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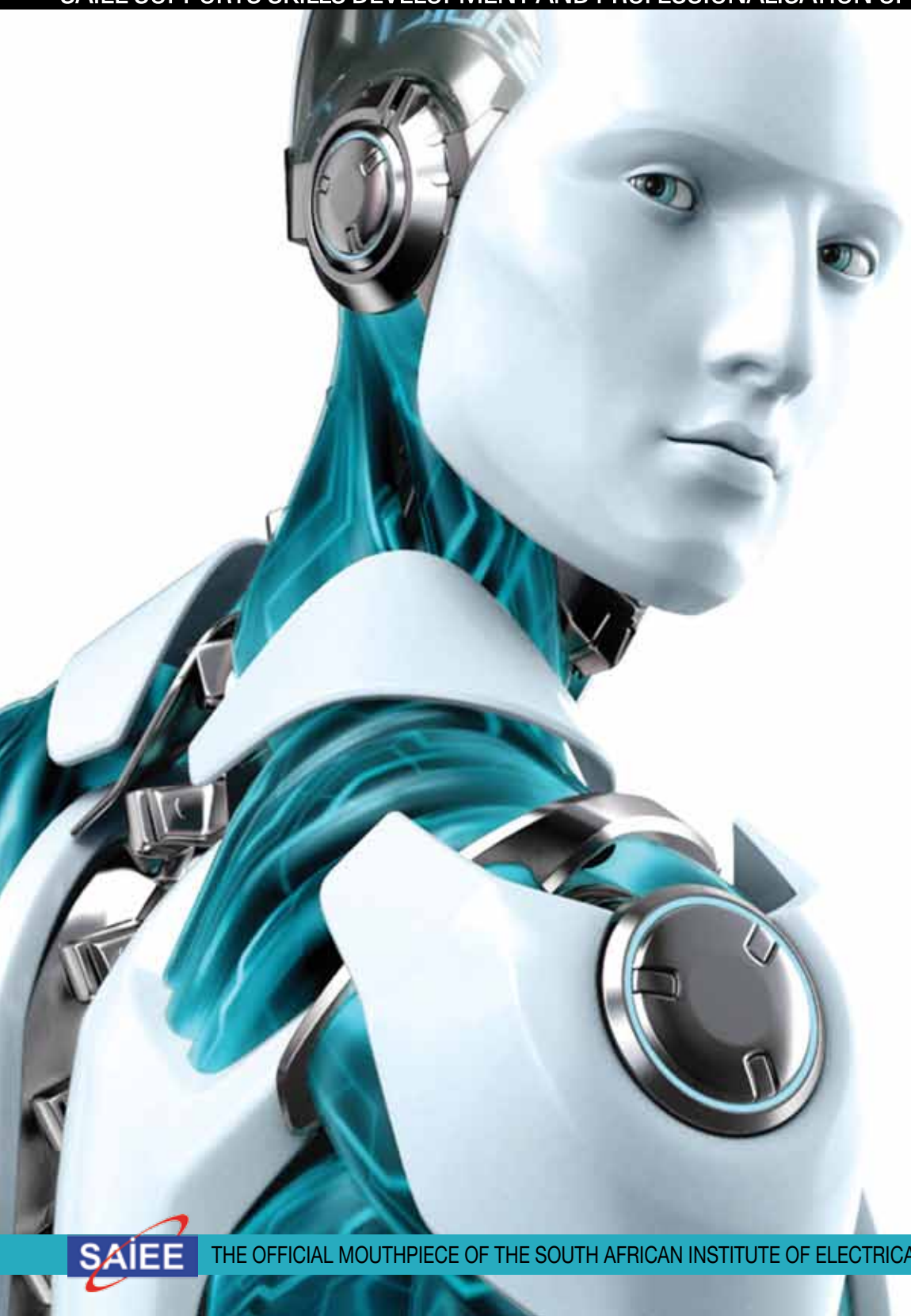

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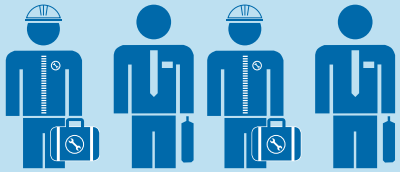

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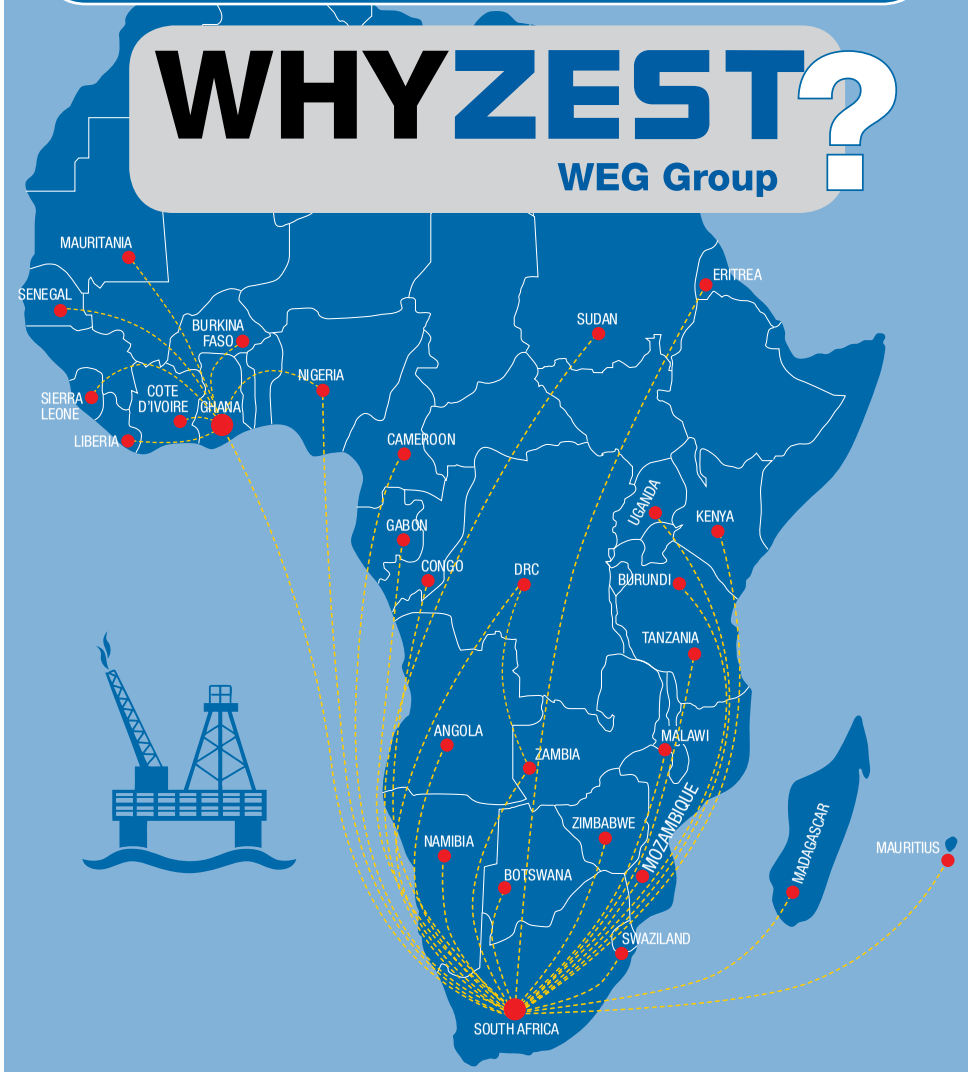

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September is around the corner again with spring in the air. It is incredible how fast 2014 has gone by, and to think there is 3 months to go until Christmas, it's enough to make me break out in a cold sweat!

This, my 32nd issue for the SAIEE, features on Robotics and Automation. One of the feature articles focuses on different ways robots enhance lean manufacturing environments. It also gives an overview as to how small and large manufacturers tend to use robots instead of humans – which provides cost saving and has a good return on investment.

In our Power Section on page 50, we feature an article written by Sishal Kuwat-Kanyae who is making the electrical connection on condition based monitoring.

Our opinion piece (pg 58), aptly written by Don Stepto, focuses on Automation. In his opinion it is crucial to maintain a sustainable balance between automation, social and environmental needs, politics and equity.

I have received quite a few non-technical articles from members, which make for very interesting reading, which I will share with you in future issues of **watt**now. I would like to urge members to also send me technical papers. These can earn you CPD credits, as well as being informative to SAIEE members.

Herewith your Robotics and Automation issue.

Enjoy the read.

Minx

*Visit www.**watt**now.co.za to answer the questions related to these articles to earn your CPD points.*

You know you're getting older when you look in the mirror and say..... "Dad?"

AVON

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Greetings to all our Members from SAIEE House, Johannesburg.

Thank you to the SAIEE Team in promoting "Our Lady in Science, Technology and Engineering" during the month of August. Our efforts must grow from strength to strength.

Thank you to Gibela for the invitation to attend their launch. Gibela is on contract for the R51billion Passenger Rail Agency of South Africa (PRASA) Urban Rail Commuter Project; project number 7 of the Presidential Strategic Infrastructure Plan.

During August, we had discussions with the South African National Energy Association (SANEA) on joint institute to institute workings; we attended the AGM of the South African Institute of Mechanical Engineers (SAIMechE) and we received a visit from Professor Ron Harley of the Power and Energy Society of IEEE. One of the purposes for this visit was to discuss how SAIEE could provide the local administration of their conferences, expositions, distinguished lectures and tutorials in South Africa. A similar call was made by the leadership of SAUPEC, the South African Universities Power Engineering Conference. SAUPEC is an annual event where local academics and students meet to discuss and present their research work in the field of electrical power and energy. When The Institute of Engineering and Technology (IET) visited SAIEE, a similar call was made for SAIEE to be their local partner in their delivery of IET conferences, distinguished lectures and tutorials.

The European Union based Utility Telecommunications Council (EUTC) is planning for their launch of the African Utilities Telecommunications Council (AUTC) in Johannesburg. EUTC has requested SAIEE involvement and support. The collective call from our Institute partners for the local administration and support of their events presents an opportunity for us to develop further our strength to serve our members.

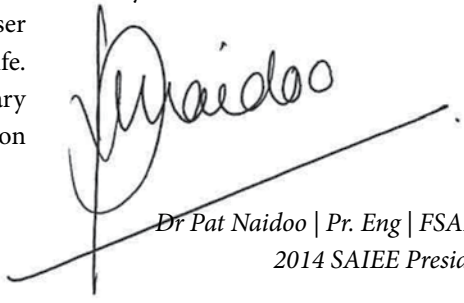
Our drive to increase our membership continiues to gather momentum. The Eskom Technology Group will host SAIEE at the Franklin Auditorium, Eskom Megawatt Park. Transnet Engineers are planning a similar forum to share and invite Transnet engineers to SAIEE membership. Our Student Council is under construction and their drive to recruit, mentor and guide our third and final year electrical engineering undergraduate students is now in top gear. Our launch of Corporate Partners has commenced. Our membership is growing towards the 7000 mark; let us try and push towards the 10,000 mark and higher. We need to make smaller the ratio of SAIEE electrical engineer to RSA citizen; the smaller the ratio, the closer we will be at world class quality of life. Thank you to all our staff and voluntary members, we are proud of your drive on membership.

Year end is in sight and a continued challenge is that of in-service training and experiential learning for our undergraduates. I had the opportunity to have a conversation with the Executive Committee of the Engineering Council of South Africa (ECSA). My response to the conversation on transformation and university accreditation was as follows: On Transformation, our challenge remains in moving our society from the tragedy of the past to the glory of the future; a better quality of life for all our people is a national priority. We must collectively work as fellow South Africans; every South African hand must be on the deck to steer the country towards value for every citizen. On University accreditation, we can give ourselves full marks for theory. Let us equally record a failure for in service training and experiential learning opportunities for our undergraduates. Thousands of our students are stranded and lack quality work opportunity. My suggestion to ECSA is that we consider community service similar to that as promoted for our colleagues in the medical faculty. Our municipalities have need and can absorb thousands of engineers in undergraduate training.

Let us open all doors for all our young engineers to engage in community service and work place experiential learning. Let our students work and have fun. Let our students grow themselves to become confident and strong engineers; World Class South Africa will follow.

Be safe, be strong and work hard. Drive at reduced speed in the rainy Spring. Zero Accident is an achievable result.

Thank you



Dr Pat Naidoo | Pr. Eng | FSAIEE
2014 SAIEE President

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WATTSUP

SAIEE Ladies in Engineering High Tea

Gerda Geyer & Minx Avrabos

The SAIEE Council Chamber was totally feminised!

Minx Avrabos, Managing Editor of the **watt**now, recently hosted a High Tea for the SAIEE Council women in celebrating women's day. The SAIEE Council Chamber was 'feminised' and depicted a vintage high tea – with chocolates, cupcakes, champagne, savoury tartlets and tea. The theme of the day were "You are never too old to…" . The guests speakers were Maureen Naidoo, wife of the 2014 SAIEE President; Leila Fourie, Director at the Johannesburg Stock Exchange; Jené Palmer, CEO Spescom; Dickie King, Senior Buyer Wetherlys and Elga Engelbrecht, Image Consultancy.

Honey Jewellers, one of the event sponsors, had some of their beautiful creations on sale, and this went down like a house on fire with the ladies.

At the end of the day, a few ladies won in the prize draw, with gifts from Magnetic Nail Academy, Honey Jewellers, Heather McCann Photography and Elga Engelbrecht Image Consultancy.

The event would not have been a huge success without the following sponsors: Impact Energy, A.J. Charnaud, Actom, Powertech Business Development, Zest, Bergmann Fisher Consultants, Promedium, Honey Jewellers, Heather McCann Photography, Magnetic Nail Academy, Avon, Wetherlys and Sandro Hairdressing.

In closing, Minx explained the aim of this event, and this is to get the Ladies in Engineering together, once a quarter for a round table and networking discussion of sharing problems they might face in their workplace, and where we as the SAIEE, can offer assistance or mentorship. As women, who are the decision makers in our homes, we have the power to encourage our sons and daughters to study engineering – which is a dying breed. The borders of different engineering fields are blurring and therefore, these networking events apply not only to electrical engineers, but all engineering disciplines.

We will urge our SAIEE Centres to also get involved, so we can nationalise the "SAIEE Ladies in Engineering" Association.

Any interested parties who would like to join this movement, should contact Minx Avrabos on minx@saiee.org.za.

Maureen Naidoo & Janine Meyer-Hoffmann.

Yolande Forst & Lizanne Scholtz.

From left: Parshie Maney, Pranshnie Gangiah & Avilasha Pandaram.

Minx Avrabos with guest speaker, Leila Fourie.

Maureen Naidoo with her guests enjoying a glass of champagne.

Guest Speaker, Lené Palmer.

Guest Speaker, Elga Engelbrecht.

Minx Avrabos with guest speaker, Dickie King.

WATTSUP

eduCate Grade 12 Revision Programme Kicks Off its Fourth Year

Front Row from left: Martin Sweet (Primestars), Dr Nonhlanhla Nduna-Watson (Dept. Basic Education), Dep. Minister Zanele kaMagwaza-Msibi (Dept Science & Technology), Kefilwe Morobane (Telkom Mobile), Dr Xolani Mkhwanazi (BHP Billiton)
Middle Row from Left: Kgotla Kagiso Tiro (Dv8 Technology), Kea' Modimoeng (Samsung), Sbusiso Leope (DJ Sbu)
Back Row from left: Yershen Pillay (NYDA), Wiseman Mabunda (Leap Science & Math School), Sbusiso Kumalo (Capitec).

A collaboration between the corporate sponsors, the Department of Basic Education and the Department of Science & Technology gathering in Johannesburg recently to mark the launch of the new season of eduCate, a nationwide matric math and science revision initiative.

The eduCate programme provides students from disadvantaged backgrounds matric revision tutoring in math and science at cinemas throughout the country, in the run-up to the matric exams. eduCate, now in its fourth year, aims to address any insecurities learners might have as they prepare for their year-end exams, in so doing, contributing to an increase in the number of learners that excel in these subjects.

Programmes like eduCate make an important contribution to address South Africa's skills shortage. Learners who benefit through these programmes improve their chances of admission to tertiary institutions where they can study in fields like engineering, medicine and accounting.

ACTOM High Voltage Equipment develops new composite insulator

Jan Venter (left), ACTOM High Voltage Equipment's Supervisor, Insulators, and Craig Aaron, Senior Product Manager, Isolators, with some of the newly-developed ACTOM-branded composite insulators for disconnectors.

ACTOM High Voltage Equipment has developed a 132 kV/550 BIL/31 mm/kV composite post insulator with a porcelain core for use on their disconnectors and other support functions.

The new insulator, introduced into the market recently, is ACTOM High Voltage Equipment's first ACTOM branded insulator product. *"It has been designed by us and is manufactured by an approved overseas manufacturer to our specifications in accordance with international quality standards,"* said Jan Venter, the division's Supervisor, Insulators.

Hard on the heels of the division's completion of development of the new product, Namibia's power utility NamPower awarded it a R20-million contract in September to manufacture and supply 28 x 132 kV and 45 x 245 kV disconnectors.

ACTOM High Voltage Equipment is the first local manufacturer to develop and produce a composite insulator with a porcelain core. Prior to introducing the new product the disconnectors it supplied into the local market were fitted with traditional all-porcelain insulators. *"This particular product is unusual among composite insulators as it consists of a porcelain core coated with silicon. The porcelain-based insulator has the rigidity that our disconnectors require,"* said Venter.

"The porcelain-based composite insulators have the advantages of being lighter than the traditional product, as well as performing more efficiently in polluted environments," Venter concluded.

Flamosafe Fire Resistant Electric Cables

Aberdare Cables' Flamosafe® range of fire resistant cables is designed to minimise the extent of damage and reduce the dangers associated with fires. The cables cover a range of applications found in industrial, commercial and residential environments where conditions range from buried, free ventilating to confined spaces where people gather, such as in cinemas, hospitals, shopping centres, high rise buildings and mines.

Throughout the world, all modern buildings, whether they are domestic, commercial or industrial, contain a large quantity of electric cable. These cables provide energy, information and control, and are distributed throughout the buildings in ducts, tunnels basements and ceiling cavities, linking every part of the building. Electric cables are potentially able to propagate fires along their length, and can cause rapid spreading of a fire throughout the cable network and the associated buildings, if not stopped by some means. In addition to the spread of fire into adjacent areas, the generation of smoke may prevent the escape of persons trapped in a fire situation though lack of visibility or incapacitation. A further concern is that the smoke and gases released by the fire may contain toxic and corrosive elements, causing harm to both people and equipment. However, Aberdare has a solution!

A cable is declared flame retardant in accordance with a particular category, if the materials and the construction of the cable, limit the spread of fire, dependant on its rating, along the cable or bundle of cables under specified conditions. Cables which make use of PVC materials requires the PVC to have a limiting oxygen index (LOI) of at least 27% to indicate the percentage of oxygen required for supporting the combustion of the material. Flamosafe® cables address each of the four major areas of performance in fire situations: flame propagation; generation of smoke; generation of toxic and corrosive gas; and circuit integrity.

Aberdare's Flamosafe® range of LV fire performance cables include Fyrgard, Lohal, Lotox and Fyrsure all of which are at the very least fire (flame) retardant to IEC 60332-3-24.

Fire resistant cables are required to pass a combination of tests in a hierarchy ranging from the least capable to the most. More advanced cables address the problems of emission of acid gasses, and still more advanced cables address the problems of smoke and toxic gas emission. At the top of the Flamosafe® range are cables capable of continuing to operate under defined conditions of fire and abuse, including water and mechanical shock, while still maintaining reliable circuit integrity. All cables bear the SABS mark of approval and comply with international standards where applicable.

The appropriate selection of a suitable cable type from the Aberdare Flamosafe® range will minimise the extent of damage, reduce the dangers associated with fires and improve public safety.

Novel approach to municipal service delivery achieves award-winning shared services centre

Rene Pearson | Aurecon Project Manager

South African municipalities are faced with a host of daily challenges when it comes to trying to provide the required level of service expected by their respective communities. Addressing general inquiries and requests for assistance, in particular, remains a significant challenge.

"Many municipalities are taking a novel approach of late," explains Rene Pearson, Aurecon Project Manager. *"We are seeing a move toward a more integrated approach when it comes to interacting with communities. Government entities are looking at ways of adopting a shared services model which enables a coordinated, multi-agency response to community requests for service via a single point of contact."*

This approach is being supported by legislation. In order to comply, the Chris Hani District Municipality (CHDM), one of seven districts in the Eastern Cape Province, commissioned Aurecon to develop and implement solutions for the Municipality's 'Information Management and Communication System' project.

WATTSUP

SAIEE Central Centre site visit

Visitors to the Lesatsi PV plant.

The SAIEE Central Centre, in conjunction with the Electrical, Electronic and Computer Systems department of the CUT, Free State arranged a site visit to Letsatsi PV plant near Bloemfontein.

On arrival the Letsatsi personnel gave a safety induction course after which Mr Anveer Chanderman took the attendees for a guided tour through the PV plant, regulation and substation. The SCADA system were also shown and explained. On the day it was partly cloudy and the plant delivered 21MW on arrival and 56MW when we left.

DEHN PROTECTION SOUTH AFRICA introduces new type 2 surge arrester with 5 kA discharge capacity to its range

The new compact design in the DEHNguard family, DEHNguard 5 kA, provides reduced discharge capacity In (8/20) of 5 kA and can be used for domestic distribution board (DB) protection. A compact, non-modular enclosure, the DEHNguard 5 kA saves on space, and comes in two versions: a single phase 230 V (1+1) and a three phase 230/400 V (3+1).

The units' narrow design makes them easy to install and ideally suited for retrofitting, given their 18 and 36 millimetre width. As the name suggests, they have an optimised discharge capacity of In (8/20) 5 kA and Imax 15 kA L - N, and co-ordinate with other arresters in the Red/Line family. For additional safety purposes, the operating state and fault indication is indicated with a flag in the inspection window, as required by the International Electrotechnical Commission (IEC) 60364-5-53 standard.

The modular surge arresters of the DEHNguard family with their functional power supply systems (Red/Line) design combine short-circuit and surge protection into a single protection module and set new standards for user-friendly application.

For more information, please visit: www.dehn-africa.com.

Birkenhead based SeaKing Electrical invests in new "high impact" electrical engineering software WITH PIC

Birkenhead based SeaKing Electrical has invested in new "high impact" electrical engineering software – used in nuclear and military sectors. The firm, which also has offices in Aberdeen, has invested in ETAP software which supports the design, simulation, operation and automation of industrial power systems.

SeaKing Electrical managing director Dave Gillam said the advanced software helps to drive maximum levels of reliability, safety and energy efficiency across power infrastructure. He said ETAP is qualified for use in the nuclear and military sectors, as well as 'mission critical' operations, opening up great potential for SeaKing to drive business growth.

"The SeaKing Group's core focus lies in marine electrical engineering," said Mr Gillam. "Clean and reliable electric power is at the foundation of any business' ability to offer its products and services.

"Our mission is to help asset managers and owners of commercial marine and offshore vessels maximise the potential of their electrical infrastructure. To achieve this we have made a significant investment in the ETAP software package and subsequent staff training. This package will enable SeaKing to deliver the very highest industry standards."

ETAP provides a set of core tools, embedded analysis modules and engineering libraries. This enables the creation, configuration, customisation and management of power systems.

Dave Gillam | Managing Director SeaKing Electrical

It is used in particular by the Ministry of Defence and the US Navy for short circuit calculations and ARC Flash analysis on power generation, switchboards and downstream electrical distribution systems. The software can also provide modelling of circuit breaker discrimination. Electrical discrimination is the selection of shielding devices so that the device adjacent to a fault will function.

"SeaKing is constantly looking for ways to improve its service and drive even greater levels of customer satisfaction," he said. "We believe this can be achieved by combining advanced technology, like ETAP software, with the broad industry knowledge, experience and expertise within the SeaKing Group. We are committed to delivering cutting edge and cost effective electrical engineering solutions for our clients. We believe this latest investment is a clear signal of our intent to continue raising the bar."

University Of Johannesburg Solar Team Unveils Ilanga II

University of Johannesburg Solar Team who will compete in September's Solar Challenge.

Ilanga II, the prototype solar energy vehicle of the University of Johannesburg's Solar Team set to compete in the 2014 Sasol Solar Challenge was unveiled on Tuesday, August 5 at the University of Johannesburg (UJ) Kingsway Campus in Auckland Park, Johannesburg.

UJ Solar Team spokesperson and Project Manager, Warren Hurter, who has been part of the UJ Solar Team since they started as undergraduates in 2011 said the new Ilanga II is one of the most advanced solar powered vehicles produced by University of Johannesburg (UJ) students and industry partners to date. *"We are more than ready to take on our international and local competitors with this vehicle which echoes values of aerodynamic success and high performance. In short, Ilanga II is light and it is fast."*

The UJ Solar project is the flagship project of the UJ Energy Movement and promotes the study of alternative energy, energy management and sustainable engineering design.

Faculty of Engineering and the Built Environment (FEBE) Executive Dean, Prof Saurabh Sinha said: *"The Faculty fully supports the UJ Solar Team's proactive participation and we look forward to seeing how they perform in the upcoming Sasol Solar Challenge."*

WATTSUP

Stream to add support for contact centre gamification

Hosted contact centre provider 1Stream says its clients will soon be able to use new gamification technologies to increase engagement and productivity in the workplace.

"Gamification is about applying elements of game design to everyday work experience to make it more interesting and engaging," says 1Stream director Bruce von Maltitz. *"In the call centre context, it gives managers a new tool for managing the workforce."*

"Every call centre has metrics they are trying to improve," adds Von Maltitz. *"It might be the time taken to deal with each call, customer satisfaction ratings or the number of training modules people complete in a month - it doesn't really matter. What matters is that if you are collecting data about any aspect of your performance, there is the potential to use that data to drive a game experience."*

Von Maltitz says typical game elements might include *"achievement badges, quests and special events, the ability to increase levels, public ranking, social sharing, and so on. Exactly how to apply gamification to any particular workplace is something for the client to decide; at 1Stream, our focus in on providing the underlying technology to make it possible."*

One of the advantages of using game dynamics, says Von Maltitz, *"is that it takes the same stats you're already tracking, and which may seem boring to most of your workforce, and uses them to create incentives that are fresh, dynamic and engaging."*

1Stream's model of providing fully hosted and managed call centres means its clients can turn on gamification ability as soon as it's available, adds Von Maltitz. *"This is one of the key advantages of choosing hosted services: New options can be turned on or off as they become available, without having to commit to any big upfront investment in new software. We manage the technology, leaving our clients free to manage their people."*

Ikhokha Gives Small Business Owners The Edge: New Mobile Card Payment Solution Launches In South Africa

iKhokha, a young and innovative Cape Town-based financial services brand, has launched an exciting new payment service that is set to transform the way SME's accept payment from their customers. The Edge, a secure Chip & PIN card reader that plugs into a smartphone, and coupled with the iKhokha mobile app, transforms the phone into a secure mobile Point of Sale (mPOS) terminal, it enables merchants to process card payments – anywhere in South Africa.

Using the Edge, a wide range of South African businesses are also able to tender cash, card and mobile transactions, sell value-added services (such as airtime) and monitor and track sales performance and transactional history through the slick and easy to use Mobile App.

Simplicity, service and security are the three pillars on which the iKhokha ethos has been built. The proudly South African developed and manufactured solution has been through an incredibly rigorous international testing process with regulatory bodies and card schemes to ensure world class security.

SAIEE HOSTS CPD COURSE BY RENOWNED LECTURER

The SAIEE was privileged to host a course on HIGH TEMPERATURE LOW SAG OVERHEAD LINE CONDUCTORS on the 5-6 August by the renowned international lecturer Dr Brian Wareing PhD MIEE CEng EA Technology; Associate Fellow of Manchester University UK.

Brian, who hails from the Wales in the UK, worked at EA Technology for thirty years as a Senior Consultant in the Overhead Lines Services & Consultancy Division. He retired in August 2002 and formed his own company, Brian Wareing Tech Ltd as an Overhead Lines and Lightning Protection Consultancy.

Dr Wareing is a recognised expert in Overhead Lines. He is a member of IEC TC11 WG11 on IEC technical reports 826 and 1774 (Meteorological Data for Assessing Climatic Loads), and he is a member of Cigré Committees TF22.06.01 (Ice Loads on Overhead Lines and Structures) and SCB2 WG11 (Conductor Dynamics).

He is the Chairman of the International Committee IWAIS 2000, and Secretary of the Cigré SCB2 WG16 (Meteorology for Overhead Lines). He is involved in delivering courses on Overhead Line Power Engineering, Wood Pole Overhead lines and Lightning Protection and an MSc course in Power Distribution Engineering at Manchester University, UK, where he is an Associate Fellow.

Sue Moseley (SAIEE), Keith Bull (ARB), Dr Brian Wareing (Lecturer) & Tony Hill (CTC Global)

Delegates were appreciative of the opportunity to attend a course given by this prestigious lecturer and found it stimulating and informative.

The SAIEE would like to express its thanks to CTC Global and ARB Holdings for sponsoring Dr Brian Wareing's visit to South Africa and affording the SAIEE this wonderful opportunity.

This course will also be held in Durban on 21-22 October 2014. Persons interested to attend should please contact the SAIEE KZN Office on saiee@iafrica.com.

WATTSUP

Aurecon appoints new CEO

Giam Swiegers (Left), Aurecon Chief Executive Officer (effective 1 February 2015), with Aurecon Chairman, Teddy Daka

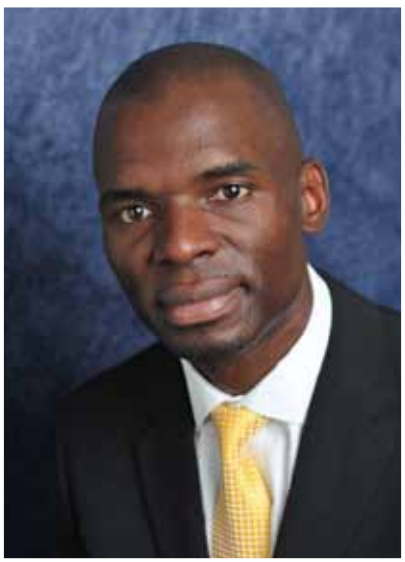
Global engineering and technical services company Aurecon today announced the appointment of Giam Swiegers as its new Chief Executive Officer (CEO) effective 1 February 2015. He will be based in the company's Sydney office.

Aurecon Chairman, Teddy Daka, said, *"After an extensive global search for a new CEO, we are delighted that Giam will be joining Aurecon. He has an outstanding track record as a CEO and is a great cultural fit for us as a business. His South African background and experience in the US and Australia tie well with our large footprint in both Australia and Africa. His track-record in building a great culture and an agile, growing business are a great strategic fit for us as an expanding global business."*

Giam leaves his current role as Chief Executive Officer of Deloitte Australia after a highly successful 12 years in the role.

Giam said, *"This is an exciting time to take a global role in a leading engineering company with the ability to be agile in the market. The sector is experiencing unparalleled change and offers immense opportunities for a company like Aurecon which is already leading in technology driven innovation and in tailoring its services to meet client needs around the entire infrastructure lifecycle."*

IITPSA WELCOMES ITS NEW PRESIDENT



Wellington Matope
2014/2015 IITPSA President.

At the recent Annual General Meeting of IITPSA (Institute of Information Technology Professionals South Africa), Wellington Matope was elected as President.

Ulandi Exner and Adrian Schofield (JCSE) will be the Vice Presidents for the next year. Moira de Roche remains in the role of Honorary Treasurer for the Institute.

As he handed the IITPSA Presidential Chain over to Wellington Matope, Rabelani Dagada (outgoing IITPSA President) noted: *"I am proud to have led the transition to the new IITPSA brand and I look forward to supporting Wellington as he takes the Institute to the next level".*

Commenting on his appointment as the new President, Wellington Matope stated: *"Firstly, I would like to thank my friend Rabelani Dagada for doing a sterling job during his term of office.*

IITPSA can be proud to share at least 3 achievements that transformed the organisation during Dagada's term of office:

- IITPSA became an Institute;
- IITPSA established a Foundation;
- IITPSA became a recognised professional body.

Matope added, *"Now that we have transformed ourselves from a society to an institute and we are a professional body, I would like to see the IITPSA brand embedded in the ICT industry with us being the voice that informs, educates, inspires and enables. I will be working with CIOs, members, EXCO, MANCO and all our strategic stakeholders to take the organisation to the next level and become more relevant to the industry."*

"I would also like the organisation to take its national influence on ICT policy matters to another level and to do that we will need to work closely with government. I am very pleased with our membership growth and the diversity thereof. Whilst I am very grateful for the international support and membership growth, I want the organisation to be just as attractive to South Africans".

Members attending the AGM were also privileged to hear a thought provoking presentation from the guest speaker, Prof. Barry Dwolatzky (Director of the JCSE at Wits University), on the subject of 'Nurturing Young Talent and Emerging Entrepreneurs'. This is a joint project between Prof. Dwolatzky and Mteto Nyati (Microsoft) who were the co-winners of the IITPSA / ITWeb IT Personality of the Year award in 2013.

Technical Visit to CBI-Electric African Cables

The visitors, with Kieron Leeburn, Chief Engineer (middle), CBI Electric.

SAIEE members were treated to an abbreviated cable training session and Factory tour at the CBI Electric African Cables plant in Vereeniging. After being welcomed by Pieter de Villiers, Technical Director at CBI Cables, the Chief Engineer, Kieron Leeburn took the group through an enlightening and entertaining whirwind tour of the interesting developments and problems facing the local and international cable industry.

The CBI facilities are well set up with a wide and solid range of cable samples for attendees to appreciate. CBI-electric african cables has been designing and manufacturing a comprehensive range of electrical power cables at their factory in Vereeniging, near Johannesburg, since 1935. Growth of the manufacturing facility has been consistent with the demand for the product locally while technological advancement has remained abreast of international trends. Apart from product manufacture, CBI-electric: African Cables also boasts a division specialising in the installation and maintenance of medium and high-voltage cable. This division of the company, known as Power Installations, is presently the sole Southern African cable installation company accredited with ISO 9001 quality certification and have a 9EE CIDB rating.

The wider implications, not only of the current ratings, but the effect of cyclic loading was covered. The huge impact of the load growth, and long term economic considerations were discussed, including the enormous effect of cable theft to the economy. High speed videos of short circuit testing were explosive. The new developments in water blocking materials were eye-opening.

After a tasty finger lunch, the group was taken on a brisk factory tour. Each area was explained, including the HV type testing. The group climbed to the top of the 85m high tower to see the XLPE plant for manufacturing and curing 132kV 2,500mm^2 cable.

Master Power Technologies releases range of solar power solutions

Master Power Technologies has launched a new range of photovoltaic solar solutions to compliment its current range of products for use in industrial applications in hot, arid regions, or wherever utility power is expensive or unreliable. The solar power systems are designed to supplement or replace utility power to save money and reduce the user's carbon footprint, and some designs can feed excess power back into the power grid.

"The Master Power Technologies' battery-free solar power solutions have been designed with characteristics such as low heat degradation and high durability, making the equipment ideal for power installations throughout Africa," explains Andre Naude, strategist for business development at Master Power Technologies. *"Some of the benefits we have designed into the product include a constant power-output curve to maintain the electricity supply needed to meet peak demands, the ability to operate without active cooling mechanisms and almost no energy loss at high ambient temperatures."*

The company has a range of grid-connected, grid-tie (or on-grid), stand-alone and off-grid solutions to choose from.

Grid-connected photovoltaic power systems are energised by photovoltaic panels that are connected to the utility grid. These power systems consist of photovoltaic panels, MPPT (Maximum Power Point Tracking, a technique used to obtain the maximum possible power from photovoltaic devices), solar inverters, power conditioning units and grid connection equipment. Unlike stand-alone photovoltaic power systems, they seldom have batteries or diesel generators attached.

Grid-tie solar systems use inverters that meet stringent requirements, such as not emitting noise that can interfere with electrical devices, and must retain acceptable levels of harmonic distortion for quality of voltage and current output waveforms.

"Grid-tie systems are advantageous as the electricity generated is used by the owner during the day." says Naude. *"During the evenings, when solar electricity is not generated, electricity is drawn from the grid, avoiding the need for costly battery banks."*

Stand-alone photovoltaic power systems, on the other hand, are electrical power systems that are independent of the utility grid. These types of systems may use solar panels only or may be used in conjunction with a diesel generator. Master Power Technologies also supplies off-grid solar generators. These systems are not connected to a utility grid and are used to provide a smaller application with electricity.

Master Power Technologies will customise the systems to each clients' requirements, ensuring every product is designed according to strict quality standards.

"Our integrated commercial-grade solar-powered and energy efficient grid-tie systems can meet clients' needs today and in the future," Naude adds. *"Our platforms offer an efficient and reliable solution to those institutions looking to lower their energy costs while also reducing their carbon footprint."*

KFC menu boards go digital

PVision, a South African manufacturer of display technologies, and One Digital Media (ODM), the largest digital signage company in South Africa, have successfully provided and installed over 5000 digital menu boards in 608 KFC stores across South Africa.

Half a decade ago, KFC developed a strategic plan to replace all print menu boards with digital screens, ODM procured and installed its own digital menu boards in 10 KFC stores as a trial run. After seeing the success of the pilot project, KFC decided to enlist PVision and ODM to supply digital menu boards for all their stores in South Africa. Today, this project is now seen as one of the largest digital menu board networks in the world.

"In the past, any new additions, or tweaks, to the menu would require a complete new print. This process would prove to be both time-consuming and costly – plus, your customers wouldn't know about the changes until the new menus arrived," says PVision Director, David Ross.

ODM Network Director, Marcel Broodryk, adds, *"Now, with a touch of a button, the screens can be changed and updated instantly. With over 27 different layout possibilities, that includes portrait and landscape options – and even soda fountain, breakfast, or 24 hour store layouts – the content can be laid out and managed effectively from a central point."*

Broodryk believes that projects such as this one could pave the way for other retailers to see the key benefits of digital signage. *"The biggest notable benefits are how it enhances the in-store retail experience for your customers and allows you to manage content in an effective and efficient manner. Also, it's environmentally-friendly and allows businesses to eliminate unnecessary paper wastage."*

Ross agrees with Broodryk, adding, *"Digital signage presents the perfect solution, because it's attention-grabbing, allows for diverse content types and is fully customisable. It is, without a doubt, the future of retail marketing."*

Schneider Electric Provides Prefabricated Data Center

Schneider Electric, a global specialist in energy management, recently announced that it had won the bid from Baidu to build an M1 containerized (prefabricated) data center with Schneider Electric's prefabricated data center solutions. As Baidu's first prefabricated data center project, the eco-friendly data center will feature fast deployment, low input and high capability operation from standardized to modular to prefabricated data center in the age of cloud computing and big data. This project not only meets the needs of Baidu's rapidly expanding business, but also sets a trailblazing example for the future of China's data center construction.

As the largest Chinese search engine and Chinese website worldwide, Baidu process billions of search and analysis requests from network users across the world every day. It is thus necessary to have an integrated, comprehensive data center in order to satisfy this explosive demand and to ensure rapid response, efficient operation while reducing the costs. The Baidu M1 data center will fill this much needed data management role as the main production data center, moving towards a "green Baidu." After intensive competition and rigorous testing, Schneider Electric won the bid with its advanced technology, reliable products and sterling brand reputation.

UJ's Kliptown Mandela Day Initiative

"What counts in life is not the mere fact that we have lived. It is what difference we have made to the lives of others that will determine the significance of the life we lead" – Nelson Mandela"

Mandela Day 2014 saw 22 staff members from University of Johannesburg's (UJ) Faculty of Engineering and the Built Environment (FEBE) joined members of Kliptown Youth Program (KYP) in adding a fresh coat of paint to residents' homes. The wood and tin housing were recently built to accommodate many who were affected by flooding.

Why Kliptown?
This year's Mandela Day was focused at beyond mere corporate philanthropy. A concerted effort is being driven within the faculty to encourage mathematics and science at primary and secondary schools across Gauteng.

Kliptown was established in 1903 and currently has an approximate population of 45 000. It is the oldest residential district of Soweto, home to 11 townships and has its roots deeply embedded in South Africa's political revolution. Despite Kliptown's historical contribution to South Africa's democracy, it remains largely under-developed facing numerous challenges including high levels of teenage pregnancy and unemployment.

KYP was founded in 2007, aimed at eradicating poverty through the provision of educational support and recreation. It has almost 480 members which are made of primary and secondary school learners and students enrolled at UJ who serve as mentors. The FEBE KYP partnership was established in 2012 with current academic engagements facilitated by Sam Gqibani, Head of Department: Mechanical and Industrial Engineering Technology.

Gqibani said: *"Support for the initiative has grown, adding value to the engagement and upskilling Kliptown community members. One of the current achievements is that we have enabled the enrolment of 12 KYP members in various courses across UJ faculties. Prior engagement included collaboration with the FEBE Department: Quality and Operations Management which focused on developing KYP founders. Skills imparted aimed at expanding reach and impact, whilst simultaneously improving the centre's community engagement."*

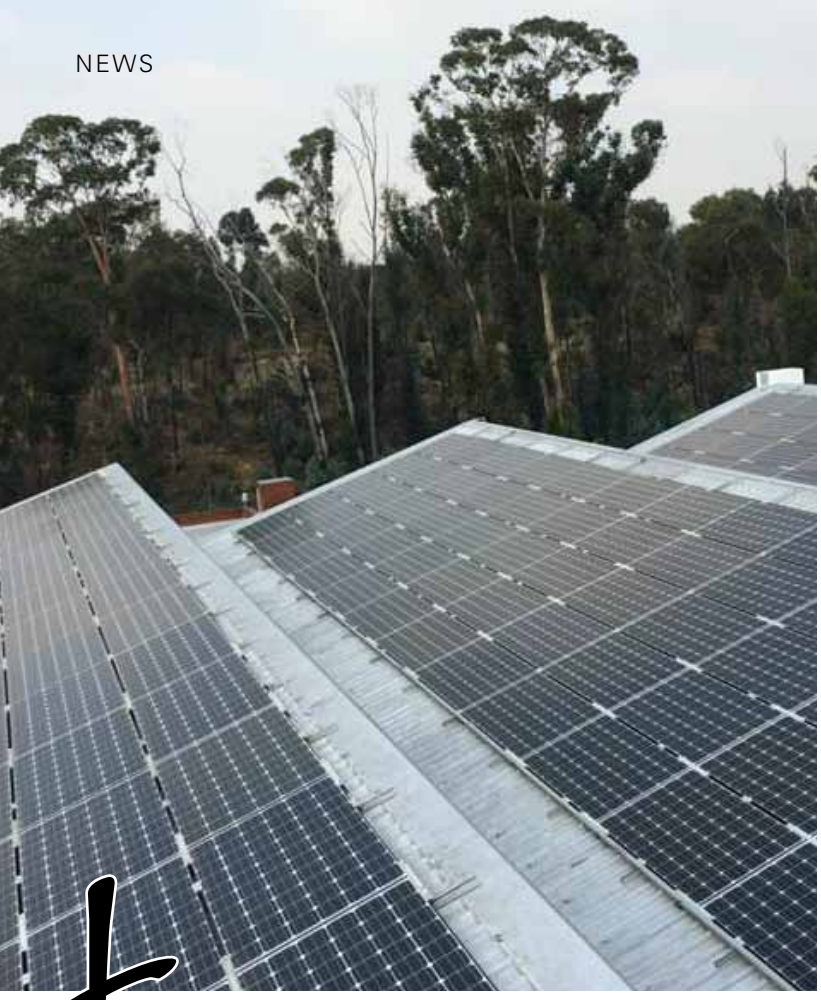
FEBE Executive Dean, Professor Saurabh Sinha said: *"The intention is to establish a multidisciplinary approach to addressing the current challenges faced by the community with the support of other UJ faculties and industry partners. In the spirit of Mandela Day, UJ staff and students were also engaged in other initiatives, giving off 67 minutes of their times at various projects around Johannesburg including supporting government's call by to clean up our environment."*

PROGRESS AT INGULA

The multi-billion Rand Ingula Pumped Storage Scheme, like many around the world of this magnitude and complexity has suffered delays not least the site closure ordered by the Department of Labour after last year's tragic accident that claimed the lives of six construction workers. However progress has been made since the incident in October last year.

The Ingula Pumped Storage Scheme is now in its seventh year of construction. The Eskom project is located between Ladysmith and Harrismith in the Little Drakensberg, and will have a generating capacity of 1332 MW available during periods of peak demand and to supplement base load when necessary – for example during outages or essential maintenance of other generating plant.

Ingula is a peaking hydro power station comprising an upper and a lower dam or reservoir separated in elevation by 480m, an underground powerhouse located 116 storeys underground in two excavated underground caverns and housing 4 x 333 MW Francis type pumps/turbines.



Jozi sees completed commercial rooftop installation

The 130 kW PV system adds up to Trina Solar´s extended list of successful local projects.

Trina Solar Limited, a global leader in photovoltaic modules, solutions, and services, was selected as sole supplier of the 130kW of PV modules for the commercial rooftop project in Johannesburg commissioned at Bazar & Bazar Wholesalers by ELDO Energy.

"Bazar & Bazar Wholesalers, a large fresh and frozen seafood wholesaler in operation since 1985 based near Gld Reef City, commissioned Eldo Energy to design a solar PV power plant which will offset a large portion of its electricity load," says Tim Ohlsen, Executive Director at ELDO Group. *"Based on studies done by Eldo Energy, a 130 kWp rooftop solar PV system was designed on a combination of IBR and concrete roofing. The Solar PV plant will be generating an impressive annual yield of 250,440 kWh."*

According to Bazar & Bazar Wholesalers, the project was commissioned in order to reduce their overall costs, and well as reduce their environmental footprint. B&B go on to explain that the installation will decrease operating costs from year 3 onwards, leading to a lower cost base and increased profitability. The installation is expected to save on a total 225 000 kg of CO^2 per year.

Eldo Energy was particularly considered in their approach to selecting the right PV supplier. *"We chose Trina Solar for their top quality product and professional customer service,"* continues Ohlsen. *"We found the local Trina Solar team to be extremely helpful in managing the process and ensuring our project timelines were met."* Comprising of 490 units of Trina Solar DC05A.08-265W monocrystalline solar modules, which are internationally acclaimed for superior efficiency and performance, the project is expected to produce a daily energy yield of 686 kWh.

Trina Solar is a key innovator in the global solar industry due to the expertise and activities in their State Key Lab of PV Science and Technology. The Company - whose advanced technologies in areas such as improving PV conversion efficiency, the lowering of module manufacturing costs and commercialisation of their innovative technologies - is recognised internationally for developments within the field of renewable energy, and continue developing their business in the uniquely positioned Southern African market.

"The completed installation of another substantial roof-mounted PV system has been an important success for Trina Solar in South Africa, and has assisted in further solidifying our local footprint," says Ben Hill, Head of Europe and Africa for Trina Solar. *"We are confident that the completion of this project, and the imminent conclusion of other key installations currently in development, will positively impact our overall presence in the Southern African PV market,"* Hill concludes. wn

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For more information contact: Pierre Nothard
Cell: 083 414 4980 | Tel: 011 396 8140
Email: pierren@safehousesa.co.za

www.safehousesa.co.za

*For the most up to date list of members please go to **www.safehousesa.co.za**

As at 02/09/2014

Leading SA Energy Company commissioning Reference site for Diesel Power Generation

Playing a key role in the growth of the Zest WEG Group's footprint across Africa, group company Zest Energy is moving towards the commissioning of its first reference site for diesel power generation in Zambia. Zest Energy also has installations in Congo, DRC, Tanzania, Zimbabwe and Ghana. The order was placed by Mopani Copper Mines (MCM) in August 2013 and calls for the supply and installation of a 12 MVA diesel power plant.

The scope of this project comprises the supply of six Perkins 4016 TAG2 diesel engines and 400 V alternators, complete with spare parts for operations and maintenance, six 2250 kVA dry type 400V/11 kV step-up transformers, 11 kV switchgear for the integration of generators from the power plant, all equipment needed for the generator plant control room including synchronisation and protection systems and all cabling within the mine's generator plant building.

Alastair Gerrard, Zest Energy projects manager, says that all equipment being supplied will be installed into a newly constructed plant building. Three complete synchronisation panels are also being supplied for integration of the local energy utility Copperbelt Energy Corporation's 11 kV incomers. The system will have the additional functionality to perform peak lopping and will thereby minimise maximum demand.

Installation commenced in June this year and commissioning started in early July, with handover scheduled for the third quarter of 2014.

"We're utilising our group company EnI Electrical, which has an office in Kitwe, to undertake all the installation work and Zest Energy's team of commissioning engineers will do the final setting up and hot commissioning," says Gerrard.

"Owing to the constrained space available on site, we had to optimise on the electrical design and that's why we selected dry type transformers which can go into the new plant building. We're also using a custom engineered busbar system between the generators and the step-up transformers.

Zest Energy is moving towards the commissioning of its first reference site for diesel power generation in Zambia – a 12 MVA diesel powered plant for Mopani Copper Mines (MCM).

"This contract showcases our ability to effectively integrate our power generation installations with the customer's infrastructure and to promote flexibility in the operation of the generator plant in conjunction the local power utility.

Further to this, we always try to add value by considering and factoring in future expansion requirements.

"The Mopani installation was a fit for purpose solution, owing to the load complexity on the specific shaft. We were involved in the design and engineering of the plant from the start of this project to ensure that the solution would be technically sound and cost effective.

"Our competitive edge lies in the backing of both WEG and the Zest WEG Group.

"WEG has a strong interest in investing into Africa, which provides the ideal platform for us to develop robust and custom engineered solutions based on our understanding of the dynamics of power generation in Africa," Gerrard concludes.

Local content has been maximised on this installation and local labour will be utilised wherever possible. As part of the contract, Zest Energy will conduct on-site plant operator training to ensure that mine personnel will be equipped to run this power generation facility at optimal performance levels.

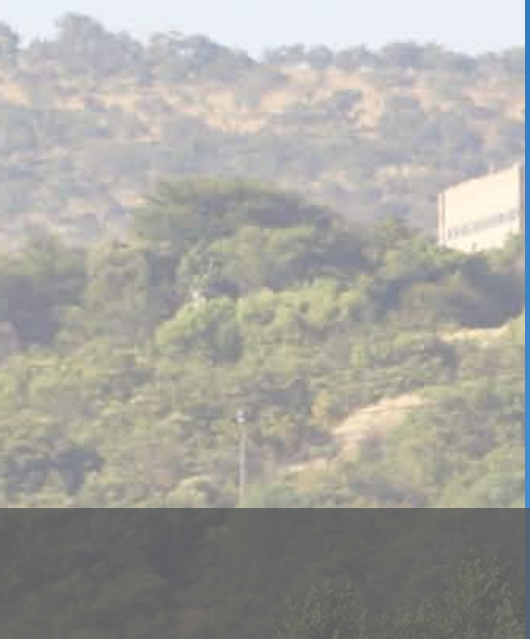
The Zest WEG Group is spearheading WEG's advances into new markets and increasing its presence in Africa. Its customer portfolio is made up of the largest companies in Africa's energy, mining, oil and gas sectors.

ENGINEERING FOR SOUTH AFRICA

For more information on ECSA and for registration, contact: Call centre: 011 607 9587/9502/9571/9554 • Tel: 011 607 9500
• Fax: 011 622 9295 • Email: engineer@ecsa.co.za • Web: www.ecsa.co.za • Postal: Private Bag X691, Bruma, 2026
• Physical: 1st Floor Waterview Corner, Bruma Office Park 2 Ernest Oppenheimer Ave, Bruma, Johannesburg

ECSA

ENGINEERING COUNCIL OF SOUTH AFRICA



The Engineering Council of South Africa (ECSA) is a statutory body that has regulated engineering practice for more than 40 years in South Africa.

ECSA exists as a regulatory body for the profession of engineering because while engineering activity is essential and beneficial to society and the economy, substantial risks to health, safety and environment accompany it and must be managed by competent professionals. In addition, engineering services must be of high quality in the interests of economy and the public's safety.

With these objectives in mind, ECSA has been empowered to perform functions which among others include:

- Establishing an engineering standards generating body (ESGB) and developing standards for engineering education and professional competency.
- Registering persons who meet educational requirements in candidate categories.
- Establishing specified categories of registration to meet health and safety licensing requirements and registering persons in these categories.
- Developing and maintaining a code of conduct supported, where necessary, by codes of practice.
- Investigating complaints of improper conduct against registered persons and conducting enquiries and imposing sanctions as each case requires.

In addition, ECSA is empowered to advise government and other parties, and to take necessary steps to protect the public interest, health and safety, improve standards of engineering services, create awareness of the need to protect the environment and conduct research.

Durban-based Conlog switched on to smarter prepayment needs worldwide

South African homes and businesses are using more technology than ever before to manage quality of life and ensure competitiveness in the global economy. Several of these technologies use "smart" components in the machinery. The local electricity system, in contrast, has not changed in over more than a decade, casting a dark blanket over the country and our economy.

According to Dudley Miller, general manager of prepayment electricity meter specialist, Conlog, prepayment meters offer an opportunity to peep out from under this blanket by allowing customers to not only track their energy usage more accurately, but to also control what you are using. *"Even more beneficial, is that the movement towards smart prepayment meters allows for better and more detailed analytics of both the flow of energy and the means to track this electricity for better management,"* he says.

Conlog, is a Durban-based company, which has garnered a global reputation for its excellence in research, development and pioneering efforts.

"Since the inception of the South African prepayment industry in the late 1980s, Conlog has been at the forefront of innovative solutions that meet the needs of utilities across the world. In fact, the majority of our revenue comes from outside South Africa's borders," says Conlog general manager, Dudley Miller, who gained vast professional experience in both the business and energy sectors at Schneider Electric, the energy management specialist company that acquired Conlog in 2000, prior to taking on his current role in 2013.

Established in 1965 as an electronics design company, Conlog today specialises in providing prepayment solutions for the delivery of electricity services. Its broad product offering encompasses prepayment meters, vending, revenue management, maintenance, support and consultation, as well as a dedicated and accredited training facility for all aspects of prepayment.

"This comprehensive and holistic approach enables customers to reap the full benefit of their investment and

ensures sustained success, into the future," says Miller.

He explains that at present, Conlog has the world's largest installed base of prepaid meters, spanning more than 20 countries on four continents.

"Furthermore, over 70 utilities worldwide utilise our solutions and consider the company their preferred prepayment provider. With systems that are available in English, Arabic, French, Spanish and Portuguese, our products have been able to reach millions," adds Miller.

The Conlog factory, which is located at head office, employs mainly women, and its engineering department boasts many experts in their relevant fields, including project management, embedded software engineering, hardware design, validation, mechanical engineering, systems engineering and research and development. *"Conlog engineers are well equipped with the knowledge and experience required to develop products that constantly outperform the rest,"* says Miller.

Many industry firsts have been developed by Conlog's dedicated team at this site, including the standard for the secure transfer of credit, Standard Transfer Specification (STS), an IEC standard (62055-41); the industry's standard wallbase for electricity meters; the common vending system and the first commercial scratch-card solution for prepayment.

Earlier in 2014, the Certification Committee of ETHIC Intelligence, a leading international certification agency specialising in anti-corruption compliance programmes, also awarded Conlog an Anti-corruption Compliance System Certification for its programme to prevent corruption.

DUDLEY MILLER | GENERAL MANAGER | CONLOG

The main conclusions drawn during May 2014, following an on-site ethics audit in February by leading inspection, verification, testing and certification company, SGS, revealed that its compliance policy and governance model are well designed, formulated in a coherent manner and correspond to international best practices.

"We strive for excellence in all areas of our business and are proud of the fact that our meters are manufactured to the highest quality of standards. Our focus now is on smart meters, and we are especially excited to witness the value proposition that they will offer society, especially in terms of greater individual electricity empowerment and energy management," says Miller. wn

SA to prepare for inevitable Fossil Fuel Crisis

BY | ARTHUR CHIEN | VICE PRESIDENT | TALESUN ENERGY

This significant need for investment into energy highlights the urgency for sustainable energy projects in order to ensure future energy security. If not done, countries will be setting themselves up for decades of hardship once the fossil fuel supplies eventually run out.

South Africa needs to prepare for an inevitable fossil fuel shortfall in the future. Should industry players not prepare accordingly, the consequences will be twofold - the remainder of fossil fuels available will likely increase drastically in price, and will eventually dry up.

According to the World Energy Council, fossil fuels will continue to dominate Africa's energy mix in the next three to five decades, but their depletion should be envisaged in the second half of the century. First world countries, such as Britain, who have relied on fossil fuels for too long, are currently facing an energy crisis. Britain reportedly only has 5.2 years worth of oil supply left. South Africa needs to learn from this example and

According to the recently released International Energy Agency's (IEA) World Energy Outlook report the global economy needs to invest $48 trillion in order to meet its energy needs by 2035.

prevent an energy crisis by implementing alternative energy solutions before the fossil fuel shortfall.

The World Energy Outlook report provides insights into where investment in the power sector might fall short, as well as the consequences of delay in such investment and the outlook for investment in low-carbon technologies such as renewables. The report begs the question: Are investors ready to commit to investing capital in a fast-changing energy environment? This is a very valid question which Governments all around the world need to be asking themselves, as well as whether the current sustainable energy projects in the country are sufficient to prepare for the future fossil fuel shortfall.

South Africa is in an exceptional position to invest in renewable energy solutions such as photovoltaic (PV) solar energy, as the sun produces around 2,500 hours of sunshine each year. For this reason there needs to be a bigger push for PV solar energy to replace fossil fuels for electricity generation.

According to the South African Government the country plans to reduce its reliance on the fossil fuel as a source of electricity to about 50 percent of its energy mix by 2050. In order to reach this and the global goal of investing $48 trillion to meet future energy needs, Governments all around the world need to set up policy frameworks that will enable investors to obtain finance to invest in renewable energy projects such as PV solar projects. Furthermore, governments need to offer investors good incentives such as tax breaks. This will encourage investment into renewable energy and reward investors with a fair return on their investment. wn

IN MEMORIAM

Eva Gerston

The South African Institute of Electrical Engineers recently said farewell to one of our valued members, who contributed so generously to the SAIEE Education Trust earlier this year.

BY I JANE BUISSON-STREET I STAN BRIDGENS

1946 - 2014

Eva, Romanian by birth, attended the Technical University of Cluj-Napoca in Romania and graduated in 1969 with a 5-year Engineering Diploma in Electromechanics. She went on to work for Electric Network Enterprise, Baia-Mare, Romania, where she was involved with maintenance, reticulation design of overhead and underground cables. In 1973 Eva joined the Construction Trust, Maramures, Romania as a site supervisor. 1975 saw her joining The Group of Construction Area – Installation Assemblage when she returned to Cluj, as the contractor-in-charge of the electrical installations for three furniture factories.

In 1977 Eva ventured into the field of project management when she joined The Institute of Research and Projections for the Wood Industry in her hometown.

During 1978, Eva moved to Israel, where she was registered in the Book of Engineers and Architectures. December that year she started work for Elsinct in Maalot, a company that specialises in medical imagery systems. Eva was in charge of the costing and design as well as the quality control of transformers.

1980 was the year that Eva married Kenneth Frank Gerston. She then took a break to start a family in 1982, not that that stopped her trying something else new at the same time; she completed a Certificate in Computer Programming through The Institute of Technical Training, Israel. The year 1984 saw her working for Israel Electric Company in Haifa as a trainee Computer Programmer.

The Gerston family moved to South Africe in 1985. Eva started to work at Fuchs Electrical and Circuit Breaker Industries, in 1986, as a Laboratory Engineer and quality assurance tester. From 1989 she was appointed Project Engineer (LV & MV Switchgear) by CHI Control (Cutler-Hammer). While in their employ Eva furthered her education yet again; this time a Certificate in Sales and Marketing Management followed by a Diploma in Project Management.

Projects she managed were in South Africa, Israel, Zimbabwe, Germany, Australia and Tanzania amongst others. SAIEE was very fortunate to have Eva join as an Associate Member in 1987; she was elected as a Member in 1989, a Senior Member in 1995 and a Fellow in 2005.

Adam, Eva's son, describe his mother's interests *"…outside of work my mom was an avid reader - non-fiction, history, biographies, especially books about politics (her collection of books is vast). She and my father would spend hours talking about politics. She and my father were very well travelled (besides South Africa, they lived in Australia and the USA)."*

Eva Gerston is most certainly an example for all of us, she kept working, studying and making career changes to get ahead in times when being a woman in the engineering workplace was not as frequent as nowadays. Eva was all FOR education and made a generous donation to SAIEE's Educational Trust earlier this year. Eva, we thank you for your generosity.

While on holiday in Italy in July, Eva passed away. Our thoughts go out to Kenneth, Adam and Viviana; thank you for sharing her with us.

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THE INTERVIEW | EVA GERSTON

BY | STAN BRIDGENS **|** PR. ENG **|** FSAIEE

What were your most challenging aspects as a woman engineer in the work place when you were developing your competence, and more importantly, when you were competent?

Although I was living in a country in which there was no legal discrimination against women, people at work places displayed various attitudes toward me, for example the older they were the more reluctant they were to help. Some people were angry, some were rude, some were indifferent, some were envious, sort of "how dare you be able to study and I couldn't?"… All-in-all I learned the ropes and very soon, about 3 years later, I realized that I was not happy with what I was doing – I was designing MV power lines – I needed something else more challenging.

To make the long story short, after a few "stops" at various electromechanical engineering subspecialties in two countries situated on two continents, I landed in SA - on the third continent.

The year was 1985; I was back to square one! I said to myself, *"Go prove that you are for real, that you are an engineer, that you have a past in the field and so on and so forth, that you really need to work."* I knocked on the doors of nearly all employment agencies around Johannesburg. It took 8 months to just land the first interview.

The only agency that really helped me was one owned by a lady, unfortunately I don't recall her name. Can you see how "sisters" in need help each other? Just kidding. The interview was not pleasant at all; questions were falling onto my head like balls of hail but I got the job.

I lasted at CBI (when Fuchs merged with Heinemann) nearly 3 years. What bugged me was that the field seemed limited and monotonous to me. But no offence intended, that's just me. I still like those guys. I need to feel comfortable with what I am doing at work, and I need to feel that my contribution helps to satisfy customers' specifications/needs, and helps to create value for them.

The same ladies from the agency landed me my job at Cutler Hammer. Those Motor Control Centres and Distribution Boards the company were designing and manufacturing were just what the doctor ordered.

To answer the second part of your question: the main challenge (apart from constantly having to keep people at bay by trying to continuously prove that I am, if not an equal colleague, at least half a man) was to keep up with the trade itself.

Do you think that the male dominant engineering fraternity has a place for women engineers? If yes, why?

Yes, it has a place; it has to have, why else allow women to study engineering in the first place? I won't say though that men and women can always do the same job. There are physical differences between the two, there are engineering specialties that are not for women, and here I refer mainly to the physical aspects of site commissioning. Exceptions? Yes there are, and they are just that: exceptions.

What additional value do women engineers bring to the design aspect of electrical engineering that somehow bypasses men engineers?

Nothing much in particular if they, the women, are unable to do their job properly. Lets hope that in this regard we think of meritocracy (defined as "a government or the holding of power by people selected on the basis of their ability").

On a lighter note, a woman has to be true to herself, has to be pretty but not with the intention to cover any perceived lack of knowledge with her looks. On the other hand I looked at design as to a form of art, I was not only designing but also creating value for the customer. I used to sign all work orders I compiled with a special name I was "awarded" by one of my colleagues, "Liewe Heksie". That was a character in a famous Afrikaans TV show at the time. I cherish that name until this day. I was also given a Liewe Heksie doll and a small broom.

What particular aspect and value do women engineers bring to the table in engineering management that somehow bypasses men in engineering management?

Nothing more than men would. And here I wish to stress that to be a manager, man or woman, it's not enough to decide yourself that you have to be one. You need to have some basic aptitudes those facilitate to gain people's acceptance, people's genuine trust, their willingness to work with you while you, the man or the woman, tell them what your expectations are regarding their daily contribution to the performance of the company in its particular market niche.

Regarding the last two questions I have to emphasize that I don't like the distinction men-women when it comes to engineering.

Eva Gerston was interviewed by SAIEE's CEO just prior to her death in July this year

As I said earlier, if women are accepted to study engineering then the difference between them and men should relate only to performance within a particular frame of work. The more we tend to separate between them, the more discriminatory we become. That doesn't mean that the two are equal. To a certain extent job performances may be deemed as equal.

From personal experience I must say that women are permanently scrutinized under a looking glass and forgiven less for the same mistake a man would make. And that phenomenon is spread worldwide; I've encountered it in nearly every job I have had. People, men in particular, are prejudiced towards women who dare to intrude their exclusive professional "clubs". I have many anecdotes to tell but I won't bore you.

As far as my own experience with managers goes, I never worked under a women manager apart from myself, so you have to ask others about it. And as a matter of personal interest/hobby if you wish, I love the Science of Management. I love Project Management in particular so much so that I studied it through Damelin College.

At some stage of my life, while working at Cutler Hammer, I was looking for explanations as to why some of the processes existed within the company. By that I mean the way the company was doing business started to 'brake': there were less orders for the same amount of tenders submitted as years before, every aspect of our work became a burden, we had no computers, never mind design software, the communication between departments was eroding all to the detriment of the quality of the output supplied. I am a big picture "man". I couldn't see anymore the buck stopping at every workstation, people not assuming responsibility, it frustrated me terribly so I went back to school.

After I finished my studies, I wrote a letter to management asking for permission to do a study that would map the status quo and perhaps conclude what possible remedies there are. Needless to say I never received an answer.

Eighteen months later I approached the MD and I finally asked him why he never even considered to enquire what I meant to achieve with my proposal? The answer was typical for someone who doesn't understand project management. He said that "…we are a company too small to do that…"

What would you advise young female engineers starting out after graduation – in the workplace today?

One of the famous/infamous dictators of past century although a dictator, had good advice for people: *"Learn, learn, learn!"* .

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Ten Ways Robots Enhance Lean Manufacturing Environments

How large and small manufacturers are benefiting from Lean Manufacturing and Robotic Automation

COMPILED BY I MINX AVRABOS

Traditionally, robots have not played a prominent role in the implementation of lean strategies. However, this is changing due to robots' ability to accurately repeat tasks, their speed and flexibility amongst other things. Automation equipment, which includes robots, is rapidly becoming a core component to lean manufacturing and the reduction of manufacturing costs.

Robotics have made it possible for manufacturers to vastly increase the scale of factory automation over the past three decades. With over 115,000 sold each year, industrial robots have become a mainstay of all sizes and types of manufacturing facilities. This increase in robotic automation has resulted in higher production rates, improved quality with decreased requirements for human intervention, while elevating the nature of work by removing people from dull, dirty & dangerous tasks. Adding robotic automation however, does not automatically make a manufacturing environment lean.

Lean manufacturing is a management philosophy focusing on reduction of seven manufacturing related wastes as defined originally by Toyota. The wastes are:

1. Overproduction - *production ahead of demand;*
2. Transportation - *movement throughout the process not required to build the item;*
3. Waiting - *Work-In-Process (WIP) sitting and waiting for the next production step;*
4. Inventory - *components, WIP and finished product;*
5. Motion - *people or equipment moving more than required to perform the processing of the part;*
6. Over Processing - *due to poor tool or product design creating activity; and*
7. Defects - *the effort involved in inspecting and fixing defects.*

Robots are not innately lean since they could be used to automate a faster creation of waste, but they are often integrated within the manufacturing process to support and enhance a lean manufacturing system success criteria such as:

- Repeatability - Robots' drive product quality or consistency and reduces waste.
- Speed - Robots' can help increase production and reduce wait time.
- Accuracy - Robots' help to reduce scrap.
- Flexibility - Robots' reduce training and changeover time – with a target of Single-Minute Exchange of Die (SMED), and often achieving One-Touch Exchange of Die (OTED) goals.

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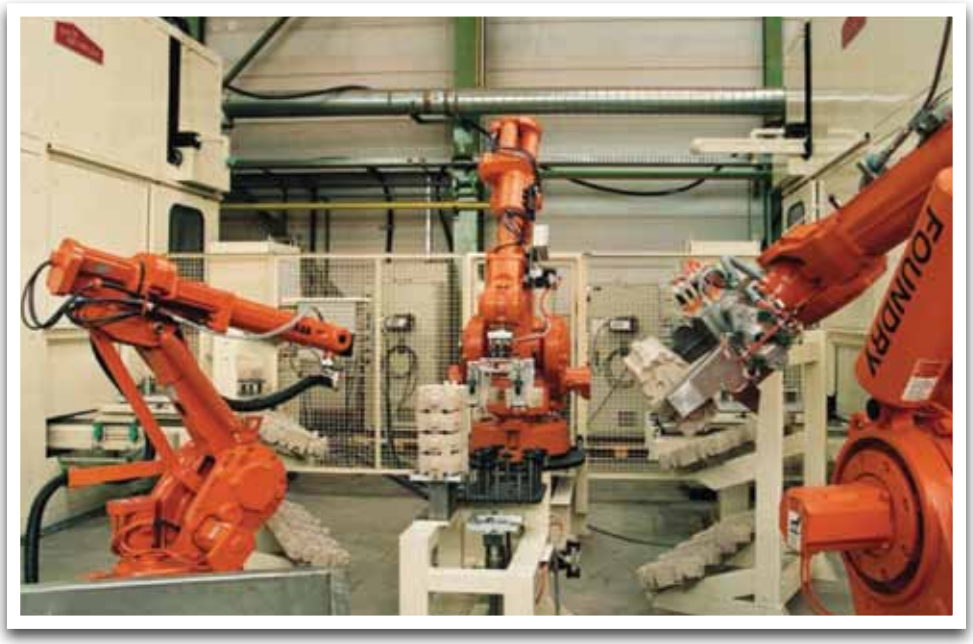

Multiple robots coordinate to reduce cycle times and speed production

Robots elevate the nature of work by reducing large lifting requirements in this facility

LEAN SYSTEMS AND ROBOTS

One thing that often gets overlooked is that automation systems (with or without robots) can actually speed up the creation of waste and reduce profitability if not designed into the system properly. Automation systems and robotic solutions are not lean by nature.

Designing the manufacturing system to be lean is one of the largest challenges faced by engineers today. A few of the factors which must be taken into account while designing a lean manufacturing system with robots are:

- Allowable scrap rate;
- Conveyor and other transportation requirements;
- Cycle time requirements by station or operation;
- Equipment reliability & downtime statistics;
- Flexibility required in the process;
- Human machine interface requirements
- Life cycle of manufactured product to ensure Return on Investment (ROI);
- Line automation requirements *(% Automation vs Manual);*
- Line production rate requirement;
- Product handling requirements;
- Maintenance requirements;
- Repair time of equipment;
- Space availability for robotic operations;
- Safety standards and ergonomics guidelines; and
- Number of product variants.

Traditional production lines are designed to be an effective collaboration between man and machine. While the machines (including robots) can be programmed for optimal performance, people cannot. Effective "lean" robot cells must take this into account. An efficiently designed automated robotic station must take into

account the "human variable" and not limit the stations ahead in the line by rigidly ensuring consistent system performance.

Most importantly, the decision to use robots must be justified by an ROI (Return On Investment) analysis. Small and large manufacturers have proven that today's robots can significantly improve the ROI in a manufacturing environment, especially when implementing robots in support of a lean initiative – but again, planning is critical. The robots must be properly incorporated into the overall lean manufacturing environment to get the desired results.

CASE STUDIES – ROBOTS IN LEAN SYSTEMS

Below are several common examples of robots strengthening a lean manufacturing environment to significantly help drive a positive ROI and support lean manufacturing goals.

MATERIAL HANDLING AND MACHINE TENDING APPLICATIONS (REPEATABILITY AND SPEED)

Prior to robots, material handling and machine tending were purely manual tasks. Operators would transport material from one fixture or machine to the next, wait on the equipment to finish its task, and then relocate the processed part(s) to another tool or process fixture. Several operators were usually required. Today, these labor-intensive tasks are often accomplished using robots, especially in operations requiring high speed and accuracy.

Many applications, such as baked goods coming out of an oven on a conveyor, are picked and set into their packaging. Then, the individually packaged products are automatically placed into cases, ready to be palletized. The palletizing robot can then place cases accurately on the pallet. Each of these robotic applications may be configured specifically for the customer the product is being shipped to. For example, Pick 'n Pay may have a different packaging and palletizing requirement than Checkers or Woolworths. Each order can be picked, packaged and palletized automatically to meet the customer's unique requirements.

Two robots work in coordination to remove and deburr the part, then spray the die to prepare for the next drop. This application of robots also removes humans from this high temperature environment

How do robots make the system lean?

- There is no wait time for operators. A material handling robot can be set up to multi-task, performing additional processing operations between operations.
- Robots have negligible downtime. Robots deliver a limited production loss compared to manual operations which tend to be error prone and inconsistent in terms of production rate, shifts, work breaks, etc.
- Robots are less expensive to operate, compared to human labor – especially when overtime is required. Robots' ROI can be quickly realized when there is high demand for the manufactured product.
- Robots are capable of highly accurate, highly repeatable tasks, which results in lowered scrap parts once the robot's tasks are optimized.
- Robots do not get fatigued and are not subject to heat, dust, humidity and other challenging work environments.

MULTIPLE APPLICATIONS - ONE ROBOT (FLEXIBILITY AND SPEED)

To incorporate robots into a lean manufacturing environment, engineers

Ten Ways Robots Enhance Lean Manufacturing Environments

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should look to process as many operations as possible within the given floor space.

Standard industrial robots have a single tool mounted to a single arm, which is more efficient than human labor, but limiting due to the lack of flexibility. Today's robots can incorporate tool changers to allow the robot to handle more than one task.

With one robot now able to perform multiple functions, the manufacturer will see improved utilization, and has the ability to create a leaner manufacturing environment overall.

In the die cast industry, robots are commonly used for material handling parts as well as degating and finishing operations like deburring and grinding.

Robots in an automotive body shop are often used for material handling of parts as well as welding or sealant application.

Robots that need to perform more than one function are built with tool changing equipment that can be used for robots to disengage/engage new end-effector tooling. Servo motor driven external axes allow robots to be more flexible by acting as auxiliary axes of motion to ensure maximum robot utilization.

Advances in robotics have given engineers the flexibility they need to incorporate robotics into a lean manufacturing initiative. Robotics have furthered engineering's ability to optimize operations based on floor space, cycle time and feasibility constraints. Over time, multi-arm robots will become the norm, continuing the progression of manufacturing operations that are faster and leaner.

A single robot is used to organize small quantities of inventory to efficiently stage individual orders to be shipped

ROBOTS AND VISION APPLICATIONS (FLEXIBILITY AND ACCURACY)

Vision technology and robots are a natural pairing and the combination has resulted in making robotic operations leaner than ever before. Vision systems are commonly used to allow robots to vary their motion targets based on vision generated guidance information.

Operations that required making visual distinctions and decisions (such as racking/unracking of parts, part picking from bins, and part inspections) were once exclusively handled by human operators.

By combining robotics with vision guided systems, these same tasks can be performed by robots with higher consistency, accuracy, repeatability and speed. Vision-equipped robots can also reduce imperfections and scrap material in finishing operations such as routering, grinding, and sealing — contributing solidly to lean manufacturing.

In the inspection arena, robots are utilized heavily in flexible measurement systems (FMS). Robots mounted with vision cameras can collect information from multiple locations, dramatically reducing the number of vision cameras and fixtures required to inspect parts.

Using vision-equipped robotics, lean manufacturing environments can be significantly improved, especially in areas where the movement, flexibility and simple decision-making of the human operator was once required.

COOPERATIVE APPLICATIONS AND COORDINATED MOTION (FLEXIBILITY, SPEED AND ACCURACY)

The latest robotics trend gaining acceptance as a lean process is coordinated motion. In this system, two or more robots are controlled by a single controller. The controller allows for easy communication between robots to simultaneously perform

Two robots are used to load, unload and weld parts with little human intervention and with a high degree of accuracy

coordinated operations on a single large part. Coordinating robot movements can significantly reduce the time wasted in the manufacturing process. Roof assembly in the automotive industry is now commonly performed with one robot firmly gripping the automobile roof, while other robots weld and assemble the roof to the main auto body. Robots are also used for part transfer between assembly stations instead of transfer equipment like lift and carry systems or shuttles. The automotive industry is just one example of how coordinated robotics can aid in lean manufacturing, improving cycle times and reducing scrap waste.

Custom-designed fixture tooling is required at almost all product manufacturing plants. If the assembly process allows for a slightly lower level of structural accuracy, robots can be used in place of hard tooling fixtures. Robots with docking end-effectors or "geo end-effectors" allow for reduced tooling content and greater flexibility while maintaining a significantly high degree of accuracy and strength.

ROBOTS AND CYCLE TIME (SPEED AND ACCURACY)

Many food packaging applications are solved by an operator (or team of operators) manually picking and packaging the products. This adds costs, can be physically demanding, and may create the potential for product contamination. Often fixed automation is used, but this can severely reduce the flexibility of the application.

When product marketing develops a new product or a customer demands a new package size or type, the fixed automation is often too inflexible to cost effectively deal with the change. Robots have become a powerful tool in the automation of pick and place applications such as pancakes, sausages, muffins and many other packaged or pre-packaged foods.

In major manufacturing assembly plants, there are often hundreds of robots performing material handling, machine tending, welding, finishing, painting and other assembly operations. Wasted robot motion can cause cycle time issues, creating bottlenecks and loss of production. Poor path planning can cause product quality issues that can lead to scrap parts. The cost of lost production is a major drain on overall corporate profitability. Ensuring that the cycle time for robotic workcells is optimized is very important to the lean manufacturing plan.

Some of the common cycle time issues impacting lean manufacturing are:

- Lack of part inventory for robots causing delays in production;
- Unsafe work conditions causing slow human operation in situations where robots and humans work in a cooperative environment;
- Poor equipment design resulting in wasted repair efforts;
- Bottlenecked stations causing part blocking or starvation at other stations;
- Individual robots over cycle causing entire station to be over-cycle;
- Wait times on other equipment causing robots to go over-cycle;
- Poor processing resulting in work overload on robots, operators or machines;
- Poor human machine interface causing delays in manufacturing; and
- Poor software and controls engineering resulting in inefficient I/O and communication between equipment.

Detailed planning of robotic operations prior to system integration can go a long way towards controlling equipment and labor costs.

WORKPLACE SAFETY AND ROBOTS

Most manufacturing operations have a degree of human injury risk. One of the primary reasons to automate a process using robots is to improve workplace safety.

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Robots speed the palletizing of motors while reducing waste, and the concern of a worker being hurt

High-risk tasks like unloading parts from a fast-moving press or working with molten metal are definitely not tasks suited for human operators. In these cases, robots are invaluable in lowering the risk of injury or death.

An unsafe workplace leads to fear-driven human inefficiency, lowered production rates, higher insurance and workmen's compensation costs, and high employee turnover. Conversely, a safe workplace boosts morale, increases employee retention and lowers costs, which ultimately improves the bottom line. And again, robots can significantly elevate the nature of work by removing people from dull, dirty & dangerous tasks.

Robots can make the work environment safer by performing functions that are unsafe for humans, but robots themselves can be unsafe. For example, if a robot cell is not guarded properly, operators may take longer to service the station because of fear of injury. Whenever robotics are used, the environment must be carefully analyzed and proper protocols instituted to keep the workcell safe. If the employees don't feel safe, the robotics implementation will not be as lean as designed.

Many applications require the strengths of both people and robots, but until recently, this could be very dangerous. Now specialized software can allow robots and operators to collaborate much more closely without compromising on safety.

This combines the flexibility of human interaction with the precision and handling capacity of robots to make applications lean, accurate and very safe to operators.

CONCLUSION

Robots, if used correctly, can enhance a lean manufacturing environment. Robots offer speed and accuracy that can't be achieved with human labor. Robots can also reduce operating costs, reduce scrap – and are flexible for future changes. Few other manufacturing solutions can reduce waste as well as robots when designed into the system properly.

Robotics' capabilities have only increased with time, while costs have continued to fall. Major robot manufacturers are constantly upgrading their robots with increased payload capacity, greater accuracy, increased reach and range of motion, improved speed and acceleration, faster communication with external equipment, better safety features, and lower operational costs.

If you have not explored incorporating robotics into your manufacturing environment lately, it is probably time to take another look. With a lower cost, more capabilities and a large number of successful manufacturing implementations, robots can increase your return, improve quality, reduce costs and help you eliminate waste.

TEN GOOD REASONS ROBOTS CAN ENHANCE LEAN ENVIRONMENTS

The following list is based on research conducted by the International Federation of Robotics (IFR).

1. Reduce operating costs - Robots are cheaper to operate compared to humans. Energy savings can be significant due to lowered heating requirements in automated operations. Current estimates point to a potential 8% savings for every 1°C decrease in temperature. Savings of 20% can be achieved by turning off unnecessary lighting in automated areas.

2. Improve product quality and consistency - Robots are inherently accurate and have a high degree of repeatability. The risks of errors caused by human factors such as tiredness, distraction, or the effects of repetitive and tedious tasks do not affect robots. This results in improved end product quality.

3. Improve quality of work environment for employees - Robots can take over tasks that are hazardous for humans thereby improving working conditions. Staff motivation can also be improved by training them to take on more technically challenging applications involving robots.

4. Increase production output rates - Robots can be left running for long shifts, overnight, and during weekends with little supervision. This enables true 24 hour production runs to increase output levels. New products can be introduced faster into the production process. Programming of new products can be done offline with no disruption to existing process.

5. Increase product manufacturing flexibility - Switching from one process to another is very simple with robots. Consequently, systems with robotic automation can accommodate variations in product and process resulting in maximum ROI on capital investment. The development in vision systems for robots has resulted in a huge increase in the flexibility of robot usage.

6. Reduce material waste and increase yield - Robots perform routine functions to fine tolerances reducing rejects and scrap waste. Improved accuracy from using robots means you can have more products finished first time to the quality standard demanded by your customers.

7. Comply with safety rules and improve workplace health and safety – Robots can take over tasks in conditions that are hazardous to human workers. Robots can also handle tasks that if done manually, could lead to ailments such as repetitive strain injuries (RSI) or vibration white finger. Welding environments are inherently hazardous for human eyes; this safety issue can be avoided by using robots. Tasks that are ergonomically challenging could potentially be handled by a robot thereby improving the plant safety record.

8. Reduce employee turnover and improve recruitment – Running a manufacturing plant with automation requires a technically skilled workforce. The work is challenging and the associated problem-solving requirements make the tasks intellectually stimulating. Consequently, employee turnover is reduced and the facility attracts high quality employee candidates.

9. Reduce capital costs (inventory and work in process) - Robots are a cost effective option to manual manufacturing. The ROI from using robots is quicker than manufacturing with operators. Robots can be programmed to produce products on a just-in-time basis thereby reducing the amount of inventory or work in process product.

10. Save space in high value manufacturing areas - Robots can be mounted on walls, ceilings, rail tracks and shelves as well as firmly mounted to the floor.

    They can also be programmed to perform their tasks in confined places thereby saving valuable floor space. wn

Robots for the Photovoltaic Industry

As in many other sectors, the trend towards automation in the photovoltaic industry is inexorable. The only way for the industry to be successful along a wide front is by permanently lowering its production costs.

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The photovoltaic industry already has a potential that not only warrants but encourages the use of automation technology. Using industrial robots brings shorter processing times, lower wage costs, less breakage and therefore higher cost effectiveness. In recent years most manufacturers who have invested in this technology have done so with great success.

But many of the robotics systems still in use today lack the most important of the five human senses and work 'blind.' The number of tasks that a 'blind' robot is precluded from performing is obvious. A 'seeing' robot can flexibly pick up, recognize and measure wafers,

solar cells and even whole modules and then place the gripped objects with great precision and speed.

Back in the 1980s the food industry was already reaping the benefits of integrated image processing by using robots for its packaging and sorting activities. Even then pastries, chocolates and rolls were being picked and sorted by conveyor belt. This requires object and position recognition functions as well as synchronizing the robot with the moving object. The essential factor has been the integration of image processing and robot control into one logical unit. Each function can access all the data it needs from other functions at any time and in the space of a few milliseconds.

The camera focus of the image processing is calibrated to the robot's coordinate system internally. The complex and inflexible communication protocols required by most external systems are virtually eliminated.

There is hardly another sector in which change and innovation take place at shorter intervals than in the photovoltaic industry.

The dimensions of cells and modules are constantly changing. Wafers are being made ever thinner to save on precious silicon. The necessary processing steps are continually evolving and manufacturers now have to build flexibility into the design of their production plants to be sure of a guaranteed future.

FEATURE

Robots for the Photovoltaic Industry

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This more or less forces them to use robotics systems. The use of dedicated robotic equipment that can adapt to changing product requirements, by updating the software, has a number of advantages. It means short response times for making changes and introducing new variants. The software for new variants can be thoroughly tested in the laboratory, well away from the production line.

That usually means the production of new variants can start quickly and easily. Set-up times for product upgrades are eliminated anyway with software variants and plants are easily duplicated, since once the software has been created it can easily be copied to different production lines.

If a company decides that it wants to use robotics across the board, it will need to set standards within the framework of a management decision.

Some of the important questions that the robotics suppliers of the future will have to consider in their decisions are:

- Does the manufacturer have different types of kinematics (parallel kinematics, SCARA robots, 6-axis, linear axes) to meet all future requirements?
- Does the manufacturer offer effective support with programming its systems?
- Does the manufacturer also supply a powerful image processing system that has been developed for use with its robots and is this easily configured?
- How quickly can I get hold of spare parts?
- Does the manufacturer offer special training for programmers and operators?
- Is the documentation available in different languages?

"The use of robotics in the solar industry is becoming increasingly important as manufacturerers strive to lower their costs by creating solutions for the efficient production of solar cells and modules. As they adopt automation it is vital for manufacturers to choose reliable partners and efficient products right from the start," said Ruediger Winter, director sales Europe at Adept Technology, Inc.

Today around 35% of all the robotics systems Adept Technology Inc. supplies have integrated image processing and around 20% of all robotics systems are supplied to the photovoltaic industry. Be it high-speed parallel kinematics, linear axis combinations, Selective Compliance Assembly Robot Arm (SCARA) robots or elbow robots – all gain a high degree of flexibility with image processing. wn

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The 25th annual symposium of the Pattern Recognition Association of South Africa (PRASA) will be held in conjunction with the 6th Workshop on African Language Technology (AfLaT) and the 7th conference of Robotics and Mechatronics (RobMech) on 27 and 28 November 2014 at the Lagoon Beach Hotel in Cape Town.

In addition to PRASA, AfLaT and RobMech, the 11th FASTAR workshop will take place on 24 and 25 November in Stellenbosch to make provision for interested parties to attend all four events. Visit www.fastar.org for more information on this workshop.

FEES

No fees are payable by delegates that attend and present.
However, delegates attending, but not presenting, incur a cost of R1,000 per delegate (subject to change if additional funding is secured).

Registration is limited to 150 delegates, and the conference dinner is limited to 100 on a first come first serve basis. Delegates are responsible for their own accommodation and transport.

Registration will open in October, authors of accepted papers are registered first.

IMPORTANT DATES AND DEADLINES

22 September 2014:
The deadline for the submission of full papers/ abstracts for work-in-progress/ posters.
1 October 2014:
Conference registration opens.
21 October 2014:
Notification of acceptance of papers and abstracts will be provided to authors via e-mail.
1 November 2014:
Deadline for registration.
14 November 2014:
Final date for submission of camera ready papers.

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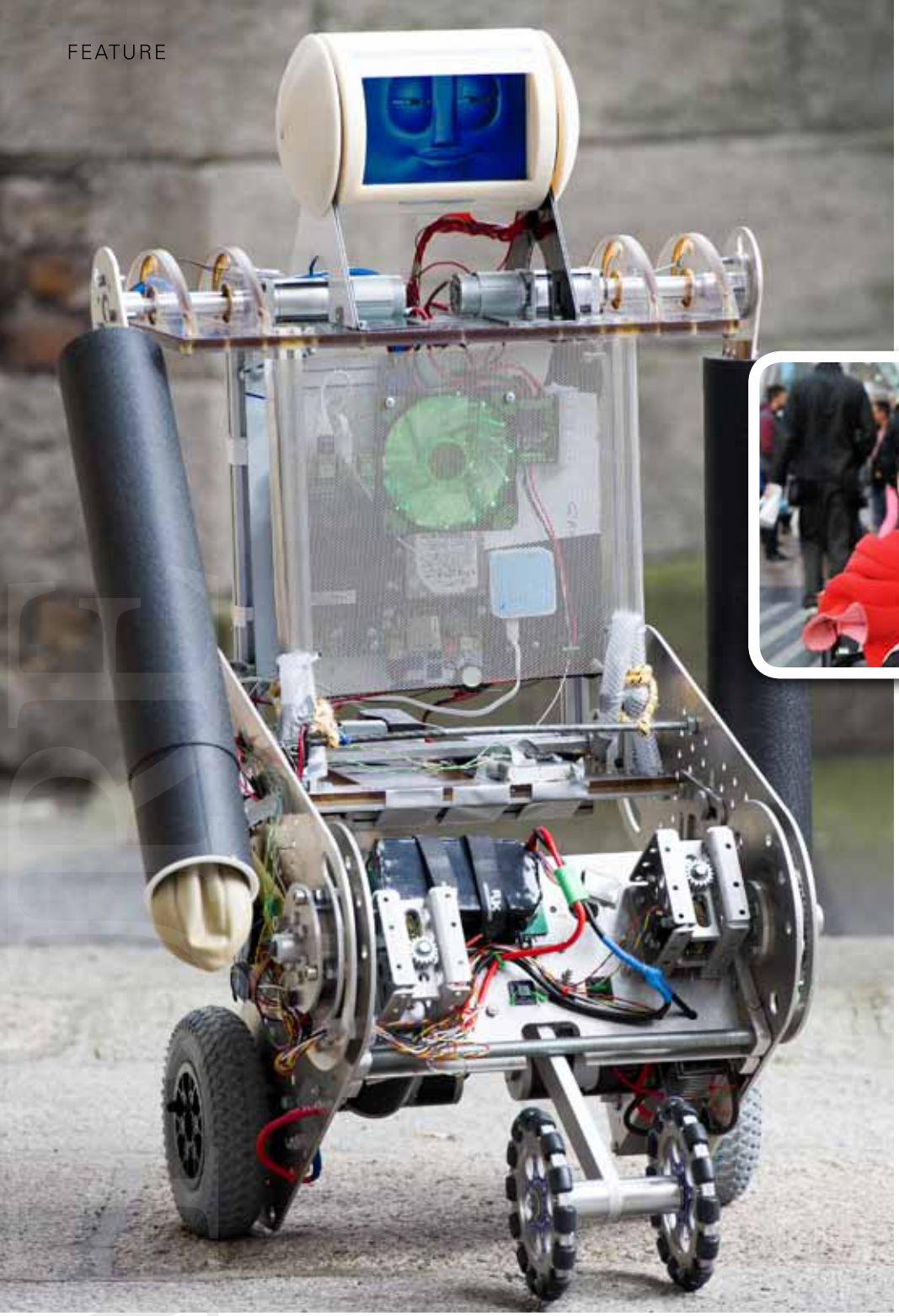

Joanne O'Riordan

Secretary General of the International Telecommunication Union (ITU) meets "Robbie the Robot" developed for Irish teenager Joanne O'Riordan, who was born without limbs.

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'Robbie' the Personal Assistance Robot Passes UN Inspection

Robbie the Robot, a prototype robot built by researchers and engineering students of Trinity College Dublin for Irish teenager Joanne O'Riordan, who was born with a rare condition known as Tetra-Amelia, was officially unveiled to its UN funders on Friday, 21 March 2014 at a special event held at Trinity College Dublin in Ireland.

In April 2012 Joanne O'Riordan, who was born without limbs, addressed an audience of international delegates at the International Telecommunication Union's (ITU) 'Girls in ICT Day' celebrations in New York and put forward a challenge for someone to build her a robot. Assistant Professor Kevin Kelly in the School of Engineering, Trinity, and a team of young engineers took up this challenge and built Robbie, a prototype humanoid robot, with a head, arms, torso and a single 'leg' which uses two wheels to move around.

Robbie was put through its paces by the Secretary General of the International Telecommunication Union (ITU), the United Nations specialised agency for information and communication technologies. Dr Touré was instrumental in obtaining additional funding for Robbie when attending a meeting of the UN Broadband Commission for Digital Development in Dublin in March this year. Paul Kagame, the President of Rwanda, made a pledge of €50,000 towards the further development of the robot at that meeting.

Speaking about the motivation behind the project, Assistant Professor Kelly said: *"Joanne's appearance at the UN conference really compelled me to get involved for two reasons. Firstly, by her presence alone she was inspiring young girls to consider technology or engineering as possible careers – something very dear to my heart, and that I've worked to encourage for many years now. And secondly, the research in autonomous robots and gripping technology that we were engaged in at Trinity seemed an ideal match for what Joanne was asking for. I got in touch with Joanne and her family and we began discussing how we could help."*

The research group embarked on an intensive three month development period to build a prototype robot which could carry out some of the actions Joanne had requested. The team have planned that future versions of the prototype robot will have expanded functionality which would not only be of benefit to Joanne but also to others with a disability or even the elderly.

"On the face of it, building a robot to pick up dropped items sounds like a straight forward idea - we take it for granted that we can easily do this ourselves. However, there are huge challenges when trying to this with a robot in a domestic environment. Primate evolution spanning 65 million years has got us where we are now whereas we had 3 months to build something!" said Conor McGinn, Chief Engineer and design lead with the Trinity project research team, who is also completing his PhD.

The robot's head is made from 3D printed plastic, with an enclosed 8-inch LCD screen (the face). The body consists of aluminium, carbon fibre and plastic, while 'inside' are lithium-polymer batteries, computers, motors, gearboxes, sensors and communication hardware that act as the 'brain', 'muscles' and 'nervous system' of the robot. When Robbie is in its default kneeling position it can interact easily with Joanne as her head is approximately the same height as the robot's head. This position also allows the robot to bend at the waist to pick up things without falling over. The robot can rise into a standing position where it is about the height and width of a 10-year-old child. Small objects like phones or pencils can be picked up with an extensible arm, on the end of which is a 'hand' (a balloon filled with coffee granules – an idea borrowed from researchers in Cornell University). The balloon can be inflated or deflated and this allows it to conform to and grip a wide range of object shapes, sizes and types.

Speaking about his experience of working on the project, Michael Cullinan, a Masters student working on the research team said: *"There have been late nights and long hours but at the heart of it has been the desire to help Joanne begin to realise her dream of having a robot that can assist her with some of the simple tasks that elude her but that could make the achievement of all the other things she does independently a lot easier for her. Joanne is an inspiring individual who really shows what can be achieved when you have determination, will, a great sense of humour, and support. This prototype is only the first step towards Joanne realising her dream of a robot and we hope that Joanne gets the financial support to continue this process and achieve her dream."*

Speaking about the challenges with and capabilities of the robot, Assistant Professor Kelly added: *"I knew this was a hugely ambitious project, given the timescale and funding constraints, but I was confident that with the calibre of people we have here in Trinity and the goodwill they show, that we could demonstrate something of real potential for Joanne and other people who may have similar needs. The prototype is just the first step on the journey, but we've designed it in a manner that will allow us to develop and extend the capability in any future generations of 'Robbie'.*

There is still a lot of work that needs to be done with regard to making the design more elegant and the functionality more extensive before the robot would be ready for use outside of our test environment. However, even to get as far as we've done in this time is a tribute to the energy and ability of the team. It has been immensely hard work but sometimes you just have to do the right thing, and ultimately the reward is the satisfaction of seeing something like we have today." wn

Earn CPD Credits

Making the Electrical Connection

There is increasing pressure on large power users to engineer value back into the bottom line. This has drawn considerable interest in recent years in the fields of equipment and asset management, capital cost optimization and life expectancy management.

BY | SISHAL KUWAR-KANAYE | GROUP ENGINEER | IMPACT ENERGY

The fault free operation of power transformers is of major economic/safety importance to power utilities and industrial consumers of electricity. One of the faults, which can lead to catastrophic failure, is gas formation in transformers, which is attributed to two principal causes; electrical disturbances and thermal decomposition.

DETECTING EARLY SIGNS OF DETERIORATION

In earlier years, the installed population of transformers and various other electrical and industrial electronic equipment were far less than modern networks today. So the management of electrical networks required less complex approaches and were generally within the limit of control.

Modern networks, with varying complexities of load types, line interconnection requirements and harsh operating environments places a greater need of key transformers on the system. The cost of a power transformer is high, but monitoring the performance of the transformer and the environment it's located in is inexpensive compared to the cost of a failure in a transformer and the costs of an interruption in power supplies. So a holistic approach to condition monitoring is becoming essential not just to transformers but the networks they operate in.

TRANSFORMER FAILURE: COSTLY CLEAN-UPS AND RECOVERY

Extensive progress has been made in the field of Dissolved Gas Analysis (DGA) of the insulating oil is and is useful in evaluating transformer health. The breakdown of electrical insulating materials, and related components inside a transformer, generates gases within the transformer. The identity of the gases being generated can be very useful information in any preventive maintenance program.

By reviewing the trends in the information provided, maintenance teams and reliability engineers can make a better judgement as to the frequency of maintenance, and detect early signs

of deterioration that, if ignored, would lead to an internal fault occurring. On one hand, there are fairly accurate guidelines, tolerances and limits in analysing the data of the chromatogram of oil-dissolved gases in determining the condition of the power transformers and the consequent ability to identify faults or problems while still in the incipient phases of development. Furthermore, finding linkages, trend analysis and patterns between DGA and electrical network condition or power quality monitoring may be very useful in establishing the pre-cursors to incipient faults and consequential failure modes. Therefore, building databases with power quality data, as well as data of chromatogram of oil-dissolved gases, will be a developmental science that allows further advancements in asset life expectancy management.

Where advancements in DGA have been made over several years now with increasing accuracy of early fault detection in transformers, the same demands are placed on the reliability and availability of electrical power quality data that are aggravators and contributors to transformer failure.

FAILURE MODES

As with humans, there are strong similarities with the natural aging and 'wrinkling' process of transformers. It has to be asked though how much of it is natural and

Making the Electrical Connection

continues from page 51

how much is as a result of the associated stressors of life on the transformer itselves and the electrical networks. For example, transformers may deteriorate faster than normal under the influence of agents of deterioration such as when the withstand strength of the transformer, with respect to one of these key properties, is exceeded by operational stresses.

Operational stresses are usually events and conditions such as lightning strikes, switching transients, load removals, short circuits, overloading, harmonics, poor power factor, increased losses resonance, inrushes due to large motor starts and the like.

The presence of harmonic current increases the core losses, copper losses, and stray-flux losses in a transformer. These losses consist of 'no load losses' and 'load losses'. 'No load loss' is affected mainly by voltage harmonics, although the increase of this loss with harmonics is small. It consists of two components: hysteresis loss (due to non-linearity of the transformers) and eddy current loss (varies in proportion to the square of frequency). Excessive harmonic current contributes to overloading and additional power losses in the transformer. In extreme cases, it can lead to high thermal stresses and early ageing of critical assets, especially transformers. These conditions could lead to a transformer's theoretical life expectancy of 30-40 years may be reduced drastically to as low as 15-20 years. Most of the time, the effects of harmonics are hidden and not immediately visible.

The combination of harmonic currents with high grid impedance aggravates voltage distortions in the network and, in extreme situations, can shift zero-crossing points of the supply voltage waveform. This increases noise and electromagnetic interference in the network. Transformers, cables and power-factor correction (PFC) capacitors are the network components that mainly get affected by Power Quality (PQ) disturbances. Another concern is the presence of 'triple-n' harmonics.

In a network, the LV nonlinear loads mainly produce harmonics. With a MV/LV transformer of Δ/Y configuration, 'triple-n' currents circulate in the closed delta winding. Only the 'non triple-n' harmonics pass to the upstream network. When supplying non-linear loads, transformers are vulnerable to overheating. Increased loading can cause overstressing of transformer and the chance of its premature failure.

It is common understanding that fast transient over-voltages do exist and can cause damage on transformer windings. There is an increasing trend of transformer dielectric failures in the system, some of them with no specific causes. These dielectric breakdowns have a direct impact on the design and testing of transformer insulation and protection.

Digital simulations show that voltage stresses across transformer terminals are usually restricted to frequencies in the range of 40 kHz-200 kHz. However, when these stresses are compared with the specified standardized waves, they may exceed the transformer withstand design.

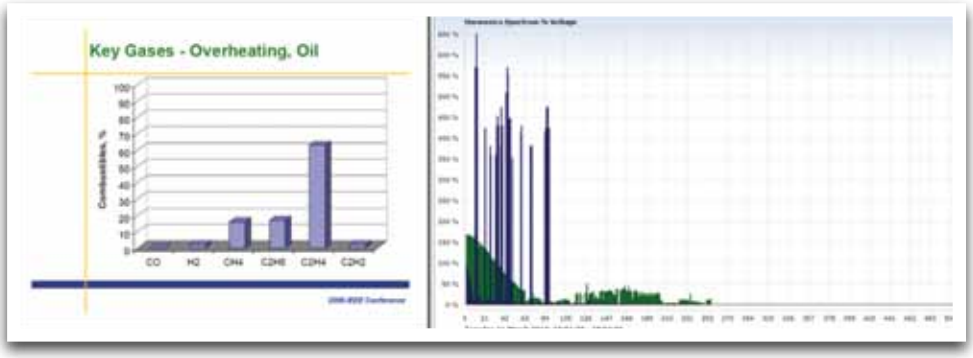
PQ conditioning improvement and maintenance strategies have to be adopted to enhance the lifetime of the network components and reduce failure rate. PQ conditioning at all points on the network, especially at the lower voltages is fast becoming a 'must have' as opposed to a 'nice to have' as a means to increasing PQ performance level in the network to a desired level. All these require appreciable investments. Investments in PQ conditioning has to approached by carefully analysing PQ issues, establishing baselines and performance targets for engineering

value and finally fulfilling the expectations of business financial investment models.

COMMON GOALS

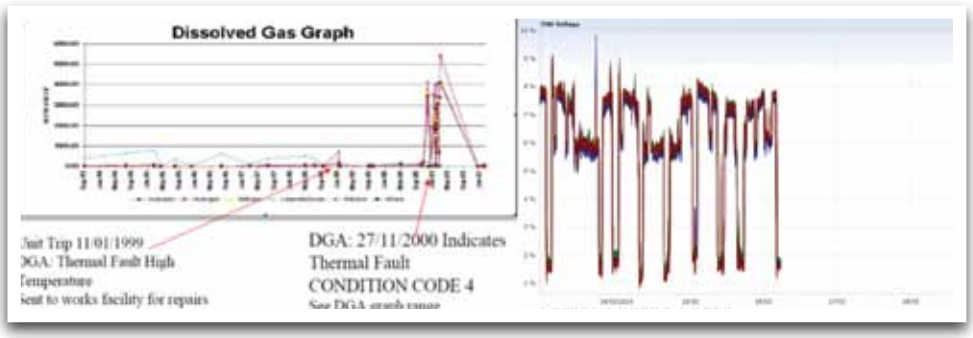
The fundamental objective of life management can be defined simply as 'to get the most out of an asset' by ensuring that actions are carried out to promote the longest possible service life or minimize the life –time operating cost, whichever is the most appropriate. The key planned actions include the areas of: specification, procurement, design review and manufacture, maintenance, condition monitoring and diagnosis, rehabilitation, refurbishment and remedial work, life extension.

Under the guidance and development with experienced workgroups, PQ data could be trended and correlated with other continuous data such as DGA and Sensor Signal Conditioning. The latter makes use of equipment such as: acoustic sensors/ piezo-electric transducers, infrared receivers, special sensitive microphones, radio wave receivers, thermography etc. It is difficult for individual engineers to build up sufficient first-hand experience of problems and how best to deal with them. In addition, failure processes in transformers are often complex therefore co-operation between manufacturers, utilities and academics is necessary if these processes are to be understood. For this reason it is important to develop communication between parties, so that a central fund of shared knowledge can be built up. In this way the experiences and beliefs of individuals concerning problems, their causes and possible remedial actions, which could be influenced by local practices, can be combined and converted to general knowledge and theory.



DGA and Harmonics Spectrum
(Sample data only. No correlation exists, used for illustrative purposes only.)

DGA Fingerprints and RMS Cycle by Cycle Voltage
(Sample data only. No correlation exists, used for illustrative purposes only.)



Dissolved Gas Graph and THD Voltage
(Sample data only. No correlation exists, used for illustrative purposes only.)

Making the Electrical Connection

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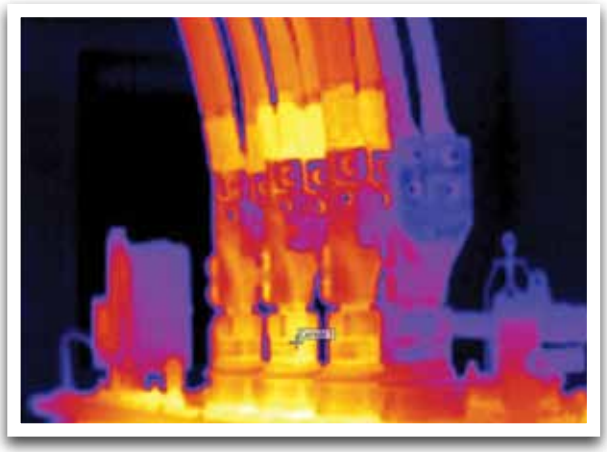
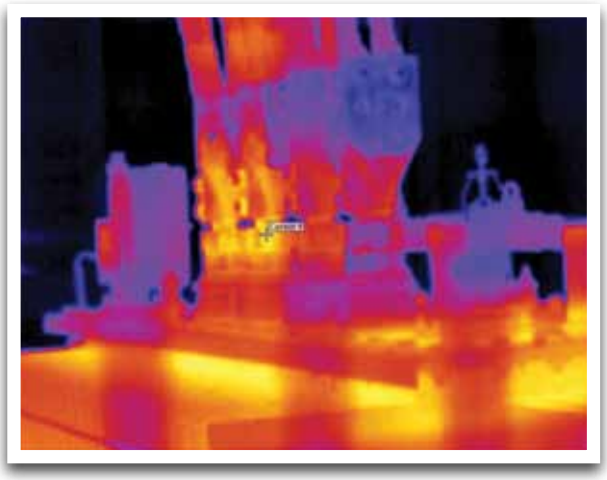


Temperature : 64.3°C
Current: 1588A, Voltage: 386V, pf:0.75



Temperature : 56°C
Current: 1300A, Voltage: 403V, pf:0.99

Thermography and PQ Statistics (with and without power factor correction)

DGA FINGERPRINTS AND RMS CYCLE BY CYCLE VOLTAGE

Factors to Consider:

- Initiation of failure
  What caused the failure to occur when it did ?
- Aging aspects
  In what respects did 'aging' or 'wear-out' contribute to the failure?
- Pre-existing fault
  What indications were there of any pre-existing faults prior to the failure?
- Initiation of pre-existing fault
  - What initiated the pre-existing fault?
- Other relevant information
  Please provide any other information considered to be relevant to the failure.

DISSOLVED GAS GRAPH AND THD VOLTAGE

For many diagnostic tests, the way in which measured results change with time can provide valuable additional information. Some techniques rely very heavily on trend analysis, whereas others can provide a diagnosis from the results of only one measurement. It should always be borne in mind that the occurrence of a rising trend, particularly when the rate of change is increasing, is probably a definite indication of a serious problem or at least something to be investigated further.

Condition monitoring is very important in guaranteeing the safe running of power transformers. With condition monitoring, unexpected failures can be avoided through the possession of quality information from various sources relating to real-time, continuous and online.

Moreover, with condition monitoring, maintenance of power transformers can be condition based rather than periodically based. The physical processes of failure are not an exact science and the monitors usually set up mappings between the faults and their appearances and then diagnose the faults with pattern recognition techniques.

The greatest indicator of potential problems within transformers should not be limited to the concentration levels of the key dissolved gases. Adding supplementary sources of trending information, especially PQ monitoring, opens a new thinking of anomalies on the network to understand further the contributors to asset degradation.

Depending on site specific conditions, once the initial linkages are made between PQ data and typical condition monitoring like DGA, place emphasis in benchmarking alarm levels depending on the tolerance to risk of the maintenance personnel and on maintenance budget available. This benchmarking could be the key to making the electrical connection in condition based monitoring of critical asset. wn

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History of the Rotating Machines Working Group

About fifty years ago, the Council for Scientific and Industrial Research (CSIR) had a research institute called the National Electric Engineering Research Institute [NEERI].

BY | MARIO KUISIS | FSAIEE & ROB MELAIA | MSAIEE

There was considerable interest in high voltage research at universities, industry and in NEERI itself. Hence a committee was formed to coordinate this research in South Africa, named the High Voltage Coordinating Committee (HVCC).

Initially the interest was in lightning and switching surges that affected transmission lines and High Voltage (HV) transformers. At that time considerable problems were occurring with windings of motors of 11kV and 6.6kV. This also became of interest to the HVCC. It was soon realised that firstly, the research workers in HV phenomena were not experienced in rotating machines and secondly, problems with HV motors could not be considered apart from Low Voltage (LV) motor problems.

Thus a working group under the HVCC, the Rotating Machines Working Group (RMWG), was formed. This arrangement worked very well for some years.

Changes were, however, occurring in the policy of the CSIR which lead to the closure of NEERI. The HVCC then decided to continue with support from Eskom. As it was then looking at research topics wider than high voltage, the name was changed to the Electric Power Coordinating Committee (EPCC). This committee was however always in difficulties due to lack of funding and eventually wound down.

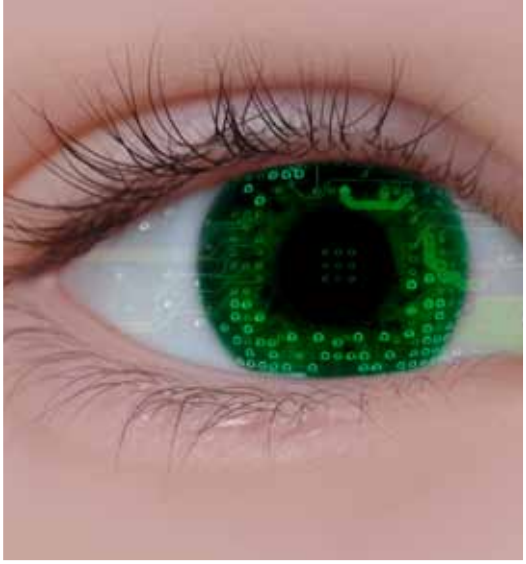
As far as it is known the EPCC has not been officially disbanded. The RMWG had, however, gained a momentum of its own and continued to hold its meetings with a tenuous link to the SAIEE, until recently when it became incorporated as a section into the Institute.

Membership of the RMWG was originally only by invitation, but over the years it changed and was opened to anyone who had an interest in electrical rotating machines. It has never had a formal constitution or committee structure, but was managed by a chairman of no fixed tenure who was elected by members of the working group. No fees were paid or collected. Originally meetings were held at the CSIR and Eskom, but then at a variety of venues made available by members (for example: ABB, LH Marthinusen, Wits University, Rand Water Board's Head Office). Participation has always been from all sectors – academia, SABS, manufacturers, repairers, end-users, consultants and private (usually retired) members. Many will recognise some of these gentlemen who have been active RMWG members in the past: Prof Charles Landy, Prof Jan Reynders, Alan Mitchell, Dave Braude, the late Allan Meyer, and the late Prof Mike Case. Some of these contributors have passed away; some have emigrated, while one has just been lucky enough to retire to the coast – out of reach of the Gauteng meetings.

The Rotating Machines Section is now an SAIEE body consisting of engineering decision makers from utility, industrial, petrochemical, mining, consulting and tertiary institutions in South Africa. Members are involved in the research, design, manufacture, supply, repair, condition assessment and application of electrical rotating machines. Apart from requiring SAIEE membership to belong to it - it is a non-profit and non-contributory technical interest group.

The new Section now holds four meetings a year to discuss relevant issues affecting the electrical rotating machines industry. It has no formal mission statement but the objectives are mainly to raise and solve common industry problems relating to electrical rotating machines, and to share knowledge and experience in an informal, purely technical forum – made up of a very wide range of members, including electrical rotating machine specialists, University professors, end-users, manufacturers and consultants. wn

If you would like to join the Rotating Machines Working Group, please email Tracey Human at SAIEE Head Office on traceyh@saiee.org.za.



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September

September is the ninth month of the year in the Julian and Gregorian Calendars and one of four months with a length of 30 days.

COMPILED BY | JANE BUISSON-STREET
SMSAIEE | PMIITPSA

1 September

1985 The remains of the four-story "unsinkable" ship, the Titanic, were located by ocean researchers.

2 September

2013 The new eastern span of the San Francisco–Oakland Bay Bridge opened to traffic, being the widest bridge in the world. The construction of the original bridge began 1933.

3 September

1995 Pierre Omidyar founded AuctionWeb, an online auction site now known as eBay. Apparently the first auction was for a broken laser pointer that sold for $14.83.

4 September aka Bright Idea Day

1950 Beetle Bailey, an American comic strip, was first published.

5 September

1698 Russia's Tsar Peter I imposed a tax on the beards' of all men except the clergy and peasantry in an attempt 'Westernize' his nobility.

6 September

1968 The Kingdom of Swaziland achieves independence from British administration. King Sobhuza II, of the ruling Dlamini house, is recognised as constitutional monarch (paramount chief).

7 September

1985 Bishop Desmond Tutu becomes the first black man to become archbishop of Cape Town, two years after winning the Nobel Peace Prize for his nonviolent opposition to apartheid in South Africa.

8 September

1966 Star Trek's first episode, The Man Trap, was aired.

9 September

1945 The first computer bug was found in a computer system by Grace Hopper. It was literally a bug; a moth in caught between Relay #70 on Panel "F" of the Harvard Mark II Aiken Relay Calculator. From then on, a "Bug" referred to (and still does) a computer system problem.

10 September

1936 The First World Individual Motorcycle Speedway Championship was held at London's (England) Wembley Stadium.

11 September

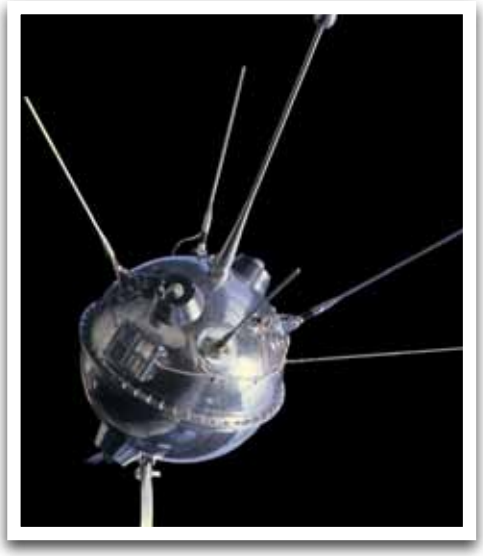
2001 9-11 terrorist attacks use airliners to destroy the World Trade Centre and part of The Pentagon. In total, more than 3 000 are killed.

12 September

1958 Texas Instruments' new employee, Jack St. Clair Kilby, demonstrated the first integrated circuit to Mark Shepherd, Cecil Dotson, Willis Adcock, and several others. The first client for this new invention was the US Air Force.

13 September

1979 Venda, the third (of four) South African homelands, is granted 'independence' by the Apartheid government. Only countries in Southern Africa recognised Venda's independence, no other countries in the world did.



14 September

1959 Finally, a man-made object reached the moon when the Soviet probe Luna 2 crashed into it.

15 September

1857 Timothy Alder patented the typesetting machine.

16 September

1975 At last, Rhodes Scholarships were made available to both men and women.

17 September

1995 Pope John Paul II begins a six-day tour of Africa by celebrating a papal mass in South Africa.

18 September

1977 Voyager I captures Earth and the moon together, for the first time, in a photograph.

19 September

1982 Emoticons were used for the first time by Scott Fahlman was the first documented person to use the emoticons :-) and :-(.

20 September

1954 The first FORTRAN (Formula Translating) program ran. This language was developed by IBM and quickly became the dominant language for engineering and scientific applications.

21 September

– aka Wife Appreciation Day

1991 Mozambique and South Africa began discussions that lead to the creation of a cross-border conservation park, which will include the Kruger National Park.

22 September

1999 226 kilograms of Marijuana is put on auction on eBay. eBay administrators only realised when bidding reached $10 million when they pulled it off the auction.

23 September

1889 Nintendo Koppai was founded in Kyoto Japan to produce and market a playing card game called Hanafuda by Fusajiro Yamauchi. In 1963, Fusajiro Yamauchi's grandson changed the company's name to Nintendo Co. Ltd, reputed to be the world's largest video game company by revenue, and still manufactures playing cards.

24 September

1948 Soichiro Honda, a Japanese mechanic and self-taught engineer founded a company in 1946 that made small, efficient engines. Two years later, in 1948, it was incorporated as Honda Motor Co.

25 September

1513 Spanish explorer Vasco Nunez de Balboa was the first European to discover the Pacific Ocean.

26 September

1580 Sir Francis Drake completes his circumnavigation of the globe, the second journey of this type.

27 September

1937 The first Santa Claus training school, Santa Claus School of Albion, New York opened.

28 September

2008 British Secret Service had been advertising for new agents; one of the mediums they apparently chose to advertise on was Facebook. It is said that MI6 placed 3 adverts on Facebook looking for people who were interest in a career change.

29 September

1977 Eva Shain becomes the first woman to judge a heavyweight boxing championship. Eva refereed the Muhammad Ali vs. Earnie Shavers fight at Madison Square Garden.

30 September

1960 Fred Flintstone's "Yaba, Daba Dooo!", was first hear on American television during the animated Stone Age sitcom. wn

IN MY OPINION : DON STEPTO

Automation

"Automation" is one of the great unseen and unappreciated technologies that impact our daily lives from the home to the workplace and everywhere in between.

BY | DON STEPTO

An overview of the current situation is shown in the Automation Overview, which has been generalised to include the "technical" players associated with the implementation of automation in a variety of common applications: "Automation" means different things to the groups of people involved in the different application areas and the degree to which it is implemented varies dramatically, often due to external factors rather than technical ones.

TYPICAL APPLICATION AREAS

- Imbedded automation - which is commonly associated with home appliances such as washing machines, dishwashers and even ovens, which are electronically controlled to provide easy to use and safe operation of the appliance. In addition to these, there are the systems associated with motor vehicles to optimise fuel consumption and performance whilst monitoring operational, mechanical and safety functions (it is now a feature of Mercedes Benz A class to offer a fully automatic parallel parking system).
- Manufacturing – this is perceived as the most common application for automation and covers everything from simple operational sequencing, such as bottling plants, to optimised processes with intelligent unit production quality and quantity control systems (e.g. motor, breweries, food production, canning, warehouse management, etc.)
- Process control – this is probably the most significant application for automation due to the scale of the oil, gas, energy and water supply, mining, mineral and metallurgical and other major production industries (e.g. plastics, chemicals, paint, etc.)
- Operational Management control - this is included as the automated control systems in both the manufacturing and process control sectors are now designed to provide selected, secure, decision support data for maintenance and production management.

ENGINEERING FOR SUSTAINABILITY

One of the main problems with the engineering of sustainable automation is the diversity of engineering challenges that have to be resolved to provide an effective longer term solution. These can be summarised:

- There is no single engineering discipline to provide graduates in Automation and Process Control
- There is no recognition of Automation and Process Control as a critical engineering function in major projects, as it is generally less than 10% of the overall capital cost of the project and every project manager knows that they must focus on the 90% to bring home a "successful" project.
- The only time a project manager takes a real interest in Automation and Process Control is when the last piece of mechanical equipment has been installed, the plant switchgear has power and there is considerable pressure from the client to get the

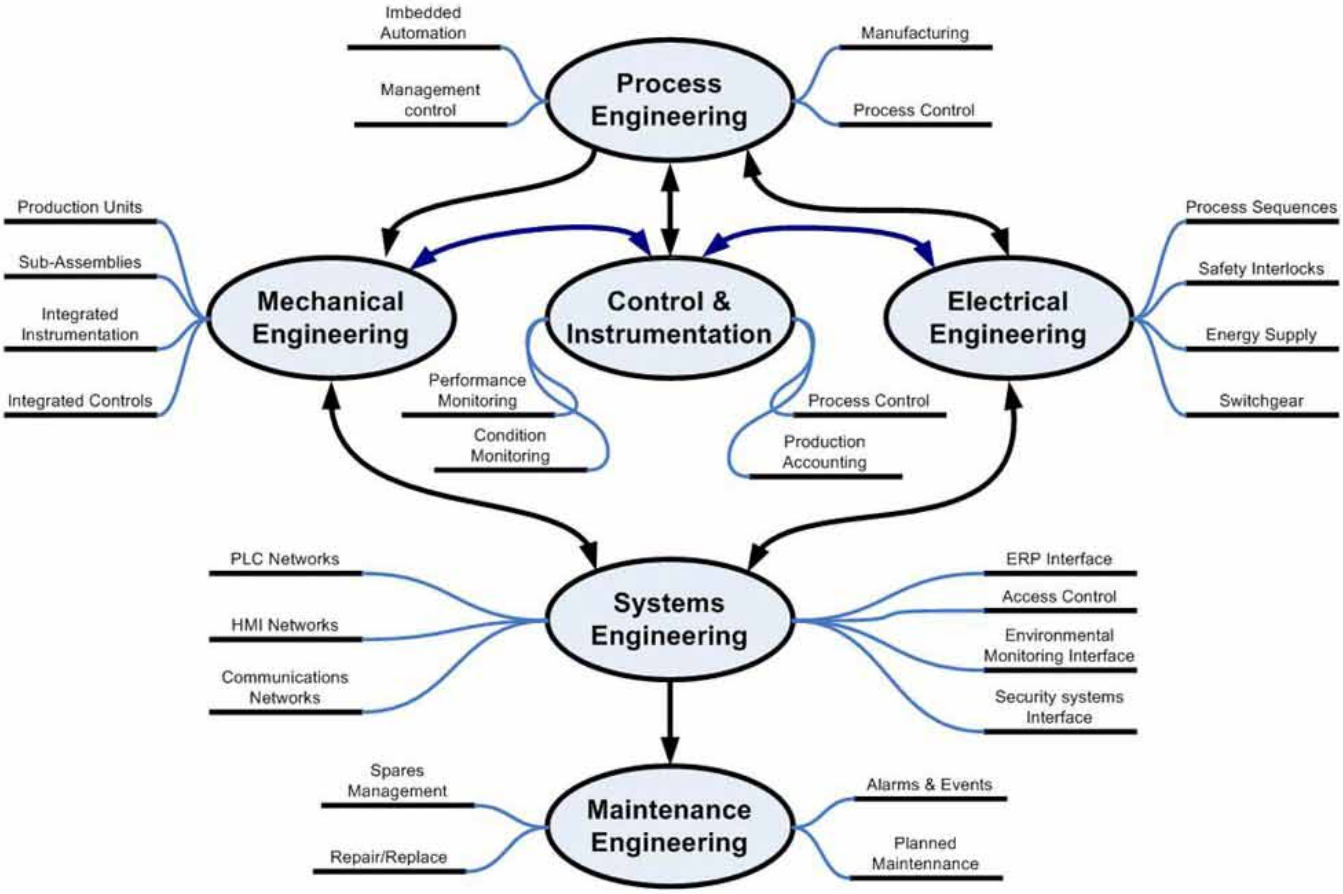


Figure 1: Automation Overview

plant into production. Unfortunately, the field instrumentation and control system is "tail-end Charlie" and can only be completed after the piping and other mechanical and electrical equipment has been fully installed. In reality, the process can only be commissioned once the electrical sequences, safety interlocks and basic process controls have been individually tested and signed off. This process may take several weeks, depending on the size and complexity of the process.

- The maintenance of an Automation and/or Process Control system requires a multi-disciplined approach, not just with an instrument technician, as there are significant networks and software based systems to be maintained, often impossible without "supplier support".

Today there is an option to outsource the software support function to the supplier using the internet, but this has to be very securely managed, as safety will be compromised if there is inadequate site presence to manage the implementation of any changes. (An actual example is that of mine winder systems, in which the software can be maintained remotely at the supplier's support service centre, located anywhere in the world, over the internet)

EXTERNAL CHALLENGES

No matter what industry, or where it is located, there will always be the challenges of social, political, environmental, and the economics of the time to be faced, when proposing any form of Automation and Control, whether for process, safety, security or simple access control.

These challenges may even be more significant than the technological and technical ones in many operations.

Automation means different things to different groups of people, and there are many misconceptions as to the value of "automation" within these groups. It has become commonplace to use "automation" as a political weapon, often to further demands for "more employment," which reduces the value of automation as a means of increasing efficiency, productivity and sustainability.

Given that we are part of the global economy and face considerable competition in the local and international markets for our products. We have to create and keep a competitive edge, in order for these products to survive, and our economy to continue to grow, thus meeting the goal of more employment.

Hence it is crucial to maintain a sustainable balance between automation, social and environmental needs, politics and employment equity. wn

Watt's your Opinion?
Please submit your comments or your own opinion piece to minx@saiee.org.za.

South African Robotics

Truly South African are ahead of the times. South Africa has always been a leader in the robotics field...

BY I ANGELA PRICE

I sense your scepticism (sis on you)…let me explain. Whilst other little kiddies over the sea were only introduced to the word/idea robot when they firstclapped eyes on RTD2 and C-3PO in Starwars….us little Saffies (South African Kiddies) had been bandying the word around ages. We have been au fait with robots for years, in fact there was one on just about every corner.

There is nothing unique about our robots, except perhaps the mind boggling fact that they are called robots. As you have likely guessed, I am referring to traffic lights - more commonly known as robots in SA….a fact that confuses the heck out of our foreign friends. Casual statements like 'I drove into the robot' or 'the robot was flashing' made around non South Africans always results in some raised eyebrows.

I am reminded of an incident in Standard 2 at school (now called Grade 4 I think) when we were writing a test during our Health Ed. class (yip we had a subject called Health??!!). We were asked to draw a robot using the correct colours. There was a poor lad in our class, fresh off the boat from Ireland and not up to speed with our 'South Africanisms'. Very thoughtlessly the teacher displayed his response to the question for all to see….the hapless chap had drawn an actual robot (the AI type) - quite well in fact. Needless to say the class were all helpless with laughter and swiftly concluded that the Irish were in fact stupid (the cruelty of children!). In hindsight the poor child must not only have felt humiliated but also completely bemused. If anyone/thing is stupid perhaps it is our strange South African way of calling a traffic light a robot. Thinking about it made me realised that I don't have a cotton picking clue as to why we call them robots.

As it turns out, we call traffic lights robots because traffic lights replaced traffic policemen who used to direct the flow of traffic at intersections. The human was replaced with a machine and hence the lights were referred to as robot policemen, later shortened to 'robots'.

Robots filling job roles currently occupied by humans is a reality that many fear, a realistic reality (ask the former traffic policemen from years gone by). Whilst the complexities of many high level job functions are still beyond the reach of the robots, many are not. Repetitive work is a field that robots are making big roads into, their high cost vs. the abundance of people needing work here makes it a less foreseeable future in SA. Large mining houses are also turning their attention to robotic mining, primarily to mine in places where humans cannot venture, but with more and more strike action one wonders if miners themselves may eventually be a 'thing of the past'. My musings gradually began to turn to dread, as I envisaged the future…the 'rise of the machines'… my poor children becoming jobless, replaced. Oh heck!!

I was still fretting over the gloomy future when I drove the kids to school the next day. To my surprise the traffic was moving and there was nothing to be seen of the usual mile long queue snaking its way along Republic road. What was different… the robots were broken and there were Outsurance pointsmen on duty.

God love 'em, those little green folk do an amazing job and it never fails to amaze me as to how much better the traffic flows when there is a human directing it as opposed to a robot/traffic light. Hold on a sec I thought…here is a great example of humans being replaced by robots (the traffic policemen of old) and now the robots being replaced by humans (the Outsurance pointsmen), and the humans are making a better job of it. We have come full circle.

Maybe there was hope after all I thought as I dropped the kids off for their costly education…….perhaps they would not be replaced by a walking tin can called "madeinchina'. wn

Calendar of events

If you want to see your function or event listed here, please send the details to Minx Avrabos at minx@saiee.org.za

SEPTEMBER 2014

3	Basic Telecommunications	SAIEE House, Johannesburg	www.saiee.org.za
4	Variable Frequency Control	Cape Town	www.saiee.org.za
9	Mastering Power System Harmonics	SAIEE House, Johannesburg	www.saiee.org.za
11	Bernard Price Memorial Lecture	Wits University, Johannesburg	www.saiee.org.za
12	Bernard Price Memorial Lecture	Central University of Technology, Bloemfontein	www.saiee.org.za
15	Bernard Price Memorial Lecture	Cape Town Science Centre, Observatory, CT	www.saiee.org.za
16	Bernard Price Memorial Lecture	Civic Centre, Main Hall, George	www.saiee.org.za
17	Bernard Price Memorial Lecture	TBC, Port Elizabeth	www.saiee.org.za
17	Design of Economical Earthing Systems	SAIEE House, Johannesburg	www.saiee.org.za
18	Bernard Price Memorial Lecture	TBC, KwaZulu Natal	www.saiee.org.za

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