in motion

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

ALPHA

05/2025
ELECTRICITY + CONTROL
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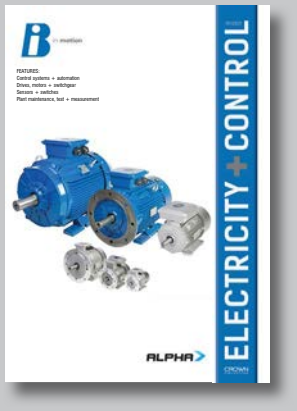

Bearings International (Bi) is now stocking the MEPS (Minimum Energy Performance Standards) approved ABB IE3 Low Voltage electric motors, making them available to the South African market.
(Read more on page 3.)

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Manufacturing can lead growth

Electricity+Control has served the manufacturing industry for over three and a half decades – decades of wonder, resilience and, at times, concern.

It is evident that the manufacturing sector in the country has declined, particularly over the past decade. Where all the facts support this troubling observation, it is not too hard to understand why the growth rate within the economy has been so poor over this period.

It is the manufacturing industry that is best positioned to access foreign markets for our goods, and to provide employment for people. I have often observed that one of our strengths as a nation is in the resilience and work ethic of South Africa's people.

But we find ourselves in the unenviable position of having one of the highest unemployment rates on the planet, albeit with an admirable commitment to provide social grants to those who have no work. Nonetheless, there is little doubt that, in general, people just want to be employed.

The manufacturing industry has suffered under load shedding for many years, making it harder and harder for manufacturers to make profits; and it seems evident that some policy decisions taken by our lawmakers have made it increasingly tricky to grow employment numbers.

It does seem, however, that there are glimmers of light appearing at the end of a long dark tunnel – or there were until some of the challenges posed by our current relationship with the USA emerged. Of course, we appreciate that the actions of the USA are more about moving a pendulum than about developing any clear economic policy. But we need to be sure we manoeuvre ourselves around all the fall out.

And one of initiatives pointing in the right direction is the setting up of the Independent Transmission Programme.

This is a crucial step towards leveraging best practice to get our transmission networks up to scratch and able to deliver for what we hope will be a more rapidly growing economy. We see similar conversations taking place in the rail transport arena – again pointing to a growing appreciation of the immense capacity of the private sector to deliver in these critical areas.

The trick is to create a policy environment that encourages such developments – rather than making them seem risky to an investor, or simply making the effort required seem not worth the while.

We really do need to have the courage, and take the steps, to create an environment for growth and development. Until we are able to do that, we will simply bumble along in the belief that we are doing all we can to help our citizens. I doubt very much that we are.

Electricity + Control remains the best magazine to read if you want to stay up to date with the technologies that can make your process, your plant, and your industry increasingly competitive.

Enjoy this month's issue.

Ian Jandrell

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

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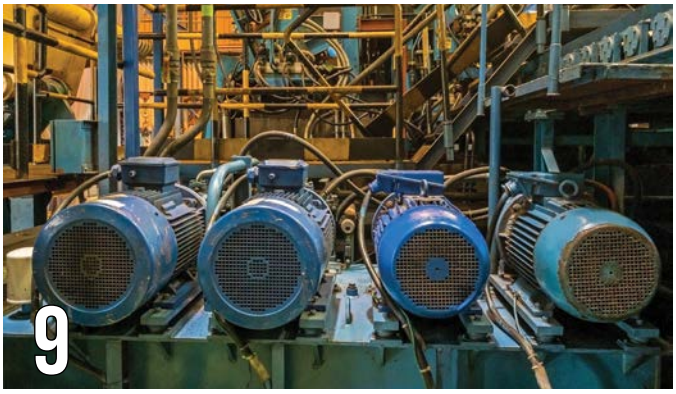


REGULARS

New energy-efficient IE3, 5-year warranty LV electric motors

Bearings International (Bi) is proud to announce that their MEPS (Minimum Energy Performance Standards) approved ABB IE3 Low Voltage (LV) electric motors are now available to the South African market. The motors conform with new legislation signed on 30 May 2024 by the South African government that will permit only IE3 certified LV motors into the country from June 2025. IE3 motors are classified as 'premium efficiency' motors by the International Electrotechnical Commission (IEC).

"We, at Bi, are 100% ready for MEPS implementation and we welcome this new legislation, which is good news not only for customers and industry as a whole, but also for our planet," says Bekker, Bi Product Leader: Motors & Drives. "If one considers that electric motors, which are used in essentially every industrial application, consume up to 55% of the world's total electricity, the use of more efficient IE3 motors aligns with ESG (Environmental, Social and Governance) compliance, mitigating energy costs, reducing CO_2 emissions and contributing to a greener environment. Bringing it closer to home, the introduction of IE3 motors will reduce demand on our fragile national power grid.

"In line with Bi's segment strategy, which focuses on giving customers access to premium, world-class quality products and technologies tailored to their industry-specific needs, we form strategic partnerships with reputable global companies like ABB and TechTop that share our narrative of quality and service first, as well as our passion for creating a healthier environment," says Bekker.

ABB is one of the largest electric motor manufacturers with over 140 years' experience as a global technology leader in electrification and automation. The organisation's global headquarters in Switzerland are supported by production facilities in Finland, Poland and India. In a bid to drive greener solutions, ABB considers its own as well as its customers' carbon footprints by optimising its manufacturing processes and developing cutting-edge technologies and more efficient products.

The robust ABB cast iron IE3 (as per IEC 60034-30-1), IP66 electric motors cater to a wide range of industry segments including mining, pulp & paper, water treatment, and sugar. Featuring a C4 corrosive painting system, these 2- to 8-pole motors, with outputs of 0.25 kW to 1 000 kW and available from 380 V to 1 000 V, are suitable for variable speed drives (VSDs). Bekker adds that ABB IE4 and IE5 motors are available from Bi on request. "Adding further value, we offer online Cloud vibration and temperature monitoring through ABB-Ability, which empowers customers to carry out preventive maintenance and avoid potential costly equipment failure."

Bi offers standard IE1 Alpha LV electric motors through its partnership with TechTop based in Shanghai, China. This globally recognised, high-tech family business is run by three brothers. Available from 220 V up to 1 000 V, and with mechanical dimensions as per SANS1804-2, the cost-effective cast iron Alpha TechTop 0.25 kW to 355 kW IE1 motors feature PTC Thermistors (155°C) for 160 - 355 frames.

"We will be phasing into the South African market the IE3 Alpha TechTop LV motors over the next six to twelve months," says Bekker. He adds that these IE3 Alpha units are already available in Australia, New Zealand and Europe.

With the supply of both premium Tier 1 (ABB IE3) and cost-effective Tier 2 (Alpha IE1) LV products, Bi is able to meet a wide range of industry and application requirements. Bekker, who is an electric motor and ABB specialist, highlights that the two offerings differ only in terms of efficiency levels. "Superior quality remains a constant as this speaks directly to motor performance, reliability and lifecycle which are fundamental to uptime, productivity, and plant optimisation."

Bekker also highlights that as important as quality is selecting the right motor. "As industry work horses, electric motors are simply expected to perform without question. A good quality, well-maintained motor, matched with the application, should theoretically last between 15 and 20 years. In a groundbreaking move that bears testament to our confidence in the quality of our electric motors, we have extended the standard 12- to 18-months warranty to five years against manufacturing defects on both the ABB and Alpha brands."

"Bi can supply energy-efficient IE3 ABB LV electric motors with all the necessary customer support, and we also offer special large medium voltage and high voltage motors. This positions Bi as a single-source supplier of top-line, energy-efficient motor solutions," asserts Bekker. "From pre-sales – providing technical expertise to ensure the right motor selection – to post-sales where we offer specialist technical on-site support, our approach mitigates the risk of potential premature electric motor failures and associated costs, promotes enhanced uptime and drives business sustainability and increased profitability for customers across the sub-Saharan African region," concludes Bekker.

Bi suppliles a range of quality IE3 electric motors, 380 V to 1 000 V, with outputs of 0.25 kW to 1 000 kW.

For more information contact Bearings International (Bi)
Tel: +27 (0)11 899 0016
Visit: https://www.bearings.co.za/

Advanced automation supports continuing growth

Earlier this year, FUCHS LUBRICANTS SOUTH AFRICA celebrated the official opening of its expanded facilities in Isando, east of Johannesburg. The new headquarters, new plant and new warehouse support the company's growth strategy in South Africa and sub-Saharan Africa, which has already seen it achieve a compound annual growth rate of 6% in sales volume since 2015. Leigh Darroll, Editor of* Electricity + Control*, spoke to Paul Deppe, Managing Director of the company and Regional Vice President - Sub-Saharan Africa, and Thami Mzolo, Manufacturing Executive, about the new plant and the advances it enables.

Speaking at the official opening, Deppe had noted that the company's growth would not have been possible without the FUCHS Group having the confidence in its subsidiary in South Africa. He said more than R650 million has been invested in creating capacity at the South African subsidiary over the past eight years. "This is confirmation of the group's confidence in the country and a huge confidence boost for the FUCHS business in South Africa," Deppe said.

Reflecting the significance of this investment, the event was attended by Dr Ralph Rheinboldt, Chairman of the South African subsidiary and member of the FUCHS SE Executive Board responsible for EMEA, Dr Sebastian Heiner member of the FUCHS SE Executive Board and CTO, and Matthias Spethmann, Vice President of EMEA OEM sales.

The completion of the expanded plant in Isando marks a significant milestone for FUCHS in South Africa. Deppe says the project began in 2020 with the purchase of a site adjacent to its existing facilities to accommodate the company's growth. He adds that this expansion follows the initial investment in a new grease plant commissioned in 2018.

The newly built facility represents a R500 million investment in creating capacity and technological advances. The development has been a key factor in FUCHS's growth. The company now employs nearly 450 people, up from 250 in 2015. Deppe highlights that no staff redundancies took place during this period, and the company continues to invest in employee training and upskilling.

Key consultants

In developing the new facilities, FUCHS worked closely with selected partners to bring the project to completion. Deppe clarifies that the FUCHS Group operates on a decentralised model that enables regional offices to operate with a degree of independence, with clear reporting lines to group head office.

He says the new plant in South Africa is unique to the needs of the regional operation and the site and its existing facilities, rather than being modelled on an international prescript. But he emphasises that the company did draw on the strong engineering support that is always available within the group. In South Africa, FUCHS has an established relationship with global engineering firm DRA Global, which it worked with in 2016/2018 when the firm was selected from four that submitted tenders to handle Engineering, Procurement and Construction Management (EPCM) for the new grease plant, and it was again appointed as the EPCM consultant for the newly expanded facilities. Deppe adds that working with DRA Global, FUCHS now has a blueprint for future planned developments on its Isando site.

Thami Mzolo, Manufacturing Executive, in the new plant.

Paul Deppe, Managing Director, FUCHS LUBRICANTS SOUTH AFRICA.

Other consultants that contributed significantly were the architects, GPD Studio, warehouse designer, ILS, the fire engineer, ASP Fire, plant automation specialists, Stadler & Schaaf, and the electrical engineer, Handson Electrical.

As well as the new office complex, the project includes:

- A new 7 000 m^2 warehouse, four and a half times larger than the previous one, incorporating SAP warehouse management technology supported by integrated scanning systems. It is designed with narrow- and wide-aisle racking for flexibility and to maximise use of space. The automated fire system conforms to NFPA standards and includes automated spill barriers.
- A new laboratory, upgraded to support the critical aspects of quality control and product development, and the growth of operations.
- And a new tank farm, blending plant and filling hall designed for future growth. The tank farm includes capacity for 1.3 million litres of base oil storage, 120 000 litres of heated additive storage and 300 000 litres of blending capacity. The blending process is fully automated, which ensures precise dosing and consistent process-

The Feige 20 L filling line.

The new tank farm provides significantly expanded storage and blending capacity.

ing of materials, to maintain quality control and FUCHS' high quality standards in its finished products. The state-of-the-art filling lines, detailed below, are all highly automated.

Completed in December 2024, the expansion has increased production capacity by over 40%.

Plant automation

Regarding the plant automation and electrical engineering consultants, Deppe says here, and in several other specialist fields, the FUCHS Group works with preferred consultants and suppliers, where their understanding of the FUCHS business and its operational needs is well established and thus advantageous.

Stadler & Schaaf, based in Germany, is a preferred supplier for the FUCHS Group and handled the automation, control and instrumentation systems for the new plant.

OCME, based in Parma, Italy, is also a preferred supplier, as a specialist in filling, packing and palletising lines, as is Feige, in Germany, which specialises in larger filling lines, including drum filling.

Thami Mzolo is excited by the capabilities introduced with the automation of the new production lines and the benefits they have brought to the plant and the company. He highlights that DRA Global did a great job in terms of attention to detail in the design and execution of the project and says, "Since commissioning, we have achieved 100% right-first-time manufacturing in the new plant."

With this project, the high-volume fast-moving large-batch products have been moved out of the existing plant to the new production facility.

Mzolo explains, "With the automation of these lines, our intention was to maximise efficiencies, accuracy – minimising waste – and quality. Automation enables us to achieve higher throughput and higher accuracy in production processes and, importantly, the control system is fully integrated into our existing SAP ERP (enterprise resource planning) system. We are seeing the benefits."

The three new filling lines significantly increase throughput for bulk filling (that is for road tankers), for IBCs (1 000 m^3 containers) and drums, as well as 20 L pails, and small packs, typically one-litre and five-litre pack sizes.

Mzolo explains that bulk line filling is fully automated using

The three new filling lines increase throughput for bulk filling, IBCs, and drums, as well as 20 L pails, and smaller packs.

loadcells to ensure the correct quantity is filled every time, and drums and IBCs can be packed interchangeably. The new 20-litre pail line also uses loadcells to monitor filling and a vision system to ensure correct labelling as well as a cap sensor that ensures good quality in the product pack at the end of the line.

The small pack line includes ten modular stations and eight of these are fully automated. This line runs one-litre and five-litre products interchangeably, depending on the product configuration. Quality assurance technology includes loadcells at each filling station, to ensure correct fill quantities, vision sensors that check pack labels to ensure they match product and pack size, and to check caps to ensure no leaking bottles are packed for dispatch, and a checkweigher to ensure there

are no missing packs in the cases. Mzolo adds that when new products are introduced, the line operator has to teach the vision system to align with new measurements that apply. He highlights that since commissioning the new lines, the team has achieved 92% efficiency in production with no overfilling or underfilling.

This points to the further benefits of automated production, minimising wastage and product discards to achieve optimum throughput.

"On top of these achievements we are working hard to ensure that the existing plant continues to deliver high-quality products to customers when they need them," says Mzolo. The old lubricants filling plant consists of ten filling lines: three drum lines, three 20 litre lines, one IBC line, and two small pack lines, including the new small pack line.

Mzolo highlights that as well as the benefits of high-speed, high-accuracy, high-quality increased production capacity of the new lines, an unexpected benefit has been seen in how this major step up in plant performance is motivating a positive new mood and new focus among the teams working on the long-established production lines. "With the new small pack line positioned in the middle of the old plant, they are seeing what can be done and some of the operators rotate through the new line to gain new skills hands-on. The teams are keen to step up the performance efficiencies on their lines."

He also emphasises that FUCHS worked through a careful preplanning process well ahead of the new facilities coming on stream, bringing in new skills and preparing the whole production team for the planned changes. Mzolo cites this as one of the key elements that has supported the positive mood that now prevails and the enthusiasm to do better.

"With the new plant up and running, the focus now is to maintain flexibility to ensure FUCHS meets its commitment for a quick turnaround on customers' orders and to look at further operational efficiencies in our processes to unlock more capacity and enhance our flexibility by removing inefficiency and waste," says Mzolo.

Return on investment

As the benefits of the extended facilities and new automated lines manifest, the question of realising a full return on investment arises. Deppe says FUCHS works with what it calls the 'FUCHS Value Add' as a measure of shareholder return. "This is simply based on the well-known principle of 'Economic Value Add', or EVA, where we look at profit over a year, less the cost of capital, to evaluate the return. In this respect, we achieved a record FVA in 2024, so all indications are that our investment will deliver a sound return. This endorses the group's decision to commit to this investment in its South and sub-Saharan African operations."

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

Control systems + automation: Products + services

Next multi-touch panel generation

Following over 25 years of successful in-house panel production and 12 years of expertise in multi-touch design, Beckhoff is introducing a new smart panel design: the Next multi-touch panel generation. With its revised electronics concept and standardised connection solution for electronics and mechanics, this device platform maintains Beckhoff's established technological lead and builds on it. The consistently high quality of Beckhoff Control Panels and Panel PCs is combined with an optimised price/performance ratio.

The Next multi-touch panel series is advanced and cost-optimised and extends the diversity of Beckhoff's portfolio. As before, this generation of control panels and panel PCs offers user-friendly operation with advanced multi-touch technology, a high-quality design, and a wide choice of formats and options. The devices, manufactured entirely in Germany, are characterised by smart, sleek electronics and device design, EtherCAT communication (FSoE) at the push of a button, and high-quality industrial-grade displays with multi-finger touch function.

The Next multi-touch panels with IP20 or IP65 protection ratings will be available long-term. They can be provided in display diagonals from 7 to 24 inches in various formats, as installation and support arm variants, and the panel PC version is available in a range of CPU performance classes. It includes a variety of accessories and mechanical extensions. The latest standards are integrated to provide a future-ready panel platform that makes it easy to optimise costs without changing the system design and provides tried-and-tested touch technology with anti-glare and anti-ghosting effects.

The introduction of the Next multi-touch panel generation starts with the CP49xx built-in Control Panel with an IP20 protection rating and the CP59xx Control Panel with an IP65 protection rating for mounting arm installation. These models are intended for direct mounting on a VESA monitor mount by the customer, or can optionally be fitted on a mounting arm with a 48 mm round tube.

For more information visit: www.beckhoff.com

The range of the Next multi-touch panel generation primarily comprises the CP49xx and CP59xx Control Panel series.

2025 – a year for growth, despite industry challenges

Adrian van Wyk, Managing Director of Referro Systems

Automation is rapidly emerging as a catalyst for industrial transformation, enabling businesses to meet sustainability targets, enhance productivity and drive economic efficiency.

Adrian van Wyk, Referro Systems.

Over the past year and, in particular, the first quarter of 2025, the importance of partnerships has been evident and key to navigating strategic growth and technological innovation for many companies in our field. This has allowed for collaboration in areas such as complex legacy migration projects, executing high horsepower drive retrofits and meeting increasingly complex market demands, ensuring our customers maintain their competitive edge.

Expectations are likely to shift significantly in the coming months, with a substantial swing anticipated in a number of critical industries in South Africa where automation and instrumentation will play an essential role in meeting very competitive market demands.

Expected changes in industry

With a shift in the agricultural space expected to come to the fore, automation and instrumentation will play a significant role in this critical industry.

Following from a five-year drought, the expectation is that this year will deliver bumper crops across all agricultural products, including grapes, sultanas, nuts, olives and others. This will place pressure on the infrastructure of producers, as they will need to be ready to handle higher yields or risk spoiling the potential of their crops.

Automation becomes a valuable tool to help producers develop plans around their inputs and when, where and how these inputs need to applied.

In the mining sector, the industry remains relatively stable, though not without its operational challenges. Companies are increasingly prioritising improved maintainability, enhanced sustainability, workforce optimisation, and strategic cost management to drive efficiency to ensure long-term growth and competitiveness in the global market.

An emerging industry trend here is a greater focus on machine safety equipment. This reflects the growing organisational imperative to prevent operational stoppages, reduce production interruptions and maintain consistent operational capacity, mitigating potential production delays.

New technology

Although over the past year the conversation was dominated by artificial intelligence, we expect to see the idea of human-robot collaboration gaining traction in the year ahead. The rise of Industry 5.0 is further spurring innovative solutions.

In automation and control, there is constant growth, learning and change. We expect to see investments therefore going into the expansion of product pipelines. Looking forward, we will be rolling out more powerful variable speed drives, enabling us to serve customers with higher voltages and power requirements. We expect to see this requirement across many industries – the need for higher voltage, higher power, higher performance products.

There are also interesting movements in the field of low-complexity products such as push buttons, contactors, motor protection devices and circuit breakers. A notable push is under way to deliver Ethernet IP capabilities into the low-end motor control space.

This advance promises to provide customers with enhanced safety and visibility into production line operations, ensuring systems run

In the sectors it serves, Referro expects to see a growing shift towards advanced automation and instrumentation as industries seek to meet demand in highly competitive markets.

efficiently and effectively. The integration of simple devices will facilitate quicker troubleshooting processes, in turn reducing costs and downtime recovery times. With the wealth of information made available through these devices, significant changes in how facilities operate their machinery are expected in the coming years.

We also expect to see some new developments in field safety devices for automation systems. For example, intelligent safety pull switches will be enabled to access ethernet networks, to stop and help prevent hazardous motion.

In terms of sustainability, there will be greater emphasis on supply chain management – companies will be scrutinised on their suppliers: are they reputable, do they source their components from trusted, sustainable and legitimate suppliers? These factors have an impact on the producers of the final product.

It is therefore important to support customers in their choices and to provide quality products that are reliable, reputable and available into the future.

Looking ahead

Going forward, the importance of partnerships will remain front of mind for Referro Systems, to ensure local stockholding, bringing customers more diverse product offerings and service capabilities on their doorstep, reducing their risks of possible downtime and loss of revenue, access to cutting-edge innovation, increased safety and the introduction of advanced technological solutions.

In our experience, our ongoing premium brand relationships with Rockwell Automation, Festo, AMCI, Allpronix, Sulzer, ACTOM, Pure Light and Fluke (Comtest SA), confirm the growing importance of strategic alliances. These allow customers to access comprehensive product portfolios with high-quality technical support. Understanding the significance of local presence and having existing relationships within South Africa, also delivers significant benefit to suppliers outside the country.

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

Control systems + automation: Products + services

Iritron celebrates 25 years of excellence

When Iritron was founded in 2000, it was on the principles of exceptional service and lasting partnerships. Today, Iritron has become a leading provider of engineering and industrial solutions. It has grown from a small team of four into a company of over 120 employees, serving clients across South Africa and beyond.

From the start the company has been committed to providing top-tier electrical, instrumentation and control systems engineering, with a focus on the mining, minerals and metals industries. Over the years, the company has expanded its services to include manufacturing and assembly of motor control centres and control panels, systems integration, and high-level software development, incorporating machine learning and artificial intelligence solutions.

CEO, Alwyn Rautenbach says, “In our minds, we started Iritron to be a forever company. Reaching 25 years is a milestone that makes me extremely proud of what we have achieved. This achievement is not solely mine but belongs to the entire team at Iritron. I could never have done it on my own, and without the team, it would never have happened.”

The company’s success is built on a foundation of strong client relationships and a commitment to staying at the forefront of technology. Its dedication to service is exemplified by its first customer, an iron-ore mine in the Northern Cape, which remains a client to this day. “The return business we get from our customers is a testament to the service they receive from us,” Rautenbach says. He highlights one early success in the implementation of a “power-proofing” project at the iron-ore mine, which significantly reduced downtime and increased plant availability during power dips, resulting in substantial revenue gains for the client.

Iritron’s proactive approach to client service involves continually assessing client needs and proposing innovative solutions, which are often integrated into long-term strategic

CEO Alwyn Rautenbach says, “In our minds we started Iritron to be a forever company.”

plans. The company’s expansion into manufacturing was a strategic move to ensure quality control and reduce time delays associated with outsourced production. Today, Iritron has one of the most advanced motor control centre facilities in the industry, with certifications including ISO 9001:2015 and SANS 1973-1 (low voltage switchgear and controlgear assemblies) and 1973-3 (safety of low voltage switchgear and controlgear assemblies) and subscribes to the standards as set out by the ISA. “By adhering to these standards, we can ensure safe, reliable and high-quality products,” Rautenbach notes.

He further highlights that the company’s partnerships with industry leaders like Festo and Scheider Electric have also been instrumental in shaping Iritron’s capabilities and expanding its reach. “These partnerships have supported collaboration, knowledge sharing and the delivery of comprehensive solutions to our clients,” says Rautenbach.

Looking ahead, Iritron remains committed to its values of service, innovation and partnerships. With a strong team, a loyal client base, and a forward-thinking approach, the company will continue to deliver top-tier services going forward.

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

Control solutions for turbomachinery

Kobus Vermeulen, Direct Sales Executive, Process Automation at Schneider Electric, highlights the value of turbomachinery, often overlooked and unrecognised for the central role it plays in industrial operations.

Kobus Vermeulen, Schneider Electric.

Turbomachinery has a long history and today refers to machines that transfer energy between a rotor and a fluid, including gases and liquids. It includes devices like turbines, compressors, and pumps. Turbomachinery also plays a crucial role in power generation, aviation, and many industrial processes.

The history of turbomachinery spans centuries. The earliest forms of this technology can be traced back to water wheels, which appeared around the first century BC in the Mediterranean region. Fast forward to the 1930s and the first gas-powered turbines lit streetlights and later found applications in aviation and power generation.

Now, almost a century later, turbomachinery can be found in most industrial settings. And at the heart of it all are advanced control systems which enhance current turbomachinery operations and take it to a new level.

Facing modern challenges

Where turbomachinery plays a central role, as it does in so many industrial processes, its continuous operation is non-negotiable. However, various factors add layers of complexity to the operation of turbomachinery today.

- Optimising efficiency: rising energy costs and pressure to minimise carbon footprints make it essential to optimise machinery performance and reduce waste.
- Regulatory compliance: most industries have to meet strict emissions and environmental standards which require precise machinery controls to achieve compliance without sacrificing efficiency.
- Industry 4.0 integration: the shift towards smart manufacturing demands control systems that integrate seamlessly with IoT devices and data analytics platforms, enabling real-time decision-making and enhanced connectivity.
- Dynamic operating conditions: fluctuating loads and diverse operational scenarios require adaptive systems capable of maintaining stable and efficient performance.

The control benefits are real

Turbomachinery control solutions assist organisations and support their profitability by optimising performance and reducing energy consumption, both universal operational benefits.

From an environmental perspective, modern turbomachinery control solutions play a key role in emissions reduction and resource optimisation. Control systems provide precise control over emissions and waste, helping organisations comply with strict environmental regulations Furthermore, by improving machinery efficiency, turbomachinery control systems minimise resource usage, again aligning with sustainability goals.

When arguing the case for automated robotic systems, safety is often cited as a major, and valid, benefit. The same can be said for turbomachinery control systems which offer real-time monitoring and diagnostics that enable quick identification and resolution of potential issues, enhancing workplace safety.

Automated safety protocols further mitigate risks by reducing reliance on human intervention, so minimising the chance of errors and ensuring safe operations.

Control solutions In action

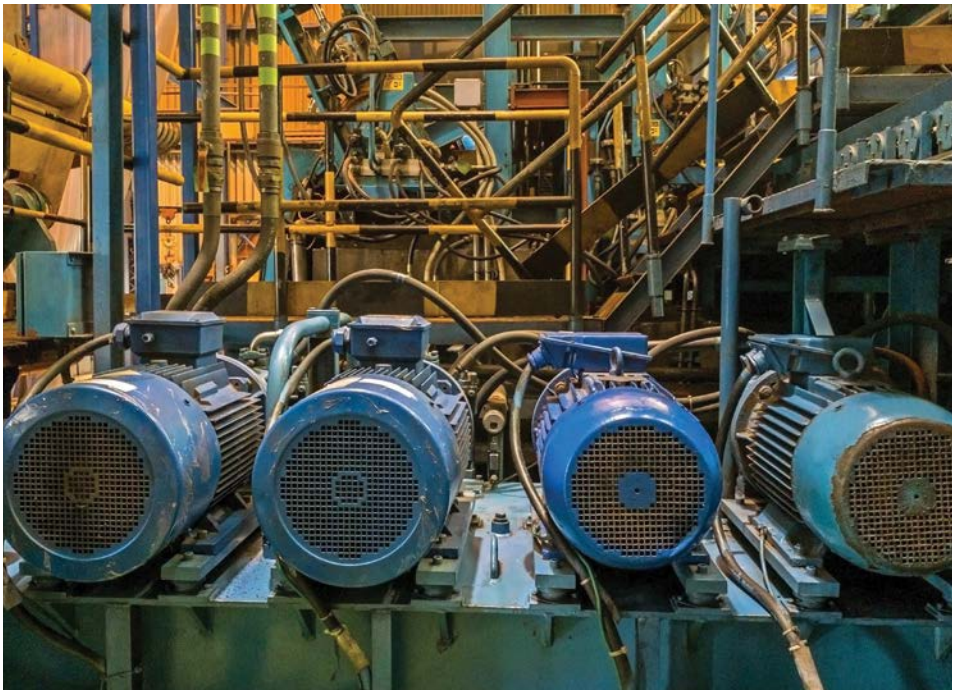
At Schneider Electric our Turbomachinery Control (TMC) solutions are optimised for generators, compressors, and drives. These solutions include anti-surge control, performance control, load sharing, and decoupling control to optimise efficiency and stability.

A major advantage of Schneider Electric's TMC solutions is that they offer mechanical retrofit capabilities, which means organisations can upgrade aging control systems to improve machine performance and extend the lifecycle of turbomachinery.

Our TMC solutions also incorporate advanced algorithms and process automation strategies to protect compressors from surging and ensure smooth operation.

And Schneider Electric TMC solutions offer safety and reliability features designed to reduce the risk of catastrophic failures and process disruptions, enhancing overall plant safety and productivity.

For more information visit: www.se.com



Today, turbomachinery plays a central role in many industrial processes where control technologies optimise its efficiency.

Smart milling for sustainable food production

Bühler is committed to making milling more energy efficient and maintaining high operational performance.

As the global demand for food continues to rise due to increasing urbanisation, the milling industry faces the challenge of balancing efficiency with sustainability. Energy consumption, waste reduction, and digitalisation are key factors in ensuring a resilient and responsible food system. Bühler, a global leader in milling technology, is at the forefront of these efforts, investing in innovation and research to help mills adapt to a rapidly evolving landscape.

Energy consumption is a major concern in milling operations and Bühler is tackling this challenge with advanced equipment, automation, and digital monitoring tools. High-performance motors and energy-efficient roller mills are instrumental in cutting energy use, and Bühler's Energy Recovery concept helps minimise heat loss.

"We are committed to making milling more energy-efficient while maintaining high operational performance. Our solutions allow mills to reduce energy costs and ensure long-term sustainability," says Marco Sutter, Managing Director of Bühler Southern Africa.

Digitalisation improves energy efficiency

Sutter adds that digitalisation plays a crucial role in improving energy efficiency. By leveraging real-time monitoring, predictive maintenance, and AI-driven process optimisation, Bühler enables mills to reduce energy consumption and streamline operations. Case studies highlight the impact of these technologies, with mills achieving energy savings of up to 15% and waste reduction of 30%.

To further minimise food loss, Bühler integrates precise sorting technologies, optimised cleaning processes, and real-time milling parameter tracking. These innovations ensure maximum yield from raw materials, reducing waste and enhancing overall efficiency.

Building greener supply chains

Bühler supports mills in adopting circular economy principles by designing machines that recover valuable byproducts and use recyclable materials. Sustainable sourcing and production practices are essential for long-term resilience, and Bühler helps mills balance cost-effectiveness with environmental responsibility through modular processing lines that minimise raw material and energy waste.

"We believe that sustainability and profitability can go hand in hand. Our goal is to provide solutions that, as well as reducing waste, enhance efficiency and profitability for milling businesses," Sutter adds.

Localised manufacturing is another key strategy in improving sustainability. Reducing transportation emissions and strengthening regional food security, Bühler's approach ensures faster service and maintenance and supports supply chain resilience. In addition, the company encourages mills to adopt recognised sustainability standards, such as ISO 50001 for energy management and LEED (Leadership in Energy and Environmental Design) for environmental compliance, to establish best practice.

Smart milling technologies

The integration of artificial intelligence (AI) and the Internet of Things (IoT) is revolutionising milling operations. Bühler's smart process control systems are designed to optimise efficiency and reduce environmental impacts, enabling mills to operate at peak performance with minimal waste.

Its digital solutions provide real-time insights, allowing mill operators to make data-driven decisions that enhance efficiency and sustainability.

Bühler Insights, a leading digital solution, provides real-time data analytics to monitor energy use, raw material efficiency, and emissions. Predictive maintenance further enhances sustainability by preventing equipment breakdowns, extending machinery lifespans and reducing unnecessary energy consumption.

Sutter adds that transparency in the food supply chain is becoming increasingly important, and Bühler's smart technologies enable enhanced traceability through blockchain integration. From farm to finished product, these innovations support accountability and food safety in milling operations.

Investing in education and workforce development

As in other sectors, the rapid advance of technology in milling requires a highly skilled workforce. Bühler is committed to knowledge-sharing and capacity-building through its African Milling School, as well as its training programmes, workshops, and e-learning platforms.

The company also collaborates with educational institutions and industry organisations to provide hands-on training and apprenticeship opportunities. "Training and skills development are fundamental to sustainability in the milling industry. We invest in education to ensure millers are well-equipped to handle new technologies and adapt to industry changes," says Sutter.

Additionally, automation and digitalisation are reshaping job opportunities in the milling sector, creating demand for expertise in maintenance, data management, and process optimisation. To prepare a future-ready workforce, milling companies need to invest in continual training and foster a culture of innovation. "Bühler is active on this front, ensuring the next generation of millers is equipped with the skills needed for a sustainable and efficient industry," says Sutter.

"As climate change and population growth put increasing pressure on food security, the need for resilient, sustainable milling solutions remains central. Bühler invites mills and industry stakeholders to work together to build a smarter, greener, and more efficient food system for the future."

Automation upgrade for ArcelorMittal compressor house

A combined compressor house (CCH) control system replacement project, undertaken by NJCSI (Pty) Ltd. (NJC), an ABB Authorised Value Provider (AVP), has won high praise from the client ArcelorMittal. “The professionalism, dedication, and attention to detail have exceeded our expectations,” says Erich Blaschczok, Senior Electrical Engineer, Information Management, at ArcelorMittal.

The project was critical as the combined compressor house supplies all instrumentation air, blast air for the blast furnaces, and other air requirements for the Vanderbijlpark facility. Thia also meant that it was not practical to initiate a major shutdown, as the CCH is integral to the entire operation. NJC CEO, Sarane Richard-Coombes notes: “The project required meticulous planning, clear communication, and unwavering support.”

Sebastian Lopes Pereira, DCS Engineer at NJC highlights, for instance, that the rewiring of panels involved 12 000 I/O points.

ArcelorMittal entrusted the production-critical project to NJC as they have a longstanding business relationship, ongoing now for over a decade. “What gave us the edge in securing this project is that competitors insisted on a shutdown, which was a non-negotiable for the client,” Pereira adds.

With this project, the latest of three projects it has carried out at ArcelorMittal over the years, NJC continued to develop its reference record of successful project implementation. The six-month project was completed and handed over in December 2024.

Sagren Govender, Business Development Manager at NJC, adds that the support received from ABB was exceptional, with stock of key components available at all times, as well as expert assistance and support.

NJC has been an AVP for ABB Control Technologies since 2016. The companies had worked on their first joint project in 2006. Since then, NJC has completed many projects using ABB systems across southern Africa. It is skilled in the ABB Ability™ System 800xA and Manufacturing Execution Systems (MES) for various industry sectors, from food and beverages to pharmaceuticals, pulp and paper, and mining and metals.

Kristian Olsson, Global Head of Partner and OEM Sales, ABB Control Technologies, says, “NJC is a valuable partner for us in the southern Africa region. The company is a great example of a best-in-class system integrator that is well positioned in several key growth sectors on the continent.”

NJC is a professional engineering service provider of process control, automation, and information systems. It designs and installs control systems and management systems that meet customers‘ specifications for performance and reliability. It has established a name for itself in the local automation industry since its inception in 1997.

“Global leaders such as ABB have selected us as their channel partner for the design and implementation of their products and systems. Based on a solid engineering background and with a diverse resource base of experienced professionals, we provide a complete service to industrial and corporate companies.

“Our mission is to deliver excellence in industrial IT and control systems to facilitate world-class production environments. We aim to be a provider of choice based on our reputation for delivering quality, innovative solutions that represent outstanding value for our clients,” says Richard-Coombes.

NJC’s engineering services enable clients to optimise their production processes and to form a clear picture of how to manage them. Its experienced automation specialists cover all areas within automation engineering and industrial IT, including management information systems, S88 compliant batch system integration, process control and optimisation, electrical and instrumentation engineering, turnkey industrial automation projects, PLC/SCADA systems, distributed control systems, advanced batch handling and MES integration solutions, automation engineering consulting, and safety systems compliance.

ABB’s control technologies, particularly ABB Ability™ System 800xA and MES, offer significant advantages for the metals

Continued on page 12

In this upgrade of the DCS, the rewiring of panels involved 12 000 I/O points.

Continued from page 11

industry in enhancing productivity, quality, and sustainability. They go beyond traditional distributed control systems, integrating process control, electrical control, safety systems, and asset management into a unified platform.

This integration provides for real-time monitoring and optimisation of metallurgical processes such as in steelmaking and rolling mills. Maintaining precise control over operations, it helps reduce defects, ensuring consistency in metal properties. At the same time, it optimises energy consumption in energy-intensive processes like electric arc furnaces and reheating furnaces. Its compatibility with existing systems, including ERP and third-party solutions, provides complete operational visibility, leading to more efficient decision-making and higher overall efficiency.

MES, the manufacturing execution system, complements this by bridging the gap between business planning and plant operations. With real-time production tracking, MES solutions monitor work in progress, yield, and quality deviations, helping to optimise output and minimise material waste. They also improve inventory management by ensuring the efficient use of raw materials, reducing costs and preventing production slowdowns.

Predictive maintenance capabilities further enhance uptime by identifying potential equipment failures before they occur to support continuous and reliable operations. Additionally, MES solutions support regulatory compliance by automating the tracking of emissions, energy usage, and production parameters, making it easier for companies to meet environmental and industry standards.

For more information visit: www.go.abb/processautomation

NJC, an ABB Authorised Value Partner, is a professional engineering service provider of process control, automation, and information systems.

Certified cybersecurity in web-based DCS

Valmet has reached a significant milestone in industrial cybersecurity with its Valmet DNAe Distributed Control System (DCS): it is the first fully web-based system to receive the ISASecure System Security Assurance (SSA) Security Level 1 certificate. The external assessment conducted by exida[1] ensured that Valmet DNAe meets the strict security requirements and levels specified in the ISA/IEC 62443-3-3 standard. The Valmet DNAe reference architecture networks were precisely evaluated, configured, and tested according to network topology and component requirements.

Introduced in 2024, Valmet DNAe takes a modern and proactive approach to cybersecurity, enabling companies to prevent and respond to evolving cyber threats. The product development process was validated with the Security Development Lifecycle Assurance (SDLA) certification in 2020, confirming that cybersecurity considerations are integrated into every stage of the system lifecycle.

"We believe that building security into the foundation of our systems is the most effective way to protect our customers in today's evolving threat landscape. Valmet DNAe has now become the world's first fully web-based DCS to reach system-level ISASecure SSA certification. The right technology decisions enable us to provide our customers with next-generation connectivity and elevate cybersecurity to new levels," says Jukka Ylijoki, Vice President of R&D, Automation Systems, Valmet.

For IT teams, Valmet DNAe provides centralised user management and Active Directory (AD) integration, enabling role-based access control and authentication. Additionally, the system offers authorisation, audit trails, secure communication, encryption mechanisms, content-signed software, and comprehensive logging. To support enterprise-level visibility, Valmet DNAe integrates with customers' Security Information and Event Management (SIEM) solutions, providing valuable information to Security Operations Centre teams.

Note

[1] exida is a global provider of functional safety, cybersecurity, alarm management services and certifications. They partner with companies worldwide to offer expertise in safety and automation.

Valmet's DNAe distributed control system has received ISA SSA cybersecurity certification.

Robotic welding solutions for automotive manufacturing

Yaskawa's advanced robotic welding systems are central to the new production line, ensuring consistent, high-quality welds at specific stages in the process.

Yaskawa Southern Africa, a leader in robotic solutions for industrial automation in South Africa, has a strong presence in the local automotive sector. Yaskawa's expertise in robotic welding technology has enabled manufacturers to achieve greater precision, efficiency and reliability in their production processes. One of its recent projects in this sector highlights its growing collaboration with D&L Engineering Solutions, a Durban-based engineering and automation company. Together, the two companies are delivering a state-of-the-art robotic welding production line for L&J Tools & Engineering Works for the assembly of original equipment manufacturer (OEM) and safety critical components.

In this project, Yaskawa's advanced robotic welding systems are central to the new production line, ensuring consistent, high-quality welds as needed at specific stages in the manufacturing process. The systems include arc welding and spot-welding technologies, leveraging Yaskawa's latest servo-driven welding actuators.

A multi-stage welding process

The production line has been designed as a multi-stage welded assembly process, balancing automation and manual intervention to maximise efficiency and cost-effectiveness.

- Stage 1: Initial spot welding

The process begins with operators manually spot-welding brackets onto C-channel sections. This step optimises use of labour and reduced the total automation investment.

- Stage 2: Robotic arc welding cell

The partially assembled component is then loaded onto a Yaskawa robotic arc welding cell, equipped with a turntable system. While the robotic system performs 52 arc welds (each 50 mm long) on one side, operators simultaneously load the next component on the other side, ensuring a continuous production cycle.

- Stage 3: Robotic spot-welding cell

After arc welding, the component moves to Yaskawa's robotic spot-welding station, which features a dual-robot setup and another turntable system. Each robot completes about 30 spot welds per component, allowing for seamless and efficient processing.

- Stage 4: Final manual welding (potential future automation)

A final component is currently welded manually, though Yaskawa and D&L Engineering Solutions are assessing potential automation upgrades to further enhance productivity.

Advanced robotic welding technology

Yaskawa's robotic welding expertise, built through decades of experience in South Africa's automotive sector, is central to this project.

Over the years, Yaskawa has installed hundreds of arc welding robots in local automotive plants. In its spot-welding solutions, servo-driven spot-welding actuators are fully integrated into the robot as a seventh axis, enabling precise control over contact pressure, current, arc time, and hold time. The robotic spot-welding solution is designed to minimise cycle times, as the welding gun's opening angles can be synchronised with the robot's movement.

Offering a fully integrated solution, Yaskawa ensures that its robotic systems can work with power sources from any leading OEM, such as Fronius and OTC, allowing manufacturers to select the best-fit welding technology for their specific requirements.

Value through collaboration

"All great partnerships start with great relationships," says Gavin Walter, Director of D&L Engineering Solutions. "There must be a high level of mutual trust and understanding for partnerships to last and to succeed. We understand that when working as a team, we can deliver and exceed our client's expectations – this, in turn, becomes mutually beneficial to both Yaskawa and D&L." The partnership has proven to be highly effective in delivering customised, high-performance robotic solutions tailored to South African manufacturing conditions.

D&L provides the tooling, jigging, and process engineering, while Yaskawa delivers the robotic automation and welding technology. Furthermore, in this project, combining manual and automated processes, the production line achieves optimal cost-effectiveness without compromising on quality and the solution allows for scalability and flexibility. A key benefit is that robotic welding ensures consistent, repeatable welds, which are crucial to produce safety-critical automotive components.

As the demand for high-quality automated welding solutions grows within the South African automotive sector, Yaskawa continues to lead the way with innovative robotic systems. "Robotics and automation already play a significant role in the automotive sector, among OEMs and the sub-tier manufacturers. Where demand for vehicles increases, so does the need to produce them at a higher rate," says Rudi von Fintel, Durban Branch Manager for Yaskawa Southern Africa. "In this project, our collaboration with D&L Engineering Solutions has resulted in a robust, high-efficiency production line that meets the high-quality requirements of supply chains."

With a strong track record of delivering tailored robotic solutions, Yaskawa remains committed to driving automation excellence in the region, ensuring that local manufacturers remain competitive in an evolving global market.

Keeping motors cool, finding the right solution

CWIEME takes place 3 to 5 June this year in Berlin, Germany. The coil winding, insulation and electrical manufacturing exhibition is organised by the Hyve Group. Ahead of the event, Nicola Acampora, Head of Sales at the Hyve Group, shared a comparative evaluation of electric motor cooling systems.

The need for cooling

Electric motors generate heat due to energy losses during operation – the more stress, the more the machine radiates heat that needs to be removed. This makes it crucial to be aware of the operational temperature and how to keep it within an optimal range.

If unchecked, the heat can lead to short- and long-term degradation of the electric motor. Excessive heat can warp mechanical components or damage bearings, leading to immediate operational issues. There is also a significant difference in performance under 'hot' conditions, which means finding the right cooling system for electric motors is key to ensuring their energy efficiency.

The longer an electric motor is subject to inadequate cooling, the shorter its operational lifespan, as wear and tear will be accelerated. Prolonged exposure to high temperatures can cause deterioration in insulation materials, posing a risk to continuing operation and safety. Without sufficient insulation material, electrical shorts can cause failure of the entire machine, and flammable components may be continuously exposed to high temperatures.

Is simple best?

A rotary fan is the simplest method to dissipate hot air surrounding an electric motor, promoting convection that allows cooler air to replace it.

An uncomplicated layout reduces the number of components and potential failure points, ensuring greater reliability and ease of troubleshooting. Installation and maintenance are also easier and cost-effective, requiring fewer resources to be committed to start and keep such systems running. A lightweight design also makes this solution ideal for fast-changing or mobile tasks.

Cool, compact and consistent

Liquid cooling, as an alternative, takes advantage of the high heat capacity in fluids like water and certain oils to absorb the heat energy emitted by electric motors.

This can be done by funnelling the cooling system through the heat source itself or via a jacket that covers the entire component, which greatly improves the cooling efficiency. The more direct heat dissipation method also allows more control over the temperature, regulating the environment of the electric motor to a consistent level. Design flexibilities like compactness and shape are also made possible by the efficiency of liquid cooling.

Decisions

Making the choice will often come down to each system's limitations and challenges.

Staying with liquid cooling, the complexity produces a higher initial investment that might not be appropriate for smaller projects. Additionally, higher levels of expertise are needed to perform maintenance checks and repairs. Depending on the fluid used, liquid cooling can also be sensitive to extreme temperatures, where there are risks of freezing or evaporation. This makes liquid cooling appropriate in applications such as high-performance industrial machinery or electric vehicles where high thermal dissipation is required in a relatively consistent environment.

Air cooling provides comparatively lower performance, which might not keep up with electric motors that produce high heat intensity. If the design requires tight or enclosed spaces where air currents are harder to generate, a fan-based system will not operate effectively. A generally hot operational environment may also make it hard to generate the necessary convection to cool down the electric motor. Simple air cooling lends itself to lightweight, simple designs like portable power tools and drones.

Practical experience under application conditions will provide the most valuable reference data to help the decision-making process, although this is not always available for new projects. That is when it's important to talk to industry experts and learn about modern, proven solutions.

The global coil winding, insulation and electrical manufacturing event, CWIEME Berlin, is a melting pot of ideas that inspires start-ups as well as industry leaders. This is an environment that facilitates conversation and the exchange of ideas among practitioners and professionals who have overcome operational temperature challenges to keep motors cool.

For more information visit: https://berlin.cwiemeevents.com/home

CWIEME is the exhibition for coil winding, insulation and electrical manufacturing.

IE3 motors – saving energy and money

The International Efficiency 3 (IE3) motor standard will soon become South Africa's legal minimum standard, mandating that local suppliers provide the market with more efficient electric motors. How does this affect the many industries that rely on these modern electric workhorses? Rodrigo Cetenareski, Sales & Marketing Director at WEG Africa, highlights some of the benefits of working with more energy efficient motors.

The world is powered by electric motors. First invented in 1835, electric motors have become ubiquitous. Nearly two centuries on, they play a part in running vehicles, elevators, escalators, air conditioners, conveyor belts, pumps and much more.

From the first mechanical water wheels and windmills, which were designed to turn the elements into torque for productive applications, the invention of steam engines served as one of the biggest catalysts in the early industrial revolution. Combustion engines ushered in an era of giant machinery and shortened travel times. Today, electric motors are at the forefront in powering the modern world. They generate over USD150 billion annually in sales, according to Allied Market Research [1]. However, industries that rely on electric motors are facing rising energy costs and constrained networks. Electric motor-driven systems (EMDS) have a considerable impact on both, not least because they consume more than 40% of global electricity supplies [2].

"Most industries are focused on how to reduce their energy bills and increase energy efficiency," says Rodrigo Cetenareski. "They are also looking to save costs through more efficiency in equipment, particularly around maintenance. These factors have made electric motors a priority area and put momentum behind MEPS regulations."

A regulated sea change

Minimum Energy Performance Standards (MEPS) encourage the use of energy-efficient technologies, including electric motors. The International Electrotechnical Commission (IEC) published new MEPS standards in 2007. The US updated its MEPS laws in 2011, European countries followed by 2017, and China established similar regulations soon after that.

Currently, over 57 countries support the new MEPS standard [3], with more to follow. South Africa gazetted its new MEPS regulations in late 2023, with enforcement slowly taking place.

The new regulations impact low-voltage electric motors in the 0.75 kW to 375 kW range, predominantly two-pole, four-pole, six-pole, and eight-pole motors. Roughly 200 000 electric motor units are sold in South Africa each year, according to the National Economic Development and Labour Council, and almost 70% of them are in the 0.75 kW to 11 kW size range. Yet very few have stated energy ratings, suggesting that most of them are inefficient IE1 motors, which require frequent maintenance. Under the new regulations, most new motors must meet the IE3 standard. The regulations don't affect current installations, but it may be more economical to replace broken motors with new models rather than repair or rewire them.

"Companies that rely on electric motors won't have to rip and replace what they have. The new regulations focus on new motors sold in the country. However, when you look at the advantages of IE3 motors, there are good reasons to consider upgrades," says Cetenareski.

As well as reducing energy usage and saving running costs, higher efficiency IE3 motors need less maintenance and have a longer lifespan.

Reduced energy and maintenance demands

It is important to consider the make-up of costs in owning and running electric motors. The purchase price represents only about 2.3% of a motor's lifetime cost, and maintenance only 1%. Almost 97% of motor costs go to electricity consumption.

IE3-level motors are more efficient than lower-rated models. Although the margin of improvement in efficiency is only between 4% and 8% on that of an IE1 motor, IE3 motors running for thousands of hours reduce energy losses by as much as 32%. They also produce lower temperatures, in turn significantly reducing maintenance requirements and extending their operational lifespan. Further peripheral gains are seen in lower carbon emissions, for instance.

IE3 motors are more expensive than lower-rated motors, yet, that cost difference is typically recouped in less than five years, and under some conditions by the second year, via the savings gained in running costs. This should be kept in mind when older motors require repair or rewiring.

Cetenareski says, "Rewiring a motor can cost more than half the price of purchasing an IE3 motor. If you look at the subsequent savings, it makes more sense economically to phase out older motors rather than repair them."

IE3 motors represent a significant advance in electric motor technology. By upgrading to the more energy-efficient motors, companies can reduce energy costs, improve sustainability, and enhance performance, as well as comply with regulations.

Furthermore, South Africa's new MEPS regulations and the widening adoption of IE3 motors will unlock more energy at a time when companies and consumers are looking to lower costs, gain value, and boost resilience.

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For more information visit: www.weg.net

Leading OEM continues to grow its Africa footprint

SEW-EURODRIVE technicians carry out precision repairs ensuring OEM-quality standards in restoring equipment to peak performance.

Steadily rolling out its strategic expansion into Africa, SEW-EURODRIVE South Africa continues to build momentum in driving forward its plans to become a leading force in the business of industrial gearboxes, drives and automation solutions on the continent.

Managing Director Raymond Obermeyer says, "Building on years of planning and proactive investment, we are successfully rolling out our African strategy to get closer to customers across the continent. To do this effectively, we are also continuing to strengthen our foundation of technical capability and expertise."

Already well established in countries such as Kenya, Tanzania and Zambia, the company is extending its reach northwards into Cameroon, Côte d'Ivoire, Mauritania, Morocco and others. At its 26 000 m² headquarters in Aeroton near Johannesburg, where the company took occupation in 2022, work is under way on the construction of the adjacent service facility.

Obermeyer says, "This service centre will further support our expansion of sales, support, engineering and training capabilities. We have begun appointing key staff for the facility and will add another 20 to 30 employees over the course of this year."

He points out that many local gearbox users face the challenge of inadequate support for products being sold into the market, and highlights that SEW-EURODRIVE South Africa focuses on being well equipped to service and repair all its products.

"As one of the few gearbox OEMs in the country with advanced design and engineering infrastructure, we can also make use of our group's world class facilities in Germany," he adds. "This enables us to service and repair the products of other OEMs as well – and to the same high standard as the original item."

The new SEW-EURODRIVE service centre in Aeroton will house the company's existing industrial gearbox repairs division as well as an expanded Drive Academy – where it runs training programmes for staff and customers. Other capabilities to be brought in-house include base plate fabrication and sand blasting, and new equipment will include robotic welders, five-axis gear cutting machines and heavy cranage.

In pursuing its plans for growth, SEW-EURODRIVE South Africa is also finding new markets, a drive which is supported by the group's wide and expanding range of products and solutions. Obermeyer highlights that In 2025, the group has already launched 16 new products, as it pushes the boundaries in fields such as industrial gears, geared motors, electronics and artificial intelligence.

"This reflects our innovative approach and our research and development capability which is opening up fresh opportunities in existing and new markets," he says. "At SEW-EURODRIVE South Africa, we understand the importance of keeping up our investments in Africa, positioning ourselves for leadership."

Construction on the expansion for the new SEW-EURODRIVE service centre began in November 2024 and the facility will be operational by the end of 2025. Obermeyer says customers can look forward to the facility raising the service bar for the industry from 2026.

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

Find the right drive cable easily

Motion plastics specialist igus has released the latest version of its readycable finder, an online tool that makes it easier for plant engineers or electromechanical equipment manufacturers or technicians to select suitable drive cables.

Users can find the right cable with the appropriate quality at the most favourable price with just one entry. Additionally, the integrated chainflex service life calculator predicts how long the cable will last in a given application.

Customers looking for a cable for motors can select from a range of over 6 000 drive cables suitable for 38 manufacturer standards, available via the igus readycable finder. With this online tool, the motion plastics specialist helps customers select the right cable. Providing a modern, user-friendly platform, it requires only the part number of the motor manufacturer's cable and converts this directly into the appropriate readycable product.

Customers can choose from up to seven different cable qualities, which are designed for special requirements in the energy chain. These include different jacket materials and particular specifications, which can vary depending on the operating conditions. The price, the cost savings when changing the chainflex cable quality and the delivery time of the cable are also displayed in real time, which allows customers to place an order quickly in the online shop.

The service life of the cable can be calculated using the integrated chainflex service life calculator. This helps customers determine the service life of their selected cable using test data from igus's own 4 000m² test laboratory and AI-based calculations. With parameters such as travel, speed, acceleration and maximum bend radius specified, the tool provides an exact calculation of the cable's durability.

The cablefinder is accessible from the igus website.

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Step into the next generation.

High-performance electric wire rope hoists

Becker Mining SA's Kito RX electric wire rope hoists – launched in Africa two years ago – play a critical role in many industries, including mining, construction, shipbuilding, food, beverage and pharmaceutical processing, manufacturing and general industry, as well as in chemical and petrochemical plants and the wind power sector.

"The addition of Kito electric wire rope hoists to our extensive range of Kito manual and electric chain hoists and lever hoists has been a success," says Rick Jacobs, Senior General Manager (SGM) for Consumables, Becker Mining South Africa – distributors of the Kito range in Africa since 1986. "Our customers rely on dependable and safe lifting equipment, supported by the assurance of quality specifications, as well as a reliable support service.

"Kito RX electric wire rope hoists have been developed with a robust design and advanced technology for dependable operation and extended service life in tough conditions. Typical applications are in production plants, plant engineering, production lines and workshops, as well as shipbuilding and general maintenance procedures.

"The flexible hoists are adaptable for use with existing cranes and machinery and all components are easily accessible for ease of maintenance."

Technical features

The Kito RX range, with lifting capacities between 1 000 kg and 50 000 kg, is available from Becker Mining in units with two or four rope strands, reeving 2/1, 4/1 and 4/2. The hoists have lifting speeds from 1.5 m/min to 12 m/min, with the option of single-speed, two-speed and frequency-control.

Features include 380-440 V / 50-60 Hz / 3 phase, Insulation Class: IP55 (standard) or IP66 (optional) and a control voltage of 42 V, 110 V, 24 V, 48 V or 230 V (optional). The hoists are powered by a three-phase asynchronous motor or the option of a sliding anchor motor. A planetary gearbox ensures optimum power transmission between the hoist motor and rope drum.

For enhanced safety, an electromagnetic disc brake acts directly on the rotor shaft for effective braking force. Electronic overload protection, with two adjustable levels, offers protection to the hoist and all its components from overloading (Performance Level C). There is also integrated overheating protection for the motor.

The rope guide is another notable design feature. It consists of two parts – the guide ring and tension spring. The tension spring ensures the rope lies correctly in the drum groove, while the guide ring always maintains the rope in the correct position, preventing it from coming off the drum groove. By moving the guide ring along the drum, limit switches are activated for the highest and lowest hook positions.

The double-girder trolley is equipped with double-flange wheels, all with high-quality ball bearings. This construction, where driven wheels are connected directly to the self-braking gear motor, ensures efficient power transmission between the running wheels and the trolley rail. This design also contributes to reduced wear, low maintenance requirements and extended service life.

The standard headroom monorail design of the trolley enables the hoist to operate directly under and parallel with the crane or runway beam. The hoist is directly connected to the trolley and all components are easily accessible for maintenance.

Hoists in the Kito RX range include a foot mounted hoist without a trolley, designed for lifting capacities from 1 000 kg to 50 000 kg and a hoist with a standard headroom monorail trolley, for capacities from 1 000 kg to 32 000 kg. Double girder trolleys are suitable for capacities from 1 000 kg up to 32 000 kg, either supported or suspended, version S2-S4.

This range is available only in supported execution for lifting higher capacities from 20 000 to 50 000 kg, Double hoist units are also supplied, with capacities up to 100 000 kg.

Becker Mining also supplies a full range of Kito accessories to enhance the performance of Kito hoists.

To ensure hoists are maintained in good condition and always operate safely, it is recommended that equipment is tested regularly at Becker Mining SA's workshops, or any certified repair centre.

Becker Mining SA is committed to the highest standards in quality and safety. It offers technical advisory, repair, test and backup services throughout Africa. A specialised consulting, training and support facility supports optimum operating efficiency across a range of equipment and safety for workers.

Becker Mining also supplies high-performance fit-for-purpose energy distribution, automation and communication solutions, and more.

Becker Mining SA's Kito RX electric wire rope hoists are designed for dependable operation and extended service life in tough conditions.

Non-contact level measurement for hygienic and industrial applications

Radar level sensors from ifm, LW 2720 and LW 2120, suit various industrial applications and applications where hygiene is key. ifm here shares several application cases that demonstrate the versatility of these sensors.

In tanks that can be as high as 10 metres, the LW2720 sensor provides precise level detection.

In the production of wine and fruit brandies

Steinhauser distillery in Kressbronn on Lake Constance (in Baden-Württemberg, Germany) has been in existence since 1828 and is still family-owned today. 1996 saw the construction of what was then the most modern bonded distillery in Europe. ifm sensors and software have been supporting production since 2021.

One sensor used in the production of spirits and wine is the LW2720 non-contact radar sensor. It monitors the level in the tank which is filled with various fruit mashes. This can be mash for the classic Williams (pear) brandy, or for cherry, mirabelle, plum or apple mash. The mash is then fermented in the tank.

The are several reasons why the radar sensor is used. Unlike hydrostatic level measurement using a flush pressure sensor, the non-contact measurement sensor rules out deposits on the measuring cell. This is important because deposits can have a negative effect on the measurement. The same applies in respect of the so-called 'head pressure' created in the tank during fermentation, which would also affect the pressure measurement. What is more, the sensor's intelligent algorithm can reliably mask the agitator that is moved into the tank during the filling process.

"Using the LW2720 radar sensor and IO-Link, we can now monitor and display the level digitally via moneo. The advantage for us is that we no longer have to measure manually at a height of 10 metres, and we can also monitor the process remotely," says a spokesperson for Steinhauser distillery.

Level monitoring in hygienic stainless steel tanks

The foundations of *Meckatzer Löwenbräu Allgäuer Bierspezialitäten* were laid over 280 years ago when Joseff Fessler served Meckatzer beer from the Allgäu region for the first time in 1738. 115 years later, Lena and Gebhard Weiß acquired the *'Landbrauerei zu Meckatz'*, establishing the Weiß family's enduring passion for brewing high-quality Allgäuer beer.

Today, sensor technology from ifm supports the Allgäuer brewer in the brewing process. This technology also includes the LW2720 radar sensor which is used for continuous level monitoring in a tank containing degassed water. The tank has a conical bottom that tapers downwards and is equipped with a spray ball, which has proved challenging in the past. For the radar sensor, however, the geometry of the tank poses no problem, and the measurement is always accurate. The key is the 80 GHz frequency of the sensor signal emitted in a very narrow beam angle. This means the radar waves remain unaffected by the spray ball, during and after cleaning.

The Meckatzer Brewery notes: "In the past, the conical bottom often led to problematic signal curves during the filling and emptying process. Today, the radar sensor monitors the fill level over the entire tank height and provides reliable measurement results."

Reliable level detection in a tank with moving structures

In another application case, a customer producing fruit juice not only

uses the pure fruit juice but also processes the fruit residues to optimise the use of resources. After pressing, which separates the juice from the fruit, the fruit residues are fed from above into a solids buffer tank. In the plant, the residues first enter a bridge breaker that shreds and crushes them. Directly below, at the bottom of the plant, a screw conveyor transports the residues to the next process. With the solids buffer tank, the bridge breaker can only work properly up to a specific level. And this is where the LW2720 radar level sensor plays its part. Even with extensive structures in the tank that are constantly in motion, the sensor reliably determines the current level, and the supply of fruit residues can be regulated accordingly.

For this fruit juice producer, "The LW2720 helps us to optimise the supply of fruit residues by continuously monitoring the level. During installation, the sensor's position was very slightly inclined. It can now detect the full height of the tank and there are no blind zones."

Continuous level monitoring in a CIP tank

The challenge with caustic tanks in a CIP process is that the caustic solution can crystallise over time and settle on the tank walls or structures within the tank. For this customer, who had several tuning forks in use, this meant that the tuning forks were switching constantly or incorrectly. The radar sensor installed now monitors the level in the caustic tank safely and reliably and it remains unaffected by the crystalline deposits.

This customer in the food industry comments: "Today, we continuously monitor the level with the radar sensor and no longer have to worry about the effects of deposits. Together with the LMT, which is used as an overflow prevention and run-dry protection for our pumps, we have found the perfect duo for our level monitoring application."

In the manufacture of bakery products

One of ifm's customers in the bakery business relies on the LW2720 radar sensor for level monitoring. During the production of cookies, a nine-metre-high tank filled with vegetable oils, such as palm oil, and pressurised from above, is monitored. The sensor offers a suitable solution here because it works independently of temperature and pressure. Even condensate and almost transparent media do not present a challenge for it. In direct comparison, ultrasonic sensors and optical systems would reach their limits in this application due to the effects of condensate and pressure.

"The sensor was a convincing choice for us because it reliably reflects the level in our oil tanks. Both optical and ultrasonic sensors were unable to solve the requirements of this application due to condensate and an almost transparent medium, so the radar sensor is the perfect solution for us," notes the manufacturer of bakery products.

For industrial applications

For industrial applications the LW2120 radar level sensor is used for non-contact measurement in tanks, in water treatment for example.

Non-contact radar measurement in tanks

For more than 30 years, EnviroFALK GmbH has been designing, manufacturing and selling pure and ultra-pure water systems for diverse industries worldwide. For non-contact level monitoring in tanks, EnviroFALK uses the LW2120 radar level sensor.

The sensor can detect levels up to a height of 10 metres without blind zones and at a millimetre resolution. The 80 GHz frequency used ensures stable and precise measurement results even in confined spaces. With the antenna extension, available as an accessory, the sensor can also be used outside closed metal tanks, for example on open tubs or plastic tanks.

Standard M12 connection technology ensures quick error-free installation, and IO-Link offers the convenience of remote parameter setting and reading. The intelligent algorithm in the unit makes parameter setting via IO-Link easy. After setting the reference height once, the sensor immediately provides the exact level via IO-Link.

Maximilian Meurer, Measurement and Control Engineer at EnviroFALK GmbH, says: "For certain applications, we use the radar sensor instead of hydrostatic level measurement. For example, end customers request this in the ultra-pure field, where every screw connection and every measuring point represents a potential source of contamination. In such applications, level measurement using a radar sensor is advantageous, as the sensor is installed outside the tank lid and does not come into contact with the medium."

Key benefits

Optimised performance

The 80 GHz technology enables focused and precise level measurement in confined spaces where hygiene is essential and in demanding industrial applications involving condensation, wind, steam, sunlight, or temperature fluctuations.

Simple set-up saves costs and time

The prewired M12 connection technology reduces the risk of incorrect wiring and only one value is required for parameter setting, which makes set-up quick and easy. Parameters can also be set conveniently via ifm's free moneo|blue app and the EIO330 Bluetooth adapter.

Non-contact measurement

The non-contact measuring principle prevents malfunctions caused by the adhesion of media or damage from agitators. Similarly, process conditions such as density, viscosity, temperature, pressure and pH do not affect the measurement.

Interfering structures are suppressed

Interfering structures (such as piping, agitators, spray balls) are suppressed automatically by the intelligent algorithm, minimising parameter setting and ensuring reliable and trouble-free level measurement.

One-piece stainless steel housing

For hygienic application the one=piece stainless steel housing, without any seal, ensures optimum and long-term durability to withstand regular cleaning processes. There is no wear caused by brittle seals. The sensors are certified for use in hygienic environments with protection class IP66/68 and IP69K.

Flexible use

With the antenna extension, available as an accessory, the sensor can also be used outside closed plastic tanks and above open tanks.

Supporting set-up and monitoring sensor behaviour

The free Vision Assistant software enables intuitive sensor set-up and clear visualisation of process values. The software is particularly useful in complex applications as it provides a real-time view of the sensor's behaviour and ensures reliable measurement.

Overall, the LW family of radar level sensors from ifm sets a new standard in the industry with its unparalleled speed and accuracy. Ease of installation and adaptability make it an ideal choice for a wide range of applications. Whether dealing with challenging conditions in high tanks or ensuring precise measurements during rapid filling and emptying processes, the LW radar sensors deliver reliable performance.

For more information visit: www.ifm.com

The radar level sensor LW2720 from ifm sets new benchmarks for speed and accuracy. It provides for extra fast installation: a standard M12 cable, fast parameter setting using IO-Link and a large selection of adapters enable a simple and customised out of the box start-up.

And in terms of accuracy, when used in tanks that can be as high as 10 metres, the LW2720 sensor provides precise level detection even in the presence of agitators or spray balls. It also remains unaffected by changing media properties. Even high-speed filling or emptying of tanks are registered by the radar sensor with its 80 GHz technology – fast, precise and without blind zones.

The radar level sensor LW2720 sets new benchmarks for speed in set up and accuracy in measurement.

Truck scales ensure precise, reliable weight recording

In the food industry, among others, truck scales ensure precise and reliable weight recording which is essential for quality control and traceability. For its truck scales, the company *Waagen Dammaschke* relies on the load cell PR 6221 from Minebea Intec, a leading global manufacturer of weighing and inspection technologies.

For truck scales used to provide fast and precise weighing under tough conditions the reliability of the technology is crucial for end user satisfaction. Sometimes, no second scale is available, and a high volume of traffic can quickly become a problem if there is a failure. In food production, for example, truck scales are often used at the entrance and exit of plants to weigh trucks precisely when they are carrying raw materials and finished products such as grain, sugar or flour, or live animals, meat or liquids. A second weighing takes place on departure to document the exact weight of the unloaded materials. This process ensures transparent and complete documentation of the production chain in the food industry.

Customised weighing solutions

Waagen Dammaschke has its own concrete mould for precast elements and uses it to offer weighing systems in a wide range of dimensions for customers and other scale manufacturers. The company focuses particularly on meeting individual customer requirements. And it always relies on the PR 6221 truck scales load cell from Minebea Intec with load levels of 30 tonnes and 50 tonnes and accuracy class C3.

Every load cell from Minebea Intec is precisely calibrated, and many have 'matched outputs', that is, the individual adjustment of the output resistance to match the characteristic value. "With new builds, we see that the load cells are perfectly matched to each other, so that corner adjustment is usually no longer necessary," says Fabian Müller, Managing Director of *Waagen Dammaschke*. This feature is also a significant advantage in servicing: "For us, the time and effort required for adjustments or maintenance is decisive. Here, the load cells require only minimal adjustment, even after years of use."

Reliable weighing in heavy-duty applications

The load cell PR 6221 also has a special measuring element that counteracts errors caused by the deflection of the weighbridge. This makes it ideal for use in truck scales where heavy lorries can move the weighbridge in the direction of travel. Additionally, with a high restoring force, the load cell quickly returns to its centred rest position. These features enable *Waagen Dammaschke* to achieve a high level of repeat accuracy, even with heavy-duty floor scales.

"We choose the load cell PR 6221 from Minebea Intec because its quality and the fact that it is 'Made in Germany' offer clear added value for us and our customers. As a result of its durability and reliability, using the PR 6221 from Minebea Intec pays off," says Fabian Müller.

Waagen Dammaschke *produces its own precast concrete elements for its truck weighing systems in a wide range of dimensions.*

Infrared visioning in automotive end-of-line testing

The OPTRIS PI 640i thermal camera is recommended for efficient automated end-of-line testing of car window heater defrosting systems in automotive manufacturing.

Window defrosters are an important feature in vehicles, particularly in colder climates. They help defrost ice from the windowpanes to ensure drivers can maintain visibility and safety.

The manufacturing process begins with producing windowpanes made from special laminated glass. Thin, nearly invisible heating wires of electrically conductive material are integrated into the panes. The wires are methodically embedded in the glass to ensure even heat distribution and efficient heating performance. For the rear windshield's heat conductors, the defroster operates by sending an electrical current through a grid made of metal and resin, which is attached to the surface of the glass using an adhesive.

As the defroster resists the flow of electricity, it converts the electrical energy into heat, warming the glass windowpane.

Issues with the defroster are common because the wiring is typically thin and fragile, so it is susceptible to breakage.

On the production line, automotive manufacturers need an efficient solution to measure the temperature of the windows quickly and precisely, ensuring that the connections, installed cables, and wires work correctly and do not have any defects, before a vehicle is released.

Previously, the end-of-line test procedure was performed manually by technicians. Heating the elements took 10 to 15 minutes. In this application case, the manufacturer sought to speed up and automate this process as much as possible.

Automating quality tests

The Optris PI 640i thermal imaging camera, available locally from Instrotech, provides a solution. This compact VGA camera (640 x 480 pixels) with a high thermal sensitivity of 40 mK, detects and evaluates even minor temperature differences.

The PI 640i can be installed at any distance from the measurement object within the system and deliver the necessary signals to any location (peripheral devices), allowing operators to focus on other processes simultaneously.

During the final test, the electrical connection of the heating strips is first examined by applying a defined voltage and measuring the current flow to ensure all wires function correctly without interruptions. Next, the defrosters are tested in a simulated environment to check their performance under simulated real-world conditions. This involves deliberately misting the windows and activating the heaters to observe how quickly and evenly visibility is restored. Additionally, the window defrosters are tested for durability by repeatedly switching them on and off to ensure reliable performance through multiple cycles.

The PI 640i IR camera records every thermal change in real-time and monitors the entire process. If, for instance, the temperature on the heated window surface exceeds or falls below a specific value (say, 35°C), the camera sends an analogue signal to an alarm LED, which is easily visible to the specialist at the certification station in the automotive production facility.

Furthermore, the process can be fully automated, with follow-up actions (such as switching off the process) triggered by the Optris system. This automation shortens production time without disrupting the process flow.

Streamlining automotive production

For the customer, the benefits of using Optris IR devices are clear: the measurement process has been reduced from up to 15 minutes to around 30 seconds, and technicians are free to perform other tasks. The time saving and efficiency gains are significant advantages, with cost savings that support using the PI 640i.

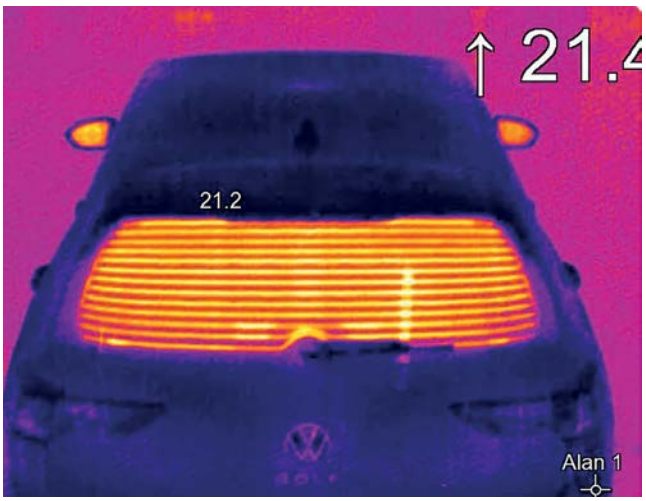
The PI 640i thermal camera also offers advantages in other thermally related production processes. Its high thermal sensitivity allows for quick detection of seat temperature changes, increasing time savings on the production line. The instrument can also capture radiometric video at frame rates of 32 Hz and up to 125 Hz in subframe mode, enabling accurate monitoring and analysis of rapid temperature changes and dynamic processes.

The camera is equipped with interchangeable lenses that cover different fields of view (15°, 33°, 60°, and 90°), so it can adapt to various printer sizes and applications by selecting the optimal focus and field of view.

It is robust and designed for industrial environments, with an IP67 rating that protects against dust and water ingress. It can operate in temperatures ranging from 0°C to 50°C, and separate accessories are available to enhance its durability further. This ensures reliability and longevity under demanding conditions.

Various interfaces and a comprehensive software package facilitate integration into existing systems. The camera can be connected via USB 2.0 or, optionally, via a Gigabit Ethernet (PoE) interface. The included Optris PI Connect software package enables simple setup and remote monitoring of the camera. Additionally, the camera offers several industrial process interfaces, including analogue and digital inputs and outputs, and relays for alarm and fail-safe functions.

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



Using infrared visioning and temperature measurement technology for faster testing in automotive manufacturing.

Robert Erasmus, Sanitech.

Wastewater treatment for industrial sustainability

In industry today, sustainability is a key driver for business success. Where industrial companies are looking to minimise their environmental footprint and enhance operational efficiency, Robert Erasmus, Managing Director of Sanitech, highlights that one of the key considerations relates to efficient wastewater treatment. This is especially relevant in Industries with high water usage such as food processing, manufacturing, pharmaceuticals, and mining, where efficient wastewater treatment plays an important part in achieving sustainability goals.

Leading by example

San Miguel, a world leading producer of lemon oils, juices, and dehydrated peel, demonstrates its commitment to sustainability in its wastewater treatment initiatives. At its processing plant in Gqeberha in South Africa's Eastern Cape, the company processes locally sourced produce and uses advanced wastewater treatment technologies to ensure efficiency and compliance with the relevant standards.

At the plant, the wastewater treatment system combines local equipment with advanced Dutch technology to enable remote monitoring and control, providing a high level of operational transparency and efficiency. One of the main goals at the plant is to reduce water consumption and ensure wastewater is treated effectively to meet discharge specifications before release into municipal sewage systems. This approach is in line with San Miguel's commitment to environmental protection, water resource conservation, and regulatory compliance.

Economic benefits and resource optimisation

Efficient wastewater treatment also presents significant economic benefits. Industries can reduce operational costs by minimising water intake and reusing treated water within their processes.

Reducing freshwater usage has the dual benefit of reducing water procurement costs and decreasing sewage discharge tariffs. This double saving makes a strong economic case for investing in efficient wastewater treatment technologies. It is estimated that the payback period for San Miguel's additional phase of its wastewater treatment plant could be between three to four years, confirming the economic viability of such investments.

Water security and sustainability

Water security is another critical aspect of industrial sustainability. Several regions in South Africa, like the Eastern Cape, have experienced severe droughts, and this highlights the importance of reliable water sources for industrial operations. Efficient wastewater treatment systems that enable water reuse enhance water security by reducing dependency on external water supplies. As well as stabilising industrial operations this aligns with broader sustainability goals, minimising the impact on natural water resources.

Broader industry implications

The benefits of efficient wastewater treatment are especially applicable to high water usage industries such as manufacturing, food and beverage production, pharmaceuticals, and mining. Each industry has specific processes and requirements, but the underlying principles of compliance, economic viability, and sustainability are consistent.

By tailoring wastewater treatment systems to address specific pollutants and operational needs, companies in these different industries can achieve similar benefits. For instance, mining operations dealing with heavy metals and other contaminants can implement specialised treatment processes to meet regulatory standards. Similarly, food and beverage operations can focus on reducing water usage through advanced filtration and recycling systems.

Achieving industrial sustainability

Efficient wastewater treatment is essential for industrial sustainability. A multi-faceted approach to compliance, economic efficiency, and water security will become increasingly important as 'water shedding' becomes a reality for South Africa. San Miguel's wastewater treatment plant in Gqeberha serves as a model of how industrial operations can leverage advanced technologies to achieve water security. By adopting a strategic approach to wastewater treatment, they can comply with regulations and achieve significant economic and environmental benefits, contributing to overall sustainability and resilience.

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

At its processing plant in Gqeberha, Eastern Cape, San Miguel has implemented advanced wastewater treatment technologies to meet efficiency, safety, and sustainability goals.

Maintaining resilience in extreme environments

Jurie Erasmus, Project Manager Business Development at ACTOM Turbo Machines

Extreme temperatures, corrosive substances and high pressures are just a few of the elements that make up the unforgiving operational environments characteristic of the petrochemical and oil & gas sectors. Under these conditions the integrity of equipment is constantly challenged, yet in such high-stakes industries, operational efficiency and consistent maintenance are critical.

In these demanding environments, unplanned downtime can have severe consequences, causing safety hazards, environmental damage and potentially significant financial losses and reputational damage. A considered and proactive approach to industrial maintenance is needed, to prevent disruptions and create the conditions that support operational performance and business success. Advanced proactive maintenance reduces downtime, enhances efficiency, and mitigates the risks associated with hazardous substances and fluctuating operational demands.

The need for proactive maintenance

Keeping pumps, turbines, and compressors running smoothly is essential in the oil and gas and petrochemical industries – they are at the heart of every operation. However, for the most part, the general approach to industrial maintenance has been short-sighted and based on a 'run it till it breaks' approach, driven by market demand and profits, and exacerbated by the 'make a plan' response to operational disruptions.

Effective operational procedures and maintenance processes require a clear understanding of equipment operating conditions and the potential consequences of even minor deviations. Many plants are left struggling to operate and maintain their equipment reliably, simply because the skills needed to maintain and run the plants are drying up. Skilled fitters and technicians cannot be replaced by machines, and the generation gap has left us with fewer skilled personnel to perform these functions accurately, as the skills have not been transferred to the next generation.

From a physical perspective, rotating equipment operating in harsh environments has to withstand constant threats. Corrosive substances eat away at materials and temperature swings cause stress. Dust, dirt, and moisture clog components, leading to wear and blockages. Vibrations can cause imbalances and bearing failures. All these factors can affect the performance and longevity of rotating equipment.

Maintaining plant and equipment in the particularly harsh conditions of petrochemical and oil & gas operations demands a considered and proactive approach.

The primary conventional strategies to manage these effects include selecting appropriate materials, applying protective coatings, implementing regular maintenance, and the use of advanced monitoring systems. Proper design, regular inspections, and environmental control systems all play a part in mitigating the risks associated with corrosive environments, temperature fluctuations, and other harsh conditions.

The benefits of proactive maintenance

Proactive maintenance strategies are key to minimising these risks. Downtime is usually a result of equipment breaking down, but the initial cause of the breakdown is only part of the story. The failure itself can trigger a cascade of problems, damaging other parts and sometimes other machines too. So, when something fails, fixing the broken part (reactive maintenance) and moving on is not always the most effective option. It is important to investigate all the contributing factors and every potential knock-on effect.

With a proactive approach to maintenance the aim is to prevent such failures in the first place. The only way to minimise downtime and protect profits is by improving overall equipment effectiveness. This usually involves implementing predictive maintenance techniques, such as vibration analysis, thermography, and oil analysis, to identify potential issues before they escalate into major failures.

The importance of monitoring KPIs

To see that maintenance systems are performing as they should be, certain Key Performance Indicators (KPIs) should be tracked. These numbers reveal equipment health, the effectiveness of the maintenance plan, and areas for improvement. Important KPIs include, for example, Mean Time Between Failures (MTBF), which is an indicator of the reliability of equipment and effective preventive maintenance. Mean Time to Repair (MTTR) is also important; a low MTTR indicates fast repairs and short downtime, and Overall Equipment Effectiveness (OEE) provides a holistic view that covers downtime, inefficiencies, and defects.

Tracking maintenance costs provides a basis for assessing the value of maintenance spending as a percentage of Replacement Asset Value (RAV). Here, a high failure rate suggests problems with design, operations, or maintenance. Scheduled Maintenance Compliance and spare parts availability are both essential for efficient maintenance operations. Root Cause Analysis (RCA) helps prevent recurring problems and the monitoring of energy usage can reveal operational inefficiencies in equipment.

By tracking these KPIs, the scope for improvements or adjustments to maintenance can be identified and where implemented will keep things running smoothly. Consistent KPI monitoring is therefore fundamental to optimising maintenance strategies and minimising operational disruptions.

New technology can simplify maintenance

New technologies are changing how petrochemical and other plants maintain their equipment. Artificial intelligence and machine learning can be used to analyse vast datasets and identify signals that predict when equipment might fail, plan maintenance schedules, and help plant managers make better decisions.

AI and ML also support Remote Monitoring and Diagnostics (RM&D) which can be used to identify potential failures and, in some applications, predict how much longer parts will last. Sophisticated algorithms can analyse wear patterns and almost precisely forecast a part's lifespan. In turn, only the necessary spare parts need be ordered and there is no need to rely on outdated, generic lists.

Continuing developments in the IoT (Internet of Things) make it possible for plants to monitor equipment in real time, so problems can be identified earlier and resolved before they become worse. Robotics can be deployed to handle repetitive or dangerous maintenance jobs, supporting safety and efficiency on the shop floor, and augmented and virtual reality (AR and VR) can be used for skills development, helping to train technicians, provide remote support for tricky repairs, and improve the effectiveness of routine inspections.

Proactive maintenance supports resilience

Petrochemical companies facing the harsh conditions of the environments in which they operate need no longer gamble with a run-to-failure approach. It is a dangerous game that raises unsustainable costs and risks. Proactive maintenance, by contrast, offers a foundation for safe and reliable operations but it means more than just fixing things when they break. It demands a commitment to the development of a well-trained workforce, empowered by technologies like predictive maintenance and sophisticated monitoring systems. These investments boost reliability, reduce risks, and optimise resources which, in turn, leads to improved safety and cost savings, and sets the stage for long-term success and profitability.

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

Advancing predictive maintenance in electrical systems

ACTOM recently announced an OEM partnership with Exertherm, a leading provider of Continuous Thermal Monitoring (CTM) technology. This collaboration signifies a progressive step in advancing predictive maintenance capabilities in the electrical and industrial sectors.

Leveraging ACTOM's extensive engineering expertise and market-leading solutions, alongside Exertherm's cutting-edge CTM technology, which was recently endorsed through its acquisition by Eaton, this partnership will deliver advanced, proactive solutions for maintaining electrical systems.

These complementary technologies will enable more precise monitoring, early identification of potential problems, and optimised system performance, enhancing reliability and efficiency. This reflects both companies' shared commitment to innovation and developing predictive maintenance solutions that deliver significant value to industries worldwide.

Focus on Africa

Commenting on the collaboration, Wesley Vorster, Product Manager: Protection & Control at ACTOM Smart Technologies said: "Integrating advanced data-driven thermal monitoring technology with ACTOM's engineering expertise represents a pivotal step in aligning with Industry 4.0 principles. Together, ACTOM and Exertherm are redefining predictive maintenance, enabling real-time insights and proactive decision-making in electrical systems. This is a significant step forward in the evolution of smart industrial solutions, enabling both companies to create connected, intelligent systems."

"The partnership between ACTOM and Exertherm, bolstered by Eaton's recent acquisition of Exertherm, brings advanced predictive maintenance technologies to the forefront, and addresses the particular challenges and opportunities in Africa's industrial and electrical sectors. Introducing the latest predictive maintenance technologies, our collaboration aims to support the continent's transition towards smarter, more sustainable industrial systems, aligning with global Industry 4.0 trends while meeting local needs," says Athol Hankey, Regional Sales Leader – Central & Eastern Europe and Africa at Exertherm.

Operational reliability and efficiency

Working together, ACTOM and Exertherm introduce a flexible solution, compatible with existing SCADA (supervisory control and data acquisition) systems for centralised, real-time monitoring or functioning independently.

The standalone solution uses machine learning (ML) to analyse historical and real-time data, enabling predictive maintenance by identifying patterns, anomalies, and potential failures before they occur. This approach means industries can adopt advanced maintenance solutions, regardless of their existing infrastructure.

The technologies enable early detection of potential issues, enhance performance through actionable insights, and offer scalability to meet diverse operational requirements, aligning with Industry 4.0's emphasis on adaptability and intelligence.

"By providing solutions that integrate with SCADA or function independently using ML, our partnership enhances operational reliability and efficiency at every level," says Vorster. "This significantly reduces downtime, optimises performance, and supports cost-effective maintenance strategies."

At the leading edge of Industry 4.0

Both ACTOM and Exertherm are committed to advancing Industry 4.0-enabled technologies that prioritise connectivity, automation, and data-driven decision-making. They have a shared vision to push the boundaries of what is possible in predictive maintenance and set new benchmarks for the industry.

By combining ACTOM's engineering leadership with Exertherm's advanced CTM technology backed by Eaton and including ML capabilities, the partnership creates a foundation for next-generation predictive maintenance solutions. The ability to integrate with SCADA or function as a standalone system supports scalability, making the solution adaptable to the evolving demands of Industry 4.0 operations. "It positions both companies as pioneers in delivering intelligent, data-driven maintenance technologies," says Vorster.

ACTOM and Exertherm are working in partnership to advance predictive maintenance in electrical systems and across industrial sectors.

WearCheck Water wins accreditation for microbiological testing

WearCheck Water's Johannesburg laboratory was recently awarded ISO/IEC17025 Accreditation for Total Coliforms and *E.coli* Testing, after a rigorous audit process. This adds to the company's extensive list of certifications and confirms again the laboratory's adherence to national and international work-quality standards.

WearCheck Water Laboratory Assistant, Khensani Mbuli, with the company's latest accreditation certificate for microbiological testing.

WearCheck Water operates under the umbrella of specialist condition monitoring company, WearCheck, which is the only oil analysis company in Africa with ISO 9001 quality certification and ISO 14001 certification for its environmental management programme, as well as ISO 17025 accreditation for its laboratory-centric quality management programme. WearCheck Water also recently earned SANAS accreditation for AdBlue®/ DEF (diesel exhaust fluid) testing.

General Manager of WearCheck Water, Thelma Horsfield, is proud of her team's achievements. "It is no easy task to set up the test method and gain accreditation. We work for many months to fine-tune methods that we can present confidently to SANAS for approval. Our ISO/IEC 17025 accreditation is for the membrane filtration method used in detecting total coliforms and *Escherichia coli (E. coli)* in water samples. This accreditation underscores the lab's commitment to delivering precise and reliable water-quality testing services.

"Total coliforms are a group of naturally occurring bacteria found in soil, vegetation, and surface water. Although most coliforms are harmless, their presence in drinking water can indicate possible contamination by pathogens. *E. coli,* a specific type of coliform, is commonly found in the intestines of warm-blooded animals. Certain strains of *E. coli* can cause serious illness, and this makes its detection crucial for public health."

Horsfield adds that the membrane filtration method used by WearCheck Water is a gold-standard technique in microbiological water analysis. It involves passing a water sample through a membrane filter that traps bacteria. The filter is then incubated on selective media, allowing the identification and enumeration of total coliforms and *E. coli* colonies.

"By securing ISO/IEC 17025 accreditation for this method, WearCheck Water's Johannesburg laboratory has confirmed its technical expertise and commitment to safeguarding public health by providing accurate and dependable water-quality testing," Horsfield says.

Khensani Mbuli is the WearCheck Water Laboratory Assistant who played a key role in achieving the accreditation. Through this, she was appointed as an ISO/IEC 17025 Technical Signatory – a significant professional milestone in the field of laboratory testing and calibration.

Horsfield elaborates: "As well as reflecting a high level of technical competence, this accreditation entrusts the individual with substantial responsibility. A Technical Signatory (TS) holds the authority to validate and approve test results, ensuring they meet international standards of accuracy and reliability.

"The journey to becoming a TS is rigorous and demands extensive knowledge, experience, and dedication. The process involves comprehensive training in quality management systems, proficiency in specific testing methods, and a thorough understanding of ISO/IEC 17025 requirements. Candidates must demonstrate their technical competence through assessments, internal audits, and continuous professional development.

"This role carries significant responsibility, as the TS is accountable for the integrity and validity of laboratory results. Their decisions directly impact public health, environmental safety, and regulatory compliance. Upholding these standards requires unwavering commitment, attention to detail, and adherence to best practices."

Khensani Mbuli is now the seventh member of WearCheck Water's team of accredited senior Technical Signatories, joining Moses Lelaka, Thelma Horsfield, Lerato Letsoalo, Lorato Hotane (nominated representative), Katlego Mokoroane and Michelle Wium.

WearCheck Water provides professional water analysis services to businesses in many industries across Southern Africa, including mining, agriculture, fleet management, manufacturing and more.

An extended range of tools for design & repair

Design and repair are fundamental aspects of any industry, often closely intertwined. Whether adapting existing systems or maintaining essential equipment, these processes play an essential role in ensuring efficiency and longevity.

The launch of the new RS PRO Design & Repair range caters to diverse industries, including discrete and process manufacturing, energy & utilities, facilities management, and intralogistics. The expanded range reinforces RS PRO's commitment to delivering tailored solutions that address the needs of each sector. It introduces over 1 900 new products across 29+ technologies, providing customers with a broad selection at competitive prices. The range offers precision, durability, and reliability in design and repair applications.

Manufacturing plants often require modifications to meet changing product demands. Whether upgrading production lines, redesigning components, or integrating new solutions, design plays a key role in maintaining operational efficiency. Similarly, repair is essential to minimise downtime. Every component, from the smallest fuse to the largest system, sooner or later requires maintenance.

Design and repair often go hand in hand. A failed component can present an opportunity for improvement, allowing for redesign that enhances performance and longevity. This synergy is key to optimising industrial processes and streamlining operations.

The RS PRO range offers a one-stop solution for design and repair needs. From power management and consumables to testing instruments, fasteners, small electronic components (capacitors, fuses, inductors, resistors, fans), cables, connectors, tools, and PPE, RS PRO provides a comprehensive selection to support every stage of the product lifecycle.

In the evolving industrial landscape, RS PRO remains committed to quality and innovation, offering customers reliable, high-performance solutions that meet design and compliance requirements.

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

AI powered maintenance

The Siemens Industrial Copilot is a generative AI-based assistant enabling customers to leverage generative AI across the value chain – from design and planning to engineering, operations, and services. For example, the Industrial Copilot empowers engineering teams to generate code for programmable logic controllers using their native language, speeding-up SCL code generation by an estimated 60% as well as minimising errors and reducing the need for specialised knowledge. This in turn reduces development time and boosts quality and productivity over the long term.

Siemens is developing a full suite of copilots to industrial-grade standards for the discrete and process manufacturing industries. It has now introduced an advanced maintenance solution.

The new generative AI-powered solution is designed to support every stage of the maintenance cycle, helping industries to move beyond traditional maintenance practices towards an intelligent, data-driven approach. To realise this, the Senseye Predictive Maintenance solution powered by Microsoft Azure is being extended with two new offerings.

The Entry Package provides an accessible and cost-effective introduction to predictive maintenance, combining AI-powered repair guidance with basic predictive capabilities. It helps businesses transition from reactive to condition-based maintenance, providing limited connectivity for sensor data collection and real-time condition monitoring. With AI-assisted troubleshooting and minimal infrastructure requirements, companies can reduce downtime, improve maintenance efficiency, and lay the foundation for full predictive maintenance.

The Scale Package is designed for enterprises looking to transform their maintenance strategy fully. It integrates Senseye Predictive Maintenance with the full Maintenance Copilot functionality. This enables users to predict failures before they happen, maximise uptime, and reduce costs with AI-driven insights. Offering enterprise-wide scalability, automated diagnostics, and sustainable business outcomes, this solution helps companies move beyond traditional maintenance, optimising operations across multiple sites and supporting long-term efficiency and resilience.

The new offering enables comprehensive coverage of the full maintenance cycle – from reactive repair to predictive and preventive strategies – by leveraging generative AI-driven insights that enhance decision-making and efficiency across industrial environments.

"The expansion of Industrial Copilot marks a significant step in Siemens' mission to transform maintenance operations," said Margherita Adragna, CEO Customer Services at Siemens Digital Industries. "By extending our predictive maintenance solutions, we're enabling industries to shift from reactive to proactive maintenance strategies and drive efficiency and resilience in an increasingly complex industrial landscape."

For more information visit www.siemens.com

Siemens is expanding its Industrial Copilot with new generative AI-powered maintenance capabilities. [Source: Siemens AG.]

True RMS clamp meter for electrical troubleshooting

Fluke, a global technology leader in the manufacture of compact, professional electronic test and measurement tools and software, and locally represented by Comtest, offers the Fluke 376 FC True-RMS Clamp Meter with iFlex as an advanced troubleshooting tool for industrial and commercial electricians.

The 376 FC is part of the Fluke Connect family of wireless test tools that, through Bluetooth connectivity, enables users to log, trend and monitor measurements while remaining safely away from the arc flash zone.

With the 376 FC clamp meter, electricians and maintenance technicians can find the cause of complex problems. It uses an integrated low-pass filter to measure non-linear signals, such as adjustable speed drives, electronic ballasts and other non-linear loads, accurately. In addition, the proprietary inrush measurement technology serves to filter out noise and captures the motor starting current exactly as the circuit protection sees it.

The Fluke 376 FC Clamp Meter enables a range of measurements.

- Voltage to 1 000 V ac or dc
- Resistance to 60 kΩ with continuity detection
- Minimum, maximum, average, and inrush, recorded to capture variations automatically
- 500 mV dc measurement range to interface with other accessories
- 1 000 µF capacitance measurement

It allows users to work safely and conveniently, and it carries a CAT III 1000 V, CAT IV 600 V safety rating, designed to offer users the highest possible protection in a test tool.

The included 18-inch or 36-inch iFlex flexible current probe provides for easier access to large conductors in tight spaces. The flexible probe expands the measurement range to 2 500 A ac and allows frequency measurement to 500 Hz with body jaw and iFlex.

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

Fluke 376 FC True-RMS Clamp Meter enables users to monitor measurements while remaining safely away from the arc flash zone.

Investment in infrastructure calls for effective maintenance

In the State of the Nation Address this year, President Cyril Ramaphosa announced the government's commitment to invest R940 billion in infrastructure over the next three years. This signals a decisive step towards economic growth, but the success of this investment hinges on effective maintenance and asset management. This is the view of enterprise asset management specialist Pragma, and the company notes that South Africa already has proven solutions in this field.

"Ramaphosa's commitment to infrastructure investment creates an opportunity to build a more functional and efficient public infrastructure network. But, as we've learned from our work across 46 countries, successful infrastructure development is not just about building new assets – it's about maintaining existing assets, and newly built assets, effectively," says Bani Kgosana, Chief Revenue Officer at Pragma.

"In the State of the Nation Address, the president highlighted that many municipalities lack technical skills and are not reinvesting revenue into infrastructure upkeep. This is where South African innovation and expertise can make a difference.

"We've seen firsthand how proper asset management can transform service delivery. When a large metro's electrical support services implemented our solutions, they achieved a 2 500% increase in operational output. This is about maintaining infrastructure and, importantly, it's about maximising the return on every rand invested in public assets," Kgosana adds.

The emphasis in the SONA on establishing professionally managed utilities for water and electricity services aligns with the successful models Pragma has already implemented. In the healthcare sector, for instance, Pragma's partnership with Tsebo at Albert Luthuli Hospital in KwaZulu-Natal demonstrates how public facilities can achieve excellence through proper asset management.

"The president spoke about the positive impact of scheduled maintenance at Eskom, which has led to a more stable electricity supply. This approach can transform water management, healthcare facilities, and other utility services at provincial and local government levels. Pragma has provided solutions for several municipalities. These include financial management, fleet, water and waste asset management solutions that have resulted in substantial savings, lower environmental risks and significant efficiency gains," Kgosana says.

Bani Kgosana, Chief Revenue Officer at Pragma.

In the SONA, President Ramaphosa said, "As we work to reform the public service and build the capability of the state, we will harness technology to transform the way that government works."

Pragma agrees that technology can be transformative. Through its own experience the company has shown that successful infrastructure management requires three key elements:

- Smart technology deployment through solutions like Pragma's On Key enterprise asset management software
- A network of skilled local contractors who can respond quickly to maintenance needs
- Rigorous tracking and reporting systems that ensure accountability.

With this approach the company has already delivered significant savings for public institutions. In the refuse management department of one metropolitan municipality, for instance, something as seemingly simple as proper tyre management saved the local authority R10 million annually, and the solid waste department reduced overdue vehicle services by 90%.

"We' ae calling on municipalities and government institutions to embrace proven South African solutions. Together we can ensure that historical infrastructure investment delivers lasting value for all South Africans," Kgosana concludes.

Fully rugged notebook/tablet PC

The Getac V110 fully rugged 11.6" IP65 MIL-STD-810H notebook.

The Getac V110 is the first thin and light fully rugged notebook and transforms with one quick rotation into a rugged tablet PC.

Made with a sturdy magnesium-aluminium alloy and unified polymer, the V110 is MIL-STD-810H rated to withstand various stresses, extreme temperatures, and harsh environments, and IP65 certified with proven rugged capabilities.

It delivers a multifunctional and reliable solution for professionals working in demanding environments, providing great resistance to vibration and liquid damage.

The Getac V110 is supplied with Windows 10 or Windows 11 (optional), an Intel® Core™ i5-10210U Processor 1.6 GHz Max. 4.2 GHz with Intel® Turbo Boost Technology, 6 MB Intel® Smart Cache, 8 GB DDR4 (upgradable), 256 GB PCIe NVMe SSD (upgradable), an 11.6" IPS TFT LCD FHD (1920 x 1080) capacitive multi-touch screen, with protection film 800 nits LumiBond® display and incorporating Getac sunlight readable technology. It is MIL-STD-810H certified, IP65 certified, MIL-STD-461G certified, vibration and drop resistant (1.2 m), and e-Mark certified for vehicle usage.

It has a US standard keyboard and offers a dual mode touchscreen option on the capacitive multi-touch screen. It includes an 11.1 V Li-ion battery. Dimensions: (W x D x H) and weight measure 313 x 238 x 39mm, and 2.1 kg.

The fully rugged device is designed for use in harsh environments. Units are available in South Africa from Vepac Electronics.

For more information email: info@vepac.co.za

Strengthening public sector cyber resilience

Graham Brown, Country Manager for South Africa/SADC at Commvault

As governments around the world face increasingly sophisticated cyber threats, the need for robust cyber resilience becomes more urgent. In South Africa, the public sector has become a prime target for cybercriminals, with some 3 312 ransomware attacks reportedly recorded each week. This underscores the critical importance of strengthening cyber defences to safeguard sensitive data and ensure continuous delivery of essential services.

The challenges are not insignificant. Government entities often rely on basic antivirus solutions that, while helpful, are no longer sufficient to defend against modern cyberattacks. As threat actors become more sophisticated, using AI-driven tools to orchestrate attacks, the public sector is finding itself increasingly vulnerable. However, with the right approach and technology, government institutions can overcome these challenges and enhance their cyber resilience.

Evolving threats

The expansion of the attack surface is a key factor behind the growing number of cyberattacks. As more government functions move to the cloud and hybrid cloud environments, potential entry points increase. Simple errors like poor configuration or a reliance on legacy systems can provide cybercriminals with a foothold. Many government agencies are still using outdated security methods, relying solely on firewalls or signature-based detection for instance, which cannot keep pace with the speed and complexity of today's cyber threats.

Although the situation may seem daunting, it is important to recognise that the right technologies can make a significant difference. The adoption of advanced solutions such as cleanroom technology and hybrid cloud can help mitigate risks and provide a pathway to a more secure, resilient future.

Adapting to new challenges

One of the critical areas where public sector institutions can improve is in their response to cyber threats. Traditionally, they have operated in a reactive manner, responding to incidents after the fact. However, to be cyber-resilient, governments need to adopt proactive measures that enable them to detect threats early and respond swiftly.

Cleanroom technology offers one solution. In the event of a breach, it ensures that the environment used for data recovery has not been compromised. In many cases, when systems are affected by a cyberattack, the recovery process can be prolonged as organisations struggle to identify which systems have been affected. Cleanroom technology ensures that when data is recovered, this is done in an environment that is guaranteed to be secure, providing government departments or other public sector institutions with the confidence they need to restore operations without fear of further compromise.

Equally important is the use of hybrid cloud solutions, which offer flexibility and scalability while maintaining control over sensitive data. By combining public and private cloud infrastructures, governments can meet the need for operational efficiency while ensuring that their most sensitive data remains secure. Hybrid cloud solutions allow scalability of operations without the need for substantial upfront capital investment, making them an appealing option for institutions working with tight budgets.

Graham Brown, Country Manager for South Africa/SADC at Commvault.

Addressing constraints

The financial impact of cyber incidents on the public sector is substantial, with each breach reportedly costing an average of around R49 million. Budget constraints, coupled with a shortage of skilled cybersecurity professionals, make it challenging for governments to adopt and implement the necessary security measures. However, there are ways to address these constraints.

One solution is to shift costs from capital expenditure to operational expenditure by adopting cloud-based platforms which offer scalability and flexibility and can reduce the need for large upfront investments, enabling governments to allocate resources more efficiently. Furthermore, by outsourcing certain cybersecurity functions or collaborating with third-party providers, governments can access the expertise they need without the burden of hiring large teams of specialists.

Compliance and cyber resilience

The upcoming Joint Standard on Cybersecurity and Cyber Resilience, due to take effect in June 2025, will impose new compliance requirements on public sector institutions. Although this raises another challenge, it also provides an opportunity for government institutions to align their cybersecurity practices with industry standards, improving resilience and ensuring that they are better prepared to face future threats.

Complying with the standard will require governments to adopt minimum cybersecurity standards, including robust risk management, incident response, and data protection protocols. For institutions already grappling with existing vulnerabilities, it will provide a structured framework to help them build resilience.

Technology as a tool

The road ahead for the public sector is challenging. However, with the right technology and a proactive approach, governments can improve their cyber resilience. Innovations like cleanroom technology, hybrid cloud solutions, and intelligent detection tools will help public institutions protect their data, enhance their response capabilities, and minimise the financial impact of cyberattacks.

For more information visit: www.commvault.com

Sodium-ion – the next step in battery technology

Shazan Siddiqi, Senior Technology Analyst at IDTechEx here outlines the similarities and differences between sodium-ion and lithium-ion batteries and the potential of sodium-ion as an alternative electrochemical technology to meet escalating demand in the fast-growing market.

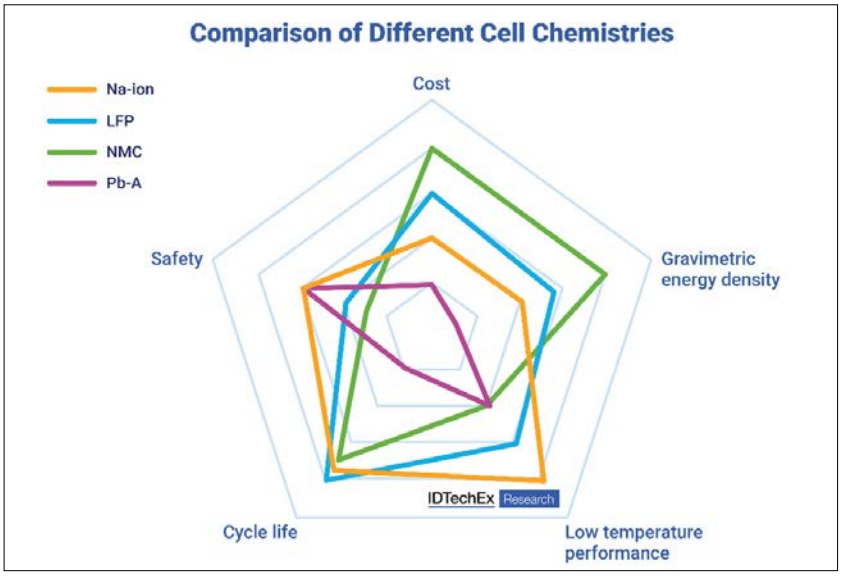
Sodium-ion and lithium-ion batteries share the same electrochemical principles, with sodium replacing lithium. While different cathodes, anodes, and electrolytes are required to accommodate this substitution, the overall chemical makeup remains similar across both technologies.

The most significant difference lies in the cathode. However, sodium-based alternatives to lithium-ion's NMC (Nickel Manganese Cobalt) and LFP (Lithium Iron Phosphate) are being developed by key players. This is noted in the new IDTechEx report, *Sodium-ion Batteries 2025-2035: Technology, Players, Markets, and Forecasts*. The three main types of sodium-ion cathodes in development are transition metal oxides (similar to NMC), polyanions (similar to LFP), and Prussian blue analogues (unique to sodium-ion).

Transition metal oxides and Prussian blue analogues are particularly promising due to their low cost and avoidance of rare earth elements. Transition metal oxides, typically composed of sodium, oxygen, nickel, iron, and manganese, exclude cobalt, addressing related sustainability concerns that have plagued lithium-ion batteries. Prussian blue analogues, with their rhombohedral structure, consist solely of sodium, iron, carbon, and nitrogen, marking them as unique to sodium-ion technology.

On the anode and electrolyte front, sodium-ion batteries are largely similar to lithium-ion. Hard carbon anodes, used in earlier lithium-ion generations, are preferred, because sodium-ions are too large to intercalate into graphite. Electrolytes consist of similar salts and solvents, with sodium replacing lithium – such as NaPF6 in a carbonate solvent.

Comparing the different performance characteristics, one can see the general pros and cons of each battery chemistry. The energy density for sodium-ion batteries is still lower than that of high-energy lithium-ion cells, which use nickel, but they are approaching the energy density of high-power lithium iron phosphate (LFP) cells. The cycle life of cells is reasonable in some configurations, but one of the interesting elements, not shown in the image, is that sodium-ion batteries can have quite high-power characteristics with reports of ~1 000 W/kg, which is higher than NMC (~340-420 W/kg) and LFP (~175-425 W/kg) cells. They also exhibit better low-temperature performance.



Comparison of Na-ion with various other cell chemistries. [Source: IDTechEx]

Cost competitiveness in a changing market

A primary advantage of sodium-ion batteries is their potential for lower costs compared to lithium-ion technologies. At scale, a sodium-ion battery featuring a layered metal oxide cathode and a hard carbon anode is expected to have material costs around 25 to 30% lower than a lithium iron phosphate (LFP) battery. This cost reduction is primarily driven by the substitution of lithium and copper with more affordable sodium and aluminium, which offers around a 12% reduction in cost, largely due to the use of aluminium as the current collector.

However, the cost structure is influenced by several factors. The main cost drivers of any battery are the electrode materials, with hard carbon emerging as the leading anode material for sodium-ion batteries. While hard carbon offers a cost advantage over graphite, it has a lower density, which means more electrolyte is required for the same active material, adding to cost and mass. Moreover, hard carbon tends to be more expensive than natural graphite, and certain variants exhibit lower performance.

The future of sodium-ion batteries and their ability to undercut lithium-ion on price remains an area of significant debate. While the cost of lithium-ion batteries continues to decline, the timeline for when sodium-ion technology could match or beat these prices is still speculative. IDTechEx finds that engineering breakthroughs, rather than simply scaling production, will be key in driving down sodium-ion costs.

If lithium prices remain near historic lows, sodium-ion batteries face a narrower path to becoming cost-competitive in the next decade. However, with continued engineering advances, sodium-ion could emerge as a complementary technology, offering value in specific applications where cost reduction and material availability are paramount.

The IDTechEx report, *Sodium-ion Batteries 2025-2035: Technology, Players, Markets, and Forecasts*, explores the cost dynamics, technology advances, and a realistic roadmap for sodium-ion to take its place in the future battery market.

For more information visit: www.IDTechEx.com

Integrating emotional intelligence into QCTO skills programmes

Roland Innes, Group CEO at DYNA Training, highlights the importance of emotional intelligence and soft skills in the workplace today. As South Africa aims to build a skilled and competitive workforce, the Quality Council for Trades and Occupations (QCTO) plays a central role in structuring development training to equip people with specific occupational skills. Whereas the focus traditionally has been on equipping learners with the technical skills required for specific roles, Innes emphasises that the demands of the modern workplace extend beyond technical proficiency. Emotional intelligence (EQ), the ability to understand, manage, and use emotions effectively, has been recognised as a critical factor in determining individual and organisational success. Noting the gap, he says the integration of soft skills into occupational skills training programmes is essential. By incorporating people skills into training curricula, the QCTO can support the development of well-rounded individuals with the skills needed to operate effectively in the working world.

EQ in the workplace

EQ has emerged as a critical determinant of success in today's complex working world. Although technical skills remain essential, research consistently indicates that individuals with high EQ tend to outperform their peers in various roles. These individuals are better equipped to build strong relationships, lead effectively, and adapt to change. Conversely, those with low EQ often struggle with interpersonal dynamics and overall job performance.

Soft skills, in which EQ is fundamental, encompass a range of interpersonal abilities that complement technical expertise. They enable individuals to communicate effectively, collaborate easily, and build rapport with their colleagues. Understanding and managing emotions, internally and externally, emotionally intelligent individuals can decipher complex work situations, resolve conflicts, and inspire those around them. The synergistic relationship between soft skills and EQ is essential to achieving personal and professional success.

Bridging the gap in skills development

By incorporating EQ into occupational skills programmes, the QCTO and training institutions can address the current gap. This more inclusive approach would equip learners with a comprehensive skills set, combining technical expertise with interpersonal abilities.

Students would be empowered to excel in their technical roles and to handle the broader challenges and opportunities in their working lives, becoming more adaptable, resilient, and engaged. As businesses increasingly prioritise soft skills, the need for EQ-equipped employees becomes more pronounced. A workforce with technical expertise and emotional intelligence is better equipped to drive innovation, enhance collaboration, and achieve organisational goals.

Leading the way

The QCTO framework can guide the integration of EQ into South Africa's training programmes. And while the QCTO plays an overarching role, it is the SETAs, acting as Assessment Quality Partners (AQPs) in collaboration with industry experts, that are on the ground developing qualifications.

Roland Innes, Group CEO at DYNA Training.

By creating a balance between hard and soft skills, the SETAs can help to ensure theoretical knowledge and practical application are covered and individuals gain both technical and people skills, so they are better prepared for employment and long-term career success. In collaboration with AQPs, the QCTO can elevate the importance of soft skills, ensuring quality training, establishing clear standards, and developing relevant curricula.

Additionally, by leveraging research, accreditation, and partnerships, the QCTO and its AQPs can create a system that embeds these essential competencies across various industries.

The integration of EQ into occupational skills programmes offers numerous benefits. It can contribute to a more productive, engaged, and innovative workforce, potentially driving economic growth and social development. And emotionally intelligent employees tend to experience higher job satisfaction and overall wellbeing.

The path forward

Integrating EQ into existing QCTO programmes is likely to present a number of challenges. These would include difficulties in measuring and assessing EQ, ensuring trainer competency, developing appropriate curricula, assessing learner readiness, securing the necessary resources, gaining industry support, and effectively allocating time within existing training frameworks. However, Innes suggests that the potential benefits outweigh the obstacles.

By collaborating with industry experts, educators, and psychologists, effective methods for assessing and developing EQ competencies can be developed. Incorporating practical exercises, simulations, and real-world case studies into training programmes can help learners apply EQ skills in work situations. In this way, South African workers can gain the necessary skills to excel in a fast-changing job market, and contribute to a more productive, adaptable, and competitive workforce.

For more information visit: https://dyna-training.co.za/

Aquifer maps to boost water supply

In its March newsletter, the CSIR reports that the Northern Cape town of De Aar will become one of only a few towns in South Africa to drill and pump its boreholes strategically, using scientific maps of underground aquifers. Harrison Pienaar, an aquifer expert at the CSIR, calls on all South African waterboards, mayors, municipal managers and communities to conduct cost-effective groundwater surveys, in line with the national directive to diversify municipal water supply.

Harrison Pienaar, CSIR Water Research Centre.

Like most towns in the Northern Cape (NC), the town of De Aar in the Emthanjeni Local Municipality relies almost entirely on groundwater for its water supply. Pienaar, who leads smart water use studies at the CSIR Water Research Centre, makes the point that surface water, in dams or rivers, is not in abundance in the Northern Cape, because it is a semi-arid area. Some rain does fall, but most seeps into the earth to recharge the underground water channels.

Over the past two years, local farmers and municipal officials hosted Pienaar and a team from the CSIR, the University of the Western Cape and the NC branch of the Department of Water and Sanitation (DWS) as they worked to map the aquifer systems below the surface, using modern, cost-effective hydrogeophysical methods. Often working day and night, they pinpointed the location, extent and thickness of groundwater channels and measured the quality of groundwater in terms of acidity, flow, temperature and potentially harmful contaminants.

"When you have, say, five or six aquifer systems next to one another, some of these are horizontally linked and some are vertically linked," Pienaar explains. "We need to study the relationship between the aquifer systems and their characteristics to understand which will run dry and when, if they are all pumped for water at a certain rate."

The researchers shared the outcomes and recommendations of the hydrogeophysical survey directly with the South African Local Government Association (SALGA) in the Northern Cape.

Pienaar says one of the immediate goals is to enable the Emthanjeni municipality to better manage aquifer recharge (refilling from rainfall), as this will lead to better decisions on groundwater usage, monitoring and management. He says municipal managers can use the aquifer maps to schedule and switch borehole pumping in a way that will not deplete the aquifers, during the dry season, for instance.

At the same time, the water quality data they have provided can inform water treatment measures that will ensure sustainable, clean and safe drinking water for their communities.

During 2024, Pienaar and a team from the CSIR, the University of the Western Cape and the NC branch of the Department of Water and Sanitation used modern hydrogeophysical methods to map the aquifer systems of De Aar, Northern Cape.

Pienaar highlights that despite enough groundwater being available to supply South Africa's citizens, most municipalities in the country are not yet using cost-effective hydrogeophysical technologies, systems approaches or catchment-wide studies for groundwater allocation and management.

"Groundwater is not being looked at strategically," says Pienaar, emphasising that this contributes to poor service delivery. "When you drive through small towns in South Africa you see that some people don't receive even the most basic of services. As researchers, we come from the same communities, so it hits home when we see people who don't get services."

He also makes the point that South Africa is now over-reliant on surface water consumption and the DWS is urging the diversification of water sources as a national imperative.

However, he says it is not just a matter of drilling boreholes. "We need to consider the strategic points, which we can point out to municipalities through these studies, to make sure that there's meaningful supply of water to the population they serve."

He adds that it is time to adopt newer, faster and more cost-effective hydrogeophysical methods to study aquifer systems because traditional approaches are invasive and expensive.

"The old approach involves drilling and taking soil samples from the site, which can disturb the study site, cost too much time or money, and potentially expose researchers and people in the community to harmful chemicals and contaminants," Pienaar says. "And these methods cover only small, localised areas, rather than the large-scale underground maps required by municipalities."

In De Aar, scientific support from the CSIR and partners is ongoing, and SALGA conveyed its gratitude to Pienaar and the team, following the detailed presentation in December 2024 on the survey results and other smart technologies that will help to ensure efficient groundwater management and service delivery in the region.

Pienaar says successes in De Aar have led to another similar project approach for Lepelle Northern Water (a Limpopo-based waterboard) as part of its systems approach to water management.

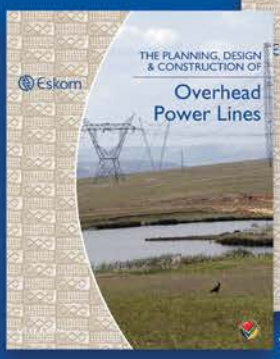
"I urge other municipal managers and waterboards, to consider strategic mapping and characterisation of aquifers to unlock the potential of groundwater as an important source of water supply," Pienaar says. "This will reduce our over-reliance on surface water, which is already overstressed due to increasing water demand."

This research forms part of a collaborative study between the CSIR, the University of the Western Cape and the DWS and is co-funded by the DWS. In terms of the UN's Sustainable Development Goals, it addresses SDG 6, SDG 11 and SDG 13.

For more information visit:
https://www.csir.co.za/water-research-centre

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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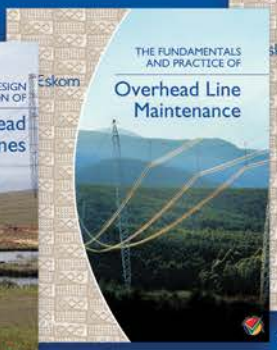

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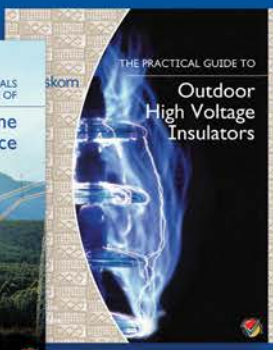

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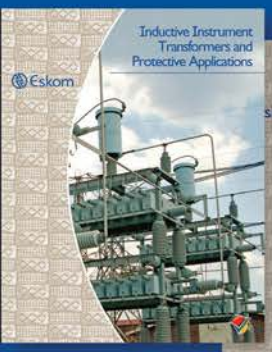

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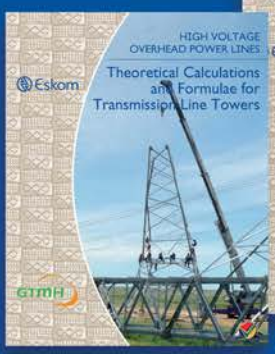

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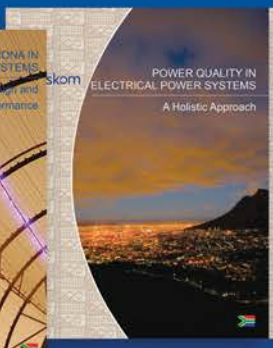

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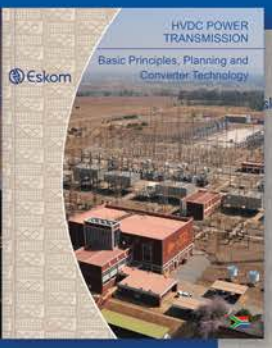

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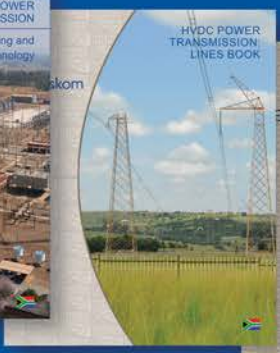

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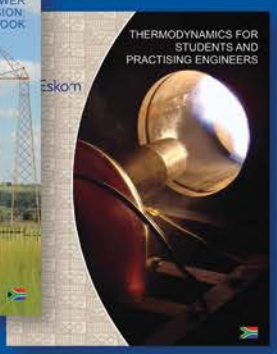

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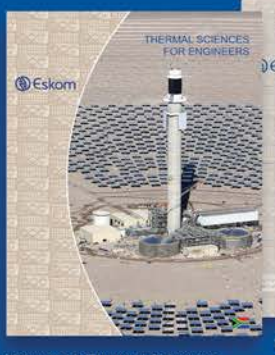
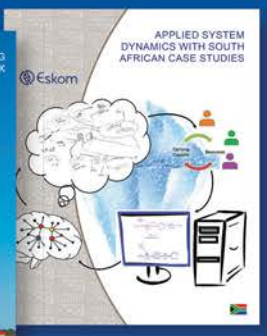


Volume 11: Thermal Sciences for Engineers

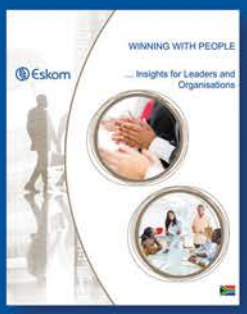
Volume 12: Basic Engineering Toolbox



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.

Volume 1: Mentorship and Coaching



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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