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Effective machine safety systems benefit workers and employers by reducing lost work days due to injury, and demonstrating the employer’s compliance with safety standards. However, machine safety can be complicated and difficult to manage. See this month’s cover story on page 26 for more on the benefits of Banner Engineering’s intuitive safety systems.

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ABB South Africa, RJ Connect
Automation professionals need communication strategy too

Catching the eye of a potential customer has become more difficult than ever thanks to the ethos of information promiscuity that defines the 21st century. It’s never been easy to stand out in a crowded market, but one thing is sure, the competitive challenges associated with the fourth industrial age are unlike any we have ever seen before.

The fundamentals of good business haven’t changed of course, even though the products and services have, which means that consumers demand value exactly as they did before – and perhaps even more so. What has changed is the proliferation of tools that marketing has at its disposal to get the company message out there. Social media has changed everything – or has it?

‘It’s vital to go viral,’ chant the converts. But for many industrial businesses, the social nature of the medium is its biggest limitation i.e. the message must have some social appeal for it to propagate effectively through the network. Therein lies the rub – the system integrators as essential to the future of the industry, as they have seen the value in having a presence in the System Integrator section of our magazine.

Over the course of the last year, we’ve been approached by several industry personalities asking why we don’t extend this to include consulting engineers and project houses as well. So we have. After discussions with Chris Campbell, CEO of Consulting Engineers South Africa (CESA), product manager Jane van der Spuy and I put our heads together to flesh out the idea.

What we’ve come up with is a flexible mix of advertising, editorial and public relations coverage that can be tailored to suit the communication strategy of any industry-related organisation, large or small. The new section in the magazine is designed to raise awareness for all consulting automation professionals – and the services they provide – in a targeted publication that reaches an audience of nearly 5000 industry professionals and decision makers. If you’re on a limited budget and looking for an effective way to cut through the clutter, both in print and online media, then we’ve lined up an excellent value proposition for you. See pages 24 and 25 for details or contact Jane to discuss your specific marketing requirements, either as standalone, or to boost what you might already be doing in your social networks.

Steven
Editor: SA Instrumentation & Control
steven@technews.co.za
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South Africa sets plans in motion with new LNG import terminal

State-owned freight logistics firm, Transnet, said on Tuesday that it had signed a cost-sharing agreement with the World Bank's International Finance Corporation (IFC) to conclude a feasibility study for the development of a liquefied natural gas (LNG) storage and regasification terminal at the Port of Richards Bay, in the KwaZulu-Natal province.

This news follows government's intention to diversify the country’s energy mix expressed in the draft Integrated Resource Plan (IRP), which is yet to be finalised. According to the draft IRP, the country will see a shift from coal-generated electricity to renewables and gas, with the latter accounting for 8100 MW leading up to 2030.

Although globally considered one of the cleanest, safest and most reliable sources of energy, natural gas accounts for just three percent of South Africa’s energy mix. The LNG project is expected to rejuvenate South Africa’s energy infrastructure and meet the increasing demand for a sustainable energy source. First gas is expected in 2024.

Emerson completes acquisition of Zedi’s software and automation businesses

Emerson has announced the purchase of Zedi's software and automation businesses. The addition of Zedi’s cloud supervisory control and data acquisition (SCADA) platform will further enable Emerson to help oil and gas producers increase production and lower operating costs through cloud-based monitoring, control and optimisation.

Zedi's technology currently enables customers to monitor more than 2 million sensors and thousands of devices and applications. By combining its scalable cloud platform and applications expertise with Emerson’s extensive applications, controller, instrumentation and flow metering portfolio, this acquisition expands opportunities across the global oil and gas production market.

The combined software and expertise of the two companies will provide producers with scalable end-to-end solutions designed to optimise and manage their operations. Zedi’s software and automation businesses are based in Calgary, Canada, with approximately 155 employees in North America.

ETG conducts first Safety over EtherCAT Plug Fest

The EtherCAT Technology Group (ETG) recently held its first Safety over EtherCAT (FSoE) Plug Fest with great success. Numerous manufacturers of EtherCAT safety master and slave devices came to Verl, Germany, to test the interoperability of their devices and to exchange knowledge with the other participants and the experts on-site.

Plug Fests have been a fixture in the ETG event calendar for many years and this one was well received: a total of 36 participants from 18 different companies came to Verl, where the event took place at the facilities of member company Beckhoff Automation. The attendees tested their devices for interoperability, and in total brought nine masters and 15 slave devices, as well as one stack and one tool. According to the experts, the interoperability of all devices was consistently good.

The focus of the event was on FSoE masters as safe controllers for distributed and central solutions, as well as on FSoE I/O devices. In addition, safe drives whose safe drive functions are implemented with the support of the ETG 6100 profile were tested. The profile serves to standardise the functionality and parameters for drive-integrated safety functions.

Guido Beckmann, who attended the event as FSoE expert from the ETG, explained: "Since the introduction of Safety over EtherCAT into the ETG in 2007, the technology has been very well received by our members. FSoE is one of the most widely used safety protocols, with 38 companies known to us offering such products, not least due to its simple implementation. The Safety over EtherCAT Plug Fest clearly showed us that the communication between FSoE devices also works wonderfully."

Due to the success of the first Safety over EtherCAT Plug Fest, further events will follow in the future. All information about dates and participation can be found online at www.ethercat.org/events.
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New Automation Technology
Endress+Hauser strengthens expertise for advanced analysis

Endress+Hauser has expanded its centre of competence for advanced analysis in Lyon, France. The Group invested €2 million in a new production facility and office space to meet growing demand in the area of advanced process analyses.

From Lyon, around 20 employees support Endress+Hauser sales centres across Europe in the application and sales of advanced analysis technology, with a focus on the project business and after-sales services. Ten Endress+Hauser sales centres across Europe already have specialists on board to handle this complex field of activity.

The new 630 square metre production facility will be used for customer-specific manufacturing and the assembly of complete analysis systems. Rounding out the facility are offices, rooms for factory acceptance tests and space reserved for future use. The adjacent 1500 square metre office building, which opened in 2017, is also home to the Endress+Hauser France regional sales office. With a total of 7000 square metres, the property offers sufficient space to grow the location even further.

Strategic focus

“The expansion of the Lyon location allows us to do an even better job of bringing our expertise in the field of process analysis to our customers,” emphasised Matthias Alttendorf, CEO of the Endress+Hauser Group. “This is an important strategic goal for us and helps our customers acquire more information from their processes.”

Advanced analysis provides immediate information related to material properties and product quality. Endress+Hauser continuously develops its analysis portfolio to provide online monitoring of quality parameters, for example through spectroscopic techniques. This allows customers to reduce time-to-market and optimise their processes. Customers in industries such as life sciences, chemical, food and beverage and oil and gas can benefit the most from the advanced analysis portfolio.

The Lyon location combines the expertise of Endress+Hauser and its subsidiaries, Kaiser Optical Systems and SpectraSensors, under one roof. The Raman analysers from Kaiser Optical Systems are used to examine the composition and material properties of liquids, gases and solids and enable the real-time measurement of product characteristics. SpectraSensors is a leader in the field of TDLAS technology, which can be used to measure trace-level concentrations of gases.

For more information contact Natlee Chetty, Endress+Hauser, +27 11 262 8000, info@za.endress.com, www.endress.com

Festo inspires with smart digital solutions at the Automation Expo

Festo hosted the first leg of the Automation Expo in Johannesburg at the Sandton Convention Centre, while the second took place in Port Elizabeth at the Boardwalk Convention Centre. Both ended on a high and promising note. The expos attracted numerous industry leaders, engineering professionals, senior executives and technology enthusiasts. On show were the latest smart solutions from Festo, aimed at increasing productivity, maximising competitiveness and simplifying life in the workplace.

Industry 4.0 is one of the most discussed topics as new technologies increase efficiency and escalate production in the industry. However, there are worries that these new technologies might increase the already high unemployment rate. As a result, Festo offered a course on ‘Introduction to Industry 4.0: Core elements and business opportunities’ to outline and educate industry professionals on how Industry 4.0 can enhance productivity in the workplace and improve efficiency.

Furthermore, four Festo industry specialists: Adrian Bromfield (head of national sales), Nico Landman (head of Didactic), Skye Prato (head of business development) and Russell Schwulst (head of process automation) engaged in a panel discussion and tackled some of the frequently asked Industry 4.0 questions.

As an industry leader, Festo constantly pursues advanced ways to ensure that its customers remain at the top. This is why it took the initiative to help customers move with the times by showing them how to go digital with the latest solutions. The company showcased solutions in its various business units namely pneumatic automation, electric automation, process automation and Didactic. An example of the showcased solutions was the Festo Motion Terminal (VTEM), which catapults pneumatics into Industry 4.0 with a product and apps that can replace over 50 individual components. VTEM is set to revolutionise automation technology and will arrive in South Africa later this year.

The Festo CP factory is another smart solution that was showcased. This holistic learning factory solution can be used to qualify personnel in the operation of a production process or in a specific field of work, such as production technology. VTEM and the CP Factory were among the many cutting-edge solutions on show, but what better way to end than with a German-themed cocktail function. Festo treated attendees in both cities to a glass of cold beer, a great way to get them networking with the industry specialists.

For more information contact
Kershia Beharie, Festo, 086 003 3786, kershia.beharie@festo.com, www.festo.co.za
AVK Academy gains traction in Africa

The Academy, the training arm of AVK Southern Africa, has taken the Group’s training into Africa. With training on basic and advanced valve fundamentals recently concluded at Mulonga Water and Sewerage Company in Zambia, there are training appointments in Lesotho, Mozambique and Botswana for the remaining year. Training in Malawi is planned for 2020.

Each module, which consists of two days comprehensive training, is ECSA-accredited and worth two CPD points for candidates who achieve the 85% pass rate, or higher. The basic course provides an introduction to acquire essential knowledge of valves in both theory and practice, while the advanced course provides greater insight into principles and practices that address the theories of fluid pressure, fluid flow and field applications.

The AVK Academy, which opened its doors in late 2016, offers training at its state-of-the-art facility in Johannesburg, as well as at client companies’ premises. The facility caters for up to 40 people, however, for on premises training, 30 is the preferred number. External training is conducted approximately five times a year, more when demand increases, with ten being the minimum number of candidates required for a course.

AVK graduates from Mulonga Water and Sewerage pictured with Roelf Frauendorf (back left).

“There are some fundamental differences between local training and training in Africa,” explains facilitator, Roelf Frauendorf. “When conducting training locally, candidates have time for additional practical experience between the fundamental and advanced courses, whereas over-border, the two courses are run back-to-back.”

The Academy’s facilities include a flow laboratory, which demonstrates the flow of water through a series of valves, with candidates physically handling the valves on which they are trained. Frauendorf says that for on-site training, in lieu of available equipment, more discussion is given to the practical aspects of the course. “We include a lot more visuals and spend more time on typical examples,” he explains. “Many of these result in in-depth discussions, for which we do not limit time, and the resultant interactive Q&A often leads to other discussions on the subject. Upon course completion, all externally trained candidates are as au fait with AVK’s product range as those who attend the Academy.”

For more information contact Sayuri Naidoo, AVK Southern Africa, +27 11 908 3760, sayuri@avkvalves.co.za, www.avkvalves.co.za

WearCheck acquires reliability testing company, boosts services

Durban-based condition monitoring specialists, WearCheck, has bought Anglo Field Services (AFS), which adds three new established divisions to the company’s comprehensive reliability solutions portfolio, including non-destructive testing (NDT), technical compliance (TC) and rope condition assessment (RCA).

The fourth AFS division – asset maintenance management (AMM) – has been absorbed into WearCheck’s existing Reliability Solutions team, boosting the company’s man-power in this section as well as adding technical expertise and additional instrumentation.

Branching into non-destructive testing means that WearCheck now conducts a range of analysis techniques through which the properties and condition of a component or system are evaluated without causing any damage to it.

NDT methods are gaining popularity because they do not permanently alter the item undergoing inspection, making NDT a valuable tool that can save both money and time in condition monitoring and inspections – an approach which dovetails perfectly with WearCheck’s ethos.

WearCheck's new NDT division offers a range of techniques, including eddy-current-, magnetic-particle-, liquid penetrant-, radiographic-, ultrasonic-, and visual testing.

The new rope testing division provides specialist cable strength assessment and is manned by seven of only 12 people in South Africa who are qualified to conduct these tests.

The technical compliance division provides expert guidance to assist companies to comply with regulatory requirements, and how to rectify violations or problems highlighted during audits.

WearCheck MD Neil Robinson believes that the addition of new services enhances the availability of assets operated by WearCheck customers by expanding the choice of condition monitoring options. “For example,” he adds, “the development and implementation of NDT procedures will have a profound impact on keeping operational maintenance costs down for our customers.”

WearCheck extends a heartfelt welcome to all current AFS customers, and looks forward to bringing new field services clients on board as well as providing existing clients with the benefit of an increased reliability optimisation service offering.

For more information contact WearCheck, +27 31 700 5460, support@wearcheck.co.za, www.wearcheck.co.za
Siemens South Africa puts Smart City vision into action

Fourteen months ago, Siemens installed a microgrid at its headquarters in Midrand and data shows it is using 50% less supplied energy, drawing it from solar resources instead. By extracting energy off its microgrid, the company has saved 2 435 000 kWh, which translates into 174 000 kWh per month – 50% of the office park’s normal consumption.

Put into perspective, 174 000 kWh is the amount of energy used by 50 average South Africa households per year. “The project provides a showcase for the vision of smart cities across Africa,” says Sabine Dall’Omo, CEO of Siemens Southern and Eastern Africa, “This small-scale example shows that it doesn’t have to remain a futuristic dream, it’s a reality that we can start working toward today. We already have a proven solution that will help save energy, cut costs, lower carbon emissions and ensure uninterrupted power.

Everything from installation to operating costs have been tracked to present a realistic case study for the South African context, and the results to date are convincing.”

The real-life case study, implemented in an existing office building, shows impressive savings in terms of cost, as well as harmful emissions (2 460 tons of CO2 saved to date). Combining efforts from local and global Siemens experts, this is the first Siemens Distributed Energy System (DES) solution of its kind in Africa. It is also the first time that Siemens has installed the system in one of its own buildings. The solution corresponds with the company’s goal to achieve carbon neutrality by 2030 through energy efficiency, decentralised energy systems, and the purchasing of clean electricity.

DES results to date:

- 14 months of uninterrupted power.
- 2 460 tons of CO2 saved.
- The initial payback period calculated for the system is 11.1 years (capex, financing, maintenance, conservative power price inflation).
- Tariff increases, however, and taking the actual production figures into consideration, Siemens are confident that the full payback will be achievable in under 10 years.

For more information contact Keshin Govender, Siemens Southern and Eastern Africa, +27 11 652 2412, keshin.govender@siemens.com, www.siemens.com

Implementing Industry 4.0 technologies in Africa’s manufacturing environment

African manufacturers are aspiring to raise their standards and increase the efficiency of their enterprise operations. To discuss the rising prevalence of technology within the industrial realm, the KwaZulu-Natal Manufacturing Indaba will educate participants on the opportunities and challenges associated with the adoption of innovative technology in the manufacturing sector, as well as how these capabilities can lead to yield higher quality outputs.

Digitisation, otherwise known as Industry 4.0, is considered the most profound and disruptive phenomenon in the world of business today. Increased reliance on computer and automation has rendered industries both self-reliant and efficient. Smart machines have immense capacity to compile, maintain and record staggering amounts of data, which the average human mind is incapable of processing. In addition, Industry 4.0 allows manufacturers to optimise their operations by pinpointing and prioritising the precise business components demanding attention.

Further, the IIoT enables industries to employ sensors and robots to improve the quality and overall efficiency of production output. IIoT-enabled machines provide manufacturers the opportunity to achieve precise customer satisfaction levels by analysing data regarding customer preferences and feedback, thereby tailoring their products accordingly. By employing the IIoT, industries can optimise their operations through the application of the cloud environment to increase the productivity levels of manufacturing enterprises.

The KwaZulu-Natal Manufacturing Indaba to be hosted in Durban from 14-15 August is designed to accommodate industrialists with an extensive technological knowledge as well as those who lack proficiency in this arena. Attending manufacturers with minimal digital know-how are set to acquire the vital foundations from which to implement relevant digital solutions into their business operations. Furthermore, exclusive debates will focus on well-versed technological industrialists, seeking to advance their existing knowledge base, thereby empowering them to take their manufacturing operations to new heights. Attending this year’s Indaba is paramount to enabling African manufacturers to harness the unique opportunities awaiting them, and place them on an equal footing with their international competitors.

For more information contact Thembisa Bambathi, Siyenza Management, +27 73 788 6044, thembisa@siyenzaevents.co.za, www.manufacturingindaba.co.za/mi-kzn
**Omnia’s new R670 million nitro-phosphate (NP) plant in Sasolburg is expected to come on line during 2019.** Built around an innovative new production method, it is going to be a game-changer for the company and Johnson Controls’ Sabroe compressors, which power a custom-build ammonia chiller plant, will play an important role.

“A core part of the NP production innovation is a new more efficient method of crystallisation, which requires the NP liquid to be rapidly cooled,” explains Kripal Daby, lead process engineer for the project. “As this is a critical part of the process, we needed a chiller solution that was not only robust and reliable, but capable of managing variable loads, and able to respond effectively and operate cost effectively.

“The custom-built Johnson Controls ammonia chiller was not only able to meet our functional demands, but it was able to offer us energy efficiency gains, helping to ensure our new production method is viable and sustainable.”

The standard NP production method is well known. It comprises dissolution of rock phosphate with nitric acid, crystallisation of the dissolving solution and separation of the crystals from the acid solution. Approximately 40 percent of the new Omnia NP plant process is known – up to the making of the NP liquid. The crystallisation process is where the differentiation lies.

Says Hattingh: “Omnia required brine streams of different temperatures. To make the process viable, efficient operation of the chiller is critical, so multiple evaporating temperatures were provided.

“We settled on the use of four Sabroe screw compressor chillers operating in parallel. All of these units have variable speed drives which enable them to operate reliably over a wide range of conditions, while cutting energy use significantly.”

“The saving for Omnia is significant,” concludes Daby: “The chillers are able to run at high capacity (90%) and still lower our energy usage, delivering up to R900 000 in energy savings per annum.”

For more information contact Russell Hattingh, Johnson Controls, +27 11 921 7129, russell.hattingh@jci.com, www.johnsoncontrols.com

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**South Africa could go a long way to cut the risk of future load-shedding by adopting a minimum efficiency performance standard (MEPS) for electric motors.** According to Fanie Steyn, manager rotating machines at Zest WEG Group, a MEPS would significantly reduce the peak power demand on the national grid. Importantly, the step could be made at no cost to government and would also bring substantial savings to industry’s electrical energy costs.

“The MEPS would phase out the least-efficient electric motor classes by setting a minimum standard for the efficiency of motors imported and sold in South Africa,” explains Steyn. “The essential challenge now is that about 280 000 electric motors are imported each year, many of which are low efficiency motors rated at IE1 level as standard.”

Steyn highlights the great strides recently achieved in the efficiency of electric motors. Energy savings of between 2.1% and 12.4%, depending on the individual power rating, can be made by converting from a standard efficiency IE1 motor to a premium efficiency IE3 motor. The capital cost differential is slight and is quickly recouped by lower operating costs. “It is estimated that as much as 30% of all energy produced globally is consumed by electric motors,” he adds. “It is therefore easy to see why improving motor efficiencies has a huge impact on national energy consumption.”

It is significant that more than 42 countries already have MEPS in place. These standards apply mostly to three-phase low voltage motors from 0.75 kW to 375 kW capacity. The MEPS is applied at import stage, so the process would be handled in the conventional manner by customs agencies. It would also mean lower carbon emissions from power stations. South Africa has committed to reduce these emissions by signing the Paris Agreement in 2016.

“Implementing MEPS will have significant benefits for everyone,” concludes Steyn.

For more information contact Zest WEG Group, +27 11 723 6000, info@zestweg.com, www.zestweg.com

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**Regulation of motor efficiency could help stabilise SA’s power supply**

**Johnson Controls powers Omnia innovation**

**For more information contact Russell Hattingh, Johnson Controls, +27 11 921 7129, russell.hattingh@jci.com, www.johnsoncontrols.com**
IS³ partners with Izinga Integrated Solutions

On 24 July, IS³ – Industry Software Solutions and Support welcomed Izinga Integrated Solutions as a strategic solutions provider for AVEVA’s asset performance management (APM) Solutions. Izinga is a maintenance management consulting and solutions provider, providing bespoke client solutions that integrate extensive industry knowledge and experience across the engineering and maintenance management spectrum.

“I worked with Wonderware, now AVEVA, in my early career days and found that in terms of advancements on the technology the solutions have always been smarter, have greater depth in terms of capability, and the platforms all have extremely intuitive interfaces,” says CEO Wayne Moodley. “Over and above this, I found that the solutions constantly evolve which confirmed the competitive edge that IS³ have as an advantage.”

The industry is constantly evolving, and it is vital for IS³ to partner with businesses that share the same vision to empower people and transform businesses. “Izinga has deep knowledge of maintenance strategies and their implementation,” says partner manager, Steven Jeffery.

“Find a solutions provider that offers one the opportunity to build and foster a long-standing sustainable relationship is key,” adds Moodley. “You cannot have a winning solution without the right calibration of people. The AVEVA solutions deliver what industry needs.”

Strategic partnerships with a variety of industry and subject matter experts enables Izinga Integrated Solutions to deliver solutions aimed at maximising return on asset investments at all levels by:

- Improving operational and organisational performance, efficiency and transparency.
- Improving profitability, sustainability and growth.
- Reducing risk and cost of regulatory compliance.
- Improving customer satisfaction.
- Creating value for all stakeholders.
- Creating a safe working environment for all through long term sustainable solutions.

Combining the skills, the AVEVA systems as supplied by IS³ and Izinga will result in deploying right-sized best of breed solutions to the benefit of clients. The synergies are obvious and this team is ready to support customers in all sectors and industries.

IS³ is the sole distributor of AVEVA Group’s software for sub-Saharan Africa.

For more information contact Clarise Rautenbach, IS³ – Industry Software, Solutions & Support, +27 11 607 8473, clarise.rautenbach@is3.co.za, www.is3.co.za

See the latest development in LabVIEW 2019 at the Test Dynamics roadshows

Test Dynamics is hosting a series of roadshows during September and October to share the latest developments in LabVIEW 2019. The half-day training/information sessions will discuss the technologies that support current trends in software development.

“The three separate sessions will allow delegates to see the latest developments in LabVIEW NXG, the new generation LabVIEW,” says Stephen Plumb, sales manager at Test Dynamics. “Delegates will then be able to determine if this is the right choice for their next project. We will also examine the signal conditioning requirements for a typical DAQ system and see how you can make more effective measurements by selecting the right sensors and signal conditioning for your measurement project.”

The first information morning takes place at the Midrand Conference Centre on 17 September. KZN delegates can attend the morning session at the Durban Country Club on 2 October and the final session will take place at the Protea Hotel in Durbanville on 7 October. All sessions begin at 8:30 and end at 12:30. Space is limited so interested parties are encouraged to book a seat as soon as possible by visiting http://www.testdynamics.co.za/Test%20Dynamics%20Roadshow.html

For more information contact Stephen Plumb, Test Dynamics, +27 62 217 0063, stephen.plumb@testdynamics.co.za, www.testdynamics.co.za

Beckhoff Automation, in partnership with VEGA, are proud to present the second South African Process 4.0 Seminar for industry.

The 2019 seminars are aimed at industry segments such as oil and gas production, petrochemicals, chemicals, water and wastewater management, food and beverage, metals, mining, plastics, woodworking, pharmaceuticals, biotechnology, and pulp and paper.

Beneficiaries of this series include process plant operators, systems integrators, plant planners, and all-round enthusiasts in process automation, especially with the global explosion-proof certification requirements.

You are cordially invited to attend a Process 4.0 Seminar at any of the convenient venues. It’s being held for the first time in Port Elizabeth and again in Durban, Cape Town and Johannesburg on the following dates:

- 13 September: Durban – The Oyster Box.
- 17 September: Cape Town – D’Aria Wine Estate.
- 19 September: Johannesburg – The Fairway Hotel.

Schedule of events

6:45 – Registration/Table-top Exhibition
7:15 – Welcome Address (Kenneth McPherson and Frikkie Streicher)
7:30 – Cold Breakfast/Table-top Exhibition
7:45 – 1st Presentation (Benjamin Bruns/ Beckhoff)
9:15 – Hot Breakfast/Table-top Exhibition
9:45 – 2nd Presentation (Mustapha Tayebi/VEGA)
11:15 – Interactive Beckhoff/VEGA Demonstration
11:45 – Q&A
12:00 – End of Seminar

For more information contact Michelle Murphy, Beckhoff Automation, +27 11 795 2898, michelle@beckhoff.com, www.beckhoff.co.za or Leandi Hendrikse, VEGA Controls SA, +27 11 795 3249, leandi.hendrikse@vega.com, www.vega.com

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For more information contact Clarise Rautenbach, IS³ – Industry Software, Solutions & Support, +27 11 607 8473, clarise.rautenbach@is3.co.za, www.is3.co.za
**NEWS & EVENTS**

**Ateq South Africa**

has appointed Bernhard Gerrits as sales manager.

**Beckhoff Automation**

has appointed Gareth Taylor as sales engineer.

The Engineering Solutions Group (ESG) of Invicta Holdings, has incorporated Gem Tool – previously part of the Mandirk Group – into its engineering consumables division, BMG. This development, effective 1 June, is a positive move for both companies and for the tools and equipment business, which will benefit from the combined services of two streamlined organisations.

“As part of this restructure programme, all Gem Tool customer and supplier trading activities will be integrated into BMG in Pretoria,” says Wynton Robinson, national sales manager at the Mandirk Group. “The Gem Tool team is excited to become part of BMG. We are confident that with access to BMG’s central support functions, including engineering, technical expertise and manufacturing skills, we can further improve our service to our loyal customer base.

“Apart from the new customers and markets that can now be leveraged through BMG, we will continue to roll-out our quality product offering, thereby enhancing sales and creating new opportunities for both companies. Gem Tool products will be distributed by the three BMG Pretoria branches, which will enable quick turnaround times on orders, closer customer relationships and broader product ranges. Customers will be able to obtain all the brands and articles that they have always associated with and procured from Gem Tool.”

Skyriders now part of BMG

The Gem Tool product range and associated technical expertise are a natural extension to the BMG offering. Complementary products include specialised tools and testers, lifting equipment, welding consumables, specialised locks and lockout devices, machine tools for workshops and associated blading, and cutting and grinding tips. The Gem Tool sales team will also transition into BMG Pretoria to ensure continuity for customers.

**Appointments**

Elonics has appointed Jaco Schoeman as sales representative: mining and heavy industry.

Elonics has appointed Musa Yaka as internal sales representative.

“Beckhoff Automation has appointed Curtis Phiri as technician.

Beckhoff Automation has appointed Gareth Taylor as sales engineer.

Ateq South Africa has appointed Bernhard Gerrits as sales manager.

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Rope access made quick work of a major tank inspection and cleaning project for a large South African petrochemical producer when Skyriders Access Specialists deployed a team to the tank, which measures 46 m in diameter and stands 15 m high.

Completed in 18 days in May, the project formed part of the petrochemical producer’s ongoing maintenance cycle, which sees its storage tanks emptied, cleaned and inspected, where after any necessary maintenance is carried out. In this instance, the tank in question was shut down for statutory inspection and maintenance, according to Skyriders marketing manager Mike Zinn.

Rope access was the ideal solution, as it allowed technicians with confined space experience to move along the roof beams and girders in order to clean the beams themselves, as well as the sidewalls, as quickly and as safely as possible. “The storage tank was found to be in good condition, so fortunately not much work beyond the cleaning itself was required,” explains Zinn.

Skyriders’ safety department provided a risk assessment and detailed methodology for the project. “We understand the dangers inherent in the petrochemical industry and plan carefully around these, from the correct personal protective equipment to the expertise of our highly trained staff,” concludes Zinn.

For more information contact Mike Zinn, Skyriders, +27 11 312 1418, mike@ropeaccess.co.za, www.ropeaccess.co.za

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**Gem Tool now part of BMG**

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For more information contact Lauren Holloway, BMG, +27 11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net
Fluid Systems Africa supplies a comprehensive range of the high-quality, affordably priced products for all system needs. It offers a complete basket of products to assist in reducing procurement costs and time, while maintaining the highest levels of quality and safety in the facility. Customers are found in the chemical/petrochemical industry, oil and gas, pharmaceuticals, energy generation, food and beverage manufacturing and general industry. The company covers the entire African continent with distributors in almost every major location.

Available brands

Dekoron Unitherm
Dekoron Unitherm is a developer of pre-insulated and heat-traced tubing for heavy industry – it has been producing since 1962. With over 50 years’ experience and in excess of 40 million metres of product installed, it is a world-leader in the design and manufacture of pre-insulated and heat traced tubing and small-bore pipe. Products have been installed on every continent and in some of the harshest known environments. Dekoron Unitherm only makes pre-insulated and heat-traced tubing and pipe, which allows it to dedicate all its resources to designing and building state-of-the-art materials for industrial applications. Applications include: steam and condensate delivery, process analysis, emissions monitoring, flexible loading and unloading hoses, and process transport piping systems.

Classic Filters
A UK-based manufacturer with a global distribution network, Classic Filters specialises in particulate and coalescing filter housings and elements. Thanks to a highly experienced team of engineers, it has developed some of the most efficient, low-cost filters, producing unparalleled flow rates and extremely low pressure drops. Whether customers need a filter element that is interchangeable with other manufacturers’ filter housings, or a completely tailored, custom-built solution, it is all possible – and quickly.

With an appreciation for the disruption and inconvenience that replacing a filter can cause, the company manufactures and delivers its products quickly, to minimise the impact this has on a customer’s business. It also offers local service and support to ensure the best possible performance from any filtration system.

Advanced Pressure Technology
AP Tech, also known as Advanced Pressure Technology, is a manufacturer of gas handling components, primarily pressure regulators and valves. Its forte is products to deliver specialty gases for high through ultra-high purity applications. Starting from the source vessel to point-of-use and into the process tool or equipment itself, AP Tech products are known to deliver gases with uncompromising quality, performance and reliability. The company sets a standard for service and support, traits that are now synonymous with the brand.

A wide array of gas delivery products is available to address almost any application. From the challenges of a corrosive gas source panel, to the fine control required at point of use for process, AP Tech products deliver high performance under pressure.

Ham-Let Advanced Control Technology
Ham-Let was established in 1950 and is a supplier of industrial and high-tech compression fittings, valves and instrumentation components for the process control and measurement industry. Products include Let-Lok compression fittings, One-Lok single ferrule fittings, pipe fittings and 37° flare fittings, ball valves, needle valves, check valves, relief valves, filters and accessories. All products guarantee long lifecycles, accuracy and flexibility, and deliver excellent value to customers.

A total solution
Fluid Systems Africa supplies products that complete the loop in all areas of a facility, and with the increasing costs of sourcing products from multiple vendors, it aims to reduce procurement costs while maintaining high levels of quality and safety in the plant.

For more information contact Stuart Harvey, Fluid Systems Africa, +27 87 551 1677, stuart@fluidsystemsafrica.co.za, www.fluidsystemsafrica.co.za
TRAINING

**BECKHOFF**

- Automation Engineers

**TwinCAT 3 and TwinCAT 2**
Port Elizabeth 1-3 Oct 2019
Cape Town 8-10 Oct 2019
Durban 15-17 Oct 2019
Johannesburg 22-24 Oct 2019

For more information contact
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+27 11 795 2898,
training@beckhoff.co.za,
http://www.beckhoff.co.za/za/support/training

**FESTO**

- Mechatronic Engineers
- Maintenance and Repair Staff

**PN111 – Basic Industrial Pneumatics**
Cape Town 8-11 Oct 2019

**PN211 – Electro-Pneumatics**
Johannesburg 16-18 Oct 2019

**PN121 – Maintenance Pneumatics**
Port Elizabeth 30 Oct – 1 Nov 2019

For more information contact
Sammy Kanye, Festo,
+27 11 971 5586,
DidacticTaC.za@festo.com,

**SIEMENS**

- Automation Engineers

**TIA-MICRO1 – S7 1200 Micro Course**
Pinetown 30 Sep – 4 Oct 2019

**ST-7SERV1 – S7 Service & Maintenance Part 1**
Pinetown 7-11 Oct 2019

**ST-PCS7SYS – PCS7 Systems Course**
Midrand 7-18 Oct 2019

For more information contact
Vanessa Bonhomme, Siemens Southern Africa,
+27 11 652 3206,
vanessa.bonhomme@siemens.com,
www.sitrain-learning.siemens.com/za

**SMC**

- Mechatronic Engineers

**TC-PNEU-E – Electro-Pneumatics**
Johannesburg 9-11 Oct 2019

**PNEU0113 – Basic Hydraulics**
Johannesburg 16-18 Oct 2019

**TC-PNEU-E – Electro-Pneumatics**
Cape Town 23-25 Oct 2019

For more information contact
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SMC Corporation South Africa,
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**VEGA**

- Automation Engineers

**IFS – Instrumentation Finishing School**
Johannesburg 2-13 Dec 2019

For more information contact
Eric Carter, turboTRAIN,
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eric@turbotrain.co.za,
http://turbotrain.co.za/instrument-workshops/

TwinCAT 3 and TwinCAT 2
Port Elizabeth 1-3 Oct 2019
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Durban 15-17 Oct 2019
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+27 11 100 5866,
rvaneck@smcza.co.za, www.smcza.co.za

**VEGA**

- Automation Engineers

**Measurement Solutions – Processing with Level, Pressure and Nucleonic**
Roodepoort 15-17 Oct 2019

For more information contact
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Adapting education to the fourth industrial revolution

By Professor Ralph Naidoo, Mangosuthu University of Technology.

Technology evolution has been applied by the writer in research into automation solutions at the Mangosuthu University of Technology and Montwood College, from Diploma to PhD level. In terms of the evolution, the hardware transition phase was from the Siemens 314-IFM to the 314-C-PtP PLC and the software, from Step7 V5.1 to V5.4.

This paradigm shift demonstrated to students the shift from battery backup, to memory card storage and the related reliability, together with the additional software components available in the library. Communication challenges led to research into cybersecurity. Up to 2009, Siemens Step7 V5.1 software & MPI (multi-point interface) communication protocol was used. In 2010, Step7 V5.4 used MPI and Profinet protocol, with limited cyber threats. In 2015, IIoT Step7 V13.0, TIA (Totally Integrated Automation) software was adopted with Ethernet communication and complete networking capability. This afforded the students of Mangosuthu University of Technology and Montwood College to understand the transition into the fourth industrial revolution (4IR) through understanding that it was no longer necessary to purchase the PLC and scada tools separately. The integration of software and hardware, and the higher level of complexity in terms of application is slowly being understood. It is therefore imperative that students now be exposed to the technologies of 4IR during their studies.

Fate of jobs in an automated world

One of the first fears to arise when the subject of automation is mentioned is ‘job losses’. This is not entirely true. Automation goes hand-in-hand with an upskilling of the workforce. Unskilled workers become semi-skilled and semi-skilled workers become skilled.

Nearly half of all existing jobs could be automated within the next two decades. Disruption will destroy some jobs, but will also create new opportunities. The fundamental challenges are: implementation of the currently established education framework, and revising the current system to conform to Industry 4.0. Institutions and industry need to adopt an entrepreneurial approach in the curriculum – some 65% of the jobs that today’s learner will perform do not yet exist. Automation is driving the creation of a number of new and rewarding job opportunities.

Robots make work physically less demanding, allowing human workers to focus on higher skilled job profiles with more emphasis on soft skills, e.g. problem-solving and decision making. Over the last decade, robotics has created a competitive edge in the manufacturing industry. Hence it is important that such technologies find their way into the education curriculum.

The role of Human Resources

The HR department is perhaps the most important component in any organisation in terms of making a success of implementing Industry 4.0 effectively, while managing the social impact. The strategy should be to explore the core capabilities that need to be enhanced. The workforce then needs to be evaluated to prioritise worker aspirations and capabilities. Focus on capacity building is an integral component in upskilling younger workers and providing incentives to retain them. Funding options need to be explored, particularly the SETA pool: now that this is administered by DHET (Department of Higher Education and Training), ongoing financial resources must be secured to train and retrain workers.

Closing the skills gap

It is important to note that the lack of qualified and skilled employees is holding back growth, not lack of jobs. The educational curricula often do not provide the skills in demand, but merely focuses on basic knowledge. More vocational programmes are required to combine classroom knowledge with on-the-job training. Stronger links are required between industry and the educational intuitions. This is a problem in South Africa.
Some questions to consider in this context are: How many educational and training providers are finding solutions to daily industrial problems? How much of the funding spent on research goes into the mainstream economy?

If South Africa wants Industry 4.0 to work, educational and training providers need to adopt a completely different approach, especially since financial resources are a primary factor. Educational and skills programmes must be coordinated by industry (the end user) in conjunction with the provider. In the South African context, very often the curriculum is developed by academics in the absence of industry, or at times, just for the purpose of ‘rubber stamping’. How well do the products of the institution, i.e. the students, serve industry? (Especially in the technological era we live in.)

“Nearly half of all existing jobs could be automated within the next two decades.”

There is a serious need to optimise the skills levy access processes. Since the three parties, i.e. the learner, the provider and employer are required in order to access skills levy funding, there are very often logistical challenges in public offices that hinder this access. Today’s workers do not necessarily lack skills, but their skills do not always meet the demand of the modern workplaces. Today’s qualifications do not necessarily include skills that are in demand.

Another challenge is the ageing workforce. Many experienced workers who can apply themselves constructively in Industry 4.0 are closing in on retirement. Very often it is easier to fill the skills gap using consultants, versus investing time and money in the next generation. In the automation industry, especially in the SAIMC context, the role of system integrators has played a pivotal role in entrepreneurship. So’s contribute to alleviating the problem of losing skills through rewarding of in-house workers.

Building a value proposition
In order to establish a firm value proposition for Industry 4.0, it has to start at the FET (Further Education and Training) level, in schools and TVET (Technical, Vocational Education and Training) colleges, at the HET (Higher Education and Training) level, in universities, and all training providers. These institutions must redefine their value proposition in the interest of learners and the industry they serve. The value to date is a degree/diploma to secure employment. Having a certificate does not necessarily mean competence in applying knowledge. CBE (competency based education) models expedite the learning process and focus more time and energy on practical skills integrated with the acquired knowledge.

Maintaining a constructive WIL (work integrated learning) based education system is integral to adapt to the Industry 4.0 era. Learning programmes need to be aligned to labour market needs, and the recognition of the shift to a skills market is important. Opportunities in the TVET sector are not fully leveraged and the enrolment at TVET colleges stands at around 6% of total secondary and post-secondary enrolment. The apprenticeship programmes need to be upgraded to provide a career path for learners instead of merely producing artisans. More learning needs to take place in the workplace. Very little, or no provision is made for workers who need to acquire the required knowledge at a college or university. Evening and correspondence studies with incentives need to be emphasised. Greater private education and training participation holds the key to building a more resilient talent pool for tomorrow.

Conclusion
In the interest of the country and its people, government needs to make education and training an investment priority. Programmes and credentials need to be aligned to labour market needs. While knowledge is essential in embarking on any Industry 4.0 initiative, recognition of the shift towards a skills market is paramount. As we move further into the digital age, the following quotations are worth considering:

• “This futuristic, post-scarcity world poses new problems, such as how will goods and services be distributed among people? And who will pay taxes?” – Mark Zuckerberg.
• “The benefits of automation can be used to fund continuous education and universal basic income.” – Elon Musk.
• “The government should tax the work done by robots to compensate the workers they replace.” – Bill Gates (Microsoft).

For more information contact Professor Ralph Naidoo, Mangosuthu University of Technology, +27 31 907 7426, pnaidoo@mut.ac.za, www.mut.ac.za

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From the President’s desk

Jobs and skills of the future are continuously at the forefront of discussions. The impact that Industry 4.0 will have on us all makes us question what the future holds. Automaton is enhancing lives, and while technology aids us on a daily basis, we humans must also adapt in readiness for the future job market.

Aligning with Industry 4.0 means that individuals need to ensure they are ready to cope with continuous adaptation to change. But, within the SAIMC, we have a mission to change the educational opportunities for the youth and any working professional in South Africa. This initiative is led by our COO and director, Johan Maartens, and the aim is to ensure that we as a country are ready for the changing face of technology.

The differentiator in our initiative is that we have buy-in from industry partners that include experts in their relevant technologies. All of the requirements being developed are done with a view to ensuring that individuals are trained and equipped with the relevant skills to enable them to make a contribution to the economy and provide for themselves and their families.

If you want to learn more, please visit our website and have a look at the NTIP initiative that is part of our 2023 strategy.

Gala dinner and branch year-end functions

The SAIMC gala evening will be hosted at Monte Casino on 25 October. This year we have the privilege to celebrate with many of our national and regional members to celebrate milestones with them. We are proud and happy for the company’s involved and the great achievements they are celebrating.

If you are attending any of the various functions, I know you will have a great time. Our leadership teams go out of their way to arrange something special to ensure you have a memorable evening, as well as a great networking opportunity within the automation community.

I would like to thank all committee members for their contributions to SAIMC activities. You are the reason we can enjoy a great night out to network and learn about new technologies. The hard work that each of you puts in does not go unnoticed – thank you all so much!

Yours in automation,
Annemarie van Coller.
Technology evening: Flow measurement, custody and Industry 4.0
From power generation and cement production to waste treatment, the petrochemical industry and gas distribution, custody transfer can be a daunting application. However, combined with Industry 4.0, we can now bring all relevant data from the instruments to the plant manager, and even the financial department, to ensure all compliance requirements are met.

The more complex the plant, the greater the demand on system engineering and services: to find solutions we need to measure and present data to optimise and produce accurate and reliable information.

Industry 1.0 and Industry 2.0
The first industrial revolution began with the invention of the steam engine at the end of the eighteenth century, and the switch from manual to automated production. The second industrial revolution followed approximately 100 years later with the development of electrically-powered assembly lines. This has made cost-effective series production possible since the first third of the 20th century.

The use of sensors in Industry 3.0
SICK Automation is already a part of the third industrial revolution, which began in the 1970s. Electronic control systems, information technology, electronics, robots, and the increased use of sensors made it possible to further automate production, assembly and logistics processes. Photoelectric sensors from SICK are already an integral part of these changes, and are used around the world and across many industries.

Sensor intelligence as a fixed component of Industry 4.0
The fourth industrial revolution with its digitisation and networking of machines has been changing our lives for some time now. These new technologies have allowed the physical and virtual worlds in production and logistics to merge to form cyber-physical systems (CPS). Since 2011, these developments have been referred to collectively as Industry 4.0. Machines have the ability to communicate with one another autonomously, thereby optimising process flows. Industry 4.0 clearly relates to networking in the industrial sector.

Sensor technology is a necessary prerequisite for transparent processes in Industry 4.0. The sensor serves as the foundation for all subsequent applications. Simply put, without sensor technology, there would be no Industry 4.0.

In contrast to conventional, non-networked sensors, Industry 4.0 sensors deliver more than just measurement data. Their integrated decentralised computing power and flexible programmability are important characteristics for making production more flexible, dynamic and efficient.

Sasolburg IPP and Renewables Roadshow
African Petrochemicals hosts travelling exhibitions which showcases products and services relevant to the petrochemical industry. The branch was represented at the recent Sasolburg event, where members on stand duty took advantage of the one-on-one networking opportunities to inform delegates of the mission and goals of the SAIMC.

The Vaal committee at the roadshow (left to right): Dirk van der Walt (vice chairman), Juaandré Heyneke (branch manager), Theo Potgieter (secretary) and Cobus du Toit (media).

Juaandré Heyneke (right) thanks Martin Kotze from SICK Automation for the presentation.
Golf day
Friday 12 July started off a little cold and blustery (and got colder and more blustery!), but that didn't deter the 17 enthusiastic four-balls who teed off at the Kloof Country Club. As always, ICA kindly sponsored the registration station and there were a variety of hot beverages to choose from: coffee for those who wanted to focus and shooters for those who thought their focus would be helped by something that warmed from the inside; biltong for sustenance, and sweets and chocolates for that sugar-boost. ICA also generously sponsored a raffle, which raised R2400 for the SAIMC coffers.

The golfers varied in skill and experience – with one person owning up that this was the first time he’d ever played golf – but one thing that didn’t vary was the high level of enthusiasm and fun.

The afternoon ended with some chilled music by brother and sister duo Four 5 Seconds, some cold beers and then prize giving. With much hilarity and bonhomie, committee member Howard Lister, ably assisted by Steve Sanders, handed out the prizes. Howard had gone shopping earlier and did us proud with an amazing array of prizes ranging from microwave ovens to bottles of wine, with nobody going home empty handed.

Presentation at KITE 2019
Professor Ralph Naidoo was recently invited to present at the KwaZulu-Natal Industrial Technology Exhibition in Durban. A large and attentive audience gathered to hear about adapting education and training to meet the evolving needs of Industry 4.0 – a relevant and topical subject in today’s world. For the benefit of interested readers not able to attend the presentation in person, Ralph has submitted a full write up which you can find in the training section on pages 14 and 15.
Zambia branch

On 8 March, a select group of SAIMC members from the Copperbelt in Kitwe congregated at the premises of incoming SAIMC Zambia chairman T.C. Siame’s Trescha Electronics. This would hail the beginning of the one hour drive to Ndola along a wide stretch of road lined by commercial forests of pine and eucalyptus trees, interspersed with acacia and other native short brush that changes in colour and temperament over the seasons – brown and yellow in the cool dry winter to deep greens and burnt sienna in the rainy summer months. More recently, short-rise industrial developments and warehouses have also begun to sprout, as well as a large Chinese shopping mall and several places of lodging.

Established industry is facing growing competition from new investors taking advantage of the mining sector growth, and also the diversification of the Zambian economy to include more production of food and sustenance-based products. Neelkanth Cables is one of the new investors and, after observing their steady progress, the team decided to investigate the operation. Neelkanth hosted us and not only did they give us a technical presentation on general cable manufacture, they gave us a tour of the facility and showed us various experimental processes, as they endeavour to provide application specific cable in line with the exacting needs of the Zambian market.

Members were exposed to the various stages of copper/steel cable production from raw materials through to finished product. The meshing of IT and production machinery that is modern automation inspired us, leading to some lively conversation on the bus ride back to Kitwe.

Johannesburg branch

The July technology evening featured a presentation by Katlego Setwaba of Pepperl+Fuchs. The main focus of her talk was Ex p (purging and pressurisation). However, she started off by reminding us of the damage done by explosions, demonstrating the catastrophic effects if these are not prevented.

The three Gas Groups (IIA, IIB and II C) and Dust Groups (III A, III B and III C) were tabulated. A being the least sensitive to spark ignition, and C the most sensitive. She went on to cover zoning – Zone 0 being the most dangerous for gases, and Zone 2 has the least chance of the hazard being present. By contrast, dusts are correspondingly grouped into Zones 20, 21 and 22.

This was followed by the different explosion prevention techniques with a focus on flame proofing (Ex d, the containment of an explosion), intrinsic safety (Ex 1, limitation of temperatures and spark energy), followed by pressurisation and purging (Ex p, filling the equipment housing with clean air or inert gas).

Pressurisation is the maintenance of a positive pressure above atmosphere, after a preliminary purge. This can obviously not be done effectively in a dusty environment, so physical cleaning is required before pressurisation. In purging, the procedure is much the same, but instead of maintaining a static pressure, Katlego explained how there is a constant flow of clean air or inert gas through the enclosure. This of course requires a dedicated controller to carry out the pre-use purge, and to maintain the internal pressure.

It was an entertaining presentation, with plenty of questions, showing just how much expertise is required to prevent explosions. The branch thanks Pepperl+Fuchs for hosting the evening.

There are important dynamics that need to be considered when choosing an instrumentation valve and/or manifold. Some of these include:

- Basic valve/packing designs.
- Pressure variation.
- Temperature considerations.
- Product support.
- Codes and standards.

Understanding the diversity of your operating conditions will greatly affect the final design selection of your instrument manifold and/or valve.

The branch thanks Sagadevan for his educational presentation. A vote of appreciation also goes out to Secunda branch patron member Honeywell for sponsoring the venue, snacks and beverages at these technical events.

All instrumentation and control related mechanics, technicians and engineers are welcome to attend the monthly technology evenings. Dates for the rest of the year are:

- Thursday 3 Oct.
- Thursday 7 Nov.

All presentations earn CPD points for ECSA registered individuals. Enquiries can be directed to branch chairman Johan Maritz – 082 856 3865.
Today, everybody is talking about the fourth industrial revolution (4IR) and the fact that it is going to change our lives substantially. The question: Is 4IR the same as Industry 4.0, or are they different? And if so, what is the difference? Some explanation might be necessary to take away the confusion.

4IR represents a fundamental change in the way we live, work and relate to one another. It is a new chapter in human development, enabled by extraordinary technology advances commensurate with those of the first, second and third industrial revolutions. These advances are merging the physical, digital and biological worlds in ways that create both huge promise and potential peril. The speed, breadth and depth of this revolution is forcing us to rethink how countries develop, how organisations create value and even what it means to be human.

The fourth industrial revolution is about more than just technology driven change; it is an opportunity to help everyone, including leaders, policy-makers and people from all income groups and nations, to harness converging technologies in order to create an inclusive, human-centred future. The real opportunity is to look beyond technology, and find ways to give the greatest number of people the ability to positively impact their families, organisations and communities (www.weforum.org).

4IR is often also referred to as the Internet of Things (IoT). The IoT is the extension of Internet connectivity to physical devices and everyday objects. Embedded with electronics, connectivity, and other forms of hardware, these devices can communicate and interact with others over the Internet, and can be remotely monitored and controlled.

But what then is the Industrial Internet of Things (IIoT), or smart industry, and what does Industry 4.0 mean exactly?

Decentralised intelligence and cyber-physical systems

Smart industry – or Industry 4.0 – refers to the technological evolution from embedded to cyber-physical systems. Put simply, Industry 4.0 represents the coming fourth industrial revolution on the way to an Internet of Things: Data and Services.

Decentralised intelligence helps create intelligent object networking and independent process management, with the interaction of the real and virtual worlds representing a crucial new aspect of the manufacturing and production process. Industry 4.0 represents a paradigm shift from centralised to decentralised production – made possible by technological advances which constitute a reversal of conventional production process logic. Simply put, this means that industrial production machinery no longer simply processes the product, but that the product communicates with the machinery to tell it exactly what to do. Industry 4.0 connects embedded system production technologies and smart production processes to pave the way to a new technological age which will radically transform industry and production value chains and business models e.g. smart factory. (German Trade & Invest – Industrie 4.0 – Smart Manufacturing for the Future.)

The key to attaining smart factory benefits successfully is a solid wired and wireless Internet infrastructure making use of 5G communication capability.

An update on where things are headed in South Africa

In April, Cyril Ramaphosa appointed The Presidential Commission on the Fourth Industrial Revolution, with 30 representatives from all areas of industry and society as a cross-cutting enabler to work on our country’s blueprint. Meanwhile six work streams and their leaders have been defined.

The commissioners established and assigned the work streams as follows:

- An infrastructure and resources work stream to be chaired by Convergence Partners, Andile Ngcaba.
- A research, technology and innovation work stream to be chaired by CSIR CEO, Thulani Dlamini.
- An economic and social impact work stream will be chaired by MTN Group CEO, Rob Shuter.
- A work stream on human capital and the future of work to be chaired by creative industries expert, Beth Arendse.
- A work stream on industrialisation and commercialisation to be chaired by SA Women in Farming’s, Nomvula Mkhonza.
- A policy and legislation work stream to be chaired by Cisco public policy director Africa at Cisco Systems, Charmaine Houvet.

The above mentioned work streams reflect the requirements from a 4IR perspective. How these will align with the industrial requirements still needs to be defined. One might assume that the work stream on industrialisation and commercialisation will be defining these requirements. Important in this whole discussion also is the higher involvement of the private sector. Government needs to foresee the necessary frameworks, but the private sector needs to turn that into tangible actions.

If we draw a parallel with the German Industry 4.0, they defined working groups dealing with the requirements of the private sector. Six working groups stand for the technical and context-related results of the platform. Experts from businesses, associations, works councils and academia develop pre-competitive concepts, solutions and recommendations on key topics of Industry 4.0 – from standardisation and IT security to economic, legal and social dimensions. And every working group is headed up, in a rotating responsibility, by one of the private companies involved.

- Technology and application scenarios, chaired by Johannes Kalhoff – Phoenix Contact.
- Legal framework, chaired by Dr. Hans-Jürgen Schlinkert – ThyssenKrupp.
- Digital business models for Industry 4.0 – Dr Svenja Falk – Accenture.

Clearly, the time has come to get the private sector involved as they have the knowledge and power to bring maximum benefit to the South African economy and all of its people.
Energy Cybernetics was contracted by the NCPC-SA as part of the IEE programme to undertake a compressed air system optimisation (CASO) assessment to recommend compressed air system energy efficiency opportunities for implementation at Hulamin Edendale in Pietermaritzburg, KZN. Their study indicated that energy reduction and cost-savings opportunities included the ability to reduce end use air flow and system air pressure, and to optimise compressor control strategy. In addition, performance improvement opportunities included the ability to assess functionality of current air dryers.

Having worked very successfully with Hulamin in the past, Control Software Solutions (CSS) was the perfect choice as system integrator on the project to optimise the visualisation and digitisation of the energy consumption processes at the plant.

“The project started with the energy optimisation project at the expanded coil coating line in 2016 and has continued to expand as budget is released and the uptake from other Hulamin users increases,” says CSS’s Pieter Venter. “In essence, the client wanted to have complete digitisation of the energy processes and to provide visualisation for all departments using energy.”

Efficiency through data visualisation

In this way, all data would be centrally located and accessible to all relevant parties. A more accurate and finite assessment of energy consumption by the various processes would allow the company to optimise its processes and reduce costs by anticipating them in advance. CSS’s scope of work therefore entailed historising data and visually displaying it; managing and immediate notification of alarms; making trends available; as well as allowing for remote plant access and change management.

Another element that needed to be addressed was the monitoring of the moisture content in the compressed air to determine where issues were arising. This early warning system would allow Hulamin management to quickly react to any issues, an essential addition since the site is so large.

The selected system included:
- Allen-Bradley ControlLogix PLC.
- Wonderware System Platform. This is the Hulamin standard and provides redundancy, seamless integration and connectivity to multiple devices.
- Win 911. This is used to notify clients when parameters are out of the acceptable range.
- InTouch Access Anywhere – deployed for the use of managers around the plant.
- InTouch WindowMaker and WindowViewer.
- Historian and Historian Client.
- APC Thin Manager.

Venter says that the project presented a number of challenges that included the fact that Hulamin did not have a proper industrial network architecture. “We were therefore forced to develop standards that would allow the development of the network in such a way that future expansion could be easily expedited. The aim was to in future provide an industrial network topology with wireless remote access and redundant PLCs. Added to this we needed to deliver central services plant air indicators that provide situational awareness and backup data for 10 years.

Another challenge faced by CSS was a purely logistical one. “Since the plant was not able to shut down for extended periods of time during the upgrade project, we had to remain extremely flexible and deploy the various elements in a fragmented manner,” explains Venter. “We also provided remote dial-in support for when we were offsite.”

Venter believes that the success of the project hinged on the collaborative nature of the relationship between all stakeholders. “A project of this scope benefits greatly from the early involvement of personnel from production, maintenance, IT and business systems,” he adds. “The requirements and expectations of these departments for the new system have to be established early on and, as the project progresses, it is crucial to maintain lines of communication between these departments. We have managed, as a team, to implement a rather complex system in a highly successful manner that ticks all the client’s boxes.”

Ephraim Khoza, electrical engineer, Hulamin’s Engineering Services, summed up the sentiment of the company: “This is a powerful solution. I can see live trends, with real-time data available, so it is easy for me to react. Notification by sms and email when alarm limits are reached means we can respond immediately.”

For more information contact Pieter Venter, Control Software Solutions, +27 31 914 0040, pieterv@cs-solutions.co.za, www.cs-solutions.co.za
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How integrated visual management and remote monitoring demystify machine safety

Safeguarding machines and personnel is critical to ensuring the smooth operation of any manufacturing facility. Effective machine safety systems benefit workers and employers by reducing lost work days due to injury and demonstrating the employer’s compliance with safety standards to appropriate regulatory agencies. Additionally, OEMs who integrate safeguarding into their machines enjoy a ready market for their easy-to-use, pre-integrated machines. However, machine safety can be complicated and difficult to manage.

This article shares common challenges for machine safety, and shows how combining easy-to-use safety devices with visual indication and remote monitoring capabilities can help make safety simpler and more effective.

Common safety challenges
For machine builders and end users alike, machine safety can be daunting, and many safety devices are cumbersome and difficult to use effectively without impacting productivity. Hard guards, such as doors, fences, and other fixed barriers, can reduce ergonomics, take up valuable floor space, and can be difficult to move in response to change. While hard guarding may be necessary for some applications, many others can benefit from electronic safety systems, including optical devices like safety light curtains and safety laser scanners. These electronic devices offer many benefits including saving floor space and increasing productivity by improving workstation ergonomics.

However, even with the use of electronic safety devices, there are still challenges. Many electronic safety devices can be difficult to setup and use, and some require complex programming. In addition, once safety devices are implemented, they must be used correctly to ensure reliable safety, and they should be easy for operators to interact with. For example, it can be challenging for managers to quickly identify when and where a device has been tripped, which means it can take time to get the line back up and running after an event. Furthermore, safety systems that are difficult to use can make it more likely for operators to try to bypass the system, increasing the risk of injury and extended downtime.

Safety simplified: three important considerations
Despite the complexities of industrial safety systems, safety can be made more intuitive. The key is to find solutions that are easy to setup and use correctly, and that allow operators seamless interaction with the devices. An intuitive safety system combines easy-to-use devices with LED indicators that can work together to make managing complex systems simpler and more visual.

The following are three considerations to keep in mind when choosing a safety system for effectiveness and ease of use:

1. Simple commissioning
The first question to consider when choosing a safety solution is whether the safety devices can be commissioned easily, cost-effectively, and with minimal downtime. In the case of safety light curtains, products that have visible alignment aids ensure that the light curtain can be set up both quickly and correctly. For example, the LS safety light curtain from Banner has alignment indicators built into the entire length of the receiver window for instant feedback during initial setup and future maintenance. When an area of the sensor is not aligned properly, or the window needs cleaning, the green lights will turn red in the affected area, making troubleshooting intuitive and expediting corrective measures.

For safety controllers, choose a device and software that feature an icon-based, drag-and-drop user interface to reduce the learning curve and speed up commissioning. For example, the XS26 expandable safety controller from Banner includes software with a seamless user interface for setting up and managing safety systems. In addition, the software’s simulation mode allows users to test new configurations and changes prior to implementation. (Note that simulations do not replace commissioning checkout procedures on installed systems. Always follow required procedures for installed systems detailed in the product instruction manual). The XS also has a built-in display and a micro USB connection to easily connect a PC or download a configuration from the XM memory card.

These seemingly small details will help get your safety devices up and running with minimal downtime, saving upfront time and costs.
2. Usability and management
Easy setup is not the only important consideration. Safety solutions can be expensive and will be used for years to come. Because of this, an important factor to consider when choosing a safety solution is whether these safety devices are easy for operators to use, understand, and respond to quickly every day, year in and year out.

Safety devices with integrated visual management can make a significant impact on usability and therefore productivity. Furthermore, operators may also be less likely to attempt to bypass safety measures when the devices are easy to understand.

For example, with traditional e-stops, it can be time-consuming to determine exactly which button was pressed, and typically an emergency stop condition requires a reset of all e-stop buttons on a line. To solve this challenge, illuminated e-stops have an LED base that can be configured to change from yellow to flashing red when pushed. The coloured lights in the e-stop base provide easy visual indication of armed button, pushed button, or system status.

This makes it easy to see the status of all e-stops at a glance and instantly identify an actuated button. The faster the response to the stop condition, the more quickly the machine can be restarted, reducing unplanned downtime. Illuminated e-stops can also reduce commissioning time and costs due to the ability to series connect the e-stops to a safety controller. This not only reduces cable costs and wiring time, but also reduces the number of inputs used at the safety controller.

Another way to combine indication and safety is to add LED indicators to safety light curtains. Like the illuminated e-stop, these indicators provide clear, understandable local alerts so that operators can quickly identify when a safety light curtain has been tripped, facilitating faster reset. Banner Engineering’s patented, field-installable indicators can be easily attached to cascade(able) models of the LS light curtain series with no wiring required, and they can be added on to the system at any time.

In addition to local indication, remote indicators can also help support productivity by making light curtain status visible from anywhere in the factory. For example, an LS light curtain can be connected to a remote tower light using a proprietary QD connection to ensure that machine safety status alerts are visible in the sightlines of a manager at their desk away from the machine. Choosing a solution provider that can bundle safety and indication solutions together can reduce the costs of installation and reduce wiring requirements.

3. Remote monitoring
A final consideration when choosing a more intuitive safety system is remote monitoring capability. As businesses convert to IIoT technologies, remote access to devices throughout a manufacturing facility is becoming more important for maintaining flexibility and visibility, and safety is no exception. Remote access to the operational status of machine safety components allows plant managers to monitor and diagnose systems quickly before problems impact machine availability and productivity.

For example, a safety controller that can communicate with the PLC allows remote users to monitor safety devices to identify faults or actuated safety devices via the HMI. Users can also track device data over time for predictive analytics and process optimisation. For example, XS26 and SC26 safety controllers can communicate via Profinet, Ethernet/IP, Modbus, and PCCC up to 256 virtual status updates to a PLC and/or HMI that can be stored and tracked for future analysis. Furthermore, these controllers can also receive up to 80 virtual non-safety inputs to remotely turn safety devices or indicators on and off, enable mute functions, cancel off-delays, initiate a reset, and accomplish other tasks quickly and easily in the HMI without complicated programming.

Conclusion
The benefits of intuitive safety systems are many. When devices are easy to set up and use correctly, they are more effective. Furthermore, when safety systems are managed visually and can be monitored remotely, problems can be addressed more quickly, reducing unplanned downtime and saving costs.

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Tunable diode laser (TDL) spectroscopy is rapidly becoming the gas analysis technology of choice in industrial processes. Mettler Toledo Ingold offers the GPro 500 TDL Series, a versatile platform that allows one to place a TDL wherever it matters in a process, no matter the location.

The GPro 500 TDL system is ideal for tough and challenging gas measurement applications and is designed for in-situ petrochemical processes and safety applications. Packed with state-of-the-art technology, it offers exceptional measuring performance, easy installation and requires almost no maintenance. TDL gas analysers are a significant improvement over extractive analysis systems, as no sample extraction or conditioning is necessary, they are immune to interference from background gases, and very tolerant to high moisture and dust environments and they exhibit very low drift.

TDL analysers measure the concentration of a target gas by analysing the absorption of laser light. The GPro 500, has an original design that is adaptable to almost any kind of process. The series comprises separate products for the measurement of oxygen, carbon monoxide, carbon dioxide, hydrogen chloride, hydrogen sulphide, moisture, ammonia and methane. The product has a very low detection limit and a response time of less than two seconds.

Most TDLs are comprised of two separate parts: a laser source and analyser. Aligning the two elements across a pipe is often problematic and may need repeating more than once. The GPro 500 combines the laser source and analyser in a single unit. The laser beam from the source passes down a probe and is reflected by a three-sided mirror back to the analyser, so no alignment is required.

The GPro 500 TDL series is available with a range of adaptions that fit directly to the analyser’s head which provides flexibility in application. Most TDLs use a large quantity of purge gas to prevent the analyser’s optics from being coated by dust in the gas stream. The GPro 500 is available with a robust probe fitted with a shielded particle filter that eliminates the need for purge gas. The series also has a wafer cell, which enables accurate measurement in confined spaces such as two inch pipes.

Mettler Toledo’s Intelligent Sensor Management (ISM) technology adds to the features of the GPro 500 by incorporating predictive diagnostics that continually assess the optical path quality and indicate when cleaning is required, before measurements are affected. Other than yearly verification and occasional cleaning of the optics, no other maintenance is required. The GPro 500 provides real-time, continuous, accurate gas measurements, resulting in operational safety at all times.

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Sealing for oil and gas applications

BMG supplies and supports the full range of Garlock seals and sealing systems, including specialist fluid sealing products for the oil and gas industry.

“Garlock seals and sealing systems, which meet stringent safety and emission compliance standards in the hydrocarbon processing sector, are enhanced by customised solutions for efficient plant operation and maintenance,” explains Marc Gravett, BMG’s business unit manager, seals and gaskets division. “Sealing services extend from simple solutions to critical applications, ensuring safe, sustainable and dependable sealing integrity in every application. BMG’s Garlock products and technical expertise ensure reduced operational costs, improved efficiency, minimal downtime and uninterrupted production.”

Products developed especially for the oil and gas industry include Klozure oil seals, Gylon and Gylon Epix gaskets, pipeline isolation products and Link-Seal modular seals.

Garlock expansion joints and Klozure oil seals ensure that fluids run smoothly, making the transition of loading or offloading of gas and liquid safe and efficient in offshore buoy applications.

Garlock Klozure oil seals and bearing isolators are designed to retain lubricants, but exclude contaminants, like moisture, dust and dirt, from penetrating the primary seal or bearing houses. These components play an important role in protecting bearings, preventing downtime and extending the service life of the system, even in arduous operating conditions.

Klozure oil seals are available from BMG in numerous shaft sizes, materials and designs, including solid and split configurations.

Easy installation and effective sealing
Seals with a reverse bevel lip allow installation in either direction without rollover and stainless steel garter and finger spring configurations provide tension to create an effective seal against the shaft. Klozure oil seals with a Gylon lip material offer reduced creep and cold flow, compared with the standard PTFE material.

Gylon sealing products are used for many applications in hydrocarbon refineries, including flanged connections and tube and shell heat exchanger flanges. Gylon gaskets are suitable for media like hydrocarbons, acids, caustics and solvents.

Newly-developed Gylon Epix gaskets are manufactured from the same PTFE material as standard Gylon products, but with one universal thickness of 2.4 mm. The consolidation of two thicknesses into one product reduces the need for users to stock gaskets with multiple thicknesses. These colour-coded gaskets, which have been designed for increased compressibility and conformability, improve performance in misaligned flanges and are suitable for a broader range of applications than conventional PTFE gaskets used in worn and pitted flanges.

This range features a hexagonal surface profile that combines the torque retention and blowout of a thin gasket and the conformability of a thicker gasket, for optimum sealing performance. The patented profile surface design reduces the contact area during initial compression to concentrate the compressive force of the flange for improved sealability.

Various high-performance sheet materials in this range are suitable for use in different applications, including acids, steam, chlorine, water, solvents, gases, refrigerants and hydrocarbons.

Garlock pipeline isolation products include new ElectroStop fittings that complement PSI/Pikotek isolation joints, to ensure the security of flange connections by providing electrical isolation, extreme temperature electrical isolation and high integrity sealing.

Special features
ElectroStop monolithic isolation fittings provide a positive leak-proof, long-lasting block against the flow of electric current in all piping systems. ElectroStop fittings, which eliminate short circuits, provide a maintenance-free welded in-line isolation joint in below-ground pipe systems.

Many applications involve connections where the pipe is penetrating a wall, floor or ceiling and sealability is required between the pipe and the penetrated surface. In these through-wall piping applications, BMG recommends the use of Link-Seal modular seals. Link-Seal – suitable for ductile iron, pre-stressed concrete and metal or plastic pipe, conduit and cables – will effect a hydrostatic seal capable of holding 20 psig (40 feet of static head) between the pipe and the penetration cylinder through which the pipe passes.

BMG’s full range of Garlock seals and sealing systems include metallic and Gylon gaskets, oil seals, bearing isolators, expansion joints and butterfly valves. Components extend from a standard sealing ring, available from BMG’s stock and ready to install, to customised designs, which are fabricated to specific requirements.

Garlock sealing products, with a user-friendly design and advanced materials, ensure dependable sealing in all sectors. These industries include chemical and petrochemical, pulp and paper, power generation, electronics, food and pharmaceuticals, as well as steel mills, mining and OEMs.

All Garlock seals and sealing systems undergo stringent field and in-house testing to ensure safe and reliable use, as well as extended service life.

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With the Tescom 44-6800, Emerson has introduced a vaporising pressure reducing regulator for gas chromatograph analysers with the option to separate the regulator body from the electronic enclosure, without compromising hazardous location certifications. This design provides protection to the regulator’s electronics from the extreme high temperatures found in petrochemical refineries and processing plants.

Designed for sample conditioning systems for online gas chromatography analysis, the new regulator promotes greater reliability and accuracy in sample testing results, while simplifying system commissioning, reducing maintenance and enabling remote and local monitoring to meet global process requirements. The device works by ensuring the carefully controlled delivery of single-phase vapour samples of hydrocarbon mixtures to a gas chromatograph (GC) where the sample is separated and its physical properties analysed. Obtaining precise and reliable values from the GC, such as the measurement of natural gas BTUs, can lead to substantially improved refinery efficiencies.

Separability ensures optimum performance

Unlike traditional vaporising regulators, the 44-6800 series separability enables the user to detach the electrical housing – which contains sensitive electronics, power supply and temperature adjustment dial – from the regulator body. This can then be installed in a lower temperature environment, preventing sensitive electronics from being exposed to ambient temperatures exceeding 65°C. Separability, coupled with high tolerance to voltage spikes and extreme ambient temperatures, ensures optimal performance and safety in locations rated as hazardous. The series is available in two body material options: 316 stainless steel and nickel alloy that provide maximum corrosion resistance for added value and long-term reliability.

“Optimal plant operation relies on accurate analytical results, and our customers seek absolute reliability in their gas chromatography sample conditioning systems, something that may be compromised when electronics are exposed to high temperatures inside heated cabinets, or when using vaporising regulators with inferior heat transfer technology,” said Laura Schafer, vice president of sales, precision fluid control, Emerson. “With its innovative design, we have boosted the reliability of sample conditioning systems so that our customers do not have to worry about the quality of their samples.”

The regulator is designed for a flow capacity of 0,02 and pressures up to 415 bar. It is offered in both electric and steam versions. Emerson is launching the new series specifically for sample conditioning systems used in on-line gas chromatography analysis in oil, gas, petrochemical and chemical applications.

Patented heat transfer technology preserves sample integrity by preventing condensation of heavier components from occurring during pressure reduction. Temperatures can be precisely controlled using the single-turn heater control dial and the regulator is also equipped with a PID controller for precise heater temperature control.

Remote monitoring has become mission critical for the oil and gas industry. The Tescom 44-6800 features an industry standard 4-20 mA analog output to enable remote monitoring of the heater temperature and for data acquisition. Signals can be output to modulating field devices, PLCs, and scada systems, amongst others, to achieve the networked goals of Industry 4.0 applications. The series also has the option for an LED screen for local monitoring in the field.

Certification adheres to the global requirements of the CSA (Canadian Standards Association), ATEX (Atmosphere Explosibles) and IECEx (International Electrotechnical Commission) certification to T3 (200°C) rating, along with the National Association of Corrosion Engineers MR0175/ISO 15156 standards for the use of materials in hydrogen sulphide bearing environments. In addition, the regulator offers global flexibility with its 100-240 VAC, 50/60 Herz design supported by voltage spike protection.

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Total E&P UK is a leading oil and gas company operating in the North Sea. In the Culzean gas field off the coast of the UK, the group is implementing an Operational Intelligence Platform (OIP) after a study verified demand for the Culzean gas deposits. The OIP is intended to enable efficient decision making and proactive operational management via access to timely data, data visualisation, monitoring/alerting capabilities and access to relevant systems and supporting documentation. Total opted to implement the OIP using plant engineering and operations intelligence software from Siemens. Breaking the project down into multiple phases allows all those involved a high level of flexibility and cost control, and also the opportunity to come up with a fast, efficient response to any arising challenges. Natural gas from the Culzean field is forecast to meet around five percent of total UK demand.

One of the main objectives behind implementation of the OIP is to facilitate how information is handled, made available, and distributed. The aim is for the entire operations team to be able to access a jointly used information environment in which real-time data can be integrated seamlessly into maintenance and engineering data, affording personnel an overview of the Culzean asset’s performance and status at any time. The OIP is based on six main pillars: operations, health and safety, production, maintenance, planning and logistics, as well as the work areas of individual employees.

**Smart software solutions**
The platform is being realised using XHQ operations intelligence software and Comos Walkinside plant engineering software from Siemens. XHQ aggregates, relates and presents operational and business data in real time to provide personnel with a solid basis for performance management and decision-making. Comos Walkinside makes available 3D design data from the engineering phases and allows it to be used throughout the entire asset lifecycle. Implementation of the XHQ and Comos Walkinside software solutions for the project was managed by Siemens partner SLN Chemtech.

**Step-by-step implementation**
The project was implemented in multiple stages: proof of concept and verifying the performance of the tools used, commissioning, and joint solution development. Taking a cooperative joint approach to development along proved enormously helpful when it came to dealing with tricky and in some cases unexpected challenges.

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Oil and gas producer reduces downtime by twenty percent

In India, the swelling middle class has created a growing market demand for petroleum products. An oil and gas producer, one of India’s largest petroleum product manufacturers and distributors, with a processing capacity of 6.5 million metric tonne per annum, must keep petroleum products pumping through the plant because any unplanned downtime could cause critical product shortages. A key contributor in the quest to reach zero unplanned downtime is healthy equipment – like pumps – achieved through monitoring and maintenance.

The company’s pipeline supplies the interior areas of India. Seven pumping stations along that pipeline have already used Rockwell Automation systems for several years, with almost no downtime. The goal was to maintain, and even improve, such performance.

Challenge

The biggest challenge for this customer is timely distribution and accurate pumping of products 24/7. Any disruption could increase refinery inventory and leave retail units without adequate supply.

To maintain continuous flow, each pumping station uses three pumps: two are at work at all times to maintain line pressure across the pipeline to the next terminal. The remaining pump is on standby, in case one of the others fails.

Oil pump operation is precise. Undetected or unreported wear and tear on the pump is not acceptable because even the slightest shift in pump operating parameters can cause damage. An ageing monitoring system, installed years ago, no longer functioned reliably, and there was no ability to communicate with the station PLC to identify and rectify system faults.

Solution

To reduce the number of systems it needed to maintain, the customer preferred a single system (and a single system supplier) for their control system, HMI and the machine monitoring system (MMS).

Since continuous operation is required, this customer could not shut down the system for a switchover. The company requires seamless integration of this system, including the MMS, with existing systems.

Given the scope and complexity of the requirements, the customer wanted a supplier with proven skills, experience and support, and selected Rockwell Automation for its extensive experience in automation and global support. With a local office and authorised distributor just five kilometres from the site, Rockwell Automation had the required expertise to manage the requirements of the project, from initial design through engineering, integration and implementation.

Effective solutions for the terminal included seamless integration on a single EtherNet/IP network with the flexibility to configure parameters using the existing graphic user interface. Separate training was not required to ensure the new systems were easily accepted by the operations team.

Rockwell Automation Global Solutions implemented a vibration monitoring solution that:

- Interfaces with existing systems to monitor vibration data of the pumps and alert operators of any abnormal situations.
- Allows operators/engineers to easily set parameters and provides trending, alarming, and exception handling.
- Works with existing equipment, including probes and sensors, by ensuring compatibility.
- Offers the plant manager complete and accurate information in real-time.

The solution is built on:

- Dynamix 1444 Condition Monitoring System using a common control system, ControlLogix L72, with a common development environment to provide high performance in an easy-to-use environment. The system’s tight integration between the programming software, controller, and I/O modules reduced development time and cost at commissioning and during normal operation.
- Logix5000 controllers and Add-on Instructions (AOI) to increase productivity and make troubleshooting easier.

Results

With this solution and the integration of various OEM control systems to enable plant wide visibility and real-time monitoring, Rockwell Automation helped its customer reduce the risk of critical equipment failure.

At the same time, the solution improved the ability of operators to monitor conditions and immediately address concerns before problems turn into downtime. The solution ensures that any abnormalities in the process conditions and deviation from the standard operating parameters are immediately highlighted to avoid problems and improve reliability.

As a result of implementing the Rockwell Automation vibration monitoring system, the customer reduced the risk of downtime by 20%, and also reduced its dependency on multiple vendors. The flexible graphic user interface helped reduce operator training time and expense. The next iteration of the solution could include the ability to create real-time dashboards for production and utility data.

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Valve technology for tyre presses

Production plants for tyres place extremely high demands on valves. Tyre curing presses work at high pressures of steam, water, and nitrogen, as well as at high temperatures. In addition, the very short processing cycles require extremely robust valves for very high cycles, so that good operating efficiency is achieved with the service life being as long as possible. In the Continental plant in Púchov, Slovakia, angle seat valves and sliding gate valves from Schubert & Salzer Control Systems have proven particularly suitable for these operating conditions.

Continental, a leading tyre manufacturer with global production facilities, has used Schubert & Salzer valves for years at its plant in Púchov. Previously, a large number of different valves from various manufacturers had been used in the curing installations at this site. This led to increasingly bigger problems in terms of maintenance and spare parts procurement. Some years ago these systems began to be retrofitted uniformly to Schubert & Salzer technology, in order to, above all to optimise the control accuracy, extend the service life under the harsh operating conditions, simplify the maintenance, reduce the range of models, and reduce the processing heat waste.

Space-saving valve construction
Initially, angle seat valves of Type 7010 were used in a special high-temperature design with threaded connections. The special advantage of 7010 angle seat valves is the high wear resistance. Due to the rapid wear of the seating seal, the ball valves, previously used for this purpose, regularly led to leakage and required maintenance after one to two months. The construction of the 7010 angle seat valves allows self-cleaning of the valve seat. This is very important under the critical conditions of vulcanisation with deposits and corrosion in the pipeline. The 7010 valves from Schubert & Salzer have operated at the same place without problems for years.

Relative to other seat valves, angle seat valves save space due to their angled design to the pipeline and the very compact actuators. Compared with traditional globe valves, angle seat valves have high Kvs values with relatively small dimensions. These dimensions make handling of the valve easier and result in a reduced weight for the entire valve.

This construction can be easily insulated, which significantly reduces the heat losses at the valve. With the single acting actuators used here, the number of control air supply lines is also reduced, and the safety of the press systems is increased in the event of the loss of control or power.

After the good experiences with the angle seat valves, Continental also decided to convert the curing installations from hot water to steam based on Schubert & Salzer technology. Instead of an inlet pressure of 3 bar, the valves must now also be able to handle 17 bar. Sliding gate valves are best suited for this purpose, because they can be used simultaneously in both areas of application.

Less wear in all operating situations
The heart of the sliding gate valve is composed of two slotted discs that slide one on top of the other and are sealed relative to each other. A sealing plate fixed in the housing perpendicular to the direction of flow has a defined number of transverse slots of the same size. A rotationally fixed disc with the same arrangement of slots is moved vertically and thus changes the flow cross-section. The subsequent pressure difference presses the moving disc onto the fixed disc. The sliding gate valve thus forms a seal without any metallic seat. This functional principle also causes a self-lapping action of the moving seal disc. This area seal is thus considerably less susceptible to faults than a ring seal typically used in globe valves. This design achieves leakage rates of less than 0.0001% of the Kvs value.

For a good long-term sealing, there is another system-dependent advantage of sliding gate valves that has an effect on an economical service life. The maximum control stroke of the sliding gate valve is only 9 mm. This short stroke length provides not only short actuation paths and switching times, but the packing and actuators are also operated very gently due to the short stroke length. In the case of sliding gate valves, both are subject to significantly less stress, so that these also have considerably longer service lives.

In the event of maintenance, all common valves require the disassembly of the entire valve housing, in order to reach the seating elements. And this requires, by experience, the help of at least two workers. This is not the case for sliding gate valves. The throttling element can be disassembled and serviced by a single person on site in the plant. After disassembly of the valve, only four cover screws have to be loosened and then the so-called functional unit can be pressed out and replaced.

In curing installations, the following properties of sliding gate control valves have proven extremely advantageous:

• According to operating requirements, the valve can be optimised with a corresponding Kvs value by simple replacement of the fixed disc.

• The high control accuracy of the sliding gate valve allows a shortening of the press cycles resulting in increased productivity.

• Simple and quick maintenance of the valve by replacing the easily accessible disc pair.

For these reasons, all of the valves in this plant have been standardised to Schubert & Salzer. Currently, over 1700 angle seat valves of Type 7010 and approximately 800 control valves of Type 7020 and sliding gate valves of Type 8043 are in use at this plant. Schubert & Salzer valves offer excellent advantages for Continental especially in the areas of cost minimisation for plant management, maintenance, and service.

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Küster Automotive is an internationally active family-run company and a part of Küster Holding. A full-service supplier, Küster manufactures components for the automotive industry. For its production to comply with Spice (software process improvement and capability determination) Level 2, Küster relies on Polarion ALM (application lifecycle management) from the PLM (product lifecycle management) specialists, Siemens PLM Software.

This way, Küster not only adheres to the standard, but also benefits from integration in the OEM supply chain, a focal element of its production. The automotive supplier must ensure that its production complies with this international standard, also known as ISO/IEC 15504-5, for evaluation of its corporate processes. Original equipment manufacturers (OEMs) also require Küster to have specifications available in the Requirements Interchange Format (RIF) and in a system enabling change management.

The specifications ensure that metadata can be exchanged between software tools from different manufacturers. To comply with these requirements, Küster was keen to find a standardised solution guaranteeing immediate RIF compatibility for its requirements management. Its hopes were answered with the Polarion ALM system from Siemens PLM Software.

One solution with a raft of benefits, Polarion enables rapid implementation of all traceability and reporting requirements for Spice Level 2, and can also be extended to include testing and quality assurance. The web-based Polarion architecture used reduces both implementation and maintenance costs. The use of a certain feature, LiveDoc documents, which is exclusive to Polarion, makes it a simple matter to transition desktop documents and their management processes to the online environment, which is always up to date.

“Polarion ALM requirements management has proven that it complies easily with Automotive Spice Level 2,” explains Christian Posluschni, team leader electronics/software development at Küster. “The depth and breadth of traceability required is easy to establish. The same system that supports our Automotive Spice compliance also supports us as a part of the OEM supply chain. The ability to use RIF (and soon, ReqIF, RIF successor) to read requirements from OEMs online and manage all the requirements, theirs and ours, is of great benefit to us.

“With Polarion, it was even possible to optimise other tools the company already had in place, such as TortoiseSVN for version control. Further fields of application are in the pipeline.”

Taken overall, the team at Küster is impressed first and foremost by the fact that Polarion meant procuring and implementing just a single package instead of several piecemeal solutions. The rollout went smoothly after only a few training sessions, and continuous improvement of the system is taken care of by regular updates. “As requirements demand, Polarion RE and Polarion QA are being used,” says Posluschni.

Polarion QA is used for test management, but there is more to come as the company has concrete plans to introduce automatic integration of test results, which are currently collected manually.

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BI revs up growth in the automotive industry

The importance of the automotive industry to Bearings International (BI) as a growth area is underlined by the fact that it has just appointed Keith du Preez as business development leader (BDL). He forms part of the larger BDL team structure established by BI, with a dedicated and focused approach to core market segments. These are mining, agriculture, sugar, OEMs, steel, FMCG, automotive, infrastructure, and wholesale and retail.

“This new strategy represents a focused and flexible approach to key markets, honing in on where we can add the maximum value,” comments general manager Shenton Botes. “Each of the market segments we have identified as key growth areas have specific client applications and requirements.”

On-highway and certain light-duty off-highway automotive applications such as the forklift industry will be overseen by du Preez. The former includes the passenger vehicle and commercial truck-trailer segments.

The passenger vehicle segment itself covers various tiers, from original equipment warranty and often use branded products such as bearings supplied by BI. In addition, the needs of the aftermarket are also catered for, from spares shops to the general public.

“Our aftermarket and direct-to-public automotive products can be sourced from any one of our branches countrywide,” highlights Botes, “including two branches in Namibia. Tier 1 OEM applications are serviced from BI’s warehouse in Parkhaven, Boksburg, also offering a bonded store facility.

“Here we not only assist with duty reclaims, but are also able to carry sufficient stock to cater for any production variations, as a buffer for our OEM clients to ensure they do not incur any costly downtime,” adds Botes.

BI supplies automotive products such as wheel hub bearings, clutch release bearings, alternator bearings, and rear wheel bearings, focused mainly on the leading Koyo and FAG brands. KML is a subsidiary, non-OE brand for clients requiring a more cost-effective solution.

“We have a dedicated team overseeing the automotive industry,” concludes Botes.
IR thermometers in the steel industry

In many foundry applications, temperature readings show whether processes are operating within their proper ranges, whether a reheater is too cold or too hot, whether a stand needs adjusting, or how much cooling should be applied.

By utilising non-contact infrared thermometers, each stage can be accurately monitored so the steel retains the correct metallurgical properties as it travels through the process.

Every section of the steel manufacturing process can benefit from the use of infrared thermometers. These benefits include higher quality products, increased productivity, reduced energy costs, enhanced worker safety, reduced downtime and easy data recording.

Infrared sensors take temperature measurement one step further. Fast and accurate analog and digital outputs allow temperature data to be integrated into a control system and simultaneously output for remote temperature monitoring and analysis. Smart sensors, with digital electronics and 2-way communications, can be configured remotely from the safety of the control room – especially important for metals with changing emissivity.

A wide range of optics covers a variety of applications. This is supported by integrated through-the-lens sighting, plus either laser or video sighting for correct target location. Infrared thermometers are used world-wide and in South Africa in many iron and steel applications. These applications include:

- **Continuous casting**
- **Fixed sensors, fibre Optic devices and line scanners are standard in this application.**

- **Reheating**
  - Reheating steel to a uniform temperature is critical so that deformation does not occur.
  - Measuring inside a reheater with a series of temperature measurement devices gives an operator the ability to check the reheater’s overall temperature and burner efficiency. Once the slab or billet exits the reheat furnace, ratio thermometers or line scanners (for wide slabs) transmit temperature data immediately to an operator or controller, allowing mill operations to be adjusted correctly.

- **Rolling mills**
  - The diversity in the types of hot rolling mills and the number of types of stands in a process vary according to the type of product being manufactured. Scale breaker, rolling stands, down coilers and coil boxes are just a few areas for the utilisation of infrared temperature measurement and scanning.

- **Cold mills**
  - Coiling is also often done at the end of the finishing stands after cooling, and the coiled steel is transported to cold mills in another area in the plant or shipped to other facilities.
  - Cold rolling makes a product thinner and smoother and is done while the steel is around 100°C, or even at room temperature. Sensors mounted between each finishing stand allow the operator to detect temperature changes that require any adjustments.

- **Rod/wire mills**
  - In a typical rod or wire mill, billets are reheated and sent to a rolling mill to be reshaped as rods. From here the rods go through a series of intermediate stands that reduce them to different sizes. Finishing stands reduce and smooth the rods into a product that can be further processed into hundreds of different products. Reheating a billet to a uniform temperature is critical to the entire process. Knowing the temperature of the product at each stand allows the operator to adjust the rollers accordingly. When the product heads for the cooling area, cooling is rapid but carefully monitored to make sure the metallurgical properties are correct. If cooling is improperly controlled, the product will not meet specifications and could be downgraded or scrapped.

  In some processes, the high speeds and vibrations of narrow rod or wire products make temperature measurement difficult. High-performance infrared ratio thermometers solve this problem. Even when the target drifts in and out of the field of view or is partially obscured (dust, steam, obstacles), a ratio thermometer will still take accurate temperature measurements.

- **Other processes**
  - Infrared provides temperature measurement solutions for every step in the steel treatment and manufacturing process, from coke ovens and blast furnaces to annealing and coating mills. Raytek and Ircon also have temperature measurement solutions for forging mills and heat treating facilities. Wherever temperature is a factor in production, from the raw material to the finished goods, Raytek and Ircon are there to help.

For more information contact R&C Instrumentation, +27 11 608 1551, info@randci.co.za, www.randci.co.za
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Kobold’s electromagnetic flowmeter

Instrotech now offers Kobold’s new electromagnetic flowmeter model EPS with a standard accuracy of 0.3% of reading. The newly developed, microprocessor-controlled converter guarantees the high accuracy and the instrument is easy to operate via its alphanumeric backlit LCD terminal with 6 keys, plain text response and plausibility check of entries.

Empty pipe detection, coil current monitoring and plain text error messages guarantee full control over sensor and measuring point at any time. Pulse, status and current outputs, as well as HART communication, are standard features, all of which are electrically isolated. Lining materials such as hard rubber, soft rubber, EPDM, ceramic, PTFE or PFA are available. A wide range of standard and special electrode materials are on offer, including stainless steel, Hastelloy, platinum, titanium and tantalum. The EPS is available for nominal diameter from DN10-DN1200, and flow velocities up to 10 m/s. Other features include:

- Maintenance-free operation.
- No pressure drop.
- Numerous electrode materials.
- Low-cost grounding electrode instead of earthing rings, also available in special materials e.g. tantalum.

The new instrument is used to measure the volume flow of liquids, slurries, pastes and other electrically conductive media without any pressure drop. Pressure, temperature, density and viscosity do not affect the volume measurements, but solid particles and gas bubbles should be avoided.

For more information contact Instrotech, +27 10 595 1831, sales@instrotech.co.za, www.instrotech.co.za

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Easy way to detect compressed air, steam and gas leaks

Comtest has announced Fluke’s new ii900, a handheld sonic industrial imager that enables maintenance teams to locate air, steam, gas and vacuum leaks. The intuitive interface allows technicians to isolate the sound frequency of the leak and to filter out background noise. In a matter of hours, the team can inspect the entire plant, even during peak operations.

Using SoundSight technology, this industrial imager offers a new way to locate issues using sound. Leak identification is simple: a SoundMap is displayed in colour over a visual image of the equipment allowing for fast location. With the visual image, it is easy to scan a large area quickly and even possible identify leaks from a distance.

The ii900 enables users to do more with existing air compressors, for example:
• Delay the capital expense of purchasing an additional compressor.
• Ensures proper air pressure to pneumatic equipment.
• Lower energy costs (optimisation of compressed air budget).
• Reduce leak detection time.
• Improve reliability on the production line.

This new instrument makes leak detection part of a typical maintenance routine, for example, the training of a maintenance team is possible in a matter of minutes and provides for the validation of repairs.

Finally, it is specifically designed for industrial maintenance teams, maintenance managers and plant operations managers, who rely on compressed air, gas or vacuum in their routine operations. With minimal training, technicians can begin checking for air leaks as part of their typical maintenance routine.

The Fluke ii900 finds application in the following industries: manufacturing: aerospace, automotive, glass, plastic and rubber, mining and mineral processing, cement, chemical processing, food and beverage pulp and paper.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za
A real-time alternative to radiometric density measurement

Currently, in mining applications, radiometric measurement has been the only way to measure the density of slurry. Until recently, and due to the harsh and abrasive environment of slurry, no other measuring principle could work. This has recently changed due to the use of tuning forks (FTL 50) in conjunction with density computers (FML621).

The reason why radiometric density is unpopular is not because the principle of measurement does not work – on the contrary it works well and with very few issues. The problem with radiometric density measurement is the red tape that surrounds the measurement point. To have radiometric measurement a site needs to conform to certain local and international standards. A radiation officer needs to be permanently on site in case of an accident. Training around safe practices with radiation needs to be performed and complex and costly transportation regulations need to be followed. These are some of the challenges that plants face when it comes to radiometric measurement for density.

This process is becoming less challenging with the introduction of a tuning fork that can measure slurry density. Depending on the slurry application, correctly installed tuning forks can now last longer than 12 months before they require any maintenance.

The tuning fork principle
Vibration limit switches are mechanical systems vibrating at their resonant frequency. A piezo drive, the core element of the sensor, generates drive impulses that are transferred to a stainless-steel tuning fork, the only part of the system which comes into contact with the product. Due to this well-known piezo effect, it is possible to make the tuning fork resonate and measure the shift in resonant frequency. The limit switch also analyses the resonant frequency at which the fork vibrates. Thanks to this cleverly employed technical feature, limit switches have reinvented themselves as fully-fledged density measuring instruments, which fulfil user requirements for information directly from the process and provide a cost-effective alternative to established measurement methods, such as manual sampling. Parameters such as conductivity or dielectric constant, do not interfere with the function of the sensor. However, temperature compensation is recommended to achieve highest accuracy. If a pressure change in the process by more than six bar, then pressure compensation will also be required.

The measuring principle is based on the fact that the resonant frequency of the tuning fork depends on the density of the product, the process temperature and pressure. Changes to the resonant frequency are directly affected by the density of the material. Materials with a lower density such as liquefied gas give rise to higher resonant frequency than materials with a greater density such as water. The density of the medium can be accurately calculated using mathematical formulae depending on the resonant frequency, temperature and pressure. The frequency shift is, therefore, used to measure changes to density levels caused by different liquids or concentrations. Combined with a density calculator, the corresponding density value of the medium can be calculated from the resonant frequency in a reliable and reproducible manner.

Fluctuating process temperature near the tuning fork should also be measured by a temperature sensor, which is then recorded and compensated in the density computer. Therefore, influences on the density value are taken into account.

Factors to consider when installing a tuning fork in a flow density application include:

- Vertical installations are recommended.
- Eliminate air bubbles.
- Eliminate build up while empty.
- Low (0-2 m/s) velocity.
- Fine slurry particles (0.15 mm).

For more information contact Dhiren Naidoo, Endress+Hauser, +27 11 262 8000, dhiren.naidoo@za.endress.com, www.za.endress.com
Hygienic pressure transmitter

The pressure transmitter Jumo Taros S46 H – available locally from ASSTech – is designed according to the hygienic requirements for precision measurement and longevity. The high-level protection type up to IP69 and the fully-welded, compact design enables residue-free cleaning and high temperature capability for SIP and CIP processes. Its excellent active temperature compensation ensures exact pressure measurements and process reliability.

The new instrument is ideal for the food industry, sterilisers and autoclaves, in fact, for all hygienic pressure measurement applications. The unit also ensures maximum operational safety in the pharmaceutical, medical and biotechnological industries. Protection classes from IP65 to IP69 enable use in all areas, regardless of environmental influences. The transmitter is compliant to FDA regulations.

Portable calibrator approved for hazardous areas

WIKA’S CPH7000 portable process calibrator has received ATEX approval. It is therefore now also suitable for use in hazardous areas.

The calibrator provides highly flexible on-site calibration for process transmitters and pressure gauges. A high-pressure version even tests measuring ranges up to 10 000 bar.

The portable, multi-function instrument integrates an electronics module, a hand pump for generating test pressures of up to 25 bar and a high-performance data logger. Due to its equipment, the CPH7000 also fulfils test tasks for the measurement parameters of temperature, voltage and current.

For more information contact WIKA Instruments, +27 11 621 0000, sales@wika.co.za, www.wika.co.za

Hygienic pressure transmitter

For more information contact Anastas Schnippenkotter, ASSTech Process Electronics & Instrumentation, +27 11 708 9200, info@asstech.co.za, www.asstech.co.za

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Want it?
Electronic pressure gauges for Ex areas

Instrotech now offers Keller’s range of intrinsically safe electronic pressure gauges for use in areas subject to gas explosion risks. The type approvals are compliant with the ATEX Explosion Protection Directive regarding explosive gases. The electronic design of these devices is trimmed to minimise energy consumption, so it is also possible to replace the batteries inside areas with explosion risks.

The simplest version, model ECO 1 Ei, offers high resolution and reproducibility for both measuring ranges (-1 to 30 bar and 0 to 300 bar), together with accuracy (typical) of 0,5% FS and an integrated min/max memory. The application range as per the ATEX directive is defined by identification markings Ex ia IIC T5 or T6.

Keller’s type Leo 1 Ei and LEO 2 Ei electronic pressure gauges feature microprocessor-assisted compensation to ensure an extremely narrow total error band (including temperature errors) of 0,2 % FS over the entire range of operating temperatures from 0-50°C. The zero point can be selected freely within the four measuring ranges and an automatic switch-off function guarantees energy efficiency. Both models feature sampling rates of 2 Hz and integrated min/max memories. The special feature of the Leo 1 Ei is its additional memory for peak values. In peak mode, even extremely short-lived peak values for system pressure are registered with a sampling rate of 5000 Hz. For both these pressure gauges, the application range as per the ATEX directive is defined by identification markings Ex ia IIC T5 or T6.

Another version of the Leo type electronic pressure gauge, the Record Ei, is equipped with an integrated data memory to record pressure and temperature progressions in the measuring medium. Outside of areas with explosion risks, the data can be transmitted via an RS-485 interface to a PC for evaluation with the Logger 4.X software. The instrument can register pressures of up to 1000 bar with a total error band of 0,1% FS. With a capacitive sensor, this type is also available for very low measuring ranges starting from 30 mbar. The application range as per the ATEX directive is defined by identification marking Ex ia IIC T4.

Featuring accuracy of up to 0,01% FS, the Lex 1 Ei electronic pressure gauge is a genuine reference and precision measuring instrument that has been specifically equipped with a 5-digit display for calibration and testing purposes. Pressure measurement ranges of between -1 and 1000 bar are available. This device also offers a min/max memory and a digital interface to generate PC protocols. The application range as per the ATEX directive is defined by identification marking Ex ia IIC T6.

Features that are shared by all Keller digital pressure gauges include simple parameterisation and operation with only two buttons, while the pressure display can be shown in various physical units that are freely selectable.

For more information contact Instrotech, +27 10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
How to eliminate blocked chute woes

The original electromechanical point level switch, Bin-Dicator diaphragm-type level controls were the first to enjoy general usage in the industry. Bin-Dicator eliminates bin overflow, empty bins, clogged conveyors, choked elevators and resulting damage and waste.

The Bin-Dicator control is a pressure actuated switch for use with free flowing bulk materials at atmospheric pressures. Actuation of the switch is the result of pressure exerted by the bulk material against the diaphragm assembly. De-actuation or switch release is a result of the bulk material clearing away from the diaphragm. The sensitivity of the diaphragm is adjustable to cater for different bulk materials. The switch offers a SPDT switch rated at 15 A at 430 VAC.

The simple and rugged construction of the cast aluminium enclosure, offering IP65 protection, can be mounted either inside or outside the bin. Outside the bin option allows for retro-fitting, lowering installation costs. The unassuming operating mechanism makes the entire unit readily accessible for inspection, resulting in lower maintenance costs. Many variations of the diaphragm are available for use in a wide range of dry materials and conditions of temperature, corrosion and moisture.

The Bin-Flo aerator is a simple and efficient means of introducing low pressure air into any dry finely ground material. The air is equally distributed in controlled quantities to give the material the ability to flow by gravity from bins, hoppers or chutes. Bin-Flo aerators incorporate non-clogging diffusers, an integral orifice and construction features which assure maintenance-free life. The Bin-Flo body is available in two different sizes and manufactured either in zinc plated steel or stainless steel.

The Bin-Flo aerator offers simple installation and can be installed from inside or outside the bin. The outside the bin option allows for retro-fitting and product inspection. The unique integral orifice controls the air consumption at any recommended pressure. The best and usually the most economical air supply is from a positive displacement low pressure blower. A non-clogging diffuser provides equal distribution of air and will not clog even with the finest materials. Bin-Flo offers a cotton diffuser for applications up to 85°C and fiberglass diffuser for applications up to 320°C.

For more information contact Rob Hare, DRH Components, +27 12 991 2119, robh@drhcomponents.co.za, www.drhcomponents.co.za
Customers often ask about data cable categories and what they mean. For many end-users, engineers and purchasing agents, who do not work with these types of cables on a daily basis, the different categories can seem complicated and overwhelming. However, what appears to be complex at first glance, can be simple to understand with a couple of tips. The category positively correlates with the data speed. i.e. the higher the category, the higher the possible frequency and the higher the frequency, the higher the possible data rate.

Data cable basics
One can compare category cables to a multi-lane road; the more lanes a road has, the more vehicles that are able to travel on this road concurrently. The standards are generally based on a maximum cable length of 100 m. This cable length consists of 90 m of installation cable and 10 m of patch cable. After the initial 100 m a repeater/extender is added to the cable system, which strengthens the signal and prepares it to be transmitted an additional 100 m as needed to connect the machine or its apparatus, and the control unit. Additionally, category data cables have to fulfil decoupling values of the pairs, e.g. near end cross talk (NEXT).

For Cat 5 cables, the decoupling of the pairs is realised in the cable construction with different twisting lengths of each pair. That means for four pairs, one has four individual twisting lengths during production.

Cat 6 cables allow users to choose between two technical designs. The relevant decoupling values of Cat 6 can be achieved with a plastic cross that creates distance between the pairs. Another way is to use a pair in metal foil (PIMF) construction. The thickness of the aluminium foil influences the effectiveness of the screen. Many people think that a screen in the construction protects the cable from environmental influences. However, it also has the opposite effect – the screen keeps the electrical signal in the cable and avoids negatively influencing other equipment in the vicinity.

For even higher categories, such as Cat 7, 7e, and 7A, a copper braid is mandatory to fulfil the standardised electrical values because an aluminium foil alone is not enough. Furthermore, each screening material has advantages and disadvantages.

Aluminium foil is inexpensive, but by itself this material does not perform well in applications that require flexible, track or torsion cables. If one moves a metal foil again and again one starts to see cracks, which decreases the effectiveness of the screening in the cable. This is the reason why some manufacturers construct cables that move frequently or are located in electromagnetic vulnerable (EMV) areas, using both an aluminium foil screen and a copper braid. This applies even to cables that are ‘only’ Cat 5 classification.

For cables with high amounts of bending
cycles and small bending radii, some manufacturers use an additional metalised tape to fulfil effective screening. This is similar to a woven tape with integrated metalised parts, which offers longer lifespan without cracking compared to a standard aluminium foil.

Core material options
Let us now turn to a variety of possible core options, from both a material and stranding perspective. In most applications, bare copper is the preferred core material to use. However, in specific applications, such as the railway industry, a tinned copper core is preferred due to its higher corrosion resistance.

In terms of core stranding, solid cores are typically used in fixed installations, while flexible applications require a more nimble core which typically consists of seven strands. Flexible cores are used for drag chains and robotic applications with short lay length in order to achieve a more flexible cable and smaller bending radius. For the smallest bend radii and maximum cycle quantity/service life, customers can request to have data cables constructed with 19-strand cores. Having more strands in a core increases its flexibility; however, the best solution for a customer specific application should be discussed in consultation with the cable manufacturer.

Sheath material options
Cable sheath types are plentiful and can be narrowed down according to the application. For cable installations in buildings, polyvinyl chloride (PVC) or flame retardant non-corrosive (FRNC) compounds are the typical choice of sheath material. PVC is not halogen free, but it is flexible and inexpensive. FRNC compounds meet the requirements of halogen-free and flame retardant, and emit a less optically dense smoke, which makes exiting a building easier and allows for improved firefighting operations in the event of a fire emergency.

Polyethylene (PE) sheaths are mainly used for outdoor cable applications or in cases where a cable needs to be buried into the ground. These cable sheaths are good at resisting moisture and exposure to the sun. Due to the increase of data cables being used in industrial automation, it is common to use oil-resistant PVC blends, polyurethane (PUR) or thermoplastic elastomer (TPE) sheath compounds. These cable sheath types are preferred for their increased oil resistance, and ability to withstand the mechanical stresses often associated with the use of drag chains, and robotics. The choice of a particular compound or blend is based on the application and operating conditions.

Cable quality
Finally, it is highly recommended to use data cables that have had their mechanical capabilities extensively tested to withstand the rigors of operating in continuous-flex (drag chains) and torsion (robotics) applications. Data transmission rates can lessen, or signal quality could erode, due to cables that are unable to withstand strenuous operating conditions. Manufacturers should use a combination of test equipment, such as drag chains, torsion apparatuses, ovens and freezers, and, in some cases, specific application testing rigs, such as towers that mimic the strain and load on cables found inside wind turbines.

For more information contact Helukabel, +27 11 462 8752, sales@helukabel.co.za, www.helukabel.co.za
Clever chilling with less refrigerant

Rittal expands its cooling technology for enclosures and machines with new Blue e+ chillers.

Rittal has significantly improved its cooling technology for machines and enclosures with its new Blue e+ chillers in the 11 to 25 kW output class range. Using 40% less refrigerant, these devices are making an important contribution to sustainable environmental protection. Simultaneously, users are benefitting from the precise temperature control, simplified operation and installation, and the new safety functions of Blue e+ chillers.

The range’s ability to re-cool liquids addresses the basic requirement for smooth operation in many industrial manufacturing processes. It was designed with the understanding that enclosures and machine tools must have an exact temperature control feature for the precise machining of metal.

Sustainable and environmentally friendly cooling

With the development of its new chillers, Rittal can offer a mature solution package to meet all requirements. As well as the Blue e+ chillers with 1,5 to 6 kW, units are now available in the robust industrial standard (IP44, electrical) in four output classes ranging from 11 to 25 kW and in the two enclosure sizes of 660 x 1265 x 1315 mm and 760 x 1265 x 1515 mm.

Regulating according to need

The chillers’ fan and compressor are regulated centrally via a digital controller. This way, the temperature of the cooling medium can be precisely regulated: by default, the hysteresis is 2K; however, a precision control (hot gas bypass) of 0,25K is also possible as an option. According to Rittal South Africa’s managing director, Adrian Buddingh, this prevents temperature fluctuations that cause inaccuracies on the machined workpiece and works to ensure consistent quality.

Easy to use

The multilingual and industrial-grade touch display on the front of the chiller, plus the intelligent communication interfaces, make both operation and analysis easy for users. Consequently, the parameterisation of the devices, as well as the read-out of the data and system messages are performed clearly and quickly and shown in plain text. Error messages are prioritised and displayed in three escalation levels (note, error and maintenance) as an easy way to assess necessary action.

Rapid assembly

Blue e+ Chillers are pre-wired ready for connection and can be quickly put into operation via plug-and-play. Lifting eyebolts make transport easy, as does the base/plinth, which is suitable for transport by forklift truck. Uniform water connections, an adjustable overflow (bypass valve) and ideal accessibility to all the components make it easy for fitters and service staff to work on the units, cutting down on maintenance time.

Comprehensive safety as a priority

Integrated overflow valves ensure a constant circulation of cooling water when the consumer is closed and the pump is running, protecting the coolant pump from overload. The valve is pre-set for the pump being used and for 50 Hz operation, but it can also be set for 60 Hz. “A filling level monitoring system ensures maximum reliability and improved availability,” adds Buddingh. “In addition to these safety features, optional flow monitors emit an alarm if the flow rate is too low and they can detect hydraulic errors such as contamination and blockages in the system at an early stage.”

Added value

As an extra service, Rittal also offers preconfigured option packages that are available from stock and which offer a suitable solution for almost any demand. One such option is performance enhanced pumps (4 and 6 bar) that are available for multi-circuit systems. If necessary, a precision control system (hot gas bypass) can be used to improve control accuracy from 2K to 0,25K. In addition, the Blue e+ chillers can be prepared for cold zones of down to -20°C, as well as for laser applications, and they can also be fitted with a water-cooled condenser or with heating and customised with special paint.

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For more information contact Rittal South Africa, +27 11 609 8294, info@rittal.co.za, www.rittal.co.za
A low-voltage electrical distribution system design to reduce the complexities often associated with panel design is available from leading local supplier ElectroMechanica (EM). Quadro+ from Hager combines modularity with familiar low-voltage (LV) components to simplify the design of a professional distribution solution.

The Quadro+ modules include assemblies, equipment and accessories required to build a complete enclosure, with IP30 or IP55 protection levels up to 4000 A. According to EM product manager, Christo van Rensburg: "This is a tried and tested international solution, the Quadro+ system is designed around a rigid frame that offers adaptability, ease of assembly, and quick build times, along with quality components."

A feature of EM’s value offering is that it can provide customers with complete solutions: when a customer partners with EM, it is able to design and build a complete LV electrical distribution system suited to its requirements.

The Quadro+ system offers support of essential third-party products like Socomec change over-switches, Lovato motor control and metering, Delta variable speed drives and automation products, with little or no additional effort. “This significantly simplifies the complexity associated with completing projects on-time, and gives customers a single point of contact for all of their needs,” highlights van Rensburg.

EM offers a comprehensive range of enclosures, from a two-way surface enclosure to a 168-way flush or surface distribution boards. IP65-rated enclosures are also available. While this range is suitable for residential and small commercial buildings, the Quadro+ system is tailored specifically for the larger commercial and even industrial markets.

“When you select Quadro+, you opt for a fully-tested LV electrical distribution solution that has continually proven its worth in different industries. It is manufactured in Italy to IEC and EN-62439-1&2 standards. This means it meets the latest international standards of safety, performance and reliability,” stresses van Rensburg.

All enclosures are designed with an extremely rigid structure (IK10 and IP55) for extra durability. Cabinets are shipped flat-packed to save on transportation and storage cost. Only eight screws are required to assemble the frame, and all the screws are pre-mounted for quick turnaround time.

“Thanks to the supporting HagerCAD software, planning and designing your system is intuitive, simple and fast,” concludes van Rensburg. “You’ll also benefit from local technical support and expertise. Whether designing, building, or installing a distribution system, the Quadro+ solution impresses with its convenience and overall quality. EM and Hager see this as a further opportunity to build on their reputation of being a trusted, reliable, and on-time partner for more than 30 years.”

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Top tips to help you implement 4IR projects that deliver value

In the just over 10 years I have spent working on IT projects in the manufacturing space, the amount of new fads and IT jargon that has to be adopted has reached the heavens, and ascended into other realms. As a regular editorial contributor, I’d like to focus this article on IT projects that must deliver value…

In my opinion, a project should follow from a PoC (proof of value) and/or a PoV (proof of concept). The 4th industrial revolution is here and it is apparently going to force us all to think and act differently about technology, and we are reminded that if we don’t, we are doomed to the archives just like many IT-fuelled revolutions before this one (Web 2.0, open standards, cybersecurity, button-less phones).

Why PoC? Why PoV?

4IR means many things right now, for instance quick, concise, at my fingertips data that allows me to respond to ever changing business demands. Let’s entertain the idea that a vendor promises to lower costs, downtime and maintenance, and at the same time improve market position, reliability and longer run time before shutdowns – all with an off the shelf product that can be implemented via an intensive project spanning two years. This is not Agile and it is not cheap. We would surely want to see proof? The vendor would suggest a proof PoC: a small sample manufacturing process that can prove their offering works, conceptually. Let’s entertain this vendor.

Months go by and technically the concept works after a few kinks were resolved. Then, top management becomes intrigued and asks for a full scale roll out. This is where you should be that guy who asks: “But has any value been proven?” All we have done is proven that the product does what it says it can do, we have not proven longer run times or increased reliability beyond the standard norms. Now scream ‘Prove the Value’ and watch your managers stare at you in admiration, and at the vendor in disdain. Proof of value is taking the concept and running another mini project to show that the solution can deliver against the agreed terms of reference that add value for us. Once the value has been agreed and proven, we can move onto a large scale project where the inputs, actions and learnings must be adopted from the PoC and used as markers to ascertain if we are indeed on the right track, pointing back to value all the time. All 4IR related projects must deliver this value, otherwise they are pointless in our context.

“From problem to PoC and PoV, and finally, a positive impact on the bottom line.”

In the above example, we moved from idea, to promise, to proposal to PoC, to PoV, and finally, to a full-scale project with benchmarked results. If only life were that simple. Unfortunately it isn’t and things do not always run smoothly. To help you then, here are my top tips for implementing successful, value-driven projects in the imminent IT revolution in manufacturing:

• Understand the value you’re seeking: in Agile speak it is called an EPIC. What do you want, less maintenance, increased reliability, less carbon footprint?

• Forget the solution, focus on the value associated with your problem: focusing on the EPIC/value will systematically lend to the identification of the solution, not the other way round.

• Deliver value in steps: Agile, which is a large part of the 4IR requirement, focuses massively on delivering value in chunks and not once off solutions e.g. the largest part of an IT project is usually the tremendous focus on the technical deliverable. We have all seen the pictographic of the tree swing required by the business and then every typical IT project resource’s interpretation of this tree swing… 4IR will require a fundamental shift when delivering on a project – solutions can no longer just be ‘thrown’ at business problems.

• Speaking of resources: system development is key, but understanding business data and what to make of it is of greater importance, so too are fundamental technical abilities such as business analysis and data extraction, interpretation and design. But these are skills, skills are harboured by the people who work in your organisation, the business and manufacturing process, the data, the untapped ideas and the known issues are seated in those minds.

• What you did in 2012 is no longer relevant: this is the sad reality, but it is the truth. Think of what you knew in 2012 and compare to what you know today – the pace of progress is endless. Therefore, do not be afraid to experiment by proving the concept and proving the value. Never in our wildest dreams could we imagine that flying drones would require a licence, never could we imagine pointing our mobile phones at a picture and the picture would become interactive, smart and intuitive.

It starts with a problem and turns into identifying the value associated with solving it. A PoC and PoV can take a few weeks or a few months, but I’d highly recommend doing either (preferably both) before embarking on a full-blown 4IR project. Embrace change, but remember to seek out the true value hidden gibberish that surrounds every industrial revolution. Always hunt the value.

Lance Turner

Lance Turner is an MES specialist employed at Sasol’s Secunda plant. He has an honours degree in Information Systems with a focus on Enterprise Architecture design and solutions. A certified MESA MES/MOM student, his passion is amalgamating general IT across the manufacturing spectrum. Lance’s vision is for a converged IT and manufacturing discipline that will become the reality of Industry 4.0. His team motto is MES services that are always available, always stable, and always dependable.

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Digitisation requires new skills

Smart grid investments by municipal and public power utilities typically focus on electric distribution and customer systems. The expected benefits include lower costs, better customer service and more reliable and efficient electrical system operations.

The uptake in South Africa has not reached its potential and Taru Madangombe, vice president of power systems in southern Africa for Schneider Electric, comments on the reasons and solutions to increase South Africa’s implementation of smart grids.

“The energy revolution is causing dynamic changes in the market;” he explains. One of the major challenges is the unavailability of good technical competencies, as people need to adapt from traditional power systems, with labour intensive practices, to a new model based on digitisation. This fourth industrial revolution (4IR), ushering in the IIoT, requires new skills and expertise based on digital expertise.

“In the implementation of a smart grid system, there is a gap between the available skills and understanding of the system. We are involved in the updating of digital training courses at universities and technical colleges across South Africa and in the Anglophone region (including east Africa).

“These skills need to address the region’s requirements of new connectivity, new mobility, remoteness of regions and how you make systems more efficient, smarter and reliable. It is no longer about learning how to commission switchgear, it is about reading, analysing and reacting to data coming in from multiple sources on the grid. “Of even more interest to South Africa is the concept of microgrids, a localised power grid that can operate either in conjunction with the main electrical grid, or independently of it, as an ‘island’. It offers new opportunities to smaller municipalities and remote communities.

“This is one of most feasible opportunities for Africa as a whole, as electrification still has not reached 600 million in sub-Saharan Africa because of the huge capital investment required for grid strengthening through construction of large substations and long transmission line. In South Africa, we have achieved 89% electrification, but that figure has not shifted much in the past 10 years because there is not sufficient infrastructure, to justify investment in such long transmission lines to some remote areas. Therefore off-grid systems are the answer to these challenges.”

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Fibre optic distributor for network expansion on demand

Jasco’s Webb Industries has introduced Telegärtner’s new, modular rail-mount fibre optic distributor, which can be extended according to actual needs. The stackable modules allow quick and easy additions and changes at any time. A vast portfolio of modules with different adaptors offers the flexibility that is needed in today’s industrial networks. In spite of their compact size, the modules offer more than enough space for fibre slack.

Variety of connecting hardware

The STX rail-mount distributor offers a vast portfolio of different modules that accept twelve fibres and ST, SC and LC adaptors as well as a high-density LC module with 24 fibres. All modules are available for OM1 to OM4 multimode and OS2 single-mode fibres.

Customers can select from a huge variety of modules for pre-terminated breakout and mini-breakout cables. This includes modules with an integrated hinged splice cassette and pigtails stripped ready-to-splice and modules for pre-terminated fibre optic cables.

The adaptors are mounted at a 45-degree angle so users can conveniently plug patch cords in and out using a minimum of valuable space. Horizontal cables can enter the modules from four different directions, which gives installers the opportunity to decide on site about the best cable routing options.

With dimensions of 35 x 215 x 155 mm (two-module width), the compact modules make the most of available space, enabling users and installers at the same time to conveniently patch and store any fibre slack. The modules can be mounted on TH35 rails as specified in DIN 60715 and on flat surfaces/walls.

For more information contact Webb Industries, +27 11 719 0000, webb@webb.co.za, www.webb.co.za
Condition monitoring systems track equipment degradation. Typically, an equipment criticality and reliability assessment is performed to identify common failure modes. With the selected equipment and failure modes in hand, users can identify sensors to monitor specific components of the equipment for degradation and the initiation of identified failure modes.

“Reliability engineers cannot be in two places at once,” says Stephen Plumb, sales manager at Test Dynamics. “But this is the request when assets from two different plants are raising concern. Which one is more likely to contribute to an outage? If deciding between two assets is difficult, what about thousands of them? Remote diagnostics help maintenance teams decide where to deploy valuable resources like subject matter experts, troubleshooting equipment and spares.”

The National Instruments solution
Fortunately, there are a number of measurement technologies and sensors for condition monitoring applications. National Instruments’ InsightCM is condition monitoring software for reliability professionals who want to remotely diagnose equipment before deciding if an in-person trip to the asset is needed. The software, along with NI monitoring devices, can catch pre-failure indicators while helping to reduce, or eliminate, route-based data collection and replace it with more productive use of time in the field.

Plumb says that five salient remote diagnostics features help unlock maintenance team productivity: web client access; waveform data for vibration analysis; the ability to convert raw accelerometer data to a WAV file; multiple measurement technologies; and intelligent alarming.

The core component of InsightCM is the server installed on a standard IT machine on-site or in the cloud. Maintenance engineers log into the server using a web browser to view and analyse data from any of the connected assets. This also means IT groups have fewer software installations to manage because no software is needed on user machines.

InsightCM collects waveform data so analysts can perform more detailed diagnostics without needing to travel to the asset or assume which machine requires the most attention. Some vibration data displays include trend views for standard calculated features as well as viewers for waveform and spectral analysis including orbit, bode, shaft centreline, FFT, order, enveloping, and time synchronous averaging.

The system can convert raw accelerometer data into an audio quality WAV file to help experts recreate the experience of being in the plant, even if they are hours away.

Multiple technologies supported
Analysts use more than vibration to diagnose machine health problems, which is why multiple sensor technologies are supported, allowing experts to monitor various failure modes and crosscheck their diagnosis for greater confidence. Supported measurement technologies beyond standard vibration measurements include:

- Motor current signature analysis (MCSA).
- Thermography.
- Electromagnetic signature analysis (EMSA).
- Other standard sensor inputs.

“Moving from route-based data collection that happens monthly or quarterly to an automated and connected system where data can come in multiple times an hour could overwhelm analysts without a way to intelligently screen data,” says Plumb.

InsightCM can help maintenance teams set alarms and data capture conditions for any of the available features. The screening can happen at the server or on intelligent NI monitoring devices already connected to sensors in the plant. The system also has an alarm baselining feature that automatically sets statistics-based alarm points created from previously captured data from ‘known to be good’ operating states.

“In addition, we also offer RFmx Bluetooth which is application software that provides simple access to advanced optimisation techniques such as multi-measurement parallelism and multi-DUT measurements,” concludes Plumb. “The result is fast, high-quality measurements with minimal software development effort. RFmx Bluetooth supports modulation accuracy, transmitted power and adjacent channel power measurements on both low energy and enhanced data rate physical layer signals. It is completely interoperable with all RFmx APIs. We invite anybody interested in maximising their condition monitoring to contact our team and discuss a productivity-enhancing solution.”

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Industry 4.0: Manufacturing Executing Systems

Industry 4.0 is set to lead the way for digitisation of manufacturing processes. Manufacturing Executing Systems (MES) are a critical component of Industry 4.0 as they act as an enabler for end-to-end digitisation.

What is MES?
Manufacturing Executing Systems are information systems that control complex manufacturing processes on the factory floor. MES achieves this by tracking and gathering accurate, real-time data about the production lifecycle. The data which is collected is about product genealogy, performance, traceability, material management, WIP and other plant activities. The importance of the MES lies within its functionality as it serves as a layer between the enterprise resource planning (ERP) and the process control systems on the factory floor, giving manufacturers real-time workflow visibility and insight into how best to improve manufacturing operations across the enterprise.

How Industry 4.0 influences MES
Industry 4.0 dictates the end of traditional centralised applications for production control. Industry 4.0’s vision of ecosystems of smart factories with intelligent and autonomous shop-floor entities is inherently decentralised. A new environment is created due to customer demands for tailor-made products. These plants are fuelled by technology enablers such as 3D printing, Internet of Things (IoT), Cloud Computing, mobile devices and Big Data. Future manufacturing systems, including MES, will have to be built to support this paradigm shift.

Lighthouse MES
S4 Integration offers the South African market a tried and tested MES/MOM platform. Lighthouse MES is modular, consisting of the four main areas of manufacturing operations, namely: production operations, quality operations, inventory operations and maintenance operations.

Lighthouse MES software allows organisations achieve:
• Smart manufacturing through the digitisation of manufacturing processes and operations.
• An uninterrupted thread of time critical data throughout the manufacturing operation.
• An improvement in efficiency, output, compliance and customer satisfaction and.
• The removal of traditional organisational silos to optimise business practices.

S4 Integration offers Lighthouse MES to the end customer covering installation, integrations, development and support. With a number of local installations within the automotive and packaging sector, Lighthouse MES has become synonymous with a Manufacturing Executing System with measurable benefits to the end user.

For more information contact Sigourney Bruintjies, S4 Integration, +27 41 451 1250, sigourneybruintjies@s4.co.za, www.s4.co.za

www.instrumentation.co.za  September 2019  55
SAFETY SYSTEMS

Taking safety to the next level

SICK Automation is a world leading manufacturer of sensors, safety systems and automatic identification products. The next step for safety – this core idea therefore underpins the entire design of the deTec4 safety light curtain from SICK.

Safety light curtains for the prevention of machine accidents are a readily available technology; but users of this technology want more than just safety. They are looking for intelligent additional functions that generate added value in terms of process transparency, flexibility, ease of use and maintainability, or integrated automation functions that guarantee fast amortisation and maximum future proofing.

The key details in brief include protective field heights of 300 mm to 2100 mm; performance level-E safety rating in accordance with EN ISO 13849; SIL3 in accordance with IEC 61508 and type 4 in accordance with IEC EN 61496-1; reduced resolution mode; beam coding; 2-signal muting; IP65 and IP67 protection class; and high temperature resistance from -30 to 55°C.

Of much greater interest are the modular functional scope and innovative features of the deTec4, which no other safety light curtain currently offers in this combination. Thanks to Smart Presence Detection, the deTec4 from SICK only activates presence detection if a person is actually in danger. In contrast to conventional safety light curtains, the deTec4 can reliably blank out sawdust and weld sparks that fall into its protective field, while securely protecting people at the same time. This reduces unplanned downtime and machine failures and increases the productivity of machines and plants.

Equally user-friendly, but significantly more extensive are the diagnostic options via NFS and the SICK Safety Assistant smartphone app. While NFC and the smartphone app facilitate real-time diagnostics and rapid troubleshooting on site by taking a snapshot, sensor communication via IO-Link provides for continuous remote diagnostic data, as well as comprehensive data analysis and visualisation in the SOPAS Engineering Tool. This helps with the systematic troubleshooting of causes in the event of a fault, as well as with quickly restoring the sensor function and operational readiness of the machine. Finally, the communication via IO-Link makes it possible to use the data from the deTec4 for additional measurement and automation functions.

Safety light curtains reliably and cost-effectively protect against access into hazardous points and areas. SICK Automation takes safety to the next level.

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Stafsjö valves protect installations

When it comes to industrial fire protection systems, reliability is essential. The system, which is often on constant standby for long periods, should be able to respond immediately and extinguish possible ignition sources to prevent fires and dust explosions.

Firefly, one of the world’s leading suppliers of spark detection and fire and dust explosion protection systems uses Stafsjö valves to protect installations worldwide.

For more than 30 years, Firefly has been using Stafsjö’s valves in their fire protection systems because the valves are robust, reliable, and deliver performance when required. It is a dependable product that provides the quality that customers require. With a closed knife gate valve, fires and dust explosions can be prevented, which enhances the levels of fire safety for users.

Stafsjö’s HG isolation valve has a through-going gate for reliable shutoff performance, independent of pressure direction. Its ability to cut through static media columns also serves its purpose well. Superior flow characteristics enable it to act as a part of the pipe system without affecting the process flow. Stainless steel metal seats extend the service life and offer low friction to achieve ultra-fast isolation time. Sometimes the valve is also supported by a pressure tank to speed up the shutoff time.

For more information contact Valve & Automation, +27 31 579 2593, sales@valve.co.za, www.valve.co.za
Flexi Soft: THE MODULAR SAFETY CONTROLLER THAT CLEVERLY INCORPORATES ADVANTAGES.

THIS IS SICK
Sensor Intelligence.

When design engineers become euphoric, there must be a good reason. Perhaps the latest safety controller from SICK? It is so safe and intelligent that a new word had to be invented for it: Flexi Soft. A solution that is flexible, scalable and easy to program using custom software – yet soft on the budget. And if the same engineers test the unlimited ability of the Flexi Line communication concept to network modular machines, they will be left speechless by its advanced capabilities. The same is likely to happen when they see that Flexi Loop makes it possible to cascade safety switches and sensors within a machine in a way that both saves money and supports diagnostics. We think that’s intelligent. www.sick.com/flexisoft
Ten facts about infrared windows

Infrared (IR) inspection is widely used and quickly becoming indispensable in electrical maintenance programmes. With the advent of IR windows, this procedure is now both safe and cost-effective. However, certain key aspects have to be considered in order to get the most out of a maintenance programme:

1. An IR window is a generic term used to describe an inspection point that is designed to allow infrared radiation to transmit to the outside environment. Simply, an IR window is a data collection point for a thermal camera.

2. An IR window will not provide shielding in case of an electrical explosion, also known as arc flash. It will however significantly reduce the likelihood of such an event due to electrical panels not being opened.

3. Wherever possible, use polymer rather than crystal windows. Crystal can shatter and is moisture absorbent, causing it to fail over time – not so with polymer.

4. Emissivity is one of the most important variables therefore, when installing IR windows, it is crucial to standardise the emissivity of the targets while the gear is open.

5. Every camera has a field-of-view defined in degrees across a horizontal/vertical axis. Obstructions, such as phase dividers or cables inside the cabinet may decrease actual field-of-view.

6. While equipment is de-energised, gather as much information as possible. Do a complete IR inspection at the end of the window installation in order to create a benchmark/baseline for future inspections.

7. The only standard that applies to the IR windows is the ULS0; this is more of a classification than a standard. All other standards that are cited may have a bearing on the gear, particularly those that apply to the IR windows.

8. IR windows allow inspections to take place with the cabinet panels closed, thereby not exposing personnel to energised components and elevated hazards/risks.

9. IR windows are safe to use and eliminate risk where possible. They provide a systematic approach to data collection during inspection and are cost efficient.

10. IR windows save time and money, which leads to a return on investment within the first or second inspection cycle.

By facilitating closed-panel inspections, the use of IR windows eliminates 99.9% of arc flash triggers and completely eliminates injuries caused by accidental human contact with energised equipment during infrared inspection. IRISS infrared windows are unique in the market, being made of polymer instead of crystal. They are shatterproof and can be manufactured in any shape or size.

For more information contact R&C Instrumentation, +27 11 608 1551, sales@randci.co.za, www.randci.co.za

Alarm system upgrade from Omniflex

Fiddler’s Ferry Power Station was constructed by the CEGB (Central Electricity Generating Board) in the UK and came into full operation in 1973. It has four 500 MW sets, giving a total generating capacity of 2 GW, and is fuelled by coal. When the facility needed to replace an obsolete alarm system, management chose a solution from Omniflex.

The challenge

The existing alarm system consisted of Bristol Babcock logic racks, which fed data via Modbus serial, into the APMS (advanced plant management system). The new alarm system was required to replicate this functionality, but using Modbus TCP via dual redundant Ethernet networks. Furthermore, some remote panels located around the plant, required incorporation into the new system. With space limitation in some of the existing panels, the replacement nodes had to be engineered to fit in the available spaces and ease of installation needed to be taken into account.

Their APMS was not compatible with the Sequence of Events timestamps, therefore an engineering scada workstation had to be provided to log and display the alarms.

The solution

To provide the required functionality the following components were required:

• Omniflex A3e Maxilarm modular alarm logic nodes.

• Omniflex Sequence of Events modules to timestamp alarms (at source).

• Ability to interface with the existing APMS via Modbus TCP.

• Time synchronisation of all nodes using a GPS Time Sync Module.

• Engineering scada workstation for logging and displaying time stamped alarms.

The new equipment was designed to fit into the space previously occupied by the original system and was provided pre-wired and tested on back plates. Most of the work was done off-site to save installation time. Furthermore, spare capacity for future expansion was included.

The upgrade provided a modern distributed alarm system with the added benefit of time stamped alarms available to the engineers, if detailed alarm analysis is required.

For more information contact Ian Loudon, Omniflex, +27 31 207 7466, sales@omniflex.com, www.omniflex.com
Extech Safety Systems has worked with UK-based Mobexx to develop the MobXscan mobile application for barcode scanning with mobile devices. The app has been released for Windows 10 and Android, offering 100 ms barcode scanning (https://mobxscan.com/).

Barcode scanner: mobXscan adds the capability of barcode scanning to any Windows 10 tablet PC or Android device and uses the built-in camera to scan and capture the barcode. Very easy to use interface makes it the simplest way to add barcode reading functionality.

Easy integration: mobXscan has been designed to be as easy to use as possible. Open the app and press the scan button to almost instantly read the barcode and enter it into your application. Or, a simple command can be sent from a user application to trigger mobXscan.

Clever design: mobXscan makes the use of barcodes easy and powerful. It is fully compliant with Microsoft Windows 10 and Android 5.0 and above, but offers some clever features to make it really easy to add to a custom application, and really simple for the operator to use – the easier to use, the easier for operators to accept a new process.

For almost 30 years, South Africa-based Extech has been providing instrumentation, especially intrinsic safety, for hazardous area operations in southern Africa. In recent years, the company has signed with several leading industrial networking and mobile communications companies with the view to offer a comprehensive solution for IIoT/Industrie 4.0 in hazardous areas.

“MobXscan opens up true 100 ms barcode scanning at a fraction of the cost of traditional intrinsically safe barcode scanners,” says Extech sales director, Gary Friend. “We can offer the AEGEx Windows 10 tablet and/or i.safe Mobile smart phone (IS520.1) or tablet (IS910.1) to use this application in all hazardous areas.”

As sole agents for MTL, Beka Associates, Extronics, MercurysHMI and authorised reseller for AEGEx, CorDEX, i.safe MOBILE & XPlore Technologies in southern Africa, technology areas where Extech Safety Systems can assist include: IS zener barriers and galvanic isolators; HART interfaces; fieldbus; industrial Ethernet; industrial security; industrial wireless networks; visualisation, displays, indicators, sounders, beacons and lamps; IS and flameproof cameras (incl. IR); rugged IS smartphones and tablets (Android, Windows); hazardous area Exd access points for zone 1 (AP of your choice); hazardous area CCTV camera for Group I & II; hazardous area barcode scanners (Bluetooth); RFID tracking; surge protection; process alarm equipment; and hazardous area access control systems.

For more information contact Gary Friend, Extech Safety Systems, +27 11 791 6000, sales@extech.co.za, www.extech.co.za
Security concerns for safety systems
A common strategy required for the future.

As machines become more complex, safety technology is becoming more and more important. However, as networking of automation systems with the IT world is becoming increasingly commonplace, scenarios are likely to arise where a different approach is required, especially for safety applications.

Security challenges are growing
As production and IT become inextricably linked within the framework of Industry 4.0, the security challenges are also growing. The network interfaces between office IT systems and production networks represent a significant gateway for hackers.

Examples of threats that industrial control systems currently face are:
• Infection with malware via the Internet.
• Introduction of malware via removable media and external hardware.
• Social engineering i.e. influencing of people in order to bring about certain modes of behaviour.
• Human error and sabotage.
• Unauthorised access to the system via remote maintenance solutions.

The worlds of safety and security meet when automated solutions implemented for functional safety become the target of hackers. A common strategy must therefore be developed in future. The ‘Triton’ malware in combination with a cyber-attack against a Safety Instrumented System (SIS) is a current case, which demonstrates that this is a far from hypothetical scenario.

Indirect effect on the end product
Functional safety refers to the safety component of a system that relies on the correct function of the safety-related (control) system and other risk-reducing measures. In this case, the controller performs the task of initiating the safe state when a critical error occurs. The requirements for the quality of safety-relevant control components are described in the B-standard EN ISO 13849 and the IEC series 61508/61511/62061. Depending on the degree of risk, corresponding risk-reducing measures are classified into different safety levels – Performance Level (PL) or Safety Integrity Level (SIL).

In contrast to functional safety, security protects goods from detrimental impairment as a result of intentional or inadvertent attacks on the availability, integrity and confidentiality of their data. This involves the use of preventative or reactive technical and/or organisational measures. If security aspects in the area of safety are disregarded, this can not only have direct effects on production facilities, it can also indirectly affect the production process and therefore the end product. In the context of pharmaceutical products and safety-relevant components for the automotive industry, it is easy to see how the effects on consumers could be significant. The IEC 61511-1 therefore requires an IT risk assessment to be carried out for safety equipment in the process industry. If operators of process control engineering (PCE) safety equipment perform the IT risk
assessment as specified in the attached NAMUR NA worksheets and implement the measures identified, it is likely they will have assessed their PCE safety equipment in accordance with the latest technical standards and will therefore have fulfilled their duty-of-care obligations.

**Active search for weak points**

When considering functional safety and access security, the potential risk must be considered based on a risk assessment or IT threat analysis. Here, a considerable difference in approaches is already evident. While the risks that design engineers need to consider within the scope of the risk assessment in accordance with the Machinery Directive – mechanical or electrical hazards for example – tend to remain the same, the environment in which IT security experts find themselves is constantly changing. In the latter case, attackers are always actively looking for ways to exploit vulnerabilities, which would be considered systematic errors in the area of functional safety.

Another important aspect to consider is the human factor: The expression ‘foreseeable misuse’ is used in the field of machine safety, for example, to describe situations where safety equipment – such as a door switch – is tampered with by operating personnel. With large-scale cyber-attacks on industrial systems, on the other hand, it must be assumed that a high degree of criminal energy is exerted.

**Initial approach in a NAMUR worksheet**

To safeguard the product life cycle of safety-oriented systems or components, manufacturers, system integrators and operators are required within the scope of Functional Safety Management to adopt an approach to quality management that reflects the requirements of the situation in accordance with IEC 61508. A comparable solution for this exists in the security world in the form of Information Security Management as its starting point to counteract threats. The human factor also plays a significant role in this process. This is highlighted by the fact that the blame for more than 50 percent of cybersecurity incidents ultimately lies with employees. It is therefore important that there is an IT security officer responsible for the security equipment. In this regard, all persons involved in the specification and design of the safety equipment should be made more aware of the subject of Automation Security, and trained accordingly. Furthermore, it is advisable for the end user to conclude confidentiality agreements with any contractual partners – i.e. manufacturers, suppliers and external operators – to safeguard information and knowledge in relation to the safety system.

Components, software tools and solutions by Phoenix Contact support users by providing them with a flexible and economic combination of safety and security technology to increase their competitive edge in the international market. This, complemented by a comprehensive range of services, which provides system planners and operators with a service portfolio tailored to their requirements throughout the entire safety lifecycle.

**Cloud-based provision of key safety system data**

The Proficloud from Phoenix Contact provides companies with important information on optimising production processes. Safety of machinery also remains a critical issue for plant engineers and machine operators. Although safety applications are in the first instance designed to protect users of the machine, they can also cause unplanned downtimes. The ability to access safety system data via the IIoT in real time and convert this into meaningful information has enormous potential.

With Profinet-based control solutions, status information for standard and safety functions is transmitted continuously to the Proficloud. Adopting a holistic approach to resources and machinery gives operators and designers a whole new range of options for increasing operational performance.

For more information contact Sheree Britz, Phoenix Contact, +27 11 801 8200, sbritz@phoenixcontact.co.za, www.phoenixcontact.co.za
Smart devices for Ex areas

The Pepperl+Fuchs brand ecom has launched its next generation ATEX Zone 1/21 and Div. 1 certified, intrinsically safe 4G/LTE-Android smartphone – Smart-Ex. The Smart-Ex 02 is a complete new development and fully tailored to the market’s requirements. Complemented by new, innovative peripherals such as the intrinsically safe Cube 800 thermal image video camera and the explosion-proof Smart-Ex Watch, the Smart-Ex 02 accompanies the mobile worker in a wide range of tasks and provides future-proof solutions. In addition, ecom’s new product line Digital Products and Services offers a comprehensive solution for the staging and management of mobile devices as well as device analytics.

Smart-Ex 02 for zone 1/21 and Div. 1
With a large display and powerful features, good ergonomics and an optimised accessory concept, the newly developed Smart-Ex 02 is an advanced intrinsically safe smartphone. In addition, global Ex and approval certifications enable worldwide use. The device supports 21 different LTE frequency bands. It is delivered unlocked and without a SIM card. With the latest Android 9 operating system, the smartphone is particularly fast, secure and efficient.

The worldwide Pepperl+Fuchs support network enables fast response to questions and problems, while users also benefit from the collaboration with ecom’s own system engineers and development teams, who can advise and support with changing software requirements. Depending on requirements, the phone can be supplemented with numerous additional, coordinated and optimised peripheral devices from ecom such as headsets, microphones, video cameras, scanners or Bluetooth beacons and smartwatches.

New Digital Products and Services division expands mobile worker concept
With Digital Products and Services, ecom offers a solution that combines automated staging, mobile device management and device analytics, and can be used as a full-fledged enterprise mobility management system if desired. All mobile devices from ecom can, at the customer’s request, leave production with the necessary configuration secured such as security settings, applications and wireless setup. Thus, they can be used by the mobile worker immediately and without further manual configuration.

On request, device diagnostics and device analytics can collect real-time operating data and error analyses of the mobile devices, permanently monitoring their condition and remedying malfunctions preventively or directly. The devices can be managed via the ecom online platform and updated at any time during operation. The hosting of cloud servers in Germany meets the highest data protection standards and enables high data availability and security. One-time staging or enrolling can also be done internally via ecom’s own production servers, if required. Additionally, the platform enables the detection of critical software events or software installations and other security-critical processes through the analysis of historical data. Statistical accumulation of events can be used to establish correlations and causalities, for example between software errors, geographical data and WiF coverage.

New safety standards thanks to peripherals
For hands-free operation in potentially dangerous areas, the Smart-Ex 02 can be extended by the Ex-camera Cube 800, formed by the cooperation between Librestream and ecom. This intrinsically safe thermal image video camera is certified for use in Zone 1 / Div. 1 Ex environments. It can be easily attached to a helmet or stick/monopod, while settings such as lighting or zoom can be remote controlled. Upon request, pictures and documents are available live in the digital workspace. The Cube 800 enables simultaneous streaming of HD and infrared video. A powerful integrated light ring and a laser target pointer ensure high image quality even in poor lighting conditions. In combination with the software Librestream Onsight Connect, experts as well as the control room can support the technician live on site. This way, remote diagnostics are possible, critical areas in the plant can be identified using thermal images and instructions for repair can be given remotely.

For a new form of hands-free cooperation and better employee protection in hazardous areas, the Smart-Ex 02 can also be synchronised with the ecom Smart-Ex Watch (based on the Samsung Galaxy smartwatch). Integrated GPS, motion and heart rate sensors make monitoring of the current status regarding critical values possible and guarantee rapid location determination in case of an emergency. Hands-free navigation simplifies operation and a rotatable bezel allows quick and easy scrolling through apps and commands, even with gloves. Hands-free workflows and operator communication support enterprise-wide solutions. The Smart-Ex Watch is fully B2B-capable, offering up to five days of performance and up to 28,5 hours of GPS time.

For more information contact Pepperl+Fuchs, +27 87 985 0797, info@za.pepperl-fuchs.com, www.pepperl-fuchs.co.za
RUGGED SAFETY LIGHT SCREEN WITH ENHANCED FEATURES

Intuitive, easy-to-use EZ-SCREEN® LS safety light screens are designed for machine safeguarding and are built to withstand challenging environments common to both manufacturing and packaging. The alignment indicators are highly visible and intuitive diagnostics simplify setup, facilitating troubleshooting and streamlining installation. Each light screen is built with metal end caps, a thick aluminum housing and a recessed window to avoid damage from impact. Standard parts, cascade systems and extensive accessories are available.

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Case History 168

Unbelievably simple mistakes that prevent control.

Michael Brown is a specialist in control loop optimisation with many years of experience in process control instrumentation. His main activities are consulting, and teaching practical control loop analysis and optimisation. He gives training courses which can be held in clients’ plants, where students can have the added benefit of practising on live loops. His work takes him to plants all over South Africa and also to other countries. He can be contacted at Michael Brown Control Engineering cc, +27 82 440 7790, michael.brown@mweb.co.za, www.controlloop.co.za

I am often astounded by finding really basic problems with controls in plants, which have operated that way for years. These problems are so basic that one can only wonder at how these controls could have been commissioned in the first place, as personnel in these plants are usually highly trained. Two examples I recently came across when performing some optimisation work at a large chemical plant are described in this article.

Example 1

The first example is of a gas pressure control that used two split range valves. The valves were effectively in parallel and supposed to operate as follows:

- Valve A is to open 0 – 100% when the PD (controller’s output) goes from 0 – 50%.
- Valve B is to open 0 – 100% when the PD (controller’s output) goes from 50 – 100%

Split ranging of valves often causes problems with controls for various reasons, particularly at the ‘cross-over’ point, where very careful calibration of the valves is required to ensure that the one valve will take over smoothly from the other. (Another common problem is that split ranging is done without ensuring that the process gain remains constant over the full travel of both valves. If this is not the case, then different tuning will be required for both of the ranges. However, it was not a problem in this case.)

In this example, there was a problem trying to keep the pressure constant at the process load conditions operating at that time. Normally operators overcome control problems by running a loop in manual. However in this case, they were really battling to achieve control.

A young control engineer in the plant had been tasked to tune the controller and had been battling for some time. Pressure control can be quite difficult to optimise on occasion, as gaseous pressure processes can be self-regulating or integrating depending on various factors in the process. In this case the tests quickly established that the process was a fairly fast integrating one. However, whatever she did to try and get an open loop test with a proper response representing the process dynamics did not seem to work, and it seemed impossible to get the process into balance.

[Note: an integrating process, which is similar to a level control, is only at a constant state when the input to the process is equal to the output from the process. The value of the PD (controller’s output value) at that point is known as the balance point.]

When we started analysing the loop in more detail, it was decided to check if the valve split ranging was working correctly. At the load conditions at the time the tests were being done it appeared as if the balance point on the PD was probably between 50 and 60%.

Very fortunately we found that there was a flowmeter some distance downstream from valve B, and this enabled us to monitor the actual valve performance. A portion of this test is shown in Figure 1, where the controller was in automatic and the PD was increasing slowly. It can be seen that the flow through the valve was initially at zero. As the PD moved past 50% the flow should have started moving. However, it remained at zero which means the valve was not moving. The valve only started moving when the PD got to 75%.

This means that from 50–75% of the PD, there was no control action. What had happened, which is something I also saw once many years ago, is that someone had tried doing the split ranging on the valve’s positioner, not knowing it had been done in the DCS. In other words the positioner had been programmed to only start opening the valve when its actual input reached 50%.

Figure 1.
No wonder there was no control in automatic or in manual as there is a 25% gap where the valve did not move at all! The interesting thing is that this plant has been running for years with this problem, and it didn’t seem to have been noticed until lately. It really boggles one’s mind.

Example 2
The next example is also very interesting. It is of a simple flow control loop, which always had to be operated in manual, as it just would not work in automatic. The figures shown for this example are made from simulated tests, as it would have taken far too much time to actually perform them in real time.

Properly tuned flow loops generally respond to a setpoint change in a few seconds. In this case, if we had performed a closed loop test on the loop with the existing tuning as set in the controller, it can be seen in Figure 2 that it would have taken approximately 5 hours for the loop to respond fully to a 10% setpoint change. This is obviously why they were always running the loop in manual.

The open loop test on the flow showed that the valve was almost twice oversized and had an extremely fast response. However, these things are not a problem, and in fact the valve was working very well. No other problems could be seen from the test. Therefore, there must have been something wrong with the tuning. The young engineer who was doing the optimisation had checked the existing tuning that in the controller. It was supposed to be P gain = 0.2, and I = 0.2 minutes/repeat. These are not unreasonable figures for a fast flow loop.

Further investigation showed that the problem lay in the set-up of the control module. This was because the control system, for some reason, only allows one to insert a minimum proportional gain of 0.1. There are times when one needs a much smaller gain particularly when the final control element are oversized, and the process is fast, like a flow loop. In the particular control system used in the plant, this problem could be overcome by using a controller module with a special gain reduction factor, whereby one can reduce the gain by an additional factor over the whole range of the control.

For some reason this module had been used in this loop, and we found that the gain reduction factor had been set at 0.1. This resulted in an effective proportional gain in the controller of 0.02, which is almost like switching the controller off.

Setting the gain reduction factor to unity enabled the module to operate like a normal controller, and with new tuning of P gain = 0.6, and I = 0.1 minutes/repeat solved the problem and enabled the controller to work properly, allowing the process to respond to set point changes in a few seconds as should be the case for flow loops. The response with the new tuning is shown on the same time scale as in the previous figure is shown in Figure 3.

Such basic and simple errors caused huge control problems. Really amazing!
The new O2I multi-code reader from ifm electronic convinces with its high resolution, short evaluation time and quick set-up, all of which fulfil the requirements placed on modern components for high-performing process automation.

Fast, robust and future orientated
The O2I, which made its début at Hannover Messe 2019, is an optimal solution for precise requirements. The technical data includes image resolution four times as high, a 10-times faster code evaluation time and the obligatory real-time Ethernet support. This latest generation of the multi-code reader therefore meets all the requirements for sustainable, instantaneous and reliable product registration, identification and tracking. Thanks to its powder-coated die-cast zinc housing, gorilla glass protecting the lens, and M12 Ethernet connectors made of stainless steel, the O2I achieves the protection class IP65 i.e. optimally prepared for use in demanding industrial environments.

Flexible and quick integration into the work environment
It is clear from the beginning that the O2I is designed for maximum efficiency: within just a few seconds it adjusts itself to its work environment. One push on the teach button is enough, and the multicode reader automatically begins with focussing, exposure setting and code type recognition. Optionally equipped with standard, wide angle or telephoto lens, the O2I can read all common 1D and 2D codes within a distance of 35 up to 1000 mm, as well as at an angle of inclination of up to 45 degrees and therefore adapts flexibly to any structural condition.

Easy configuration via app
The basic integration of the device into the work flow and infrastructure is accomplished easily thanks to the matching smartphone app for iOS, Android and Windows. With this, for example, the trigger function of the camera can be set and the intended network parameters defined. As soon as the settings are adjusted to the individual requirements, the app creates a DataMatrix code. When this code is held into the reader’s field of view, the configuration is automatically adopted.

Once the instrument is configured with a few steps, it processes codes with a frequency of up to 40 Hz and with a speed of up to 7 m/s. Whether the information is printed on the surface, engraved by laser or dot-peened into metallic products is unimportant. Thanks to optional integrated red light or infrared illumination and polarisation filter, the O2I can easily deal with reflecting surfaces, varying colours and changing ambient light.

The same goes for the omnidirectional recognition of several different codes per image, due to the auto-find code function. Together with the award-winning Vision Assistant software, the O2I shows off its strengths. In the software, the user can easily classify identified codes and assign them to a defined automatic process via various logic functions. The live image and extensive visualisation of all settings provide an optimum overview for the user.

Memory stick saves costs and makes reproduction easier
Once the user has created a process, it will be saved on an exchangeable USB memory stick which is built into the multicode reader. A solution that has several advantages: firstly, the configuration can be passed on in case of a device exchange; secondly, using the same method, identical process controls can be transferred to several devices. At the same time the use of the device also reduces costs for further components, as the procurement of an expensive external evaluation unit is no longer necessary.

With the O2I, ifm meets all the requirements for a sustainable multi-code reader. Easy to integrate into the existing network and plant infrastructure, powerful in code reading and equipped with a large range of functions, the instrument takes product tracking to a new level.

For more information contact ifm – South Africa, 086 143 6772, info.za@ifm.com, www.ifm.com
For the first time we bring together our core global motion control technologies in a single unifying force. Through insight, intelligence and innovation we provide solutions to meet the increasingly complex demands. This is Parker helping to solve the world’s greatest engineering challenges.
How fieldbus systems are really selected

By Martin Rostan, executive director, EtherCAT Technology Group.

plays a most important role ("I am happy with the vendor's support: they are attentive and responsive and they know what they are talking about"). Vendor reputation contributes big time ("my supplier is leading edge and provides innovative technology that keeps me ahead of my competition," or "they are so big, they must be good"). And, of course, all the other usual factors are taken into account as well: initial price (often more important than "total cost of ownership"), quality, ease of use, performance, and yes, even design.

Don’t get me wrong, these considerations are quite valid. And, in fact, they lead to EtherCAT as the bus system of choice if the name of the control system vendor of choice happens to be Beckhoff, Omron, ABB, Samsung, LSIS, Hitachi, Sanyo Denki, Kollmorgen, National Instruments or any other of the companies that have chosen EtherCAT as their system bus.

High performance legitimises broad-based support

But how about those users that start their control system evaluation by taking a closer look at the bus technology itself as the key component of their system? Naturally, these are the types of users that the fieldbus organisations primarily address. We find that for many of those users that compare technologies in some detail, EtherCAT quickly becomes the favourite: its unique functional principle is compelling and makes it 'the engineer's choice'. With EtherCAT, the Ethernet packet is no longer received then interpreted with process data copied at every device, but the EtherCAT slave devices read the data addressed to them while the frame passes through the node. Similarly, input data is inserted while the telegram passes through. With this technique, called 'processing on-the-fly', the frames are hardly delayed at all. As a result, an EtherCAT frame comprises the data of many devices both in 'send' and 'receive' direction within one Ethernet frame and the usable data rate increases to over 90%. Figure 1 shows the idea.

The resulting higher performance then leads to more efficient machines. EtherCAT makes the processing power of an industrial PC more available for the application, and faster controls provide more accurate results. For example, Husky, a leading injection moulding machine manufacturer, reported that by using EtherCAT it was possible to reduce the part weight variation and thus the wall thickness of plastic cups their machines make. As a result, this saves material worth over $180 000 per machine, per year for Husky's customers. But not only closed loop controls benefit from faster communications: in many applications there are so called 'transitions,' where one has to wait for the part to arrive, the cylinder to reach its end position, or the pressure to reach a certain threshold. With a faster network, the waiting times are reduced and the throughput of the machine or plant is increased – increasing efficiency a few percentage points can easily be achieved this way.

Also, such users understand that EtherCAT is not only fast, but also very precise: thanks to the distributed clock mechanism, measurement values can be sampled and outputs set in a synchronised manner network wide – and with a jitter substantially smaller than one microsecond. This accuracy is ideal for synchronised motion control applications and for the integration of measurement tasks within the same network.

EtherCAT is versatile: master-to-slave, slave-to-slave and master-to-master communication methodologies are supported. It is also convincing that EtherCAT is inexpensive: On one hand there are the software-implemented masters on standard Ethernet ports, on the other there are the highly integrated yet low cost slave controller chips. The cabling efficiencies also save money, since EtherCAT does not require switches or other active infrastructure components and uses standard Ethernet cabling and connectors. Even engineering efforts are reduced, since network tuning is not required anymore and because the diagnostic features of EtherCAT technology provide exact error localisation, reducing troubleshooting time. (See Figure 2.)

Besides low cost chips and hardware it is important to stress again another crucial factor for low component prices: worldwide acceptance of the technology. This ideally means a wide selection of products and thus competition among the suppliers. EtherCAT is supported by the EtherCAT Technology Group (ETG) with over 3300 member companies from 58 countries, resulting in the world's largest Industrial Ethernet organisation. The ETG meanwhile counts almost 200 vendors of EtherCAT masters, over 150 vendors of
EtherCAT drives and over 100 vendors of EtherCAT I/O products in its ranks.

System integrators and machine builders also increasingly want to integrate functional safety in their control architecture – and not just to reduce wiring. Conventionally, safety functions were realised separately from the automation network, either via hardware or using dedicated safety bus systems. Safety over EtherCAT, on the other hand, enables safety-related communication and control communication on the same network and ETG members are capitalising on this in the form of exciting new safety solutions.

**Flexibility and openness boost functionality**

Users of EtherCAT also capitalise on the flexible topology that simplifies planning and installation. EtherCAT networks have no practical limitations regarding the topology: line, star, tree, redundant ring and all those combined with a practically unlimited number of nodes per segment. Even wireless technologies can be integrated and the ‘hot connect’ feature allows users to connect and disconnect nodes or entire network segments during runtime.

For many users, the migration from a legacy bus system can seem challenging. EtherCAT addresses this with a large selection of fieldbus gateways: more than 20 different bus systems are already supported. With these components one can integrate existing devices with a legacy fieldbus connection into an EtherCAT network and establish interfaces to ‘neighbouring’ or higher level systems. Migration from previous systems is smooth and at the same time the previously complex interface requirements of the central controllers are omitted: other systems are simply integrated via EtherCAT and no longer via PCI, cPCI, PCIe and so on.

With EtherCAT networks, there is also no need for manual address settings via dip-switch, rotary switch or similar means at every device: at boot-up, the addresses are assigned automatically. Even if devices are added later, the original addresses can be kept. EtherCAT masters can also feature automatic topology recognition with which they can compare the actual network configuration with the one expected by the application program. After device replacement, all parameters can be downloaded automatically.

When selecting a fieldbus network, true openness means future-proof implementation. That said, almost every fieldbus and Ethernet technology claims to be ‘open.’ With EtherCAT, openness does not only mean international standardisation (IEC, ISO), availability of commercial (as well as shared and open source) master and slave software and chips from several suppliers. It also means implementation support that is free of charge, clear guidelines regarding interoperability, master and slave implementations for a wide variety of operating systems and controllers, openness of the configuration tools (including third-party devices) and specifications for the application interfaces. EtherCAT technology is not only fully Ethernet compatible; it is also characterised by particular openness ‘by design’: the protocol can transport other Ethernet-based services and protocols on the same physical network. Such Internet technologies are tunnelled via the EtherCAT protocol, so that the real-time characteristics are not impaired. Therefore, all Internet technologies can also be used in the EtherCAT environment: integrated web servers, e-mail, FTP transfer, etc.

**Figure 1. Process Data is inserted and extracted on the fly: the unique functional principle of EtherCAT.**

**Figure 2. The topology flexibility of EtherCAT simplifies planning and installation.**

**An answer for all users**

So we find that both groups of users – those that base their network decisions on their choice of control vendors and those that take a closer look at the bus technology itself – are increasingly moving toward EtherCAT. In summary, EtherCAT is characterised by outstanding performance, very simple wiring and openness for a wide range of devices and other protocols. EtherCAT sets new performance standards and provides, thanks to Ethernet and Internet technologies, optimum vertical integration. With EtherCAT topology complications are a matter of the past – and expensive infrastructure components are a dying breed.

For more information contact EtherCAT Technology Group, +49 911 540 56 226, press@ethercat.org, www.ethercat.org
Productivity Master points the way to digitalisation

Seamless connectivity of handling and software solutions developed by Festo.

The Productivity Master, a modular demonstration system for producing personalised USB memory sticks from Festo, shows how automation technology will evolve along the value chain when combined with digitalisation. Thanks to software, everything fits perfectly, from the mechanical and electric systems to the intelligence. The Festo automation platform provides an integrated and practical system to link all Festo engineering tools, components and solutions in hardware and software.

The demonstration system personalises USB memory sticks in four steps. The electric products, the mechanical systems for the axes, the electronics and the software are organised into a complete automation platform with seamless connectivity. This saves users an enormous amount of time, from planning to commissioning, and they gain maximum process reliability since everything fits together with Industry 4.0 as standard.

Four fully connected stations
Visitors to the demonstration create the production order at the first station by registering with their name and perhaps a picture. A QR code identifies the visitors at the machine. A vision sensor SBSI from Festo registers the visitors and starts the production order. This is followed by stock management. This complete mechatronic solution, made up among other things of a planar surface gantry (EXCM in size 40) for fast picking and placing of the USB memory stick, offers all the options from stock management and workpiece handling to the cloud.

The USB memory stick is then transported, printed, turned over and then passed on. The work steps involved at the second station are holding, moving, handling, positioning and identifying the workpiece, as well as identifying, separating, gripping and applying labels. Fast transfer to a label printer is carried out at station 3 by a highly dynamic linear gantry (EXCT with dynamic servo motors EMMT-AS and servo drives CMMT-AS). The rotation functions are carried out by electric rotary drives (ERMH).

The process is completed in station 4 where files are uploaded to the USB memory stick.
This involves holding the workpiece, turning and carefully positioning the cap and press-fitting delicate parts. This is done using the attractively priced electric cylinders (EPCO) and rotary drives (ERMO). The personalised USB memory sticks are then handed out to the visitors.

Seamless connectivity and engineering tools
The machine was planned in record time. The state-of-the-art and standardised Festo engineering environment proved useful here. Projects, Festo's lifecycle management platform, simplifies project planning and the management of digital twins. This enables design engineers and developers worldwide to work collaboratively. With the Festo HGO (handling guide online), users can select and size 1D, 2D and 3D gantries in just three steps, including planar surface and linear kinematics.

For more information contact Kershia Beharie, Festo, 086 003 3786, kershia.beharie@festo.com, www.festo.co.za

DLM V-Drives

DLM V-Drives control the latest generation of permanent magnet and standard induction motors. DLM offers the AMC (advanced motor control) and EPC (efficient pump control) V-Drives, which are available in IP20, IP55 and IP66 enclosures.

V-Drive AMC
These drives offer the perfect combination of high performance together with ease of use to allow even the most demanding applications such as slurry pumps, cranes, conveyors and plastic injection moulding pumps to be resolved easily, using:

- Sensorless vector control providing up to 200% torque from zero speed to ensure reliable starting and accurate speed control under all load conditions.
- PM motor control that allows upgrading to latest generation of high efficiency permanent magnet motors.
- I/O and communications: the AMC V-Drive supports a wide range of protocols for modern industrial requirements.
- Low installation cost is achieved through features such as a built-in EMC filter and an integral brake transistor.

V-Drive EPC
This range offers Optiflow as standard on every unit to provide coordinated pump station control. This allows multiple pumps to be controlled, each at a variable speed to ensure maximum energy saving. Automatic reconfiguring is offered should a pump fail, including the master. An internal PID controller is provided that is fully integrated with HVAC and energy efficient features, presented in a user friendly menu to ensure ease of use and fast commissioning. The drives also support a wide range of protocols including those for mining, process control and HVAC requirements including pumps, fans and compressors.

Smart tools for all V-Drive VSDs
Optistick Smart is a USB stick utilising Bluetooth and near field communication. This handy feature allows copying, restoring and backup of the V-Drive parameters. It also provides a Bluetooth interface to a PC running Optitools Studio or the Optitools Mobile app on a smart-phone for convenient mobile commissioning within range.

For more information contact Duplex Liquid Meters, +27 11 457 0500, sales@dlm.co.za, www.dlm.co.za
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Flexible communication across building and mobility applications

TwinCAT OPC UA connects research and innovation infrastructure on Empa campus.

Empa (Swiss Federal Laboratories for Materials Testing and Research) conducts interdisciplinary energy research in the building and mobility sectors inside an actively used living and working environment on its campus. Empa relies on the OPC UA communication standard to interconnect its research infrastructure – three large-scale projects named ‘NEST’, ‘ehub’ and ‘move’ plus all components involved in producing, storing, transporting and converting energy. Data communication – from control traffic between devices to data analysis in the cloud – is handled by CX5140 Embedded PCs running TwinCAT 3 OPC UA software.

Empa, an interdisciplinary research institute and member of the ETH Domain – composed of university and research institutions – is working to bridge the gap between the laboratory and real-world applications. One primary focus of its work is on energy and sustainable building technologies based on research and technology transfer platforms called demonstrators. These include the Next Evolution in Sustainable Building Technologies (NEST), the Energy Hub (ehub) and the demonstrator for future mobility (move). Working in close collaboration with research and industry partners, Empa uses these large-scale building, mobility and energy projects to deliver market-ready solutions in those sectors.

Open, clearly defined interfaces with PC-based control and OPC UA

Given that Empa’s demonstrators are available to a wide range of users, it was essential to create an open, manufacturer-independent platform with clearly defined interfaces, according to Philipp Heer, ehub Group Leader at Empa: “The units have just a single physical link to the NEST backbone that connects them with the thermal and electrical systems. Each unit operates independently and incorporates its own automation solution, which communicates via Ethernet. The challenge here is to integrate new units into the demonstrator infrastructure with as few limitations as possible so that systems can be maintained by service technicians and used safely and to their fullest potential for research purposes as well. From an integration point of view, flexibility is essential because the system boundaries shift whenever we add a new unit.”

Enabling flexible access from outside the Empa campus was another challenge. To achieve this, the process control level was implemented in the cloud rather than on internal servers. In addition to other requirements, this called for a specialised control system software architecture that would ensure safe system operation yet allow actuator override where necessary for research purposes. For Heer, OPC UA was the ideal communication technology to meet the requirements for a highly complex and flexible system of this kind: “We use OPC UA across the board, for everything from device-to-device communication at the control level all the way up to data analysis in the cloud and research integration. We developed an OPC UA information model specifically for this purpose. This model lets us integrate new units and components based on standardised specifications. To keep the integration effort as low as possible and ensure consistency, we incorporated parts of the software architecture into the OPC UA information model itself. This approach also allows us to
implement new Internet of Things (IoT) software and services without having to adapt the system."

Embedded PCs with TwinCAT OPC UA drive data communications
Ten CX5140 embedded PCs running TwinCAT OPC UA software (TF6100) control the communication among Empa’s three demonstrators. Heer explains: “We have seven CX5140s operating on the NEST backbone as TwinCAT OPC UA servers and clients that we use to connect heating, ventilation and room automation systems. The other three embedded PCs work as central management systems in NEST to hook up the micro grid and integrate the units. The system as a whole monitors some 60 000 OPC UA objects, including a number of data point instances needed for building automation or to provide researchers write access. Around 6000 relevant sensor signals from these objects are logged straight to a database. Despite the scale and scope of the system, there have been no performance issues so far. The TwinCAT OPC UA Gateway offers a distinct advantage here: It provides a central point of access to the entire information model, where each sensor is mapped to a corresponding structure. With this setup, all of the information contained in the database and from integrated systems such as LabVIEW can be accessed easily through a single interface.”

Another valuable feature from Heer’s perspective is that the classic building automation system, implemented using the TwinCAT Building Automation Library, can be manipulated directly over OPC UA: “We can override any individual actuator to suit the needs of specific research projects. TwinCAT OPC UA lets us create new instances elegantly and easily within the information model’s tree. Researchers are only able to see their own particular tree – in much the same way as the building automation system can only see its own tree for normal operating purposes. We can choose and apply the requisite permissions via a selector implemented in the Beckhoff control system. This is both extremely flexible and fast, which is a huge advantage.”

Flexibility – the core advantage of PC-based control
Empa began using PC-based control technology from Beckhoff in 2013 – initially, to automate a small research building equipped with a large number of different interfaces. Says Heer: “One important factor besides the compact design was the variety of interfaces, which went well beyond the usual array of building technology standards like DALI, KNX or M-Bus. The building relied on additional industrial communication protocols, which we also had to accommodate. The project called for a mix of Bus Terminals and EtherCAT Terminals, which was not a problem with Beckhoff technology. The outstanding communication performance of EtherCAT is another big advantage for us, especially in situations that require exceptionally precise measurements.”

A further benefit of PC-based control is that it allows the seamless integration of energy measurement technology. For instance, Empa uses around 25 EL3403 and EL3443 EtherCAT three-phase power measurement terminals to record and analyse key electrical data in its supply network. TwinCAT Scope also makes work even easier. Heer concludes: “With TwinCAT Scope’s ease-of-use and powerful analysis capabilities, we can test controllers using high-resolution data and evaluate disturbance inputs exceptionally well.”

For more information contact Michelle Murphy, Beckhoff Automation, +27 11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
Practical project management to replace an obsolete control system

Successful integration of a Yokogawa Centum V-Net IP NIO DCS at Umfolozi Sugar Mill.

There are numerous books on project management that can be referred to as guidelines for a specific project: commonly referred to are the Red and Yellow books of FiDIC, which provide for the general conditions of a contract, as well as any applicable specific items. These specific conditions, normally negotiated between the client and the contractor, cover areas like total project value, project duration according to the project plan, penalties for late delivery, additional costs for extensions, and any other items requiring specific mention as part of the contract.

Once everything is agreed and a purchase order has been generated, one starts with the procurement of materials, which in this case was the Yokogawa DCS hardware, software and computer equipment, as well as the cabinets for the DCS, the cables, cable racking and consumables, as well as creating a safety file, establishing a site office and transporting all goods and materials to site. Once this is complete, project work begins in earnest.

Pre-work and acceptance tests
Work on this project could be done on several fronts simultaneously, namely site identification of field I/O to be rewired to the new DCS universal I/O Mmodules. Most of the existing 2500 I/O would be accessed via the existing Siemens ET200 modules on the Profibus Network, which would be rewired to the New DCS’s Profibus ALP121 communication card. Work could also be started in the ICA workshop on building the new DCS cabinets in preparation for the I-FAT, which is done in anticipation of the client factory acceptance test.

During I-FAT there were live subsystems running to simulate all signals and communication protocols that would be encountered on site. These included Profibus from the ET200 and Simocodes, as well as ASI Bus from the ASI switch packs on the valves at the pan floor. The client also asked that several of the digital outputs be connected to solenoids to prove the current rating of the NIO DO module, and that it be put on a soak test for three days or more. All the above having been done and the C-FAT complete, the panels were crated for transport to site.

Once on site, the panels were moved into position in the termination room in anticipation of the cable rerouting for the hardwired I/O, as well as UPS power, the connection of earthing and screening. The dual redundant Profibus network also had to be connected in order to access the I/O remaining on the ET200, Simocodes and ASI networks.

Software engineering was also started as a pre-work item, based on the URS (user requirement specification), with modifications of several control strategies based on the more powerful capabilities of the new DCS. During this stage, the close relationship with the Yokogawa proved critical.

“Project management is great, but if you fail to plan, you plan to fail.”

Commissioning and training
Once the software thus complete, the installation crew could start with cold commissioning in order to verify I/O, to check the scaling of inputs, and ensure that the correct engineering units were displayed and linked to the corresponding graphic modifiers.

Once the client’s lead engineer was satisfied that all concerns had been addressed, items the process of hot commissioning could begin to check all facets of the engineering installation and the final issue of quality control packs (QCP’s). The client engineer and the site supervisor/project manager then sign off against these.

In this project, it was also necessary to train the client’s engineers and operators. This took place at the Yokogawa offices in Johannesburg. Once this was complete, there were obvious signs from the Umfolozi staff that they were eager to see the new system in action.

Keeping the project on track
To keep things running smoothly, regular progress meetings with recording of action items against specific people and completion dates proved invaluable.

Often, when project deadlines are missed due to factors like mechanical or civilwork being delayed, the project plan gets ignored because emergency items arise through the site manager wanting certain critical tasks completed. This invariably leads to the E&I contractor being delayed and then the specific conditions of contract come into play.

One then needs to negotiate an extension of time (ET), based on the conditions specified during initial negotiations. All this can be avoided through meticulous planning and timeous execution as well as having a back-up plan where one mitigates problems through advance thinking about recovery scenarios.

In the project described above, no delays were encountered as the initial enquiry and tender phase allowed enough time for detailed planning, testing and simulation, well in advance of the project execution implementation phase. The software design was also carefully monitored with regular feedback sessions with the client engineer.

A comprehensive FDS (functional design specification) was also produced, which, together with the URS and the QCP documents, were all filed for their record and reference.

As a result, successful plant start-up was enjoyed with no delays and consequently Umfolozi has benefitted through excellent plant operations with new innovations thanks to the planning that went into this DCS project and ensured its successful implementation.

Conclusion
Project management is great but the old adage of “If you fail to plan, you plan to fail” holds true. Fortunately, this project was a great success and resulted in Phase 2 being implemented the very next season, with equal success. Project management is easy if the planning, design, engineering, execution and implementation is handled correctly by a great team of people.

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Control systems

The importance of the sugar industry in KwaZulu-Natal to SEW-Eurodrive as a key growth area for its complete drive solutions was underscored when it exhibited at the Congress of the South African Sugar Technologists’ Association (SASTA) during August at the International Convention Centre in Durban.

The company used the congress as a platform to showcase its robust drive engineering solutions, which are ideal for sugar production, according to KwaZulu-Natal branch manager, Clive O’Reilly. Its geared motors are ideal for horizontal crystallisers, filters, clarifiers, conveyors, batch pans, mixers and packaging.

An extremely challenging production process is required to turn the harvested product, sugar cane or sugar beets, into finely granulated sugar. The main component of any sugar factory, no matter where it is located globally, is the sugar mill. During the harvest period, these run 24/7 for several months.

The only opportunity for any maintenance or upgrade that is required is during the off-crop season.

Sugar mills in particular present a harsh environment that requires highly robust and reliable drive solutions that can easily generate high nominal torque values. Typical applications for these large gear units are rotary kilns and segmented girth gears, large agitators, extruders, and crane technology, among others.

“There is a significant growth opportunity for us in this sector, especially as the sugar industry standardises on tailored drive packages and complete system solutions to optimise efficiencies and reduce costs,” concludes O’Reilly. “Here we have the necessary application knowledge and experience to be able to assist the local sugar mills.”

The premier event for the sugar industry, the 2019 SASTA event provided a platform for the latest research and innovations. An accompanying trade exhibition allowed key suppliers such as SEW-Eurodrive to engage with the sugar industry and present its full service and product offering.

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za

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Emerson
Radar sensors are commonly used for a wide variety of vehicle detection and collision avoidance applications, and they are a particularly good choice for outdoor deployments. Keep reading to learn more about radar sensors through answers to frequently asked questions.

Q: What are radar sensors?
Radar is an object detection system using radio waves. The benefits of radar include:
- Reliable outdoor use. Radar sensors are unaffected by wind, falling rain and snow, fog and sunlight. They are less affected by temperature fluctuations and operate in a wider range of temperatures than competing technologies.
- Long sensing range for flexible mounting.
- More durable and less downtime than other technologies.

Banner’s radar sensors utilise frequency modulated continuous waves (FMCW). FMCW radiates continuous transmission power and changes its operating frequency during the measurement. FMCW measures the frequency shift between emitted and received signals and can detect both moving and stationary targets. (Doppler cannot see stationary targets.)

Q: Where should I use a radar sensor?
Radar sensors are an ideal solution for applications that need to detect a vehicle or avoid a collision when moving equipment. For example, radar can be used for:
- Vehicle detection including cars, trucks, and trains in traffic and parking applications, toll booths, loading docks, shipping canals and railroads.
- Collision avoidance in ports and manufacturing (i.e. overhead and gantry cranes).
- Collision avoidance for mobile equipment i.e. reach stackers, forklifts, and mining vehicles.
- Collision avoidance in low-visibility factory environments i.e. overhead bridge cranes.

Q: What objects can radar sensors detect?
Good targets for radar sensors include objects containing metal, large amounts of water, or similar high-dielectric materials. Poor targets include many plastics, cloth, wood, fibreglass and organic materials.

Q: Does the target have to be moving for a radar sensor to detect it?
No, radar sensors from Banner Engineering can detect both stationary and moving targets. Moving targets do provide more powerful reflections compared to stationary targets.

Q: Can radar detect people, or will nearby people interfere with sensing the target?
Radar sensors can detect people, but the radar cross section of a person is very weak so it is not intended to be used in personnel detection. Depending on sensitivity settings, a person could interfere with sensing the intended target if a person is near the sensor and within the its direct field of view.

Q: What is the difference between adjustable field and retro-reflective radar sensors?
An adjustable field radar sensor can detect vehicles and other objects by sensing the reflection of the radio waves bouncing off the object. Optimal targets include:
- Large metallic objects that reflect a lot of radio waves, a property referred to as a large ‘radar cross section’.
- Objects that have surfaces that are perpendicular to the radar beam pattern to reflect the radio signal directly back to the sensor.

Adjustable field radar sensors have configurable set-point distances, where the sensor will use the time between emitted pulse and reflected signal detection to calculate how far away a sensed object is from the sensor and only turn the output on when the object is within the set-point distance.

A retro-reflective radar sensor uses a taught reference condition like a wall, floor, or special retro-reflective target. The sensor detects objects between it and the reference target by looking for disruptions in the signal coming back from the reference target.

This type of sensing can sense objects even if they do not have a good radar cross section, but they must block the signal reflection from the reference target. This makes retro-reflective radar sensors the most robust radar sensing option.

Q: What is the dead zone for radar sensors?
Radar sensors from Banner have a typical dead zone of 0.4 metres for moving targets and 1 metre for stationary targets. What this means is different depending on whether the sensor is adjustable field or retro-reflective:
- Adjustable field sensors: the sensor cannot reliably sense objects within the dead zone.
- Retro-reflective sensors: the retro-reflective target cannot be placed within the dead zone, but an object within the dead zone can still be sensed because it interrupts the signal from the reflector target.

Q: Can radar sensors have two independently set outputs?
Yes, depending on the series. Most radar sensors from Banner Engineering have an option with two zones with an independent output for each zone.
Q: When would I use a radar sensor with two zones?
It is common to use two zones in collision avoidance applications. For example, one long-range zone can be used as a 'slow down' signal, and the other short-range zone can be used as a 'stop' signal. Two zones can also be used to determine if the object is getting closer to or further away from the sensor.

Q: Can radar sensors tell me which way an object is moving?
Yes, by using two zones or an analog output, the radar sensor can tell which way an object is moving. But it can only determine if the object is getting closer or further away, not if it is moving left or right.

Q: Can radar sensors be used outdoors?
Yes, radar sensors can be effectively used outdoors. The housings are rated IP67 for reliable operation in harsh environments.

Q: Is radar susceptible to rain, snow, sleet or other weather conditions?
Radar sensors are resistant to extreme temperatures, falling snow, fog, heavy rain, humidity and strong wind. They are also immune to error from sunlight. They have no moving parts and are resistant to vibration from nearby traffic and heavy machinery.

Weather shields are also available to prevent rain/snow accumulation on the face of the sensor. The sensor can be placed in special fibreglass enclosures (radar can transmit through some materials) if the application requires it.

Q: What is a radar sensor’s beam pattern?
The beam pattern for each sensor is defined by its antenna and remains constant.

Q: How wide is a radar sensor’s beam?
The effective beam pattern chart for each sensor is provided in its datasheet. If the beam pattern is too wide, consider using a narrow-beam sensor. The effective beam width varies with the sensor, the distance to the target, the radar cross section of the target, and the sensor’s sensitivity (signal strength threshold) setting.

Q: What does adjusting the sensitivity (signal strength threshold) do?
Changing the sensitivity selection for a radar sensor can be used to ignore unwanted weak targets within the field of view of the sensor (focusing the beam on the main target you want to see vs. smaller objects in the beam path).

Q: How should I mount a radar sensor to account for beam width?
When mounting the sensor, consider both the vertical beam pattern and the horizontal beam pattern. You may want to rotate the sensor 90 degrees to reduce the field of view of the sensor to ignore unwanted reflections.

Q: Can you locate two radar sensors next to each other without cross talk issues?
Yes. Radio waves travel at the speed of light. Each radar sensor knows when it should be receiving the radio pulse reflected from its target and is generally resistant to crosstalk.

Q: What might help to fix a chattering/flickering/intermittent output?
If a radar sensor’s output is chattering when the target is fully within the field of view of the sensor, you could increase the response speed and/or the sensitivity of the radar sensor to make the output more consistent.

Q: How do I choose a radar sensor model that is approved in my country?
Country certifications are listed in the product datasheets. Contact Banner if you do not see the country needed. With recent FCC changes, we can now offer EU models in the US and other countries. EU models use a wider frequency bandwidth to achieve shorter dead-zones. If you have specific questions, please contact Turck Banner.

For more information contact Brandon Topham, Turck Banner, +27 11 453 2468, brandon.topham@turckbanner.co.za, www.turckbanner.co.za
The future of basic control innovation

By Mark Sen Gupta, research director, ARC Advisory Group.

Basic process control, what we now call 'level 2' in the Purdue Enterprise Reference Architecture, has been the basis for successful process manufacturing for decades. Industry has witnessed several revolutions in technology that have produced more accurate, precise, and faster process control leading to better product quality and throughput. Innovations have moved from mechanical to electrical and on to computational. Currently, the innovation in automation has moved further up the architecture, with mostly incremental changes at level 2.

The Open Process Automation Forum (OPAF), a forum of The Open Group, has stressed the need for standardisation at level 2 to help reduce lifecycle costs. What, then, can industry expect in the future from this level in the automation architecture? How should end users prepare?

Ancient roots of basic control innovation

Greeks and Arabs (in the period between about 300 BC and about 1200 AD) had a preoccupation with keeping accurate track of time. In Egypt, about 270 BC, Ctesibius described a float regulator for a water clock, a device similar to the ball and cock assembly in a modern toilet. This has been identified as the earliest feedback-controlled mechanism. The appearance of the mechanical clock in the fourteenth century made the water clock and its feedback control system obsolete.

In their Book of Ingenious Devices (850 AD), the Persian Banū Mūsā brothers described several automatic controls. The brothers developed two-step level controls for fluids, a form of discontinuous variable structure controls. The book also described a feedback controller.

Many forms of mechanical devices have been used for control. Innovations occurred slowly and methodically. In the late 1940s, however, the transistor was invented, opening new opportunities for innovation via electrically-based automation. In the 1960s, innovative engineers began to leverage computer processing in automation. Suddenly, the controls could be easily changed, repurposed, and made to interact with other controls.

Later, in the 1970s, networking technology was introduced allowing greatly increased data exchange between controllers and operators. Computing power and memory increased, as well. In the 1980s and 1990s, this trend continued. Instrumentation suppliers also extended compute power and networking into field devices and the industry briefly flirted with control within and between field instruments. In the last decade, industry witnessed a greater focus on securing level 2 control assets and reducing the labour needed to install, commission, and maintain those assets. However, when it comes to the basic process control technology, not much has changed.

Open process automation

This was one of the drivers behind the Open Process Automation Forum (OPAF) initiative. The recent ARC Industry Forum dedicated several sessions to this topic and ARC analysts have written numerous reports and blogposts on the topic. OPAF focuses on standardising systems for ISA95 level 1 and 2 functions. These are basic inputs and outputs from field devices and regulatory control function block execution. ExxonMobil and other end user firms envision automation systems with many more, but much smaller, process controllers. These smaller hardware devices would control as few as one to two loops each, creating what are in effect micro-services for process automation.

Members are not looking for a technical innovation to revolutionise basic process control. All the technical innovation required to achieve their goals has been created. Instead, they want to make automation less costly to engineer, staff, update, and so on. In fact, much of the recent innovation from automation suppliers centres around reduced project and lifecycle costs rather than improving process control at level 2, where it appears that all the opportunities have already been seized.

Parallels from level 1

This parallels what has already occurred with process field devices. When you consider the valves and pressure/level/flow/temperature transmitters in your plant, they are pretty much commodity items. Each instrument manufacturer might have slightly different features and functionality, but their products will usually accomplish the goal. While configuring these devices used to consume a considerable amount of engineering time, end users now send the supplier the process data and receive the properly configured device. Plant technicians install it and it’s done.

The market is now taking a similar approach for level 2 control. The value proposition provided by most field devices centres around ease of configuration, ease of use, cost of support and initial cost. All new value in the space is found in software applications supervising the devices. The approach being pursued by OPAF means there will be little to no intellectual property at the control level to safeguard, just like a transmitter today. Instead, critical information will be maintained at a higher level in the control strategy. An OPAF architecture would certainly enable suppliers to safely embed proprietary (and potentially superior) level 2 control algorithms in products, but it is an open question whether they will focus on this level rather than higher value applications such as model predictive control for multiple loops.

Given the above, ARC expects to see little change in the approach to control at level 2. The PID algorithm has been ‘good enough’ and will continue to do the job. Software innovations for control development and for advanced applications will likely become the main areas of automation innovation in what could be labelled as ‘level 2.5.’

For more information contact Paul Miller, ARC Advisory Group, +1 781 471 1141, pmiller@arcweb.com, www.arcweb.com
Parker Hannifin has added an expanded range of features and capabilities to its H Series ISO valve platform as part of its global focus on factory automation. Designed with a new universal manifold, the new valves provide the opportunity to mix ISO 02, 01, 1 and 2 valve sizes on one common manifold without transition blocks. This ability allows right sizing in the field and the ISO design supports easy interchangeability for additions or changes to the valve and manifold assembly.

In addition, the H Universal Manifold’s design allows the user to zone supply or pilot pressure allowing for a mix of different pressures, plus the addition of vacuum or the ability to isolate the entire supply pressure or just the pilot pressure. Zoning and pressure isolation allow the user to disconnect supply pressure for safety reasons and maintenance of the machine. This zoning flexibility is made possible with a unique design that allows main and pilot supply/exhaust to be added anywhere throughout the valve manifold.

A full range of connectivity options are offered for IO-Link, Ethernet/IP, Profinet IO, EtherCAT, Modbus/TCP, DeviceNet, ControlNet, Profinet DP, CANopen, AS-I or InterBus-S. Those customers requiring a collective, hardwired solution can connect with 25 pin D-sub, 19 pin Brad Harrison, 12 pin M23 connections or, for rigid conduit, a terminal box is also offered.

Users can enjoy important benefits from this product due to its robust design, connectivity options, supply pressure zoning, ability to mix sizes on the manifold and an easy means of controlling flow within the valve. The H Series ISO valve offers very high flow rates, covers a broad range of industrial applications and is easy to install with the availability of new patented mounting hardware. The overall design reduces complexity at the machine and makes valve assembly or changes simple and easy. Assembly is further supported with a new configurator.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za

Zest WEG Group is able to offer a range of standard off-the-shelf products as well as end-to-end energy solutions by leveraging best practice engineering and manufacturing capabilities.

All products are engineered to facilitate a safe and reliable environment with operational stability and the highest possible production levels as an objective. Reduced maintenance and ease of serviceability assist in lowering the total cost of ownership.
Robotic platform relies on LiDAR

A SICK Automation LiDAR sensor was used to build a winning robotic platform in the prestigious Drexel University’s annual College of Engineering senior project design competition. For the Swerve team, the process was invaluable for learning how to create something innovative that works.

Freddy Wachter (mechanical engineering), Alexander Nhan (electrical and computer engineering), Harrison Katz (mechanical engineering) and Matt Wiese (mechanical engineering) set out to design and build a robotic platform. There was a lot of trial and error, testing and collaboration among the Swerve team during the project which was taken over a class over three 10-week quarters of the 2017/2018 school year.

Among eight teams who competed, the first-place result was the Swerve Robotic Platform, a highly versatile, three-wheeled, autonomy-enabled vehicle that is capable of carrying large loads while moving at high speeds and accelerations. Swerve was designed, fabricated and tested using motion-capture systems, advanced machining, computer simulations and software, as well as SICK’s LiDAR sensor.

While Swerve might look like a triangle on wheels with a lot of wires on it, the innovation lies in four design elements which the team packed into one robotic platform.

“Robotic mobility platforms today contain just a couple of the elements of lightweight, high-speed, omni-directional and integrated technology, but Swerve incorporates all four,” says Wachter. “Such elements make Swerve innovative, surpassing the functionality of many similar platforms. For starters, Swerve weighs less and carries more than similar robots.

Sensor technology
Sensors were a key technological element of Swerve’s design to support navigation, autonomy and nimbleness. The swerve uses SICK Automation’s 2D LiDAR (light detection and ranging sensors for area-monitoring data capture, and IMU (inertial measurement unit) sensors. The Swerve robot receives the LiDAR data through a SICK TiM561 sensor, which provides scan angles and ranges to the nearest object to those angles. These scans can then be visualised and used to create 2D representations of the robot’s local environment.

Wachter credits SICK’s enthusiasm for the project from a connection that came about from his attendance at a robotics conference, ROSCon 2017, in Vancouver. There, he connected with a SICK West Coast executive who connected him to George Thiel, SICK account executive for the northeast region.

Mechanical elements of swerve
A number of mechanical and structural elements make Swerve nimble, fast and omni-directional. “It has caster wheels that can rotate in every direction and uses slip rings to keep all the wires tangle-free,” Wachter says. This means wheels can move independently and turn on a dime. Brushless DC motors allow the vehicle to accelerate quickly.

Many of the mechanical design elements of the Swerve impressed the project judges. “The major part of what helped us win the competition was in-depth design which was described well in our report,” says Wachter. Elements like welded crush tubes built into the aluminium chassis gave Swerve the strength to withstand heavy loads.

Swerve gets a life
The Swerve team had a strong idea going into the project, based on a request and sponsorship from a former co-worker – Josh Geating, project stakeholder and robotic tinkerer. Geating contributed design input and will potentially use Swerve to compete in BattleBots competitions in California.

Geating underscored how the team designed the platform with the human-machine interface in mind. “Project Swerve is an attempt to make the most agile robotics wheeled platform to date while maintaining a high level of precision and sensing to enable autonomy and highly dynamic motion,” says Geating. “Power, precision and mass are often mutually exclusive in robotics, and the combination of these three in the Swerve platform enables many unique applications.”

While Swerve may live on in BattleBot applications for now, future uses abound. In addition, personal mobility uses for Swerve include serving the disabled. Entertainment and amusement applications include serving as a base for trackless rides, allowing for easily changing the consumer experience without building a whole new attraction.

The logistics industry already has companies like Amazon deploying robots in the warehouse for picking orders. Swerve could supplement a warehouse labour force to meet peak demand periods or work every day. “Swerve has potential to work alongside warehouse personnel in a dynamic environment,” explains Wachter.

Indeed, the Swerve platform holds the potential to incorporate machine learning (ML) and artificial intelligence (AI). “The framework we used would allow the opportunity for ML and AI to be used,” concludes Wachter. “Though it would take a significant amount of time to develop customer-specific applications, it can be done.”

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Smart sensing reduces motor downtime

Until now, the monitoring and preventive maintenance of low-voltage motors has been time-consuming and expensive. New technology from ABB transforms simple motors into intelligent machines that warn when they need servicing. Smart sensors attached directly to the motor supply information regarding operating and condition parameters via wireless transmission.

The innovative sensor technology offers plant operators not only huge potential savings on maintenance and repair, but will henceforth also make it easy to utilise the Internet of Things, Services and People (IoTSP) for millions of motors. The IoTSP is ABB’s concept for enabling its customers to take advantage of the opportunities of digitalisation. With the new solution, small and mid-sized companies can also benefit from the advantages offered by the IoTSP.

The smart sensor provides information on operating and condition parameters such as vibration, temperature or overload, and calculates power consumption. The data are analysed by a specially developed software program and provided to the plant operator in the form of graphics for maintenance planning, thereby enabling downtime reductions of up to 70 percent. At the same time, the lifetime of the motors can be extended by up to 30 percent and energy consumption reduced by as much as 10 percent, so that the investment in this innovative form of condition monitoring pays for itself in less than a year.

“This solution makes condition monitoring the new standard for low-voltage motors,” says Pekka Tiitinen, president of the ABB’s discrete automation and motion division. “Optimised maintenance schedules help reduce maintenance costs greatly, while unscheduled outages are reduced considerably, or eliminated completely. Increased availability significantly boosts our customers’ productivity.”

Easy deployment

Applications are not restricted to new motors made by ABB. The sensors can be installed at the factory or retrofitted on already operating low-voltage motors within minutes. “The sensors will also be available in the Middle East and can be used on any low-voltage motor, in any industry, from food and beverage businesses to steel and chemical plants,” adds Gus Abboud, lead division manager, discrete automation and motion, Middle East and Africa.

Cybersecurity is guaranteed at all times with the new sensor technology from ABB. The sensor is not electrically connected to the motor, so unauthorised parties cannot access the motor via this route. The smart sensors wirelessly transmit the data via encryption protocols to a secure server where they are analysed using special algorithms. The cloud-based server implementation fulfils all of ABB’s strict specifications for cybersecurity and the data are stored in the cloud in encrypted form. The Internet-based customer portal also uses a role-based access protocol to make the data securely accessible.

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Intelligent wireless connectivity

The ultimate goal of most industrial automation applications is to obtain actionable insights from data sources for more precise decision-making. To achieve this, businesses need to make their field data accessible to information technology (IT) or operational technology (OT) systems. Read on to learn how Moxa’s easy, reliable, and secure connectivity solutions can facilitate such industrial applications.

Taking data to the cloud: all OT field data can easily be transmitted to the cloud. Instead of spending extra time and resources on OT/IT integration, simply migrate all field device data to the cloud. Focus on developing applications to avoid the complex integration between OT and IT systems using ready-to-run edge connectivity solutions to connect multiple serial, Modbus, EtherNet/IP, or I/O field devices to private clouds through generic MQTT, or to public clouds through reintegrated Azure or Alibaba Cloud SDKs. With intuitive UIs, it only takes a few steps to complete the cloud selection, connection, and message tag settings between the field and cloud. To speed up OT/IT integration project development, choose a Moxa edge connectivity product.

Q: What if my Application requires programmability or data pre-processing?

For applications that require edge computing, Moxa’s UC series of edge computers is available. These Arm-based industrial computers support WiFi/LTE connectivity and various communication interfaces. The optional ThingsPro software enables easy Modbus data acquisition and supports cloud connectivity for Azure, AWS, Alibaba Cloud, and generic MQTT.

For more information contact RJ Connect, +27 11 781 0777, info@rjconnect.co.za, www.rjconnect.co.za
XP Power has announced the DSR range of AC-DC DIN rail power supplies approved for industrial control systems and information technology equipment applications. These versatile supplies provide reliable power with a 150% peak load capability in a slim DIN rail mount metal case.

Competitively priced, the DSR's space saving design features a width of just 32 mm for 75 W and 120 W models, and 45 mm for 240 W models, making them among the slimmest available in the market today.

For use in industrial and building control applications, specific deployment areas include machine control, factory automation, escalator/lift control, as well as building control and security systems.

Technological advancements in these areas require greater automation and control, whilst minimising control system size without compromising reliability. XP Power’s DSR power supplies are perfectly suited to address these needs.

DSR power supply models feature high efficiency and two lower power models are available with 12, 24 and 48 V outputs, whilst the DSR240 is available with 24 or 48 V outputs. All models operate from an input supply 85-264 VAC.

The power supplies’ 150% peak load capability enables start up for electro-mechanical loads. Ambient temperature rating is -25 to 70°C for all models, with rated power available up to 50 or 60°C model dependent. Volt free relay contacts facilitate remote monitoring for DC OK. Units can be paralleled for higher requirements or to provide N+1 redundancy in critical applications.

For more information contact Vepac Electronics, +27 11 454 8053, sales@vepac.co.za, www.vepac.co.za

**Integrate IO-Link devices in Profinet**

Turck’s simple IO-Link device integration (SIDI) simplifies the handling of IO-Link devices in Profinet engineering systems. As the devices are already integrated in the GSDML file of the master, users can select the devices from the device library (for example in the TIA Portal) and integrate them in their projects via drop-down fields as if the devices are submodules on a modular I/O system. The user benefits from access to all device properties and parameters in plain text. Measuring ranges, switch points and pulse rates can be set directly from the engineering system – without any programming or additional software required.

From now on, SIDI is integrated on all Turck IO-Link masters of the TBEN-L, TBEN-S and FEN20 series. The software contains all the IO-Link devices from Turck and Banner Engineering. Turck has also included IO-Link devices from third-party manufacturers, such as valve blocks, in the SIDI catalogue. Other devices of manufacturers can be added on request.

SIDI also considerably simplifies maintenance. As all device properties and parameters of masters and devices are directly available in the central project file of the controller, automatic device exchange in the event of damage can be carried out easily without any problem – both for IO-Link masters as well as devices.

For more information contact Brandon Topham, Turck Banner, +27 11 453 2468, brandon.topham@turckbanner.co.za, www.turckbanner.co.za
Comtest has announced an addition to the Optris Compact line of IR cameras – Xi 80 and Xi 400 – with new industrial accessories for use in harsh conditions. The range has a modular design and as a result, the water cooled housing, the air purge unit and the shutter can be used both individually and combined.

This stainless-steel shutter is generally used to protect the optics from contamination and foreign objects. This is particularly important when the camera measures upwards with the measurement objects above it, such as in the glass industry. With a response time of just 100 ms, the cameras are optimally protected from falling broken glass. Furthermore, the shutter can be used in intermittent processes, so that the optics are exposed to environmental conditions only during the measurement process.

**Temperature measurement in harsh conditions**
A stainless steel, water-cooled housing and an air purge collar made of anodised aluminium are available so that the compact infrared camera can be used in rough industrial conditions. Cooling allows for use in hot environments up to 250°C. The air purge unit protects against air particles and prevents condensation on the optics. It can be screwed on in four positions, allowing the air flow to be customised for the application. Integrated into the air purge unit is a silicone window that can be replaced without complex assembly steps if it suffers mechanical damage.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za

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The new multicode reader from ifm electronic reliably detects 1D and 2D codes. It ensures reliable identification even under difficult conditions, e.g. in case of changing extraneous light or shiny surfaces. Several different codes in one or more images can be evaluated in just a few milliseconds.

**Quick set-up and Vision Assistant software**
Simple applications with one code per image can be set quickly via teach button. This saves time and costs, while the preset device configuration can be changed by means of a user-friendly smartphone app. For complex identification tasks, the multicode reader can be configured using the award-winning Vision Assistant software. The intuitive navigation and visualisation help users through the process.

For more information contact ifm - South Africa, 086 143 6772, info.za@ifm.com, www.ifm.com

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RS Components has announced availability of a new series of PLS brand laser levels from Fluke. PLS (Pacific Laser Systems) became a Fluke company in 2015 and is well known for providing high-quality tools in a number of major European markets.

The new series of PLS red and green-line laser levels will replace some of the Fluke-branded products. They deliver high levels of durability and precision and offer a high-end selection of features for users such as contractors and maintenance engineers involved in building construction and maintenance, as well as many other industrial markets.

For example, the units come with a fast-setting and self-levelling pendulum to deliver accurate point and reference lines – virtually instantaneously. The tools also feature a pendulum lock to secure the laser during transportation as well as enabling manual tilt mode. Additionally, all the laser levels are accurate to less than 3 mm across a distance of 10m, as well as offering dust and water resistance according to IP54.

The range of laser level models newly available from RS include the PLS 3R, 3G, PLS 5R, 5G PLS 6R, 6G, PLS 180R, and 180G. The existing PLS 4 series has been upgraded to become the PLS 6 series and now comes with four dots and two lines, and is also available in both red and green versions. In addition, the PLS 3 and PLS 180 series will replace the Fluke branded laser products. Also available are a selection of accessories, including a universal wall and ceiling bracket, which has been specifically designed for the PLS magnetic L-bracket.

For more information contact RS Components SA, +27 11 691 9300, sales.za@rs-components.com, www.rsonline.co.za

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RS introduces red and green laser level tools from Fluke

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For maximum process repeatability and consistency, modern plasma applications require precise RF power regulation and control. A key component in ensuring accurate and repeatable RF power delivery to the chamber is calibration, regulation and monitoring of the RF generator.

Represented locally through Comtest, Bird Technologies, a provider of RF components, subsystems and test equipment, now offers ultra-stable, low VSWR (voltage standing wave ratio) loads for quick and precise measurement of generator power output when used with precision power sensors such as the Bird 4020 series. Bird models 8865SC13, 8890-300SC13, 8921SC13 and 8931 SC models not only provide low VSWR but also less than 0.1 dB total change in VSWR at process critical frequencies. There is no need for load warmup, or risk of non-repeatability due to calibration for different lengths of time. This can minimise the errors associated with calibration, and control one of the more critical process variables.

RS Components has announced the launch of the K4 Drive System Development Kit (K4DSDK) from ebm-papst, one of the world’s leading manufacturers of high-efficiency fan and motor drive products. Targeting use by design engineers, application specialists and developers, the compact K4 system offers faster development and deployment for motor-control based solutions.

RS has been working closely with ebm-papst to demonstrate the potential of the K4 drive motors via its DesignSpark engineering community. A host of supporting content is now available on the DesignSpark website showing the ease of use and the flexibility of the K4 drive system in a range of typical application examples.

The new system offers a highly flexible solution that delivers the ability to program and upload different control functionality even with a motor in situ. In addition, a simple development controller helps interact with the K4 motor and the Drive Studio software, which comes with the kit and provides clear visualisation of the control strategy during the development stage.

RS Components has announced availability of a new online tool that makes it easier for customers in their selection of protective and safety eyewear for a wide range of industrial applications.

Targeting PPE (personal protection equipment) professionals including purchasers and end users, the ‘3M Eyewear Product Selector’ essentially helps customers make decisions on choosing the right protective eyewear by asking a short series of questions to establish the most suitable PPE/safety product for their application.

Major considerations for protective eyewear users in industrial environments will include serious hazards involved in the use of chemicals, for example, or environments where high-speed solid particles are flying around. Other important criteria to consider in the selection process include expected light levels available for workers, whether the eyewear will be used indoors or outside, the level of user comfort required (especially if a user will be wearing protective eyewear all day and every day), and whether a specific user wears prescription lenses or not.

All these issues are addressed by the selector, enabling customers to make the right eyewear product decision. The selector is available at: https://za.rs-online.com/web/b/3m

Oil dielectric RF termination loads

RS announces drive controller kit

RS introduces safety eyewear selector tool

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For more information contact Vishal Ramphal, RS Components South Africa, +27 11 691 9300, vishal.ramphal@rs-components.com, www.rsonline.co.za

RS announces drive controller kit

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