is vibration- and shock-tested. Equipped with a glass-fibre reinforced housing and fully encapsulated module electronics, it is suitable for use in demanding logistics and production applications at temperatures ranging from -40°C to +70°C. Power is supplied via L-coded M12 terminals.

For more information contact Turck Banner.
Tel: +27 (0)11 453 2468
Email: katrina.sutcliffe@turckbanner.co.za
Visit: www.turckbanner.co.za

Testing switchgear to extremes

As grids are put under greater pressure by more extreme weather globally, ABB has established Europe's first climatic test chamber for testing medium voltage (MV) switchgear in extreme conditions.

The climatic test chamber in Brno, Czech Republic, will be used to test all ABB energised indoor MV switchgear panels, to ensure they keep the power on 24/7 in the harshest operating environments.

The state-of-the-art test facility will simulate harsh climatic site conditions, from temperature lows of -50°C to highs of up to 80°C as well as pollution conditions. It will also test for 0 to 100% humidity and water condensation, all of which can cause switchgear to age faster.

The enhanced testing, which can take from four to eight weeks to complete for each component, will take ABB's switchgear beyond current standards, to comply with the new (IEC/TS 62271-304 from Class 1 to Class 4) regulation. It will improve the quality and reliability of ABB's energised MV indoor switchgear solutions when operating in the most extreme climatic site conditions and polluted environments, to reduce failures and unplanned downtime at customers' sites.

Martin Stefanka, ABB's Global Technology Manager for Distribution Solutions said: "Our new climatic test chamber will help us to understand the limits of our switchgear beyond the requirements of current standards. By simulating the harshest of conditions, from the coldest Arctic temperatures to the stifling heat of the Sahara, we will enhance product reliability and grid resilience to help our customers to keep the power supply on full-time."

Testing unigear switchgear in the new climatic test chamber.

For more information contact ABB.
Visit: https://go.abb/electrification

Schneider Electric offers customers support via combined field and digital services.

Service expertise extended to VSDs

Schneider Electric has extended its EcoStruxure Service Plan to include variable speed drives, consolidating its ongoing commitment to customers in delivering safety, resilience and sustainability.

Already available for Electrical Asset Management (low and medium voltage equipment such as transformers, switchgear and circuit breakers), Power Management Systems, and more recently, Three-Phase Uninterrupted Power Supplies (UPS) 10-40 kVA, the EcoStruxure Service Plan – combining field and digital services – is now also available to customers for variable speed drives. Customers can rely on Schneider Electric's Services' expertise in energy management and automation to get the maintenance they need at the right time.

Key benefits

- Preventive condition-based maintenance: harnessing the power of the EcoStruxure platform, the service plan provides dynamic scheduling for maintenance of variable speed drives combined with preventive maintenance visits. By monitoring the connected variable speed drives, possible issues are detected and anticipated, allowing customers to reduce unscheduled and unnecessary downtime significantly, to optimise site operations, and to improve safety for operators and equipment.
- 24/7 expert remote monitoring: experts in Schneider Electric's Connected Services Hub remotely monitor the health of the connected variable speed drives and provide recommendations on how customers can optimise performance. This includes customised quarterly reports and an annual consultation. In parallel, based on analysis, a services expert will notify customers in a timely manner when issues are identified, proposing corrective actions that can be implemented online or on-site by its field service technicians.

Reflecting Schneider's ongoing commitment to building future-proof business resilience for customers, the EcoStruxure Service Plan provides for:

- Up to 65% mitigation of electrical failure risk, minimising unplanned downtime
- Up to 20% reduction in maintenance activities and planned downtime, with a substantial financial impact.

Full access to expertise

Tapping into its industry experience and expertise, Schneider assigns a dedicated Customer Success Manager to manage each service plan, someone who understands the customer's strategic goals and tactical needs and acts as a consultant in helping them to take cost-effective decisions related to their energy monitoring and management needs. These can inform a modernisation plan, or lead to the creation and maintenance of an electrical digital twin, ensuring safety, compliance and readiness for the new electrical world, and making this a seamless journey for the customer.

"At Schneider Electric, we believe we can accelerate the decarbonisation journey for our customers, and bringing together advanced analytics and field support through our Services portfolio is key to unlocking this journey," said Frederic Godémél, Executive Vice President of Power Systems and Services at Schneider Electric. "By combining traditional expert consultancy, on-site services and powerful new digital services with IoT, we hope to give customers the space for business-critical decisions and provide them with the assurance that Schneider Electric Services has the resilience of their installation covered."

For more information visit: www.se.com

The new BlokSeT LV switchboard provides improved safety and reliability.

Next generation LV switchboard

Schneider Electric has launched its next generation BlokSeT low voltage switchboard – a state-of-the-art design that answers the need for superior operational safety in the world of high-performance LV power applications.

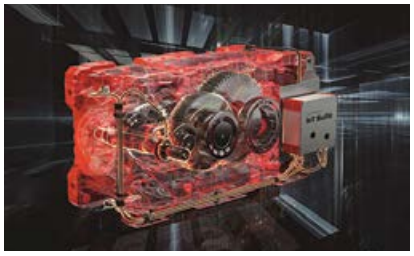
BlokSeT's iPMCC (intelligent Power and Motor Control Centre) is an advanced smart solution that provides for fault prevention, protection, and automatic restart. New temperature and humidity monitoring thermal sensors incorporated into the iPMCC achieve significant improvements in safety and reliability. The permanent thermal monitoring system uses small plastic non-contact and non-powered IR sensors that extend the maintenance lifecycle and mitigate safety risks such as electrical fires. In addition, ergonomic design improvements make the BlokSeT LV switchboard easier and safer to operate and maintain.

With EcoStruxure IoT-enabled solutions, switchboard data can be collected and analysed in real-time via wireless connectivity, giving operators predictive maintenance analysis.

The next generation BlokSeT LV switchboard consolidates Schneider Electric's dedication to maximising uptime and enhancing safety, reliability, and connectivity for customers.

For more information contact Schneider Electric.
Tel: +27 (0)11 254 6400
Email: Kovilan.chinnathambi@se.com
Visit: www.se.com

High tech solutions launched at Electra Mining



SEW-EURODRIVE South Africa's DriveRadar® solution provides for remote condition monitoring of drive systems.

At this year's Electra Mining Africa exhibition in Johannesburg SEW-EURODRIVE South Africa is introducing a number of new solutions designed to drive productivity and efficiency. These include the company's DriveRadar® suite for remote condition monitoring and maintenance forecasting, the M1 single-stage high-speed gearbox, and the 3.5 metre diameter model girth gear for mills and kilns.

Addressing growing demand for reduced total cost of ownership, the company's DriveRadar® solution comprises a package of multiple sensors which capture all operationally relevant physical parameters, including vibration behaviour, oil level, oil temperature, ambient temperature and input speed. Gear unit data is digitally recorded and automatically assessed. Results can be used to evaluate the unit's condition and predict future changes in condition, providing a firm basis for predictive maintenance.

The single-stage M1 series industrial gearbox, also presented at Electra Mining Africa, is designed for high speed and high power applications – for pumps in mining, as one example. Jonathan McKey, National Sales and Marketing Manager at SEW-EURODRIVE South Africa, says four of these girth gears have already been supplied to a large mining operation in Limpopo in South Africa.

The company's purpose-built gearbox solution for air-cooled condensers (ACCs) are used for driving fans in power stations. McKey says, "Our SEW MACCs will be locally assembled at the new Aeroton production facility which will be able to deliver at a rate of three units a week. This will be an advantage for our customers, as it will enable us to deliver on much shorter lead times."

Also on show, SEW-EURODRIVE's high efficiency IE3 SEW electric motors are just some of the company's extensive range of motors, from 0.75 to 335 kW ratings. "An important benefit of our electric motors is that SEW-EURODRIVE designs and supplies the add-ons, such as encoders and braking systems," McKey adds. "Customers can source add-on accessories from us, which assure them of world class quality and accountability."

For more information contact SEW-EURODRIVE South Africa.
Visit: www.sew-eurodrive.co.za

Electromagnetic flowmeters help manage water sustainably

With water supplies under growing pressure globally, effective measurement holds the key to managing water losses and meeting escalating demand. Krishna Prashanth, Global Product Line Manager - Electromagnetic Flow Meters at ABB Measurement & Analytics, explains why electromagnetic flowmeters are ideal for helping to manage water supplies more sustainably.

Stemming water losses from distribution networks poses a major challenge for water companies worldwide. With water supplies under increasing strain, governments expect water utilities to account for every drop.

Many water pipelines stretch for thousands of kilometres across country that may be remote, difficult to operate in or hard to access. Some countries have made advances in tackling and stopping water losses, although many others still experience significant water losses that challenge their security of supply.

The scale of the problem was highlighted in a 2019 report by the International Water Association which estimated a loss of 346 billion litres of treated water, every day, from pipelines around the globe.

Such high levels of losses impact not only the water supply. Each drop of water lost needs to be replaced, requiring extra energy plus treatment and pumping. The resulting costs, in turn, reduce revenue that could otherwise be invested in upgrading networks or water management facilities. Facing such pressures and expectations, the water industry needs to locate the leaks, understand why they are happening, and fix them to prevent further losses.

Improvement starts with measurement

Detecting water losses starts with choosing the best flow measurement technique that can offer optimum accuracy. Techniques can range from constrictive methods such as flumes and weirs for open channel systems, to orifice, mechanical, ultrasonic or electromagnetic flowmeters in closed pipe systems. Each of these methods has its benefits and drawbacks.

Determining the location of water leaks is another factor to be considered. Performing measurements as widely as possible maximises the data available to develop appropriate methods to address water losses and resolve related issues. Given the wide variety of environments where measurements need to be taken, including remote regions, any device used to measure water flows should be easy to install, access and maintain.

Electromagnetic flowmeters offer high levels of accuracy, repeatability and reliability in monitoring water flow.

NFC technology enables users to download configuration settings and share logged and diagnostic data simply, using a smart device.

Electromagnetic flowmeters

A valuable advantage of electromagnetic flowmeters is the high level of accuracy they provide, with uncertainty as low as +/- 0.4% or better, compared to other methods, as well as the high levels of repeatability. Both are important qualities in discriminating between legitimate consumption and leaks or other causes of water loss.

Reliability is another important benefit. With no moving parts, electromagnetic flowmeters do not suffer from the wear and tear that affects mechanical designs, and thus reduce the need for maintenance and save the cost of fitting upstream strainers to filter sediment out of the water flow.

Electromagnetic flowmeters also have the potential to handle distorted velocity profiles without these affecting the accuracy of measurements. This means they can be fitted into pipelines without the need for defined lengths of upstream or downstream piping, as required by other flowmeter technologies, and makes them ideal for locations where space is limited.

Digitalisation brings added benefits

The benefits of electromagnetic flowmeters are further amplified by ongoing technological developments. One example of this is in the use of alternative power sources, including battery and renewable solar and wind, which open a raft of new possibilities for installing meters in any location, without the need for a mains connection.

Accessing measurement data from the devices is another important aspect. Manufacturers, including ABB, are looking at using Low Power Wide Area Network (LPWAN) and Narrow Band Internet of Things (NB-IoT) technologies, which allow for the rapid exchange of measurement, configuration and maintenance data with relatively low power consumption. As these technologies mature, they offer the prospect of controlling and monitoring water supplies in near real-time.

Power over Ethernet (PoE), which uses the same cable for both power and communications, also provides for added flexibility, enabling flowmeters to be installed wherever they are needed. Flowmeters with Ethernet connectivity increase simplicity, flexibility, and reliability, as well as offering access to previously hidden data, such as measurement of density, conductivity or concentration of the medium.

The time needed for commissioning, operating and maintaining electromagnetic flowmeters, and the skills and training required for technicians and operators, are further factors to be taken into account in total cost of ownership. ABB's AquaMaster4 electromagnetic flowmeter offers Near Field Communications (NFC) technology, allowing users to download configuration settings and retrieve, interrogate and share logged and diagnostic data by tapping the transmitter with a smart device, such as a phone or tablet, loaded with ABB's Velox app.

Pressure adds an extra dimension

Effective pressure management is critical to optimising the performance of water distribution networks. Access to more useful data on pressure is therefore key to making the right choice on pressure levels in the network.

Utilities are increasingly looking to the prospect of combining flow and pressure measurement in one device. Users can then download the logged data and investigate flow and pressure for a specific period. Combining these possibilities with the ability to download and share the data significantly improves users' capacity to assess and enhance network performance.

Improved water management

The benefits of electromagnetic flowmeters make them an ideal choice for managing the world's water supplies more sustainably, helping to ensure that water, one of the world's most precious resources, is well managed for the benefit of all. □

For more information visit: www.abb.com

Calculating flow rates and volume flow in flowmeters

Kobold's electronic ZOE units, specifically designed for the calculation and display of flow rates and volume flow for flowmeters, are available from Instrotech. The units can be battery-powered or powered by an external dc power supply and offer the option of an included back-lit display or not. The ZOE devices can be set for an extensive range of applications. The units show flow rate, resettable daily and a total counter. (Mass units can also be set.) All customised program settings remain saved, even after a battery exchange.

The instruments are suitable for harsh indoor and outdoor environments and comply with EU Electromagnetic Compatibility directives. ZOE's UV-resistant, glass-fibre reinforced nylon housing is weather-resistant and has CAT IP66/67 Nema 4X protection.

The electronic flow measurement units incorporate a universal pulse input (NPN, PNP, NAMUR, reed switch), scalable pulse output, sensor supply, free scaling and housing for wall or pipe mounting. The units can be connected with flowmeters with pulse or frequency output.

Users can choose either the compact version, used in combination with Kobold's DON and DOT flowmeters, or the remote version. Both versions offer an excellent price/performance ratio.

Kobold's electronic ZOE units are available from Instrotech.

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

Pressure transmitters for mobile machines

Pressure transmitters from ifm for mobile machines are suitable for mobile applications and especially for hydraulic and pneumatic applications with high operating pressure. The PT/PU-type sensors offer high vibration and shock resistance, a high degree of protection, and good EMC resistance. They also have E1 type approval.

The thin film measuring cell of the sensors is welded directly to the process connection and the sensors deliver a high measuring accuracy at < +/- 0.8%, repeatability at < +/- 0.05% and fast response time of only two milliseconds. The measurement technology used also allows for the compact housing dimensions, with a width across flats of only 19 mm. With a G 1/4-inch process connection, this facilitates installation even where space is at a premium. The welded stainless steel housing provides for durable use in harsh working environments. The sensors are available with an M12 or Deutsch connector.

ifm's pressure transmitters for mobile machines deliver high measuring accuracy in a compact housing.

For more information contact ifm South Africa.
Tel: +27 (0)12 450 0400
Email: info.za@ifm.com, visit: www.ifm.com

Alexander Edinger, Endress+Hauser Level+Pressure.

Moisture measurement in bulk solids

Alexander Edinger, Product Manager, Endress+Hauser Level+Pressure

Products manufactured in industrial processes often contain water in various concentrations. Moisture has a critical impact on the quality, storage/shelf life and weight of the product – and thus on the price. To date, laboratory instruments have been the most commonly used tools for measuring moisture. Although the measurement processes are precise, they also have disadvantages. Endress+Hauser has enhanced an existing level measurement technology so that it can also determine material characteristics. The new radar-based sensors supply real-time information on material moisture, supporting greater reliability and efficiency in the production plant.

Moisture measurement instruments are used for numerous reasons. Because the water content in products can be a decisive factor in product quality and process reliability, it is important to know the moisture level in the materials. This can range from very small amounts of water in dry products in the food industry, for example, to very high levels such as in drilling mud in the mining industry.

Laboratory instruments are typically used to assess water content. To do that, dry and wet samples are weighed and compared. The results can then be used to draw conclusions about the water content. Although this method is precise and simple to use, it has several disadvantages. One of these is that the process sample is merely a representative snapshot. Drying may take from 30 minutes to 24 hours, depending on the moisture content and the quantity and type of the sample. Meanwhile, the process continues to run and by the time the measurement result is available, it is already outdated. In addition, manual sampling is laborious and costly.

A substitute for random sampling

With the Solitrend family of products, Endress+Hauser has created a solution for continuous, process-based moisture measurements. The sensors, which are based on TDR (time domain reflectometry) technology, determine the water content in bulk solids precisely, based on the runtime of a radar impulse across a ceramic measurement cell, using the physical effect of the increasing dielectric constant as it relates to increased water content.

The moisture sensors are installed directly in the bulk solid stream with the support of a bracket, to provide fast and reliable measurements. In the primary industries, for example, material is often conveyed out in the open. In these environments, sensors are mounted directly under silo hatches, under the conveyor heads, where they can measure in free fall or from above where they are installed on the conveyors. This ensures that the sensor has a proper flow around it and can maintain direct contact with the material. The measurement values can be read out with an optional display or a control system (SPS). It is also possible to enter threshold values into the control system and trigger alarms when they are reached. This allows the water dosage to be controlled during the process.

Minimal wear, no calibration

Compared to other measurement methods, TDR enables a high degree of accuracy and deep penetration of the material, and it is not affected by the grain size or contaminants. With their robust construction and the use of high-quality materials, the Solitrend sensors are characterised by resistance to wear and deliver a long service life. To measure

The water content in products can be critical for product quality and process reliability.

Solitrend ensures fast and reliable measurement of moisture directly in bulk solid flows.

highly abrasive materials, such as coarse bulk solids, a hard metal version is available. The high-temperature version of the sensor is suitable for process temperatures of up to 120°C and can thus be employed directly behind the dryer. Because calibration curves for various aggregate materials (sand, gravel, crushed stone) are delivered with the sensor, commissioning of the instrument is straightforward. Once the instrument has been initially commissioned, regular recalibration in production is not needed.

The Solitrend family of products comprises several versions; shown here is the MMP40 for measuring moisture in conductive bulk solids and slurry.

Diverse applications

Solitrend sensors are available in different versions for various bulk densities, including low density products (such as animal feed, grains, plastic granulate), very low density and low water content products (sawdust, pellets) as well as conductive bulk goods and slurry (fresh cement, sewage sludge). All versions feature simple installation and operation, even in demanding applications, plus an integrated transmitter which provides for streamlined plant integration. Solitrend instruments eliminate the need for manual sampling and laboratory analysis, allowing plant operators to optimise process costs, improve product quality and reduce energy needs. □

For more information visit: www.endress.com

The TDR measurement principle

Guided radar (using the TDR measurement principle) operates at close to the speed of light. The sensor measures layer for layer in the form of 'slices', perpendicular to the surface of the sensor, similar to the way computer tomography works. That means the sensor has a precisely defined measurement field and can perform error-free measurements, even when there are fluctuating fines or varying grain sizes.

Since the measurement is traverse to the surface of the sensor, the mechanical condition of the sensor surface is not a disturbance variable. That means recurring and unavoidable wear of the sensor does not lead to falsification of the measurement value. Furthermore, the defined measurement field enables precise measurements with applications in which the material coverage is low or fluctuates. This provides a high degree of flexibility in mechanically integrating the sensor into the application.

Sensors help streamline cartonboard production

Christian Langensiepen (Dipl.-Ing.) Sector Management - Paper Industry, VEGA Grieshaber KG, Schiltach

The LEIPA Group is an independent family business which, for over 170 years, has stood for environmentally friendly processes and technologies in producing paper and packaging based on 100% recycling. At the Schrobenhausen site in Bavaria, Germany, where the company was founded, the range of business activities includes production of cartonboard and speciality paper as well as the LEIPA FlexPack business unit. The latter offers paper-based solutions in the field of flexible packaging.

LEIPA multi-ply grey cartonboard is the 'classic' product for secure protection of valuable products in boxes and packaging. It is also a popular standard solution for pallet covers or hardbound books. The environmentally friendly material, with grammages ranging from 300 up to a sturdy 950 gsm, is especially durable and stable and is used in a wide range of applications.

The cartonboard machine at the Schrobenhausen site was previously supplied by three separate stock preparation lines, one for each of the three layers of the board: top, interlining and back. Because the proportion of foreign matter and dirt in the recycled paper used was constantly increasing, the costs of operating and servicing the threefold system technology were also increasing. Consequently, the company undertook a comprehensive modernisation project, combining the three stock preparation lines into one and investing in new plant components and extensive automation technology. There were four main goals here:

- increase operational reliability
- make production more cost-efficient through new technologies
- reduce maintenance costs
- and improve de-inking quality.

A high degree of automation is indispensable in a modern stock preparation system that is required to ensure stock availability around the clock, throughout the year. This is enabled by a modern control system and the right sensors. Because of the good experiences LEIPA had already had with VEGA sensors, the team responsible for planning and maintenance decided in favour of the VEGABAR 82 pressure transmitter as the standard instrument for level and pressure measurement in the new stock preparation system. The simple on-site adjustment and the robustness of the instruments were also decisive factors.

The LEIPA production site in Schrobenhausen.

Pressure measurement with VEGABAR 82 in the cleaning system.

The VEGABAR 82 pressure transmitter.

Especially in recovered paper processing, the measurement technology used is subject to extreme mechanical stresses caused by abrasive residues in the suspension or the vibration of refiners or standpipes of MC pumps, as well as hydraulic shock resulting from quickly closing valves. Further challenges for every measuring system include varying stock densities as well as agitators in vats and stock towers. The internal cleaning of equipment components with aggressive chemicals and external cleaning with high pressure cleaners are additional factors that have to be considered.

In spite of these challenging conditions, the sensors have to measure precisely and reliably. VEGA understood the advantages of robust ceramic early on and developed a sophisticated sensor design using the dry, capacitive measuring cell CERTEC®. High-purity alumina ceramic (99.9% Al2O3), which is second in hardness only to diamonds, is used as the diaphragm material. This protects against abrasion, especially in cleaners, and ensures the long service life required for profitable continuous operation. □

For more information visit: www.vega.com/en-za

An app for easy access to product info and support

With the new GEMÜ app for smartphones and tablets, GEMÜ products can be clearly identified, operated intuitively and product information can be called up conveniently. It makes the complete GEMÜ product range accessible from your pocket. The app offers numerous functions that make things easier in the world of GEMÜ valves, measurement and control systems.

New electrical GEMÜ products can now be initialised, configured, parameterised and localised via a Bluetooth connection. The GEMÜ app shows process values as well as status information in detail and provides support in setting parameters and error analysis. In the development of the app, particular attention was given to making it user friendly, to enable intuitive operation of GEMÜ products. The new GEMÜ 1441 cPos-X positioner is the first product that can be operated using the GEMÜ app.

GEMÜ products with a digital product label (QR code) or RFID tag can be readily identified with the app. This means users have the right product information and documents to hand directly in the plant. In addition, job-specific information, such as any product certificates acquired, can be called up. GEMÜ provides the currently available documentation as well as the documentation at the time the product was or is delivered. Thus, any changes or additions are immediately apparent.

The new app provides a range of easy-access digital services supporting GEMÜ valves, measurement and control systems.

The new GEMÜ app also enables easy access to general GEMÜ product information and documents – even on the move. Users can quickly access datasheets, operating instructions, product flyers and further information to help them with product selection. The offline availability of the documents, which can also be used in plants without internet access, is particularly helpful.

Work is in progress on further functions that will help plant operators and plant designers in the digitalisation of the processing industry.

The GEMÜ app can be used on Android and iOS operating systems. It can be downloaded from the Google PlayStore or the App Store.

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

Berthold's SmartSeries LB 414 is well suited for density measurements in the rough mining industry.

Measuring the solid content in thickening tanks

Large volume thickening tanks are used in the mining industry to concentrate ore or minerals. The solid-liquid separation is driven by gravity which concentrates the solids at the bottom of the tank. The concentrated slurry is removed via an underflow outlet and should have a high solids content. However, care must be taken to monitor the slurry solids content: if the solids content is too high it can clog or damage pumps and pipes.

Berthold's SmartSeries LB 414 has been designed for the harshest of environments and is well suited for density measurements in the rough mining industry, in non-hazardous and non-explosive environments.

The SmartSeries LB 414 radiometric density measurement system provides for continuous monitoring of the solids content in the underflow. The robust and cost-efficient device provides reliable measurement with high accuracy and repeatability for many years. The local user interface with display and software focused on key aspects makes calibration and operation of the HART device easy. Calibration can be carried out via the detector's push button, HART communicator, PC with service modem, or infrared remote control. Once calibrated, in addition to the 4-20 mA HART output, the current measured value is shown continuously on the local display.

Benefits

The SmartSeries LB 414 radiometric density measurement system offers customers a number of benefits. The system:

- Ensures smooth process flow and prevents pipes and valves from clogging
- Optimises flocculant use via feeding rate control
- Determines exact mass flow, in combination with a flow meter
- Has minimal operating costs
- Is maintenance free, does not require re-calibration and, because the system uses non-contact measurement, wear is avoided.

The instruments additionally are:

- Easy to install on the pipeline exiting the thickener with clamp-on mounting
- Not affected by corrosive or aggressive process media
- Non-contact, non-intrusive measurement devices
- Deliver online, real-time measurement
- Provide long term stability in the face of temperature changes and aging
- And highly repeatable measurement.

Experts in measurement technology

Berthold Technologies stands for excellent know-how, high quality, and reliability. In developing solutions the company always focuses on the customer. Using its varied product portfolio, specialised knowledge and extensive experience, it develops suitable solutions with customers for new, individual measurement tasks in various industries and applications.

With its global network, the company assures customers of fast, competent and skilled assistance when needed.

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

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

Quick detection of steam, air, gas leaks

The Fluke ii900 sonic imager enables fast, simple detection of leaks in compressed air and other industrial systems.

The Fluke ii900 handheld sonic industrial imager, available from Comtest, enables fast, simple detection of compressed air, steam, gas and vacuum leaks. The intuitive interface allows technicians to isolate the sound frequency of leaks and to filter out background noise. Maintenance technicians can conduct a full plant inspection within hours, even during peak operations.

Using SoundSight™, the industrial imager locates issues using sound. With SoundMap™, identified leaks are displayed in colour over a visual image of the equipment to enable fast visual location. With the visual image, it is easy to scan a large area quickly and to identify leaks from a distance.

The Fluke ii900 is specifically designed for industrial maintenance teams, maintenance leads, plant maintenance managers and plant operations managers, working on plants that rely on compressed air, gas or vacuum in routine operations. The industrial imagers are used in manufacturing facilities: in aerospace, automotive, glass, machinery, instrumentation and appliances, plastic and rubber, mining and mineral processing sectors, as well as in process manufacturing plants for: cement, chemical processing, food and beverage, and pulp, paper and wood.

With minimal training, technicians can use the ii900 to check for compressed air leaks, gas and/or vacuum leaks in routine maintenance rounds.

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

High-accuracy moisture measurement in SF6 switchgear

The GDHT-20 monitors moisture content in the gas, as well as density.

Moisture measurement in SF6-insulated switchgear is essential – and WIKA has improved the performance of the GDHT-20 sensor specifically for this industry. The transmitter, which also provides values for gas density, pressure and temperature, now measures the dew/frost point with an accuracy of ±2 K.

Andre Dahlheimer – Product Manager, WIKA Alexander Wiegand SE & Co, says moisture, together with density, are the crucial parameters for assessing the condition of the SF6 gas used in the switchgear. The GDHT-20 continuously monitors moisture content in the gas. The information from the online monitoring forms the input for a downstream trend analysis. The more precise the density and the moisture measurements are, the more precise this analysis will be.

Enabling predictive maintenance

The analysis shows the operator when the SF6 will reach a critical state and when remedial measures must be taken. As a result, maintenance work or gas treatment can be undertaken only when action is needed. Predictive maintenance thus replaces the sequence of regular maintenance previously necessary to avoid ecological and safety risks.

Too much moisture in the gas compartment is one of these risks. In older plants, moisture increases mainly due to permeation through sealing materials. In newer plants, it is usually a consequence of moisture remaining on metal surfaces or in insulation materials during tank assembly, due to incomplete evacuation before initial filling with SF6.

Excessive moisture content leads to corrosive reaction products that can damage internal components and shorten the service life. If such substances escape, there is an additional danger to people's health.

SF6 moisture measurement parameters

Measurement of SF6 moisture is therefore indispensable. In most cases, the dew or frost point is used as a parameter. This is the temperature at which the humidity in the air begins to condense. In the case of SF6, the atmospheric dew point specified by IEC 60376 is -36°C.

The accuracy of the GDHT-20 of ±2 K for moisture measurement is validated at the frost point with an internationally valid reference standard. However, the measuring instrument can also be configured for other parameters (dew point, ppmv, ppmw and relative humidity).

The new version of the sensor also features greater application flexibility. The GDHT-20 is now suitable for monitoring density of the alternative insulating gases N_2, CF_4, O_2, CO_2 and 3M™ Novec™ 4710.

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

Safeguarding power quality in remote locations

When transformers and other power equipment are based in remote locations they are vulnerable to harmonics and noise caused by insufficient dampening and exposure to surrounding electrical currents. If these issues are not addressed, they can cause component failure and severe damage to the local power supply. In the case of a UK installation where Fairfields Control Systems had experienced failures of equipment at two of several remote groundwater sites recently upgraded for the Environment Agency, it approached power quality specialist CP Automation for a solution.

Fairfields Control Systems is a systems integrator specialising in unique control and automation systems. It provides turnkey mechanical, electrical, instrumentation, control and automation (MEICA) solutions for a range of industries, including flood defence and factory automation. As a contractor for the Environment Agency (EA), Fairfields had recently upgraded the borehole pumps on seven of its groundwater sites, installing variable speed drives that were fed from transformers. Each transformer helped to power a pumping station, used to alleviate low river flows.

One of the transformers feeding power to the borehole pump system at an EA groundwater site.

Transformers and harmonics

Transformers are used in many industrial settings, reducing the voltage of incoming power supply circuits to operate low voltage devices. They are also used in remote locations to transmit power to more isolated sites. In such outdoor locations, transformers are generally smaller and often installed in an elevated position, high on concrete or wooden poles or platforms.

Soon after the upgrade of the borehole pumps at the EA sites had been completed, the surge protection devices (SPDs) that limit transient voltages by diverting or limiting surge current began to fail on two of them. It was clear that abnormal supply characteristics were present, and that harmonic distortion levels were too high.

Voltage distortion describes any deviation from the nominal sine waveform of the ac line voltage. It is caused when current harmonics increase the voltage and electric currents in a circuit and can overheat the power system, destabilise the voltage and damage equipment. Hence, Fairfields needed to resolve the issue effectively and it was also important that it should stay compliant with the (UK's Energy Networks Association's) Engineering Recommendation G5/4, which specifies the planning levels for harmonic voltage distortion.

Overcoming the problem

Fairfields had worked with CP Automation previously, as the company had carried out various surveys and had been consulted on different projects in the past.

"CP Automation's power quality expertise has been crucial for protecting our systems," said Peter McMorrow, Engineering Director at Fairfields Control Systems. "The groundwater project was different. While we can often foresee issues with noise and power quality, in this case, we were already experiencing issues. Once we had identified these, our priorities were to determine the source of the abnormal supply and its characteristics. Our plan was to retrofit equipment to mitigate the effects."

John Mitchell, Global Business Development Manager at CP Automation, noted that, "The total harmonic distortion (THDi) was falling outside its normal range and the voltage was becoming unstable, so long-term damage to the transformer and its components was a real risk.

"After surveying the situation, we suggested replacing the failed SPDs with two SineTamer transient voltage surge suppression (TVSS) devices, which protect equipment from surges and transient spikes."

After proving that the SineTamer could function effectively in the high harmonic environments where the original SPDs failed, CP Automation agreed to fit the new devices across all the EA sites. Additionally, it supplied two REVCON Harmonic Filters (RHFs) for the high-harmonic sites to help protect the transformer and other nearby equipment. The RHFs prevent the harmonic distortion of non-linear loads and sources, reducing the THDi to below five per cent, which is essential to staying within ER G5/4 levels.

A stable power supply

Fairfields purchased two RHF-5P double-stage passive filters. As well as reducing the THDi of variable frequency drives and other non-linear loads, the filters can reach an efficiency of up to 99.5%. As a result, power losses can be up to 75% lower than those produced by alternative devices.

Since Fairfields installed the SineTamer devices and the RHFs, the transformers have been running normally across the EA's groundwater sites. By managing power quality and minimising voltage distortions, the technologies supplied by CP Automation have prevented issues like voltage notching, motor vibration, nuisance tripping, electromagnetic interference (EMI) and overheating. Furthermore, the sites are compliant with G5/4 standards, because the RHFs limit frequency voltage harmonics. □

Left: The SineTamer, here installed on a transformer, is a transient voltage surge suppression device. Right: REVCON Harmonic Filters installed at the high-harmonic sites provide additional protection for the transformer and other nearby equipment.

For more information visit: www.cpa-ltd.net

An automation overhaul can benefit smaller utilities

A small utility in Seguin, Texas installed a complete monitoring and control system that rivals systems installed at much larger utilities, in order to improve its operational efficiency and service to customers.

Traditionally, smaller municipal electrical utilities like the one in the City of Seguin, Texas, in the USA, have tended to believe that implementing a supervisory control and data acquisition (SCADA) system was simply out of reach, due to the perceived high initial costs, high licensing fees, and complexity of such systems.

However, advances in web-based SCADA systems have transformed the process of installing, configuring, and managing such systems to manage substation performance. Modern web-based systems streamline installation and maintenance and provide engineers with a user interface they can configure easily – a factor that now allows even smaller utilities to operate like large utilities with hundreds of substations.

The City of Seguin, Texas, presents a case in point. The utility embarked on an ambitious plan to integrate a new SCADA system with outage management system (OMS) software, citywide Wi-Fi, advanced metering infrastructure (AMI) technology, GIS mapping, and energy efficiency software to improve information monitoring and sharing in support of improved operations. The system was designed to enable utility engineering teams to manage a dispersed network and support the cooperative's mission to provide reliable, cost-effective service more efficiently.

The City of Seguin has only three substations. Nonetheless, it went ahead with the SCADA investment. The system provides the same degree of monitoring and control as systems implemented by larger utilities.

The city has a population of 25 090; about 8 200 residential customers and several large industrial facilities rely on power from the electrical system. The utility operates three substations with 14 circuits; 19 employees manage 110 miles (about 176 kilometres) of overhead electric lines and 26 miles (about 42 kilometres) of underground electric lines.

One-line diagrams in the Orion HMI show the status of the substation at a glance; feeder breaker zoom screens allow more detailed information to be viewed at the office.

To complete its ambitious SCADA implementation, the city turned to M&S Engineering, a full-service electrical, civil, subsurface utility engineering and surveying firm to develop all the specifications outlined in the initial bid.

Designing the system

For the physical infrastructure and sensors, M&S Engineering specified an AMI system from Aclara, which includes nine collectors that gather smart meter readings. AMI systems enable electric utilities to collect and harness the power of smart meters, edge devices, and data to meet challenges such as: substation monitoring, load monitoring, load control/demand response, fault detection/outage management, distributed generation, conservation voltage reduction, and customer engagement.

The data is transmitted over a newly installed, citywide Strix Wi-Fi system to a central network, which allows multiple users and departments to access the information.

To enhance communication and decision making, assets such as electric poles and meters are now mapped and coordinated by ESRI, a geographic information system (GIS) mapping company. The GPS coordinates facilitate more efficient dispatch of utility trucks and service crews, when needed.

For the SCADA system, M&S Engineering selected the OrionLX system from the Power Division of NovaTech Automation (Lenexa, KS), a substation automation company that has served the power transmission and distribution market for more than 30 years.

The OrionLX 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 or calculated data to any number of clients in their own protocol. The system can be integrated with almost any equipment, and usually with microprocessor-based relays, meters, and other intelligent electronic devices (IEDs) as well. It is then connected to the SCADA system.

The system uses open-source web technologies and preconfigured template pages. This simplifies the building of interactive SCADA and local HMI screens to view data

from connected IEDs and RTUs (remote terminal units) using standard web browsers. Engineers can open multiple browsers to view graphical interfaces for the different substations and set up key remote monitoring features on different tabs, which eases network monitoring. Multiple users can be logged in simultaneously.

An economical option

For the most economical setup, the City of Seguin opted to install an OrionLX in each of its three substations. These connect wirelessly to a browsing PC with multiple monitors, each representing a substation. Another configuration option for smaller utilities is a centralised model where an Orion is installed in the central office (taking the place of the browsing PC), where it accesses each substation OrionLX and presents the information to connected networks.

The Orion RTU incorporates integrated functions which were previously accomplished by separate physical devices. For example, separate alarm annunciators and PCs do not have to be connected to the Orion RTU; only a monitor, keyboard, and mouse need be connected. The Orion Tile Annunciator is a pre-engineered product that can be set up in minutes to present alarm status. When combined with sequence of events recording, relay event retrieval, IED faceplates, one-line diagrams, control screens, and trending, Orion can serve as a complete substation HMI, or an economical, small SCADA system.

One-line diagrams in the Orion HMI show the status of the entire substation at a glance. This enables dispatch teams to see quickly which feeders are open and if there are voltage issues. Feeder breaker zoom screens allow more detailed information to be viewed at the office, such as: ground trip blocked, non-reclosing, max amperage, power factor, and fault currents. A history of events can be accumulated, including, for example: breaker trips, breaker lock outs, reclosers blocked or enabled, low voltage events, high voltage events, and maximum amperage for each circuit.

An integrated outage management system

M&S Engineering was also asked to integrate the Orion SCADA system with Milsoft's outage management system (OMS). OMSs are efficient at identifying the locations of outages and providing real-time alerts. The systems also record the history of outages and alert customers about the status of outages and repairs.

Over time, NovaTech has received numerous requests to create an interface between its equipment and popular outage management systems. As a result, the company plans to introduce the MultiSpeak interface in Q4 2022. This interface facilitates communication between enterprise applications, SCADA, outage management, dispatch, GIS, and meter reading.

As part of the City of Seguin project, M&S also specified an upgrade of all electromechanical relays to microprocessor relays from Schweitzer Engineering Laboratories (SEL). NovaTech developed settings that allowed the SEL relays to be accessed by the OrionLX, including real-time data and fault information.

"Relays keep detailed records of the electrical conditions at the time of a fault, and that information can be accessed remotely to provide technicians with critical information on where to go and what might need to be corrected," says Ray Wright, Senior VP, Marketing for NovaTech.

"You don't want to have a technician going out and searching the line for miles to find the problem and then have to go back to the shop to get the needed equipment," he adds. "Ideally, you want to say, 'Drive to this GPS location, take a spare fuse, and fix the (known) problem."

An OrionLX RTU cabinet installed at one of the substations.

Minimising dispatches

Once the SCADA system, microprocessor-based relays, and other components had been installed, the city could respond to issues more quickly, resulting in shorter outage times for customers. Previously, personnel would have to drive out to a substation when there was an issue with a feeder or transformer. Now, most issues are diagnosed remotely.

"Now the monitoring is done from the office," Wright says. "The engineering team logs into the substation devices remotely to view the data, settings, sequence of events, and to make changes if needed. They usually do not have to visit the substations in person, so the labour involved in monthly checks is significantly reduced," he adds.

"With SCADA, the engineering team can monitor and capture events, such as low voltage or high voltage at the bus, which helps when troubleshooting customer complaints, and enables remote manual control of voltage regulators," says Wright. SCADA also allows the city to monitor the power factor on individual circuits and to switch capacitors in or out, without having to depend on other companies.

In future, the city of Seguin plans additional system upgrades, including an energy efficiency program. This includes a new VoIP phone system and about eight additional Wi-Fi units with accompanying antennas to improve 'self-healing' properties in the system. The utility is also investigating automated switching, which would involve adding control panels and motors to the existing air break switches for facility operations through the SCADA system. □

For more information visit www.novatechautomation.com

SA cable glands for Hong Kong airport extension

CCG was recently awarded the contract to supply cable glands and related accessories to one of the largest airport projects currently under construction in the world.

The US$ 20 billion Hong Kong Chek Lap Kok International Airport Extension Project entails an expansion of the current airport infrastructure with a third runway system to maintain the position of Hong Kong International Airport as a leading international and regional aviation hub.

Bidding against well-known international manufacturers and based on the strong technical design and comprehensive certification of its products, CCG was selected for installation of cable glands on all the project packages. These are:

- Construction of a new passenger concourse and parking positions: a new passenger concourse with a floor area of more than 280 000 square metres and parking positions for over 100 aircraft
- Expansion of the existing Terminal 2 building and new concourse: designed to serve an additional 30 million passengers annually
- Provision of a new automated people mover system: a 2 600-metre long APM will operate at top speed of 80 km/h per hour; the new system can transport up to 10 800 passengers an hour
- Provision of a new baggage handling system: the new high-speed system, which links Terminal 2 with the new passenger concourse, will transport bags at a rate up to three times faster than the system in use today
- Construction of comprehensive road network and transportation facilities: a multi-modal transport facility will be built for connecting services between Hong Kong/Mainland and HKIA; these include rail and road tunnel systems.

The project engineering design teams placed importance on a range of cable glands that could demonstrate tested proven performance to all the required electrical properties, such as equipotential bonding, protective connection to earth, electrical current withstand tests of up to 43 kA and compatibility with EMC rated cable and equipment. While most of these requirements were covered by CCG's existing BS EN IEC 62444 certification, through its UK based R&D facility, CCG conducted additional electrical current and EMC testing at specialised high voltage testing centres in the UK and the Netherlands. The stringent Low Smoke Zero Halogen requirements of the project required tests to EN 61034-2 and EN 60754-2 standards, which were conducted at the test facility of British Approval Services for Cables, in the UK.

As a South African manufacturer, CCG is honoured to have been chosen for another prestigious international project, thus demonstrating that there are South African companies that have the products, technology and levels of service required to compete and succeed in the international market.

The third runway expansion at HKIA is one of the biggest airport construction projects currently under way.

For more information contact CCG.
Tel: +27 (0)11 394 2020
Email: info@ccgcablegland.co.za
Visit: www.ccgcablegland.co.za

Monitoring substation networks digitally

The new Doble F6880 Digital Network Analyser (DNA) makes the transition to IEC 61850 easier. (As part of the International Electrotechnical Commission's Technical Committee 57 reference architecture for electric power systems, IEC 61850 is the international standard defining communication protocols for intelligent electronic devices at electrical substations.)

The F6880 is a digital multimeter that indicates IED contact status, and a diagnostic tool that provides visual metrics for differentiating power system events from network traffic issues. The F6880 can be used to understand essential details about digital signals in IEC 61850 architectures and to address issues quickly.

The Digital Network Analyser is small, lightweight, easily portable, and incorporates user-friendly software that offers fast setup and intuitive operation. The network analyser makes it easy for users to record and log instances of anomalies in network traffic when designing digital substation topologies or when troubleshooting issues during commissioning and routine maintenance operations. The units can be used on site or left connected for extended periods, allowing for secure remote access and control.

The Doble F6880 Digital Network Analyser reveals details that help protection engineers and relay test technicians quickly resolve issues in IEC 61850 network traffic. The compact instrument is paired with powerful software that analyses IED communications and provides diagnostic and analytical functionality in real time.

For more information visit: www.doble.com

Building local manufacturing capability

Over the past 12 years Zest WEG, the South African subsidiary of Brazilian motor and controls manufacturer WEG, has evolved from being primarily a sales and distribution company to a fully-fledged manufacturer working to the best global standards.

Newly appointed Group CEO of Zest WEG, Eduardo Werninghaus, says, "It was in 2010 that WEG acquired a majority shareholding in Zest, which was the WEG distributor in South Africa. Although Zest had some manufacturing capability, its focus was on distributing WEG's range in the sub-Saharan market. Once WEG assumed control, the decision was taken to expand the company's local manufacturing capability progressively."

Werninghaus adds that WEG, founded in 1961, is a global manufacturer, with factories on five continents. "In all, WEG manufactures in 12 countries outside of Brazil and the plants in these countries account for almost 50% of WEG's production. Manufacturing is in WEG's DNA and is now part of the DNA of the South African operation. Currently, at its manufacturing facilities in South Africa, Zest WEG can produce a range of equipment with varying levels of local content – more than 90% in the case of transformers and close to 70% for panels and E-houses."

In Gauteng, Zest WEG has two transformer manufacturing facilities, one in Wadeville and the other in Heidelberg. "These facilities were acquired when we bought out two local manufacturers in 2013 and in 2015," says Werninghaus. "Here we have the capability to locally manufacture transformers up to 45 MVA capacity."

Zest WEG has upgraded and extended the facilities and they are fitted with state-of-the-art equipment – including an impulse voltage generator at the Heidelberg factory which allows for in-house testing of transformers.

Also in Gauteng, Zest WEG – through its automation division – produces a wide range of electrical panels in Robertsham and E-houses and electrical enclosures in Heidelberg.

In Cape Town, the company has a genset factory and a panel manufacturing facility. The genset site is dedicated to producing custom-engineered gensets and is complemented by an assembly line at Zest WEG's headquarters in Longlake, Johannesburg, which assembles boxed gensets and gear motors.

Werninghaus emphasises that Zest WEG has put specific focused effort into building up a network of local suppliers, who contribute to the manufacturing process.

"We don't do this just to meet government-mandated targets on local procurement, but because it is something that WEG has always done," he says. "The company started operating in the early '60s in the southern Brazilian state of Santa Catarina, which was then very undeveloped, so WEG had no choice but to develop local suppliers. The process worked well and is now standard throughout our global operations."

Eduardo Werninghaus, newly appointed CEO at Zest WEG.

The Zest WEG manufacturing facility for large transformers in Heidelberg.

Although Zest WEG's manufacturing drive has been successful, it has not been without its challenges, says Werninghaus. "WEG is an aggressive company when it comes to manufacturing and is very focused on efficiency and productivity and it was not easy to translate this WEG culture to the South African manufacturing operations," he remarks. "Nevertheless, our efforts have been rewarded and our South African plants now perform as well as those anywhere else in the global WEG group and work to exactly the same quality standards."

On the benefits of local manufacture, Werninghaus highlights that it helps control costs, allows for the customisation of products and gives Zest WEG the ability to adapt much faster to changing specifications and regulations. "Most of all, however, it gives us a significant advantage in supplying the African market. South Africa is the gateway to much of the continent and it is a strategic imperative for WEG to have a strong manufacturing and supply hub serving the African region."

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

Refurbishment of fire-damaged substations

Earlier this year the City of Tshwane awarded two contracts valued at some R200 million to ACTOM Power Systems to repair and refurbish two substations that had been ravaged by fire: the 132/11 kV Pyramid substation in the Rooiwal area, and the 132/11 kV Kentron substation in the Highveld Park area of Centurion.

In both instances the initial focus was on constructing new control and switchgear buildings to house the replacement equipment destroyed by the fires. Following that, Power Systems handled the supply, installation and cabling up of a total of 109 new 11 kV switchgear panels – 49 for the Pyramid substation and 60 for Kentron substation – in the new buildings. This included the installation of associated protection schemes, a SCADA overlay and dc chargers with battery backup.

The replacement 11 kV switchboards make use of the premier class AMV12 switchgear, developed by ACTOM MV Switchgear and an international partner and now well-proven and widely used in the local market.

The new protection and SCADA panels were sourced from ACTOM Protection & Control, and ACTOM's Static Power supplied the dc systems.

John McClure, Power Systems' General Manager, said initially, priority was given to the secondary plant portion of the contracts to restore the fire damage. "Impromptu repairs had been carried out by the municipality to restore power supply as quickly as possible, but the longer-term security of supply would have remained compromised until permanent solutions were implemented, which is what ACTOM Power Systems undertook."

The contracts also include the supply of a range of new 132 kV gear to replace aging equipment in the outdoor yards, so both substations will receive an overall upgrade by the end date. The full contract term will run over three years, and will be completed in phases as annual funds are released.

The outdoor equipment will comprise 132 kV circuit breakers, isolators, current transformers, voltage transformers and surge arrestors – all to be supplied by ACTOM High Voltage Equipment. In addition, the cable and cabling accessories required for the works will be sourced from ACTOM Electrical Products.

For both contracts Power Systems is required to involve and upskill local labour under the Expanded Public Works Programme (EPWP) and to identify sections of work for local subcontractors. This is aimed at supporting the development of small businesses from the surrounds.

"These provisions arise from the Preferential Procurement regulations of 2017 and strike a balance between the need to appoint a reputable contractor with the capacity to be held accountable for contractual delivery; and to ensure that vulnerable and marginalised sectors of society are brought into the fold in a meaningful way," McClure said.

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

EPWP candidates assist with a wiring alteration on an AMV12 switchboard control cubicle, under the supervision of Kaizer Sithole from ACTOM Power Systems.

The new QCTO framework – addressing the skills shortage

Roland Innes, Group CEO, Dyna Training, and Leoni MacKenzie, QCTO Subject Matter Expert in Qualifications Development

In its global risk barometer for 2022, international financial services provider Allianz surveyed 2 650 risk experts in 89 countries on the biggest risks facing industries in the coming year. Notably, skills shortages were identified as the eighth biggest risk in South Africa currently. The country's economic recovery and growth in the aftermath of the Covid-19 pandemic will depend to a large extent on our ability to address skills shortages in the labour market and the workplace. Companies and individuals need to make the most of every opportunity to develop skills, and to align these skills with the standards and certifications governed by the Quality Council for Trades and Occupations (QCTO). Responsible for oversight of the accreditation, implementation, assessment, and certification of occupational qualifications, part-qualifications, and skills programmes, the QCTO has a major role to play in tackling skills shortages, placing vocational certification – by way of learnership and apprenticeship programmes – at the centre of South Africa's skills creation system.

The need for practical skills

There has been an increase in demand worldwide for artisans, engineers and technicians as well as individuals skilled in sales and marketing. This highlights that practical skills are urgently needed in the labour market and that there should be an increased focus on training artisans. South Africa's QCTO was established to manage the Occupational Qualifications Sub-Framework (OQSF) by setting and developing standards, and assuring the quality of national occupational qualifications. It's purpose is to facilitate the development and registration of quality-assured occupational and trade-related qualifications, part-qualifications and skills programmes from the National Qualifications Framework (NQF) Levels 1 to 8. This is intended to meet the needs of existing and emerging sectors by ensuring that all learners, professionals, workers, people unemployed and those classified as NEET (not in employment, education or training), are equipped with relevant and transferable competencies to enhance lifelong employability.

Win-win for businesses and labour market

The QCTO is intended to replace the Sector Education and Training Authorities (SETAs), closing the gap where individuals in the labour market have the skills but lack the formal certifications or paperwork necessary to find employment or to maximise earning potential. While higher-level qualifications are essential, it is also necessary to address the immediate gap that stands between an individual coming out of school and becoming eligible to embark on the national qualification process.

In this respect, the QCTO has implemented skills programmes, effectively a shorter skills syllabus, at the end of which a learner can gain entry into an NQF study programme, full-time or part-time. This also has the immediate benefit of making the individual more employable. In addition to increasing and keeping their own skills in-house, businesses can contribute to the career development of their employees, which provides a greater level of motivation and incentive. Skills development training also assists with reducing absenteeism where workers feel that the training is valuable to their personal growth, contributing to a more committed workforce. Where companies offer skills development opportunities, it becomes possible to redirect budget spend previously used for recruitment into training, shifting the focus to retention rather than acquisition.

Roland Innes, Group CEO, Dyna Training.

How does the QCTO work?

The QCTO is responsible for the accreditation of Skills Development Providers (SDPs), authorising them to facilitate programmes and qualifications that fall under the OQSF. These include occupational qualifications, including 'old' trades, N4-N6 Programmes, historically registered qualifications, and the shorter, bridging skills programmes. Any SDP offering training or intending to offer training in any of these must seek accreditation from the QCTO, and must comply with the entity's minimum criteria.

Out with SETA, in with QCTO

From June 2023, SETA accreditation will be subject to a teach-out period, after which qualifications and skills programmes will need to be aligned with QCTO standards. This provides the opportunity for training providers to align their offerings to the QCTO accreditation requirements. They will need to work hand-in-hand with industry leaders in developing learning material to ensure the necessary knowledge is combined with practical experience, hands-on learning opportunities and assessments.

Additionally, a major focus of the skills development and training programmes will be ensuring that learners are placed at companies where they can gain experience and skills in the workplace and, in time, take up employment after assessment and qualification. The output from SDPs will be assessed by Assessment Quality Partners (AQPs), and it is the responsibility of the Assessment Quality Partner to sign off on the provider issuing a Statement of Result to the learner, which gives them entry to the Integrated Summative Assessment for certification.

A smarter approach to skills development

For companies to maximise this opportunity, from a tax rebate perspective and in terms of Broad-Based Black Economic Empowerment (B-BBEE) scoring, they will need to ensure they coordinate training initiatives with SDPs that are accredited by the QCTO. SDPs will need to modernise their curricula to be more learner-focused, and form relationships with Assessment Quality Partners. Organisations will need to prepare their workplaces so they are compliant with QCTO requirements, developing the mentoring infrastructure to enable learner placements and to give learners the best possible support. In shifting the focus from generic skills training to inclusive learner development and facilitation through the QCTO framework, we will be better equipped to address South Africa's skills shortage effectively and sustainably.

For more information visit:
www.dyna-training.co.za and www.qcto.org.za

Opportunities in repurposing Grootvlei power station

Eskom and the Embassy of the Kingdom of the Netherlands have signed a letter of intent to guide the next phase of ongoing collaboration between the two parties regarding the repurposing of Grootvlei power station in Mpumalanga. This collaboration will provide guidance for future work between Eskom and the Kingdom of the Netherlands, and the affected communities, to determine tangible outcomes.

In the next phase of the collaboration, Eskom and the Netherlands Embassy, supported by the Netherlands Enterprise Agency, intend to work along two tracks: preparing a pre-feasibility assessment for a climate-smart, labour-intensive agricultural/horticulture development on the Grootvlei power station site, and preparing an integrated and sustainable approach for the repurposing of the Grootvlei power station site.

Eskom's Just Energy Transition office places equal importance on the transition to lower carbon technologies, and the ability to do so in a manner that is just. Eskom is committed to ensuring that the socio-economic and environmental benefits of transitioning are realised, that employees and communities are involved in finding the solutions, and that the transition does not exacerbate the already high unemployment rate in our country but results in a net increase in sustainable jobs.

Eskom is keen to assess all options for the repurposing of its sites, where its older coal-fired power stations are scheduled for closure within the next several years, and is looking at opportunities that will ensure greater community involvement, innovative revenue creation and the upliftment of the socio-economic standing of communities in the surrounding areas.

The Kingdom of the Netherlands is committed to combat climate change and supports the Just Energy Transition in South Africa. Specifically, the transition should accelerate a green and inclusive economy and leave no-one behind.

In keeping with this drive from both parties to create alternative employment and economic development opportunities, in 2021, the Embassy of the Kingdom of the Netherlands embarked on grant-funded agricultural related studies at Grootvlei power station, based on the extensive experience of the Netherlands in this regard. The Grootvlei power station was selected due to the site's repurposing potential, its strategic location (proximity to the industrial hub of Gauteng) and accessibility (along the N3 highway).

The Netherlands Embassy drew on the expertise of the Territorial Development team of the Netherlands Enterprise Agency, given their expertise in the development of integrated territorial development approaches in the Netherlands and abroad. By supporting a participative, multi-stakeholder process to develop transition pathways and creating new, green employment opportunities, the Just Energy Transition at Grootvlei can become an inspiration, and a blueprint for other sites that will also transition.

The aim of the study is to determine the most applicable climate-smart, labour-intensive farming and agricultural related repurposing opportunities for the Grootvlei power station site, to create a positive social, economic, and environmental impact on the surrounding area, and ensure local community involvement and empowerment. The repurposing opportunities will be employed in addition to the renewable energy repowering options that are currently being assessed for the site. These activities are complementary and respond to the aim of Eskom's Just Energy Transition strategy – to meet both decarbonisation and socio-economic goals.

The collaboration thus far has produced a geographical information systems (GIS) study of the Grootvlei area, an assessment of repurposing options, a preliminary situational analysis of the property by horticulture experts, and soil and water quality analyses by specialists. Further work is ongoing.

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

Renewable energy and agricultural opportunities are being considered for repurposing the Grootvlei site.

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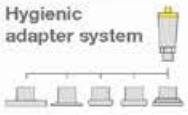

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Free app provides graphic representation

The highlight of the intuitive app, which is available free of charge for Apple and Android smartphones, is that it features graphic representation, which makes parameter setting of the TCC temperature sensor or the MVQ101 valve sensor, for example, even easier. As demonstrated at Electra Mining Africa Expo 2022

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