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It seems very hard to hear good news. The manufacturing industry has been contracting for some time, the economy is not set to grow in leaps and bounds – although we need to be quite frank and accept that a fraction of this (less than 0,5 %) can be attributed to the current situation at Eskom.

We have also driven ourselves into a predicament where we assume the worst before stepping back and contemplating where we are.

Sub-saharan Africa has some of the fastest growing economies. It is home to some of the greatest mineral reserves and to remarkable reserves of hydro energy – all waiting to be tapped and appreciated.

Recently a network of Research Active African Universities was established and there is a move to rationalise and prioritise research on the continent. This means *what* to our industry?

Well, if we want to get anywhere on the world stage, we need to remember that we require a commitment – not only to basic education – but to drive an agenda of excellence in higher education and research. Whereas our mining industry is well known for innovation in many spheres, it is not that obvious that we play leading roles in other areas as well. Possibly this should be the topic of a future comment.

What has struck me is how fertile our continent is as a place for world-leading research. While this is not often acknowledged – consider this. We have a significant number of people in the sub-continental region who have very good basic education. Certain surveys and assessments suggest that they are generally better educated than South Africans. But South Africa has, without doubt, an excellent university sector.

Allied to this are some of the current challenges we face. These include the significant migration of people to cities – cited as the largest migration of people in the history of the world. Then there are the associated challenges of our modern cities. Some, like Johannesburg, Gaborone and Harare, do indeed look like cities – they have the infrastructure, the suburbs,

the finance houses and the industry. Others, like Bushbuckridge, look nothing like a city – although they are, without doubt, cities.

How do we deal with this? How can you add infrastructure, effectively, after the fact? How do you establish a sustainable community in an area that was once a mine? How do you develop a manufacturing industry around a community – and make it sustainable?

These are profound questions, and questions that we need to be able to answer. I believe that South Africa is a laboratory for the world. In addition, when we consider a national grid that is under strain, make no mistake – the same challenges are creeping up in many other parts of the world. The reasons may be different, but how to tackle them will be similar. What better place is there to play with solar energy – and crack the wicked problem of getting alternative energy onto a grid? We all know the challenges with that.

When one considers society, and the need to employ people... how do we construct communities with a sense of community? Communities where self-actualisation becomes the norm, and not the exception? How does one construct the future that the nation deserves?

I have often considered what South Africa may look like within the decade – and truth is, I do not see anything that resembles an African country. I see something completely different?

What do you see?



Ian

Ian Jandrell

Pr Eng,
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Data analytics technology for optimal building performance

By A Socha, Schneider Electric South Africa

Data analytics – the practice of collecting and analysing data to extract insights – is one of the most effective tools that building managers can use to improve the operation of their facilities.

Buildings are central to modern life. Considering they account for up to 40 % of energy use in most countries, buildings are a prime target for cutting waste, saving money and using resources more effectively. Effective use of data analytics in buildings can reduce major equipment spend and increase energy savings by up to 30 %.

The use of data analytics in buildings helps proactively identify and solve inefficiencies in building systems. Lighting, HVAC, security and building automation systems all generate massive volumes of data. With the right tools, building managers can pull data from these systems and run it against algorithms to compare current operations to an optimal range for a system or piece of equipment.

This process allows building managers to easily see when a system or piece of equipment deviates from optimal operating conditions. In addition to spotting deviations, the data can also be used to proactively optimise a building's operations from an entire plant to a single terminal unit.

Data analytics is often associated with creating operational efficiencies, but building managers may be surprised to learn it is also a powerful tool to identify waste and undetected problems. For example, through collecting and analysing data, facility managers can uncover issues like simultaneous heating and cooling, sub-optimal economiser controls, leaking valves, broken dampers, manual overrides, poor occupancy scheduling, excessive zone temperature set points, and much more. Without data analytics, these significant sources of waste would go unnoticed, weighing on the bottom line and eating up resources.

Drive action through intelligent, informed insights

In order to achieve the maximum operational efficiencies, cost sav-

ings and competitive advantage from data analytics, facility managers must first derive the most comprehensive insights from their building's performance data. For several years now, organisations have been using data visualisation dashboards to view performance, and manually spot trends and insights. While dashboards can be quite helpful in understanding building behaviour, the data being returned from dashboards is often complex, especially for building managers and owners, who manage a multitude of challenges in optimising their operations.

These challenges often include trying to keep pace with increasingly complex building operation technologies, especially when some building managers may not fully understand the newer, IP-enabled systems with complex, IT-reliant interfaces. To make matters worse, these IP-enabled systems are often left unsupported by the facility's IT staff since they are specialised facilities technologies. Additionally, many facility managers are working to keep their building running smoothly while balancing budgetary pressures to reduce costs and meet corporate social responsibility goals with fewer resources. All of these competing challenges leave little time for them to sit and analyse large amounts of data in order to identify otherwise hidden problems.

While most dashboards excel at aggregating data and providing tools to visually analyse the data, they usually lack the ability to provide insights without the help of experienced building engineers. The capacity to automatically identify problems and provide recommendations for savings opportunities is a process referred to as automated Fault Detection and Diagnostics (aFDD).

The most advanced aFDD platforms can identify faults, conduct diagnostics on mechanical systems and determine the cost or savings incurred through making repairs, improvements or upgrades to a building's systems or operations. Unlike alarms, which highlight when

aFDD	– automated Fault Detection and Diagnostics
BMS	– Building Management System
HVAC	– Heating, Ventilation, Air-Conditioning
IP	– Internet Protocol
IT	– Information Technology
MSaaS	– Managed Software as a Service
ROI	– Return On Investment

Abbreviations/Acronyms



Building analytics byline dashboard.

A data analytics system must be straightforward, intuitive and able to provide intelligent, actionable information.

conditions exceed a threshold, aFDD can identify when conditions may be trending toward a future problem prior to issues occurring. aFDD can also identify issues like simultaneous heating and cooling, which may not lead to an alarm because space conditions are always within tolerances, helping spot waste and savings opportunities that would otherwise go unnoticed.

For building owners and managers under high pressure and short on time, a data analytics system must be straightforward, intuitive and provide intelligent, actionable information. Dashboards that simply spit out data often offer limited value if building managers cannot leverage the information because they lack the time or the technical background to translate it into specific actions that will result in highest efficiency and return on investment (ROI).

To solve this problem and help building managers effectively implement insights from their systems' data, some analytics technologies also include managed software as a service (MSaaS) solutions (sometimes also referred to as managed services), which can help optimise a facility's operations. With managed services, external, third-party engineering analysts help aggregate and analyse diag-

nostic results, track progress, and consult with building stakeholders on more complex or challenging issues.

Managed services can help reduce or eliminate the need for businesses to bring on additional full-time resources, allowing existing internal teams to continue to focus on their core work while benefiting from the expertise of building optimisation expert business partners.

For example, according to Navigant Research, only 20% of personnel currently using a building energy management system use up to 80% of its functionality, while the other 80% use a limited amount of the functionality, or they use it in way that was not intended [1]. Managed services teams, which are made up of experienced energy experts, can help building owners and managers use their data analytics and building management systems (BMS) more effectively.

The managed services aspect of data analytics technology ensures that data is used to keep buildings operating at peak performance for optimal ROI.

For example, a member of the managed services team can help direct the maintenance team, helping them choose the best course of action on a daily basis to optimise building operations. The managed services team can also provide building owners and managers with advice on how to prioritise maintenance or actions to replace a particular energy system based on which action will provide the organisation with the most significant savings.

This proactive approach can also help identify equipment issues before there is a system failure, avoiding costly downtime and unexpected interruptions to operations.

Managed service partners can also validate corrective actions and can often remotely resolve issues.

Leveraging data analytics for effective vendor management

Data analytics helps buildings managers derive greater value from their work with vendors. Consolidating and integrating data while making it accessible to vendors – such as equipment maintenance specialists – giving them granular insights into a building's operations and a deeper understanding of where and how their work can have the highest impact.

By leveraging data analytics, a vendor can extract insights from day to day operations and easily identify a repair or tweak that would drive the greatest value based on the priority of the building manager.

Vendors can initiate their assessments remotely or from mobile devices and focus their efforts on a specific task or piece of equipment, allowing them to maximise proactive maintenance and more easily assess how a particular piece of equipment is performing based on the building manager's priorities.

Additionally, vendors can use building analytics data to validate and verify improvements or upgrades. Data pulled and analysed from equipment that has been upgraded or improved can easily provide building managers a clear ROI on investments they've made to their systems and equipment. This data can help support the business case for future improvements and upgrades to drive additional savings.

In addition to improving vendor performance, building analytics technology can help procurement managers and business analysts quantifiably prioritise budget allocations based on data that identi-

fies which upgrades and repairs will result in the highest direct cost savings.

For example, Schneider Electric recently worked with the City of Henderson, Nevada, to implement a building analytics and proactive maintenance solution across its 13 municipal buildings to identify, prioritise and execute repairs based on cost, comfort, energy and maintenance needs.

By leveraging building analytics technology, the City will be able to perform targeted maintenance for all of its HVAC equipment. This proactive maintenance is expected to lower annual operating costs and generate an anticipated positive return expected to exceed US\$ 364 000 over 10 years.

Logistics of leveraging data

In order for building managers to maximise the value of their data analytics technology, there are some considerations that they should take into account while selecting solutions.

It is important to ensure the solution includes a robust diagnostic and fault detection library already written, as obtaining these essential functionalities at a later time may result in significant additional setup costs. Another factor building managers should consider is the degree of virtualisation they are willing to deploy in their data analytics solutions. There are three general categories of data analytics technology with different advantages, as outlined:

- o **On-premise system:** This option is hardware-based and is "bolted on" to a building's systems. This gives building managers maximum control as they have access to nearly all of the servers and tools. The limitations of this system include lack of remote

access, increased hardware maintenance needs and the need to regularly update software to receive the latest features and functionality.

- o **Cloud-based system:** This option is built using mostly cloud based and virtual systems, where data is pulled from building systems and analysed in a virtual cloud environment with limited on-premise systems. This option allows for greater flexibility, remote access and control, easy upgrades and less maintenance. A key consideration for this category is that most cloud-based systems ensure that software is



always up to date and the facility is benefiting from the most current set of analytic diagnostics.

- o **Embedded analytics:** This system is fully embedded into hardware and software with deep integration. Embedded analytics works best for new construction and is more challenging to accomplish with retrofits and upgrades. The available embedded analytics today are still in their infancy and thus are limited in functionality and availability.

Conclusion

Data analytics helps building owners and managers understand not only how a building is operating, but why. The 'why' emerges through a comprehensive view including snapshots of current operations, outlines of energy trending, alerts through the application of simplistic rules or algorithms, detailed diagnostic reports, and more. Through proactively identifying operational problems that would not otherwise be detected, data analytics helps building managers gain a deeper understanding of the 'why', which in turn leads to more permanent and effective solutions.

Reference

- [1] Smart Building Managed Services. Navigant Research, Washington, D.C., 2012. <http://www.navigantresearch.com/research/smart-building-managed-services>

- Data analytics helps building managers understand how a building is operating – and 'why'.
- Understanding the 'why' leads to permanent and effective solutions.
- Data analytics in buildings can reduce equipment spend and increase energy savings.



take note

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Rise of IP-based camera surveillance systems

By R Alves, Axis Communications

As the cost of bandwidth goes down, the appeal of IP-based camera systems goes up for companies that require a flexible, cost-effective surveillance solution with enhanced functionalities such as remote accessibility and better scalability.

Within CCTV (closed-circuit television) surveillance images are captured and recorded on a digital video recorder (DVR), with the images being relayed through analogue cables going from the cameras to the DVR in the surveillance room.

IP-based surveillance cameras store their data on more common PC storage devices by way of a wireless network or wired set-up (CAT-5 network cables), thus helping businesses save on installation costs as existing network infrastructure can be repurposed for surveillance.

Unlike an analogue system, IP security cameras can be installed at any location, no matter the distance from the surveillance room housing the storage equipment and can also be easily moved from one location to the next, without any cabling needing to be replaced.

IP flexes flexibility muscles

The flexibility of the systems comes in when you notice that bandwidth can be controlled differently for each camera, with higher resolution cameras demanding greater bandwidth for instance, and hard-drive space can be shared across many systems for the recording of a video.

Any amount of recordings per camera can also take place simultaneously, at multiple locations for redundancy purposes, off-site storage, or even live video surveillance at service providers. In terms of the latter, a number of institutions such as the KwaZulu-Natal Blind and Deaf Society provide training for deaf people to make them more employable by surveillance firms.

IP-based surveillance cameras store their data on PC storage devices by way of a wireless network or wired set-up.

These companies use deaf people to monitor video footage and obtain better results. This is down to the fact that the footage itself is silent and deaf monitors have additional abilities like being able to read lips and aren't so easily distracted by the environmental noise within a monitoring centre.

- IP security cameras can be installed at any location.
- Any amount of recordings per camera can take place simultaneously.
- There are advantages and challenges in IP surveillance

take note

Bandwidth and storage

Beyond the advantages of IP-based surveillance, there are also a number of challenges with integrating such a surveillance system, with the most prominent of these being bandwidth and storage. Networked video solutions utilise network bandwidth and storage space based upon their configuration in terms of factors such as the number and image resolution of the cameras used, what video compression type is employed, as well as whether recording will be done on a continuous- or event-based basis. If a company only requires a small number (8-10) of surveillance cameras, a basic 100-megabit (Mbit) network switch can be used without having to consider bandwidth limitations. When businesses implement ten or more high-quality cameras that record at high frame rates, the network load for the system should be around the 2-3 Mbit/s mark of the available network bandwidth.

Large organisations using more than 12 to 15 cameras must consider using a gigabit-supporting switch and the server that is running the video management software should also have a gigabit network adapter installed. When it comes to storage, the type of

- CCTV – Closed Circuit Television
- DVR – Digital Video Recorder
- IP – Internet Protocol
- LAN – Local Area Network
- NAS – Network Attached Storage
- SAN – Storage Area Network
- WAN – Wide Area Network

Abbreviations/Acronyms



video compression used, plays a big role in helping determine a company's network-attached storage (NAS) or storage area network (SAN) storage requirements. On this front, the H.264 compression format is the most efficient video compression technology currently available, translating into significantly less network bandwidth and storage space required per H.264 video file. For instance, three cameras recording 30 days' worth of footage will require about 135 GB storage space, compared to 204 GB when recording in MPEG-4 format and a whopping 1002 GB for the same setup based upon Motion JPEG video format.

Conclusion

IP-based video solutions allow video to be monitored and recorded from anywhere on the network; whether it is on a local area network

(LAN) or a wide area network (WAN) like the internet. These systems have capabilities that cannot be matched by an analogue CCTV camera system such as reduced installation costs, guaranteed video quality, flexible deployment, and scalability, making IP-based surveillance the way of the future for local firms going forward.



Roy Alves is the regional business development manager of Axis Communications. Enquiries: Visit www.axis.com

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Beckhoff has introduced the new CP37xx series Panel PCs with multi-touch functionality and advanced Intel Atom processors for high PC-based performance in a compact housing. These devices are designed for mounting-arm installation and feature full IP 65 protection. With a large number of display sizes and processor options, the CP37xx series offers high scalability to solve a wide range of automation challenges.

The Panel PCs feature robust aluminium housings and are equipped with Intel Atom processors, known for their high computing power and excellent on-board graphics

capability with excellent thermodynamics. These processors enable an exceptionally compact device design and are available with 1, 2 or 4 cores, allowing best-possible adaptation to a diverse range of application requirements. This is supported by a wide range of display options, including seven multi-touch TFT displays in sizes between 12-inch and 24-inches, with 4:3, 5:4, or 19:9 (widescreen) formats. The CP37xx can be used in ambient temperatures up to 45 °C. Heat dissipation is provided by exterior heat sink fins, aided by fans to provide uniform temperature distribution inside the housing.

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Enhanced integrated DCS

Yokogawa South Africa released the CENTUMVP R6.01, an enhanced version of the company's flagship integrated Distributed Control System (DCS) at a launch on 6 March 2015. R6.01 marks the first step in the development of an all-new CENTUM VP that will play a central role in Yokogawa's VigilantPlant strategy for the Industrial Automation business. Manufacturers today need a high degree of certainty and confidence to achieve timely production, and flexibility to make

changes in product and material specifications. This enables them to effectively respond to intense global competition and major market shifts. Yokogawa's managing director, Johan Louw, says, "The adaptive evolution of the new CENTUM VP focuses on addressing customers' needs to keep up with the fast pace of change in the business landscape and technology while delivering maximum return on assets and the lowest total cost of ownership." This first R6-level



release of the CENTUMVP system represents much more than conventional functional improvements. R6 brings together smart engineering, advanced operation, system agility, and sustainable plant. Louw continues, "With R6, plant operators can be assured of an optimum engineering environment that spans the entire plant lifecycle, from plant design and the engineering and installation of systems and devices to the start-up of production, maintenance, and renovation. In addition, it is designed to meet the most stringent industry requirements for safe and reliable plant operations and environmental protection." (See *Social Engineers* on page 59).

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Project Lumen: Lightning protection innovation

By T Manas, Pontins

The installation of an 'Isolated' lightning protection system through the use of HVI conductors in 'Project Lumen' represents the most up to date lightning protection technology available in the world today.

Project Lumen is the world's largest light emitting display. This world first is located approximately 140 m above the Johannesburg skyline on top of the ABSA Towers building and is an instantly recognisable landmark. The screens dubbed 'Lumen' are bigger than those that make famous London's Piccadilly Circus and New York's Times Square. Lumen uses the most advanced LED technology on such a large scale making it a world first.

Project Lumen comprises four giant LED displays, each almost twice the size of a basketball court (40 m long, 18 m high). These can be seen from many kilometres away. Since being 'switched on' in November 2013, the LED screens have been continually damaged by direct lightning strikes owing to various factors like Johannesburg's high lightning density (11,7 strikes per km² per year), the height of the LED screens (138 m) and the susceptibility of the technology to lightning damage.



LED	– Light Emitting Diodes
HVI	– High Voltage Insulated
LPL	– Lightning Protection Level
CCTV	– Closed Circuit Television

Abbreviations/Acronyms

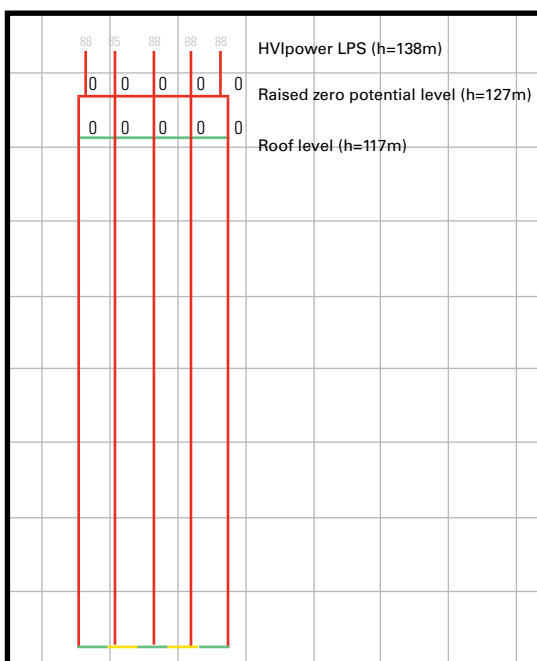
Lumen was equipped with a lightning protection system using the old 'cross bonded' protection method. There was no separation distance between the lightning protection conductors and the LED panels or the electrical or data supply cables to the panels. This resulted in the entire LED system being vulnerable to partial lightning currents which then caused substantial damage to the LED system. The solution to the problem was to install an 'Isolated' lightning protection system where the lightning protection conductors are separated or isolated from the LED screens and frames.

Detailed design

The detailed lightning protection design and installation followed the requirements of the SANS / IEC 62305 [1] standards. To this end, the procedures as described below were followed:

Risk assessments and separation distance calculations

The lightning protection risk assessments and separation distance calculations were calculated using the DEHN Toolbox and were conducted in accordance with SANS / IEC 62305 Part 2 [1]. The risk assessments resulted in a lightning protection level 1 (the highest level of protection) being required for the site. The separation distances were calculated using a LPL1 with an insulation factor of 1 for air and the zero potential point being at a height of 127 m (roof level). The resultant separation distance was 88 cm.



Separation distance calculation.

- The LED system installed in 'Project Lumen' was vulnerable to partial lightning currents.
- The solution was to install an 'Isolated' lightning protection system.
- The HVI power conductor was suitable for the Project Lumen installation.



Details of calculation

- Selected class of LPS: 1
- Current intensity: 200 kA
- Insulation coefficient (km): 1
- Potential level: 127 m
- Reserved 88 cm

The only practical method of ensuring the separation distance of 88 cm was to make use of HVI conductors.

Zero potential point

The existing concrete steel reinforcing was exposed in various positions and was then tested for electrical continuity between the various points. Through this rigorous range of tests it was determined that the existing concrete steel reinforcing of the structure was in fact interconnected and should be utilised as natural down conductors and natural earth electrodes.

The use of the concrete steel reinforcing enhances the current division of the lightning current in the case of a direct strike and it also enabled us to raise the zero potential point from ground level to roof level making the lightning protection design more effective.

HVI conductors

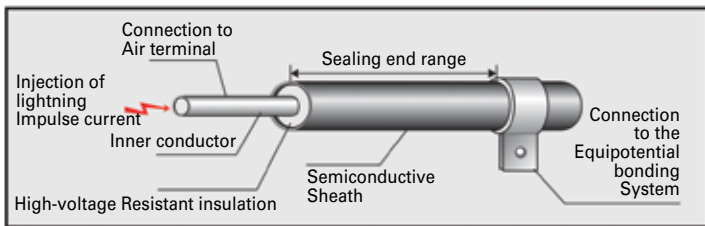
The calculation of the separation distance forms the basis for the decision whether and which HVI conductor can be used for the installation. Therefore the entire Project Lumen design (Isolated LPS) is based upon the calculated separation distance of 88 cm, the lightning protection level (LPL1) and the length of the down conductor to the zero potential point.

How do HVI conductors work?

The basic principle of HVI conductors is that the lightning current carrying conductor is covered with insulating material to ensure that the required separation distance from other conductive parts of the structure is maintained. In order to perform properly the HVI conductor must fulfil the following requirements:

- Have sufficient electric strength of the insulation in case of lightning voltage impulses along the entire HVI conductor

- Prevention of creeping discharge
- Have sufficient current carrying capability via sufficient cross sectional area of the inner conductor



Components of an HVI conductor.

The specifically designed HVI conductors allow for the prevention of creeping discharge and the safe dissipation of the lightning current into the ground.

HVI conductors via their semi-conductive sheath prevent creeping discharge of the lightning current by specifically influencing the electric field within the 'sealing end' range. Therefore the lightning current is trapped into the special cable and is safely dissipated while maintaining the required separation distance. It is of vital importance that the electric field within the 'sealing end' range not be interfered with.

The basic principle of HVI conductors is that the lightning current carrying conductor is covered with insulating material to maintain the required separation distance from other conductive parts of the structure.

Types of HVI conductor

Since 2003, three different types of HVI conductor have been developed to meet the growing requirements of different installation environments:

- HVI light conductor [separation distance = 45 cm (air), 90 cm (solid material) - suitable for LPL 3, 4]
- HVI long conductor [separation distance = 75 cm (air), 150 cm (solid material) - suitable for LPL 2, 3, 4]
- HVI power conductor [separation distance = 90 cm (air), 180 cm (solid material) - suitable for LPL 1, 2, 3, 4]

The HVI power conductor was found to be suitable for the Project Lumen installation.

Maximum HVI conductor length

Based upon the separation distance calculations SANS / IEC 62305 Part 3 [1], the maximum conductor length of the HVI conductors was calculated as follows:

$$L_{max} = \frac{k_m \cdot S}{k_i \cdot k_c}$$

Where:

- k_m = Insulation material - air = 1
- S = Separation distance = 0,88 m
- k_i = Selected Lightning Protection Level (LPL 1) = 0,08
- k_c = Number of down conductors = 1

Therefore:

$$L_{max} = 11 \text{ m}$$

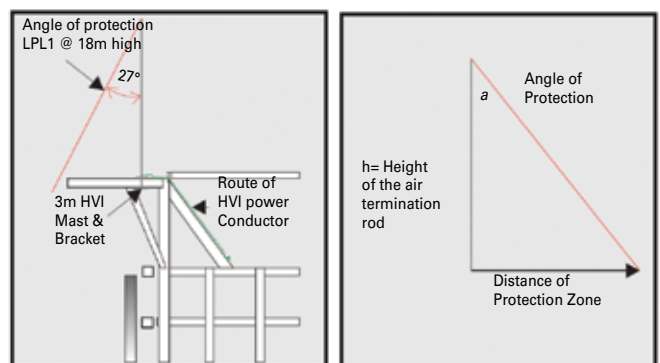
The maximum HVI conductor length of 11m would not be sufficient to meet the requirements on the site due to the fact that the length to the zero potential point (concrete steel reinforcing) was 18 m. Therefore a lightning protection system using two HVI down conductors from the air terminals had to be designed!

Isolated air termination system

The air termination system was designed to intercept the lightning strike and prevent penetration into the protected space (i.e. LED screens and frames). The air termination system was designed in accordance with SANS / IEC 62305 Part 3 [1] using two methods of protection:

Angle of protection

The angle of protection was calculated using a lightning protection level 1 system at a height of 18 m. The calculated angle of protection = 27 °, which gives a zone of protection of 9,17 m from the top of the air terminal. This zone of protection covers the structural steelwork of the LED frames.





Earthing and Lightning Protection Specialists

LIGHTNING PROTECTION INNOVATION

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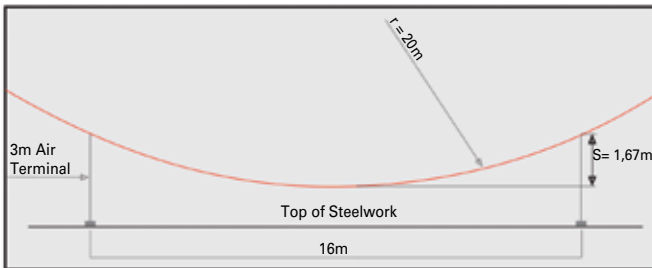
FAX : (011) 792-9585

E-MAIL : info@pontins.co.za

WEBSITE : www.pontins.co.za

Rolling sphere method

In accordance with a lightning protection level 1 system a sphere with a radius of 20 m was used to determine the height and positioning of the air terminals.



There are two applicable distances between the air terminals; namely 12 m apart and 16 m apart. The sag of the sphere (20 m radius - LPL1) is calculated using the following formula:

$$P = r - [r^2 - (d/2)^2]$$

Where:

- P = Penetration depth (sag)
 r = Radius of sphere (20 m)
 d = Distance between air terminals

The calculated sag between the air terminals is therefore:

- 12 m distance = 0,92 m
- 16 m distance = 1,67 m

The area between the air terminals is therefore covered via the rolling sphere method of protection.

Isolated air termination system Air termination masts and brackets

In order to comply with the design requirements, i.e. two 3 m masts to be installed to the top of the steel LED frames, specialised mast brackets had to be designed and manufactured to house the 3 m long HVI power masts.

Down conductor system

Each mast location is equipped with two HVI power down conductors that run from the mast connection point to the zero potential connection point (concrete steel reinforcing). The HVI down conductors are fixed to the structural steelwork (I-Beams) by means of stainless steel clamps and brackets.

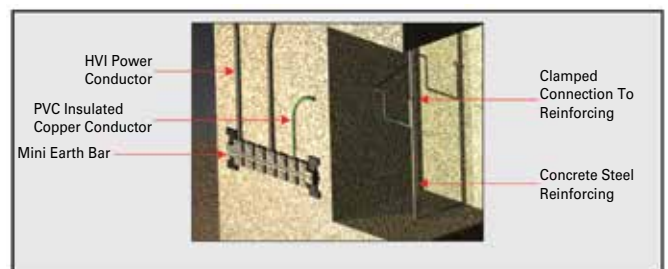


Installation of HVI Down conductors.

Earthing and equipotential bonding

The correct earthing and equipotential bonding of the Lumen lighting protection system is imperative for the effective protection of the LED screens. To this end the following measures were employed:

- The HVI conductors were positively bonded to the concrete steel reinforcing of the structure at a level below the LED frames
- The concrete steel reinforcing was tested in numerous positions and found to be electrically continuous with various parallel paths to earth
- The use of the concrete steel reinforcing vastly increases the current division capabilities of the entire lightning protection system



Earthing of HVI power conductors.

Equipotential bonding

The semi-conductive sheath of the HVI power conductors were equipotentially bonded to the electrical earthing system at a level below the LED frames. In turn the electrical earthing system was bonded to the concrete steel reinforcing at ground floor level. The LED screens and frames are equipotentially bonded to the electrical earthing system via the electrical reticulation.

In order for the HVI system to work properly it is imperative that this equipotential bonding be performed.



Current division properties

The Project Lumen lightning protection design incorporates various current division properties to enhance the effectiveness of the lightning protection system. The current division of the lightning impulse current begins at the point of strike where the two air termination masts are joined together by means of a bridging bracket and a 500 mm finial, therefore the lightning current is immediately divided at the point of strike. The already divided lightning current is then trapped within the HVI conductors preventing any creeping voltages onto LED system until it reaches the connection to the concrete steel reinforcing whereby it is dissipated by literally thousands of parallel paths to earth. The concrete steel reinforcing also allows for an extremely low resistant path of dissipation.

Lightning protection layout

High level design drawings were produced including 3D and Top View layouts to ensure that the on-site installation was carried out exactly as per the design parameters.

Installation

The installation of this lightning protection system was no mean feat. The installation of the masts and running of the HVI conductors at over 140 m above Johannesburg's skyline presented various installation challenges with particular attention being paid to the safety aspects of this type of installation.

Conclusion

The structural lightning protection was installed in conjunction with the installation of additional surge protection devices to form the complete lightning protection system. The complete lightning protection system was completed in December 2014 and there have been no reported damages to the LED system since then. We are, through ABSA CCTV system, monitoring the effectiveness of the HVI lightning protection system and we will be sharing any footage of lightning striking the protection system as and when we obtain such footage.

Reference

- [1] SANS 62305: 2010. Protection against lightning - physical damage to structures and life hazard.
 Part 1: General principles.
 Part 2: Risk management.
 Part 3: Physical damage and life hazard.



Trevor Manas started his lightning protection career at Pontins in 1991 as an installation technician, learning the ropes by working on various sites and doing physical installations. Within two years, he was promoted to a sales engineer position, where he was involved in site assessments, soil resistivity surveys and compiling quotations. In 1996, Trevor was promoted to the position of director and was in charge of ensuring the company's compliance with the earthing and lightning protection codes of practice. In 1999, Trevor became the managing director of Pontins and over the past 16 years, Pontins under Trevor's guidance has strived to offer protection solutions for some of South Africa's largest and most prestigious projects. In 2013, Pontins formed a partnership with DEHN Africa which gave Pontins access to world class cutting edge lightning protection technologies like the HVI protection system and DEHN's renowned surge protection devices. Enquiries: Email trevor@pontins.co.za



Security requires protection

By V Raab, DEHN + SÖHNE GmbH

Structural and technical measures such as CCTV systems are decisive to increase the security in buildings and facilities.

Security, stability and order are basic needs. In a world of increasingly complex processes, sophisticated technical equipment is required to satisfy these basic needs. In this context, both structural and technical measures such as CCTV systems are decisive to increase the security in buildings and facilities. Failure-free opera-

tion of these systems is particularly vital in dangerous and extreme situations to ensure that the required information is transferred and the relevant actions are initiated. False alarms may cause unnecessary costs and make the alarmed group of persons used to alarms so that real alarms may no longer be taken seriously. This would have fatal consequences. False alarms resulting from technical problems can have different causes. One possible cause is electromagnetic interference with the monitoring systems. During a thunderstorm, a particularly dangerous combination of circumstances occurs. On the one hand, there is always an increased risk of fire resulting from the thermal effect of a lightning strike. On the other hand, a lightning discharge is a strong source of electromagnetic interference which may interfere with the security systems due to conducted interferences and the electromagnetic field. This leads to failure or destruction of the security systems which are then no longer able to indicate a dangerous situation. Therefore, lightning and surge protection measures are required to ensure safe operation of such systems.

CCTV systems are used to monitor public and private rooms, traffic flows and technical systems. In industrial plants, they are vital to ensure safe and efficient operating procedures. Installed in an outdoor location, CCTV cameras are often vulnerable to direct



Figure 1

- CCTV systems are decisive in increasing security in buildings and facilities.
- CCTV systems are used to monitor public and private rooms, traffic flows and technical systems.
- Lightning protection standards form the basis for planning and implementing lightning protection measures.



lightning strikes due to their exposed location. This danger can be avoided by adequately arranging the cameras at the outer walls of buildings (see *Figure 1*) or installing lightning protection systems for the cameras (see *Figure 2*).

The lightning protection standards of the IEC 62305 [1] series form the basis for planning and implementing lightning protection measures. The protection goal of the two protection measures mentioned before is to prevent a direct lightning strike to the camera to be protected by an adequate arrangement of air-termination systems. When dimensioning the down conductors for the external lightning protection system of the camera, a sufficiently large separation distance must be maintained between the down conductor of the lightning protection system and the CCTV camera including its supply lines to prevent flashover between the down conductor and the CCTV camera. The minimum value of the separation distance to



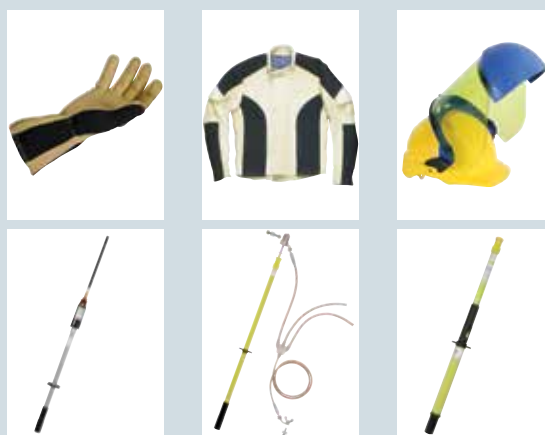
Figure 2



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be maintained can be calculated based on the calculation scheme provided in IEC 62305-3 [1].

False alarms may cause unnecessary costs and make the alarmed group of people used to alarms so that real alarms may no longer be taken seriously.

Conclusion

If, for example, CCTV cameras have to be installed on an isolated camera mast to be able to seamlessly monitor an object or an installation (see *Figure 2*), it is often difficult to maintain the separation distance between the CCTV camera and the installations of the external lightning protection system.

But there are also practice-proven solutions for this case such as high-voltage-resistance, insulated conductors (see *Figure 1*). As can be seen in *Figure 2*, no separation distance must be maintained between the CCTV camera and the down conductor if these special conductors are used.

CCTV cameras are typically installed on masts at the periphery of large objects and installations. The resulting larger cable lengths between the central monitoring system and the camera masts are targets for the electromagnetic field of the lightning discharge which may induce impulse-shaped and temporary high voltages in the lines of the CCTV system. These voltages may interfere with or even destroy the CCTV cameras. To prevent this situation, surge protective devices for protecting the supply voltage and the video signal of the camera should be used (see *Figure 3*).

Specific lightning and surge protection measures for security systems such as CCTV systems avoid false alarms in case of uncritical situations and the resulting costs, thus considerably increasing the operational reliability of these systems.

Only if all technical boundary conditions are observed, trouble-free operation of security systems and thus the necessary information transfer is ensured.

Reference

[1] IEC 62305-3. 2010. Protection against lightning. Part 3: Physical damage to structures and life hazard.



Figure 3



Veiko Raab received his engineering degree (Dipl.-Ing) from the Technical University of Ilmenau (Germany) in 1990. He joined DEHN + SÖHNE GmbH+Co.KG in 1991 and is currently working as director of international technical services and support. He provides training courses on lightning and surge protection for DEHN's customers as well as a lecturer on training courses organised by the Association for Electrical, Electronic and Information Technologies of Germany (VDE). He is the author of several articles published in technical magazines and author of a handbook on Lightning and Surge Protection in Germany. Enquiries: Visit www.schneider-electric.com

Increase your energy efficiency

The first rolling blackouts (commonly called load shedding) of 2007/8 shook the country and started discussions around energy efficiency. It appears 2015 is going to be worse. Since the beginning of 2015 there have been constant power disruptions throughout the country. Everyone has been asked to conserve electricity and save up to 15 %.

However, one cannot control what is not measured. This is where **NewElec's** range of electronic motor protection relays comes in (such as the NewCode motor protection and control relay), as it has the ability to measure electrical energy consumption. This totalised energy consumption (real watt-hours and var-hours) information can now be downloaded into process databases for further analysis. In addition to comprehensive consumption knowledge, where motors are found to be overrated, they can be replaced with smaller more efficient motors, reducing operational costs.

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Three phase general motor and pump protection

NewElec designs, manufactures and markets three-phase motor protection relays. However, some of its relays are geared towards specific applications, such as pump protection. The NewElec development team has worked with experts in the pumping industry to develop relays much more suited to the application.

As an example, the dry run protection (or minimum load or load loss) helps to trip the pump when there is no more media to pump. This is important to safeguard the pump from cavitation thus damaging the pump's impeller. The settings for dry run are percentage load level where the pump is known to be running dry and associated time required to confirm the condition. This percentage load level is obtained by testing and using empirical data for the specific pump, whereas time delay is typically set to 10 s or operating specification. Additionally, one needs to determine when the pump can restart and continue to pump. This can either be calculated based on the pumping infrastructure, for instance dam or sump level, or trial and error.

All these parameters can be easily set on NewElec's KD/KE or NewCode relays, which are geared for pumping environments amongst other applications.

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89 km 400 kV transmission line – great achievement

A major milestone for the **CONCO group** is the three-year construction of a 400 kV, 89 kilometre long transmission line for Eskom, stretching from Eros substation near Harding in KwaZulu-Natal, towards Vuyani substation in Mthatha in the Eastern Cape. This major project was completed by CONCO and officially handed over to Eskom last year. Commenting on the success of the project, Sugan Naidoo (Eskom project engineer) says, "The CONCO relationship with Eskom was professionally handled with Eskom's requirements being met in terms of delivering the project according to specifications. The contract management was executed with excellence. The handover was well received by Eskom for the first section of transmission line being built in the former Transkei area which is now part of the Eastern Cape," said Naidoo. "CONCO built 89 kilometres of the 167 kilometre 400 kV line and considering this was CONCO's first 400 kV line construction project, its successful completion was a great achievement by the efforts of the project team and site workers."

CONCO project engineer, Joseph Mahlangu says, "Effective stakeholder communication and project control integration which encompassed communication planning, applying best practised systems and controls, work structure, scheduling, reporting and adhering to the project plan, were key elements to the project's success." This is the first 400 kV line in the former Transkei area enabling a higher power transfer capability in the area. "400 kV Lines transmit bulk power to feed a large number of customers and can power up a town," says Naidoo. "When the line is placed in commercial operation, the current power shortfall in the Mthatha area and surrounding towns will be relieved and will strengthen the network by supplying sufficient capacity to the area for economic growth."

Approximately 400 people worked on the project over a three-year period. During that time, over 200 temporary employment opportunities were created in the local villages. CONCO also donated 200 desks, 100 chairs, a microscope and a projector, to Dudumeni High School in Flagstaff.

"The Eros/Vuyani project is a milestone for the CONCO group," says Mahlangu. "It's the first 400kV project executed by CONCO and we have proved our ability to project manage, engineer and construct a transmission line of this dimension. We completed it on time, within budget and to the highest quality."

Enquiries: Joseph Mahlangu. Tel. 011 805 4281 or email joseph.mahlangu@concogrp.com



CONCO chief executive officer, David van Zyl, hands over a plaque to Eskom executive projects manager, Bob Naraghi, at the official handover.

Proper integration of test joints in external thermal insulation composite systems

The relevant technical processing guidelines for insulation materials must be observed for the thermal insulation of existing or new buildings with external thermal insulation composite systems (ETICS). This also impacts the integration of windows, doors and all components leading through the composite system. In addition, these guidelines are relevant for lightning protection components. Lightning protection systems, in conjunction with an external thermal insulation composite system, pose challenges for designers and installers, particularly with regard to the installation and integration of test joints for these systems. The test joint products previously available on the market were often installed on the roof level or in flush-mounted boxes, exposing them to increased pollution. The expandable test joint box for external thermal insulation composite systems from **DEHN** is an innovative product for designers and installers which allows for flexible and proper installation.

The telescopic test joint box can be gradually adjusted for insulation material thicknesses between 90 and 140 mm and can therefore be used for common insulation material thicknesses. An additional spacer must be used for insulation material thicknesses between 140 and 320 mm. The spacer has a Styrofoam core to prevent thermal bridges and can be shortened from 200 to 50 mm in 10 mm interval steps. The down and earthing conductor can be easily led into the box, and there is sufficient space for installing a clamp. Thanks to the test joint box's dimensions of 140 by 180 mm and a depth of 80 mm, continuity and earthing measurements for lightning protec-

tion systems can be easily performed by means of measuring callipers. The proper installation is finished by mounting a stable and aesthetically appealing stainless steel cover, which protects the test joint from rain.

A UV and weather-resistant foam sealing is integrated in the cover to ensure that the test joint is fully protected, whilst the edge of the cover exerts sufficient pressure on the sealing at the corners. This test joint box for external thermal insulation composite systems is an innovative, universal and practical solution for integrating a test joint in external thermal insulation composite systems.

Enquiries: Alexis Barwise. Tel. 011 704 1487 or email alexis.barwise@dehn-africa.com



Natural gas flow computer testing and evaluation

By S Stark, Stark & Associates, Inc

The advent of flow computers, electronic flow measurement systems, communication systems, and new metering technologies has drastically changed the way we measure natural gas.

Natural gas flow computers came into much wider use for custody transfer (fiscal) measurement beginning in the late 1980s following their less common application in the 1970s and before. In the beginning, flow computers were used almost exclusively to calculate flow and the earliest models simply offered an alternative to chart recorders and a new way to handle and store measurement data.

Thanks to improved microprocessors, field-hardened electronics, and better power systems, things improved rapidly. Along the way, multiple communications systems evolved as better pressure and temperature transducers and new meter types and other technologies arrived on the scene.

Today it is possible to enjoy your morning coffee in Tulsa or Johannesburg, Cape Town, Houston or virtually anywhere else on earth while monitoring flow from thousands of miles away – almost instantaneously. These measurement improvements have supported the fast-paced marketing structure that helps drive the energy industry economy – an economy that grows and prospers thanks to the innovations brought forth by the men and women of a great industry and despite the efforts of the small-minded ones who would suppress it.

Now in 2015, our simple little solar-powered white (or black or whatever color you prefer) 'flow computer' has grown up and learned how to do almost anything you can dream up – monitor well performance, control pump jacks, direct flow, measure tank levels, listen for leaks, operate valves, monitor weather, secure the site, and even count the cows in the sheep in the pasture (well, we're almost there on that one). Many modern flow computers provide a mountain of data – some people say too much data – and perform many tasks essential in a complex and even faster-paced gas energy industry.

Sometimes, the more experienced measurement men and women of our industry ponder the situation and wonder if the initial purpose of flow computers has been lost in the mix of technology and SCADA-systems and other EGM-provided information we rely on. They sometimes worry that calculating flow may have become a secondary use for flow computers in some cases and that measurement precision is sometimes lost.

Let us review a few of the many pieces of a measurement system regarding specifically the testing, maintenance, and operation of natural gas flow computers in the reliable calculation of natural gas flow.

Flow measurement system components

A natural gas flow computer (sometimes abbreviated EFC, EFM, ECT, EGM, RTU, etc) is only one part of a flow measurement system. Most measurement systems can be described as having three basic parts:

- Primary device – the basic meter type (e.g. orifice, Venturi, displacement-type, diaphragm, turbine, ultrasonic, Coriolis, etc.).
- Secondary device – the transducers, transmitters, and other instruments that communicate pressures, temperatures, and other measured variables from the primary device to the tertiary device.
- Tertiary device – the flow calculation device that performs final flow calculations.

The secondary and tertiary devices (as well as the primary device in some cases) can be contained in one or more enclosures, or can be packaged and housed at the same general location (e.g. the field site or processing plant location). Sometimes, tertiary devices are located at greater distances from the point of measurement.

This article addresses only secondary and tertiary devices. API MPMS Ch. 21.1 and the meter-specific standards and reports sometimes provide additional valuable information. ***NOTES A**

They should be read and studied very completely and carefully and discussed internally and externally with everybody involved with the measurement process which helps prevent misunderstandings and disputes later on.

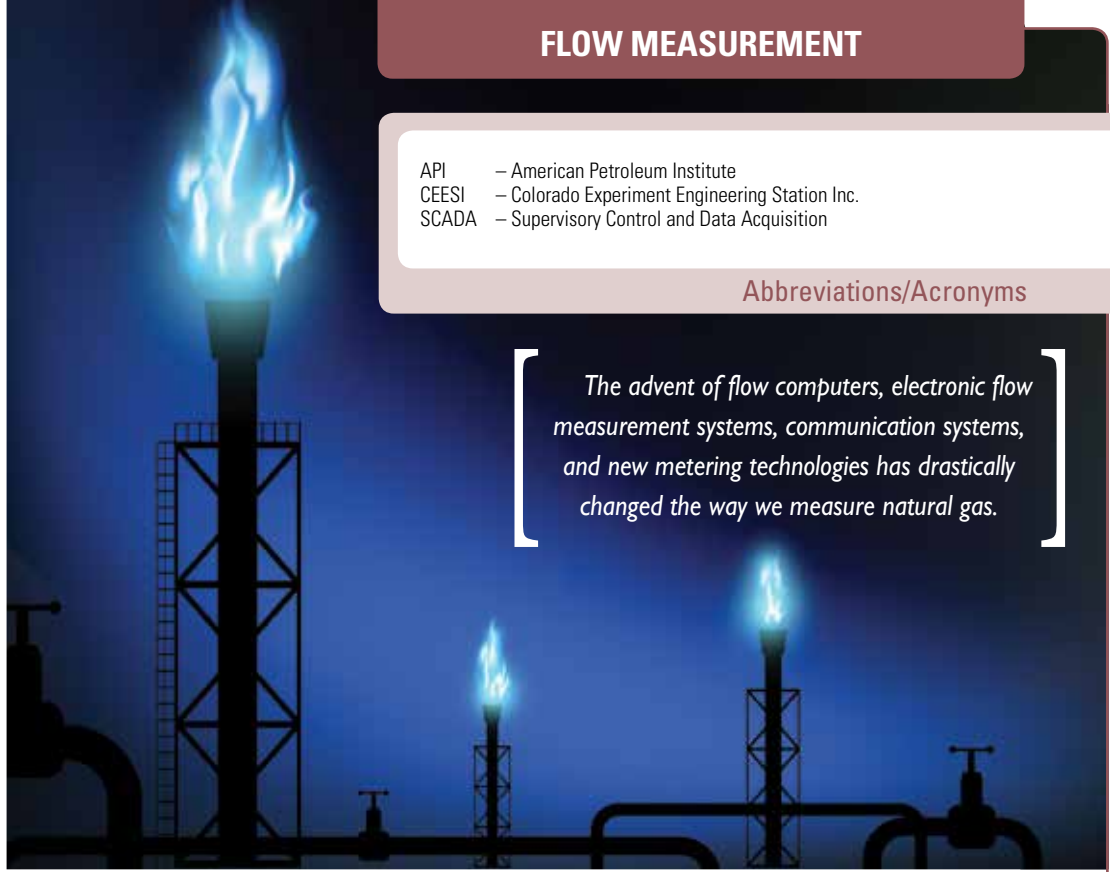
Flow computer testing - general

The word 'testing' can bring to mind many different concepts. Flow computers used for custody transfer and other crucial measurement applications should be 'tested' in two different and separate ways.

API – American Petroleum Institute
 CEESI – Colorado Experiment Engineering Station Inc.
 SCADA – Supervisory Control and Data Acquisition

Abbreviations/Acronyms

The advent of flow computers, electronic flow measurement systems, communication systems, and new metering technologies has drastically changed the way we measure natural gas.



- During the flow computer selection processes where testing helps ensure correct equipment selection, setup, calculations, and individual component performance.
- On a regular and recurring basis in the field to confirm that flow computer transducers and other system parts are working correctly and communicating reliably with other parts of the measurement system.

Breaking it down a little further, natural gas flow computers should be initially tested and evaluated in two distinct ways during the equipment selection process. They are:

- Static testing
- Dynamic testing

Both types of testing are necessary to ensure that flow computers perform:

- Reliably under various flowing conditions and during ambient temperature changes
- Dependably relative to alarms and systems control functions
- Correctly in calculating flow including flow parameter averaging and including providing reliable audit trail documentation after flow occurs

Conducting only one type of test, such as static testing (sometimes called 'bench-testing'), has historically resulted in misunderstandings about the performance of flow computers and their related systems. Bench testing is much easier and less expensive than dynamic testing and is, therefore, the only method selected especially if flow facilities are not available. Just because a flow computer correctly calculates flow from fixed inputs is no indication that it will correctly calculate flow under actual flowing conditions.

There are many instances where attempts to perform dynamic testing using a bench-test method have failed due to the inability to reliably track and hold measured variables, often due to the effect of thermal instability in a test system. The concept of bench testing seems simple but is actually quite complex. Nothing can duplicate

actual flow when testing and evaluating natural gas flow computers.

Additionally, there is no known way in which a 'canned' test protocol can be applied to all flow computers due to the wide variety of devices on the market today, a fact clearly demonstrated for more than thirty years as equipment and technologies have changed and improved. Attempting to fit all types of flow computers used with all types of primary devices into a standard testing protocol would be a very complex process.

The careful flow computer researcher must study and have a clear understanding of the equipment under test and its intended use including location and flowing conditions. This means, for example, if the device is only to be installed in sub-tropical conditions, the testing protocol might include investigating equipment component acclimatisation to the effect of higher relative humidity and less on cold weather hardening. All parties involved in the testing should be fully briefed and invited to comment on the final protocol.

No two testing protocols are identical and the key to success is very careful and detailed planning and preparations.

Also, no industry measurement standard currently addresses either static testing or dynamic testing. However, an API Standard is currently under development by the COGFM, titled 'Testing Protocol for Electronic Flow Computers for Gas Flows,' and designated as API MPMS Ch. 22.5. Being a somewhat difficult subject to address, it is slow in development.

Following are some general thoughts relating to static testing and dynamic testing.

Flow computer static testing

Because not all operating conditions can be reliably replicated, a test matrix is first developed to address the desired operational parameters. Initially, nine sets of operational parameters are chosen based on anticipated worst case flowing conditions. Engineering units are compared in all cases to a tolerance of fifty parts per million (50 ppm) for flow rate or accumulated flow. Following the completion of the initial nine tests, additional test cases are developed to emulate

a representative range of meter sizes, gas compositions, operating parameters, and other anticipated conditions of use. Data retrieval through the entire communication system can also be tested during the static testing phase. Additional inputs and outputs are likewise tested, and are dependent on the particular equipment design and intended use.

Static testing is accomplished by manually inputting fixed values into the flow computer registers and comparing intermediate calculated results with individually calculated values that are traceable to the applicable standards. Values verified for orifice meters (and other differential pressure meters) include the following. ***NOTES B**

- Conversion from psig to psia – applicability depends on flow computer design, transducer type, and transducer design
- Differential pressure – inches H₂O
- Static pressure – psia
- Temperature – °F and correct conversion to °R
- Discharge coefficient – (Cd(FT)) for orifice meters conforming to API MPMS Ch. 14.3 and per special tests for other differential meter type
- Pipe Reynolds number – necessary for calculating discharge coefficient where empirical data are used
- Pressure tap location – P₁ or P₂

- Expansion factor – Y₁ or Y₂ ***NOTES C**
- Velocity of approach factor – E_v
- Flow extension – (Hw Pf)^{0.5}
- Gas compressibility – Z_b, Z_{f1}, Z_{f2}
- Gas relative density – Gi, G_r
- Gas density – where applicable as based on suitable EOS or densitometer input
- Gas heating value – Btu/ft³
- Acceleration of gravity – F_{pwl}
- Flow time – seconds, minutes, hours
- Instantaneous flow rate – Scf, Mcf, MMScf, MMBtu
- Accumulated gas flow – Scf, Mcf, MMScf, MMBtu
- Alarms
- Problems indication flags and codes
- SCADA – including CFR 193 and 195 (September 2010) and API RP 1165
- Audit logs
- Audit trail – API MPMS Ch. 21.1
- Other parameters required by standards and legal agreements, state agencies, federal agencies and depending on the specific meter type and design

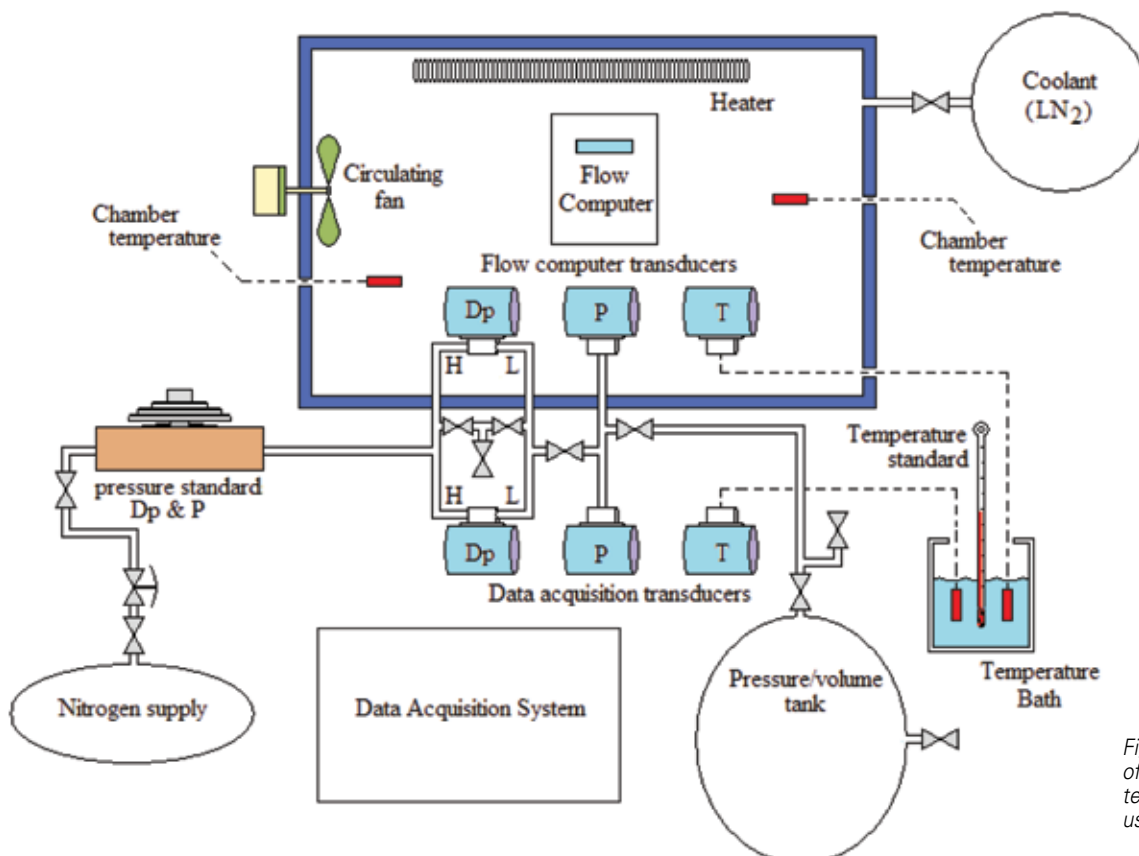


Figure 1: Basic components of the CEESI flow computer temperature test chamber used for several decades.

Values verified for linear meter types (e.g. ultrasonic meters, turbine meters, rotary meters, diaphragm meters, Coriolis meters, etc.) can include (as applicable) some of the same values as listed. Additionally, K factors, meter factors, flow calibration data, and the original flow calibration audit trail data are carefully considered.

Additional tests under controlled static conditions are conducted to define performance limitations under hot and cold ambient temperatures ranging from approximately -30° F to approximately +130° F. During these tests, all flow computer enclosures, electronics, transducer, wiring, and other components are subjected to the same temperature extremes while fixed values are input using identical transducers and transmitters to be used in practice. *Figure 1* shows the fundamental parts of a typical temperature test chamber used in the evaluation of flow computer systems.

The equipment manufacturer should provide a complete listing of all standards, reports, and recommended practices used in developing their equipment, including the auxiliary components (e.g. gas chromatographs, editor systems) they have tested for compatibility, and provide independent documentation of such tests.

It is important that all testing address the same equipment, including the actual software and firmware to be used in operation, and that all static test parameters are documented completely.

Flow computer dynamic testing

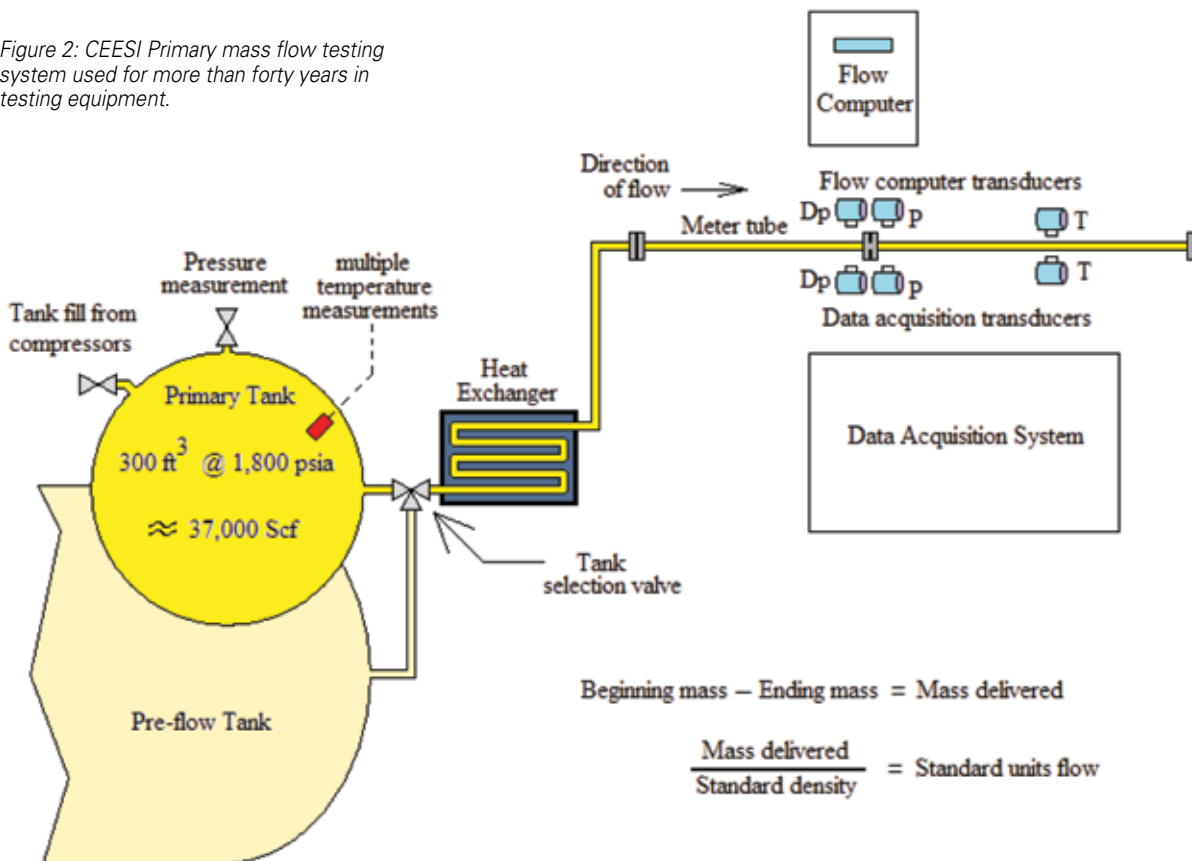
A primary mass measurement system developed and operated by Colorado Engineering Experiment Station, Inc. (CEESI) is employed for the performance of dynamic testing to traceable and verifiable accuracy tolerances of +/-0.1% of delivered mass flow.

Orifice meters and other square root meters undergo a minimum of five separate flow tests. Turbine meters, rotary meters, diaphragm meters, ultrasonic meters, Coriolis meters and other linear meter types are subjected to a minimum of three separate flow tests.

Dry air is the preferred test fluid due to excellent uncertainty regarding its physical properties, although any gas may be used as long as its physical properties are known and very well documented. Special considerations are made when a fluid other than natural gas is used in the test system.

Test parameters include steady state and varying flow rates designed to meet the most stringent operating conditions under which the flow computer will be installed. Standard flow patterns for such testing have been developed over many years that may be used to replicate gas lifts (gas intermitters) and other severe flowing conditions. At least one of the varying flow tests should include a period of zero-flow time which overlaps two of the audit log periods.

Figure 2: CEESI Primary mass flow testing system used for more than forty years in testing equipment.



It is crucial that the flow computer clock is settable to a resolution of +/- 0.5 seconds of the flow laboratory clock. A separate data acquisition system installed by the flow laboratory is used to facilitate troubleshooting to help identify problems during the data analysis process. *Figure 2* is a general diagram of the CEESI primary mass flow testing system.

Historically, flow test results of acceptable flow computers have compared to laboratory results to a tolerance of better than approximately +/- 0.3% for all dynamic test cases. The required tolerance is formally considered and set before testing begins and it is not adjusted afterwards. In all static and dynamic testing, it is essential that the test parameters selected are similar to those typical of actual operational conditions and that intermediate as well as final calculated values are verified in all cases. This means that not only the final calculated gas volumes (e.g. Mcf) are confirmed, but also that transitional values are confirmed as well. ***NOTES D**

Field testing, operation, and maintenance

The process of field testing a flow computer requires careful attention to detail and prudent correction and documentation of all problems and errors detected.

Field testing of flow computers consists of a visit to the field site whereupon the following items are checked and corrected if necessary. All input values including the following.

- Pressure base
- Temperature base
- Static pressure source (e.g. upstream / downstream pressure tap for orifice meters)
- Gas composition source information (e.g. manually input, from GC, etc.)
- Compressibility calculation method (and, depending on method used, the source of gas composition, Sg, CO₂, N₂, etc.)
- Specific heats ratio (Cp/Cv) for differential pressure producers
- Gas viscosity (with special attention paid to correct viscosity units)
- Meter tube diameter
- Orifice plate bore (or flow restrictor diameter/size)
- Required 'K' factor or meter factor (where applicable)
- Transducer ranges and/or URL (original and as calibrated)
- Flags and alarms (settings and limits functionality)
- Peripheral component settings (gas sampling systems, odorant injector settings, etc.)
- Other input values as are applicable to the particular meter type or flow computer
- Transducer and transmitter performance

In addition, the following steps should be taken.

1. Thoroughly leak check entire measurement system from pressure source throughout tubing including all valves and connections and at the temperature well and sample point locations.
2. Determine the as-found condition of transducers including readings

taken at or near typical operating conditions (e.g. temperature, pressure, and differential pressure checks).

3. Perform a re-calibration of transducers as necessary.
4. Determine the approximate error caused by any transducers which are found operating outside anticipated limits.
5. Record and document the as-left condition of all transducers.
6. Perform other checks as are applicable to the particular meter type and flow computer.

The volumes of information written by flow computer manufacturers regarding equipment maintenance should be carefully read and studied to help ensure proper operation

Conclusion

Gas measurement technology has improved significantly from the mid-1960s until today in 2015. The advent of flow computers, electronic flow measurement systems, communication systems, and new metering technologies has drastically changed the way we measure natural gas. Even so, greater care must be taken today than ever before to ensure gas quantities are calculated correctly because many end-users now place more emphasis on the ancillary functions and associated systems than on the proper and correct quantification of flow.

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- Gas measurement technology has improved significantly from the mid-1960s.
- Natural gas flow computers came into wider use for custody transfer (fiscal) measurement in the late 1980s.
- Greater care must be taken today, more than ever before, to ensure that gas quantities are calculated correctly.



*** NOTES**

A As of the writing of this article in March 2015, API MPMS Ch. 21.1 has been revised and reprinted. As is common in many hydrocarbon measurement standards, it is necessarily vague in some sections while over-cooked in others due to the viewpoints and biases of the many authors and contributors all of whom (like all of us) have limited knowledge and individual opinions.

B The selection of tested and verified values depends on the specific meter type, meter design, and intended use. In the example given, orifice meters have been selected as the primary measurement device.

C Latest and pending revisions to industry measurement standards are reviewed to help ensure that all applicable measurement calculations and parameters are checked. For example, API MPMS Ch.14.3 (orifice metering) has undergone revision with additional changes pending.

D The 'intermediate' and 'transitional' values mentioned in this article include discharge coefficient, compressibility, expansion factor, water vapor correction factors, acceleration of gravity correction, calculated Btu, calculated MMBtu (Dth), and other flow-dependent variables that are selected depending on the particular meter type for which the flow computer is designed.



Stephen T. (Steve) Stark is an independent advisor, consultant, coach, and teacher with over 35 years' experience in measuring natural gas, crude oil, and hydrocarbon liquids. Before forming Stark &

Associates, Inc. in 1997, he was Manager of Measurement Technology with Williams Energy having previously managed the Measurement Department for Williams Natural Gas Co. In the 1980s, he worked for Phillips Petroleum Co in the Corporate Engineering Fluid Measurement Group at their headquarters in Bartlesville, Oklahoma. Before that, Steve was a field measurement technician with Transok Pipeline Company and even earlier worked as a Rigger with Jetco, Inc., a perforating and logging company located in Oklahoma City. Steve has served on numerous oil and gas measurement standards-writing committees including those of the API (American Petroleum Institute), the AGA (American Gas Association), and the GPA (Gas Processors Association). He has been directly involved in writing many of the measurement standards in use today, now serving mainly on various API committees. He has chaired activities of the Southern Gas Association and Gas Research Institute and served on the Board of Trustees and General Committee of the International School of Hydrocarbon Measurement (ISHM) where he founded and was the first Chairman of the ISHM Scholarship Fund in 1997. He currently serves as an ISHM Principal Advisor and teaches most years during the ISHM annual conference. He received the American Gas Association (AGA) Award of Merit in October 2006; the Laurance Reid Award in 2011 for outstanding contributions to hydrocarbon measurement and control; and the American Petroleum Institute 30 year Service Award in 2011. Steve was appointed an Emeritus Member of the American Petroleum Institute Committee on Petroleum Measurement in 2013. Steve holds several U.S. patents relating to flow measurement and works regularly on new ideas.

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Proline is a proven and uniform product concept, designed to do the same things the same way, thereby increasing the safety and efficiency of your operations. The Human Machine Interface (HMI) and subsequent device set-up and programming are user-friendly through and through. This ensures that your process can be securely controlled with confidence and can be integrated seamlessly into your plant asset management, providing reliable information for optimising production and business processes. The Promass 200 has been developed for SIL2/3 applications and has internationally recognised Ex approval including the local South African requirements.

Enquiries: Frans van den Berg. Tel. 011 262 8000 or email info@za.endress.com

Labelling solutions

Barcode printer manufacturer cab is setting new standards in developing and manufacturing devices and systems for product labelling and product marking. Technical sales manager for southern Africa, Rudie Buys affirms the company's support for the region's customers. "cab provides on-the-spot support for our customers in chemical, food, agricultural and manufacturing industries, who rely on our high quality standards", he says. The USA Occupational Safety & Health Administration's new labelling requirements are expected to have the greatest impact on internationally-based chemical manufacturers, with few mandatory changes proposed for other general chemical storage. HCS targets chemical manufacturers and importers to ensure their chemical containers will display a label similar to those now used in Europe and many other Globally Harmonised System (GHS) adopters, beginning June 1, 2015.

Enquiries: Julian Power. Tel: 011 886 0307 or email julian@gw.co.za

On 1 June 2015 a new global system will be adopted for labelling in the chemical industry, known as the Globally Harmonised System (GHS) of Chemical Labelling. This initiative is a system developed by the United Nations (UN) to strengthen international efforts concerning environmentally sound management of chemicals.



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Benefits for vortex measurement include the following;

- Long-term stability
- Wet steam detection
- Seamless system integration thanks to two-wire technology
- Unaffected by shocks and vibration
- Intrinsically safe

A strong pedigree

Endress+Hauser is a leading manufacturer of vortex meters, having sold more than 300,000 Prowirl flowmeters since the technology was introduced 30 years ago. Immunity to vibrations, mechanical shocks and abrupt changes in temperature account for the instruments' popularity. They're also renowned for their excellent long-term stability; the sensors are not subject to drift over time, ensuring minimised operating costs and high reliability.

Now the 200 series Prowirl brings further improvements. The new generation harnesses two-wire technology to reduce costs during installation and enable devices to be replaced easily. Prowirl is an intrinsically safe, 4–20 mA instrument that can be installed even in Zone 0 hazardous areas. It is the first vortex flowmeter developed according to the IEC 61508 international standard for functional safety.

The Prowirl F 200 is the first flowmeter able to measure steam and mass energy, warning if wet steam is in the line and even estimating the concentration. Wet steam is a safety concern as it can damage the equipment due to water hammer. It also affects efficiency as wet steam contains less energy than dry steam. Therefore being able to detect wet steam is a unique and invaluable feature that guarantees the highest process safety and helps to keep operating costs to a minimum.

Enquiries: Frans van den Berg.
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info@za.endress.com

Compact vortex flowmeter – low viscosity liquids

KOBOLD Instrumentation, represented in South Africa by **Instrotech** – a Comtest Group company, has on offer the compact KOBOLD Vortex flow meter Model DVZ, used for measuring and monitoring smaller and medium-sized flow of low viscosity, water-like liquids in pipes. The device works using the vortex principle, making it virtually maintenance-free. This involves the installation of a sharp-edged object (the vortex generator) in the flow duct. Vortices are created behind the object whose frequency is proportional to the velocity of flow of the liquid. The flow volume can be determined with a high degree of accuracy by measuring the vortex frequency. The result is a very high linearity over the whole measuring range (0,5 - 4,5...10-100l/ min) with an accuracy of +2,5 % of full scale.

The device can be fitted with switching, frequency or analogue outputs. There is also an optional compact electronics package that includes a digital display, and both a switching

and analogue output. Dosing and metering electronics are currently being developed. THE KOBOLD DVZ vortex flow meter finds application in the following areas:

- Monitoring the flow of low viscosity liquids
- Measuring of aggressive, high-purity or salty solutions
- Unsuitable for abrasive media or media containing a large proportion of fibres

Enquiries: Pieter Deysel. Tel. 010 595 1831 or email sales@instrotech.co.za



Ultra low-flow Coriolis meter with EtherCAT capability

Bronkhorst Cori-Tech BV (The Netherlands) has introduced their new mini CORI-FLOW Series ML120 Coriolis mass flow meters and controllers for (ultra) low flow ranges. The instruments were designed to provide the user with highly stable, accurate and repeatable mass flow in advanced research or production processes.

ML120 offers flow ranges from 50 mg/h to 200 g/h, measured with an accuracy as high as 0,2 % of reading. The compact Mass Flow Controller is equipped with a microprocessor based pc-board with signal and fieldbus conversion and an integrated digital controller for accurate mass flow control by means of the integrated piezoelectric control valve. The flow controller

has a very small internal volume, making the Coriolis MFC an ideal device for fast, repetitive dosing and filling processes for precursors, additives, solvents, etc.

Mini CORI-FLOW Series Coriolis mass flow meters and controllers are offered with analog and digital communication, RS232 and various fieldbus options. Responding to the requirements of the market, ML120 is the first low-flow Coriolis instrument to offer EtherCAT capabilities. EtherCAT is currently the fastest industrial Ethernet technology, allowing quick and easy system integration.

Mecosa is the sole agent for Bronkhorst Cori-Tech B.V. in Southern Africa.

Enquiries: Tel. 011 257-6100 or email measure@mecosa.co.za



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Our certified functional safety management includes a quality and safety policy to allow permanent and systematic verification and improvement.

Enquiries: Jan Gerritsen. Tel. 011 262 8000 or email info@za.endress.com

Level sensor in hygienic design



For sanitary applications, **WIKA** has developed a magnetostrictive level sensor in hygienic design. The model FLM-H sensor, certified in accordance with 3A Sanitary Standards, measures level in tanks and vessels with an accuracy of < 0,5 mm.

The level is detected continuously, regardless of any physico-chemical changes of state in the media, such as foaming or boiling effects. This measuring instrument, based on the float principle, even operates reliably with CIP/SIP processes - cleaning liquids and elevated temperatures do not have any negative influence. The guide tube is directly welded to the process connection. This leads to a crevice-free joint between the connection and the measuring cell, without the need for additional seals.

The 4 ... 20 mA output of the sensor, also available with HART protocol, transmits the signal even over long distances. The level is displayed proportional to volume or height. No calibration is required following installation. The sensor is suitable for SIL 2 (IEC 61508).

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The OPTIMASS 2300 is also capable of high turndown ratios, keeping flow velocities low, preventing the build-up of static in hydrocarbons and presenting a real benefit for custody transfer applications, especially in the oil and gas industry.

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Configuration suite for remote oil and gas field applications

OpenEnterprise FieldTools improves productivity by streamlining configuration and monitoring, helps improve personnel safety by eliminating unnecessary trips to the field. **Emerson Process Management** has introduced OpenEnterprise FieldTools, the world's first Remote Terminal Unit (RTU) and HART configuration suite that enables local and remote configuration and real-time HART device monitoring in remote oil and gas applications such as wellhead automation, flow measurement, and tank overflow protection.

The software suite streamlines servicing and maintenance of multiple RTU platforms and HART transmitters across remote sites, helping improve operations and field personnel safety.

The new single software toolkit enables the configuration of Emerson's family of Remote Terminal Units, flow computers and presets including products under the ROC, FloBoss, and ControlWave brands. Additionally, OpenEnterprise FieldTools is a fully-functional HART communicator that supports configuration, troubleshooting, and maintenance of all wired HART and Wireless HART transmitters. FieldTools enables the seamless commissioning of HART devices by leveraging HART pass-through via Emerson RTUs and flow computers. HART pass-through enables tunneling over complex SCADA infrastructures using native Emerson RTU communication protocols.

Enquiries: Michael Eksteen. Tel. 011 451 3700 or email Michael.Eksteen@Emerson.com

New flow indicator with rotor

KOBOLD Instrumentation, represented in South Africa by **Instrotech** – a Comtest Group company, has introduced their Rotating Vane Flow Indicator model DAF, for application where visual flow indication without flow measurement is required. A square housing with transparent front and back windows contains a rotating vane whose rotary motion, caused by the flowing medium, indicates presence of 'flow'. The DAF series may be installed in pipes from G 1/8 to G 1 1/2 with the same housing. Further versions are available with flange connection from DN 15 to DN 50. Flow ranges from 0,03...0,1 to 5...150 l/min can be obtained by changing the inlet port orifice. The instruments can be installed in any position. Flow, however, must be in the direction indicated by the arrow. Four different material combinations allow an optimum instrument selection



for a multitude of applications. A housing made of complete plastic (Trogamid-T or polysulfone with stainless steel connections for aggressive media) provide a cost-effective flow indicator for pressures up to 10 bar. The flow indicator DAF can also be supplied with a brass housing with Trogamid-T cover (or stainless steel housing with polysulfone cover) for pressures up to 16 bar.

Enquiries: Pieter Deysel. Tel. 010 595 1831 email: sales@instrotech.co.za

Measuring diesel engine fuel consumption

KOBOLD Instrumentation, represented in South Africa by **Instrotech** – a Comtest Group company – was asked by commercial fishermen for an off-shore, onboard solution to monitor real-time fuel consumption on their small ships and fishing vessels. KOBOLD's Oval Wheel Flow Meters Model DOM were specified for fuel consumption measurement in diesel engines using the dual flow inputs and the 'A-B' setting. A pair of DOM flowmeters is used with a single electronic model ZOD-Z3 to give a net reading of fuel consumption. For this specific application, KOBOLD installed a pair of stainless

steel flowmeters (DOM-S15... for flows upto 550 l/h per flowmeter) and one ZOD-Z3 per engine. As choking of the flowmeter or strainer in main line may result in higher differential pressure and result in diminishing fuel to the engine, an alternative is to use a pressure relief valve in the bypass line. Higher inlet pressure opens the pressure relief valve and ensures a constant supply to the diesel engine. In selective cases, the choice of 'pulsating flow' option may be recommended.

Enquiries: Tel. 010 595 1831 or email sales@instrotech.co.za

Portable clamp on flow meter

The FLUXUS F601 is the portable clamp-on flow meter of choice for servicing and maintenance activities, the control and auditing of measurement points not covered by permanent meters, or even the temporary replacement of permanently installed flow meters. It is ideal for chemical, water, wastewater, oil/gas and aviation industries.

The FLUXUS F601 is measurement ready in less than five minutes, including the measurement of the pipe wall thickness, the connection of the transducers to the transmitter, the parameterisation of the flow meter and finally the mounting of the transducers.

Though featuring an ergonomic design, which offers simple handling and maximum ease of use, the F601 was designed to easily withstand rough industrial environments.

Besides its sturdy housing, the F601 portable flow meter features stable and precise push-pull transducer connectors with the cables themselves being steel armored to prevent breaking or rupturing during daily work.

With its Li-Ion battery, the F601 allows for up to 14 hours of autonomous measurement. Matched and paired transducers as well as sophisticated algorithms care for the correction of pipe wall echoes and a wrong transducer positioning, thus ensuring reliable and highly accurate measurements - even during the most demanding application conditions. Due to the new HybridTrek mode, the portable flow meter can also reliably and accurately measure the liquid flow under conditions with a high content of solid particles or gaseous loads.

The FLUXUS F601 portable clamp-on flow meter is also available in an 'Energy' and 'Multifunctional' version, allowing the measurement of thermal energy / BTU flows and making the flow meter the ideal companion for the analysis or auditing of heating and chiller plants.

Enquiries: Tel. 011 608 2944 or email sales@peterjones.co.za



VEGAPULS 69

The ultimate bulk solids level sensor



VEGA, the market leader in solids radar level for over 10 years, recently introduced the new VEGAPULS 69 - a non-contact sensor delivering the full performance spectrum in bulk solids level measurement.

“What sets the VEGAPULS 69 apart”, says John Groom, managing director of VEGA Instruments SA, “is the performance of this new generation radar sensor. It has the capability to meet the most diverse tasks; from level gauging down mine shafts, to measurement in small hoppers or bulk containers, and it even reacts fast enough for level or position control on conveyor cars”. He adds, “This new innovation takes radar level technology very close to being a universal bulk solids level measurement sensor”.

Good focusing is a critical factor for accurate and reliable measurement. A radar sensor can only measure the level correctly if a proper level echo is present. This is especially true for solids – if the noise (i.e. the jumble of interfering signals) is as strong as the level echo itself, a consistent performance from a non-contact sensor is very difficult to achieve. The beam angle of the emitted radar energy – and thus also the focusing – is dependent on two factors: transmission frequency and effective antenna aperture. This means that, with an antenna of the same size, considerably better focusing is achieved with a higher frequency. The VEGAPULS 69

operates with a transmission frequency of 79 GHz and an antenna aperture of 75 mm. A beam angle of just 4 ° is achieved with this, making measurement more certain and reliable. The focused 79 GHz beam simply avoids any internal installations and build-up on the vessel wall and the result is highly reliable measurement data.

By comparison, a radar sensor with a transmission frequency of 26 GHz and an antenna of the same size has an aperture angle of approximately 10 °. The wider beam generates more false echoes as it strikes the internal fixtures and build-up on the vessel wall, making a precise measurement more difficult.

The VEGAPULS 69 offers high frequency, optimum signal focusing – ideal for narrow containers and eliminating false signals, resulting in higher measurement accuracy and reliability, even over long measuring ranges. With an accuracy of ± 5 mm it is sensitive enough to detect the smallest of level reflections. Difficult bulk

solids, for example very dusty, uneven surface profiles like fine ash, cement, flour, coal, plastic powders biomass and wood chips, can be measured confidently using this contactless technology, with no signal loss and minimal false echoes.

“If you want to find out more about our latest offering, contact us for a demonstration with a battery powered device or to arrange a trial in your application”, John Groom offers. “We’re asking you ‘Is it time to focus on your bulk solids level measurement?’. If so, our team of sales engineers and staff is here to help and advise you every step of the way”. He concludes, “You might find that the VEGAPULS 69 is a game changer for contactless level measurement of bulk solids”.

Enquiries: Chantal Groom.
Vega Instruments SA
Tel: 27 11 795 3249 or
email: info.za@vega.com or
visit: www.vega.com/za





Key to emergency lighting effectiveness

By R Head, Hochiki Europe

How installers can support organisations to select emergency lighting equipment that upholds the wellbeing of building users and ensures maximum life safety system efficiency.

Emergency lighting is a vital life safety feature in any development, and essential for the modern-day built environment. In the case of an emergency, such technology is there to illuminate escape routes, enable building occupants to see their way clearly and avoid obstacles to evacuate the structure as quickly and safely as possible. Without lighting equipment in place, people are far more likely to lose their lives in a fire.

With these benefits in mind, a growing number of organisations in Africa have, in recent years, begun to incorporate emergency lighting technology into their buildings. This growth in use is both to optimise the safety of employees and visitors and to ensure compliance with legislation, such as Part T (Fire Protection) of the National Building Regulations [1] in South Africa, and similar laws being implemented across the continent.

To help organisations meet these increasingly stringent regulations, many installers are recommending and specifying fire safety and emergency lighting equipment that has received certification

to European performance guidelines, such as those issued by the British Standards Institute (BSI). Such marks of third party approval are rightly seen to demonstrate the quality and effectiveness of the life safety technology to which they have been awarded, helping to reassure organisations that their buildings will be compliant with even the strictest legislative requirements.

So how can installers ensure they recommend and install the most appropriate emergency lighting equipment for the needs of their customer's building?

When advising on these types of systems, it is crucial for installers to consider whether the solutions offered and the design of the emergency lighting meets the requirements of key international standards.

The BSI's BS 5266 [2] code of practice for emergency lighting, for example, has strict guidelines on the positioning of luminaires, minimum light levels, acceptable glare levels and minimum routine testing schedules. These codes are increasingly being used by both installers and organisations across Africa as a baseline for best prac-

BSI	– British Standards Institute
CPD	– Continuing Professional Development
LED	– Light Emitting Diodes
TCO	– Total Cost of Ownership

Abbreviations/Acronyms

tice when it comes to choosing fire safety and emergency lighting systems and fitting them in buildings.

There are clear recommendations provided by BS 5266 [2] regarding the 'points of emphasis' within the building – mandatory locations within a structure where specific hazards need to be highlighted with luminaires, as well as safety equipment and signage. These include areas near stairs, changes of level, at each change of direction on the escape route, near firefighting equipment and manual call points. The final exit, first aid points, exit doors and safety signs also require illumination. It is imperative that any emergency lighting system selected for the building should be suitable for use at all points of emphasis.

Achieving the correct light level – or 'Lux' (lumens per square metre) - from emergency lighting equipment is a necessity to comply with fire safety regulations and optimise the wellbeing of building occupants. BS 5266 [2] recommends a minimum level of one Lux in escape routes, and 0,5 Lux in open areas at floor level to help people navigate through the building even in heavy smoke. It also suggests positioning luminaires in such a way to reduce glare, which can also reduce visibility.

A growing number of organisations in Africa, in recent years, have begun to incorporate emergency lighting technology into their buildings.

For non-domestic multi-storey buildings primarily used by disabled occupants, BS 5266 [2] also advises that refuges for anyone unable to easily use emergency exits or stairs be lit to a higher level of illumination than the rest of the escape route - to make sure they are clearly visible in the event of a fire. It also suggests that kitchens, first aid rooms, treatment rooms, plant rooms and reception areas all have emergency lighting fitted that offer higher Lux levels.

No two manufacturers' products are the same, offering slightly different levels of illumination. As such, installers will need to fit their chosen luminaires at different locations and in different quantities depending on the manufacturer, to ensure the correct Lux level for each area of the building. Many manufacturers provide spacing guides to help installers calculate the minimum number of products they need to be compliant and what the system design should look like.

At the same time as considering compliance with regulations, installers should think about the maintenance and aftercare require-

ments of the emergency lighting equipment they recommend for their customers. All emergency lighting systems need to be regularly and correctly maintained by the organisation in charge of the building to minimise the risk of a lighting failure during a genuine emergency. However, irregular maintenance can lead to premature degradation in system performance, which can require components to be repaired or replaced more regularly than otherwise necessary. This simply increases downtime further, raising costs and impacting on safety and business efficiency.

With all this in mind, it is imperative that installers consider the maintenance requirements of their chosen emergency lighting solutions over their lifetime. Systems that require additional maintenance will end up costing more to look after than those that need less care. Similarly, products that have not been built to withstand environmental conditions will degrade prematurely, requiring extra care and costly repairs. All of this will adversely affect process efficiency for building owners and increase the system's total cost of ownership (TCO).

It is also crucial to think about system reliability, as this too can have an impact on TCO. A less reliable system, for example, may suffer from unexpected problems, which will cost organisations time and money to repair. Replacement components may also vary in terms of price, particularly if the emergency lighting system is not easily compatible with technologies from different suppliers, further impacting on the cost of aftercare. Selecting a system produced by a manufacturer that offers a comprehensive warranty can help installers mitigate the effect and costs of unforeseen repairs on their customers.

Another key consideration for installers seeking to support customers in reconciling safety with efficiency is the energy consumption of the emergency lighting system in question. A system that requires more electricity to operate will end up costing considerably more over its lifetime than one that consumes less.

In addition, organisations operating in rural, or emerging economic areas, may find themselves vulnerable to brown-outs when mains electricity is significantly curtailed for at least part of the day, relying on personal generators to mitigate the economic impact. In such circumstances, systems that consume a lot of electricity will be a considerable drain, impacting on the performance of other equipment in the building.

With these considerations in mind, installers should look carefully at the energy efficiency ratings of the emergency lighting systems they intend to install for customers. There are emergency lighting



- Emergency lighting is a vital life safety feature in any development.
- Emergency lighting solutions must fall within the requirements of key international standards.
- Installers of an emergency lighting system must consider the maintenance requirements of the system over its lifetime.

take note

solutions that incorporate low-voltage cabling and energy-efficient light emitting diodes (LEDs), which together consume less electricity than standard lighting.

Some surveys suggest an energy reduction of up to 95 % utilising luminaires featuring LED technology compared to those with standard fluorescent tubes (*Based on a maintained system of 100 LED luminaires compared to 100 traditional fluorescent tube light fittings). Using new technology such as this can go a long way towards reducing operating costs and minimising the organisation's reliance on mains electricity.

Online efficiency calculator

There is plenty of help available to installers to enable them to select emergency lighting solutions that meet the particular needs of their customer's building and its occupants while also optimising efficiency.

For example, Hochiki Europe, has developed an online Efficiency Calculator to support installers in accurately assessing an organisation's existing equipment.

The tool quizzes users on performance status of the building's current fire detection or emergency lighting technology, as well as providing guidance on methods of improving it to both maximise efficiency and uphold regulatory compliance.

Many fire safety system manufacturers provide Continuing Professional Development (CPD) training programmes for installers to give them the knowledge and skills they need to fit emergency lighting equipment to the latest international standards. A number also have technical experts on hand to offer guidance when designing the most suitable lighting solution for the safety and efficiency needs of the building in question, as well as meeting local legislative requirements. Taking advantage of this help can enable installers to support organisations in protecting the well-being of their building's occupants as efficiently as possible. Having emergency lighting installed across their buildings is crucial for organisations to ensure compliance with South African fire safety regulations, as well as legislation in a growing number of countries across Africa.

Conclusion

However, there is no 'one-size-fits-all' emergency lighting solution. Each building has its own particular safety and design needs that must be taken into consideration by installers to ensure they choose the most appropriate technology for their customers. Installers should talk to their life safety experts to ensure they get the support and guidance they need to choose the right emergency lighting technology for their customers. Doing so, they will ensure they provide optimum safety for customers' building occupants, while also maximising the efficiency of their emergency lighting equipment.

References

- [1] National Building Regulations and Building Standards Act, South Africa, 1977: http://www.thedti.gov.za/business_regulation/acts/building_standards_act.pdf
- [2] BS 5266. Series. Fire Industry Association standards.
- [3] BS 5839. Series. Automatic fire detection systems.



Robert Head joined Hochiki Europe over ten years ago as part of the Technical Support Team providing first line support and product training to customers both in the UK and overseas. During his time as a technical support engineer Robert gained a detailed understanding of life safety systems and qualified in design, installation and commissioning for both BS 5839 [3] and BS 5266 [2]. His knowledge of Hochiki Europe's customer base enabled a natural progression into sales and for over the last three years Robert has managed its growing business across the African continent. Enquiries: Visit www.hochikieurope.com

Specialised turnkey lighting project at data centre

ACTOM Electrical Products, the ACTOM group's distribution arm which incorporates a specialised lighting business unit, recently completed a turnkey lighting project for South Africa's leading cellular network Vodacom for its Data Centre in Midrand, Gauteng, involving designing and providing energy-efficient lighting systems for the interior illumination of the building. The project, overseen by Taemane Consulting Engineers, Vodacom's consulting electrical engineers, was executed by ACTOM Electrical Products' lighting business unit from November 2013 to July 2014.

The lighting design technologies applied on the project comprise:

- A custom-designed and fabricated stainless steel suspended light fixture supporting four large edge-lit linear LED luminaires to illuminate the main reception area. It is coupled to a daylight harvesting system designed to automatically dim the artificial illumination during the day when the area is sufficiently lit by natural light. The luminaires' on-board photocell sensor continuously measures the ambient light levels and automatically ramps up its light output to supplement the natural light if a drop in the pre-set ambient illumination level is detected due to overcast conditions and automatically ramps up to its full capacity at night
- The Data Centres occupy an open plan area (White Space), but each Data Centre hall requires individual concentrated lighting according to occupancy and is therefore illuminated by high efficiency T5 linear fluorescent recessed luminaires individually equipped with passive infrared occupancy sensors allowing for accurate lighting control and switching within tight parameters
- The passages serving the Data Centres are illuminated by high performance IP 65 rated linear fluorescent luminaires equipped with electronic control gear coupled to high efficiency 45 W T5 lamps and employing a corridor dimming function – as opposed to the on/off switching that applies in the occupancy/non-occupancy applications – and control coupled to strategically placed sensors
- High efficiency LED luminaires illuminate the offices

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email neil.van-blerek@actom.co.za*



William Blackbeard (left) and Neil van Blerk in one of Vodacom's new data centre halls, which are illuminated by recessed high performance T5 light fittings, controlled by individually fitted passive infrared occupancy sensors.

NF 72 LED
Circuit watts 190 at 81 amp, 230v
60000hr life expectancy, L90 rating
Ambient Working Temperature 35°C

NBG 32 LED
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Overhead line analysis and measurement with a smartphone or tablet

By C Rathbone, Linesmarts Ltd

Many of the design resources which are taken for granted in the transmission industry are unavailable, cost prohibitive or impractical for use on distribution lines. For many distribution utilities the feasibility of generally adopting a detailed approach to design will hinge on the availability of practical alternatives.

LineSmarts is an app for Android smartphones and tablets that enables remote field analysis and measurement of overhead power lines and structures. It takes advantage of the emerging ubiquity of smart device technology to deliver a tool for overhead line assessment, which can be accessible to anyone. LineSmarts supports the following direct measurements for overhead line assets:

- Span length
- Conductor tension, catenary constant and attachment loads
- Conductor sag
- Pole lean
- Structure horizontal and vertical dimensions (including pole height, pole diameter, hardware and equipment dimensions)

LineSmarts also supports a range of analyses based on user defined load case scenarios. The app is able to report individual load case and maximum summary results for:

- Conductor tension, catenary constant and attachment loads
- Conductor utilisation
- Conductor sag
- Conductor blow-out

Process

The LineSmarts measurement process works by firstly capturing a photo of the overhead line being assessed and then asking the user to enter distance information for the power line supports contained in the image. From that point the user can immediately process the results or move on to another measurement and process the results later.

The photograph and the distance inputs are combined with information from device sensors to understand how to scale measurements from the image. Users identify defining points on the image through the device touch screen interface to perform the measurements. For example, to measure pole lean or height, points are selected at the top and bottom of the pole. From this information the measurement

and analysis results are automatically processed and displayed. The development of LineSmarts pioneers a brand new method of overhead line measurement. This method has been made possible through the advent of the modern smart device and the systems that have evolved in support. LineSmarts relies on the processing capability, high definition touch display, GPS, accelerometers, gyroscopes, compass, internet connection and the camera all being integrated into the one device.

Smart device

By using a smart device as its platform, LineSmarts is able to take advantage of the innate strengths of these devices. Measurements made by LineSmarts are recorded digitally and so can be readily copied and communicated using the various available electronic communication channels. The ability to digitally communicate results generally facilitates potential improvements to efficiency and information integrity. Ultimately it provides an opportunity to directly export results to corporate systems and databases. Other advantages of the smart device platform mean that LineSmarts can be easily accessible to a broad range of users. Smart devices are made to be affordable, richly featured, of good quality and user friendly for the highly competitive, volume driven, consumer market to which they are targeted. This is in stark contrast with tools specifically made for the electricity sector, which are relatively low volume, specialist and expensive.

For smart phones especially, the platform offers the advantage of always being to hand. The result is that measurements can be made where they otherwise would not be, or might require a repeat site visit to perform. Smart devices also offer software distribution advantages. Apps can be easily found, downloaded and automatically updated via the Google Play store. This means that tools hosted on smart phone devices can be continually improved, in many cases without any action being taken by the user.



Measurement and analysis

Utilising remotely captured images as a basis for measurement and analysis yields improvements to safety and efficiency, and potentially can reduce landowner disruption. The technique avoids operation at heights, operation in the vicinity of electrified wires, the operation of heavy equipment or proximity to or disturbance of mechanically loaded assets. In some cases the technique may be used as a substitute for methods which would otherwise require an outage to be taken. Typically measurements can be completed within minutes of arriving on site and in some cases will allow entry to private property to be avoided.

Immediacy

Results can be viewed immediately in the field without requirement for post-processing or additional analysis. Generally assessments can be made from a single image. This means that an image captured on LineSmarts can be returned to repeatedly for new measurements without having to revisit the site.

Calibration requirements

Like any measurement tool, LineSmarts is subject to calibration requirements and its level of accuracy and precision can change as a function of host device qualities, measurement type and the specific situation in which it is used. For some smart devices users may need to perform a one-time calibration before LineSmarts will return accurate results. Detailed information on calibration and factors that influence LineSmarts accuracy are provided on the LineSmarts website.





By using a smart device as its platform, LineSmarts is able to take advantage of the innate strengths of these devices.

Advantages

Many of LineSmarts' features provide significant advantages over equivalent conventional measurement techniques. However, the effect can be greater than the simple increase in efficiency, safety or convenience. These advantages can change the result of value judgements made to determine whether a measurement or analysis is worth the effort. For some organisations LineSmarts may reduce the effort required to perform a measurement or analysis, below the potential for derived benefit. This could therefore make it possible to justify increasing the rigour and quality of engineering practice. For many distribution organisations, not measuring tension is an example of a pragmatic judgement to accept a reduced level of quality control or information rather than incur the cost of measurement. Especially at the lower voltages it can be common practice to install conductor without measuring tension, or only measuring tensions from the pulling end. Similarly in line design it is not uncommon for designers to assume installed tension based on estimates or historic records. The validity of any design or assessment is predicated on the accuracy of the information on which it is based. Therefore the cost of such assumptions can be the expensive and unnecessary replacement of structures, or non-conservative design outcomes. In the past, these risks have been offset by the significant cost and inconvenience of measuring overhead line tension.

If dramatic reductions are made to the cost and time required to capture tension measurements, it should lead to an increased practice of measuring tension. Assessment of how line tensions change is another area where opportunities offered by LineSmarts may facilitate an improvement in engineering practice. These assessments are performed to identify vulnerability of conductor systems to vibration, mechanical overloading and clearance encroachments. LineSmarts is able to use its conductor measurements as a basis from which to automatically assess tension under a set of user defined load cases. The resulting tensions are able to be automatically compared against vibration and mechanical load thresholds to report the utilisation percentage.

Likewise, calculation of site specific tensions under design load case scenarios enables assessment of conductor sag variation. Many utilities measure conductor ground clearances to ensure that their statutory ground clearance requirements are maintained, without having the means to determine the extent to which the conductor is

likely to sag beyond its surveyed position. This means that utilities are at risk of not identifying clearance encroachments, applying inadequate treatments to low spans or, conservatively identifying spans as having encroachments when they do not. LineSmarts provides a viable method of determining site specific potential for sag change. Leaning poles indicate potential footing issues, and therefore risk, which tools like LineSmarts can be used to systematically monitor and manage. If pole verticality is measured, subsequent pole lean can be identified. Preferably the verticality should be assessed immediately after a pole has been installed. Routinely monitoring pole lean as part of a periodic condition assessment programme can assist with identifying lean, quantitatively tracking rate of lean or establishing whether poles have stabilised.

Conclusion

These are some examples of activities where LineSmarts has reduced the associated effort to an extent that organisations might reasonably consider increasing the level of engineering rigour they apply. These increases to engineering rigour may take the form of additional one-off measurements and analyses, through to the systematic incorporation of new or improved assessments into a general asset inspection programme.

Reference

[1] AS/NZS7000. 2010. Overhead line design. Detailed procedures.

Some background

The need for a tool like LineSmarts became apparent to its creators following the 2010 publication of AS/NZS7000 [1], the Australia and New Zealand Overhead line design standard. AS/NZS7000 [1] is a limit state standard that specifies a level of rigour for distribution design which, prior to its publication, had largely been reserved for transmission line design.

Many of the design resources which are taken for granted in the transmission industry, such as LIDAR, finite element

[continued >](#)



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- An app – that enables measurement and analysis of overhead power lines and structures from a safe distance – has been developed.
- This is a viable method of determining site specific tension, and potential for tension change, on overhead lines.
- LineSmarts uses a brand new overhead line measurement method, made possible by modern smart phones and tablets.



Some background ...continued >

modelling software, site specific soil investigations and skilled professional engineers are unavailable, cost prohibitive or otherwise impractical for use on distribution lines. It was realised that for AS/NZS7000 [1] to be fully implemented on distribution networks, practical alternatives would be required for:

- Line design (software)
- Line route survey
- Soil investigation
- Footing design
- Tension measurement
- Technical engineers

LineSmarts was conceived of in the first instance as a practical and efficient method to fill the tension measurement requirement. However it was quickly realised that it could be developed as a tool to assist with aspects of line design, line survey and technical engineering assessment. Perhaps the most significant gap exposed by the introduction of AS/NZS7000 was a general absence of engineering capacity in the distribution sector with which to implement the standard.

The big organisations originally required to build the electricity network in New Zealand had largely completed the task by the early 1970s. The installed networks remained relatively new and so a comparatively inactive period persisted in the industry for the next few decades. The consequence of this was that the large utility design offices that had once existed dwindled, in many cases to nothing. Utility internal design capability was cut to basic functionality and remaining structural engineering requirements were largely outsourced to consultants, who in many cases only serviced the industry on a part time basis. This is a pattern familiar to many countries.

When AS/NZS7000 [1] was introduced, the majority of New Zealand distribution designs were non-technical or developed in accordance with legacy design systems and standards. A large proportion of design work, especially at the lower voltages, was being undertaken by experienced, but non-technical staff, who did not have the skills, systems or equipment required to assimilate the new standard into their established design processes.

Non-technical design involves specification of design based on rules of thumb and the experience of the designers, who frequently have a field background. The advantage of this approach is that the designers are able to efficiently create practical designs.

By inspection, insufficient numbers of technical engineers are available within New Zealand's electricity industry to expand current detailed design activities to cover all distribution design activity. Nor would that necessarily be a good solution if it were an option. It would be relatively inefficient and risk losing the qualities that experience based designers bring to design. It was recognised that an alternative solution might be to develop tools that could be used by existing designers to complement their practical skills and demonstrate design compliance with AS/NZS7000. That alternative solution has been pursued, with various tools and systems being developed.

LineSmarts is one such tool. It allows non-technical operators to perform various measurements and certain engineering analyses. It takes calculations which were formerly the domain of engineers with expensive desktop computer modelling packages and allows them to be performed in the field with greater efficiency and accuracy. This empowers existing non-technical designers to apply rigour to technically complex assessments while relieving them of the need to become involved in the technical detail.

With further development the range of engineering assessments that can be performed using LineSmarts can be extended. One of the challenges, as increasingly sophisticated analyses are added to LineSmarts, is to keep the tool efficient, simple and accessible for non-technical users. Ultimately LineSmarts could be developed for non-technical designers to validate their structure and line designs. This would make it possible to have the consistency associated with design to a standard, without losing the efficiency and practical input of field based designers, while freeing up technical engineers to perform more complex tasks.

LineSmarts developers aspire to contribute a technology based solution to address the industry challenge of increasing engineering requirements of standards, at a time of constrained structural and mechanical engineering resource.



Carl Rathbone graduated from the University of Canterbury in 2002 with a degree in civil/structural engineering. He has worked in the electricity industry since, spending approximately equal amounts of time working in the UK, Australia and New Zealand, specialising in the design and asset management of Transmission and Distribution overhead lines. Carl is an active member of the Standards Australia/Standards New Zealand Committee EL-052. He is a Chartered Professional Civil/Structural Engineer and currently works for PowerNet Ltd as a Senior Lines and Structures Engineer. Carl recently co-founded LineSmarts Ltd to develop overhead line engineering software solutions. Enquiries: Email carl@linesmarts.com

BEES – Building Environmental and Economic Sustainability
 IEC – International Electrotechnical Commission
 IEEE – Institute of Electrical and Electronic Engineers
 TUK – Thermally Upgraded Kraft

Abbreviations/Acronyms

Natural esters: Redefining transformers

Byline: By DS Roesser, K Rapp, J Luksich, CP McShane, A Sbravati, CM Tanger, Cargill

Natural ester dielectric fluids are increasingly being designed into transformers globally for one of three reasons – fire safety, environmental safety and insulation life extension.

Backed by thousands of transformers on multiple continents and the recent publication of international standards, the life extension capability has been ‘inverted’, due to the transformer cost efficiencies enabled by designing high temperature insulation systems. Without degrading life expectations, smaller, optimised transformer designs are of keen interest to utilities globally.

Upper operating temperature limit

The standards, IEEE C57.154 [1] ‘Standard for the design, testing and application of liquid-immersed distribution, power and regulating transformers using high-temperature insulation systems’, and a similar IEC standard currently under development, sets the upper operating temperature limit of transformers designed with natural esters (Envirotemp FR3 fluid) and Thermally Upgraded Kraft (TUK) paper at 130 °C without adversely impacting transformer life.

Compared to mineral oil, Envirotemp FR3 fluid enables longer lasting transformer insulation systems, improved temperature management during peak energy demand periods, and construction in a more compact design.

The science behind this powerful capability is the way in which natural esters like Envirotemp FR3 fluid interact with water. Natural esters like Envirotemp FR3 fluid have significantly higher water saturation limits compared to conventional transformer liquids. In a transformer system, the solid cellulose insulation is the limiting factor for transformer life and must work in harmony with the fluid. The higher water saturation limits of natural esters, coupled with their ability to remove water, provide conditions that allow higher operating temperatures.

For natural esters, higher operating temperatures are not a problem for safety, since their flash and fire point temperatures are two

times higher than conventional transformer oils. Furthermore, natural esters are considered self-extinguishing Class K fluids. Utilising this technology means a shift in conventional wisdom for the transformer industry. If asked for the keys to maintaining optimal transformer life, many industry professionals would reply by saying ‘keep them dry and cool’. However, natural esters turn these constraints upside down. Thousands of Envirotemp FR3 fluid filled transformers designed to fully utilise this enhanced insulation system capability are currently energised on multiple continents, because of cost effectiveness and risk reduction. Along with optimised transformer designs, Envirotemp FR3 fluid provides improved fire safety (no reported incidences since the product launched more than a decade ago) and best-in-class environmental properties.

Envirotemp FR3 fluid is currently applied in over 500 000 new and existing transformers across six continents.

Improved environmental impact

Higher temperature transformer designs using the combination of cellulose insulation materials and natural ester fluids as described in the above standards have reduced environmental impact. Envirotemp FR3 fluid is biobased, renewable, ultimately biodegradable, nontoxic, non-hazardous, and essentially carbon neutral (according to Building Environmental and Economic Sustainability (BEES) lifecycle analysis). By taking advantage of higher temperature insulation system designs, compact natural ester filled transformers can be constructed with less

fluid and less solid construction materials. Reduced material usage enables the conservation of resources and provides a more-effective, efficiently designed transformer with improved environmental and fire safety. Envirotemp FR3 fluid-filled transformers provide both improved thermal performance and significant environmental benefits.

Fluid history and benefits

Envirotemp FR3 fluid was developed two decades ago, and was released to the industry in 1998. It was designed to help customers achieve higher levels of fire safety, performance, and reliability, while keeping costs and liability down.

Today, dozens of utilities and corporations throughout Australia and New Zealand, and hundreds of utilities around the world, use the product over traditional mineral oil because of its tested and proven environmental and performance benefits. Envirotemp FR3 fluid is a biobased product consisting primarily of vegetable oil, and is classified as non-toxic, ultimately biodegradable, and essentially carbon neutral. The environmental and health profile of Envirotemp FR3 fluid is unmatched by any other dielectric coolant.

Conclusion

Cargill, which has been Cooper Power Systems' exclusive production partner since 2004, purchased the global Envirotemp FR3 fluid brand from Cooper, in June, 2012. Cargill is utilising its global footprint to increase the global production of the fluid via the development of regional operations, to meet increasing demand.

Envirotemp FR3 fluid is currently applied in over 500 000 new and existing transformers across six continents. Envirotemp FR3 fluid is available to all distribution, transmission, and power transformer manufacturers. Envirotemp FR3 fluid is also used in retro fill applications for existing transformers and other fluid-filled distribution and power equipment.

- Compared to mineral oil, Envirotemp FR3 fluid enables longer lasting transformer insulation systems.
- Envirotemp FR3 fluid has improved temperature management during peak energy demand.
- The science behind this capability is the way in which natural esters like Envirotemp FR3 fluid interact with water.



take note

Reference

- [1] IEEE C57.154. 2012. Standard for the design, testing, and application of liquid-immersed distribution, power, and regulating transformers using high-temperature insulation systems and operating at elevated temperatures.

Envirotemp FR3 fluid enables a new class of transformer – smaller, safer, and more reliable – while better protecting the environment. Across the globe, bio-based Envirotemp FR3 fluid dielectric coolant is improving overall equipment and bottom line performance. Learn how you can improve transformer capacity by as much as 20 %, and provide the highest level of fire resistance, with reduced carbon emissions.

Dave S Roesser PhD is the global general manager (dielectric fluids) for Cargill's Industrial Specialties business unit.

Kevin J Rapp is a senior chemist at Cargill.

John Luksich is a principal engineer at Cargill Inc – his focus being on natural and synthetic ester dielectric fluids.

C Patrick McShane is the global technology consultant on dielectric fluids for Cargill.

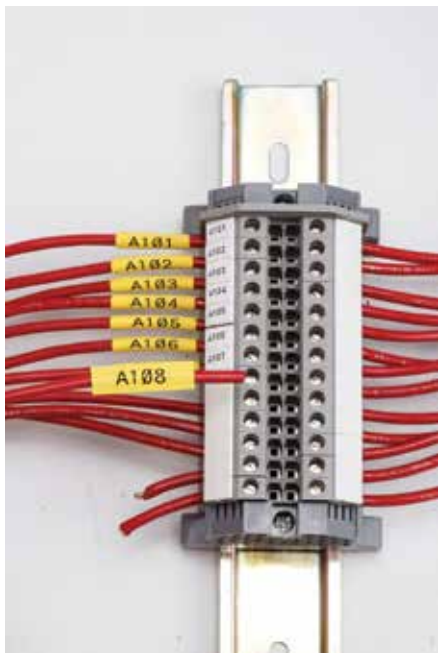
Alan Sbravati graduated from the University of Campinas as a mechanical engineer.

Charles Tanger is a principal chemist with Cargill Industrial Specialties, focused on technical and plant support for dielectric fluids and bio-based polyols.

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Identify any cable or component

Wrap around labels in multiple colours equipped with a quality adhesive are the most popular solution to professionally identify cables and wires. Your identifying text or code can be printed multiple times on each label, enabling 360° information visibility. Very often self-laminating wrap around labels are used for extra durability and legibility. **Brady** offers self-laminating



labels and wrap arounds in great colour variety, both die-cut and on continuous rolls, all of them printable on location with a Brady Mobile Printer.

Sleeves are a relocatable identification solution with strong durability and staying power. Slide them over a cable before termination. After cable termination, slide the sleeves into position and heat shrink to fix them into place. Any Brady Mobile Printer can print a selection of quality sleeves in various colours that are halogen-free, diesel resistant or high temperature resistant to suit specific requirements and standards. Brady also provides on-site printable identification solutions for components, like the Engraved Plate Replacement Label, which is made out of polyethylene foam and laminated polyester. It offers a raised profile similar to an engraved plate, but at a much lower cost and greatly increased flexibility.

There are many ways to source the identification solutions you need, but the most flexible way is to print your own labels on-site and on demand. Modern portable label printers, such as the BMP21-PLUS and BMP41 Label Printer, or the BMP51 and BMP53 Label Maker, auto-calibrate so you can easily call on their entire versatile label range, including continuous labels and die-cuts, to identify any cable or component with great ease.

*Enquiries: Tom Van de Putte.
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Course to address network convergence challenges

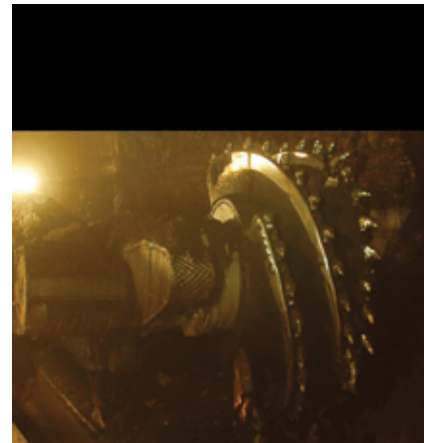
The demand for skilled professionals who understand the exchange between information technology (IT) and operations technology (OT) is increasing as the industrial plant floor and corporate enterprise become more connected. In response, **Rockwell Automation**, in collaboration with Strategic Alliance partner **Cisco**, has launched a new training course to help IT and OT professionals overcome the challenges of converging their network technologies. The new training helps candidates prepare for the recently introduced Cisco Industrial Networking Specialist certification.

The hands-on, lab-based course Managing Industrial Networks with Cisco Networking Technologies (IMINS) provides the foundational skills needed to manage and administer networked, industrial control systems. The first-of-its-kind course is designed to help control system and traditional network engineers in manufacturing, process control, and oil and gas environments to better understand the networking technologies required to enable a connected enterprise for more profitable, real-time decision making.

Students will get hands-on experience working on the Rockwell Automation suite of products to help converge technologies and bring the value of the connected enterprise to life.

Enquiries: Michelle Junius. Tel. 011 654 9700 or email mjunius@ra.rockwell.com

*IMINIS will be held from 25 to 29 May and 17 to 21 August 2015 at
Rockwell Automation's offices in Midrand, Johannesburg.*



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Effective operation with electronic logbooks

Capturing log entries electronically minimises shift handover risk, improves task management, and facilitates collaboration. **Emerson Process Management's** Logbooks enables operators to electronically document activity records to streamline shift changes, drive operator action, and accelerate decision-making. A consistent approach to operator logs supports safety improvement efforts as well as audits and corrective action processes. Shift handover can be a risky time for a plant; poor communication can quickly result in process upsets. Logbooks deliver a shift change dashboard that includes a shift summary and detailed information on assigned tasks. Operators can identify priorities for the new shift and access documentation of events from the previous shift, ensuring quality, safety, and throughput are protected. The consolidated graphical view makes it easy to provide complete, accurate information to customers and auditors. Automating



task management ensures work is not overlooked or incomplete. With the ability to schedule tasks now, later, or on a recurring basis, management can be confident that critical tasks are prioritized and important – but non-urgent – tasks like training, reviews, and routine maintenance are completed and documented. Tasks are visible on the shift dashboard, so operators can easily determine criticality and plan work.

Enquiries: Michael Eksteen. Tel. 011 451 3700 or email: Michael.Eksteen@Emerson.com



Product offering extends – now includes LV and MV applications

Shaw Controls, a company within the **Zest WEG Group**, has extended its product offering to encompass low voltage (LV) and medium voltage (MV) applications. It manufactures switchboard panels and control systems from 24 V up to 36 000 V (36 kV) for the industrial, mining and infrastructure sectors. "Shaw Controls offers a complete product line from MV switchgear to LV withdrawable Motor Control Centres (MCCs)," Valter Luiz Knih, group automation and systems director, says. These locally manufactured products are independently certified in accordance with the IEC 62271-200 and IEC 61439-1/2 standards. According to IEC specifications, LV covers applications up to 690 V, while the MV range is from 1 kV up to 52 kV. In addition, Shaw Controls has recently received ISO 9001 accreditation from Bureau Veritas. LV switchboard panels range from SC 100, SC 200 to SC 300 models, which can be configured for various applications at different fault levels and current ratings. This gives Shaw Controls the flexibility to be able to offer fit-for-purpose solutions. A recent addition to the Shaw Controls product range is the CCM 03 ZA withdrawable MCC which is an already well-established product of WEG Brazil. This highly successful MCC solution will now be manufactured in South Africa. All products include both a mechanical and electrical interlock system to ensure maximum

safety, while the construction itself is robust. Switchgear panels are manufactured in bent steel profiles and enclosed on all sides by steel plating. Over-pressure relief devices in the top provide for pressure relief in the event of internal arc. Shield-type MV switchgear have metal divisions separating the compartments. The general busbar configuration comprises one or more rectangular bars, manufactured from electrolytic copper with tin-plated fittings. The LV compartment is located in the upper front part, which houses the measuring instruments, protection relay, terminals, thermostats and contacts. This is completely isolated from the MV via a steel plate, with its own closable door.

Enquiries: Kirsten Larkan. Tel. 011 723 6000 or email kirstenl@zest.co.za



High scoring mobile app development platform

OutSystems, the enterprise Rapid Application Delivery (RAD) platform provider, today announced that industry analyst firm Ovum has named OutSystems Platform as a market leader in the 2015 Ovum Decision Matrix for Mobile Application Development Platforms (MADP). OutSystems scored exceptionally high in areas of feature coverage, execution and revenue growth. "Ovum is impressed with OutSystems because of the complete end-to-end nature of their solution for the rapid development and delivery of mobile and web applications," said Michael Azoff, Principal Analyst, IT Infrastructure Solutions for Ovum. "Its enterprise-grade features and functionality cover the entire mobile app lifecycle, in addition to providing a complete platform for delivering custom applications across all devices." OutSystems chief executive officer, Paulo Rosado is pleased that Ovum has recognised OutSystems as a market leader and anticipates that this research will help organisations around the world more confidently consider and evaluate MADP solutions that meet their mobile and web application delivery needs.

"Everyday, we witness firsthand how positively and enthusiastically business decision makers and the development community continue to benefit from the power and flexibility of our platform for creating and managing solutions to meet the demands of today's mobile customer," he explains. In outlining the strengths of OutSystems Platform, Ovum identified some particular areas in which the solution excelled. Among these is the fact that OutSystems Platform has been designed as a single solution with features covering the entire mobile app lifecycle and does not require any add-ons, as compared to many others in its category. **OutSystems South Africa** director Craig Terblanche says OutSystems provides its users with a choice of hosting apps created using OutSystems Platform in the public cloud, the customer's private cloud, and/or on-premises, without any differing price considerations. Finally, the report points out that OutSystems provides excellent and robust security and performance management support by offering a range of authentication types, comprehensive data protection features, code-related security support and app security monitoring.

Enquiries: Alexa Terblanche. Tel. 011 784 4418 or email alexa.terblanche@outsystems.co.za

Low smoke zero halogen sleeve

Brady has launched a durable and compliant Low Smoke Zero Halogen Sleeve to identify wires and cables and to protect people in closed environments during a fire. "Our Low Smoke Zero Halogen Sleeve passes EU and UK norms for smoke and toxic gas emission and is therefore useful to identify cables and wires in mass transit passenger vehicles or in public places", says Mario Van Bever, global product manager materials Wire ID at Brady Corporation. In enclosed spaces, where it is difficult for people to evacuate, smoke and toxicity are often more lethal than the fire itself. "It is difficult for people to evacuate quickly in closed environments. To reduce the risk of toxic smoke poisoning during a fire in these spaces, it is necessary to limit the release of smoke with toxic substances. We have created a very durable wire and cable identification sleeve that will offer new options to railway manufacturers, and suppliers working with similar conditions, to increase passenger safety."

Enquiries: Email emea_request@bradycorp.com



For part detection in stamping and machining centres



Banner Engineering introduces the Q3X laser contrast sensor. With the ability to detect up to 2 000 events per second, the Q3X provides high-speed, reliable detection of parts, tools, pallets or registration marks with small contrast differences. The Q3X has a small laser spot and is an excellent sensor for reliable part presence, tool-in-place or broken tool detection in stamping and machining centres. Featuring speeds as fast as 250 µs and a sensing range up to 300 mm, the Q3X is ideal for high-speed packaging and detection applications of small targets, such as registration marks on packaging, or verifying placement of black gaskets and O-rings on machined metal parts. "The Q3X was designed for precise detection in harsh environments," said Dennis Smith, technical marketing manager at Banner Engineering. "The bright laser spot and digital read-out allow machine builders to quickly set up the sensor for their application. The metal housing and robust construction means it will survive in their application." Featuring a unique angled, three-digit display of signal intensity, the Q3X provides high visibility of operating conditions from multiple angles. For an intuitive user setup, the Q3X has two tactile buttons conveniently located below the display. Designed with robust nickel-plated zinc die cast housing, the Q3X provides superior performance, even in environments with exposure to cutting fluids and oils. Sensors are also rated to IP67, IP68 and IP69K for enhanced protection to water submergence and high-pressure wash down.

Enquiries: RET Automation Controls. Tel. 011 453 2468. Visit www.retautomation.com

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The current wave of power outages in South Africa means that your transformer is working harder than ever, which could accelerate ageing. Serious damage to a transformer could spell disaster - involving costly repairs or replacement of the whole unit. Not to mention lost process time. And think of the environmental impact, should your transformer explode or catch fire.

- Transformers have a degradable paper core that needs to be monitored via furanic analysis.
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- Contamination of transformer oil by water or dirt needs to be closely monitored as contaminants may cause grave transformer problems.
- Environmentally, transformers should be tested and retested every time oil is cleaned or changed to monitor cross-contamination and ensure it is PCB-free.

WearCheck also offers a sampling/thermography service.

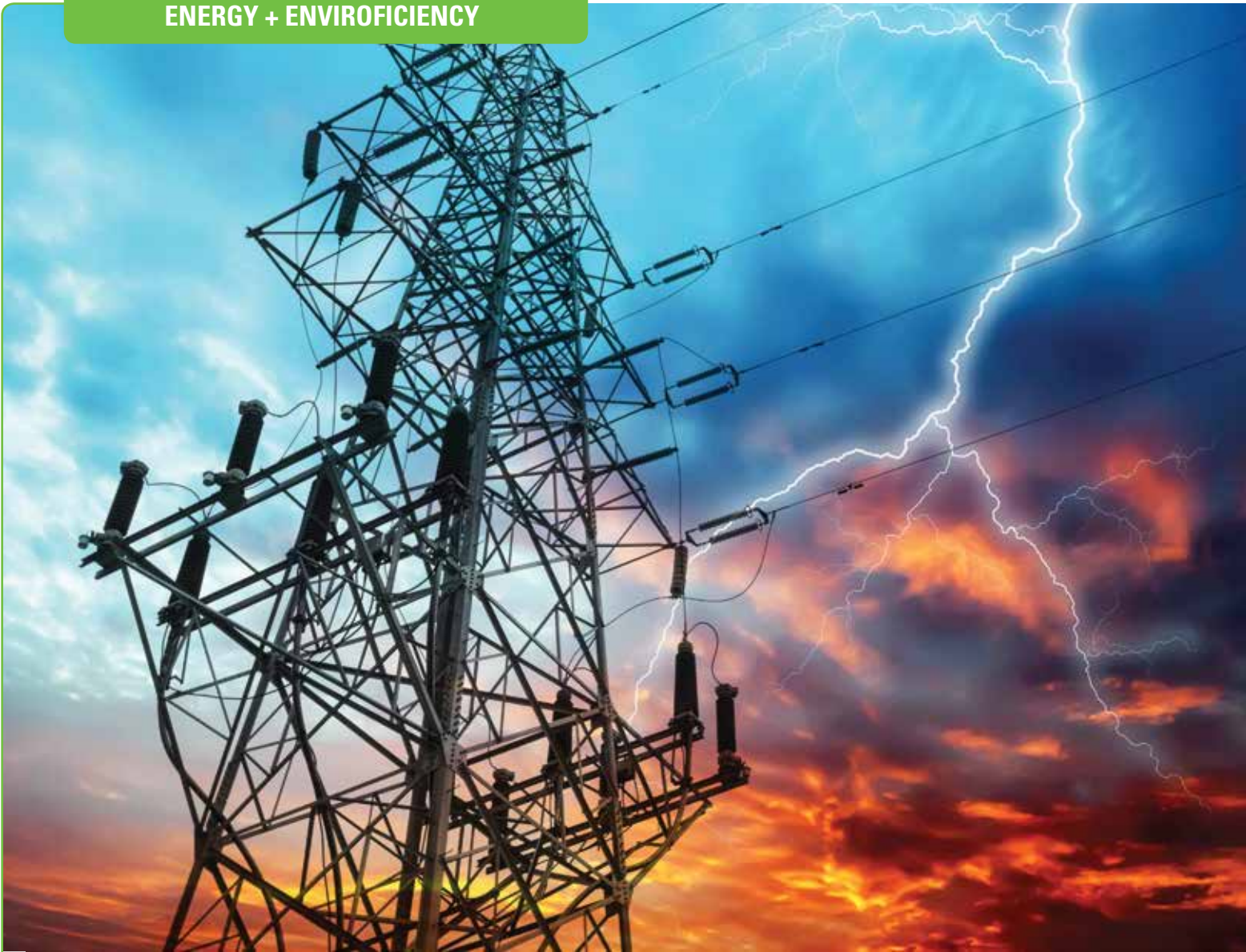
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THE LEADER
IN OIL ANALYSIS

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Instant data management enables smart grids to **maximise** power distribution efficiency

By W Warren, RAIMA

There are multiple pressures on the power supply network. More people are using it, established customers are consuming more electricity, and the pressure to reduce carbon emissions from power generation is increasing.

Part of the solution to this dilemma will lie in developing smart grids that provide better husbanding of the available power – metering it more precisely, reducing transmission losses and encouraging more sustainable practices by consumers. A key characteristic of a smart grid is the efficient and timely use of operational data to constantly match supply to demand.

In recent decades developing countries have wanted to extend their electrical distribution networks to new population centres and industrial bases. In many cases they have not been in a position to increase their generating capacity quickly enough, so have looked to develop ‘smart grids’, which make best use of the power available. The developed nations are also looking to smart grids, although it

ACID	– Atomicity, Consistency, Isolation and Durability
BPL	– Broadband over Power Lines
DBMS	– Database Management System
RDM	– Raima Database Manager

Abbreviations /Acronyms

is to meet growing demand from existing users. The alternative is to add generators to the network, but capital outlay and increased emissions are hard to justify.

Further, there is increasing concern about global warming, and smart grids make better use of available power. Smart grids are also attractive in relation to renewable power sources, which are variable in output and tend to lead to a complex network architecture, based on many small-to-medium power sources, rather than a few large power stations.

A smart grid uses data collection and computer technologies to gather information about consumption by individual consumers, interpret it and optimise operations to match the ever-changing patterns of demand.

Electric utilities are transforming their grids by improving and renewing infrastructure, while simultaneously adding the intelligent digital technology, which includes automatic meter reading.

For instance, smart meters use continuous communications to provide real-time monitoring, so that they can determine how demand from individual users varies over time – and predict future needs. Often the data is transmitted as broadband over power lines (BPL), although other systems use wireless technologies, such as mesh networking.

Developed nations are looking to smart grids to meet the growing demand from existing users.

The amount of data that needs to be collected is enormous and it has to be analysed instantly as well as being stored for reference and reuse. Quite simply, this could not be done manually, so high-performance database technologies need to be married with automated metering and other supporting technologies.

A state-of-the-art high-performance database management system, such as the Raima Database Manager (RDM), can be configured to precisely match the needs of any grid. Multiple databases can be embedded into the grid to provide local real-time control.

RDM is an ACID-(atomicity, consistency, isolation and durability) compliant database management system (DBMS). Its multi-core processors can be distributed about the grid, yet work together to max-

imise the use of available memory capacity. Its speed of processing is almost instantaneous, because it uses on-chip data storage; however, it also instantly transfers data to disk for secure long-term storage.

- A key characteristic of a smart grid is the efficient and timely use of operational data to constantly match supply to demand.
- Electric utilities are transforming their grids by improving and renewing infrastructure while simultaneously adding intelligent digital technology.
- A state-of-the-art high-performance database management system can be configured to precisely match the needs of any grid.



take note

Conclusion

If smart grids are to achieve their full potential, efficient data handling is a prerequisite. Raima's RDM data management technology is proven in many demanding fields, such as the control of nuclear facilities, subsea oil well management and worldwide telecommunications networks, and is fast proving its worth in smart grid applications.



Wayne Warren, CTO at Raima, Inc., with Randy Merilatt, left Boeing in 1982 to start the organisation that became Raima. In 1984, Raima released its first commercial product, db_VISTA, which is the predecessor of today's RDM. In the 1990s, Wayne designed and implemented the client/server product now known as RDM Server. In recent years, Wayne has led the effort to modernise the RDM product so that it runs well in multi-core and networked configurations. Wayne earned a MS in Computer Science in 1978 from Colorado State University.

Enquiries: Wayne.warren@raima.com

Light at the end of the tunnel for SA energy crisis

Afrox has been awarded a long-term contract to supply high-purity nitrogen, and liquid petroleum gas (LPG), to the US\$ 565-million Bokpoort CSP Project located approximately 125 km south-east of Upington. Afrox business manager for bulk ASU gases, Carte Lubbe explains that the company is supplying Bokpoort CSP (approximately 125 km south-east of Upington) with a fully-customised turn-key solution unique to the local market. "LPG will be used by the CSP during the start-up phase for melting of salts for the Thermal Energy Storage system, whereby the transfer medium is heated to the point that it transforms from a solid state into a molten state." The Bokpoort CSP will boast

a 50 MWe generating capacity with nine hours of thermal storage once it is fully commissioned by end-2015.

The substantial amount of LPG is, however, only required during the heating phase of the project. As a result, Afrox has designed an innovative modular supply system that will be installed and can be dismantled and removed from site within days, thereby ensuring minimal project disruption.

Lubbe continues: "Following the heating period, the entire LPG supply plant will be removed from site. Similar projects in the past have made use of fixed installations that become redundant after the start-up phase and take up unnecessary space,

while costing a fortune to maintain. Upon service completion, our unique modular plant can be removed by a fleet of dedicated and specialised vehicles in under a week – an unrivalled turnaround time."

Enquiries: Simon Miller. Tel. 011 490 0466 or email simon.miller@afrox.linde.com



Techlyn turns 30

On 1 March 2015 Techlyn (Pty) Ltd turned 30 – the founder is Glyn Craig. The company initially concentrated on manufacturing electronic measurement and control units for OEM customers. This is still an important Part of Techlyn's activities. In the late eighties, the availability of economically priced computer aided draughting programs resulted in a major productivity improvement to the design cycle.

In the nineties, power electronics and mechatronics were added to the product line-up. Initially all components were imported. At present, Techlyn manufactures step motor drives, brushed servo drives and brushless positioning drives locally. In ad-

dition, the company produces its own system controllers. Advanced system controllers, if needed, are sourced from Galil Motion Control in North California, USA. Their controllers can control up to eight axes simultaneously. Together, these components allow Techlyn to function as a system integrator.

Techlyn has a well-equipped mechanical facility which has facilitated the production of special purpose machinery. The photo shows an automated pan and tilt mechanism used for solar research by a university.



Enquiries: Email glyn@techlyn.co.za

When it comes to nuclear disaster, safety really is in numbers

The safety of nuclear plants, as well as the medical management of acute radiation syndrome, could soon be dramatically improved thanks to a new mathematical equation developed by Japan's Nuclear Safety Research Centre. A recent study on the behaviour of nuclear fuels in atomic blasts, published in the Journal of Nuclear Science and Technology (Taylor & Francis), suggests a formula that offers a rigorous yet straightforward way to measure the impact of radioactive emissions on humans. As accurate as complex kinetic calculations, yet devoid of all their numerical intricacies, it promises to be a highly effective tool for the planning of safer nuclear facilities, as well as for the safeguard of individuals.

Yuichi Yamane states that: 'In a criticality accident, the first peak power is useful and important information to estimate the scale of the accident and employees' dose of direct radiation from the fissions in the nuclear fuel.' There is no doubt that the safety of nuclear energy is a highly divisive issue, with the wellbeing of those living in the proximity of atomic plants being at the core of the controversy. Scientists have strived to improve the performances of reactors at critical times and developed a series of complex calculations to analyse them with precision. However, to set the parameters for these computations, a high level of knowledge of nuclear disasters is required. This study aims to develop a measuring

tool neither dependant on China syndrome expertise nor on elaborate arithmetic. 'Such method can make it easy to design shields against radiations and to perform a safety review of fuel facilities, in addition to the planning of evacuation zones', adds the author. While leading scientists have announced that nuclear power is the greenest form of energy, Japan is holding off on reopening its plants in the anniversary of the Fukushima disaster and Germany has recently announced the closer of its reactors by 2020. So what does the future hold for atomic power?

Read the full article online:

<http://www.tandfonline.com/doi/full/10.1080/00223131.2015.1005718>

Egypt's power generation capacity to be massively increased

Siemens and the Egyptian government have reached firm agreements today to build a 4,4 GW combined-cycle power plant and install wind power capacity of 2 GW. Siemens will build a factory in Egypt to manufacture rotor blades for wind turbines, creating up to 1 000 jobs and therefore nearly trebling Siemens' footprint in the country. Including two further Memorandums of Understanding (MoU) which were signed at the event, Egypt's power generation capacity will be massively increased by up to one third mostly by 2020. Under the agreements, Siemens will propose to build additional combined cycle power plants with a capacity of up to 6,6 GW and ten substations for reliable power supply. The agreements were signed at the Egypt Economic Development Conference in Sharm el-Sheikh in the presence of Egypt's Minister of Electricity Shaker al Markabi, Germany's vice chancellor Sigmar Gabriel, and Joe Kaeser, president and chief executive officer of Siemens AG. "Egypt needs a powerful and reliable energy system to support its long-term, sustainable economic development, and experienced partners who understand the specific challenges facing the country", said Joe Kaeser. "Siemens' technology and expertise has been supporting Egypt's growth for more than 150 years, and our track record shows that we deliver what we promise - also in challenging times. We are part of Egypt's society and proud to shape Egypt's future together."

Enquiries: Email Keshin.govender@siemens.com



Annual Renewable Energy Outlook 2014

New analysis from **Frost & Sullivan**, Annual Renewable Energy Outlook 2014, forecasts the global installed capacity of renewable energy to more than double from 1,566 gigawatts (GW) in 2012 to reach 3,203 GW in 2025 at an average annual growth rate of 5,7 %. Solar photovoltaic (PV) technology is expected to account for 33,4 % of total renewable energy capacity additions over the 2012-2025 period. Wind follows closely at 32,7 %, ahead of hydro power at 25,3 %. Other renewable technologies will represent the remaining 8,6 % of capacity additions. However, economic difficulties in many parts of the world are affecting the outlook for renewable energy. In much of the Western world, the weak economic climate has impacted support schemes, which will continue to be the lifeline for many renewable energy installations until grid parity is achieved. For complimentary access to more information on this research, please visit: <http://ow.ly/K6uJ6>.

Rosatom is ready to empower Africa

Rosatom presented an overview of the current trends in the development of nuclear energy as well as the company's vision for South Africa, during the annual Nuclear Africa Conference held on the 18 and 19 March 2015. The renowned annual conference was held at Necsas's Visitors Centre in Pelindaba, North West Province and was intended to develop a positive and proactive approach to the nuclear power planning and implementation process in South Africa, as well as to provide a forum for people to access the entire spectrum of expertise from research and development, to the construction and fabrication of nuclear power assemblies and installations. Speaking at the conference, Rosatom director of the international business department, Nikolay Drozdov noted that there were a number of new developments within the Russian Nuclear Industry. One of these developments is the use of nuclear reactors for desalination purposes, and Rosatom believes this could be part of the solution to combat the ever worsening water crisis in Africa.

Enquiries: Email rcollyer@rosatom.co.za

Eskom tariff increase from 1 April 2015

Eskom confirms that the price increase to be implemented on 1 April 2015 to Eskom direct customers is still 12,69 % and for municipalities will be 14,25 % from 1 July 2015 as approved by the National Energy Regulator of South Africa (Nersa) during November 2014. Eskom's current financial position, as a result of historical non-cost reflective tariffs and the lag in recovery of eligible expenditure, does not afford Eskom's balance sheet the ability to pre-fund further costs that are necessitated by a constrained power system such as short term power purchases from independent power producers and municipal generators and the increased use of open cycle gas turbines. These constraints have necessitated Eskom to explore options for further review of tariff increases for the 2015/16 financial year.

Enquiries: Email MediaDesk@eskom.co.za



Bizz Buzz

Schneider Electric's chief executive officer champions gender equality

Since 2013, each WEPs Annual Event has included the announcement of the WEPs CEO Leadership Awards, saluting five exceptional chief executive officers for championing gender equality and the 7 WEPs Principles, in particular Principle One, which urges these leaders to lead by example. Jean-Pascal Tricoire, chairman and chief executive officer at Schneider Electric, was awarded one of the five Awards for his demonstrated commitment to and implementation of policies that advance and empower women in the workplace, marketplace and community. The 2015 Business Case for Action Award recognised **Schneider Electric's** for its Diversity and Inclusion policy, which prioritises communicating the business case for diversity and creating a company-wide gender balance environment that extends beyond the parent company to more than 10 Schneider Electric chief executive officers of its international branches in countries from Vietnam to Turkey.

Enquiries: Visit www.schneider-electric.com

JDR expands footprint in Africa

JDR, a leading provider of technology connecting the offshore energy industry, has expanded its footprint by establishing a new service and maintenance facility in Port Harcourt and Lagos, Nigeria in partnership with Royal Niger Emerging Technologies. In the agreement, which also establishes a long-term trade partnership, the Global Service division of JDR is providing local content to the West African oil and gas market with Nigeria as its first location for services in the region. JDR specialises in the design and production of steel and thermo-plastic subsea production umbilicals, subsea power cables and Intervention Workover Control Systems (IWOCs), as well as having a team of highly technical on and offshore service support. JDR offers support for pre-commissioning, inspection, maintenance and repair, both onshore and offshore.

Enquiries: Email regan.burford@jdrglobal.com

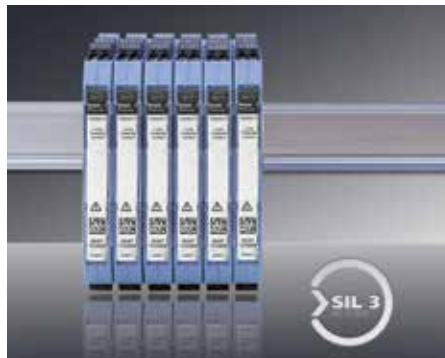
Security solutions in small, medium and large installations

Legrand's extensive range of security solutions encompasses closed circuit television (CCTV) systems, which meet specific requirements in small, medium and large installations. "These modular CCTV systems, which include an analog, IP or composite approach, are selected according to the exact safety requirements of each building – for protection in diverse installations, from small businesses, to large shopping centres," states Luk Ivens, general manager, Legrand Southern Africa. "The advantage of high definition IP technology is a scene filmed in 'recognition' mode can be zoomed to enable the identification of people. In selecting the appropriate CCTV solution, we recommend four important steps: define the areas that need to be monitored and specify the expected results of the system.

Enquiries: Email legrand.south-africa@legrand.co.za

Signal isolator - high availability and functional safety

The requirements on operational and safety-related circuits in plants are continuously growing which also affects the technical requirements on components. Often, functional safety can only be increased with much effort and at the expense of availability. Proving that high safety standards and high availability can go hand in hand, Knick present ProLine P 22400 passive standard signal isolators certified for applications with a SIL3 safety integrity level according to EN 61508. The passive isolator's



safety functionality is the highly precise, linear transmission of 4...20 mA signals with a low transmission error of 0,08 % full scale. A high level of functional safety can be achieved even in single-channel structure and without diagnostics. For instance,

sensors and actuators in safety circuits can be connected directly, requiring no elaborate evaluation equipment for redundant structures.

The isolator's robust design ensures excellent availability with a mean time between failures of 965 years. Thanks to loop-powered operation, it contains fewer parts than devices with an auxiliary power unit and the total failure rate is decreased.

Furthermore, it is mechanically stable, approved for marine applications, resistant against electromagnetic interferences, and boasts protection against electric shocks up to 600 V ac/dc through reinforced insulation. The test voltage during routine testing is 5,4 kV ac. ProLine P 22400 is suitable for ambient temperatures between -40 and 85 °C. Knick provide a five-year warranty for all ProLine devices. **Mecosa** is the sole agent for Knick Elektronische Messgeräte in Southern Africa.

Enquiries: Tel. 011 257 6100 or email measure@mecosa.co.za

Cameras ensure accident reduction

According to a survey by **Intelligent Telematics**, a global integrated camera tracking solution provider, vehicle cameras have shown a reduction in accident frequency of 45 %. These findings were taken from the analysis of 2 000 commercial vehicles using the company's IT1000 camera solution over a six month period. Data showed the cost of those accidents that did occur were 27 % less as a result of instant intervention. Intelligent Telematics operations director, Craig Lovell, says they are seeing multiple benefits from using a 3G vehicle camera, which are helping fleets to operate more responsibly while at the same time reduce overheads.

"The 3G cameras are not only preventing incidents and discouraging other road users from making fraudulent or inflated claims, but when an accident does happen the footage is available from the scene within seconds so first notification of loss is helping achieve substantial insurance claim cost savings," he explains. The analysis also found that 65 % of the accidents recorded were in fact avoidable, highlighting a clear opportunity to improve fleet safety levels through improved and targeted driver engagement. With this in mind, companies are increasingly using the information provided by the vehicle cameras to pro-actively improve driver behaviour.

Enquiries: Tel. 08611 58527 or email craig@intelligent-telematics.co.za

Latest generator set technology available in Africa

The QSK95 generator sets are **Cummins** Power Generation's most powerful diesel generator sets to date, offering up to 3,5 MW 60 Hz and 3.75 MVA 50 Hz. They are engineered with the highest kilowatt per square foot ratio in their class, resulting in a smaller footprint that achieves a 20 % improvement in power density.

The durable and robust QSK95 Series generator sets are ideally suited for mining, oil and gas, or any project where harsh conditions, challenging environments and the demand for reliable, continuous remote power exist. The QSK95 Series generator sets are also engineered to deliver reliable, mission critical power protection without interruption — an uptime requirement shared by data centres, hospitals, water and wastewater treatment plants, and utilities.

Cummins Southern Africa power generation director, Kobus Coetzer, points out that the new generator sets boast more power and best-in-class fuel economy. "Over the course of 8 000 hours

of operation, the QSK95 can achieve fuel savings of more than US\$400,000 (R4-million+). The QSK95 Series is designed to lower the total cost of ownership by reducing installation expenses, fuel costs and maintenance requirements — all while maintaining Cummins' high standards of reliability."

Enquiries: Kobus Coetzer. Tel. 011 321 8700 or email kobus.coetzer@cummins.com



Monitoring relays – reliable machine protection

Drawing on more than 50 years of experience in manufacturing monitoring relays, the compact K8 series continues the long tradition in providing reliable machine protection and safeguarding. **Omron** has now completed this popular product range by adding six new models for three-phase monitoring.

These additions to the range mean that now, virtually all machine monitoring functions can be conveniently implemented with the same range of products, with the added benefit that all of the products comply with global safety standards.

The new monitoring relays feature advanced switching power supply technology and generate almost no heat. This ensures that they have long reliable product life-cycles and also allow the K8 relays to be mounted closely to one another and to other components, saving valuable control panel space.

K8 monitoring relays are available in versions for both single- and three-phase applications and provide a wide range of solutions for detecting common issues such as under- and overvoltage, phase loss, under- and overcurrent, over temperature,

phase sequence errors, and voltage asymmetry conditions. Omron also offers thermistor motor protection relays that directly monitor the temperature of motor windings.

Added to this are the contact-type outputs – all of the new monitoring relays incorporate LED indicators that show equipment status, which greatly simplifies machine troubleshooting and allows corrective action to be taken, before any lasting damage can occur, therefore avoiding costly machine downtime.

Enquiries: Michelle le Roux. Tel. 011 5792600 or email michelle.le.roux@eu.omron.com

New range of switchgear on local shelves

Schneider Electric, the global specialist in energy management, has launched Easy9 switchgear, a new range to help electricians with the provision of reliable switchboards in southern African homes and small-sized buildings.

A leader in switchgear technologies since the 1920s, Schneider Electric has engineered Easy9 to be affordable without compromising on safety and reliability.

According to Christo Janse van Rensburg, product manager: final distribution, at Schneider Electric South Africa, Easy9 answers the need for electricians to have access to robust products that are widely available, and will also help them to complete their installations swiftly and professionally.

The range covers miniature circuit breakers, residual current circuit breakers, surge protection devices, comb busbars, and switchboard enclosures.

All Easy9 products are manufactured in ISO9000-certified plants belonging to Schneider Electric and are approved by independent authorities as compliant with local electrical safety standards.

"We work closely with electricians worldwide to help bring safe electricity to homes and buildings around the globe. With Easy9 electricians can take pride in delivering the enhanced safety and

peace of mind their customers deserve. An advantage too is that it is a high-end device available at a mid-range price," adds Janse van Rensburg.

Enquiries: Ntombi Mhangwani. Tel. 011 254 6400 or email ntombi.mhangwani@schneider-electric.com





NI Technical Symposium 2015

On 5 March 2015 NI held a technical symposium in Johannesburg to share the latest technology to accelerate productivity for software defined systems in test, measurement, embedded systems and control. The symposium opened with a keynote presentation by Mark Phillips (NI marketing manager – Africa and Oceania) with input from Rejwan Ali (NI technical marketing engineer – Africa and Oceania). Stephen Plumb (NI branch manager – Southern Africa) introduced the new innovations in LabVIEW. Stuart Gillen (NI principal marketing manager – condition monitoring platform – Austin) gave insight into solutions for condition monitoring applications. These are only highlights of a very full programme. Free Certified LabView Associated Developer (CLAD) Exams were on offer to end the day.

Enquiries: Email mark.phillips@ni.com



Stuart Gillen (principal marketing manager, condition monitoring platform, Austin), Mark Phillips (marketing manager – Africa and Oceania), Stephen Plumb (branch manager – Southern Africa).



From Ansys – Johan Malan; Wessel Nel.



SAM - Sandra Oosthuizen and Kemp Maritz.



Paramount Group: Susan Benade; Riaan Hoogenboezem and Frederick Mabeto.



Yokogawa launches enhanced integrated DCS

Yokogawa South Africa released the CENTUM VP R6.01, an enhanced version of the company's flagship integrated Distributed Control System (DCS) at a launch on 6 March 2015. R6.01 marks the first step in the development of an all-new CENTUM VP that will play a central role in Yokogawa's VigilantPlant strategy for the Industrial Automation business. Yokogawa's managing director, Johan Louw, says, "The adaptive evolution of the new CENTUM VP focuses on addressing customers' needs to keep up with the fast pace of change in the business landscape and technology while delivering maximum return on assets and the lowest total cost of ownership." This first R6-level release of the CENTUM VP system represents much more than conventional functional improvements. R6 brings together smart engineering, advanced operation, system agility, and sustainable plant. (Read more on page 12) **Enquiries: Tel. 011 831 6300 or email Christie.cronje@za.yokogawa.com**



From left: Herat Shah (general manager business development: Eastern and Southern Africa), Muraleedharan N (executive vice-president: systems solutions: Yokogawa Middle East and Africa), Vinesh Maharaj (sales and Marketing Director), Johan Louw (managing director), Bennie Coetzer (system marketing specialist).

VEGA Instruments assists with scholarship

When Mokokobale Diana Makgopa's professor of drama at UCT sent out an urgent appeal for a sponsorship to allow her to complete her studies, little did he expect to hear good news from a company selling pressure and level instruments. VEGA Instruments has a social responsibility track record for giving deserving young people a chance to succeed in life, and when managing director, John Groom, received Professor Fleishman's motivation letter, it was hard to ignore. The result was a R60 000 sponsorship towards Mokokobale's student fees, allowing her to complete her studies at UCT. Mokokobale has completed two years of the BA theatre and performance



degree within the Drama Department and is on course to graduate at the end of 2016. **Enquiries: Chantal Groom. Tel. 011 795 3249 or email chantal.groom@vega.com**

Mokokobale Makgopa.

CMP Products opens in Johannesburg

CMP Products, a division of British Engines Limited, is expanding its international footprint. The company has established a branch in Johannesburg to serve the African market. CMP Products SA is based in Midrand, Johannesburg. The company designs, manufactures, and supplies cable glands, cable connectors, cable cleats and cable accessories for customers around the globe in various sectors of industry including oil and gas, petrochemical, pharmaceutical, power generation and distribution, mining and transportation infrastructure. The company's manufacturing base is situated in the North East of England and it has regional offices to support key global markets in Houston, Singapore, Dubai, Pusan, Shanghai, Perth, Brisbane and now Johannesburg. **Enquiries: Attie Booysen. Tel. 011 266 8880 or email Attie.Booyesen@cmp-products.com**



(From left) Vince Patterson (chief executive officer), Attie Booysen (regional sales manager - Africa) and Phil Wood (regional manager UK, Middle East, Africa).

NewElec, head office Pretoria



*Chris Cardoso,
sales manager*



*Juan-Pierre Potgieter,
software engineer*

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*Stuart Munstermann,
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