

FEATURES:

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01/2024

ELECTRICITY + CONTROL

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heart of machine reliability



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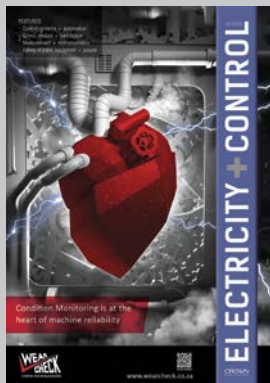


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Driving efficiency and sustainability.





The fundamental goal of condition monitoring specialist company, WearCheck, is to ensure that industrial machinery operates at peak performance with reduced maintenance costs.

(Read more on page 3.)

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What can we make of 2024?

Welcome to 2024. A year waiting to be made, and I have no doubt it will be a good one.

I believe the past few years have shown the resilience of this country, and indeed this continent, in so many ways. We can speak at length about failings and missed opportunities – but I marvel at the way we have managed to keep the system running, nevertheless.

For readers of *Electricity+Control*, there is little need to explain the requirement for efficiency, optimisation, automation, control and energy efficiency in industry. These things we know. But we have been faced with some remarkable challenges – and these obviously make us stronger!

In many respects our renewed strength has been based on ingenuity in the face of an increasingly difficult energy and logistics environment – but it has equally seen significant progress made in several continental initiatives – in a fresh commitment to establishing port, road and rail infrastructure that has been sorely needed.

It also reminds me of the significant challenge we face as we export skills to all parts of the world. In some ways this is an acknowledgement that at specific levels (for instance, in engineering) we produce world-class practitioners who will obviously 'ply their trade' wherever their expertise is needed. Professions like this, being internationally benchmarked, are internationally portable, as they should be.

The downside is that the local environment is not being developed to accommodate them, and it seems there are no concrete plans even to consider tackling thorny issues like making this an investor-friendly environment or establishing a job-creation economy. My sense is that much of what is being done is well-intended, but not practical.

Having said this – the opportunity now exists to operationalise our own success – as an industry. Figuring out how to manage in an environment of failing infrastructure does require ingenuity – and we have that in buckets.

It takes communities to band together to formulate solutions to these challenges, and

to set about making those areas attractive both to investors, as well as people simply looking for a job. As we move into this new year, look about your areas or fields of work and see how best you can formulate collective approaches to solving problems that you all share.

There are many examples of how creating a collaborative pre-competitive environment can free up an economy to become globally competitive. And becoming globally competitive also means the need to identify what the world needs – and to become a leader in providing that.

If we can begin to believe we can become world leaders, then a force will develop around our industry that will see it thrive. Aspects to be looked at very carefully include the need to automate and control even more effectively, to understand energy and how to optimise the use of energy, the growing concerns around global warming – and the narrative around the use of fossil fuels – and so on.

My sense is that in 2024 we will see a clear shift in thinking around the future of energy, as well as how to build internationally competitive industry, notwithstanding the complex policy and logistics environment that we have created.

This can only be exciting – and should be considered in the context of how wonderful this part of the world is, what incredibly resourceful people we have – and the remarkable opportunity we have to experience many things before they most surely will impact the rest of the world. That experience, and how to overcome the implications, is likely to see us, again, step up to lead in an ever more complex and ever more competitive world.

The issues we face with energy and water, for instance, will certainly rise in other parts of the world. Watch this space. In addition, the need to rethink how we run our plants based on non-dispatchable energy resources (in the absence of nuclear in many parts of the world) will be a learning curve that I suspect we will navigate before many others.

Enjoy 2024!

Ian

Ian Jandrell

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



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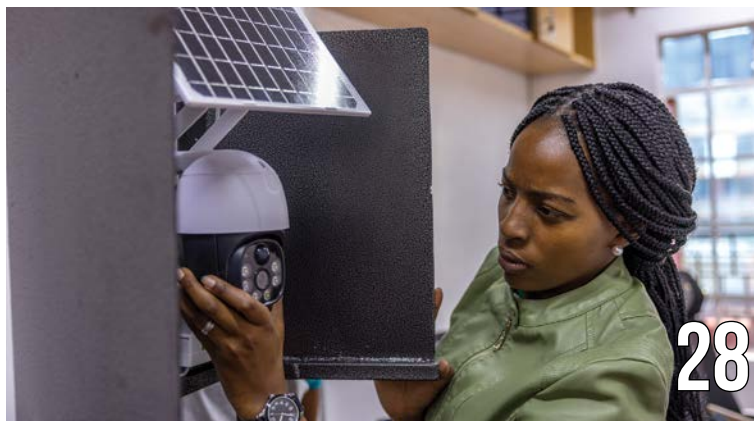
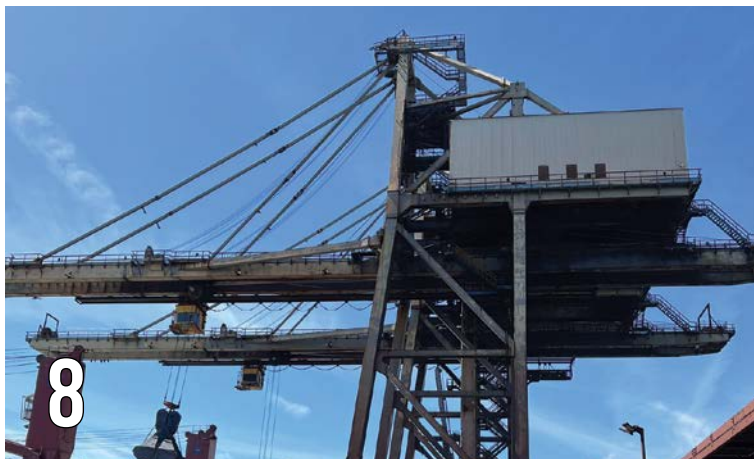
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Customers save costs, boost productivity with WearCheck

The fundamental goal of condition monitoring specialist company, WearCheck, is to ensure that industrial machinery operates at peak performance with reduced maintenance costs.

With many success stories and thousands of happy customers – many of whom have been customers for decades – WearCheck enjoys its recognition as a leader in the preventive maintenance field, servicing a wide range of industries with an array of different monitoring techniques.

The company's extensive network of 16 world-class laboratories in nine countries across Africa and beyond, services clients that operate in power generation and renewable energy, mining, fleet management, aviation, the maritime sector and more.

WearCheck's business model is built around the scientific analysis of used oil, fuel and other fluids. This entails analysing fluid samples for trace particles, which indicate which component is suffering unusual wear patterns. This information is assessed by a team of specialised diagnosticians, who advise on a course of remedial action, where required.

Additional predictive maintenance techniques offered – which are employed depending on the type of machinery being monitored – include asset reliability care (ARC) services, water analysis, transformer chemistry services and advanced field services (AFS) such as non-destructive testing, technical compliance and rope condition assessment. The company also offers lubrication enabled reliability (LER), providing clients with bespoke solutions to ensure that their lubrication systems are well managed, efficient and cost effective.

WearCheck MD, Neil Robinson, outlines the concept of proactive maintenance: "By monitoring a component's condition regularly over time, our scientific techniques provide reliable



WearCheck managing director, Neil Robinson, is dedicated to helping customers avoid unnecessary maintenance costs arising from unplanned machinery failure.

data which enables our diagnosticians to accurately predict whether and when that component will potentially fail.

"We identify a potential failure before it occurs and recommend a remedy. This way, catastrophic failure is avoided, enhancing machine availability and performance.

"Unplanned component failure can be prohibitively expensive and is preferably avoided. With forewarning about potential component failure, our customers avoid unnecessary maintenance costs and maintain efficiency by upholding optimum production levels."

Transformer maintenance is a particular focus for WearCheck. Transformer division manager, Gert Nel, provides insight into getting the most out of a transformer. "The timely detection and diagnosis of potential issues in transformers are essential for ensuring the efficient and reliable operation of any project.

"Transformer oil condition monitoring involves analysing the physical and chemical properties of the oil, such as furanic components, dielectric strength, IFT (interfacial tension), acidity, moisture content, and dissolved gas content. These properties can provide insight into the condition of the transformer insulation and other components, as well as potential issues that may be developing.

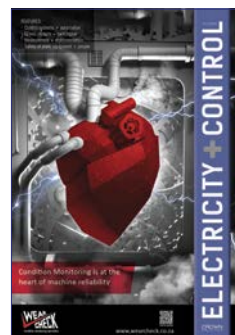
"By analysing the oil properties over time, maintenance teams can detect changes in the oil condition and take appropriate actions, such as performing maintenance or replacing components before a failure occurs." □



Transformers can be prone to wear and aging, which can lead to unplanned failure. These hurdles are overcome with WearCheck's transformer condition monitoring programme, which detects potential problems before they occur.



WearCheck lab technicians at work, analysing used oil samples in WearCheck's Durban laboratory.



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A view into the future of manufacturing and technology

The MESA Africa 2023 Summit held in November last year at Kloofzicht Lodge & Spa, northwest of Johannesburg, was reportedly a great success. The summit brought together well-respected thought leaders in the manufacturing and technology sectors who offered a view into the future of these industries.

Sponsors of the event included Schneider Electric, Iritron Pty Ltd, Pragma Global, 4Sight, MESA International, SAIMC, Montgomery Group and Ki Leadership Institute Pty Ltd, and it is their support that enabled the summit to take place.

Dr Ananth Seshan, Board Member of MESA International, flew in from Canada to share insights into the journey of small and medium manufacturers (SMMs) navigating smart manufacturing. In his address he underlined the importance of garnering buy-in from management and employees, highlighting successful smart manufacturing pilots through industry-agnostic collaborations.



Dr Ananth Seshan shared insights into the journey of small and medium manufacturers navigating smart manufacturing.

Seshan's hypothesis on the differing challenges in low-to-mid-income economies ignited discussions on a collaborative 'Smart Manufacturing Strategic Group for SMMs'. This is proposed to unite economies, share insights, and collectively address funding, digital transformation, secure value chains, and workforce development – a powerful call to reshape the global landscape of smart manufacturing for smaller enterprises.

Gerhard Greeff, Divisional Manager at Iritron, focused on 'The impact of computer engineering as defined engineering work', outlining the objectives of the Identification of Engineering Work (IDoEW) to ensure accountability and regulate computer engineering activities. (See more below.)

In his presentation, 'Don't get lost in the cloud; future proof your architecture and operations', Jaco Markwat shed light on Element 8's dedication to community and industry service. Focusing on collaborative learning, he set out scalable, intuitive solutions for a data-driven future, tackling challenges in data management evolution.

Pekka Pihlajasaari, described as a luminary in digital transformation, explored the evolving landscape where machine learning transcends expert domains, offering delegates insights into the dynamic intersection of machine learning and industry.

Charl Marais, OT Digital Transformation Business Unit Manager at Blue SP/4Sight, led a dynamic session on

'Pit-to-port value chain optimisation in the mining sector', advocating for efficiency and unified approaches to ensure sustainable success.

Dr Mike Ntokozo Sishi, Information Technology Manager at Rand Refinery, shared insights on 'Digital transformation of industrial organisations', offering transformative approaches for businesses to optimise processes and enhance performance.

Dr Arthie Moore-Robberts, CEO and Director of the Ki Leadership Institute, presented strategies to accelerate generational disruption in the manufacturing industry, emphasising digital transformation and proactive strategies for success.

Yanesh Naidoo, Innovations Director at Jendemark, challenged conventional thinking with 'Why MES has to be changed/rethought for discrete manufacturing', introducing a software-defined paradigm to foster adaptability, upgradability, and connectivity.

The MESA Africa Summit provided a platform for industry leaders and the presentation of transformative solutions, illuminating the way forward for manufacturing and technology. The shared insights promise to shape a future of innovation, resilience, and success for industries globally.

In addition to the presentations outlined above, others covered further interest areas and different industry sectors.

Adapting to digital change in the workplace

Dr Suven M Ramsunder, Digital Transformation Expert at Schneider Electric, spoke about adapting to digital change in the workplace.

He referred to the Fred Davis Technology Acceptance Model (TAM) – an information systems theory released in 1989 – noting that it is as relevant today as it was almost 35 years ago. Addressing the delegates at the summit, Ramsunder emphasised that individuals' perception of what technology can do for them continues to influence their decision-making process. It



Dr Suven M Ramsunder, Digital Transformation Expert at Schneider Electric.

is also this perception that forms an important part of the Davis TAM theory, which hypothesises that when users are presented with a new technology, there are two basic factors that influence their decisions on how and when they will use it; these are perceived usefulness (PU) and perceived ease-of-use (PEOU).

"Our choice in cell phones is a good example," Ramsunder said. "It is often based on how easy the phone is to use; we don't want to waste our time relearning simple tasks. Furthermore, the phone should also meet our individual aesthetic preferences and provide us with the required functionality to make our lives easier."

In his presentation, Ramsunder also focused on the evolving relationship between man and machine and its impact in the workplace. "In our personal lives we tend to embrace technologies quickly, but in the workplace, we're often reluctant to adopt new systems, which again boils down to perception. Technology should be used to work alongside people to make their lives easier."

Ramsunder went on to say, "Interestingly, we underestimate the constant state of change in our lives, assuming everything remains static. However, we are in a continuous state of change, although this doesn't have to be monumental."

Addressing change in the workplace, he said: "Initiating small-scale implementations, fostering open communication, embracing failures as opportunities to learn, and adapting quickly are key principles that should be maximised in the workplace. By applying these principles, workplaces can unlock the potential for swift and effective innovation."

"Change has always been a constant in our work lives. Embracing and adapting to these shifts is an integral part of our professional journey," Ramsunder said.

Computer engineering as defined engineering work



Gerhard Greeff, Divisional Manager at Iritron, outlined the competencies involved in Computer engineering as defined engineering work.

In his presentation on Computer engineering as defined engineering work, Iritron's Gerhard Greeff explained the range of competencies – as set out in the national regulations in the IDoEW (Identification of Engineering Work, gazetted in March 2021) – that the practice encompasses. These include:

- Conducting research and developing new or improving theories and methods related to computer and software engineering
- Advising on and designing computer-based systems or components, systems equipment, software and distribution centres
- Specifying production or installation methods, materials, quality and safety standards and directing production or installation work of computer-based products, software and systems
- Supervising, controlling, developing and monitoring the operation and maintenance of computer-based systems, software, networks and equipment
- Organising and directing maintenance and repair

of existing computer-based systems, programs and equipment

- Researching and advising on computer-based equipment and software
- Planning and designing computer-based communications networks based on wired, fibre optical and wireless communications media and ultra-high-speed data networks
- System analysis, designing and developing complex computer-based systems and implementing these through appropriate choice of hardware and managing the development of the necessary software
- Determining manufacturing methods for computer-based systems as well as the maintenance and repair of existing computer-based systems, networks and equipment
- Designing usable and fit-for-purpose products
- Identifying and involving all stakeholders in the design process.

In a separate presentation, Greeff introduced the MESA Global Education programme. He said that MESA, as an organisation, has evolved with the technological changes in manufacturing and across industry. In this respect, it has recently released a new dynamic smart manufacturing model that embraces the interaction between business objectives, business process lifecycles, cross-lifecycle threads and enabling technologies, to support the realisation of smart mining, manufacturing and processing. This model serves also as the framework for its education programme.

Through the online education programme participating members can learn from their colleagues and others who have travelled the smart manufacturing journey or are navigating the transition led by fast-changing technologies and gain insights into best practice in different industry sectors.

Greeff is Chairperson of the MESA Africa Advisory Committee, guiding MESA Africa's strategic direction and shaping its initiatives. With over 25 years of experience in the field of industrial automation and a commitment to driving excellence, in this position Greeff shares his expertise and industry insight. He has been a part of the MESA organisation in South Africa since 2007. It provides a platform and network to share knowledge and lessons learned industrywide. □

For more information visit www.mesa-africa.org

As a Special Interest Group of the global non-profit organisation MESA International, MESA Africa is dedicated to driving the adoption and implementation of smart mining, manufacturing and Industry 4.0 technologies in Africa. With a strong focus on collaboration, knowledge sharing and thought leadership, MESA Africa plays a valuable role in advancing manufacturing excellence across the continent.

Controlling unmanned construction machinery efficiently

Although it may seem that quarrying construction machinery only has to do rough work, precise and efficient control technology is essential. This is particularly so for unmanned, remote-controlled machines, such as those being developed by the Portuguese specialist Fravizel. Supported by Bresimar, a Beckhoff distributor, the company selected a compact combination: the CX7000 Embedded PC and EtherCAT Terminals to form the foundation of its robust control solution. Here, Jonas Brinkmann, International Sales, Beckhoff Automation, reports on the application.

Fravizel is a Portuguese company with close to 40 years of experience in designing and manufacturing earthmoving equipment as well as machinery for quarrying, forestry, and industry, such as diamond wire cutting and drilling machinery. Present on five continents, the company cites its ability to innovate as essential in enabling it to meet the manifold equipment needs of its diverse, worldwide customer base.

A member of the Fravizel engineering team explains why they chose to implement PC-based control in this case. "Beckhoff distributor Bresimar suggested the CX7000 as a potential solution. We were not aware of this embedded PC, so we analysed it and realised it is an extremely compact device that has all the necessary processing and storage functions. It was also compatible with the Beckhoff products and solutions we were already using. In addition, our partnership with Bresimar was very important for technical development, as we received all the support we needed."

A compact, robust control solution

The machines in which the CX7000 Embedded PC will be implemented are unmanned and can only be controlled remotely by specialised operators. The equipment is intended for use in quarries, for cutting and processing ornamental stone. The controls needed to be modernised, so Fravizel began the search for an especially compact and robust solution. It found that the CX7000 and Beckhoff I/O technology were a great option, which also ensured compatibility with the EtherCAT communication

protocol already in place. According to the engineering team, the high computing and storage capacity of the compact controller covers all requirements for machine operation.

The CX7000 functions as an EtherCAT master, which enables the broad EtherCAT I/O portfolio from Beckhoff to be deployed in conjunction with a compact and cost-effective device. The controller can thus be used in various systems. The Automation & Control team highlighted that EtherCAT was already being used in communication between the control components of the machines and had proved to be one of the major advantages of the Beckhoff control solution, as it allows for third-party hardware to be integrated much more flexibly than is the case with other systems.

The hydraulic and pneumatic circuits are essential to the proper function of the construction machines. EtherCAT analogue terminals, including EL3004, EL3174, EL4032, EL4034 and EL4038, can be used to control the flow and pressure of the proportional valves precisely, which are important variables here, and to record system performance. The EL1809 and EL2809 EtherCAT digital terminals are used, among other things, as command inputs and for sensors, or as outputs for hydraulic/pneumatic solenoid valves and power and control drives.

Machines with extendable arms, central axis rotation and/or lateral displacement also require positioning control for the various machine segments, which is provided by the EL5001 and EL5002 EtherCAT encoder terminals forming a control loop with absolute encoders. To provide reliable pressure monitoring for the hydraulic and pneumatic systems, EL3024 EtherCAT input terminals collect the analogue signals from pressure, fill level, inclination, and temperature sensors positioned at different points in the machine.

Looking to the future

For Fravizel, it is critical that a control system has longevity and is also suitable for other projects. If more signal types are required, for example, additional

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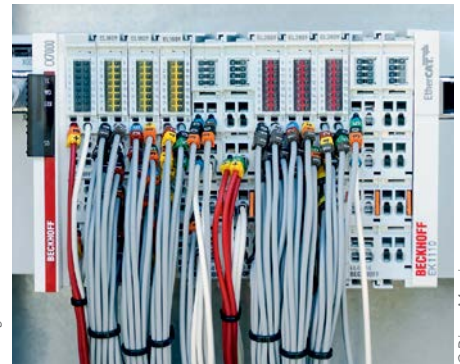
© Diogo Moreira

Precise control and monitoring of the machining process is essential in providing high-quality ornamental stone.



© Diogo Moreira

The CX7000 Embedded PC controls Fravizel construction machinery that is used in quarries to cut and process ornamental stone.



© Diogo Moreira

The CX7000 Embedded PC with directly connected EtherCAT Terminals provides a compact and robust control solution.

New energy supply system for SCARA robots in cleanrooms

igus is launching a new energy supply system for SCARA robots in cleanrooms: the Clean SCARA Cable Solution is made of tribologically optimised high-performance plastics and works almost particle-free, according to ISO Class 2, even in high-speed applications. It is also stronger and more user-friendly than the standard corrugated hoses.

In the production of electronic equipment, tiny particles, invisible to the naked eye, can ruin electronic components, semiconductors and displays. It is therefore important that there should be as little friction as possible in machines and systems in order not to contaminate the surrounding air. This is not easy, especially with SCARA robots (selective compliance assembly robot arm, or selective compliance articulated robot arm), which resemble a human arm that moves rapidly along four axes with cycle times of well under a second. There is always a risk that particles may become detached from corrugated hoses and tubes in high-speed applications.

"Finding a way to guide cables and hoses on a SCARA robot in a cleanroom is a science in itself. Fast movements place stress on the material, which releases unwelcome abrasion particles," says Matthias Meyer, Head of the triflex and Robotics Business Unit at igus.

For this reason, igus has added a variant for cleanrooms to its SCARA Cable Solution energy supply system, which it developed in 2020. "The new Clean SCARA Cable Solution is a cleanroom-compatible energy supply system for high-speed applications – reliable, compact, easy to use and quick to retrofit," says Meyer.

ISO Class 2: minimal particles in the surrounding air

The core of the new cleanroom energy supply system is the e-skin soft, a modular energy chain that guides cables and hoses in a sag from the robot's vertical arm to the end effector. Its separable upper and lower shells can be combined to form a closed, dust-proof water-resistant tube. This ensures that particles from the cables and hoses cannot escape into the surrounding air from the inside, even with the wildest movements.

"To reduce stress on the cables and increase their durability, we have provided a rotating mount for the connections to the fixed and moving ends of the energy supply system," says Meyer. "In addition, the rotary bearings are designed to be almost particle-free, even during highly dynamic movements."

The e-chain itself is also especially abrasion-resistant, being made with tribologically optimised high-



[Source: igus GmbH]

The Clean SCARA Cable Solution ensures particle-free energy supply, even with highly dynamic movements.

performance plastic. ISO certification by Fraunhofer Institute experts confirms this. The Clean SCARA Cable Solution is certified as ISO Class 2, which means it is so abrasion-resistant that a maximum of 100 particles up to a size of 0.1 microns can be found in one cubic metre of air during operation. For comparison, a standard sheet of paper is 80 microns thick, or 800 times as thick as such a particle.

An alternative to classic corrugated hoses

With its Clean SCARA Cable Solution, igus offers an alternative to the conventional corrugated hoses, and it has two other advantages in addition to cleanroom compatibility. First: the thin corrugated hoses most often used with the SCARA have very little inherent rigidity and are therefore susceptible to kinking. There is no bearing to absorb torsion, so they can tear easily. "Unlike corrugated hoses, the Clean SCARA Cable Solution supports itself and has a unique rotary bearing. This makes it ideal for short unsupported lengths and highly dynamic applications," says Meyer. "The oval chain geometry is especially advantageous when lateral forces are applied, as it offers additional strength." The second advantage is that the zipper principle makes the Clean SCARA Cable Solution easy to open, enabling users to insert cables and hoses quickly. An optional interior separation provides additional protection that corrugated hoses cannot provide.

"On request, customers can receive the new energy chain for cleanrooms as a ready-to-connect complete system with chainflex cables," Meyer adds. Igus offers more than 900 highly flexible cables of IPA Class 1.

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

Continued from page 6

EtherCAT Terminals can simply be added to the CX7000 Embedded PC. According to Bresimar, the CX7000, which unites compact design with high functionality, is the right solution for Fravizel and is just the first step into using scalable PC-based control technology from

Beckhoff. Bresimar will maintain a close relationship with the customer to create innovative solutions with added value for the equipment Fravizel develops, and to enable growth and knowledge sharing.

For more information visit: www.beckhoff.com

Factors to consider for crane upgrades

With the right maintenance and care, industrial cranes can last decades. Highlighting that he recently helped redesign some 1960s Matterson cranes so they could run on variable speed drives and all at the same speeds, Andy Swann, Business Development Manager for cranes and power transmission at cranes specialist CP Automation, emphasises that carrying out any industrial crane upgrade requires the right systems, combined with dedicated expertise. Here he outlines some key considerations for crane upgrades.

Industrial cranes are widely used. Large gantry cranes can be used in warehouses, harbours and shipyards, where they help to load and unload containers. In my 26-year career, I've seen the industry change significantly and operators now require more than ever from their materials handling equipment to keep up with demand.

Improving safety

Cranes can pose a significant risk in factories, harbours and other industrial settings. Even a small crane weighing, say, 20 tonnes, can experience a pendulum effect and a swaying load when stopped. Mismanagement can result in people nearby being injured and/or equipment being damaged. Furthermore, rigging equipment is often designed for static rather than dynamic loads, which can put the system under added strain.

Even if an operational crane is decades old, there are steps operators can take to bring them up to date with the latest safety standards. For example, retrofitting variable speed drives (VSDs) with hoist-specific software, rather than integrating general-purpose drives can help improve operator control over motion. To illustrate this, crane-specific drives which CP Automation sources from its suppliers are equipped with a series of safety features, including Safe Torque Off, a safety redundancy feature, and anti-sway control software.

Additional safety measures can include fitting limit switches to prevent the over-travel of the crane. The limit switch is operated by contact with the crane hook block and, when activated, it interrupts power to the lift motor. Limit switches are also incorporated in similar ways for the crane's travel motions. Another measure is the use of wireless transmitters and receivers, which allow operators to remove themselves from the environment where the crane is operating.

Return on investment

The upfront capital involved in purchasing a crane, even a second-hand one, constitutes a large investment, so any future upgrades must provide satisfactory returns in an acceptable payback period. When making any upgrades, a good partner will provide the full picture. Recently, we supplied an international steel manufacturer with a Magne-Pulse DMC Series 2 Digital Magnet Controller to help improve crane safety and efficiency. We calculated the cost of energy usage combined with the cost of the labour and spare parts – and from that, we could compare what the digital controls would actually consume and shared that with the customer.

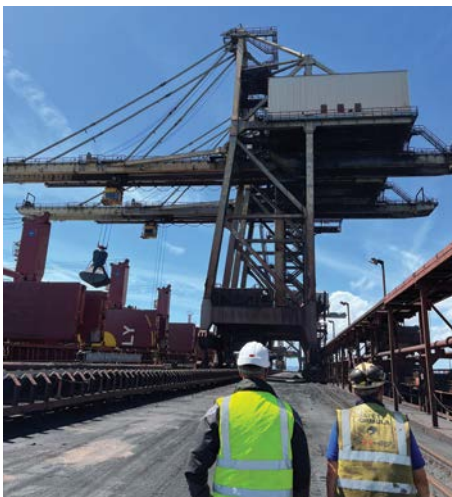
Rather than looking at only the initial investment, it helps to understand what the long-term savings from an upgrade will be. The savings in energy and labour costs can be substantial and, continuing over several years, they will deliver further value.

Getting the right technical support

If a fault is found during a visual inspection, the right partner will investigate the problem to find patterns that determine the cause. Using this information, the crane specialists can either implement mitigation measures themselves, or recommend a particular system or corrective action.

Sometimes, crane businesses will already have an idea of what they want to achieve with an upgrade and, if so, this would require a conversation between the equipment owner and customer. It usually starts with a discussion around the challenges and how the objectives can be achieved. For instance, if a temporary shutdown is required, businesses can time this to align with expected lead times for replacement parts, to minimise disruption.

Retrofitting VSDs to 60-year-old Matterson cranes and allowing a fleet to run at the same speed is just one example of how upgrades can benefit businesses and operators. Working with a dedicated crane partner can help companies get the technical support they need through the lifecycle of the equipment and ensure compliance with safety and other requirements. □



Cranes are widely used in industry and can pose a safety risk if they are not well managed and maintained.

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

A 'long-distance' mine winder drive upgrade

Towards the end of last year ACTOM Industry secured a breakthrough contract to upgrade the drive and control system of a mine winder at a gold mine in Ghana.

The mine is one of several gold mining operations in Ghana that are owned and operated by a leading international gold mining company.

"We view this contract as a ground-breaking achievement for ACTOM Industry as we have been selected to replace original equipment manufactured and supplied by an OEM that is not in any way connected with us," said Janna Kapp, General Manager at ACTOM Industry.

"In most of our mine winder drive and control system contracts, we are responsible for the design, assembly, supply, installation and commissioning of each system ordered. However, in this instance, due to various regulations prevailing in Ghana that make it unworkable for us to participate in any of the on-site work involved, we had to negotiate a project plan with the client which would allow us to deliver and execute the project without undue risk to either party," Janna said.

"The agreed project plan will ensure that the required standards and competence for the on-site work are adhered to without ACTOM Industry's personnel being present in Ghana," he said. "In terms of the project plan, the client undertakes to procure and supply the labour

force required for the installation work."

The contract, due for completion in the first quarter of 2024, is for the replacement of the aging and outdated Ward-Leonard motor-generator set and associated electrical and control systems with ACTOM Industry's state-of-the-art dc system. This comprises a thyristor converter system, which will regulate the dc voltage supply to the retained 2 635 kW motor, and other equipment including transformers, switchgear and a safety and control system.

Janna highlighted that ACTOM Industry's system is "more efficient, less expensive and less maintenance-intensive than the legacy system it replaces".

"Having won this important winder upgrade contract in Ghana, we believe we stand a good chance of soon being awarded further winder drive and control upgrade contracts for some of the other operations there," he said.

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



ACTOM Industry has been awarded a contract to replace the drive and control system of a mine-winder at a gold mine in Ghana.

Locally Designed and Manufactured Motor Protection Solutions

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- ANSI 46 Single Phasing
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- ANSI 50P Short-circuit
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- ANSI 59 Overvoltage
- ANSI 27 Undervoltage
- ANSI 47 Phase Rotation
- ANSI 81O Over Frequency
- ANSI 81U Under Frequency

MA BBRTU Ethernet Relay Features:



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- ANSI 51LR Locked Rotor Protection
- ANSI 51 Running Stall
- ANSI 46 Unbalanced Current Protection
- ANSI 47 Single Phasing Protection
- ANSI 37 Underload Protection
- ANSI 50G Earth Leakage Protection
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Nine agitator industrial gear units in one order

SEW-EURODRIVE South Africa made history within the global group when it secured a world-first order for nine new X.e Series agitator industrial gear units, which will go to a customer in the mining industry. This came just three months after the launch of the series in July 2023.

SEW-EURODRIVE has a well-established reputation for providing reliable high-performance solutions for mixing and agitation applications in various industries, globally. The X.e agitator units have proven suitable for mixing and blending liquids and other materials, particularly in the harsh African operating environment.

Jarrod Futter, Engineering Manager at SEW-EURODRIVE says, “The X.e agitator units are ideal for applications where high power ratings are required for stirring and mixing materials. Importantly, we can customise the agitator units to suit the customer’s specifications. For example, we offer various bearing and shafting options and modular systems for the unit which can be selected to meet the customer’s budget and expectations.

“In this case, due to the customer’s requirements for nine low-ratio and moderately high torque and force applications, the X3FSM240e HD version was selected. The selection process depends on multiple factors, including the input speed, motor power, loading distance, axial loading and most importantly, the radial loading in the application and required output speed,” Futter adds.

The X.e agitator differs from previous X Series vertical drives. It is purpose designed for mixing and agitation, with a stronger and dynamically improved housing. This allows for higher radial load applications, with a maximised bearing distance and an intelligent housing split above the maximum oil level to minimise potential leaks and offer more directly manageable servicing and maintenance. The X.e agitator also features a new, robust, integrated foot design with multiple aligned foot holes to allow for easy mounting and greater stiffness, as well as substantial thermal improvement.

In designing the X.e agitator, SEW-EURODRIVE made use of the digital twin process that ties real-world testing

to a digital Finite Element Analysis. Explaining the process, Futter says this methodology allows the matching of real-time measurements during testing to the digital analysis, to achieve the same results. “This enabled many cost benefits, minimised the need for physical testing and allowed the team to see and solve problems before they happened. Compared to traditional methods, the digital twin design process is a more energy-efficient and environmentally friendly solution for development and testing, and minimises potential waste,” Futter adds.

As an example, he says the extended bearing distance could be optimised together with the oil flow characteristics. Using fluid simulation, the piping could be optimised internally, allowing the designers to see how the flow occurs before creating a physical unit to evaluate the theory. The simulation results could then be checked with real-time tests to ensure the oil flow occurs as designed and optimal lubrication is achieved.

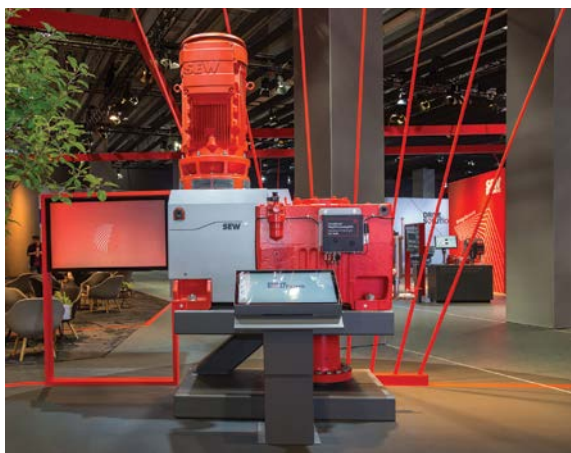
The X.e agitator unit incorporates a unique, application-specific reinforced and extended bearing distance, with the distance between the mounting of the lower and upper output shaft bearing being further apart. This creates a greater shaft distance between these loading points, which allows the low-speed shaft to handle higher radial forces. “Put more simply – the lever has been made longer to move a larger load,” Futter says.

The new agitator unit also features a pressurised internal lubrication system that allows for continuous oil flow to all upper bearings and gears to ensure the units are well lubricated, and the labyrinth seal ensures protection from external particles that could damage the oil seals.

SEW-EURODRIVE offers the X.e units in three sizes, with various torque ranges and gear units, and all client-specific products safely encapsulated inside the gearbox for client and product protection.

The company is committed to sustainable engineering solutions, and the X.e agitator unit is testament to this. The housing has been developed to allow for easy servicing and maintenance, which will support sustainable long-term use. Components are easily replaceable. The efficiency gains are attributed to the X.e series gearing, which has been extensively adapted from the original X Series. And the use of standard, existing components, which meant the X.e agitator series required less design time to achieve the final product, was another aspect of sustainable engineering.

With five production plants worldwide and a footprint in more than 50 countries, SEW-EURODRIVE offers a quick turnaround in aftersales support and efficient lead times. “We are looking forward to delivering the nine X.e agitator units in this world-first for the group, and we will provide whatever aftersales support is required at our world-class standards,” Futter says.



The X.e agitator units are ideal for applications where high power ratings are required for stirring and mixing materials.

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

Laser simplifies shaft alignment

Misalignment causes at least half of all damage to rotating machinery. Despite this, instead of fixing the problem, teams often treat the symptoms of misalignment by replacing bearings, couplings, and seals because they think alignment takes too long. Fluke, a global technology leader in the manufacture of compact, professional electronic test and measurement tools and software, and locally represented by Comtest, has introduced its 831 Laser Shaft Alignment Tool, which makes shaft alignment easy with an intuitive guided user interface that enables quick and complete shaft alignment. There is no need for advanced training or complicated programs.

The Fluke 831 is easy to use and powerful enough for the skilled technician. It enables them to cover more machines with all the functionality needed on the plant floor — from thermal growth calculations to user-defined tolerances and more.

Key features

- High performance and precise results – With powerful features like unique extend mode the Fluke 831 can handle gross misalignment and an integrated thermal growth calculator automatically

factors dynamic machine changes into the result.

- Quick setup and intuitive user interface – Swift setup and the tablet-like, intuitive, guided user interface make the Fluke 831 laser alignment tool more user-friendly than other conventional measurement methods; coupled shafts can be aligned in quick, easy steps.
- Adaptive alignment – It enables maintenance and reliability teams to address the different challenges of horizontal, angular, and vertical alignment.
- Data sharing via the cloud – The integrated Wi-Fi cloud solution easily transfers data from the Fluke laser alignment tool to the ARC 4.0 PC software.

Because it is easy to use, the Fluke 831 allows for shaft alignment to become a regular part of the maintenance routine, and this in turn means lower energy usage, by eliminating reaction forces inside rotating machinery, increasing reliability, reducing costs by decreasing stockholdings of spare parts, extended parts life, and increased maintenance intervals due to longer machine life.

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



The Fluke 831 laser alignment tool is easy to use and powerful enough for the skilled technician.

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Efficient motors and drives are key to industry energy solutions



Jaco Brits, Projects and Technical Manager at WEG Africa.

With the continuing energy supply shortfall in South Africa, motors and drives can play a central role in industry's energy solution strategy. The manufacturing and processing sectors, which include minerals processing plants, are energy-intensive industries, and finding ways to reduce energy consumption and increase efficiencies is essential for economic

and environmental reasons.

Jaco Brits, Projects and Technical Manager at WEG Africa, says the company has the knowledge and expertise as well as the technology solutions to assist operations in reducing their operating costs and increasing their productivity – safeguarding their energy security at the same time.

"Electric motors and drives are used across industries to operate pumps, mixers, conveyors, vibrating screens and feeders, crushers, and other machinery including, for instance, automated packaging systems," Brits says.

"Advances in motor and drive technology, underpinned by WEG's extensive research and development, have seen substantial improvements in energy efficiency. Advanced control algorithms enable motor performance to be optimised based on real-time conditions," Brits explains. "The algorithms assist in ensuring motors operate at peak efficiency levels, even in complex processes.

"By upgrading to newer technology and installing higher efficiency motors such as the WEG IE3 or IE4



A WEG Top Premium Efficiency motor driving a pump via belt and pulley, controlled by a WEG CFW11 VSD.

electric motors, customers can lower their energy usage significantly.

"In addition," he says, "by combining high efficiency motors with WEG variable speed drives (VSDs), better control and optimisation of equipment can be achieved. This ensures equipment operates at its most energy-efficient speed and power level and will reduce operating costs."

Commenting on the use of VSDs, Brits explains that traditional fixed speed motors run at a constant speed, regardless of the load requirements. In contrast, VSDs are most effective in controlling the speed and torque of motors based on the actual – and changing – load requirements. With this level of precision, the speed of

Continued on page 13



Safeguarding connections to the traditional grid – and more

The NewFeed Feeder Protection Relay from NewElec provides microgrid feeder security in the dynamic interface where solar farms intersect with traditional power grids. The NewFeed Feeder Protection Relay is designed to safeguard this link. It is purpose-built to fortify the connection between solar farms and conventional power grids in low voltage (LV) and medium voltage (MV) distribution settings.

The NewFeed relay has the capacity to gauge a number of critical metrics: from voltage and current to complex evaluations like positive, negative, and zero sequences, phase angles, power factor, harmonics, and Total Harmonic Distortion (THD). It also looks at independent earth leakage levels. This comprehensive data toolkit facilitates the seamless incorporation of complete ANSI protection attributes to safeguard microgrid feeders.

The NewFeed relay serves to protect motors as well, with the added flexibility of multiple curve selections like IEC60255-8, NINV, VINV, EINV, MINV, DT, IT, I2T, and I4T. What's more, its directional current components cater adeptly to parallel feeder scenarios.

All this functionality is contained within a compact 45 mm DIN rail mounted enclosure. The enclosure is a hub of insight. LED indicators signal fault conditions, field inputs, and relay outputs, ensuring clarity even in complex applications. This transparency is complemented by the relay's internal configurability, facilitating adaptable logic and comprehensive statistical records.

Further capability is provided through the NewFeed relay's range of MV and LV current transformer module blocks (CTMB). This feature enables the seamless integration of various current ranges into higher current and system voltage systems. The integration of interposing current transformers and voltage transformers with selectable ratios enriches flexibility, enabling isolation and expansive range settings. An additional current balance CT (CBCT) addresses earth leakage detection exclusively.

Front-end configuration software empowers users to tailor the device's functionality. An onboard database etches 36 fault records and 940 event records with precise timestamps, and a comprehensive data recorder and spectrum

Continued on page 13

In the fast-evolving landscape of feeder protection, the NewFeed Feeder Protection Relay delivers innovation, advanced functionality, and reliability.

Continued from page 12

the motor is adjusted to match the load, thus ensuring that equipment operates as needed. VSDs also provide for faster reaction to load changes and better integration with equipment. "All these factors reduce unnecessary energy consumption during periods of low demand and enhance overall equipment efficiency and performance," he says.

Unpacking advances in drive technology, Brits points to the WEG CFW11 VSD line, which incorporates some of the most advanced technology in the world for alternating-current three-phase induction motors.

"Incorporating WEG Vectrue™ technology, these new generation WEG drives combine variable frequency, sensorless and closed-loop vector (with encoder) control techniques in a single product. This facilitates high torque and a fast dynamic response with the self-tuning function allowing automatic configuration of the drive to adjust it to the motor and load in vector modes," Brits says.

As most industries are looking to sustainable energy sources to meet their energy needs, including renewables such as wind and solar, motors and drives will continue to play an important role in facilitating the integration of such systems. VSDs can be used to balance power supply and demand and ensure stable operation in hybrid energy systems.

"Substantial efficiency improvements can be achieved by using the latest motor and drive technology, and the significant savings in energy consumption more than justify the capital cost of replacing old equipment with higher efficiency technology," Brits says.

For more information visit: www.weg.net

Continued from page 12

analyser are embedded in the configuration software.

This dual-purpose toolset opens up the ability to examine motor performance or analyse feeder power quality with precision.

As well as providing protection, the NewFeed relay provides control too. Advanced features and switchgear controller logic integrate motor and feeder control functionalities. From prestart protocols to execution timing of close commands, and continuous monitoring of breaker states with real-time load current feedback, the relay ensures every aspect of operation is monitored. Unauthorised operations or anomalies like breaker failures are swiftly detected.

The NewFeed Feeder Protection Relay is recognised as an Intelligent Electronic Device (IED). It supports various communication protocols, including Modbus/TCP and PROFINET, reinforcing its compatibility within modern system architectures.

As an example of South African ingenuity, the NewFeed Feeder Protection Relay is designed and manufactured locally, in line with ISO 9001:2015 standards.

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

On-site winding of gearless mill drive in Panama



The M&C team on site, ready to take on the gearless mill drive winding contract.

Late last year Marthinusen & Coutts (M&C) carried out the on-site winding and sub-assembly of an 18 MW gearless mill drive for a new ball mill at the Cobre Panama copper mine in Panama. This was done as part of the mine's expansion of its processing plant to cater for increased ore output. M&C has undertaken similar contracts for the mine eight times over the previous five years.

M&C's seven-man on-site team, led by Divisional CEO Richard Botton, did the work over 40 days during October and November last year.

"We knew from previous experience that the working conditions at the mine are extremely tough, with frequent heavy rain, high humidity and excessive heat, but our familiarity with the procedures involved helped to ensure that the project went according to plan and was completed on time," Botton commented. He added that it is the complexity of the job that requires the winding and sub-assembly to be done on site.

"Our preparation is extensive and starts about six months prior to site establishment. The machine is transported to the site from the OEM in Europe in four quadrants, each of which weighs 85 tonnes. We are responsible for the connecting and continuity between the four segments, which have been pre-wound by the OEM," he explained.

"About half of the tools we use for the on-site work are purchased and supplied by the mine, and we supply or bring with us the other more specialised tools, as well as the test equipment needed."

As previously, M&C was contracted for the latest project by the owner and operator of Cobre Panama, Minera Panama, the Panamanian subsidiary of international mining company, First Quantum Minerals (FQM).

M&C has also carried out four on-site winding and sub-assembly projects on gearless mill drives for FQM's Sentenial copper mine in Zambia in recent years.

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

Making quality audible

Stefan Ziegler, Beckhoff Automation

Nobody wants to hear cracking, scratching, knocking, or whirring while driving. But how can the subjective perception of noise be quantified and measured objectively? thyssenkrupp Presta tests this by measuring structure-borne noise during end-of-line testing. Joachim Sutterlüty, Karsten Mauersberger, Michael Sauerwein, and Julius Ellmann have replaced the previous external electronics with Beckhoff's high-end ELM measurement terminals together with TwinCAT Scope. This saves a lot of engineering work and time, as well as space and money.

Just a few moments are crucial in the life of a steering system – when thyssenkrupp Presta puts it through its paces in an end-of-line test rig, as it does with every steering system. In addition to various functional tests, the noise generated is a critical factor.

“Acoustic testing is about ensuring that drivers do not perceive any annoying noises while driving,” says Joachim Sutterlüty, head of automation at thyssenkrupp Presta. Translating such noise perceptions into measurable values is the work done by experts at the thyssenkrupp Presta acoustic centre of excellence. Together with customers, they analyse and define noise behaviour from the development stage – on prototypes and pilot series – and measure subjective acoustic properties in objective terms. This noise profile and its permissible limits later form the basis for measuring structure-borne noise in production.

If the noise spectrum of a steering system lies outside this profile, the system is returned from the test rig to a re-



[Picture: © Beckhoff]

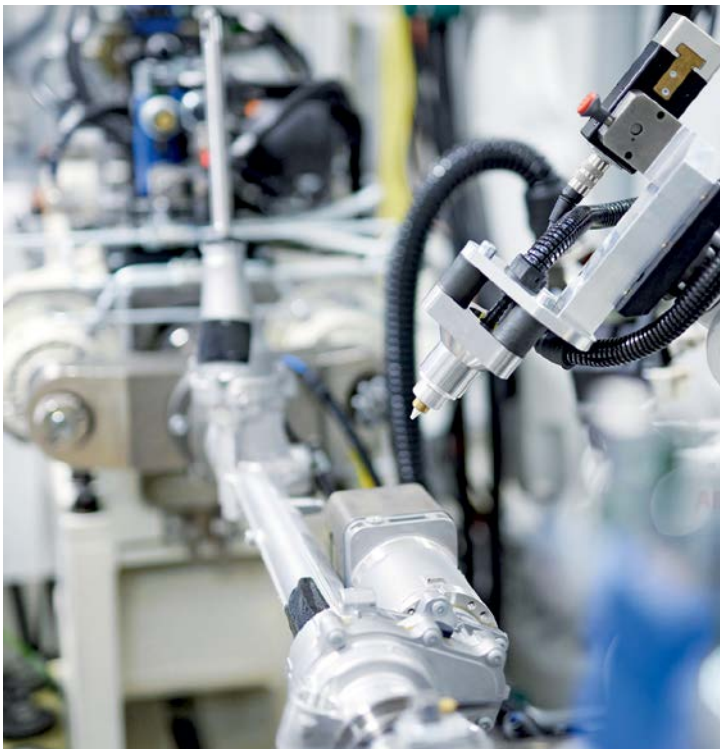
Joachim Sutterlüty (right), head of automation technology at thyssenkrupp Presta, with his team, which designs and automates the test rigs for global steering gear production: acoustics expert Julius Ellmann, electrical engineer Michael Sauerwein, and software expert Karsten Mauersberger. In between (second from left): Maurus Kaelin, sales engineer at Beckhoff Switzerland.

work station, where the measured structure-borne sound spectrum is used to decide whether to rework or disassemble the component. As Sutterlüty says: “With our sensors, and the measurement terminals and PC-based control from Beckhoff, we can evaluate the noise so precisely, enabling the worker to narrow down the cause of the noise accurately based on the displayed spectrum.”

Measuring structure-borne sound

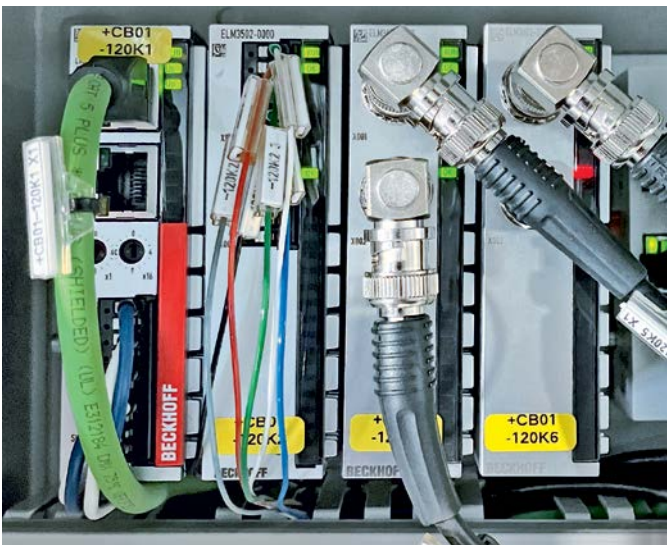
A large number of tests on prototypes are needed before a noise profile like this can be developed. Accordingly, thyssenkrupp Presta has a large number of test rigs in operation in the prototype shop, where the acoustics of a steering system are designed. These must then be followed in the fully automated assembly plant.

“As development is incredibly dynamic with frequently changing variants, we need a high level of flexibility,” says Sutterlüty. That’s why Presta designs and automates all test rigs completely in-house, purchasing only the mechanical setup and electrical components. For the latter, the automotive supplier has relied on Beckhoff components for more than 20 years. It now also uses the high-end measurement technology ELM3604 EtherCAT Terminals and the TwinCAT Scope for acquisition of measurement data.



[Picture: © Beckhoff]

With EtherCAT measurement terminals and PC-based control, the high-frequency signals of the IEPE transducers are acquired and recorded via PC-based control synchronously with the test sequences.



The high-frequency signal acquisition of the IEPE sensors is performed via two- or four-channel ELM terminals (ELM360x) with a galvanically isolated EtherCAT Coupler (EKM1101) and TwinCAT 3 on a C6930 Industrial PC in the central control cabinet.

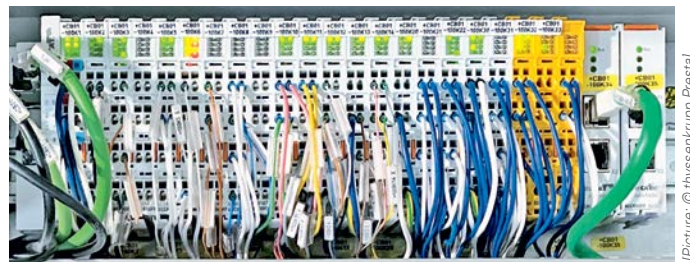
High-end measurement terminals

The previous concept was based on an external system for acoustic testing, which necessitated complex interfaces and signal splitters for the actual test rig control system. Electrical engineer Michael Sauerwein says: "This equipment alone required a separate control cabinet and repeatedly caused problems during commissioning, from complex EMC shielding to double calibration and wiring errors." Additional considerations concerned the project planning, configuration, and programming of the separate system. With PC-based control, EtherCAT, and the high-end measurement terminals, Sauerwein could eliminate these interfaces completely, gaining significant flexibility and time with a substantial reduction in complexity and costs. Sutterlüty notes: "Roughly speaking, we save about 5% of the investment costs per test module."

In 2020, the new concept was intensively tested and examined in an initial testing plant in Eschen. The Beckhoff technology was then integrated into the test field and the sensor signals were tapped in parallel with a previous system to verify the results. thyssenkrupp Presta needed to check if the new measurement technology from Beckhoff would come close to the external system.

Acoustics expert Julius Ellmann comments: "We wanted to see if we could replace the old system with something that would live up to the same measurement quality." Some sensor signals have to be recorded synchronously at a high resolution with 24 bits and up to 20 ksamples/s. The concept tests demonstrated that all the requirements for metrological complexity were met, and at much better value for money. This is because the ELM360x EtherCAT measurement terminals are directly integrated into EtherCAT. They are also very flexible in terms of the number of channels and – with TwinCAT Scope – can be quickly configured for data collection.

"As part of the changeover to ELM measurement technology, we were able to increase the number of measurement channels due to the advantageous price. Together with optimised meas-



Previously, a separate control cabinet was required for acoustic testing. Now, a small number of high-end EtherCAT measurement terminals and other components that fit comfortably into the existing control cabinet are sufficient.

urement sensor technology, we were also able to enhance the measurement quality," Ellmann adds.

Resolving the software interface bottleneck

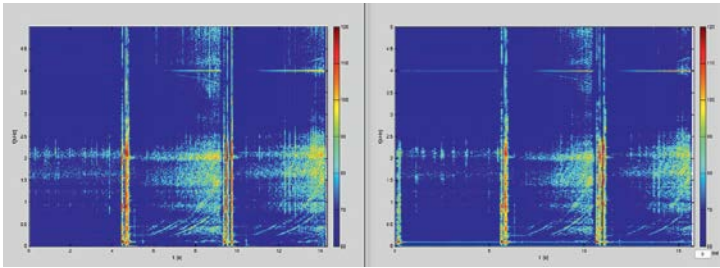
The success of the changeover was due in no small part to the flexibility and openness of PC-based control. This was confirmed when TwinCAT was integrated into the external evaluation software – something that was required because Sutterlüty was not willing or able to dispense with the existing evaluation software from the previous manufacturer, as various departments use functions of the software. Maurus Kaelin, sales engineer at Beckhoff Switzerland, says the TwinCAT Scope API is a powerful interface for reading out the data.

However, it was the interface of the evaluation software that turned out to be a bottleneck. "We had to optimise the software interface so that the data packets could be received and analysed quickly enough," recalls Karsten Mauersberger, who develops the software for the test rigs.

Pascal Dresselhaus, Product Manager for TwinCAT, was on hand with his Scope development team to work with thyssenkrupp Presta and the evaluation software provider and achieve the best possible performance for the application. "Joachim Sutterlüty and his team set out their requirement for a powerful, state-of-the-art interface for data acquisition," says Dresselhaus.

Many TwinCAT users are familiar with TwinCAT Scope only from its integration in Microsoft Visual Studio for measurement data analysis and machine commissioning. However, in addition to the front end in the TwinCAT engineering environment, there is an extensive programming interface (API) for TwinCAT Scope (TE1300). Especially in the .NET environment, this can be used to integrate the charts of a Scope View as a control in the user's own visualisation, for example. This finalises all the charting, including the back end with the Scope Server. Many Scope properties can be used on a highly customisable basis, so, in some cases, it may not even be possible to spot a TwinCAT Scope from Beckhoff performing its role.

In this specific case, however, the API was not used in the conventional manner for the visual display, but instead for relaying the recorded measurement data from the ELM3604 terminals. Using sample code with sophisticated data buffers, smooth integration with the third-party software could be ensured. "In terms of functionality, we could implement the application directly, based on the current state of the Scope API. Our support essentially consisted of writing a kind of best practice for using high-resolution data," says Dresselhaus.



Picture: © thyssenkrupp Presta

The comparison of the external measuring system (right) with the integrated solution based on the precision measuring technology EtherCAT Terminals, TwinCAT, and PC-based control shows practically no difference in accuracy, but there was a big difference in terms of space requirements, project planning work, and costs.

The openness of the software solution was an important criterion for thyssenkrupp Presta. It was especially advantageous when it came to integrating the evaluation software and the many export formats. At the same time, thyssenkrupp Presta retains the ability to use the analysis options available in TwinCAT. "All options are available, particularly those involving TwinCAT Analytics," Dresselhaus emphasises. "We have great engineering products for data analysis with over 100 algorithms. From the cycle times of the test rigs to frequency analyses of noise development, as soon as the data is available in the

Scope format svdx, TwinCAT Analytics can be used to find many needles in the data haystack," he says, highlighting the additional possibilities for thyssenkrupp.

Global rollout

What began around two years ago with an initial concept is now proving itself in practice. In addition to the test rig at the company's headquarters in Eschen, the first systems are already in regular operation at the production plant in Hungary. "Further systems are on their way to China and Mexico or are already being set up there," says Sutterlüty.

Due to the results in the areas of measurement accuracy and test speed, as well as the much simpler implementation and commissioning processes, the concept based on the high-end measurement technology EtherCAT Terminals will form the basis for all further acoustic measurement modules. In future, all new acoustic test systems in the production area will be equipped with it. This is because of the advantages of PC-based control, which means, as Sutterlüty states: "We can completely replace external measurement technology hardware." □

For more information visit: www.beckhoff.com

MEASUREMENT + INSTRUMENTATION : PRODUCTS + SERVICES

New valve technology improves noise reduction

Emerson's new valve trim technology improves noise reduction and flow efficiency. The Fisher™ Whisper™ trim solution leverages additive manufacturing to implement optimised process designs, providing 20% more valve capacity with 10 fewer decibels of noise.

The new trim technology can be used in rotary and globe valves, providing an extension to Emerson's current portfolio of Whisper noise solutions.

Control valve noise is often problematic in industrial applications. It is created by high pressure drops across a valve, which generate high velocities as the fluid moves through the narrowed passages in the valve body. This aerodynamic noise is strongly dependent on the gas velocity, so high flow and high pressure drop applications tend to reach high sound levels very quickly. This type of noise can damage hearing and, over time, it can destroy tubing, sensitive equipment, nearby piping connections, and valve components.

Rotary valves are typically less expensive than globe valves, but they are inherently prone to higher noise levels due to their trim configuration. It is difficult to incorporate a high level of noise reduction into the trim because of the limited available space and other factors, so rotary valves are not usually employed in high noise applications.

The new rotary style Fisher Whisper Trim Technology

addresses this issue, with additive manufacturing used to provide a reduction in sound level of up to 20 A-weighted decibels (dBA), a 10 dBA improvement compared to traditionally manufactured solutions. The improved noise reduction levels are achieved with the high flow capacities common with rotary valves largely maintained and this solution saves significant costs compared to globe valve alternatives.

A wide selection of low noise trims is currently available in globe valves, each using a progressively more complicated trim configuration to produce higher levels of noise reduction. Usually, the more complex the trim style, the higher the noise reduction and cost, and the lower the flow capacity. If high flow capacities are required, a much larger valve body has been necessary when using traditional low noise trim designs.

The new globe style Fisher Whisper Trim Technology addresses this issue by using additive manufacturing to create trim designs with increased flow capacity. Globe valves using this technology have a 20% increased flow capacity compared to traditional trim designs, and still offer noise reduction levels of up to 30 dBA. This means smaller valves can be used where larger sizes were previously required, with related savings in space and costs.

Each of these solutions provides significant noise reduction without the drawbacks of traditional designs, providing users with more options to solve issues related to valve installations where noise is problematic. □

Emerson has introduced new valve trim technology making use of additive manufacturing to improve noise reduction on rotary and globe valves.



Pressure monitoring for tempering machines

Temperature plays a significant role in many product manufacturing processes. Where a tempering machine is used, this is a permanently installed device that is responsible, as an integral component of a production plant, for tempering a mould or chosen tool in the manufacturing process.

The consistent temperature of the tool or mould is a critical factor in the quality of the finished product. Water or oil is most commonly used as a medium for transporting heat, but other fluids can also be used, depending on the application. Tempering machines often serve both a heating and a cooling function.

The medium is brought to a specific temperature and added to the process through a system of pipes. There, the medium transfers the heat or cold as energy. This can then go back to the tempering machine in a closed circuit to top up the used energy once more.

The purpose of a tempering machine is to provide the manufacturing process with the desired temperature and to keep this constant. Temperature sensors are used to check the target temperature.

Keller, which is locally represented by Instrotech, recently supplied a PR-21Y piezoresistive pressure transmitter to a client specialising in developing and producing oil and water tempering machines. The Keller 21Y transmitters are used to ensure pressure monitoring on the tank of the tempering machine. An overpressure, which can result from the heating of the medium, can be prevented with the help of pressure monitoring. A constant pressure of 16 bar is set. The transmitters from the Y range are particularly suitable because they have a very low temperature error range.

Keller's 21Y piezoresistive pressure sensor is weld-



Above: KELLER recently supplied PR-21Y piezoresistive pressure transmitters to a client that specialises in developing and producing oil and water tempering machines.

Right: The KELLER 21Y piezoresistive pressure sensor.

ed, fully insulated and encapsulated with no internal seals. Its robust stainless steel housing and compact design make it suitable for space-critical industrial applications, heat pumps, air conditioning technology, and the food industry. The 21Y's direct analogue signal path with high bandwidth guarantees high, long-term stability.

For more information visit:

www.instrotech.co.za



Thermal imaging cameras without wire grid protection

AMETEK Land, a leading manufacturer of highly accurate infrared pyrometers, scanners, and thermal imagers, has introduced an industry-leading protection design for thermal imaging cameras without the compromise of a wire grid.

This new, proven, protective housing has been developed for thermal cameras in challenging installation conditions and offers distinct benefits in terms of optical clarity, temperature accuracy, improved efficiency and lower maintenance.

Thermal imaging camera housings have to meet impact test requirements, so a wire grid or mesh is typically installed in front of a germanium window, which acts as a protective layer to absorb and disperse impact energy.

Germanium windows are impermeable to ultraviolet and visible light, so, to the naked eye, they have a dark, metallic appearance. In the infrared range, germanium has an excellent, broad transmission range from 2 to 16 μm , which makes it ideal for mid-wave-infrared

(MWIR) and long-wave-infrared (LWIR) applications.

LAND's protective housing uses a germanium window, but without an additional wire grid, and it still meets the Exd impact test requirement. It also reduces exposure to high temperatures and corrosive, outdoor environments, and ensures the thermal imaging camera is not a potential source of ignition.

James Cross, Global Industry Manager for Hydrocarbon Processing Industries at AMETEK Land, said: "Using the grid-less concept on several installations, the AMETEK Land LWIR in EXSH housing provides LAND's crystal-clear images with highly accurate, sensitive, repeatable temperature data. Users increasingly demand higher accuracy temperature values to achieve better yields, improved efficiency, and longer maintenance intervals, and we expect the demand for gridless housing designs to increase with that." □

AMETEK Land's EXSH without a wire grid still meets the Exd impact test requirement.





The new SPECTRO Genesis ICP-OES provides new levels of sensitivity and efficiency.

Upgrades raise the benchmark for entry-level elemental analysis

SPECTRO Analytical Instruments has introduced its new, high-performance high-value SPECTRO Genesis ICP-OES, upgraded with advances that provide greater sensitivity, a new compact design, improved ergonomics, and critical state-

of-the-art technologies.

For many environmental, industrial, and academic laboratories worldwide, the SPECTRO Genesis is a cost-efficient elemental analysis solution for emission and process control applications. The new SPECTRO Genesis is easier to use and delivers greater industrial-grade durability and throughput and is still affordable to buy and operate. Its linear dynamic range allows analysis from parts per billion (ppb) to percent levels. The analyser's new DSOI plasma interface provides significantly increased sensitivity to deliver fast, accurate analysis for a wider range of applications.

The upgrades reaffirm the SPECTRO Genesis as the 'gold standard' among entry-level ICP-OES instruments.

Significantly improved sensitivity is achieved due to its upgrade to SPECTRO's dual side-on interface (DSOI) plasma observation technology. So, dual-view systems' second measurements are unnecessary, matrix effects are reduced, accuracy is improved, and high matrix tolerance allows analyses in lower dilutions – to handle a broader array of applications, including wastewater, industrial wastewater, soil, sewage sludge, wear metals and additives in lube oils, crude oil, distillation fuels, biodiesel – and more.

The new, compact redesign combines ruggedness with a reduced footprint, less bulk, and easier installation on tight laboratory benchtops.

New ergonomics improve usage efficiency with a quick-mount bayonet torch holder for fast and easy torch installations; redesigned connection points to provide barrier-free access, minimised fluid paths for optimal operational simplicity and speed; and an optional Intelligent valve system for quicker loading of samples.

New solid-state line-array detectors are based on complementary metal-oxide-semiconductor (CMOS) technology. These read trace elements' low signals, deliver high dynamic range, don't need on-chip cooling, and eliminate blooming.

The ultrafast readout delivers shortest integration time of 0.1 milliseconds (ms) and allows greater dynamic range to measure high signals of intense spectral lines without difficulty.

An updated laterally diffused metal oxide semiconductor (LDMOS) generator delivers up to 1 700 W of proven solid-state power. This provides plasma robustness for high matrix compatibility – enabling low or no need for sample preparation, the ability to run samples at lower dilutions, and better limits of detection.

To save gas and energy, users can set the system to automatically turn on, begin standby low-level gas purging, and other such processes, at predetermined times.

In addition, to ensure maximum uptime, optimum performance, and the longest possible equipment life for all SPECTRO elemental analysers, AMECARE Performance Services provides high-value, customised support with experienced service engineers in 50 countries. □

Measuring rotating consistency for pulp and paper producers

Valmet has redesigned its rotating consistency measurement transmitter – Valmet Rotary – for pulp and paper producers. With the latest technology, a new user interface and easier maintenance, the transmitter continues to offer highly accurate fibre consistency measurement for critical applications.

"Built on well-known technology and long experience, the new measurement instrument is robust and built to last. The patented technology provides for rapid measurement response and fast reaction to consistency variations," says Sami Laaksonen, Product Manager, Automation Systems business line at Valmet.

Reliable fibre consistency measurement

The redesigned Valmet Rotating Consistency Measurement has a new mechanical design and an electronic solution to improve reliability. With its high sensitivity, this third generation version is as accurate as the previous

one and offers the further benefits of simplified design which makes on-site maintenance easier and faster for low overall lifetime costs.

Based on shear force measurement technology, Valmet Rotating Consistency Measurement maintains high performance even in challenging environments with high temperature or pressure and abrasive chemicals. The modular design provides for universal use covering a consistency range from 1.5 to 16%.

New user interface

Commissioning, calibration, and operation have been enhanced with a new Valmet Link user interface, a flexible platform which can also serve secure remote connection. The graphical display and a clear menu structure, make setup and operation fast and easy. The intuitive user interface and bigger display enable easier calibration and provide a better overview of the calibration data. The user interface is prepared for different communication protocols and can be updated for future functionalities. □

Valmet Rotating Consistency Measurement and Valmet Link user interface.



Understanding SIL ratings

Worldwide, major industrial accidents like the Bhopal chemical plant disaster, which resulted from a gas leak at the plant in India in the 1980s, have usually occurred due to substandard operating and safety procedures and insufficient and poorly designed safety systems. Safety Integrity Level (SIL) ratings were first introduced as part of IEC 61508 in 1998 and seek to quantify the probability of dangerous system failure. Here Gary Bradshaw, Director of critical alarm specialist Omniflex, explains how SIL ratings work and clarifies some of the misconceptions that exist around them.



Gary Bradshaw,
Director, Omniflex.

Functional safety, as defined by IEC 61508, is the safety that control systems provide to an industrial process or plant. Its purpose is to prevent both direct and indirect risk to human life that could result from those industrial processes, including risk caused by damage to equipment, property or the environment. Functional safety is an important focus area across the industrial spectrum, from petrochemicals and tank farms to oil and gas and nuclear safety.

One metric used to assess the risk of unsafe failure in industrial settings is SIL – safety integrity level – ratings, which correspond to the frequency and severity of hazards. They describe the probability of failure on demand (PFD) and the performance required for a safety instrumented function (SIF) to maintain safety.

The ratings range from SIL-1 up to SIL-4 and the higher the level, the higher the associated safety and the lower the probability that the system will fail to perform. However, the installation and maintenance costs, as well as the system complexity, typically increase with the SIL rating. The levels are distinguished by their acceptable rate of failure, which increases each time by a factor of ten: SIL-1 systems accept one failure in every ten demands; SIL-2 systems accept one failure in every 100 demands, and so on.

Bigger isn't always better

A common misconception is that higher SIL ratings are always superior for every application. Although SIL-4 does offer the highest reliability, the complexity involved with redundant backup systems, more regular performance testing and hierarchical voting arrangements can be unwieldy and over-expensive if this level of safety is unnecessary.

The correct SIL rating is application dependent. For example, if the plant can rely on a human operator to take action on an abnormal condition, as indicated by an alarm annunciator alert, then a SIL-1 system is sufficient. Notably, a safety loop requiring human intervention cannot be rated above SIL-1 as systems are required to operate independently of operators for SIL-2 and upwards.

While the most critical applications, such as aircraft flight systems or nuclear reactor protection, require SIL-4 protection, correct safety analysis during the design stage is the key to determine the minimum acceptable SIL rating. Adhering to this recommendation will provide an adequate level of functional safety and maintain cost effectiveness.

Evaluating instrumentation

Independent validation of safety instruments is an important



Above: An alarm annunciator panel. Alarm annunciator systems provide a critical layer of protection in ensuring plant safety.

Right: Alarm action: if the plant can rely on a human operator to take action on an abnormal condition, as indicated by an alarm annunciator alert, a SIL-1 system is sufficient.



factor for customer confidence in every industrial sector. Evaluation International (EI), a member owned, not-for-profit organisation, offers consultation and evaluation services for electrical, control and instrumentation matters.

In March 2007, EI evaluated Omniflex's alarm annunciator unit, the Omni16C, and found that it passed the various functionality tests, and that the results were in accordance with Omniflex's specifications. Reports like the one written about the Omni16C are useful for facility planners and functional safety managers, as they provide reliable information about validated and qualified instrumentation.

Alarm annunciator systems provide a critical layer of protection in a plant's safety strategy. They provide operators with early warnings of abnormal conditions arising and thus can enable human logic-driven intervention, facilitating action before hazards take effect. SIL ratings have been an important metric for industrial functional safety for 25 years, but misinterpretations about their application still circulate. To avoid incurring unnecessary cost and complexity, it's important for facility planners and managers to work with safety system suppliers who fully understand safety integrity levels and their appropriate application. □

For more information visit: www.omniflex.com

Fire safety for lithium-ion batteries

SafeQuip, a leader in innovative fire safety solutions in South Africa, is spearheading effective lithium fire extinguisher solutions in the country.

With the use of lithium-ion batteries increasing in many types of portable devices and battery storage solutions, lithium-ion battery fires have emerged as a growing risk worldwide. In South Africa, as the country progresses towards greener energy solutions and increased off-grid power system installations, the same challenges arise.

Stakeholders, including insurance providers and fire departments, are taking proactive measures to address the rising risks of lithium-ion fires.

Pierre Malherbe, Managing Director of SafeQuip says, "Without a fire class structure in place for lithium-ion batteries and due to the severe risk posed by thermal runaway in the batteries, risk mitigation and the use of tools that are available to combat these fires effectively is being discussed and documented across all sectors globally. As more knowledge is shared and standards and protocols are being developed, it is important to verify and test the ability of products to combat, suppress and prevent re-ignition of lithium-ion battery fires effectively."

Currently, many products are being developed and marketed in this field, Malherbe says, and it is important that each new product has been correctly certified and verified according to the local regulations, standards, and test protocols. He emphasises that as part of this verification, as well as testing the product's effectiveness in suppressing and extinguishing fires, effective prevention of re-ignition should also be tested. Independent testing has shown that although many products can suppress and/or extinguish a lithium fire they are not always effective in preventing re-ignition – and this can happen after minutes, hours or even days if the agent used is not fully effective.

SafeQuip has been working with AVD Lithex over the past three years to address this critical issue. This partnership journey has involved, among other things, advocating amendments to the SANS 1910 standard to enable the use of water-based extinguishing agents – a milestone achieved when the revised standard was published in November 2022.

Subsequently, SafeQuip submitted product samples to BSI and has worked steadily towards certification through much of 2023. Once it has certification in place,



AVD Lithex has extended its fire extinguishing technologies to fire blankets that can withstand temperatures above 1 000°C.



SafeQuip is pioneering the development of a SANS 1910-approved lithium-ion battery fire extinguisher in South Africa.

SafeQuip will offer the only SANS 1910-approved fire extinguisher with lithium fire extinguishing capabilities in South Africa.

AVD Lithex holds approvals in several countries and carries well-recognised certifications, including BSI certification, the CE mark, EN 3.7 approval, Apergaz module B approval, NTA 8133 KIWA test, and tests with UL are ongoing. This positions SafeQuip's product as inherently compliant with the requirements in South Africa for safe equipment. Based on vermiculite, the patented technology distinguishes the SafeQuip product from others on the market. It boasts three critical features in combatting lithium-ion battery fires: cooling and encapsulation, preventing propagation, and preventing re-ignition.

Although various products, such as water mist and gel-based media, are claimed to suppress fires effectively, the final test lies in the prevention of re-ignition. SafeQuip's lithium fire extinguisher has met this stringent criterion, having successfully passed the KIWA test, which is recognised internationally as a key indicator of re-ignition prevention.

AVD Lithex has extended its groundbreaking technology to fire blankets, creating a versatile blanket that can withstand temperatures above 1 000°C – a valuable tool for containing fires until they self-extinguish.

The South African Qualification and Certification Committee (SAQCC) rightly asserts that currently, no lithium fire extinguisher in South Africa complies with SANS 1910 and none should be serviced. However, SafeQuip is leading the way to deliver a SANS 1910-approved fire extinguisher with lithium fire extinguishing capabilities, which will be a significant development for the South African market.

SafeQuip and AVD Lithex are committed to advancing fire safety standards in South Africa and globally, ensuring that the risk of lithium fires is mitigated effectively. □

Industry-first automated robot charger for safety in underground mines

ABB, in partnership with mine operators Boliden and LKAB, has successfully completed testing of the industry-first automated robot charging technology for underground mines. The goal is to make mines safer by automating one of the manual processes remaining in mining: charging the blasting holes with explosives.

Blasting schedules in underground mines can vary, but the process takes place up to 15 times a day in larger mines, as miners expand the chambers to extract mineral and metal ores. ABB Robot Charger automatically detects boreholes and fills them with charges without needing human assistance and thus removing the need for people to be near the unsupported rock face during blasting sequences.

The completed testing phase confirms the effectiveness of integrating the robot charger with a carrier vehicle, communication with bulk emulsion and vision systems and incorporation of a second robot arm to assemble prime and detonator. It ensures full reach to all borehole levels and areas of the rock face and confirms remote control for operators.

The test programme was undertaken at Boliden Garpenberg, which is the world's most productive underground zinc mine. It is located 180 km northwest of Stockholm in Sweden.

ABB is now embarking on the final stage of development in which it aims to execute the full blasting sequence in the underground mine with full control of the robot handed over to the customer. ABB is also starting discussions with other mine operators to join the co-development project, so the technology can be tested in different mine environments and in regions outside of Northern Europe with varying climates and rock composition.

"This is a significant technology development for ABB and the wider industry where safety is part of the overall ESG (environmental, social and governance) commitments," said Vedrana Spudic, Head of Technology, Business Line Mining at ABB. "The robot locates the drilled holes on the rock face using a vision system, and these recent tests show all can be reached and charged with the cycle fully automated. This removes the need for human operators to be in the small, unsupported area right at the face."

ABB developed the robot charger technology with vision systems and automation solutions to communicate with the truck, crane and ABB industrial robotic arm. The solution can be retrofitted to any truck.

ABB draws on 130 years of experience in the mining industry and is a pioneer in the integration of electrification, automation and digitalisation in mining.

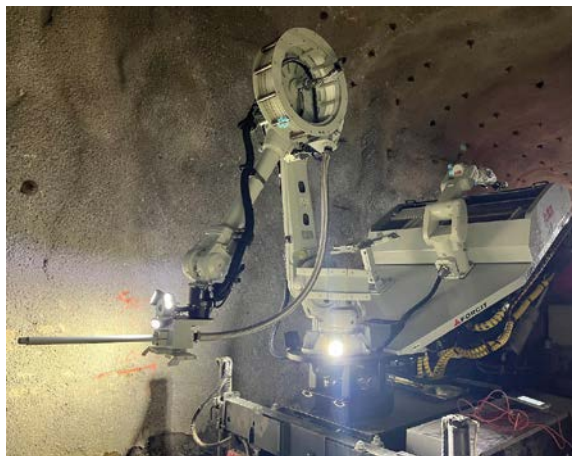
For more information visit: go.abb/processautomation



The ABB Robot Charger detects drilled holes in a rock face and installs explosive charges during mining operations.



The robot charger ensures full reach to all borehole levels and areas of the rockface.



The technology includes vision systems and automation solutions to communicate with the truck or crane.

Gas and flame detection – for safe hydrogen use

Hydrogen will be central to the world's energy transition away from natural gas (and other fuels). Although there are many ways to produce and use hydrogen, there is a common denominator: all require monitoring for safety. Teledyne Gas and Flame Detection offers a range of hydrogen safety products including gas, flame and fire detectors, and a complementary range of controllers, services and cloud data management options.

Teledyne Gas and Flame Detection's innovative fixed and portable systems have served to ensure the safe use of hydrogen for decades, and the company today provides a critical contribution to a safe and efficient energy transition. Products, systems and services are available to support the full hydrogen spectrum – from production to distribution and storage – across a host of established and new applications. In addition, a wide range of sensors is available for the main gases in the hydrogen value chain, including methane, ammonia, carbon monoxide and carbon dioxide. Many are suitable for integration into SIL2 or SIL3 systems.

Fixed gas detectors

The DG7-SIL2 intelligent fixed gas detector with integral display is ideal for detecting hydrogen and other gases related to hydrogen and hydrogen derivatives. The microprocessor-driven DG7-SIL2 is fully configurable using a wireless handheld terminal or a hard-wired HART option, providing flexibility for the installer and reduced service costs. The unit can interface directly with a range of panels, controllers and PLCs.

Another option in fixed gas detectors is the OLCT 100-SIL2, which offers different housings and sensors for the full hydrogen value chain. The OLCT 100-SIL2 is supplied with a 4-20 mA output and carries SIL certification in accordance with EN 50402.

Part of the same product family, the compact OLCT 20 fixed gas detector is suitable for installation in shelters or on skids, where there is a need for monitoring in very small spaces or for on-board applications. The OLCT 20 transmitters again provide a 4-20 mA output with the potential for direct connection to PLCs.

Flame detectors

Many customers ask if they can use their existing natural gas flame detector with hydrogen. However, many flame detection systems for use in hydrocarbon processing just 'see' combustion products such as water, soot or carbon dioxide. When pure hydrogen burns it forms only water, making it necessary to use special flame detection equipment.

In this field, Teledyne GFD has introduced the Spyglass IR3-H2-V flame detector which quickly detects hydrogen and other 'energy transition' fires to support rapid response. A near-infrared camera enables personnel to see invisible hydrogen flames in all weather and light conditions. Additionally, the detector automatically



Teledyne Gas and Flame Detection offers a comprehensive portfolio of hydrogen gas and flame detection systems.

records video, providing a reference to study the cause and development of fires.

For networks of wired or wireless gas and flame detection equipment to enable integrated site safety strategies, a controller is needed. Here, the Teledyne GFD modular and flexible MX62-SIL2 features a large, fully interactive 10" (up to 15") high-definition colour touch-screen, 64 secure channels and a backup processor to ensure continual measurement.

Portable gas leak detectors

Portable gas detection equipment is ideal for use by personnel working in locations where compressed hydrogen is present and could leak. Hydrogen has a wide flammability range in air: from 4% to 74% at atmospheric pressure. To ensure safety at all times, Teledyne Gas and Flame Detection portable gas detection systems have an alarm at 50% of the LEL, or 2% hydrogen.

Among the latest developments is the versatile GS700-Hydrogen, an upgraded version of the popular Gasurveyor 700 (GS700) that includes the ability to detect hydrogen. The new ATEX-certified GS700-Hydrogen thus offers natural gas and hydrogen detection in a single instrument. It is useful for leak detection around major equipment, large sites, and pipeline installation and maintenance, and offers an optional GPS mapping system. Data can be stored and processed from the field in Teledyne GDCloud software to map the location of measured data and pinpoint the geo-location of any leaks. The device, which offers the benefits of flexibility and performance in all gas utility applications, is already in use at several hydrogen network test sites.

Personal safety gas monitors

Teledyne Gas and Flame Detection also offers a range of wearable devices for monitoring hydrogen, ammonia and all major gases relating to the hydrogen value chain. For example, the PS200 four-gas compliance monitor is compact, lightweight, water resistant and particularly robust, and the larger PS500 model provides the potential to detect up to five gases.

There will be many roads to the hydrogen economy, based on decarbonisation and new applications. While there are some concerns in the market about hydrogen's tiny molecules that can leak through the smallest cracks, Teledyne GFD has the expertise and solutions to render hydrogen a very ordinary gas. The company has been working with customers for decades to ensure the safety of personnel and assets when handling hydrogen. It offers a comprehensive portfolio of hydrogen gas and flame detection systems. □

Effective control of air pollutants in mining

Creating a work environment that prioritises workers' wellbeing is top of mind for mine owners today. Johan Snyman, Mechanical Engineer at BBE says, in the context of effective mine ventilation, supporting this ethos requires a clear understanding of how employees may be exposed to air pollutants, what pollutants they may be exposed to, and how exposure can be minimised to ensure healthy working conditions. Combined with this, stricter enforcement of health and safety regulations by government institutions over the past five to 10 years has prompted many mines to adopt a proactive approach to managing airborne pollutant exposure by implementing effective control systems.

Snyman explains that standard dust and fume control is typically done with dust and fume suppression systems, and one of two types of ventilation systems are generally employed – a point extraction or local exhaust ventilation system, or a general ventilation system designed to prevent worker exposure to dust and fumes.

Although the principles of these systems are generally well understood, specialists that address the issue of harmful airborne pollutant exposures proactively should be consulted in the design of general ventilation controls and the design and installation of new dust and fume suppression systems. This involves incorporating monitoring systems as part of ventilation solutions, and planning and designing systems to reduce, significantly, the possibility of harmful 'liberation' of and exposure to airborne pollutants.

To support safe mining operations and ensure workers return healthy and safe after each shift, the implementation of effective solutions that mitigate the risks of harmful airborne pollutant emissions is essential.

Innovative technology

Generally, airborne pollutant control specialists are qualified, experienced, independent, and knowledgeable engineers who understand the mechanisms of airborne pollutant liberation and the systems that can be implemented to minimise workers' exposure. Identifying

and addressing potential problems during the design phase is key to mitigating exposure risks that may arise.

The concept of ventilation, extraction and suppression systems is not new to the industry and appropriate technologies are generally well-known and widely implemented. There is, however, a constant push to innovate and to streamline airborne pollutant control and capture systems for efficiency and effectiveness. For instance, in dust suppression systems, where water spray is used, work is being done to improve the efficiency of these systems by studying various spray and suppression technologies to fully understand and characterise the fusion of dust and water particles. Additionally, by analysing a representative dust sample from a specific mining operation, application-specific systems can be designed and optimised to eliminate specific particle sizes and ensure optimal performance.

Accurate simulation

Work is also being done on the design of general ventilation and point extraction systems using computational fluid dynamics (CFD) ventilation and particulate flow simulation software. In this way, engineers can mathematically predict airflow and contaminant release behaviour and produce visual outputs. Real-time results can be produced and accurate simulations generated of any conceivable scenario, representative of fume or dust propagation, and in any section of an operation. CFD also supports the enhanced design of ventilation control systems suitable for a particular environment, taking particle carry velocities into account, for example, and can determine a system's effectiveness before purchase and installation costs are incurred.

These are just some of the new technologies that specialists are using today to design and implement innovative solutions for increased efficiency and effectiveness of airborne pollutant control systems. Because dust and fume generation are unique to a particular process, innovative and considered solutions are required for each process, to ensure maximum capture and control and minimum harm to mine personnel. □



Johan Snyman,
BBE Mine
Ventilation
Systems.

Increasing competition in speciality gases market

Towards the end of 2023, leading supplier of speciality gases, Afrox, was awarded ISO 17025:2017 accreditation by the South African National Accreditation System (SANAS). This confirms that Afrox's laboratory and technicians are officially recognised by the government of South Africa as competent to provide speciality gas mixtures to exacting tolerances and standards to meet market needs.

The ISO 17025:2017 accreditation for Afrox means medical laboratories and the environmental, construction, power supply, automotive, materials and chemicals industries, among others, now have a wider choice of

suppliers. Regulations require that all companies use only accredited standards of calibration gases to calibrate their emissions detection instruments.

Afrox Senior Director of PGP & Healthcare, Marius Kruger, said: "This accreditation will allow Afrox to enter new markets and offer superior products and services to those currently available in South Africa. It is also a development that is beneficial for many companies in that it opens up competition in the calibration gases space and offers customers more choice to the highest of standards."

The ISO 17025:2017 accreditation also confirms that the Afrox laboratory operates reliably. □

Creating safety applications with TSN functions

At SPS – Smart Production Solutions 2023, held in November 2023, at Nürnberg Messe, Nuremberg, Germany, the CC-Link Partner Association (CLPA) introduced new products and services for the development of safety devices with CC-Link IE TSN connectivity. This addition to the existing offering, supported by CLPA members Mitsubishi Electric and Neuron Automation, will help drive the implementation of effective, convergent industrial automation applications for functional safety.

The CC-Link IE TSN development ecosystem consists of a broad range of software and hardware tools to help automation vendors create compatible products. The latest addition to the ecosystem is Mitsubishi Electric's safety protocol stack, which is TÜV certified to meet IEC 61508 standards and can therefore support applications with safety integrity level (SIL) requirements up to SIL3. This enables industrial automation vendors to create safety devices compatible with CC-Link IE TSN.

The safety protocol stack now available enables device manufacturers to develop fail-safe devices for safety ecosystems in CC-Link IE TSN converged networks. This, in turn, reduces costs and effort for machine and plant builders by allowing standard control data, fail-safe application data and non-time-critical data such as video streams, to be transported simultaneously over one network via CC-Link IE TSN.

Andreas Pfaff, Division Manager - European Development Centre at Mitsubishi Electric, says: "There is an increase in demand for safety solutions and industrial automation products that make Industry 4.0 real. With this latest development option for CC-Link IE TSN, we address both needs as it will drive the delivery of devices and systems that can ensure functional safety and communicate over cutting-edge networks."

As a pre-certified component, the safety protocol stack helps in the design and creation of devices with SIL ratings. It reduces the expensive and lengthy work of having to develop and certify embedded safety code in-



There is increasing demand for safety solutions in industrial automation products.

house, streamlining development, certification and validation activities. In addition, automation vendors based in Europe will be able to benefit from extensive, localised assistance from Neuron Automation.

The company has a proven track record of providing a comprehensive toolkit for the creation of engineering solutions, including firmware and hardware development for safety systems. As a partner, Neuron Automation can support the reduction of time-to-market and associated costs while helping de-risk safety projects.

Robert Mühlfellner, Chief Technology Officer at Neuron Automation, comments: "Advanced safety solutions are in high demand globally, and we are pleased to help companies deliver them. SIL2 and SIL3 applications are growing. Our ability to help companies adopt the new safety stack from Mitsubishi Electric will help them quickly develop competitive products to meet customers' needs."

John Browett, General Manager at the CLPA Europe, says: "With this latest solution and service offering we can help industrial automation players drive the implementation of effective safety communications over converged CC-Link IE TSN networks, enabling the economical setup of connected, smart factories." □



The Guardmaster Lifeline 5™ range of cable-pull switches provides for improved safety of personnel and equipment.

Lifeline cable-pull switches increase safety

The Allen-Bradley Guardmaster Lifeline 5™ range of cable-pull switches available from Referro Systems provides for improved safety of personnel and equipment and supports an extended lifespan for conveyor systems operating in tough site conditions.

Adrian van Wyk, Managing Director of Referro Systems, notes: "Traditional cable-pull switches are prone to nuisance trips and unreliable operation due to temperature-based changes in cable tension, or slack cable pull systems,

as not all systems are tensioned. The solid-state operation of the Lifeline 5™ offers an electronic monitoring system to compensate for thermal expansion and cable sag and provide for tensioned systems to 'understand' the difference of the pull cable being present or not. The rugged safety switches are designed to improve safety without sacrificing productivity."

Available in die-cast aluminium or stainless-steel housings with IP66 and IP67 (IP69K) ingress protection ratings respectively, the

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Safety light curtains protect machine operators

Turck Banner's safety light curtains are available in a wide range and can be selected for a variety of safety and risk applications, whether in harsh industrial conditions or where the need is for compact units to be used in tight spaces. They are built to withstand challenges commonly found in manufacturing and packaging environments and different resolution options are available to detect – and protect – workers and their fingers, hands, arms, or legs.

The Type 4 Safety Light Curtains protect personnel from injury and machines from damage by guarding points of operation, access areas and perimeters. Type 2 Safety Light Curtains offer a cost-effective light curtain safety solution to guard lower-risk applications, where an accident would cause only a slight injury.

EZ-Screen Safety Light Curtains from Turck Banner are intuitive and easy to use and set up. They allow end-to-end sensing and units can be cascaded where necessary. Each EZ-Screen is encased in a heavy-duty aluminium housing with a recessed window to avoid damage in harsh environments. An IP69 hygienic model is also available, suitable for use in washdown environments. The EZ-Screen also allows for highly visible alignment and diagnostic indicators.

Type 4 Heavy-duty light curtains

The robust design of the EZ-Screen LS-S and LP range makes these heavy-duty light curtains the right fit in large robust applications that require sturdy safety devices and heavy-duty enclosures. In hygienic tubular enclosures, the EZ-Screen LS, effectively protects operators from injury and remains hygienic for easy cleaning procedures.

Type 4 Compact light curtains

The compact safety light curtains are suitable for smaller machines and other areas where space is constrained. The SLC4 models are Type 4 safety light curtains specifically designed to safeguard smaller points of operation

and access on compact machines. The EZ-SCREEN LP safety light screen is compact and can be mounted in tight spaces to provide continual end-to-end sensing that leaves no gaps.

Very compact Type 4 light curtains

The LP Series and SLC4 Series are designed for simple applications. LP Series full feature and basic compact Type 4 models are space-saving units with compact housing, which makes them suitable for use on smaller machines and in constrained areas. Models are available in 14 and 25 mm resolutions and lengths of up to 1 250 mm with no 'dead zone'. The Basic Series offers cost-effective safety light curtains for simple applications requiring a basic feature set.

The SLC4 safety light curtains are the shortest, most compact safety light curtains in the range. They are designed to safeguard points of access and operation on smaller production machines and similar equipment.

The Type 2 series is suitable for lower risk applications where only minor injuries might occur. These units are available in lengths of 30 mm up to 1 800 mm lengths.

SGS safety grid system

Light grids are suitable for various access and long-range perimeter guarding applications, using two, three, or four beams to protect personnel and machinery.

Brighter illumination for visual management

Turck Banner's growing selection of LED light fixtures, tower lights, indicators and actuators shine bright to provide top-quality illumination, clear status indication and operator guidance. They also offer the low-power, long-life, maintenance-free advantages of LED technology. □



Heavy-duty Type 4 robust safety light curtains are designed for use in harsh environments.

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Lifeline 5™ safety switch helps optimise productivity by combining high reliability with diagnostics that can help prevent unplanned downtime without compromising safety. The die-cast aluminium model also offers an optional, integrated E-stop button for more application flexibility.

"As the Lifeline 5™ is a solid-state switch, the mechanical wear often associated with traditional switches is mitigated providing for increased uptime with improved safety over a longer lifecycle. So it enables savings on maintenance and improves the lifespan of the conveyor belt system," says van Wyk.

The Lifeline 5™ safety switch provides constant access to the E-stop function, enabling a machine to be stopped when a hazard is detected with a simple pull of the at-

tached cable or a push of the onboard E-stop button. The patented, microprocessor-based solution simplifies setup and allows for more efficient maintenance and troubleshooting. The easy-to-see 270° LED integrated indicators assist in cable tensioning for quick, precise setup and provide clearly visible switch status and diagnostics during operation.

With the same bolt pattern as previous Lifeline 4™ versions, the Lifeline 5™ cable-pull switches can be easily retrofitted into an existing Lifeline 4™ system, with 270° LEDs for set up and diagnostics. The new switches feature a cable span of up to 100 m and have an extended operating temperature range. They are internationally certified and designed to match local operating conditions, providing safety for personnel and machinery in a single device. □

OHS in risk-sensitive industries

In today's complex, fast-paced work environments, paying attention to occupational safety and health regulations is essential. Louise Woodburn, General Manager of KBC Health & Safety, Risk Solutions says, "By collaborating with providers of specialised risk solutions, organisations can ensure the proper consideration and implementation of health and safety procedures mandated by law, with the effect of improving occupational health and safety practices that contribute to safer and healthier workplaces."

The risks of non-compliance

The Occupational Health and Safety Act (OHSA) sets out the legal requirements for employers to ensure the health and safety of their employees. The legal consequences of non-compliance with occupational safety and health regulations in South Africa are serious. Businesses that fail to comply with the OHSA risk being fined, imprisonment of responsible parties, or having their workplace closed. Non-compliance can also have negative consequences related to the workforce. Employers may be liable to pay damages to employees (or their dependents) who are injured or killed as a consequence of the organisation's non-compliance with regulations. Productivity may be reduced due to downtime caused by accidents or injury. There is also the very real risk of reputational damage, which can be severe, given the speed at which negative news travels, and this makes it difficult to attract and retain customers and employees.

Navigating the regulatory landscape

In an ever-changing regulatory landscape, partnering with a specialised risk solutions provider to ensure compliance with Occupational Health and Safety (OHS) regulations is one of the most effective strategies for improving occupational health and safety in risk-sensitive industries. In some fields, the risk of accidents is increasing as technology advances and work environments become more complicated. A specialised risk solutions provider can assist businesses to identify and mitigate risks, and develop and implement tailored, contextual, safety plans that will protect employees and help businesses to protect their reputation.

Professional partnerships

For risk-sensitive industries such as mining, bypassing critical safety processes can hold potential long-term ramifications. Partnering with a professional solutions provider enables an organisation to identify risk exposures and determine the necessary response measures based on a hierarchy of controls. Furthermore, the organisation can ensure its workforce participates in comprehensive training programmes that encompass risk assessment, hazard identification, emergency response planning, and essential compliance requirements.

Using KBC Health & Safety's Risk Solutions services assists businesses to achieve a sustainable compliance



Louise Woodburn, General Manager of KBC Health & Safety.



Sian Thurtell, Chief Operating Officer at KBC Health & Safety.

cycle. KBC follows a detailed development approach to ensure the solutions are customised to industry- and business-specific requirements. "Our aim is to empower stakeholders with the knowledge and tools to make prompt and confident choices regarding safety in the workplace," says Woodburn.

Motivating behavioural change for safety

Woodburn's colleague, Sian Thurtell, Chief Operating Officer at KBC Health & Safety notes that it is important to establish internal risk management control processes that align with specific strategic management outcomes.

She says KBC believes two core aspects underpin effective Operational Risk Management Processes (ORMP): alignment and attunement. "Alignment creates a shared understanding of risk management across all levels of the organisation, without which, sustainable behavioural change in workplace safety is not possible. Attunement requires a cognitive shift which arises from alignment and motivates learners to apply their training in the workplace – and this can be done through gamification and fun, inspirational experiences."

Programme methodology

Thurtell goes on to say that to ensure technical safety terminology and operational risk management are understood at all levels of the organisation, KBC has found Cognitive Behavioural Therapy and Systems Learning to be an effective foundation for ORMP. "The objective is to create sustainable behavioural change and foster an agile risk management culture throughout the organisation. Our programmes incorporate blended learning to guide learners to an understanding of the necessary safety behaviours, motivating them to adopt new safety behaviours and instilling the belief that they can behave differently."

Safety at every level

KBC takes a hierarchal approach, from executive to operator level, to help employees develop a fresh perspective, identifying hazards and implementing appropriate controls to mitigate potential risks within their environments. Engaging with subject matter experts, it develops crucial risk-level-specific programmes that break down complex terminology and techniques into manageable modules.

Continued on page 27

Regular testing reduces substance abuse in the workplace

Alcohol and substance abuse is not the type of problem that waits until after working hours. Rhys Evans, Managing Director at ALCO-Safe, emphasises that it has significant implications in the workplace for productivity, safety and employee well-being, particularly when people are 'on the clock'. Many organisations have stepped up company policies, putting in place increased testing and reporting protocols to prevent, detect and manage substance abuse among their workforces. When undertaken with a proactive and preventive approach, rather than a punitive one, there is a clear correlation between the increased adoption of testing and reporting protocols, a decline in positive results, and a decrease in alcohol and substance abuse in the workplace. The result is a favourable transformation of workplace culture, fostering a healthier, safer and more productive environment.

A policy-based approach

A critical step in addressing intoxicating substances in the workplace is the implementation of a written policy that clearly states the company's stance on alcohol and drug abuse and details the consequences of contravention, as well as outlining the measures that will be taken to test and enforce the policy. In addition to investigative and disciplinary measures, companies also have a duty to educate their workforce on the dangers of substance abuse, and to offer the appropriate levels of support for employees who find themselves with a problem.

Enforcing safety: testing for alcohol and substances

In industries where intoxication poses a significant risk, regular testing using breathalysers for alcohol, or saliva testing for chemical substances, is essential. In terms of logistics and costs, compulsory alcohol testing of each employee at regular intervals throughout the day is more feasible than compulsory drug testing. Thus, each organ-

isation has to test for drugs according to its policy, and consistency is key to achieving a deterrent effect.

Compulsory versus random testing

Evans presents the example of one company that examined the impact of different testing approaches for alcohol testing across its two operational sites. One site enforced compulsory testing for all employees, and the other conducted random tests. Interestingly, the site with random testing had a higher rate of positive test results, despite conducting only a fraction of the tests compared to the site that conducted compulsory testing. This can be linked to the powerful deterrent effect of compulsory testing. Individuals at the site where compulsory testing was conducted, were aware that they would be tested every day, and this reduced the likelihood of their engaging in risky behaviour significantly. On the other hand, the element of surprise in random testing created a sense of uncertainty among employees and although this led to a higher number of positive tests, this was not the desired outcome. The goal is always to minimise positive results, as this shows that alcohol and substance abuse are declining.

Technology drives intelligent intervention

Technology can be of valuable assistance in addressing substance abuse in the workplace. The integration of cloud technology, biometrics, and analytics capabilities, for instance, previously not available to be used with testing procedures and results, can make a difference.

For example, cloud-based cooperation provides a cloud-based platform that enables real-time, secure data sharing, which can be used to report, store, and make results accessible. This ensures that nothing falls through the cracks, even across operational sites that are spread out geographically.

Biometric identity authentication enables quick and secure identification of individuals undergoing testing with fingerprint or facial recognition. It saves time and ensures accurate results. Reporting plays an important role in ensuring compliance and reducing manipulation of the testing process.

Prevention, intervention and support

In the ongoing battle against alcohol and substance abuse in the workplace, technology and increased testing play instrumental roles. By leveraging innovative solutions and a consistent approach to testing, organisations can witness a noticeable decline in such issues. The commitment to addressing alcohol and drug-related problems demonstrates a strong dedication to employee well-being, workplace safety, and business success. With the right policies, procedures and technological measures in place, organisations can foster a culture that supports prevention, intervention, and support, ensuring the well-being and productivity of their workforce. □



*Rhys Evans,
Managing
Director at Alco
Safe.*

Continued from page 26

Making theory practical

An engaging learning experience is key to ensure employees understand their role in the risk management process, regardless of their level or scope of operation, and to apply what they have learned in the workplace.

Learn, apply and reflect

Senior-level training may include elements of personal reflection on their own behaviours in the work environment and the analysis of critical-impact case studies. "This 'golden thread' provides a reality check that runs through all our programmes; it is powerful in terms of attunement," says Thurtell, "and it promotes a sense of shared responsibility for safety across all levels." □

Shortlisted for the Africa Prize for Engineering Innovation

Sixteen innovators from eight African countries, including Botswana for the first time, have been shortlisted for the 10th Africa Prize for Engineering Innovation. The shortlist was announced at the end of November 2023.

The Africa Prize, launched in 2014 by the UK's Royal Academy of Engineering, demonstrates how ambitious engineering innovators are addressing local, pan-African and international challenges, protecting the environment and transforming the continent's economy through scalable solutions. Africa Prize innovators are working across diverse sectors, adapting food and water systems for climate resilience, developing low-carbon energy and transport solutions, and improving telecommunications, education, financial services and healthcare.

Shortlisted innovations for the 2024 Africa Prize include roof tiles made from recycled plastic, early detection of agricultural pests and diseases, environmental monitoring of chicken farms, and a fabric made from fungi grown on human waste.

Also featured are innovations aimed at healthier methods of cooking, including low-smoke briquettes made from biowaste, a solar-induction oven and hob, and a bi-digester that uses organic waste to generate gas. Clean energy solutions include a large-scale power pack made from repurposed electric vehicle batteries, a solar dryer to enhance small fish farming, and converted electric motor-bikes with replaceable batteries.

Other innovations include an automated storage locker, a domestic alert for deaf people, a plug-in device to transform any screen into a computer, and a healthcare platform based on WhatsApp.

Engineering is a fundamental enabler of development and is linked to all the United Nation's Sustainable Development Goals, impacting healthcare, education, gender equality, the environment and other concerns. Engineering is also a driver of the Africa Agenda 2063, the African Union's blueprint for development over the next 50 years, where it is described as supporting the continent's goal of being "integrated, prosperous and peaceful... driven by its own citizens and representing a dynamic force in the international arena".

Being shortlisted for the Africa Prize, innovators benefit from support including business incubation, mentoring,

fundraising and communication. They also gain access to the Academy's global network of high-profile engineering and business experts in the UK, Africa and beyond.

Judges, mentors, and expert reviewers for the Africa Prize for Engineering Innovation have provided more than 4 000 hours of their valuable time and support to entrepreneurs since the prize was established.

2020 Africa Prize winner Charlette N'Guessan from Côte d'Ivoire, the first woman to win the prize, said, "Winning the prize opened our business up to many opportunities and provided exposure for our solution to the local and international market. In 2023 I am happy to see the Africa Prize has inspired many young women, as innovators, to break down barriers."

Four finalists will be chosen from the shortlist to present their innovations and business plans to judges at the Africa Prize final in Nairobi, Kenya, in June 2024. The winner will receive £25 000, and three runners up will be awarded £10 000 each. A One-to-Watch award of £5 000 will be made for the most impactful pitch, as voted by the audience. In 2024, the audience will include some 80 Africa Prize alumni from the last ten years.

In developing their products or services, Africa Prize alumni have supported more than 10 million beneficiaries. They have created more than 28 000 jobs – including more than 21 000 jobs for women and more than 500 jobs for persons with disabilities – and raised more the USD 39 million in grants and equity funding, directly contributing to 15 of the UN Sustainable Development Goals.

Africa Prize judge Sewu-Steve Tawia said, "The 16 innovators shortlisted for this year's Africa Prize for Engineering Innovation are contributing to achieving key Sustainable Development Goals, including the goals of eradicating poverty, and providing health and wellbeing, quality education, affordable and clean energy, reducing inequalities, and pursuing climate action. These 16 people are distinguished by their determination to solve local challenges, contribute to job creation and seize the opportunity to scale their innovation across Africa. In its tenth year, the Africa Prize is



Ludo Ntshiwa of Botswana has developed Biomass Briquettes.



Esther Kimani of Kenya has developed a tech-smart solar-powered Crop Pest and Disease Detection Device.



Another innovator from Kenya, Purity Gakuo, has developed the low-cost solar-powered Kuza Freezer.



Christopher Maara of Kenya has developed Kiri EV as an affordable, clean energy mobility service.



Paul Soddo of Uganda has developed the low-cost solar-powered MakSol Cooker.

proud to elevate these local changemakers to global engineering innovators.”

Shortlisted innovations and entrepreneurs

- **Beba-Beggie**, developed by Charles Oduki, Kenya, is an IoT automated locker technology offering affordable, accessible, secure and convenient short-term storage.
- **Biomass Briquettes**, developed by Ludo Ntshiwa, Botswana, are an environmentally-friendly clean fuel that harnesses the green energy of biowaste to produce a renewable energy source for heat production as a substitute for charcoal.
- **Early Crop Pest and Disease Detection Device**, developed by Esther Kimani, Kenya, is a solar-powered tool using AI- and machine learning-enabled cameras to detect and identify agricultural pests and diseases early.
- **Eco Tiles**, developed by Kevin Maina, Kenya are an environmentally-friendly roofing material made from recycled plastic.
- **Kiri EV**, developed by Christopher Maara, Kenya, provides an end-to-end affordable and clean energy mobility service, from electric motorcycles, scooters and tuktuks to battery charging infrastructure across Kenya.
- **Knock Knock**, developed by Esther Mueni, Kenya, is a domestic alert system for the deaf and hard of hearing, that uses a highly sensitive vibration sensor to detect physical knocks on a door and transmit this information to smartphones via Bluetooth.
- **Kuza Freezer**, developed by Purity Gakuo, Kenya is a durable low-cost solar-powered fridge freezer made from recycled plastic waste.
- **La Ruche Health**, conceptualised by Rory Assandey, Côte d'Ivoire, is a smart healthcare platform that provides communities in remote areas with direct access to vital healthcare information via WhatsApp, facilitates appointments to vetted medical practitioners, and digitises medical records for smooth patient onboarding.
- **MakSol Cooker**, developed by Paul Soddo, Uganda, is a low-cost, solar-powered induction oven and hob designed for safe, zero-emissions indoor cooking by people in off-grid communities.
- **MAVUNOLAB Solar Dryer**, developed by Dr Evodius



In Tanzania, Dr Evodius Rutta has developed the MAVUNOLAB Solar Dryer to help small-scale fish processors and farmers.



Second-Life Batteries, developed by Léandre Berwa, Rwanda, provide a backup power supply for telecom towers and mini electricity grids.

- Rutta, Tanzania, is a low-cost solar-powered dryer developed to help small-scale fish processors and farmers in off-grid locations by enhancing food safety and hygiene for perishable food products.
- **Microfuse Stick Computer**, developed by Ivan Karugaba, Uganda, is a compact and affordable device that plugs in to any screen, projector or monitor to transform it into a Wi-Fi-connected computer, increasing computer access and digital inclusivity.
- **Myco-Substitutes**, developed by Abubakari Zarouk Imoro, Ghana, is an eco-friendly sewage treatment that uses viruses, bacteria, and fungi to treat and feed on faecal waste and produce yarn and leather substitutes.
- **PenKeep**, developed by Adaye Akpagbula, Nigeria, is a climate-smart remote sensing device that monitors and controls environmental conditions in poultry farms, ensuring optimal health and productivity of chickens.
- **Second-Life Batteries**, developed by Léandre Berwa, Rwanda, is a solution that repurposes retired electric vehicle (EV) batteries to be assembled as a backup power supply for telecom towers and mini electricity grids.
- **The Kitchen Box**, developed by Tunde Adeyemi, Nigeria, is an affordable biogas digester technology which turns any type of organic waste into animal feed and organic fertiliser, and generates clean energy for heating and cooking.
- **Yo-Waste**, developed by Martin Tumusiime, Uganda, is a location-based mobile application that connects homes and businesses to independent agents for an efficient on-demand rubbish collection and disposal service.

For more information visit: www.raeng.org.uk/africaprise



Steve Flynn, ESET
Southern Africa.

Securing the hybrid cloud

For SA businesses, securing the hybrid cloud is a balancing act. To protect data and other digital assets in hybrid cloud environments, businesses need to adopt a modernised, flexible and scalable cybersecurity approach. Although small and mid-sized companies may not have the same IT challenges – or benefits – as larger organisations, their security needs,

especially in an increasingly hybrid cloud world, are as essential, says Steve Flynn, Sales and Marketing Director at ESET Southern Africa.

Globally, organisations have adopted hybrid cloud solutions for many well-documented reasons: flexibility, cost efficiency, the ability to balance internal control with workload migration, widespread scalability and faster time to value for new applications and services. In South Africa, businesses are shifting the structure of their IT environments to take advantage of the cloud, with many adopting a cloud-first architecture or, increasingly, a hybrid cloud model.

However, hybrid cloud is not immune to security risks. It is clear that organisations understand the need to secure their data, devices and applications in the cloud; even though overall IT spending growth in 2020 was dampened by the pandemic, research indicates that spending on cloud security jumped by 33%. Irrespective of size, businesses need to stay on top of the fast-evolving cyber risk landscape, and seek out new, modernised and flexible solutions to help mitigate those risks in a hybrid cloud environment.

Security and protection challenges

Cyber threats are increasing in number, diversity and sophistication. Advanced threat protection and overall cybersecurity management are often front and centre in an organisation's approach to cybersecurity, especially in hybrid cloud environments. Using a centralised approach to cybersecurity through advanced software solutions, often as a cloud service, to stay secure from multiple threats is a sound method to protect end users and valuable business data. Implementing a comprehensive security solution is significantly more efficient to deploy, simpler to manage and, in many cases, more cost-effective than purchasing individual products for different threats.

Compared to legacy approaches, cloud-based cybersecurity management is:

- A more appropriate fit for the increasingly challenging threat landscape, driven by overlapping attacks of different types, often with no advanced warning
- A better strategy to gain increased visibility into network, application, data and user behaviour over physical and virtual networks
- A much simpler and more automated approach to coordinate a unified response to security threats.

The once common focus on mainstream, relatively

simple security threats like viruses and keystroke logging, is no longer adequate. It has been overtaken by the need to address the growing diversity of threats, combined with overlapping attacks and long 'dwell times' (the length of time an attack remains undetected inside an organisation's cyber defences) which have raised the level of risk.

As organisations adopt hybrid cloud frameworks such as cloud-native application development/deployment, container-based architectures, microservices and serverless computing, they need a security approach designed for a cloud-first or, in some cases, a cloud-only environment.

What to look for in a cloud-based security platform

Selecting the right toolset for security in hybrid cloud environments carries far-reaching implications. Solutions that do not properly address threats can result in compliance violations, data governance problems, legal exposure, and the loss of customer confidence. Furthermore solutions that are unnecessarily difficult and expensive to deploy cost money, degrade employee productivity and take cybersecurity professionals away from other tasks.

As businesses create their checklist, it is important to keep in mind some core functionalities for hybrid cloud security. These include:

- Protecting traditionally unprotected or poorly protected endpoints, networks and applications now being used more frequently in remote work, such as home networks or personally subscribed cloud services
- Enabling cloud sandboxing as isolated test environments to study, analyse and plan action against suspicious programs and/or files
- Delivering multilayered protection of the expanding number of applications, data and devices at the endpoint, server, network and cloud levels
- Supporting an integrated platform design, rather than disparate security point products, to ease management and support automated prevention, detection, response and remediation
- Improving time to value by speeding deployment, facilitating scalability, and reducing costs
- Embracing a multipurpose console to do more than threat monitoring
- Avoiding 'one-size-fits-all' options by choosing customised solutions, configurations, and policies
- Securing data at rest and data in motion, due to the need to support both cloud and on-premises protection, as well as securing data as part of workload migrations.

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

Extending skills training into Africa

A recognised qualification helps a person get a job. This is the theory. But not everyone is made for university or college and, often, tertiary education does not equip people to enter the workplace directly. The DEKRA Institute of Learning (IOL) develops people who are qualified and employable, according to Chris Mörsner, Head of Training at the QCTO-accredited educational institution.

“A priority for us is to address one of the biggest challenges faced by South African industry today: building up a base of skilled employees who can successfully navigate daily operational challenges,” says Mörsner.

Already, growing demand for occupational training indicates just how important a gap the DEKRA IOL is filling.

“This is a step-by-step process, starting with the training and wellness of our own employees,” Mörsner says. “Putting down strong roots through the development and empowerment of our people, we are establishing an ethos and setting an operational example of hard work and dedication for our students. That is why – every day – we strive to live by what we say,” he says.

Deep roots for a bright future

Supporting its alignment with the latest learning and educational trends and developments in the workplace, DEKRA IOL has deep roots which go back nearly 100 years. As part of a 98-year-old global group, and with a reputation built up over the years and an innate understanding of the demands of local industry, the IOL's parent company, DEKRA Industrial, is a pan-African leader in inspection services, non-destructive testing (NDT), material testing, laboratory services, advanced NDT, and asset integrity services. DEKRA IOL is a leader in the field of occupational skills training and adult-based education.

The skills training that the IOL provides is applicable across many industries, including power generation, oil and gas, construction, petrochemicals, manufacturing, fabrication, pulp and paper, rail, mining, the steel industry and foundries.

For Mörsner, the true value to be found in this wide range of skills training, industry-related full qualifications and occupational education, comes from the combination of practical, theoretical and workplace components – always geared towards gainful employment. This also reflects the IOL's 2028 vision to offer all forms of training and skills development, and to make a sustainable difference in reducing unemployment.

“In this regard, the metaphor of the tree of knowledge – secured by our strong roots – is so apt as a symbol for education – and a tree that shelters and gives life. It starts with putting down roots, investing in our own people, training our own staff, so that everyone gives the best they can, every day,” says Mörsner.

Growing the tree of knowledge, expanding roots

Looking back over 2023, Mörsner says the greatest demand at the IOL has been for training as a forklift operator. The institute offers this through its partner Willco Safety and Training, which specialises in machine operator training.

Another growing area, which he expects to become more sought-after, is First Aid training. Pending changes in rules and

regulations governing first aid accreditation have seen new elements being added to the training offered. Once DEKRA IOL has received its accreditation to meet these requirements, it will be the first occupational training institution in the country to offer the updated courses.

Looking further afield, DEKRA IOL is expanding into Africa, starting in Uganda and then setting up training facilities in 17 African countries over the next few months, to provide process safety consulting and training. This will include zone calculations and flammability source identification for a large pan-African distillery.

In addition, the Institute is looking to secure a training deal for staff at some 2 500 branches of a large local retail group in aspects such as visual merchandising, and logistically-related training on facilities and warehousing management, including receiving and dispatching of goods.

Mörsner says training for staff at the distillery will be relatively specific to that sector – including, for instance, atmospheric testing. However, for the retail company, training will cover a wider spectrum of skills, which are also sought-after in many other industries.

He acknowledges that the move into Africa will test DEKRA IOL's educational approach. Although digital or online training has gained popularity in South Africa, other clients in Africa prefer in-person training. “We will work with a combination of methods to suit the needs of different clients,” he says.

For more information visit: www.dekrapa.com



Chris Mörsner, Head of Training at DEKRA Institute of Learning (IOL).



Dr Chris von Holdt,
Director Asset
Management at Zutari.

Maintaining South Africa's infrastructure – a public-private approach

Dr Chris von Holdt, Director Asset Management at Zutari, a leading consulting engineering and advisory firm, here emphasises the critical importance of maintaining infrastructure, South Africa's biggest asset.

Our national infrastructure, which carries an asset value of trillions of rands, is owned by all South African citizens and can either support or hold back the economy. South Africa does not have the money to let infrastructure break and then fix it again, so it

is critical that we understand that prevention is better than cure.

The South African Institution of Civil Engineering (SAICE) 2022 Infrastructure Report Card for South Africa gave the country a 'D' grade, the lowest on record, indicating that most of the country's infrastructure is 'at risk of failure' or 'unfit for purpose'. Economic and social infrastructure such as water, sanitation, roads, health, and education continue to deteriorate across our provinces, cities and towns.

We have seen maintenance delivery fail nationwide. It is clear we need to adopt a different approach in managing our infrastructure to that we have followed so far. South Africa, as a country, needs to balance the money and attention we are giving to building new infrastructure with the need to look after what we already have.

I believe we will benefit from a national approach, and that the private sector can manage the complexity and apply the controls needed for correct execution, effectively. The current maintenance challenge is an opportunity for us to create jobs. We can advance the skills of people practically, through structured training, and build local businesses with effective supplier development programmes. This is being done in small pockets of success but needs to be done at a national scale.

We are spending money on infrastructure, but we need to make sure that what we must spend is spent wisely. Minister of Public Works and Infrastructure, Sihle Zikalala announced in May 2023 that the department has a budget of R8.782 billion for the 2023/24 financial year. It is the department's mandate to oversee the implementation of infrastructure projects to stimulate economic growth.

Infrastructure South Africa (ISA) has completed R21.4 billion worth of projects to date, mainly in the roads, energy, and human settlement sectors. There is R313.5 billion worth of projects currently under construction and R295.2 billion worth of projects in procurement.

In addition, R300 billion worth of green hydrogen projects are in the pipeline; the first feasibility reports were anticipated by end 2023. South Africa is rolling out the largest programme for the procurement of renewable energy and resource efficiency in Africa – the Integrated Renewable and Resource Efficiency Programme (iREREP).

However, Minister Zikalala noted: "As a country, we cannot always be building. We will introduce innovative approaches to ensure that infrastructure maintenance, by

all spheres of government, is proactively planned and that budget ringfenced for infrastructure is spent on what it is earmarked for."

Research has shown that proactive and preventive maintenance provides a positive economic return on investment and is labour intensive, which represents low-hanging fruit for the country, suffering from unreliable infrastructure and poor performance problems as well as high unemployment.

At Zutari, with our asset management capability, we add value to many of the largest asset owners on the continent. Our experience has shown that managing existing infrastructure requires a systematic and sustained effort, underpinned by technical capacity and tight management controls – and this is why I believe a national-scale programme that leverages private sector capability is urgently needed.

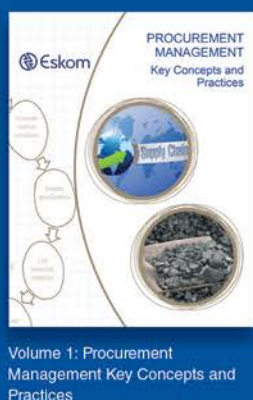
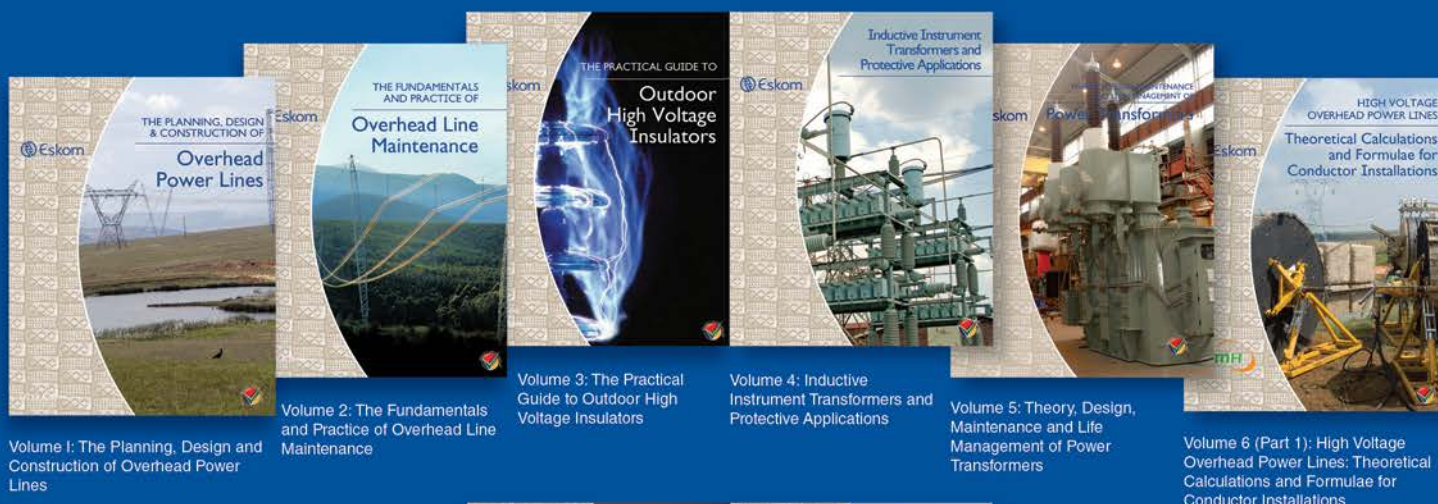
It is evident that government in general, and local government in particular, has struggled with the implementation of effective maintenance programmes and the likelihood that this situation will improve in the near term is low.

The private sector requires basic infrastructure to be in place and to be properly maintained for it to operate and grow the country's economy. Mining, for instance, has recently seen substantial revenue losses due to the current dysfunctional logistics network. The situation can be turned around with the application of expertise and technical capacity that exists in the private sector, but we need a strategic approach, led by government, and we need to take action.

As part of its contribution to develop a skills pipeline for the industry, Zutari runs a graduate programme that brings in 120 to 150 graduate engineers a year. We are committed to nurturing young talent, assisting young graduates to obtain their professional certification and encouraging them to have a positive impact in shaping the future as engineers.

For more information visit: www.zutari.com

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



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

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



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

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Visit our website: http://www.eskom.co.za/AboutElectricity/EskomPowerSeries/Pages/Our_Products.aspx

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