07/2024

ELECTRICITY + CONTROL

FEATURES:

- Control systems + automation
- Drives, motors + switchgear
- Measurement + instrumentation
- Safety of plant, equipment + people

CROWN PUBLICATIONS

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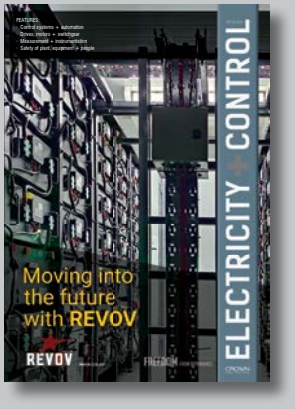
Scan here to find out more about the multi-touch application spectrum

New Automation Technology **BECKHOFF**



The technology and benefits of HV battery energy storage systems have evolved to make them applicable and scalable across sectors, providing energy security in industrial, commercial and utility settings.
(Read more on page 3.)

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People are central to all that we do

Of course one cannot predict the future, but I do find myself reflecting on the resilience of the country we live in and the fact that there seems always to be a ray of light at the end of a long, long tunnel.

I speak naturally of the political situation in the country right now, and how deftly it has been managed. There is evidence of significant maturity being shown by most of our politicians. This must be lauded.

And it must surely be an indication of a more stable future to come?

As it is inappropriate to discuss politics in this comment, I will leave it there. But the fact of the matter is that it is at the political level that policy is established, and that policy has profound impacts on our economy – by virtue of the bearing it has on all our enterprises. So, let's imagine a positive future.

This also reminds us that people are central to all that we do. We speak about control and automation, artificial intelligence – and the like, so we often think about the replacement of human labour and even intellect in what we do.

But ultimately, it is for people that we deliver a service or produce a product. Quite how we produce it is, of course, a matter of efficiency – how best to do it.

People are the beneficiaries of all our endeavours – even if at times that objective may seem a bit obscure.

One of the features in *Electricity + Control* this month is Safety of plant, equipment and people. This focus on people is crucial – and core to all that we do.

Very often issues of safety are reduced to tick boxes or meaningless exercises that benefit no one. However, taken seriously, safety can not only improve the wellbeing of employees – but also contribute to improved efficiency on your plant.

How often has one had to complete a simple questionnaire that effectively allows you access to a (potentially) dangerous plant? Here, it is not really your competence that is being assessed, but rather a confirmation that the process was followed.

Often one finds that safety is an 'office' – rather than being a culture within an organisation.

Practically, there are numerous examples of where safety systems have been bypassed simply to ensure production does not stop.

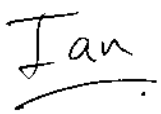
The consequences can be catastrophic. And the question is: why did anyone even think of doing that?

Well, this month we appeal to you never to lose sight of the fact that no matter how you view safety at your plant, it is the human element that is absolutely fundamental. The challenge is to inculcate a culture of safety through which employees are equipped and empowered to identify and proffer solutions to safety issues.

Of course there are many remarkable systems that support a culture of safety: fail-safe systems, light curtains, carefully designed mechanisms requiring operators to engage them in a way that automatically makes it extremely difficult to be hurt or cause harm.

But at the essence of your plant, safety must be a culture – a culture endorsed by all employees – where care for people and care for the plant are core.

Safety systems and processes must be conscious interventions that really work – that are developed with input from the people whom they are meant to protect – and that are understood and maintained at every level by all the people on the plant.



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

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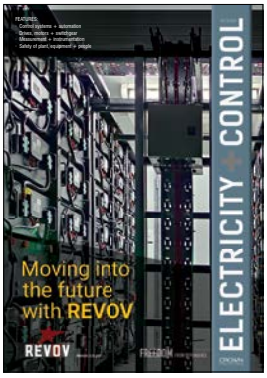
FEATURES

REGULARS

BESS is on everyone's lips and with good reason



Lance Dickerson, MD and co-founder of REVOV, says high voltage (HV) battery energy storage systems, commonly referred to as BESS, which drastically improve the power reliability prospects for businesses, have been around for some time, but there is a lot of talk about the technology and we can expect to see a massive increase in BESS installations over the coming months and years.

If we consider the unreliable distribution network, it is no surprise the battery industry is seeing a surge in HV inquiries from critical players in agriculture, manufacturing, property development, residential and commercial property management, and even the education sector.

Recently the City of Johannesburg announced load reduction to protect the city's electricity infrastructure from collapse. Businesses across sectors in the economy realise they must take control of their own energy security and they are coming to terms with the fact that renewable energy storage is a far more viable, and reliable, option than internal combustion generators.

Access to markets such as the EU will also become increasingly difficult and restrictive unless businesses, industries, and countries comply with ever stricter carbon targets. A business cannot assume it will always be able to sell a product in the EU if it is made or farmed on the back of internal combustion engines or coal power stations.

It is abundantly clear that the perfect storm of unreliable electricity supply together with economic and social factors have combined to create an environment for HV BESS systems to become almost synonymous with electricity security in South African industry.

The technology and benefits of HV BESS have evolved to a point where the systems are applicable and scalable across sectors, making them suitable for larger-scale applications in industrial, commercial and utility settings. Leading suppliers are able to build modular systems, allowing businesses to scale up their investment as needed.

Businesses have different motivations for investing in BESS, but they all hinge on energy security with cost savings front and centre. Beyond this, in a utility setting, BESS systems store the energy generated from solar panels and in some instances, turbines, which can be fed into the grid when the sun isn't shining or the wind isn't blowing.

Modern, modular systems include local and remote monitoring of specific battery telemetry, ranging from individual per-cell visibility, all the way up to data relating to each battery string. Comparing this type of technology to the hope and a prayer that municipalities will miraculously fix crumbling infrastructure overnight, it is understandable why HV BESS is on everyone's lips.

REVOV is a leading supplier of 2nd LiFe and LiFePO4 batteries in sub-Saharan Africa, for both large-scale industrial and residential applications. □

BESS installation at Inyati Lodge.

A containerised HV battery energy storage system.

For more information contact REVOV.
Tel: +27 (0)10 035 6061
Visit: www.revov.co.za

Re-elected President Ramaphosa can accelerate growth agenda

Cyril Ramaphosa, re-elected as the President of South Africa for the seventh democratic administration.

Following the re-election of Cyril Ramaphosa as the President of South Africa, Business Leadership South Africa (BLSA) congratulated the President and welcomed the continuity associated with this, noting it as an outcome that indicates the country's reform agenda will advance, and its important democratic institutions will be safeguarded.

In a statement issued on 15 June 2024, BLSA urged President Ramaphosa's new government of national unity to demonstrate policy clarity, regulatory certainty and the principles of democratic governance, to unite South Africans in building a more successful, modern, capable and competitive state. It called on the president to appoint a capable and ethical cabinet.

BLSA CEO, Busisiwe Mavuso, said: "We urgently need to turn around South Africa's economic performance to move our country towards greater prosperity and meet the needs of a growing population. The government must assure all the country's citizens, as well as local and international investors, that South Africa is open for business, underpinned by a robust constitutional democracy, well-managed and capable institutions and the rule of law.

She said business looks forward to a government founded on sound principles that puts the country first, ensuring that men and women of integrity guide South Africa on the path to growth and prosperity and deliver stability – a government of meritocracy and with professionalised public service delivery.

"The business community has been clear and collaborative: for South Africa to grow and thrive it needs responsive economic policy, regulatory certainty, efficient network industries, a capable state, effective public services, safety and security, the rule of law and social stability. Critical to achieving this outcome is an effective parliament and well-functioning provincial legislatures, which together provide the necessary oversight and accountability.

"All spheres of government need to accelerate the momentum, building on the solid foundation established by the sixth administration in stabilising institutions and driving the reforms necessary to get our economy out of the low-growth, low-employment trap South Africa has been stuck in for over a decade. Through robust engagement with business and other stakeholders, President Ramaphosa has managed to mobilise private sector resources and skills to support constructive interventions."

Recognising the challenge of the responsibilities ahead, Mavuso said business calls on President Ramaphosa to actively lead the country's seventh administration, build on the progress made, and accelerate growth- and jobs-rich initiatives. "As a business organisation that believes in South Africa's future and shares the values set out in the Constitution, BLSA is ready to partner with the government and civil society to deliver economic growth, transformation and inclusion, and create a South Africa of increasing prosperity for all."

She acknowledged the significant progress made by the Operation Vulindlela unit, established between the Presidency and National Treasury, in accelerating the implementation of reforms, particularly in restructuring electricity generation and working towards rebuilding the country's broken logistics system.

"These kinds of reforms take years to shift the trajectory of the economy as they slowly work their way through into the investment decisions of firms – to result in improved electricity and logistics reliability. The challenge for any democratic government is to make the choices now that will pay off, especially in the medium and long term. We have had to deal with the legacy of decisions not made decades ago, when we should have been liberalising and investing in the electricity, water and logistics systems. Over the past five years, government has been able to begin making the changes needed to deliver long-term payoffs. Let's pick up the momentum and build on this good progress," said Mavuso.

For more information visit: www.blsa.org.za

Electricity theft is wide-ranging and it puts people's lives at risk.

Eskom has replaced over 400 transformers

As winter temperatures fall and demand for electricity rises, Eskom notes that the issue of network overloading has resurfaced in some areas due to electricity theft. To date, Eskom has replaced 400 transformers damaged by network overloading since January 2024. The utility has suspended load-shedding for now more than 80 consecutive days due to sufficient generation capacity to supply electricity to the country.

Electricity theft is wide-ranging and includes illegal connections, network equipment theft, vandalism, meter bypasses and tampering, unauthorised network operations and purchasing electricity from illegal vendors.

There are currently about 2 500 transformers, around the country, that are frequently overloaded and at risk of failing, and just under 1 000 transformers are isolated and awaiting replacement.

"Overloaded transformers as a result of electricity theft present a serious risk to human life. Furthermore, the time, funds and manpower used to replace these

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Eskom GCE Marokane reports on his first 100 days

Eskom Group Chief Executive (GCE) Dan Marokane on 14 June 2024 presented an update from his first 100 days in office, sharing the progress made towards addressing Eskom's business challenges and repositioning the utility for growth and sustainability.

Marokane said his first 100 days have been focused on assessing the effectiveness of the Generation Operational Recovery Plan, reviewing the progress on the implementation of Eskom's unbundling and engaging with internal and external stakeholders to create and build alignment, as well putting in place the building blocks for the creation of a competitive and sustainable Eskom.

He noted that Generation performance has shown a step change, with almost 80 days of no loadshedding (at that date and continuing) and unplanned outages consistently around 12 GW (with a low of 9.5 GW at one point), below the winter planning assumption of 15.5 GW which would trigger up to Stage 2 loadshedding on some days. This performance comes from a sustained multi-dimensional programme involving adequate human resources, aggressive planned maintenance on the back of financial certainty, the use of original equipment manufacturers (OEMs) for critical systems, and progressive implementation of interventions in response to the findings of the assessment conducted by VGBe.

This improved performance has also had a positive impact on Eskom's financial position, given the significant year-on-year reduction in the use of diesel in open-cycle gas turbines (OCGTs), translating into over R4 billion in savings in the current financial year.

"Eskom's executives and employees have helped deliver these significant results to date and we have a good base to build on. I have also noticed a significant improvement in morale," Marokane said.

In the area of the unbundling of the business, plans are on track to operationalise the National Transmission Company of South Africa (NTCSA) on 1 July 2024, following the fulfilment of the suspensive conditions at the end of March 2024. As part of incorporating the lessons learnt from the unbundling of the transmission business, Eskom is concluding the process of augmenting its internal resources with external support for the focused unbundling project management unit to drive efficiencies for the remainder of the programme. This is expected to enable faster execution of the unbundling process.

In respect of stakeholder engagement, the GCE has addressed over 10 000 employees in person – one quarter of the entire workforce – and he has engaged with over 200 stakeholders in government, organised business and labour, among original equipment manufacturers and financial institutions. This process was used to create awareness and alignment on the tactical shifts required for the strategic direction of the business, and to further improve engagement with employees.

Dan Marokane, Group Chief Executive, Eskom.

"We are putting the building blocks in place to rebuild trust and credibility in Eskom through transparent performance, with the intent to re-affirm the company as worthy of further future investment as we undertake our strategic initiatives. It is our intention to remain a critical player in South Africa's evolving energy market," Marokane continued.

Delivering on the strategic initiatives

Over the next 36 months Eskom will pursue its strategy across a number of key initiatives to deliver value. These include:

- Increasing the Energy Availability Factor (EAF) to 70% in the next 12 to 36 months
- Returning more than 2.5 GW in capacity to the grid by March 2025 and developing an executable initial pipeline of at least 2 GW of clean energy projects by 2026
- Re-baselining the cost trajectory and improving efficiencies
- Advocating and pursuing a sustainable solution on municipality debt
- Delivering the unbundling of the Distribution and Generation divisions
- Accelerating the implementation of initiatives to enable a Just Energy Transition.

Eskom will continue to focus on implementing generation recovery, strengthening governance and tackling crime and corruption, with a view to future proofing the organisation to enable energy security, growth, and long-term sustainability to the benefit of South Africa and sub-Saharan Africa.

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

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transformers could have been used to improve the reliability of the network, extend electricity access to more communities, improve the experience of Eskom's paying customers, and create more jobs," said Agnes Mlambo, Acting Group Executive for Eskom Distribution. "A transformer damaged by overloading can leave an area without power for up to six months." She emphasised that: "Protecting Eskom's assets is in the best interest of all South Africans."

To prevent load reduction and abrupt loss of supply, Eskom has launched the 'Save Your Transformers, Save Lives' campaign through which it urges customers to reduce their consumption, ensure that the electricity they consume is legally connected, paid for, and purchased from legal vendors, and to report illegal activities. Customers can learn more about energy saving tips at: *www.eskom.co.za/eas/energy-saving-tips*

Load reduction is a long-established process which Eskom uses in specific areas when there is sufficient electricity available, but a transformer is in danger of being overloaded, putting people's lives and livelihoods at risk. By contrast loadshedding is used when there is an insufficient supply of electricity.

Customers are urged to report criminal activities such as illegal connections, theft and vandalism that can damage electricity infrastructure to the Eskom Crime Line on 0800 112 722.

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

A reversal in progress on access to energy

A new report published jointly by the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), the United Nations Statistics Division (UNSD), the World Bank, and the World Health Organisation (WHO), confirms that the world remains off course to achieve Sustainable Development Goal (SDG) 7 by 2030.

SDG 7 aims at ensuring access to affordable, reliable, sustainable and modern energy, encompassing universal access to electricity and clean cooking, doubling historical levels of efficiency improvements, and substantially increasing the share of renewables in the global energy mix. Attaining this goal will have a deep impact on people's health and wellbeing, helping to protect them from environmental and social risks such as air pollution, and expanding access to primary health care and services.

The 2024 edition of *Tracking SDG 7: The Energy Progress Report* shows that current efforts are not enough to achieve SDG 7 by 2030. There has been some progress on specific elements of the SDG 7 agenda – in the increased rate of renewables deployment in the power sector, for example – but progress is insufficient to reach the targets set.

The latest report confirms that the number of people without access to electricity increased for the first time in over a decade, as populations grew – mostly in sub-Saharan Africa – at a higher rate than that of new electricity connections, seeing 685 million people without access to electricity in 2022, 10 million more than in 2021. A combination of factors contributed to this, including the global energy crisis, inflation, growing debt distress in many low-income countries, and increased geopolitical tensions. However, promising trends in the rollout of decentralised energy solutions, largely based on renewable energy, are helping accelerate progress, particularly in rural areas where eight in ten people without access to electricity live today.

The report also shows that 2.1 billion people still live without access to clean cooking fuels and technologies, with the number remaining largely flat last year. This carries with it significant implications for health, gender equality, and the environment. Renewed political momentum within the context of G7, G20, and new financial commitments made at the Summit on Clean Cooking in Africa are buoying prospects for stronger progress later this decade. Still, efforts remain insufficient to reach universal access to electricity or clean cooking by 2030.

Other aspects of the SDG 7 agenda have shown better progress recently. Renewable energy has seen robust growth over the past two years, and energy efficiency improvements are gradually increasing after a drop-off during the pandemic, albeit still not sufficiently to meet the SDG 7 target. New global targets pledged by over 130 countries in the UAE Consensus reinforce the objectives of SDG 7: aiming to triple renewable generating capacity and double the rate of energy efficiency. Immediate concrete actions are required to meet these targets, especially in addressing the large disparity in clean energy investment, of which

Progress on basic energy access reverses for the first time in a decade as population growth outpaces new connections.

80% remained concentrated in just 25 countries in 2022.

Key findings

- 2022 saw a reversal in progress, with the number of people living without electricity growing for the first time in over a decade. Today, 685 million people live without access to electricity – 10 million more than in 2021. In 2022, 570 million people in sub-Saharan Africa were living without electricity, accounting for more than 80% of the global number. The access deficit in the region has seen an uptick relative to 2010 levels.
- The world is still off track to achieve universal access to clean cooking by 2030. Up to 2.1 billion people still use polluting fuels and technologies for cooking, largely in sub-Saharan Africa and Asia. The traditional use of biomass also means these households spend up to 40 hours a week gathering firewood and cooking, which makes it difficult for women to pursue employment or participate in local decision-making bodies and for children to go to school.
- Household air pollution caused by using polluting fuels and technologies for cooking is estimated to result in 3.2 million premature deaths each year.
- Renewable electricity consumption grew more than 6% year-on-year in 2021, bringing the share of renewables in global electricity consumption to 28.2%.
- Installed renewable energy-generating capacity per capita reached a new record in 2022 at 424 watts per capita, globally. However considerable disparities exist. Developed countries (at 1 073 watts per capita) have 3.7 times more capacity installed than developing countries (at 293 watts per capita).
- The rate of energy intensity improvement saw a slight advance of 0.8% in 2021 compared with 0.6% a year earlier. However, this remains well below the long-term average. The slow progress in 2021 occurred amid the robust economic recovery after the Covid-19 pandemic, which saw the largest annual rise in energy consumption in 50 years. Average annual improvements through 2030 now need to accelerate to over 3.8% to meet the SDG 7.3 target.
- International public financial flows in support of clean

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CESA survey points to the need for sustained investment in infrastructure

Chris Campbell, CEO of CESA.

Business confidence remains a pressing concern in South Africa. Consulting Engineers South Africa's (CESA's) *Bi-Annual Economic and Capacity Survey* (BECS), for the period July to December 2023, revealed a 22% decline, seeing business confidence at a low of 32, the weakest level since 2019. This drop, exacerbated by political uncertainty, corruption, and infrastructural constraints, has continued into the first quarter of 2024, which saw a further fall to 30.

CESA recently published its latest survey which highlights significant trends and challenges in the engineering and construction sectors for the latter half of 2023. The survey, conducted during a period of moderated global economic growth, looks at critical factors such as business confidence, private sector investment, project cancellations, and consulting fees, presenting a nuanced picture of the industry's current state and future prospects.

Chris Campbell, CEO of CESA, emphasises the importance of business confidence in supporting investment growth. "Higher levels of business confidence are fundamental for investment growth, regardless of interest rates or financing accessibility. A sustained recovery to a neutral level of 50 or higher is needed to bolster investment levels," Campbell says.

Further, the survey shows that project cancellations continued to plague the construction industry, with 41% of respondents reporting tender cancellations in the last six months of 2023, up from 31% in June 2023. The reasons range from economic uncertainties and budget constraints to community interference and skills shortages. The cancellation costs are substantial, impacting earnings across firms of all sizes, with smaller firms being the most severely affected.

"We need to address these issues to stabilise the industry and maintain project momentum," Campbell adds.

Despite the challenges, the survey reports an average 7% year-on-year increase in consulting fees in 2023, with a significant 10% growth in the second half of the year. This improvement is largely driven by private sector demand, which saw an 18% increase in fee earnings. However, earnings from national and local government saw a decline, highlighting a dependency on private sector initiatives to sustain growth.

The outlook for the first half of 2024 remains mixed. Larger firms expect earnings to stabilise; medium-sized firms anticipate a modest increase of 5 to 7%. The order book-to-income ratio for larger firms has declined, indicating potentially softer future demand, although medium-sized firms have reported improvements.

The survey also indicates a promising increase in private sector investment, particularly in critical economic infrastructure such as electricity, water, rail, and ports. Fixed investment grew by 4.2% year-on-year in 2023, with the private sector contributing an average of 5% increase over the past two years. In contrast, investment by state-owned enterprises declined by 1.8%, following a significant 8.2% drop in 2022.

Campbell highlights the growing role of the private sector: "The collapse of energy infrastructure, combined with a mounting water crisis, may serve as a catalyst for increased private sector investment. Government must create a more conducive environment for such investments," he says. This shift is evidenced by the private sector's increasing involvement in construction works, now accounting for an average of 25% over the last two years, up from less than 10% in 2000.

The findings of the BECS reinforce the need for sustained investment in South Africa's critical economic infrastructure. The private sector's growing involvement is a positive sign, but challenges such as low business confidence, high project cancellation rates, and uneven earnings growth persist.

"The path forward requires a concerted effort from both the public and private sectors to ensure a steady pipeline of projects, fostering job creation and economic stability," Campbell comments. "The improved outlook suggests increased activity in infrastructure design and planning, but the real challenge lies in executing these projects to drive sustained economic growth."

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

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energy in developing countries rebounded in 2022, to USD 15.4 billion, a 25% increase over 2021. However, it is still around half of the 2016 peak of USD 28.5 billion.

- By 2030, under current policies, projections indicate there will still be 660 million people lacking electricity access and around 1.8 billion without access to clean cooking technologies and fuels. Progress in energy efficiency rates also falls below target, reaching just 2.3%, well below the level set in SDG 7.

The report will be presented to top decision-makers on t5 July at the High-Level Political Forum (HLPF) on Sustainable Development, which oversees progress on the SDGs. The authors urge the international community to refocus efforts on providing the required financial, technological and policy support to close the access deficit and ensure all countries and communities can benefit from accelerated renewable energy deployment and improved energy efficiency.

For more information visit: www.irena.org

Flexible automation of single-crystal furnaces

To grow monocrystalline semiconductors for photovoltaic equipment, Chinese company Jingsheng Mechanical & Electrical originally used separate process and temperature control systems. Since it made the change to using PC-based control technology from Beckhoff, it has gained scalability, increased its competitiveness and is saving costs. Additionally, the TwinCAT software enables the company to protect its intellectual property. Stefan Ziegler of Beckhoff Automation reports on this application.

Headquartered in the Zhejiang Province, Jingsheng Mechanical & Electrical Co. Ltd. (JSG) operates globally and is a leading supplier of high-end equipment for the semiconductor and photovoltaic industries. With many years of development experience, JSG is an established supplier of crystal-growth technology for photovoltaic equipment. To automate its single-crystal furnaces, JSG previously used a conventional PLC and a temperature control system. The temperature control, however, offered only limited functionality and, in combination with the PLC, had become too inflexible. JSG therefore adopted a Beckhoff control platform consisting of an embedded PC, the TwinCAT automation software and various EtherCAT terminals to connect the field devices easily and flexibly via the industrial Ethernet system EtherCAT. The integrated control platform replaces two separate devices and, according to JSG, offers far more flexibility for adaptation to individual requirements.

Stable process control is key

The growth of monocrystals is possible only under specific conditions. Silicon is melted in the furnace and a monocrystalline seed crystal on a metal rod is dipped into the melt, starting the crystallisation process. The melt has to be kept at a certain temperature as the rod is slowly rotated and pulled upwards in a way that allows the material to deposit to form a crystal column reaching a specific final diameter. This is known as an ingot. Cut into wafers and used in solar modules, monocrystalline semiconductors offer the advantage of high efficiency due to the uniform crystal orientation.

© Beckhoff

Jingsheng Mechanical & Electrical in China is a leading provider of single-crystal furnaces for growing semiconductors for photovoltaic equipment.

Precise sequential control and stable process control for longer periods of time – between several days and half a month – are prerequisites. Temperature control is essential in this, because uneven temperatures can cause polycrystalline material to grow, creating structural defects in the crystal lattice. For continuous furnace operation, the control system must be able to process large amounts of data. This is no problem for the embedded PCs from Beckhoff. The industrial-grade DIN rail controllers also cope well with harsh environmental conditions.

JSG began the change with a CX1030 Embedded PC; now, a CX9020 or CX8080 serves as the central machine controller, depending on project requirements. The company benefits from the scalable performance of the controllers, always available with new CPU generations, and this enables it to optimise its production continually and reduce costs, increasing its competitiveness.

Although JSG mainly uses TwinCAT 2 control software, the switch to TwinCAT 3 would be easy, should extended functionality be needed. When migrating a control project, it is simply expanded and upgraded with minor changes to the code itself. In addition, TwinCAT supports a wide range of communication protocols, enabling communication between the main control system and subsystems, such as for heating and generating magnetic fields. Seamless data transmission and exchange create synergies and improve the overall efficiency of the system.

Mr Wang, Senior Specialist at JSG, says in commenting on the Beckhoff software platform: “The TwinCAT software is mature and field-proven, and its flexible programming facilitates the processing of all kinds of data. In addition, the PC-based control architecture makes it easier to connect the controller to an MES system in order to exchange data between production and enterprise systems.”

Flexible configuration

For real-time communication via EtherCAT, JSG can choose from the range of available EtherCAT terminals. Wang notes: “EtherCAT distributed I/O modules bring great convenience to project implementation, with unrestricted topol-

ogy flexibility and a huge range of diverse configuration options. Thus, we can select them based on the needs and cost requirements of different projects. The EtherCAT products from Beckhoff are easy to use, compatible, and can be used to replace 'secondary' products from different manufacturers, without affecting overall performance and stability and ensuring the consistency of the EtherCAT products. As EtherCAT eliminates the need for switches or other active devices, the costs of purchasing and maintaining hardware equipment are reduced, and wiring and commissioning of the system are simplified."

Code protection

One of the core elements in single-crystal furnace control is temperature control, and customers need to keep this part of their intellectual property highly confidential. An advantage of the TwinCAT modular automation software is that users can easily separate the entire control program into sets of subtasks based on their priority, and assign different users to manage them independently. Data exchange between the different subtask programs can be achieved through variable mapping. The single tasks are called up in the runtime by TwinCAT. The modular design also makes software development and maintenance more flexible and efficient.

In addition, JSG adopts multi-PLC task processing to encapsulate the core process algorithm into a single PLC program. In order to protect the security of the core algorithm program, JSG saves the program as binary code that cannot be decompiled. The deployment is very convenient, as the complete program can be downloaded simply by copying these binary code files to the target controller.

Following the company's latest technological innovations, Mr Wang says: "JSG has launched its fifth-generation single-crystal furnaces based on an open platform architecture. Their biggest advantage is in the transition away from a traditional closed control system model towards configuration with software-based control with an open architecture. The platform enables the automatic creation of TwinCAT XAE configurations via high-level language programming, based on the TwinCAT Automation Interface. Using this interface, end customers can turn valuable knowledge regarding their own manufacturing processes into software modules. This significantly increases the capacity for end users to develop customised processes and protect their innovations in order to improve their competitiveness." □

For more information visit: www.beckhoff.com

Managing intralogistics in warehousing

Managing intralogistics in warehousing can be challenging. Warehouses, distribution centres and production facilities that rely on manual processes face health and safety risks and problems with traceability and quality. Efficient, intelligent automation offers some solutions.

When material flow is not optimised it results in slower production or process downtime, which affect overall operations. Manufacturers need agile solutions that can scale production up or down to meet changing demands. By investing in warehouse automation, businesses can ensure that materials and goods are stored and transferred correctly. This simplifies employees' tasks, supports optimised workflows, improves productivity, and increases capacity, over time leading to growth and higher profitability.

The increased use of programmable logic controllers (PLCs) in the field of logistics has accompanied the automation of warehouses and production centres closely. PLCs mark the initial phase of automation in warehouses and are used wherever automated systems are deployed – to operate pick and place robots at pick stations in the automotive industry, for example, or to manage automated storage and retrieval systems (AS/RS) in the chemical and pharmaceutical sectors. PLCs play a central role in controlling numerous automated storage and transportation solutions, including roller conveyors for boxes, totes, and bins. Omron offers a flexible line of scalable industrial PLC controllers for use in single machines or as part of larger machine control installations, and several models of PLC hardware that provide various processing and I/O options for smaller to bigger machine automation systems.

Automated conveyor systems

The integration of automated conveyor systems is valuable in enhancing efficiency and safety. They are core to optimising material handling processes, elevating overall productivity, and contributing to workplace safety by minimising human exposure to operating machinery and difficult industrial conditions.

In a fast-paced industrial environment, automated conveyor systems face demands for increased throughput, shorter processing times, smooth product motion, and a need to manage rising operational costs. The main objective is to reduce the cost per case while ensuring scalability and reliability.

Omron's MX2 meets these challenges, offering advanced control capabilities, seamless product motion with controlled acceleration and deceleration, and ensuring high reliability, increased uptime, and reduced maintenance costs. The MX2 model also allows for easy integration into networks and communication settings, including EtherCAT, Modbus, DeviceNet, Profibus, CompoNet, MECHATROLINK-II, and EtherNet/IP. Additionally, the MX2 features an automatic energy-saving function.

Vision systems

Omron solutions are designed to automate the most time-consuming and labour-intensive aspects of warehouse operations. The 3D robot vision system addresses common challenges, such as sorting errors and lifting heavy workloads for precise item singulation. This is particularly advantageous for handling high-value and delicate e-commerce items. Notably, the 3D robot vision system ensures precision and care in sorting, minimising the risk of damage or loss.

In automated intralogistics autonomous mobile robots can enhance efficiency and optimise workflows.

A distinctive feature of Omron's vision system is in the efficiency of a single camera performing tasks that, in other systems, would typically require several cameras. It thus reduces potential points of failure and simplifies the set-up process. The system can execute actions like barcode reading and verification simultaneously. The suite of Omron vision systems includes tools such as presence/ absence detection, optical character recognition, optical character verification, and barcode reading and verification.

Ensuring safety

To ensure a safe working environment, Omron emphasises the need for enclosing robotic cells and operating them only when the surrounding area is clear of people. With its safety risk assessment expertise, it assists customers to comply with regulations and optimise performance using devices such as light curtains, safety laser scanners, and interlock switches. Prioritising risk assessment, safety design, and training, it assists companies in identifying hazards, implementing safeguard measures, and training workers on proper equipment usage. This approach reduces the risk of accidents significantly, enhances compliance with safety regulations, and contributes to improving overall productivity.

For high-speed applications, Omron uses precise servos to ensure optimal performance and maintain worker safety. Autonomous mobile robots (AMRs) are equipped with safety scanners to enhance protection for operators in interactive situations and ensure a safe work environment. Omron's Certified System Integrator Program enables the seamless integration of smart and affordable solutions, providing the support to streamline and optimise performance in a facility.

Tote identification solutions

Omron also offers accurate and reliable tote identification solutions, handheld or mounted. The X-Mode technology in the code readers incorporates advanced symbol location, analysis, and reconstruction algorithms, reducing instances of no-reads and ensuring reliable decoding, even in challenging situations such as fast-moving totes on high-speed conveyors.

Omron operates as an ally for customers seeking to modernise and progress the efficient functioning of warehouse operations. By integrating automation solutions strategically, it tackles the challenges of sorting errors, heavy workloads, and scarce human resources, and excels in the delicate handling of high-value items. Omron's solutions offer streamlined functionality, minimising points of failure and simplifying setup processes. □

For more information visit: https://industrial.omron.co.za

Upgrades and improvements in D3 DCS

Using Valmet's D3 Distributed Control System (DCS) automation platform, electrical engineers and processors can now integrate new reliability and performance features – following a significant update to the technology. The latest D3 version 16.3 from Valmet, a worldwide provider of process technologies, automation, and services, confirms the company's ongoing commitment to enhancing its widely used DCS.

Serving customers since 1982, initially as D/3, the D3 DCS provides a comprehensive automation solution for electrical engineers and processors. It includes system-wide redundancy, robust I/O modules, advanced process controllers, fast Ethernet connectivity, efficient HMI tools, and customisable application programming for batch and continuous processes.

The update includes various improvements, bug fixes, security and usability improvements, and new features.

D3 v16.3 is among the first major DCS versions to support Windows Server 2022. Windows Server 2019 is also supported for the system servers. Operator consoles and small display servers use Windows 10 Enterprise LTSC 2021 or LTSC 2019.

Valmet D3's core HMI system, the ProcessVision Console (PVC), is also upgraded with additional features, making it more user friendly. Engineers, technicians, and operators use the PVC to control processes, view and troubleshoot detailed system and IO information, and to monitor trend data.

Integrating Valmet's PID Loop Optimiser into D3 is one of the most significant value-added improvements. The optional layered product supports tuning PID and PRF loops and can be launched from Valmet ProcessVision. With the PID loop tuning software directly embedded in D3, the operator can call up the loop tuning software directly from their workstation; it will analyse the performance of the loop and make recommendations for tuning that can be copied or downloaded directly back to the controller.

Plant engineers and processors can now integrate new performance features into existing D3 DCS.

This means operators can tune PIDs with confidence, with accurate parameters for the required process response. Operators have control over the tuning selection and can also tune specialised loops.

D3 v16.3 also supports the newest controller in Valmet's PCM4 line, the PCM4100A. This has a 5-slot backplane rather than the 4-slot backplane of the PCM4100.

The main advantage for D3 customers is they can now upgrade a 20-plus-year-old Robo CPU to new hardware without losing any I/O slots in a redundant controller configuration. This is all part of Valmet's aim to help customers maintain long-lived systems at their plants. □

Gerhard Greeff, Iritron.

Proper planning is key to successful system integration

Gerhard Greeff – Divisional Manager Process Management & Control, Iritron

At face value, upgrading your control system by integrating Programmable Logic Controllers with Supervisory Control and Data Acquisition systems should be a simple seamless process. However, the industry is plagued with control system integration and upgrade myths and misconceptions that can lead to liability issues, project delays, cost overruns and decreased plant performance.

In modern manufacturing, PLCs with SCADA systems are widely used, as they enable manufacturers to collect and monitor real-time data from various production processes. Their integration into control systems allows manufacturers to optimise production processes, reduce disruptions, and enhance overall efficiency.

The PLC has become indispensable as the 'brain' that controls and monitors various systems and processes. With the ability to integrate with other systems and applications, PLCs have become increasingly sophisticated and powerful over time. Hence the integration of PLCs provides numerous benefits, including increased productivity, efficiency, and quality.

But integrating PLCs with other systems and applications is not straightforward and requires a high degree of skill and understanding. It is the system's complexity that can be difficult to comprehend and requires an 'eat the elephant' approach of careful planning and design logic.

Many factors can influence the decision on specifying a PLC model for an integration application. Some key considerations are outlined below.

Electrical capacity: PLCs have different voltage requirements for their power supplies, so check to ensure the selection is compatible with the installed electrical system.

Processing speed: Check the PLC model's CPU speed to determine whether it meets the application's needs.

Compatibility: Ensure the PLC model is compatible with any new or existing system hardware, whether that is power supplies or DIN rails.

Selecting the right PLCs and SCADA systems and ensuring compatibilities with existing systems is critical.

Temperature tolerance: Most PLCs are designed for safe operation within the range of 0 to 60°C. There are some specialised PLC models that can operate at extreme temperatures, which is important for facilities with unusually hot or cold manufacturing conditions.

Memory: A PLC needs sufficient ROM and RAM to execute the processes it is intended to automate. The controller uses ROM to store its operating system and instructions and RAM to execute its functions.

Connectivity: Make sure the PLC has enough input and output ports, and make sure it can connect to the type of peripherals that the existing system requires.

Analogue I/O: Although PLCs are primarily used for discrete functions, some models also have analogue inputs and outputs that can control processes with continuous variables.

Taking account of all these issues, it is clear that besides skill and understanding, planning is crucial in ensuring the success of an integration or upgrade project. During the planning process the following steps are recommended.

- Define the project deliverable limits
- Establish an approved and documented control philosophy – without this, the project is set up for failure
- Define and document the PLC and SCADA standards
- Develop a Functional Design Specification based on the control philosophy before starting on PLC programming.

Although it might seem obvious, it is essential to check the state of the equipment.

Check the switchgear: Ensure contactors and auxiliaries are working properly – they may have changed.

PLC connections: Ensure the PLC connections are on and there is communication between them through a proper channel and not via the I/O server.

Field instrumentation: Check the state of the field panels and the proxy readings.

PLC communication: Look for missing parts in the PLC and SCADA systems.

SCADA scripts: Identify and find the scripts in the SCADA system. This will help avoid any hurdles during commissioning.

Take before and after videos and make notes to record what is currently in the plant and as importantly, what has been delivered and installed.

Proper planning is crucial to the success of a project and by following these steps, system integrators and their customers can ensure they have the right control philosophy, standards, and communication to avoid issues during commissioning and ensure the success of the project. □

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

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Peter Marumong, Schneider Electric.

Bridging the skills gap in water management

Peter Marumong, Cluster WWW Segment Leader at Schneider Electric

The Department of Water and Sanitation's (DWS) Annual Performance Plan for 2023/24 to 2025/26, published in May 2023, outlined the challenges faced by the South African water sector. These include poor maintenance, recurring droughts driven by climatic variations, inequities in access to water and sanitation, deteriorating water quality and a shortage of skilled water engineers.

These challenges are widely recognised, each adding to the country's water constraints and disruptions. With regard to the shortage of skilled water engineers, the challenge is compounded by factors such as an aging workforce, limited educational opportunities, and low industry attractiveness.

Here, automation and technology offer some solutions. Although they do not present the silver bullet to eliminating the country's skills shortage in the water and wastewater sectors, they can provide utilities and operators with the tools to alleviate some of the immediate skills challenges.

Evolution instead of revolution

The marketplace for automation in water and wastewater is mature. Application-centric solutions decouple software from hardware, enabling end users to design adaptable systems that respond to evolving supply and demand.

Automation offers native IT/OT integration, thus eliminating the need for complex gateways. This makes for user-friendly systems that benefit all stakeholders, including engineers, plant operators, systems integrators, and machine builders.

Furthermore, designs can be simulated and tested virtually before being deployed, and once the design is defined as a digital asset, it can be 'dragged and dropped' in the user interface. Additionally, automation enables streamlined maintenance and troubleshooting as system information remains up to date throughout an asset's lifecycle.

Automation and technology can help the water sector overcome some of the challenges it currently faces.

This approach significantly reduces the workload of engineers, control room operators, and maintenance personnel. Access to up-to-date information improves overall uptime and reliability. The mean time to repair (MTTR) is shortened, as technicians no longer need to search through multiple sources for the data they need.

Automation solutions do not require an all-or-nothing approach. Water and wastewater systems' operators can use it at smaller scale, preserving current investments and minimising training needs. A 'wrap and replace' approach allows for existing and new systems to run together, and automation can be gradually scaled up as the financial benefits materialise.

Where automation can help

Automation technologies offer a viable solution to supplement some of the skills lacking. By integrating automated systems and processes, utilities can reduce the need for manual intervention and specialised expertise. Automation also offers wider benefits such as:

- Enhanced efficiency – automated control systems monitor water treatment processes continuously, optimising parameters and adjusting operations in real time. This reduces the reliance on skilled personnel to oversee complex processes manually.
- Remote monitoring and asset monitoring enable experienced professionals to provide support and guidance to less experienced workers from a distance. This kind of virtual collaboration facilitates knowledge sharing and skills transfer, even in geographically dispersed locations.

Thus, automation offers some valuable solutions to bridging the skills gap and addressing other challenges in water and wastewater sectors. However, investment in skills development must continue to be a priority. Over the medium to longer term, the integration of automation and skilled personnel will play an important role in enabling water and wastewater utilities to overcome some of the most pressing challenges they face. □

For more information visit: www.se.com

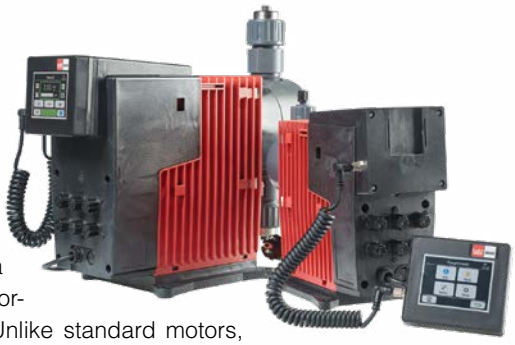
Improved dosing of aggressive chemicals

Gentle and low-pulsation dosing of aggressive chemicals without pressure peaks and with minimised dead time. This is made possible by MEMDOS SMART, a new stepper motor-driven dosing pump from Lutz-Jesco. The Industry 4.0-compatible dosing pump can be operated as easily and reliably as a smartphone via its full-colour touch display.

Wastewater treatment plants, power stations and car washes all need to dose aggressive chemicals on a daily basis: wastewater treatment plants have to dose flocculants into the water, power stations have to dose rust inhibitors to their piping, and car washes need to dose detergents to their cleaning brushes. These substances are often introduced via dosing pumps equipped with a diaphragm in the dosing head. The backwards movement of the diaphragm generates negative pressure in the pump head, which draws liquid in. When it moves forwards, the fluid is expelled from the pump head.

It is a simple and reliable principle with just one downside: conventional models on the market usually work with standard motors running at a constant speed that maintain equal diaphragm stroke times during priming and ejection. This is disadvantageous because fluid delivery stops during the vacuum generation phase. The constant interruptions reduce efficiency and they lead to a phenomenon known as 'pulsation'. This can cause pressure fluctuations in the lines that impair the accuracy of the dosing and, in the worst case, result in damage and outages.

"Pump operators often have to buy expensive accessories such as pulsation dampers to manage this detrimental effect," says Steffen Roth, Head of Development at Lutz-Jesco GmbH. "Our new generation of diaphragm dosing pumps – MEMDOS SMART – provides an economical alternative."



Core to the new diaphragm dosing pumps is a drive with a microprocessor-controlled stepper motor.

Core to the new diaphragm dosing pumps is a drive with a microprocessor-controlled stepper motor. Unlike standard motors, the stepper motor can be run asynchronously. This means the dosing pump can operate at different speeds for the suction stroke and pressure stroke. It enables operation of the motor at a higher speed during suction, thereby creating negative pressure which draws in the fluid more quickly. The vacuum phase, a dead time with standard motors, is reduced to a minimum. After priming, the stepper motor then operates at a slower speed to expel the fluid in a controlled and even way, without an abrupt increase in pressure. A slow mode is available for highly viscous media.

"The stepper motor enables an almost constant supply stream, which permits the gentle, low-pulsation dosing of aggressive chemicals without pressure peaks and with minimised dead time," Roth emphasises. The repetitive accuracy of the MEMDOS SMART series diaphragm pumps is +- one per cent across the entire dosing range. "The stepper motor-driven diaphragm dosing pumps meet the need for high-precision reproducible industrial dosing applications."

The MEMDOS SMART is available in eight performance levels, with delivery rates ranging from two litres per hour at a pressure of 20 bar up to 180 litres per hour at four bar. There are four different versions to cover all market requirements. □

Floating connectors for factory automation

New products available from Mouser Electronics and through TRX Electronics in South Africa include TE Connectivity's Vertical USB 3.2 A Gen 1 THT Receptacle Connectors and Harwin's Flecto Floating Connectors.

The Flecto Floating Connectors are ideal for high-performance applications with multiple micro-pitch interconnects. They are designed to provide movement in the X, Y, and Z axes of the male connector, and the movement allows for added location tolerance. Flecto connectors feature low-stress mating connections with mated heights up to 29.9 mm nominal, and the mating area of the male connector can move by up to ±0.8 mm from the centreline. This design compensates for positional misalignment across multiple connectors, eases stresses from misalignment, and helps maintain the contact force over time.

Harwin Flecto Floating Connectors are suitable for factory automation applications. They can be used, for example, for drives and controls, robotics, sensor units and vision systems. They are also suitable for various applications in electric vehicles, LED displays, and security cameras.

Harwin Flecto Floating Connectors are suitable for use in factory automation and other applications.

TRX Electronics is the authorised independent representative for Mouser Electronics Inc. in South Africa. Mouser is one of the largest global distributors of semiconductors and electronics components. It specialises in supplying prototyping quantities for engineering design and new product development. TRX Electronics supplies electronic components from Mouser Electronics for delivery in South Africa, with local customer service and support.

For more information visit: www.trxe.com

Digital technology can transform the food sector

Glen Koster, Area Sales Manager, Bühler Johannesburg says digitisation has the potential to advance almost every aspect of the food industry. "Harnessing the power of digital technology means we can address important issues such as food safety, transparency along the value chain, energy conservation and waste reduction more efficiently than before."

In line with the trend towards increased digitisation and automation, the all-new Arrakis MRRK roller mill from Bühler incorporates a host of new features and improvements. With state-of-the-art hardware and software, the new roller mill enables smoother production and enhanced operational efficiency.

The feeding unit provides a continuous product flow and ensures an even spread of product for the grinding rolls – a key step for an effective grinding process. The design has been kept deliberately simple with the fixed-speed feeding roll connected directly to the drive of the main roll, so there is no need for an additional motor and frequency converter.

"This straightforward system ensures less time is needed for installation and maintenance," says Koster.

He adds that the heart of the Arrakis is the grinding unit, which delivers stable, reliable grinding performance. "A proven loadcell sensor is used to keep a constant product level in the inlet and adapts the feeding gap to ensure a steady product flow over the entire gap of the grinding rolls. This increases operational reliability and reduces the need for operator intervention."

When the machine is not in operation, the feeding gap is closed automatically, preventing any accumulation of product between the rolls. This saves time and energy when restarting the Arrakis. A quick release function allows fast opening of the feed module. With its wide opening angle, the cleaning flap ensures the rapid discharge of any product remaining in the feed module. All these design features save time by simplifying cleaning operations, streamlining the required steps.

The Arrakis MRRK roller mill incorporates advanced hardware and software that enable more efficient production.

In terms of control, the Arrakis has an intuitive interface that provides a quick, simple overview of key operating parameters. It makes control and monitoring of the roller mill straightforward. An integrated touchscreen is available as an optional extra and is not essential to control the roller mill.

"Safety is a priority for Bühler, and the Arrakis incorporates several protective features to ensure safety without hindering performance," says Koster. Perforated side panels allow for quick and safe inspection of the machine while it is running. Additionally, optimised airflow provides for improved cooling. Safety grids protect roller mill operators from moving parts yet afford them optimal access for product sampling.

The sturdy design of the Arrakis, the robust casting frame with the load-carrying structure translate into a high vibration absorption. This durability ensures reliability for long operating periods. The Arrakis MRRK is built to the same footprint as the MDDK model, allowing one-to-one replacements where applicable. Installation is fast and simple with no need to adapt the flowsheet or extend the existing building. □

Supporting automation efficiency

RS South Africa, a trading brand of RS Group plc, a global provider of product and service solutions, has launched RS PRO Automation Efficiency – expanding its portfolio with over 1 100 new products across more than 18 technologies, to support automation efficiency. The extended range reinforces its commitment to providing comprehensive and cutting-edge solutions for industrial automation.

RS PRO offers a comprehensive range of products across different technologies to support efficiencies in industrial automation.

Ensuring efficiency in industrial automation processes is essential to improving plant performance in terms of output, energy saving, reduced resource consumption and minimising environmental impact. "RS PRO offers a set of products across multiple technologies to maximise automation efficiency and keep production lines fully effective," says Sales Director Erick Wessels.

Adding to its existing range of over 45 000 products in this area, with this new launch RS PRO aims to offer customers a growing and comprehensive selection of products at a competitive price. From logic controllers and push buttons to Cat6 cables, circuit protection, energy-saving lighting and more, RS PRO offers a one-brand solution to meet diverse industrial automation needs.

The Automation Efficiency range will serve various sectors, including food and beverages, paper and packaging, pharmaceuticals, chemicals, oil & gas as well as equipment manufacturing, utilities, energy and engineering services. It will support designers, machine builders, and maintenance teams, providing a comprehensive offering that meets design and compliance specifications at every stage of the product lifecycle. □

Pioneering local manufacture of MV soft starters

Pervin Gurie, Director of the Digital & Systems Division at WEG Africa.

In a first for South Africa, medium voltage soft starters are now being manufactured locally by WEG Africa – reducing lead times and presenting a more cost-effective option for customers. Director of the Digital & Systems Division, Pervin Gurie, says the company has already supplied 11 locally made units to a mining customer in Angola.

The WEG SSW7000 units are produced at WEG Africa's Robertsham facility south of Johannesburg to the high quality standards for which the company is well known. Gurie says the SSW7000 range is well regarded by the market. The soft starters are used extensively in pump and fan applications in Africa's mining sector.

"As the demand for our MV soft starters has grown in recent years, we recognised that we could offer customers considerable benefits by manufacturing the products locally," says Gurie. "The immediate benefit is that we can almost halve the lead time from 20 or 24 weeks to 10 weeks, by removing the need for long-distance shipping from WEG's Brazil facilities."

He notes that the value of soft starters has come to the fore as users look for ways to address the rising cost of electricity, as well as to protect installed electric motors and extend their operational lifecycle. Soft starters allow for a gentle ramp up of power as electric motors are started, reducing the peak energy demand during startup. Motors starting with a conventional direct-on-line (DOL) starting system will draw up to 700% more power than the respective motor's rated current, and a soft starter can reduce this to about 300%.

"At our Robertsham design and production facility we already manufacture a range of variable speed drive panels and motor control centres, among other solutions," Gurie adds. "Our customers are always impressed by our infrastructure and expertise here, and we look forward to welcoming more of them when they visit to inspect the new MV soft starter manufacturing area."

The local manufacturing capability will include the continued customisation of MV soft starters in units designed to meet customers' specific applications.

The local manufacturing capability will include the continued customisation of MV soft starters, where units are designed to meet specific requirements in customers' applications. Gurie highlights that solutions can also be packaged in a containerised substation, as was the case with the recent order for the mining customer in Angola.

"The order for 11 units, which we built last year, was delivered in three containerised substations, and could be transported easily and installed on site for quick commissioning," he says. "We have also found that customers in Africa have particular needs, such as extra space in their panels to accommodate thicker cables with less flexibility."

He sees ongoing potential for the WEG SSW7000 range and highlights that the units include a monitoring feature which tracks whether the electric motor is overheating or drawing excessive current. This allows for the motor to be shut down before damage is caused.

"To produce the MV soft starters locally, we have applied our stringent manufacturing quality systems that are in place at our Robertsham facility," he says. "We use the proven WEG designs from our head office in Brazil, as well as technical input from our engineers there, as and when required. This assures customers that all the units continue to be produced to WEG's world class standards."

For more information visit: www.weg.net

Improving energy efficiency in LV motors

ABB is launching an online calculator to help businesses gain the benefits of improving energy efficiency in low voltage motors used in pump and fan applications.

The 9th Global Conference on Energy Efficiency, hosted by the International Energy Agency (IEA) in May in Nairobi, brought together government and business leaders from around the world to address ways in which the goal of doubling progress towards energy efficiency by 2030 can be achieved to meet emissions reduction targets, as agreed at COP28, and cut energy costs. However, a recent report from the Energy Efficiency Movement indicates that although there is optimism and appetite among businesses to invest in energy efficiency, there are barriers, including a lack of specialist resources (33%).

Addressing this gap and to help businesses take the first step towards improving energy efficiency, ABB's online calculator offers easy access to data insights based on the energy performance of motor-driven systems. By inputting basic details about their motor fleet, running hours and average operating power, users can estimate energy and emissions savings, and payback period. The online calculator is a 'light' version of the in-depth energy efficiency audit used by ABB's experts in a full study and is based on the same algorithm.

The online calculator helps organisations move towards improving energy efficiency.

"Improving energy efficiency is one of the fastest and most cost-effective ways for industrial organisations to

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Willem Strydom, Business Development Electronics Manager at SEW-EURODRIVE.

Closing the loop with control panel solutions

As companies in various sectors move towards a preference for single sources of supply, SEW-EURODRIVE South Africa, well known for its geared motors, frequency inverters, controls and software, highlights that it also supplies complete electrical control panels. Providing all these products together, the company helps customers streamline their costs and supply chain.

Willem Strydom, Business Development Electronics Manager at SEW-EURODRIVE, says there has been a strong trend in recent years in companies wanting to deal directly with original equipment suppliers (OEMs). The preference is moving towards a single source of supply to reduce cost and risk, and to simplify the supply chain.

"The market in many industries – from mining to agriculture – has made it clear that they can no longer afford 'middlemen' in the procurement process," says Strydom. "Companies want to deal with one supplier, preferably a specialised OEM who has a depth of expertise and can stand behind their solutions with the necessary support."

Responding to these needs, SEW-EURODRIVE is pursuing a strategy of complementing its existing range by steadily adding more value – or closing the loop, as they say. Control panels are another key aspect of most contracts in which the company is involved, so it has actively moved into this space to make sourcing and supply easier for customers.

"There are relatively few OEMs in our field in this region, which gives us the opportunity to broaden our offering and provide customers with comprehensive high-quality solutions and the assurance of local support," he says. "With one of the largest sales forces in the country and on the ground representation across Africa, SEW-EURODRIVE delivers a high level of service to support our mechanical and electronic capability."

The company's in-house engineering team designs control panels for specific applications where its drive technology is being applied, and it provides the programming required. The local assembly of the units also aligns with efforts across many industries to support the local economy and secure their supply chains against possible disruption.

View inside an SEW-EURODRIVE wall mount panel.

"Our customers are looking for the same high quality of ancillary equipment as they receive with all our other products and solutions," says Strydom. "With our established reputation in the market, customers trust that we will deliver what they need."

The design and manufacture of SEW-EURODRIVE South Africa's panels and enclosures can be adapted to suit any customer requirement, including providing for floor mounts or wall mounts, and with ingress protection (IP) ratings up to IP65 or whatever the application demands. The panels can also be supplied for containerised solutions such as e-houses, which are increasingly popular around Africa on remote mining sites as well as other industrial applications.

"Although our focus in the past has been on our specialised componentry and solutions, our customers have requested our broader involvement in their projects – leading to us entering this important space," Strydom says. "By taking responsibility for delivering a wider scope of related equipment, in line with SEW-EURODRIVE's recognised quality standards, we have consolidated our relationships with customers."

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

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reduce their environmental impact and operating costs," said Erich Labuda, President of the Motion Services division at ABB. "However, many businesses lack the data insights needed to act. Our new online calculator democratises access to this valuable information and helps businesses understand the scale of the opportunity."

The calculator provides an initial estimate of the potential energy and cost savings achievable by upgrading pump and fan systems driven by low voltage direct online (DOL) motors, which are installed without a variable speed drive (VSD) to control their speed. The calculator focuses on low voltage motors of efficiency class IE3 and below. It estimates the energy savings that could be achieved by upgrading to the latest motor and drive technology – the IE5 SynRM package – for optimal energy efficiency gains.

After seeing the potential results, the next step in the energy efficiency journey is a full energy efficiency audit, where ABB's experts gather site-specific data to identify an operator's top opportunities for saving energy. Once the audit recommendations have been implemented, a further step for customers is to protect their investments with customised service agreements that keep their motors and drives operating efficiently and reliably through their lifetime.

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

Multifunctionality in plant signal conditioning

Often, plant managers have a deep understanding of all the key operational challenges in their facility and a broad knowledge of the instrumentation that can help solve them. However, they might not always be aware of the latest innovations that can make their lives easier: for example, multifunctional monitoring instrumentation that simplifies all plant measurement and control processes.

Here, Ian Loudon, International Sales and Marketing Manager at Omniflex, explains the challenges of plant signal conditioning and how multifunctional modules play a crucial role in monitoring applications across the industrial sector.

Streamlining technology is one of the most effective ways to innovate. In almost every industry, it's likely that a business will opt for a single solution with multiple functionalities rather than a selection of specialised products – providing it doesn't compromise on quality.

The same applies in signal conditioning. Essentially, signal conditioning converts physical qualities into readable data that can be processed by computer systems. Often, applications are complex with multiple specialised components configured to measure a single physical property, for example line linearisation in tanks. Across all industries, this approach quickly becomes impractical in signal conditioning applications because there are multiple physical processes requiring 24/7 monitoring.

In an industrial plant environment, physical processes must be working efficiently and must be measured accurately. They act as catalysts for each other, constantly propelling an efficient plant operation, which is why signal conditioning is an integral interface in plant management.

Tank monitoring and linearisation

Tank monitoring, for example, typically involves measuring the volume of liquid (or other materials) in storage tanks and detecting issues like overflows and leaks before they cause major structural and environmental damage or possibly safety incidents. This can often be a straightforward process, but it becomes trickier if the tank is uneven or awkwardly shaped as this can make it harder to read levels – which will require additional mathematical computations beyond simply reading the analogue signals.

An example of this would be in petrochemical applications where spherical tanks are commonly used. Here, liquid levels inside the tank don't rise in linear proportion with liquid volumes and additional mathematical calculations are needed to work out liquid volumes from the readable tank level. In such applications, the Omniflex TFX module finds its place, acting as a 'one stop shop' for signal conditioning. It has the capability to manipulate analogue signals and configure the appropriate mathematical functions, which means it can be used to measure multiple physical properties at once.

Tank monitoring can present specific challenges and the TFX module provides a safe and accurate multifunctional solution.

Additionally, it has a SIL-1 rating which makes the module suitable for use in harsh and hazardous environments where safety is a key consideration. This is critical in petrochemical applications where the potential for combustion and explosion must be factored into all operational decisions.

Applied to the challenges that arise in tank monitoring, the TFX module provides an easy mitigating solution. In the case of differentiating tank shapes, for instance, it works out the volume of conical or spherical tanks without the need for additional kit.

Tanks can also deform – often due to pressure or temperature changes over time. They could have minor denting that is not severe enough to warrant a replacement – but the shape of the tank has changed and original linearisation data is obsolete. This can be mitigated easily using the TFX module to monitor linearisation because it can calibrate itself to adjust to the subtle deformations.

Due to the multifunctionality of the device, the risk of a tank leaking is significantly reduced. The TFX's ability to adapt means the data collected is accurate even when unconventional physical properties are present. This means that any issues with the tanks can be addressed and resolved quickly and the chances of significant errors occurring – like tanks leaking – decrease significantly.

Finding the right signal conditioning application is critical to plant operations. Multifunctional modules like the TFX smooth out the monitoring process and maintain the accuracy needed for successful data monitoring. □

For more information visit: www.omniflex.com

Fast multi-channel data acquisition made easy

A new option from Spectrum Instrumentation offers system designers a user-friendly way to create multi-channel data acquisition systems with ultrafast sampling speeds up to 10 GS/s. The Star-Hub allows up to eight of the company's PCIe digitisers (M5i.33xx series) to be connected together. Individual cards then share common clock and trigger signals, which ensures there is minimal phase delay and timing skew between all the channels. The Star-Hub option is installed by mounting a single piggyback module onto any of the M5i series cards in the multi-channel system. Using accurately matched and shielded coax cabling, the board distributes the clock to each module and precisely synchronises the trigger event with the system clock.

Star-Hub can be used with any of the cards from Spectrum Instrumentation's M5i.33xx digitser family. Seven different models are available offering one or two channels, sampling rates from 3.2 to 10 GS/s, 12-bit vertical resolution and bandwidths from 1 to 4.7 GHz. The cards can handle a wide range of signals and feature programmable input voltage ranges, offset control, large on-board memories, advanced trigger functions and several different acquisition modes. Together with Star-Hub, the line-up lets the user build data acquisition systems with 2 to 16 channels, sampling at rates of up to 5 GS/s, or up to 8 channels at the maximum sampling rate of 10 GS/s.

Users can also choose to run the Star-Hub system with the digitiser card's internal clock, which offers better than ±1 ppm accuracy, or an external clock, via a front panel SMA input connector. To minimise any channel-to-channel timing skew, there is a programmable skew adjustment available for each connected card. This feature allows time shifts up to 200 ps (10 GS/s) or 312 ps (3.2 and 6.4 GS/s) of the clock of each individual card. It thus creates an easy way for users to correct any timing mismatches that may be present in their setup.

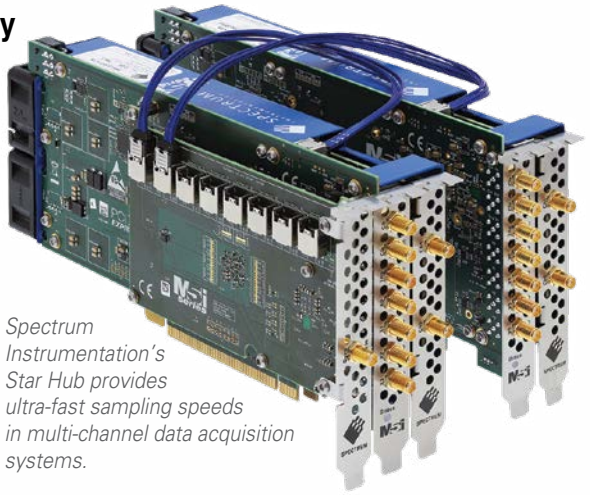
The ability to create customised multi-channel data acquisition systems, that can synchronously acquire signals in the GHz range, is ideal for a variety of applications. For example, they can provide a unique measurement solution in fields like communications, automated testing, aerospace and scientific experimentation, where banks of receivers, detectors, sensors or antennas are deployed.

Fast data transfer for processing and storage

Another advantage of the Star-Hub system is that each card retains its own 16-lane, Gen3, PCIe bus, capable of transferring data at rates up to 12.8 GB/s. This transfer speed allows continuous transfer at 6.4 GS/s in 12-bit mode, or up to 10 GS/s in data-saving 8-bit mode. The bus allows the cards to shift acquired data to PC resources like memory, SSDs and GPUs at exceptionally fast speeds, even though they are all controlled by a single host processor.

Multi-channel control and display

Specifically designed for multi-channel systems, Spectrum Instrumentation also has its own measurement software: SBench 6 Professional. This interactive GUI can control all the cards connected with Star-Hub. It runs on PCs, using either Windows or LINUX operating systems, and provides complete instrument control, along with display, analysis, storage and documentation capabilities. SBench 6 can handle large data files and has several processing tools, including a plug-in interface that allows the use of custom calculation functions. There are also cursor and parameter functions that enable cross-channel measurements, as well as various import and export filters.



Spectrum Instrumentation's Star Hub provides ultra-fast sampling speeds in multi-channel data acquisition systems.

Software development kit

Every M5i digitiser is shipped with a software development kit (SDK) as standard. The SDK allows for the modules to be programmed with almost any common language; it contains various programming examples and all the driver libraries necessary for running under a Windows or LINUX operating system.

Care-free operation

Oliver Rovini, CTO at Spectrum, says: "Providing an easy-to-use solution for the multi-channel acquisition of signals in the GHz range is something our customers have been requesting for some time. However, when using modular instruments, this is not a simple task. You need to deal with clock systems designed to handle a variety of rates and typically use a phased lock loop (PLL) type architecture. Furthermore, each card has its own trigger circuitry that uses comparators to detect trigger level crossings. At the speeds we are working at, any small differences in these reference levels can easily produce unwanted jitter. The beauty of Star-Hub is that it takes care of these issues so the user doesn't have to deal with them The setup is straightforward and, once the cards are connected together, the drivers manage all the necessary clock and trigger distribution conditions for the user."

The Star-Hub option can be ordered with any new M5i.33xx series digitiser cards. Spectrum Instrumentation's products are available in South Africa via Vepac Electronics. □

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Using oil efficiently, protecting plants effectively

The LDH112 sensor from ifm continuously monitors the relative humidity and temperature of oil so potential problems can be identified and prevented.

The oil humidity sensor LDH112 from ifm, continuously monitors and measures the relative humidity and temperature of oil in use in a plant. This enables plant operators to carry out condition-based changes and maintenance. It allows for the medium to be used with maximum efficiency and thus plant damage, due to reduced cooling or lubricating action, can be avoided. Corrosion and cavitation caused by free water can also be effectively prevented.

With its standardised process connection and M12 connector, the LDH1xx can be put into operation easily and correctly, and with the IO-Link technology the data can be used for IT-based condition monitoring. The stainless steel housing withstands the harshest conditions of the operating environment permanently.

Enabling condition-based maintenance

To ensure the efficiency of hydraulic systems, oil samples are usually analysed at regular intervals. This involves specific effort and costs. By contrast, the continuous measurement of oil humidity allows for condition-based maintenance to be conducted as required, enabling reduced costs and less system downtime.

Early steps against corrosion and cavitation.

Moisture in the hydraulic oil can cause component corrosion and cavitation, which can damage the pumps, resulting in complete component failure, unplanned downtime and repair costs. The LDH1xx provides information about the current humidity content of the oil, which means the plant operator can initiate countermeasures in good time to prevent water from penetrating the system. Possible points of entry, such as damaged seals or open oil tanks, can also be detected.

Consistent system efficiency.

The quality of oil decreases with increasing oil humidity and this reduces the efficiency of the filter and lubrication and has a negative effect on the ageing of the oil. By measuring the oil humidity consistently, the quality of the oil can be determined and measures can be taken to prevent the oil from losing its properties and its effective lubrication.

Added value with IO-Link

The added value of IO-Link enables convenient set-up: the sensor can be configured quickly and easily. If the device is replaced, the parameter sets are written directly to the new device.

IO-Link also supports transparent processes: oil humidity and temperature can be checked digitally at any time. And using digital communication, the risk of conversion losses in data transmission is excluded.

The sensor is also available with two analogue outputs.

For more information visit: www.ifm.com

Reliable valves for gas applications

GEMÜ butterfly valves in the GEMÜ R480 Victoria series and the GEMÜ B20 ball valve have been awarded gas approval by DVGW (German Technical and Scientific Association for Gas and Water).

The GEMÜ R480 Victoria and GEMÜ B20 are suitable for use with different gases, such as natural gas and biogas (the main component of which is methane), propane and liquid gases containing butane. They are approved for gas production, treatment and injection. This includes use for combustible gases in gas families two and three in gas burners and gas appliances. It also includes the use of hydrogen. The DVGW regulatory code is used to confirm the ability of these valves to work reliably and precisely in different gas environments.

GEMÜ butterfly valves in the GEMÜ R480 Victoria series (right) and the GEMÜ B20 ball valve (left) have been awarded gas approval by DVGW.

The butterfly valves are available in nominal sizes DN 25 to DN 600 and can be ordered with the 'G' (the marking for gas) special function. The GEMÜ B20 ball valve in nominal sizes DN 8 to DN 65, which also has the 'G' special function, is suitable for use with combustible gases. A yellow hand lever is available as an option for better visual identification. A type examination was carried out for both quarter turn valves in accordance with DIN EN 13774.

The GEMÜ R480 Victoria butterfly valve is certified and listed under registration number DG-313CQ0540, and the GEMÜ B20 ball valve under registration number 22-00143-AB01-130. □

New generation metal analyser

Leading manufacturer of analytical instruments, SPECTRO, has introduced the SPECTROCHECK LMM02 Stationary Metal Analyser – an affordable solution to meet the performance demands and budgets of small foundries, automotive suppliers, and other metal fabricators.

The latest generation SPECTROCHECK analyser delivers an industry-leading combination of lower cost of ownership with continued precision, stability, reliability, and unmatched analytical performance – at what SPECTRO considers the lowest possible price. It is suitable for routine elemental analysis of a variety of metal samples (including iron-, aluminium-, or copper-based metals) and delivers reliable test results that meet the most demanding specifications for content and quality.

Key advances of the latest SPECTROCHECK model include ultra-fast one-sample standardisation based on SPECTRO's Intelligent Calibration Logic (iCAL) which saves an average of 30 minutes daily. Compared to the previous model, the new argon-saving features allow total flow shutoff during downtimes and 70% less argon consumption during standby. In addition, the redesigned, space-saving housing makes it 35% more compact and is configured with greater accessibility for easy, safe functionality and maintenance.

Engineered to improve performance and usability, the new analyser includes new hardware components, plug-in functionality to enable users to pay only for the functions they need, and iCAL logic to eliminate time-intensive recalibrations. Its patented optical technology, optimised for elements found in common foundry metals, provides precise performance across the entire application – relevant spectral range, minimal spectral interferences, and high stability – and enables better separation of neighbouring spectra in line-rich analyses.

The SPECTROCHECK LMM02 Stationary Metal Analyser is newly available from SPECTRO Analytical Instruments.

With fast, easy startup and intuitive operation, SPECTROCHECK is simple to run and maintain, even for operators without specialised knowledge. Its plug-in design allows for affordable customisation to add additional software modules as needs evolve.

Maximum uptime, optimum performance, and long equipment life are supported by AMECARE Performance Services, also part of the Ametek Inc group of businesses. With a team of experienced service engineers it provides customised support internationally. □

Effective lighting for industrial applications

Effective lighting is important to productivity and safety in general warehousing, manufacturing facilities and logistics centres. For such applications, BEKA Schréder recommends its highbay ranges – ECOBay and LEDBay – designed and manufactured in South Africa to deliver high-quality lighting solutions with reduced energy and maintenance costs

Choosing LED highbay lighting customers gain cutting-edge illumination solutions and contribute to growing local industry and the economy. They also benefit from BEKA Schréder's local presence and value-added service.

LEDBay range

The LEDBay range is designed for optimal performance in illuminating various industrial applications at a reduced total cost of ownership and without compromising on light level requirements. This efficient solution suits lowbay and highbay applications, outperforming other fixtures with its energy savings and long-lasting performance.

With a wide range of lumen packages, various light distributions, and mounting options, the LEDBay can be used for indoor and outdoor lighting needs. It is suitable for hazardous environments that require Zone 2 or 21/22 rated luminaires. Additionally, the LEDBay-MIDI offers a battery backup version for use in emergency applications. The recently launched LEDBay-MAXI is specifically designed for highbay applications with unique criteria such as high mounting heights and temperatures.

By creating a comfortable environment for employees and minimising energy consumption, the LEDBay reduces initial investment and lowers maintenance costs with its reliable performance and minimal maintenance requirements.

ECOBay range

The ECOBay range offers ideal lighting solutions for industrial facilities providing optimised light levels and a sound return of investment. It offers a cost-effective high-efficiency option for lowbay and highbay applications, providing substantial energy savings and high performance and can operate at high ambient temperatures.

BEKA Schréder's ECOBay and LEDBay highbay luminaires make lighting an asset.

Available with a selection of lumen packages and various light distributions, the ECOBay is suitable for multiple indoor lighting applications.

At a lower initial cost the ECOBay delivers a maximum return by providing a comfortably lit environment for staff and limiting energy consumption to only what is necessary. With its reliable performance, low dust accumulation and no need for re-lamping or regular maintenance, the ECOBay is a favoured option.

As the average annual energy bill continues to rise, owners, operators, and managers of industrial facilities are always looking for ways to cut costs and improve employee productivity. BEKA Schréder's ECOBay and LEDBay highbay luminaire ranges offer suitable lighting solutions.

Added value service

BEKA Schréder offers customers additional service at no extra cost – providing an Initial survey, measurement and verification of light levels, an optimal 3D lighting design for the given project, and measurement and verification of light levels after installation. Using contemporary technologies, it aims to offer intelligent and sustainable lighting solutions to reduce energy consumption, as well as the overall cost of ownership. □

Championing PDS in surface mining safety

In South Africa, the adoption of Proximity Detection Systems (PDS) in quarries and surface mines is in line with the move towards heightened safety and adherence to regulatory requirements. With over 18 years at the forefront of PDS innovation, Booyco Electronics champions the integration of PDS systems and emphasises the importance of involving the people on site to realise the systems' full value in safeguarding workers.

Booyco Electronics emphasises that people play a crucial role in ensuring the successful use of PDS technologies.

Technology can play a key role in enhancing safety and ensuring compliance with statutory regulations. However, as the pioneer of PDS in South Africa Booyco Electronics has witnessed how important it is to engage the people who will use the technology to ensure its successful deployment.

Anton Lourens, CEO of Booyco Electronics, says that beyond the technical installation, the acceptance and willingness of employees to embrace the tools and adopt them in their daily operations are fundamental to their effectiveness. He advocates a comprehensive approach to change management that involves all organisational levels, from front-line workers to top executives, to ensure

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Training for workplace safety

As a leading provider of adult-based education and occupational skills training and a strong proponent of health and safety in the workplace, Dekra Institute of Learning (IOL) participated in the recent A-OSH expo, held in June. The exhibition focuses on delivering solutions to promote occupational safety and health and compliance with South Africa's Occupational Health and Safety (OHS) Act.

In many industry sectors, companies are increasingly taking ownership of health and safety. Recent events, such as the tragic building collapse in George, have spotlighted the need for accountability and such incidents are a sobering reminder of the need to adhere to quality protocols and best practices in terms of health and safety.

Dekra IOL is broadening its footprint and influence, as seen in the company's recent opening of a branch in Lephalale, Limpopo, serving a region where it has secured several key training contracts in the power generation and related sectors.

Dekra IOL's Head of Training and Consulting Christopher Mörsner says, "Having started only four short years ago, the team has worked hard and is focused on our aim of expanding our roots to create a brighter future for the communities we serve and for industry as a whole."

A-OSH Expo is the largest event in Africa dedicated to occupational health and safety and provides an ideally aligned context for Dekra IOL to platform its training services and its commitment to growing people through skills and occupational training and development.

"Over and above our QCTO-accredited courses and occupational health and safety training, Dekra IOL offers business and operational training, following a strongly client-centric approach," Mörsner says.

He emphasises the importance of a "knowledge bank and…chain of influence," in which occupational skills development and education provide long-term benefits beyond immediate job placements. Dekra IOL's 'pay it forward' approach to training focuses on making a difference – enhancing employability through adult-based occupational skills development and full qualifications – and thus making a significant impact in individuals' lives and in the communities in which they live.

Recently exhibiting at A-OSH 2024, Dekra Industrial and Dekra IOL aim to be recognised as the 'heroes of safety'.

"By improving even just one person's employability, we create a ripple effect – extending the circles of influence which impact the families and communities of those employed, and build socio-economic sustainability," he comments.

Safety means more than compliance

Mörsner adds that health and safety education leads to a significant organisational cultural shift in how industries and companies approach workplace safety and workers' wellbeing. "It is not only about compliance. Employers need to embrace occupational health and safety proactively, creating a culture of care and responsibility."

Safety is core to Dekra IOL's offerings, which include a range of occupational health and safety training courses such as behaviour-based safety, first aid, working at heights, legal liability, occupational health and safety management and process safety courses.

In addition, Dekra Industrial – parent company of the IOL in South Africa – offers non-destructive testing (NDT) and inspection, aimed at identifying and mitigating risks in a range of industry sectors. □

Continued from page 24

a unified understanding of the technology's purpose, benefits and operational impact.

Lourens points out that the successful implementation of PDS technologies not only promises to enhance safety in quarries and surface mining operations, it also influences other key operational aspects such as equipment availability and productivity. He emphasises the importance of clear communication about the technology's objectives to facilitate smoother adoption and minimise resistance among employees.

Drawing from the company's experience, Lourens highlights the setbacks in safety and productivity that can arise from inadequate change management, reinforcing the need for employee involvement in the process to ensure understanding and foster a sense of ownership.

In Booyco Electronics' approach, the change management strategy begins with a technical readiness assessment to tailor the PDS technology to the specific conditions of each site. It encompasses educating stakeholders about the technology's capabilities and limitations in particular applications, managing expectations and providing training that explains the rationale behind the investment and the operational mechanics of the technology.

Lourens also emphasises the importance of ongoing training and system optimisation based on user feedback, to ensure continuing success and inform potential improvements to the PDS technology. Additionally, he cautions against the unintended consequences of technology dependence, advocating for proactive management and continuous education to maintain the safety benefits of PDS implementations. □

VUT students gain insight into NDT

Consolidating the collaborative spirit of the December 2023 Memorandum of Understanding (MoU) between Two Roads Group and the Vaal University of Technology (VUT), Integrity NDT Projects, a member company of Two Roads Group, recently hosted a delegation of VUT students to offer them some insight into the world of Non-Destructive Testing (NDT).

The initiative aligns with the MoU's objective of cultivating future professionals in this critical field. The programme provided VUT students with an understanding of the role NDT plays in safeguarding the integrity and reliability of infrastructure, with a particular focus on South Africa's power generation sector. It covered various aspects of NDT.

Fundamentals of NDT and its significance in the power industry – This session provided a foundational understanding of NDT principles and its critical role in ensuring the safety and reliability of power generation infrastructure. Students gained insights into how NDT helps prevent catastrophic failures, equipment downtime, and potential safety hazards.

Implementation strategies for NDT at power plants – The students gained practical knowledge of how NDT techniques are used in power plants and which NDT methods are used at various stages of a power plant's lifecycle, from construction and commissioning to in-service inspections and maintenance outages.

A closer look at NDT processes and methodologies – The programme explored the various NDT methods employed in real-world scenarios, including:

- Ultrasonic wall thickness testing – This method uses high-frequency sound waves to measure the thickness of materials precisely and detect internal flaws that could compromise structural integrity.
- Positive material identification – This technique ensures components are constructed from the correct materials for optimal performance and safety. It can involve various methods such as spark optical emission spectroscopy or X-ray fluorescence analysis.
- Dye penetrant testing – A popular method for revealing surface-breaking cracks and discontinuities on a component's surface. A coloured dye is applied to penetrate the openings and then a developer is used to draw the dye out, making the cracks visible for inspection.
- Magnetic particle testing – This method is effective in detecting surface and near-surface cracks in ferromagnetic materials like steel. It uses a strong magnetic field to magnetise the component, and then finely divided magnetic particles are applied. The particles are attracted to areas of leakage flux, which can indicate the presence of cracks.
- Phased array UT – This is an advanced ultrasonic testing technique which offers more versatility and precision in flaw detection. By electronically controlling the direction and focusing of sound waves, phased array UT can be used to inspect complex geometries and welding points more effectively than conventional ultrasonic testing.
- Portable hardness testing – This method determines the hardness of a material at a specific location. Hardness is an important indicator of a material's strength and wear resistance.
- Radiographic testing – This technique uses X-rays or gamma rays to create images that reveal internal defects within a material. Radiographic testing is particularly valuable for inspecting welds and thick components where other NDT methods may have limitations.

Integrity NDT Projects recently hosted a group of VUT students to explore the practice of NDT.

Kabelo Molaudzi, Key Accounts Executive at Integrity NDT Projects, said: "We were delighted to welcome VUT students to our facility and share our knowledge of NDT. This was an opportunity to showcase the practical applications of NDT and ignite an interest in this field for the next generation of NDT professionals. We believe our collaboration with VUT will be instrumental in developing a highly skilled and qualified NDT workforce in South Africa."

Integrity NDT Projects is committed to continuous learning and staying abreast of the latest advances in NDT globally. This ensures it can provide its clients with the most effective and up-to-date NDT solutions. □

A first in electrical safety under the EcoTech label

Among the first products covered by the recently launched Siemens EcoTech labels, and the first electrical safety product under the EcoTech banner, is the SIRIUS 3RV2 circuit breaker which makes use of plastic components produced using more eco-friendly fuel.

Siemens Smart Infrastructure and BASF announced the launch of the new circuit breaker which includes components made from biomass-balanced plastics. Used across industrial and infrastructure applications, Siemens SIRIUS 3RV2 circuit breakers are now being manufactured using Ultramid® BMBcert™ and Ultradur® BMBcert™ from BASF, where fossil feedstock at the beginning of the value chain is replaced by biomethane derived from renewable sources such as agricultural waste. Both materials offer the same quality and performance as conventional plastics. The material changeover in the SIRIUS 3RV2 circuit breaker production will reduce emissions of carbon dioxide equivalents by some 270 tonnes per year[1]. Customers using the new products thus contribute to a circular economy and towards a more sustainable future.

The move supports Siemens´ sustainability goals in the areas of decarbonisation and resource efficiency, outlined in its DEGREE framework, which sees the company following a 1.5°C science-based decarbonisation target, including a 90% reduction target for scope 1 and 2 emissions until 2030, and the application of a Robust Eco Design for 100% of relevant product families by 2030.

In the coming months, Siemens plans to expand the use of sustainable materials across the broader SIRIUS industrial controls portfolio. In addition to product design and features, as well as manufacturing and supply processes, the choice of materials plays a major role in further reducing carbon emissions and conserving natural resources. The SIRIUS 3RV2 circuit breaker meets the strict criteria of the recently introduced Siemens EcoTech label, developed to give customers comprehensive insight into product performance across selected environmental criteria. In addition to most of the product housing and functional parts being made from biomass-balanced plastic, the product also offers lower power consumption over its lifetime compared to its predecessor.

"With our products we aim to help customers improve asset performance, availability, and reliability, using resource-efficient and circular products which optimise energy use, production, and supply chains throughout their lifecycle. In BASF, we have found a strong partner that supports us with its innovations in the field of sustainable plastics," said Andreas Matthé, CEO of Electrical Products at Siemens Smart Infrastructure.

Increasingly relying on renewable and recycled raw materials for the manufacture of its products, BASF is committed to make its contribution to the circular economy and de-fossilisation. It is following a process that gradually replaces fossil-based raw materials with bio-based and recycled feedstock. According to the mass balance approach, renewable or recycled raw materials are introduced into production at the beginning of the complex BASF value chains. If customers decide in favour of a certified product from such a value chain, BASF feeds sustainable raw materials into ongoing BASF Verbund production.

© Siemens

The SIRIUS 3RV2 circuit breaker, now made using sustainable plastic components.

"The mass balance approach is a solution that enables the gradual replacement of fossil raw materials in sometimes complex production processes. The advantages of this approach are obvious, and the greater the demand for alternative products, the higher the proportion of alternative raw materials in the production network. This aligns with our goal of contributing to a circular economy and achieving net zero operations as soon as possible," says Martin Jung, President BASF Performance Materials. "A special point about this project is that the SIRIUS 3RV2 circuit breaker is also used in our BASF production plants. This circuit breaker protects the motors and increases their efficiency and reliability, making a double contribution to our sustainability objectives."

With the mass balance approach, various alternative raw materials, such as biomethane, bio-naphtha or pyrolysis oil, can be included in the value chain. The bio-naphtha and biomethane used by BASF are certified as sustainable according to established systems such as ISCC PLUS and REDcert. The SIRIUS 3RV2 circuit breaker is an example of the use of resource-efficient plastics production and a milestone for BASF in its alternative plastics journey.

"The use of such an innovative material in an important safety component, without compromising its safety functionality and performance, marks a special achievement for Siemens," Matthé emphasises.

Circuit breakers are used in factories and buildings around the world and protect machines or electrical cables in the event of faults such as short circuits, helping to prevent major damage. □

Note:

[1] The calculation of Product Carbon Footprint of materials is according to TfS Methodology and compares the CO_2 reduction of the BASF Biomass Balanced product vs the conventional BASF product.

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

STEMulator – inviting youth to explore STEM subjects

STEMulator is a fresh virtual platform designed to spark curiosity in young minds and stimulate youth's interest in science, technology, engineering, and mathematics (STEM) subjects. An initiative of the National Science and Technology Forum (NSTF), a leading advocate for science and technology education in South Africa, STEMulator was launched as a gift to the youth of the nation on National Youth Day June 16th 2024.

A world at their fingertips

The addition of the maths and science classrooms to the free to access virtual school supports the initiative's aim to address the pressing issue of STEM literacy in South Africa by providing a comprehensive and engaging educational experience.

The STEMulator platform was originally launched in July 2020 with the aim of getting more school-going learners interested and engaged in STEM subjects and careers and encouraging them to persevere with maths and science at school. It presents a range of interactive and educational content, developed by the NSTF and its proSET (Professionals in Science, Engineering and Technology) Committee. STEMulator is a proudly South African initiative, unique in the world, providing a platform for young people to explore, discover, and learn about the important role that STEM professionals play in various fields.

"STEMulator is not your typical educational platform," explains Richard Gundersen, Chief Instigator at STEMulator. "It's an immersive, interactive landscape filled with animated objects and clickable areas. A child can click on a car – and be transported into exploring its engine, or click on a farm and learn about the machinery used for harvesting. This engaging format allows learners to explore various aspects of STEM in a fun and accessible way."

By clicking on objects they can explore further, uncovering the inner workings of machines and the fascinating processes behind everyday phenomena, all of which link directly to diverse career paths available in STEM fields, as well as information relating to where to study and how to qualify. Learners can also discover the origins and processing procedures behind daily foodstuffs such as a loaf of bread – the loaf of bread in the pantry will take a learner from the combine harvester in the wheat fields, through the mill, to the bakery; guiding kids to explore the origins of ingredients, the mechanics of a mill, the chemistry of baking, and gain an appreciation for the complexities and diverse skills and careers involved in creating a simple loaf of bread.

The NSTF's STEMulator virtual school opens up a world to explore in various fields based on STEM subjects.

The NSTF has created a virtual school that is aligned to the existing educational curriculum and programmes, ensuring a cohesive and effective learning environment that supports the development of the country's future innovators in STEM fields. By doing so, it hopes to inspire a passion for learning, foster critical thinking, and equip the youth with the skills they need to thrive in an increasingly complex and technology-driven world.

Addressing a critical need

The creation of the STEMulator is driven by a critical need to address the declining interest in STEM subjects among South African youth. This lack of interest translates into a shortage of skilled professionals in important fields that are essential to the country's development.

The NSTF is committed to reversing this trend. "STEMulator is our gift to the nation's youth, a free and accessible platform that makes learning about STEM fun and engaging," Gundersen continues. "This is particularly important for students from underprivileged backgrounds who may not have access to traditional resources."

Contribute to the future of STEM education

STEMulator offers a robust foundation and is continually expanding with new material being developed and new sections. The NSTF encourages contributions from individuals, educators, and organisations.

- Individuals: Explore STEMulator and share it with your children, grandchildren, or younger siblings.
- Educators: Integrate STEMulator into your lesson plans, contribute content to ensure alignment with the national curriculum, and encourage students to explore the platform.
- Companies and organisations: Contribute missing content, showcase your products or services through relevant animations, or offer financial support to help the platform reach its full potential. By actively participating in the STEMulator, businesses can support STEM education and earn CSI/BEE points by demonstrating their commitment to education and innovation. Showcasing how their products or business align with STEM principles can further enhance their impact and visibility within the STEM community.
- Professional organisations: Contribute to the STEMulator by providing content, resources, and expertise related to your field. Showcase how

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New skills for the energy transition

Mamiki Matlawa, Group Business Development Executive at ACTOM

Mamiki Matlawa, ACTOM.

The shifting landscape of the energy sector as it moves towards sustainability and increased efficiency has implications for workforce and skills development. Organisations need to explore how to navigate this transition effectively.

South Africa's draft Integrated Resources Plan (IRP 2023) for the energy sector introduces new energy sources such as small-scale nuclear, gas and hydrogen into the mix, and that calls for proactive measures to be taken to prepare workforces for these incoming technologies. New skills sets will be required for the building and operating of new power plants in the unfolding transition, including in the renewables space, energy storage, and smart grid technologies, where different skills need to be developed.

Along with smart technology skills, project management is another specific skill that is becoming increasingly important in the energy sector as it transitions to renewable energy technologies and digitalisation. The shortage of project management skills already became apparent during some of Eskom's capital projects, such as the construction of the Kusile plant, which required these skills to be sourced from outside the country.

Organisations need to look especially at upskilling initiatives, partnerships, and inclusive practices to meet the demands of the changing industry; they need to invest in future jobs in the energy sector.

Proactive steps

Encouragingly, some industry-leading organisations are already taking proactive steps to prepare their workforce to meet the evolving demands of the energy transition. Over the past two years, many of these companies have increased their intake of technicians and engineers in training to build up the skills needed now and into the future, as they form a base for the newer technologies that will be introduced.

Beyond this, companies in the energy sector should also invest in tailored training programmes and upskilling initiatives which can play an important role in enabling employees to gain the necessary competencies for the future energy market. Such initiatives can go a long way to ensuring that business and government entities are prepared for the new skills requirements. Tailored training and upskilling programmes can be used to develop a diverse set of skills, from design and project management to quality assurance and maintenance.

Collaborative partnerships

Additionally, partnerships between industry players, educational institutions and government bodies can contribute to skills development and address sector-wide needs. Several industry leaders are already partnering with tertiary education institutions to map out future curricula that are in step with the future needs of industry.

More can be done in this area, considering the value of such partnerships. Collaborations like these are key to the development of the future workforce as they offer opportunities for focused training and skills development in critical areas where there are recognised skills gaps in the sector.

Furthermore, building a resilient and innovative workforce for the energy sector's future needs to encompass diversity and inclusivity. This will only happen when companies acknowledge that representation is important to allow new entrants into the job market to participate meaningfully in the sector, as well as to tap into diverse talent pools. Many companies are looking to introduce new policies, for instance, to ensure greater gender representation as they head into the energy transition.

The future of the energy sector looks bright as it transitions towards greater sustainability and increased efficiency – and due consideration must be given to long- and medium-term targets concerning skills capacity building. The transition brings with it tremendous opportunities for growth of the sector and for developing universal access to energy – it is an opportunity for our country to grow and prosper.

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

Industry, business and government all have a role to play in developing the skills needed for the energy transition.

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your profession is relevant to STEM and inspire students to pursue related careers. By supporting the STEMulator, professional organisations can help establish a strong foundation for STEM education and highlight the importance of their discipline in driving innovation and progress.

The NSTF envisions a future where every learner under the age of 15 has the opportunity to explore STEMulator. This exposure will empower them to make informed choices about their education and career paths. "Whether they choose STEM or another field, STEMulator will equip them with valuable critical thinking and problem-solving skills," Gundersen states.

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

Adrian Stanford, ESET Southern Africa.

The promise and peril of AI

Artificial Intelligence (AI) has ushered in both promise and peril for organisations that need to combat cyber threat actors. ESET Southern Africa Chief Technology Officer, Adrian Stanford, comments: "AI is reshaping the battlefield between cyber attackers and defenders, offering new tools to both sides."

Generative AI (Gen AI) can be used by malicious actors to craft sophisticated phishing emails, spam, and disinformation campaigns, amplifying the scale and effectiveness of cyberattacks. However, defenders too can harness AI for threat intelligence research, improved threat detection capabilities, and streamlined incident response. Stanford says, "It's a battle of wits and algorithms, where innovation is the currency."

AI cybersecurity is surging

According to the World Economic Forum's (WEF's) Global Cybersecurity Outlook 2024[1], "Emerging technology (like AI) will exacerbate longstanding challenges related to cyber resilience." It is therefore no surprise to see Help Net Security[2] reporting that:

- 55% of organisations plan to adopt GenAI solutions within this year, signalling a substantial surge in GenAI integration
- 48% of professionals expressed confidence in their organisation's ability to execute a strategy for leveraging AI in security.

Contrary to fears about AI taking people's jobs, Help Net Security reports that only 12% of security professionals believe AI will completely replace their role. Looking after your cybersecurity employees remains a crucial component of AI-related security strategy.

Build human cybersecurity capabilities

In an industry fraught with constant pressure and hypervigilance, the ability to develop and strengthen human capabilities contributes significantly to the mental wellbeing of cybersecurity professionals, improving employee experience and supporting retention of key skills. According to Stanford, "The flood of cybersecurity data and alerts poses a significant challenge, often overwhelming analysts and impeding their ability to prioritise and react effectively. This is where the transformative power of AI-driven automation lies."

Stanford believes that by harnessing AI to digest vast amounts of data and distil actionable insights, cybersecurity professionals can focus their attention on the most critical and genuine threats, mitigating the risk of burnout and cognitive overload. AI empowers defenders to identify and mitigate threats automatically and proactively in real time, safeguarding digital assets with new levels of safety, convenience and precision.

Specific use cases include:

- Accelerating threat research – AI helps cybersecurity specialists discover and analyse new threats more rapidly. That's key in an industry where safety means staying one step ahead of evolving threats.
- Machine learning algorithms – play a pivotal role in behavioural and malicious code analysis, offering insights into the modus operandi of cybercriminals.
- Large language models – serve as valuable tools to interpret and explain threat intelligence, facilitating case summarisation, and automating incident creation.

Stanford says it's important to recognise that AI should complement, not replace, human expertise. "Human oversight remains indispensable in guiding and refining AI-driven cybersecurity solutions for the foreseeable future, ensuring ethical and effective implementation in the cybersecurity domain," he says.

Bridging the talent gap

In an industry where there simply are not enough skills, hiring more people cannot be a sustainable solution. Here AI emerges as an ally in bridging the cybersecurity talent gap in three ways.

AI can be an excellent, personalised training tool. It equips junior security professionals with the skills and expertise needed to navigate cyberspace effectively.

Secondly, AI-powered tools can augment the capabilities of junior security professionals, teaching them to be more effective.

Thirdly, with the automation of certain aspects of threat hunting, advanced security professionals can focus their resources on more advanced tasks.

As AI transforms the cybersecurity landscape with potential for both defenders and attackers, the human element remains central. The synergy between AI and human intelligence is essential to maintain robust cybersecurity defences.

References

[1] https://www.weforum.org/publications/global-cybersecurity-outlook-2024/

[2] https://www.helpnetsecurity.com/2024/04/25/cybersecurity-ai-stats/

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

Winner of the Africa Prize for Engineering Innovation

Esther Kimani was announced the winner this year of Africa's biggest engineering prize, the Royal Academy of Engineering's Africa Prize for Engineering Innovation, in Nairobi on 13 June 2024.

Kimani won the prize for her early detection device for crop pests and disease. Her winning innovation – a solar-powered tool using AI and machine-learning enabled cameras – provides for swift detection and identification of agricultural pests and diseases, reducing crop losses for smallholder farmers by up to 30% and increasing yields by as much as 40%.

Five million smallholder farmers in Kenya lose on average 33% of their crops to pests and diseases. Kimani's innovation provides real-time alerts within five seconds of an infestation, offering tailored intervention suggestions, and alerts government agricultural officers to the presence of diseases or pests, contributing to broader agricultural management efforts.

The solar-powered tool uses computer vision algorithms and advanced machine learning to detect and identify crop pests, pathogens or diseases, as well as the nature of the infection or infestation. The device then notifies the farmer via SMS. This affordable alternative to traditional detection methods leases for just $3 per month, significantly cheaper than hiring drones or agricultural inspectors.

The annual Africa Prize was founded by the Royal Academy of Engineering in 2014 to support innovators developing sustainable and scalable engineering solutions to local challenges in Africa. This year has seen the Africa Prize alumni community grow to almost 150 entrepreneurs from 23 countries, who together have generated more than 28 000 jobs and benefitted more than 10 million people through their innovative products and services.

To celebrate the 10th anniversary of the Prize, the Royal Academy of Engineering hosted the Africa Prize Alumni Reunion, bringing together 100 innovators from the past decade for a three-day programme ahead of the final ceremony. This gathering celebrated the strength of the community united by the prize.

Kimani said: "My parents would lose up to 40% of their crops each farming season, which affected our standard of living. With this new device we are empowering smallholder farmers, many of whom are women, to increase their income. We aim to scale to one million farmers in the next five years."

Malcolm Brinded (Chair of the judges), Past President of the Energy Institute, and former Chair of Engineering UK, noted: "These awards form part of the Royal Academy of Engineering's investment of over £1 million in African innovators through grants, prizes and accelerator programmes during the tenth anniversary year of the Africa Prize."

Kimani received KSh 8.3 million to further develop the device. This is the largest amount awarded to a winner, marking the 10th anniversary of the prize. The four finalists delivered their final business pitch to the academy judges and an in-person audience of about 700 people.

The three runners up were each awarded KSh 2.5 million to develop their innovations.

Eco Tiles, developed by Kevin Maina of Kenya

- An environmentally friendly roofing material made from recycled plastic. Stronger and lighter than clay or concrete tiles, the innovation is a dual solution to plastic pollution and high building costs.
- The innovative manufacturing process involves a custom-made extrusion machine that blends different plastics at varying temperatures, eliminating the need for energy-intensive processes like kiln-burning and reducing carbon emissions. The tiles are enhanced with UV stabilisation chemicals and construction sand to improve durability and sturdiness.

Esther Kimani, winner of the Africa Prize for Engineering Innovation.

La Ruche Health, developed by Rory Assandey of *Côte d'Ivoire*

- La Ruche Health connects communities to vital health information, advice, and services through 'Kiko', an AI chatbot tool available on WhatsApp and mobile apps, and a digital backend solution to streamline documentation, billing, and data sharing for practitioners.
- By May 2024, the AI chatbot had facilitated over 150 000 user interactions and 189 in-home and teleconsultation appointments, processing over $18 000 in medical billings, illustrating its effectiveness and scalability.

Yo-Waste, developed by Martin Tumusiime of Uganda

- Addressing Uganda's mounting waste crisis, Yo-Waste is a location-based mobile application that connects homes and businesses to independent agents for efficient on-demand rubbish collection and disposal.
- Yo-Waste currently serves over 1 500 customers including homes, businesses, and waste collection agents, with a goal to reach 20 000 users by 2026.

A separate 'One to Watch' award was presented to Dr Abubakari Zarouk Imoro for his innovation, Myco-Substitutes, for their impact on local communities. Voted for by live and online audiences on the night of the awards, Dr Imoro receives £5 000, conferred in 2024 in honour of Martin Bruce, a late Ghanaian alumnus of the Africa Prize.

The 2025 Africa Prize for Engineering Innovation, launched at the 2024 final, is now open for entries. The Academy is looking for scalable engineering solutions designed to solve local challenges, and individuals and small teams living and working in sub-Saharan Africa are invited to enter. The deadline for entries is 15 October. Visit the *'How to Apply' guide* on the Africa Prize website.

The Africa Prize presents a unique opportunity to support the brightest minds in tackling the greatest global challenges, contributing to improving economic prosperity and sustainable development for Africa through engineering.

For more information about becoming an Africa Prize partner, visit: *www.raeng.org.uk*

Decommissioning Finland's oldest nuclear reactor

The FiR1 nuclear reactor, which operated for over fifty years in Espoo, Finland, has been decommissioned by VTT working in collaboration with Fortum. This challenging project addressed numerous issues and simultaneously established the national mechanism for a nuclear decommissioning waste management process. The experience gained will serve as a model for decommissioning commercial nuclear reactors in Finland – and further afield – as they reach the end of their operational life.

The FiR1 research reactor was Finland's oldest nuclear reactor. Commissioned in 1962, the unit was used for various research purposes and also served the healthcare sector. The reactor, with a thermal power of 250 kilowatts, did not produce electricity or heat for consumption.

Despite the reactor's small size, the FiR1 decommissioning project will serve as a model for decommissioning commercial nuclear reactors in Finland and created new expertise which will benefit VTT's and Fortum's international customers.

"The process of decommissioning a nuclear reactor has now been comprehensively tested in Finland for the first time, taking into account the perspectives of various stakeholders. Significant actions were taken during the process, such as establishing a national waste management mechanism. Administratively, the same measures were implemented as would be required for decommissioning a large reactor," notes Markus Airila, VTT's principal scientist, who led the project and served as the decommissioning manager.

The reactor was shut down in 2015, which initiated the application to license the decommissioning, and the planning for dismantling. In 2020, a significant milestone was reached when the spent fuel was transferred to the United States for further use. A total of 103 spent nuclear fuel rods, weighing about 300 kilograms, were removed from the reactor.

Alongside the FiR1 project, VTT, in collaboration with several Finnish partners, also executed the dECOmm development project funded by Business Finland. It used the decommissioning project as a test platform for various applicable technologies and successfully achieved its initial goal of exporting technology.

Valuable lessons have been learnt and experience gained from the decommissioning of the nuclear reactor.

"During the project our reputation has spread and, as a result, VTT will be involved in similar decommissioning projects abroad, in research reactors as well as commercial power plants," Airila says.

Having set ambitious and measurable safety goals, the project brought together VTT's safety culture experts and the project leaders, which facilitated valuable interactions. The experts supported the project lead in continuously enhancing the organisation's safety culture, so they also gained hands-on experience from a real use case over several years. VTT can use this experienced and cross-disciplinary team to offer unique safety culture support to other safety-critical projects.

Thorough planning

Careful planning helped to accelerate the decommissioning process.

In 2021, VTT received the decommissioning licence for FiR1 from the Finnish government. Fortum, the main contractor, began dismantling in June 2023 and concluded the work in April 2024. Fortum's works on the project will continue with the final disposal of waste in the Loviisa power plant's final repository for low- and intermediate-level waste.

"The dismantling phase was very swift as a result of thorough planning and preparatory work. Additionally, we could leverage the strong nuclear safety culture and expertise from Fortum's Loviisa nuclear power plant, and that was crucial. Fortum handled everything safely, efficiently, and on schedule without significant delays," says Airila.

Dismantling the reactor on Aalto University's Otaniemi campus presented particular safety requirements in organising the dismantling site and the arrangement of necessary waste transports.

The demolition waste which is classified as radioactive includes about 60 cubic metres of concrete, from a six-metre-high water tank and the two-metre-thick concrete shell that surrounded the reactor.

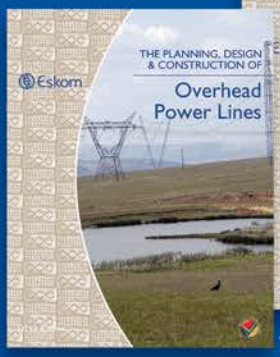
"For us at Fortum, this successful project is a testament to our extensive expertise, covering the entire lifecycle of a nuclear facility. We have executed a nuclear facility decommissioning project with the same quality and competence with which we have operated nuclear facilities and delivered projects for external customers over decades," says Antti Ketolainen, Fortum's director in charge of the project.

A valuable experience for both VTT and Fortum was the preparation of a decommissioning and dismantling plan as was required for the decommissioning licence. Extensive documentation was produced and developed for this purpose. Lessons learnt will be carried forward to future projects.

For more information visit: www.vttresearch.com

Eskom

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



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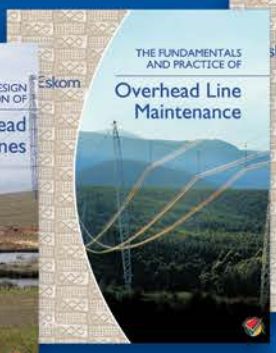

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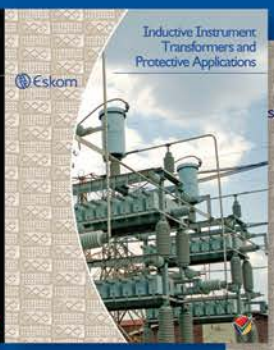

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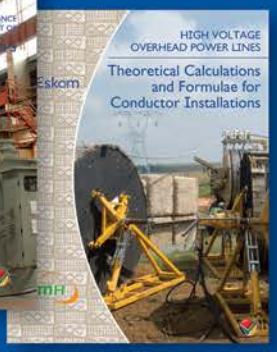

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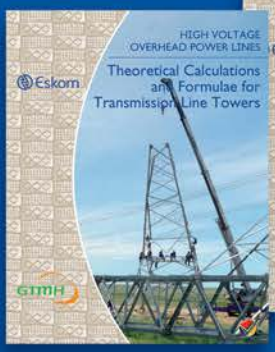

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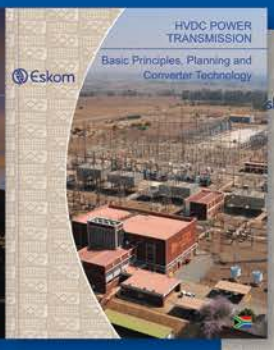

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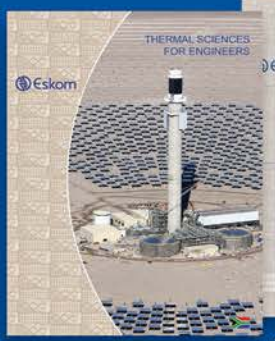

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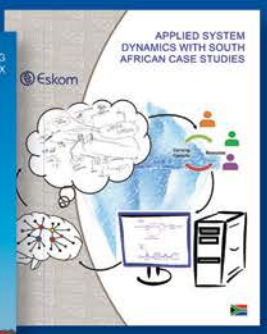
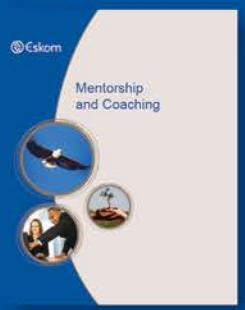


Volume 13: Applied System Dynamics with South African Case Studies

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



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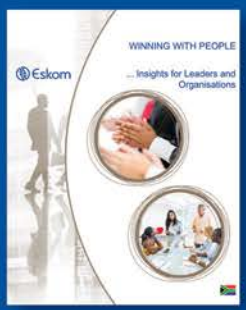

Volume 2: Winning with People ... Insights for Leaders and Organisations

Volume 1: Procurement Management Key Concepts and Practices

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

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

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