WHAT'S WATT

December 2021

Featuring:

ACTOM - offering a greener future for Africa!

ACTOM

The severe impact of COVID-19 continues apace, but ....

The devastating effects of COVID-19 continued to dominate every aspect of life in South Africa – and around the world – during the second half of 2021.

Not only has the disease had – and continues to have – a marked impact on our economy and made conditions in the ACTOM group's business sector extremely challenging, with a major slowdown in capital projects, but it has also resulted in major logistics delays, increased costs and shortages of raw materials.

Tragically it has also taken a heavy toll in lives. Within the group, I'm sad to say, we've lost another seven colleagues in the pandemic's third wave.

We also sadly this year lost **Garth McEwan**, our previous Group Financial Director and Chief Operations Officer, who served in those capacities for many years. I pay tribute to him for everything that he did.

It is pleasing to note that government's vaccine drive has been gaining momentum and it is absolutely critical that all South Africans heed the request to be vaccinated, as they need to do so for the protection of all our society.

We have seen many customers opt to sweat existing assets, resulting in increased activity in the repair and services businesses, while the manufacturing businesses had major challenges to deal with.

As if the negative effects of COVID-19 haven't been enough for us to have to cope with, the unrest, incidents of violence, looting and damage to property that occurred in July this year added to our woes by shattering

investor confidence and further slowed down capital projects.

We were further challenged by a strike that occurred in our industry in October, which lasted three weeks, with violence, intimidation, damage to property and several incidents of assault taking place. I am deeply saddened by this behaviour and extreme criminality, which are unacceptable. This had a major disruptive impact on our business and also to our customers.

But as we continue to soldier on unbowed in the face of multiple challenges, there are at least three "green shoots" already burgeoning forth that provide some sound reasons to be more hopeful about what the future holds. These are:

- Round 5 of the Independent Power Producer (IPP) renewable energy programme will be positive in stimulating demand for manufactured product and economic growth.
- Old Mutual recently became ACTOM's largest investor (58% shareholding) after buying out the shares of Actis and Rand Merchant Bank. This gives us a major shareholder that will support investment towards growing the business and paves the way forward for expansion of the group geographically together with product and service diversification.
- We are also currently busy with various acquisition initiatives, the details of which I will announce in due course.

And while we're speaking in a positive vein, let me take the opportunity to congratulate **Chris Bezuidenhout** and his management team on their recent exceptional success in further growing ACTOM Turbo Machines in leaps and bounds, despite the most challenging operating conditions.

We have fared very well from a health & safety perspective across the group. I would like to thank our management teams and all staff for their efforts and commitment over the past year, which has been an extremely challenging period.

I am confident that 2022 will be a better year for South Africa and our business. As we head into the holiday season, please be vigilant and adhere to COVID-19 regulations and precautions so that we avoid a repeat of the infection spread which happened last year.

I would like to wish all staff and their families a blessed Christmas and a happy New Year.

Mervyn Naidoo

What's Inside

***Cover**: A 2.8MVA pad mounted transformer kiosk (PTK) in use at the Golden Valley Wind Farm near Cookhouse in the Eastern Cape.*

ACTOM - offering a greener future for Africa

The recently concluded COP 26 has brought the stark reality of the world's energy needs to the forefront of all participating countries and highlighted just how far behind South Africa is in the race for renewable energy sources. So much so that that the world's wealthiest countries have come together and penned a R130 billion deal to support SA in reaching its 2030 CO_2 emission targets.

The world's wealthiest countries are actively and speedily moving to greener energy sources utilising various natural elements, such as water, wind, geothermal, solar, and biomass, to generate electricity and ensure that greenhouse gasses are reduced by 49% by 2030 and 95% by 2050.

The renewable energy industry in South Africa is relatively new compared to other countries, which started using wind as an alternative energy source about 20 years ago. The first wind farm in South Africa became operational in 2014, and today, we have approximately 40 windfarms, equating to 1500 individual wind turbines operating in the Western and Eastern Cape provinces.

Mervyn Naidoo, ACTOM CEO, stated, "When you look at the traditional coal requirements from a coal power station and engineering perspective, it was clear that ACTOM had to make a distinct shift by enhancing existing designs, looking towards new technologies, and designing new product lines". As a result, ACTOM has been positioning itself to align with Eskom's "Just Energy Transition" plan, which is to decommission ten coal fired power stations by 2040 and an additional three by 2050. The "Just energy transition plan" presents an opportunity to repurpose these sites into agrivoltaics, photovoltaics and gas generation and migrate towards a cleaner and greener energy future while creating new job opportunities for those displaced by the replacement of coal technologies.

A 2.7MVA 690V to 33kV step-up pad mount transformer is installed at the Kangana Wind Farm in the Northern Cape.

"Traditionally, ACTOM supplied switchgear, protection technologies, control schemes and electric motors. What is transpiring now with renewable energy projects is that Engineering Procurement Contractors (EPC's) are requiring an integrated offering", he added. This dynamic shift into the renewable energy space has triggered a whole new migration in ACTOM towards evolution engineering in new design technologies and embracing a new approach in the 4th Industrial Revolution (4IR).

"Now, what is happening is that we have multiple renewable power plants scattered around the Northern Cape, Eastern Cape, and Western Cape. The technology applied there is very different to what is applied in a traditional coal fired power station. With that, we had to say, let's adapt our product and engineering offers as well".

For example, "With all these plants scattered all over the country, we had to evolve our condition monitoring to monitor individual systems remotely. You can imagine, when you have an issue with a piece of equipment that sits in the Northern Cape, it makes sense to have online technology whereby you literally access the operating parameters of the plant and get into the diagnostics to see if it is operating according to its set parameters. So, with that, we had to develop new software, systems, and technologies to be able to sit in Johannesburg and access a plant irrespective of where it is located. This has triggered a whole new approach towards the fourth industrial revolution and the digitisation of things," said Naidoo.

Wind power currently tops the list as the most promising renewable energy source in South Africa. According to **Christian Barret**, Divisional CEO,

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A prefabricated collector E-house substation, equipped with medium voltage switchgear for solar.

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ACTOM Energy, "When Round 7 of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) is fully implemented, we are estimating that we could have approximately 70 windfarms operational, which will host 2500 turbines".

ACTOM benefits from an established repair and services industry in South Africa and, as a group, is ready to take on the challenge. "By integrating ACTOM's locally manufactured electrical equipment, repairs and services, together with its energy solution, front-end engineering and project management capabilities, we can provide customised solutions for most of our client's windfarm requirements," said Barret.

John McClure, Operations Manager, ACTOM Power Systems, added that ACTOM had not previously got involved with project investors or wheeling arrangements. Typically, the developer with financial backing applies to the Department of Mineral Resources & Energy applicable to a specific renewable window; currently, window five is in progress. Once an application is accepted, the developer awards the job to an Engineering Procurement Construction (EPC) contractor, which are typically internationally based companies who would supply the wind turbine generators but not be involved in the installation or maintenance of the balance of plant required for system integration, which is where ACTOM comes in.

A 2.8MVA 0.69/33kV step-up pad mount transformer next to the much more significant 33/132kV step-up collector transformer for wind and solar applications - both supplied by ACTOM Power Transformers.

Each wind farm presents two distinct areas of opportunity for ACTOM. The first is the supply and maintenance of the electrical components and turbines, which convert the aerodynamic force from the rotor blades into electricity through its gearbox-generator subassembly. The second is the Balance of Plant (BoP), which collects the power generated by each turbine, steps up the voltage and transmits it into the national grid. "To this end, we have completed two turnkey contracts for the latter; the first was the Nordex Kouga Wind Farm in the Eastern Cape, and the second for Vestas at the Tsitsikamma Community Wind Farm. We have also submitted additional bids for window five and are busy working on aligning with the recently announced successful bids," McClure said.

The Groeipunt substation between Springbok and Aggenys in the Northern Cape connects the Kangnas wind farm to the grid via ACTOM's 250MVA 220/132/22kV transformer and related substation equipment.

All building systems and components need some level of maintenance, and renewable-energy systems are no exception to this rule. The specific maintenance requirements vary based on the type of system and components installed. For all renewable energy systems, it is proper maintenance practice to inspect the integrity of mechanical and electrical connections at least once each year, which is a non-invasive examination of the transformer online and under load. Corroded or loose connections can result in decreased performance, and in extreme cases, they can create safety hazards.

In addition to wind power generation, ACTOM is actively involved in two large scale green energy projects across Africa.

The first biomass power plant installation, established under South Africa's Independent Power Producer Programme (IPPP), has been completed as a joint venture between John Thompson's Industrial Watertube Boilers (IWTB) and Lesedi Nuclear Services. The 25MW power plant

ACTOM Distribution Transformers supplied this 2750kVA 33kV/690V Dyn5 Pad-Mount Transformer Kiosk (PTK) installed at Greefspan 2 Solar Park in Douglas, Northern Cape.

is adjacent to the Sappi Ngodwana pulp mill in Mpumalanga. According to **Russel Warren**, General Manager of John Thompson's IWTB unit, "the installation took 20 months. Now that it has been completed, we are contracted for the operating and maintenance for the next five years. We have recruited approximately 40 electrical and mechanical artisans to perform the operating and maintenance of the plant". The contract is one of the largest operation and maintenance contracts John Thompson has undertaken. The JV company will operate and maintain the entire plant, comprising the boiler, turbine, and balance of the plant.

The second is Hydropower. Currently, Hydropower accounts for 17% of the electricity generation in Africa on average. In some countries, such as the Democratic Republic of Congo, Ethiopia, Malawi, Mozambique, Uganda, and Zambia, Hydropower in electricity generation exceeds 80%. Marthinusen & Coutts (M&C), a division of ACTOM, is the largest aftermarket service provider of electrical and mechanical Rotating Machines in Africa. They work extensively on Hydro Power plants and have just been contracted to refurbish a synchronous condenser at the Inga River hydro project.

With the whole Hydrogen economy in its infancy, ACTOM sees massive potential. South Africa is well placed to take advantage of a worldwide market for green hydrogen that could be worth $2.5 trillion by 2050. South Africa has plans to link its massive platinum reserves to the green hydrogen market that is touted as a trillion-dollar opportunity in the green energy world. "In our perspective, we are looking to see how we can participate in Hydrogen, but we see it as a key part of the energy mix and will actively get involved", said Naidoo.

All over the world, interest in hydrogen as a vector for clean energy is growing as industries and governments investigate and implement national decarbonisation strategies. With the rapid growth in renewable electricity and falling costs of wind and solar power, the opportunity to produce zero-carbon hydrogen has caught the attention of global energy players.

With the world increasingly turning towards countries with optimal renewable energy resources to provide the clean energy of the future, South Africa

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High Voltage Equipment assembly staff doing final checks on high voltage transformers to be installed in solar and wind farm sub stations.

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is in a unique position to revolutionise its economy and supply green hydrogen to the world.

Whether countries have established renewable energy plants or are only just entering the renewable industry, there will be an extensive requirement for products and services. "We are evolving our product lines to be at the forefront of renewable energy, and where we have gaps, we are looking towards partnering.

We are targeting to utilise our current platform as ACTOM to be the launching pad for manufacturing on the continent through the African Continental Free Trade Area. The way I look at it is that Africa as a continent generates 170GW of power for about 1.4 billion people. Whereas China also has a population of 1.4 billion people, but they generate 2200GW of power. So, you can see there is a radical gap, and it is a no-brainer that Africa must gear up when you look at an analogy of what is happening with mobile and cell phones in Africa. Like in Nigeria, they went from 7000 landlines to the point of 150 million mobile phone contracts in less than 5 – 10 years," Naidoo concluded.

ACTOM, through innovation of products and services, is well-positioned and geared towards capitalising on the many opportunities that exist with greener electricity generation in both South Africa and the rest of the Continent. By strengthening and adding to our current product offering and delivering turnkey solutions, we believe that we can make a considerable contribution to achieving future CO_2 emission targets and a cleaner, healthier living environment. Most of all, ACTOM is well poised to continue providing the necessary employment for our people.

ACTOM sets out to ensure as many group employees as possible get vaccinated

To further lower the risk of group employees contracting COVID-19, as the third wave of COVID-19 started to take hold this year ACTOM got in touch with the Reality Wellness Group, which offers a range of wellness interventions and activities to corporates, to provide on-site vaccinations to employees.

It was agreed that Reality would first run information sessions for the employees to inform them fully about what the vaccinations are about to help to ensure they understood clearly that vaccinations are completely safe and effective in preventing contracting the disease.

The provision of on-site vaccinations by Reality was however conditional upon each site arranging to have at least 100 employees in attendance to be vaccinated on a given day.

"Due to this condition, we were unable to arrange to have on-site vaccinations provided at all the group's business sites. The site at Knights, Germiston, could guarantee attendance of the required minimum number of employees, while some of the other sites made alternative arrangements to have their employees vaccinated," said **Alre van Wyk**, ACTOM's Group Environmental, Health & Safety Officer.

He went on to point out that many employees were found to be resistant to being vaccinated, due to being misinformed about its effects.

"As you surely know already, many untrue horror stories have circulated throughout the population, and indeed worldwide, about vaccinations being harmful in some way. In fact, an extraordinary number of people have seriously adopted the false idea, which has been spread widely via social media and by word-of-mouth, that COVID-19 itself isn't a life-threatening disease at all, but just another form of flu! So it's hardly surprising that many of our employees have taken such misinformation to heart," he said.

One of the posters John Thompson displayed at its Bellville premises to encourage its staff to get vaccinated.

A month-long strike by workers at ACTOM's main site at Knights that occurred immediately prior to the widespread strike in October also contributed strongly to the poor attendance on "vaccination day" at Knights.

Consequently, at the Knights site, where 1500 people work, the number of employees who attended the on-site vaccinations session on the appointed day, September 9, was disappointingly small – a total of only 120 people.

Marthinusen & Coutts (M&C) arranged for vaccinations to be provided off-site at a facility in Fourways for employees from its Cleveland and Benoni workshops on a number of days in August and provided transport for them to get there and back on each occasion.

M&C made a special arrangement with Reality to provide on-site vaccinations at its Rustenburg branch, where 33 employees were vaccinated with the Pfizer first jab on September 13 and the second jab on October 29.

On-site vaccinations by Reality of most of the employees at LH Marthinusen's Denver, Johannesburg, site were carried out during August, September and October, with 288 employees, or 88 % of the total, being vaccinated during that time.

"These vaccination sessions included repeat visits for the second Pfizer dose by people who'd had the first dose during one of the earlier sessions," said **George McKeever**, LHM's Divisional SHEQ Manager.

John Thompson ran a full-on promotional campaign towards the end of the year at its head office and factory premises in Bellville, Cape Town, to encourage employees to get vaccinated, including producing and displaying posters inviting them to attend on-site vaccinations that Department of Health nurses came there to provide

ACTOM employees are seen preparing for their vaccinations by Reality Wellness Group nurses at the group's Knights site on September 9.

on September 22 and November 4.

The majority of the vaccinations, however, were arranged off-site during this period, with about 250 staff-members being vaccinated on that basis, while 45 employees received their first and second Pfizer jabs at the two abovementioned on-site sessions.

"Continuous information sessions, posters and talks were run via our John Thompson communications e-mails, assisted by Reality Wellness, line management, toolbox talks and one-on-one talks," said **Riaan Louw**, John Thompson's Risk Manager.

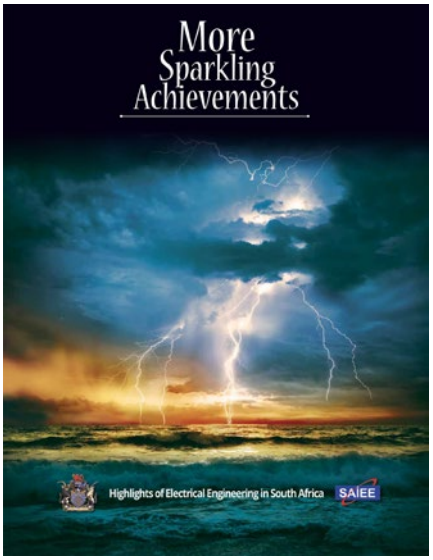
SAIEE publishes new edition of its popular 'Sparkling Achievements' book

At the beginning of the 2000's the SA Institute of Electrical Engineers (SAIEE) came up with the idea of publishing a book to highlight its achievements and those of other players in the industry.

The book, published in 2001 and appropriately named "Sparkling Achievements", was sponsored by SAIEE member companies and organisations, as well as other interested parties, who recognised it as a golden opportunity to showcase their aims and achievements in a form and with a shelf-life that no magazine or any other available printed publicity vehicle could match.

Also much helped by the great variety of content provided by the numerous participants featured in it, the book proved to be a great success at the time.

Then in 2018 the SAIEE decided it was time to start producing a successor edition. With many changes having occurred in the interim, including technological advances along with changed circumstances in the market and new businesses being established while others had faded into obscurity amid the political and economic turmoil occurring during this period in South Africa, they decided it was high time a new "Sparkling Achievements" book in the same winning format as before was required.



The new Sparkling Achievements book published by the SAIEE.

At that stage they couldn't have foreseen the devastating impact that COVID-19 which was soon to hit the world would have. Not only has it had a serious impact on the economy and day-to-day business activities, but it caused delays and complications to bringing out the envisaged new book, resulting in it taking a total of 2-1/2 years to prepare and complete it.

"When we started out on this

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project I drew up a list of 72 companies and institutions I intended to approach to participate as sponsors, but with many of them dropping out for various reasons linked to the effects of COVID-19 – some going out of business, some saying they couldn't afford it – we've ended up with 32 sponsors in all. Nevertheless the new book is very similar in size to the first," said **Mike Crouch**, the book's Compiler and Editor.

"It also has, I believe, an even greater variety of interesting content than the first book and the layout and presentation is more modern. We have produced a total of 400 printed copies but a new and exciting aspect – which was of course not available when the first book appeared – is that an online version is available free to anyone who wishes to access it via the Institute's website www.saiee.org.za."

The new book, entitled "More Sparkling Achievements", was published in August this year and comprises 134 pages. Unlike the first version, which was a hardcover book, the new printed book, for sale at R350, has a soft cover for easier posting.

It is divided into two sections, with the first 26 pages devoted to the achievements and activities of the Institute, while the other 108 pages contain material supplied by the sponsors describing their own noteworthy developments and achievements, accompanied by photographs and other illustrations.

"Through the online version additional material of interest is available. For instance, in the Institute's section where a selection of its online magazine WattNow is featured, viewers can gain access to a variety of fascinating articles on various interesting subjects and new developments written by our feature writer **Dudley Basson**. And in the sponsors sections readers may access their websites to gain more information about them," Mike pointed out.

ACTOM's contribution, which heads the sponsors section, covers 13 pages. Other major participants are the Council for Scientific & Industrial Research (CSIR) (11 pages), the Square Kilometre Array (SKA) & Meerkat, the only international contributor, with 10 pages, Reutech (6 pages), the University of Johannesburg (6 pages), Multichoice Group (4 pages), the University of Pretoria (4 pages) and the University of the Witwatersrand (4 pages).

Mervyn Naidoo, ACTOM's Group CEO, and Sy Gourrah, Senior General Manager Designate of the ACTOM Smart Technologies division, each display a copy of the SAIEE's "More Sparkling Achievements" book at the group's Knights head office after Mike Crouch (centre), the book's Compiler and Editor, delivered complimentary copies of the newly-published book to them.

On-line availability of What's Watt makes it more easily accessible to more people than ever before

What's Watt as an on-line magazine – dubbed e-What's Watt – has taken on a life of its own since it was introduced earlier this year, proving itself to be popular, accessible, readable and offering variety of content in ways that are beyond the capacity of the print version of the magazine.

e-What's Watt was launched in the highly flexible and versatile "news website" format for the first time as the June 2021 issue of the magazine, coinciding with its publication in its traditional hard-copy form.

"In line with the general trend in the magazine industry in this direction – trade magazines especially – this marked a decisive shift by the group into relying primarily on deploying a digital magazine, as opposed to a printed magazine, as the most suitable and effective medium for spreading group news, achievements and other matters of interest in the marketplace, including of course among our own employees," said **Andries Mthethwa**, ACTOM's Chairman, whose responsibilities include managing the preparation and publication of What's Watt.

A spot survey among readers

conducted by the group's Marketing department shortly after the June issue of e-What's Watt was made available confirmed that readers are overwhelmingly in favour of the change.

Compared with the hard-copy version, it was found to be far more easily accessible and readable.

"In addition, e-What's Watt offers a variety of user-friendly functions that are beyond the scope of a print magazine to supply. To name just one example, a reader of e-What's Watt wanting to find information on a particular topic of interest can do so instantly at the press of a button," Andries remarked.

e-What's Watt may be found at https://whatswatt.actom.co.za or on the ACTOM website www.actom.co.za by clicking on the 'What's Watt magazine' tab under the tab 'About ACTOM'.

"It is a sub-domain of the ACTOM website and has all the interactive features and flexibility of a modern online news publication," said **Debby Riddle**, ACTOM's Group Marketing Officer.

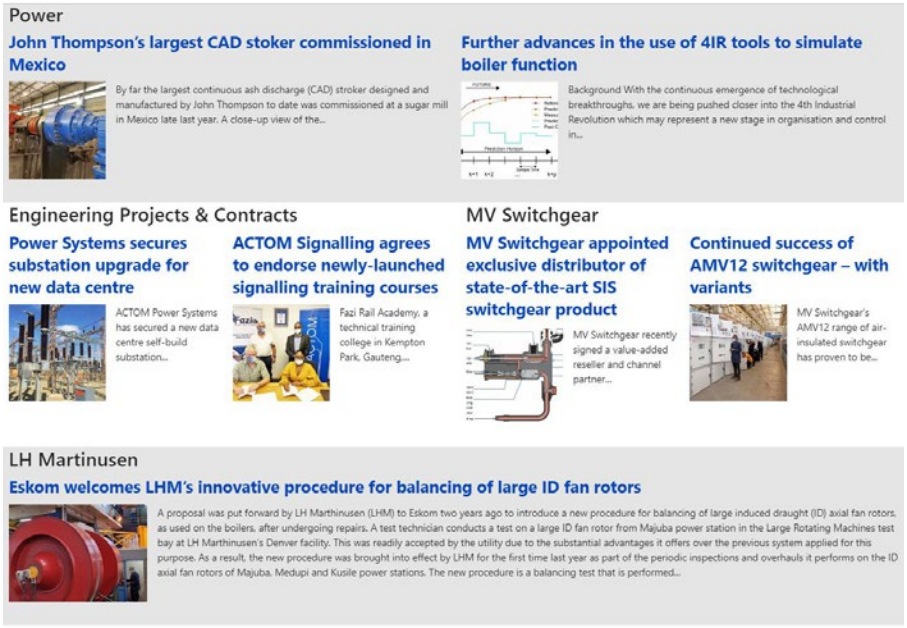
The Home Page displays all stories in the current issue of the magazine in abbreviated form.

These are listed under the group divisions that those stories belong to, or in the case of stories relating to the group as a whole they are listed under the "Corporate" heading, while stories about individual staff-members and the like are listed under the heading "Our People".

An alternative route for accessing the magazine's content is via the menu at the top of the Home Page. This menu includes a tab entitled "Search Inside", which enables a reader to type in a subject of his own choice, resulting in any stories in which the named subject is mentioned being displayed.

Access to the archive is also provided. "This means any reader seeking info on a particular subject is not only directed to stories in the current issue dealing with it, but also stories in previous issues of e-What's Watt that contain stories on the named subject," said Debby.

Andries concluded: "The flexibility that the new online version of the magazine affords of being able to include other material that can't be included in the print version provides a golden opportunity to group businesses to impart extra useful information to readers via additional images, video clips, animated illustrations and links to other articles on the same or a similar subject to that covered in a What's Watt article."



A screen grab showing a portion of the Home Page of e-What's Watt.

Top ACTOM managers urge Balmoral College learners to 'study hard to get ahead'

In June this year three top managers from ACTOM visited Balmoral College next door to the group's head office site in Knights, Germiston, to encourage and motivate Grade 11 & 12 learners at the school about the importance of education for building a secure and fulfilling career.

The three top managers were **Andries Mthethwa**, ACTOM's Chairman, **Mervyn Naidoo**, Group CEO, and **Sylvester Makamu**, Group HR Executive, who each addressed the learners, including tracing their own career paths as examples of what may be achieved by learners who study with dedication and are ambitious, even though they may come from disadvantaged backgrounds.

Balmoral College, one of the leading beneficiaries of ACTOM's social responsibility programme, sets high standards of achievement for its learners and has an excellent track record for consistently achieving good results.

Sylvester said: "When I was at school I was often mocked for having my head in my books and for always wanting to study, but I knew that education was the only way I was going to improve the quality of my life and enable me to improve the lives of those around me."

He added that many of his friends left school and started working straight away, while he continued to study.

"I have no regrets because today I am able to make the difference I dreamed of," he commented.

Mervyn said he came from a poor family in KwaZulu-Natal and was raised by his grandmother because both his parents had to work seven days a week to make ends meet. His grandmother often spoke to him about the importance of an education although she herself was illiterate. Due to the hardships she had experienced she had a passion for him to be well-educated.

"I saw how people who were skilled or educated could rise up out of poverty and with my grandmother's encouragement I was determined to do the same. Instead of having to cook food over an open fire as my grandmother did, I wanted some of the better things life has to offer, like a flushing toilet and warm, running water to bath in," he said.

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He had to make sacrifices along the way to achieve what he needed to. "I was a good soccer player, for example, but I realised that if I wanted to achieve the grades I needed to get a bursary to study, there was no time to play soccer, because without that bursary I would remain poor. So I chose to study to change my circumstances in the long term and achieve my goals," Mervyn explained.

In his talk Andries emphasized that in addition to setting out to build their own careers, learners also have a responsibility to contribute towards South Africa's success as a country.

Briefly tracing his own upbringing and education, he said his parents were farmworkers and he was the first of their eight children, so he and his siblings faced daunting obstacles to advancement. But he recalled that at a young age while walking past a factory in Alrode on his way to school he said to himself: "One day I will be the managing director of a factory", so demonstrating that he had a strong ambition to get ahead despite his disadvantages. He described some of the challenges he faced, including the obstacles he had to overcome to study for an engineering degree during the apartheid era.

"What is holding you back from achieving your goals?" he asked the Balmoral College learners.

"You attend a school that achieves a 100% pass rate, you have teachers who are dedicated to preparing you for life. Remember, education also means preparing you to play meaningful roles in our society and in your families. You can achieve whatever you want to achieve through hard work and sacrifice," he concluded.

Posing with some of the Grade 11 and 12 learners at Balmoral College after addressing them about their own efforts to make a success of their careers are (from left) Sylvester Makamu, Mervyn Naidoo and Andries Mthethwa.

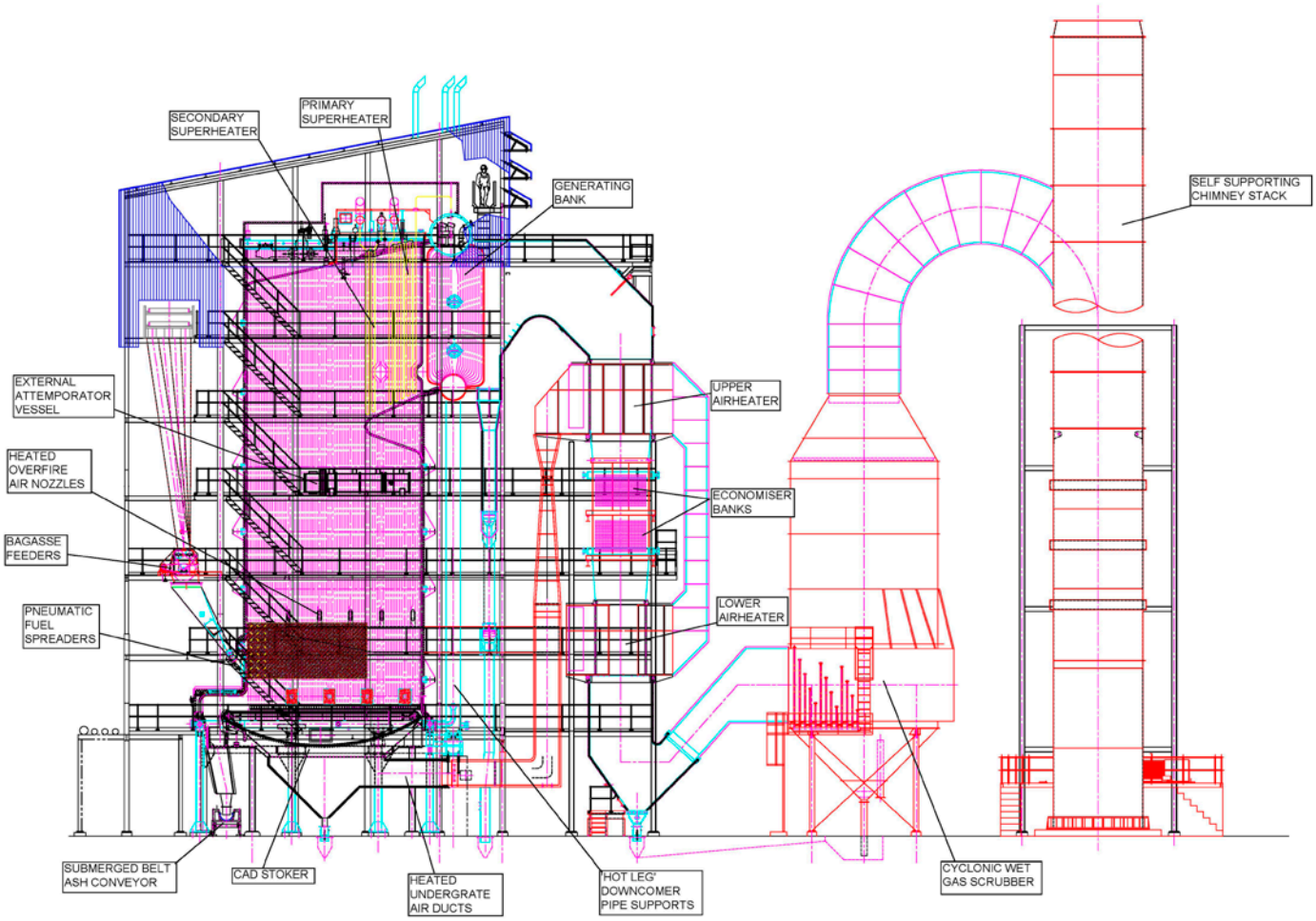
Prized watertube boilers order for Kilombero expansion project in Tanzania

John Thompson's Industrial Watertube Boiler business unit has been successful in securing an order for two new 150 tph watertube boilers for Illovo Sugar's Kilombero Mill Expansion Project in Tanzania.

The highly prized multimillion rand order, won against stiff competition from Indian and Chinese boiler manufacturers, was awarded to John Thompson in June 2021 by TSK, a Spanish EPC company which Illovo commissioned to implement and oversee the project.

TSK is a global company specialised in innovative technologies that contribute to a more sustainable development at an international level, providing solutions for different industry sectors such as electrical infrastructures, industrial plants, power generation plants, Gas to Power, water treatment plants or storage and handling facilities for raw materials. At this moment, TSK reaches sales close to 1000-million Euros, with more than 1000 professionals and projects in more than 50 countries.

The expansion, due for completion in 2023, will increase the Kilombero Sugar Company's raw sugar production capacity by 104% to 269 469t during a single cane crushing season. In addition to supply of the new boilers, due for completion and delivery by August 2022, the project includes manufacture, supply and installation of



2 x 150tph 44bar(g) 440°C bagasse-fired bi-drum boilers for Kilombero K4 Mill Expansion Project.

a powerhouse with turbines for power cogeneration, and balance of sugar producing plant.

The customised boilers are bottom/"hot-leg" supported bi-drum watertube units designed to burn milled bagasse, with the combustion equipment comprising continuous ash discharge (CAD) stokers, three-drum fuel feeders and pneumatic fuel spreaders. They will operate at a pressure of 44bar(g) and a temperature of 440°C, with the steam temperature controlled between 50% and 100% load via inter-stage attemperation.

Noteworthy design features of the boilers include:

- Optimised furnace width and depth arrangement to ensure adequate furnace volume and to achieve the required particulate residence time.
- Customised fuel feeders of extended width to suit the bespoke furnace width and panel tube/fin arrangement.
- Furnace membrane walls constructed of 63.5mm OD tubes pitched at 95mm, resulting in a lighter furnace design.
- Complete pre-boiler plant, including a common high pressure deaerator supplying feedwater to the boilers, boiler feedwater pumps and deaerator lift pumps.

"Based on the successful implementation of a similar concept at a sugar mill in Kwa-Zulu Natal, each boiler will be supplied with an external heat exchanger vessel which is integral with the boiler pressure envelope and used to control the final steam temperature at part loads to customer specification," explained **Lauren Barnard**, a Design & Applications Engineer for the Industrial Watertube Boilers unit in Durban.

She added that the superheater inter-stage piping is arranged so that a portion of the steam exiting the primary superheater is diverted through an external shell-and-tube heat exchanger vessel on the side of the boiler, while the remainder is bypassed.

"Mechanically linked control valves are installed in the heat exchanger inlet and bypass lines to modulate the steam flow rate through the heat exchanger in order to achieve the final steam temperature set point," she pointed out.

In addition, the water side of the heat exchanger is fully integrated into the boiler steam and water circuit and uses the natural circulation inside the boiler pressure envelope to drive the cooling water through the vessel.

"A further innovative feature is that the external attemperator vessel is supported off the boiler steelwork and its connecting piping is designed to be sufficiently flexible to cater for the differential thermal expansion," Lauren said.

"A major advantage of this system is that there is minimal risk of steam contamination that could occur in the case of spray type de-superheating. The use of a separate attemperator vessel as opposed to the more traditional tube coil within the mud drum of the boiler non-contact attemperator arrangement also leaves the inside of the mud drum uncluttered for maintenance and inspection purposes. There is also no need for extensive additional support steelwork, piping, valves and additional storage vessel associated with a sweet water condenser type attemperator," she further explained.

The furnace chambers and stokers are supported independently of the bottom-supported boilers.

"They are supported off steelwork at firing floor level, while the mainbank

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tubes and drums are supported off two large downcomer pipes called 'hot legs', which extend down to the same level. This reduces support steelwork required on the boiler, while the minimal relative thermal expansion between the furnace chamber and the stoker facilitates good sealing of this interface without the need for floating seals," Lauren said.

The boilers incorporate a hot overfire air system, which diverts a percentage of hot air from the primary undergrate air supply to enter the furnace through the sidewalls. The hot overfire air, combined with high pressure ambient secondary air, maximises turbulence in the furnace, improving air fuel mixing and furnace residence time.

The heat recovery tower arrangement, comprising airheater – economiser – airheater, optimises on space while ensuring a high boiler efficiency. "Mechanisms are in place to reduce cold end corrosion, blockages and other problems known to be a challenge with this arrangement, with the final airheater fabricated from corrosion-resistant materials," Lauren stated.

The boiler particulate emissions are controlled using cyclonic wet scrubbers, which are widely recognised and used in the sugar industry.

John Thompson converts Philippines sugar plant boiler to coal-and-bagasse unit

Late last year John Thompson's Industrial Watertube Boilers (IWB) business unit won a contract to convert one of the bagasse-fired boilers in a sugar and ethanol plant in the Philippines for firing by both coal and bagasse.

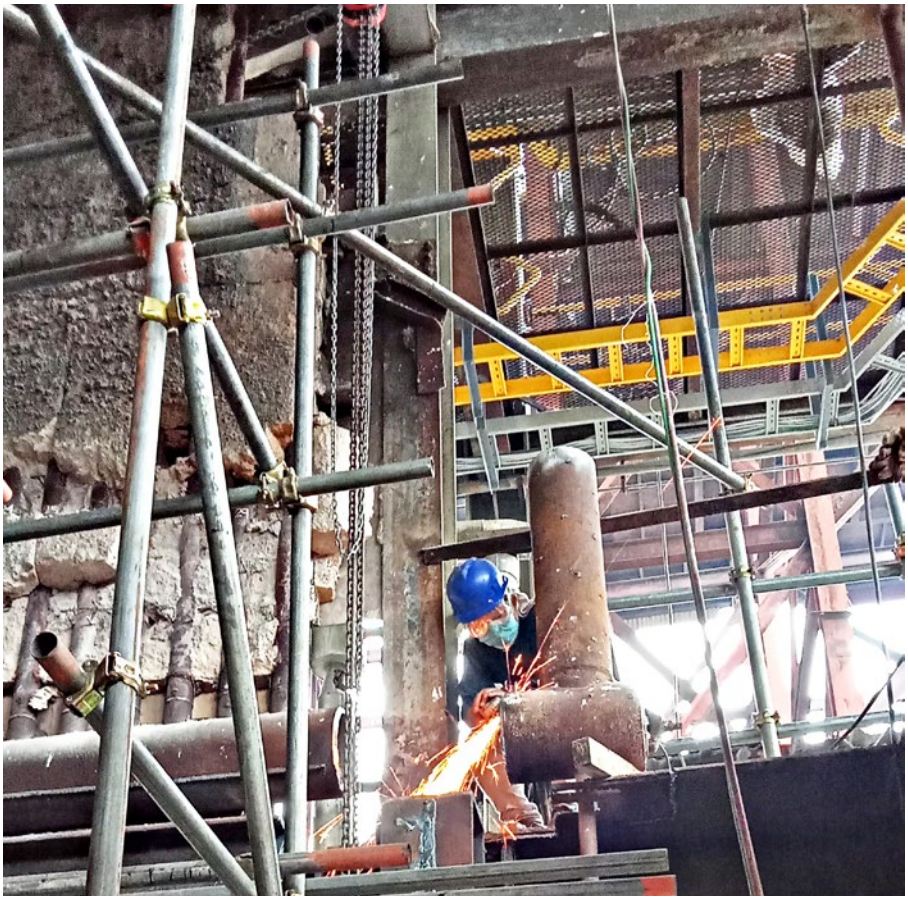
The contract was awarded by Central Azucarera Don Pedro, Inc (CADPI) for conversion of one of the five 90tph bagasse-fired boilers operating in its refinery in Nasugbu, Batangas in the Philippines for the purpose of producing process steam for the plant during their off-crop periods.

"The conversion of one of the boilers to coal-firing capability, while retaining its existing capability of bagasse-firing, was aimed at increasing production for the refinery as a whole by being able to utilise coal when bagasse is not available during the off-crop periods," said **Russell Warren**, General Manager of the IWB unit.

"We were initially commissioned to do a feasibility study to establish that production of the targeted steam output could be achieved through conversion of a single boiler, or whether acquiring a new or second-hand coal fired boiler would have to be resorted to achieve this.

"Our study confirmed it was viable to go the conversion route and we were then invited to tender for the contract, which we were awarded In December 2020.The scope of the retrofit conversion of the boiler is extensive and one of the most significant retrofit projects undertaken in the Philippines by John Thompson," Russell pointed out.

"The thermal design of the converted boiler is based on providing steam outputs on bagasse at 90tph and on coal at 75tph. The steam requirement was set to be designed for maximum continuous rating of 75t of steam per hour at a pressure of 60MPa and temperature of 480°C at the boiler outlet," he explained.



Header modification in progress to enable the retrofitting of the CAD stoker.

The contract encompasses the manufacture and supply of new pneumatic fuel feeding equipment for coal and bagasse firing, a continuous ash discharge stoker (CAD), an ash handling system, a soot blower system, a feedwater heater system, modification of the existing wet gas scrubber and ash clarifier system, a coal handling plant and coal bunker assembly, a retrofit new draft plant, an air heater partial retube and air-side bypass system, controls and instrumentation, retrofit furnace pressure part components and retrofit electrical equipment.

In addition, the contract includes having John Thompson responsible for supervision of site erection works, technical advisory services, commissioning, training, start-up assistance and performance testing of the converted boiler.

At the end of October the John Thompson team was on schedule to meet the planned project handover date for operation of December 23, 2021.

Power Systems wins electrical contract for new 132kV indoor GIS switching station in Cape Town

In November this year ACTOM Power Systems (APS) was awarded the electrical works for a new 132kV gas-insulated switchgear (GIS) indoor switching station by the City of Cape Town.

The latest contract at the Morgen Gronde switching station in Brackenfell will supply power to a large-scale data centre campus that is being built on an adjacent site, which is premised as the first of several in the vicinity.

"This is also the fourth substation contract we have received in as many years involving the provision of power to local cyber facilities, which epitomises how this particular market segment has become the primary driver of substation infrastructure development countrywide," commented **John McClure**, Power Systems' Operations Manager, who added that this project also caters for the envisaged future developments and network strengthening of the surrounds.

In tendering for the contract of over R100-million APS partnered an international switchgear supplier, Xian XD Switchgear Electric Company of China, making Morgen Gronde the first of its kind in the City of Cape Town where the GIS switchgear will be designed and manufactured by an OEM outside of the conventional Europe-based producer niche.

"Consequently, we were put through a rigorous evaluation, with multiple rounds of comprehensive clarifications and close examination of our technical offering in particular, including all GIS type test certification, to ensure absolute conformity with every detail of the applicable IEC standards," John pointed out.

"A valuable spin-off of this process, however, is that with full technical compliance now conclusively established, it stands us in good stead to extrapolate our GIS offering in collaboration with Xian XD to the rest of the South African market."

Xian XD will supply a 20-bay 132kV GIS switchboard for the Morgen Gronde switching station.

The contract also includes the provision of a substation control system by which all events, measurements, operations and control are achieved from either a local HMI station or the city's main control centre. "This substation control system (SCS) means that the entire switching station will be fully automated with completely remote functionality," John commented.

Other ACTOM businesses involved in the project are Static Power, which will supply DC chargers and battery banks for backup power, and Electrical Products, which will supply all cabling and cable accessories.

Construction of the switching station edifice will take another year or so to complete and Power Systems will only gain access for the electrical installation component thereafter. As a result the contract is scheduled to run through until May 2023.

"The structural design of the building has to incorporate the parameters of our specific equipment, so we are under pressure to complete all the electrical designs to ensure that the breaking of ground is not unduly held up," said John.

A view of the GIS switchgear in the City of Cape Town's 132kV Foreshore indoor substation, for which Power Systems supplied and installed the electrical works in 2009.

ACTOM Energy wins electrical installations contract for new offshore drillship

ACTOM Energy was recently awarded a contract by international offshore oil & gas drilling company SeaDrill Ltd to perform the electrical and instrumentation system integration on its new drillship, SeaDrill Sonangol Quenguela.

The award of the electrical installations contract to ACTOM Energy in July this year follows the announcement by UK-based SeaDrill in May of a new offshore oil & gas drilling contract having been secured off Angola by SonaDrill Holding Ltd, SeaDrill's 50/50 joint venture company with Sonangol E.P.

The ACTOM Energy contract, worth in excess of R20-million, is scheduled for completion in February 2022. The business is contracted to design, supply and install electrical and instrumentation systems that include distribution boards for mounting in safe areas on board the rig, junction boxes, many of which will be installed in explosion hazard areas, and to supply and install cable on the drillship.

"The equipment we will supply and install also comprises specific purpose-made ancillary equipment such as equipment used to process drilling fluid, or process the cuttings produced during drilling, or to enhance the drilling process with special functions," commented **Alex Passetti**, ACTOM Energy's General Manager.

All the equipment the business is required to deal with is classed as "3rd party equipment" because it does not form part of the basic drilling system.

"Installation of 3rd party equipment is not complex but it is governed by strict quality control procedures and installation regulations, particularly in the explosion hazard areas," Alex pointed out.

ACTOM Energy will install the equipment in the drillship while it is docked at Swakopmund, Namibia. It will have a total of 20 people on board during the peak periods of activity while engaged on the contract.

A picture of Sonangol Quenguela's twin sister ship Sonangol Libongos. (Credit: www.seadrill.com)

ACTOM Energy performed power plant upgrade of De Beers Marine offshore diamond mining vessel

In 2017/18 ACTOM Energy performed a comprehensive power plant upgrade for one of the offshore diamond mining vessels of De Beers Marine.

The vessel, Grand Banks, is one of the offshore mining vessels that the Cape Town based company has been operating for over 30 years.

The contract, awarded in January 2017 and completed in July 2018, comprised a feasibility study and design for the upgrade and life extension of the vessel's power system and DC propulsion system, as well as the manufacture, supply and installation of the new DC propulsion switchboard.

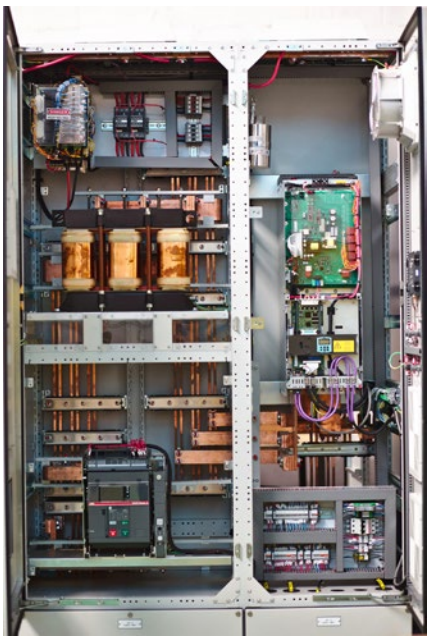
"The power plant was designed and made to suit the new more efficient diesel electric generators purchased by the client to replace the vessel's original diesel electric generators," explained **Yushri Mentor**, ACTOM Energy's Power Automation Manager.

"The generating system provides power for the whole vessel and the DC system provides the propulsion. While the main part of the DC system is for power and control of the new propulsion system, it also controls the hydraulic and other motors, including the motors for the vessel's new treatment plant," he added.

The power and control system, consisting of six DC variable speed drives and redundant PLC system that controls the six 750VDC 920A propulsion motors, replaced the old power system, which had a DC generators system of speed control.

ACTOM Energy also designed, installed and commissioned a new main switchboard incorporating two 3MVA transformers to feed the new DC system.

"The switchboard comprises port and starboard dual redundant sections to ensure the continued provision of power to the DC system and vessel services should one of the two sections fail," said Yushri.



Shown here is the System Functional Unit that forms part of Grand Banks' new power and control system. In the top left of the photo is the DC motor field supply unit; bottom left the incoming air circuit breaker; right centre the DC drive supplying the DC motor armature; and bottom right the control and interface panel.

HVE supplies GL 317X 550kV circuit breakers for upgrade at Duvha power station

Eskom Transmission recently awarded a contract to ACTOM High Voltage Equipment (HVE) to supply, install and test 550kV circuit breakers to replace 420kV units at Duvha power station in Emalahleni, Mpumalanga.

Partnering with Grid Solutions, a business unit of GE Renewable Energy, HVE tendered for the contract and was awarded it last year.

The contract stipulated the provision of five of GE Grid's GL 317X 550kV 4000A 63kA SF6-insulated circuit breakers – one for each of the power station's five operating generator units.

Eskom Transmission's decision to have the original circuit breakers replaced by the higher-rated units is based on studies showing that the currently installed circuit breakers are underrated for future increase of continuous nominal current above 3150A and an increase in Dielectric withstand requirements close to the Generators. Eskom specification therefore requires for Transmission circuit breakers on 400kV generator unit bays to be rated one voltage level higher for increased insulation withstand to overcome potential transient and overvoltage issues.

The new GL 317X circuit breakers, the first 550kV units sold into the local market, were supplied from GE Grid's factory in India and delivered to Eskom Transmission at the beginning of 2021. The first unit was installed at Duvha power station by HVE's Field Services team in August this year.

High Voltage Equipment's Craig Aaron and Service Technician Mpho Makgae check the spring operating mechanism for the first of five 550kV replacement circuit breakers installed at Duvha power station.

"In accordance with the Eskom specification to meet the new nominal current requirement, the new high voltage circuit breakers will mitigate electrical failures from overvoltage that could occur when the Generator is being synchronised to the HV Transmission busbar, stressing the insulation of the open position HV Transmission generator unit breaker that connects the generator via the Generator transformers," said **Craig Aaron**, HVE's Senior Product Support Manager

High Voltage Equipment introduces enhanced 36kV outdoor combo circuit breaker

High Voltage Equipment (HVE) has introduced a new improved model of its popular 36kV 31,5kA outdoor combo vacuum circuit breaker which it launched several years ago as a more environmentally friendly and competitively priced substitute for the traditional kiosk "dogbox" breaker.

The latest product, the CTB36Plus, was introduced in August this year as successor to the CTB36 unit. Compared with dogbox breakers, these units are favourable, in that the circuit breaker, instrument transformers and surge arresters are all mounted on a single frame, reducing substation footprint by over 50%.

Like the CTB36, which has proven to be successful since its introduction in 2016, the new combo ACTOM branded circuit breaker model has been developed by HVE in partnership with an international technology partner, a reputable designer and manufacturer of HV circuit breakers.

These products, comprising a combination of a circuit breaker and instrument transformers, have a local content of around 40%, with HVE being responsible for manufacturing the control cubicle as well as the assembly and testing of the complete units.

"The CTB36Plus is of the same design as the CTB36, except that the operating mechanism has been repositioned to ground level to provide easier access for manual operations, inspections and maintenance," said **Craig Aaron**, HVE's Senior Product Support Manager.

In addition to being lower priced and more compact than dogboxes, the modern outdoor combo circuit breaker models are more environmentally friendly, being vacuum breakers whereas the dogboxes were SF6 gas-filled breakers.

Craig Aaron and HVE's MV Circuit Breaker Foreman Alex Mudau with one of the new 36kV outdoor combo vacuum circuit breakers, branded CTB36Plus, that are now in production at High Voltage Equipment's Knights factory.

MV Switchgear completes type tests on new SBV4XE switchgear product

Introduction

MV Switchgear commenced development of its SBV4XE switchgear, successor to its SBV4 and SBV4E products, in mid-2017.

SBV4XE represents a substantial advance over the existing SBV products. While it retains their well-proven ergonomic advantages, it incorporates a host of modern technological, functional and cost-saving features.

SBV4XE modelled on SBV4 and SBV4E

The main features of the withdrawable pattern SBV4 and later SBV4E switchgear ranges – on offer in Southern Africa since the early 1990's – are their low profile and compactness, which makes them well-suited for applications with tight space constraints. These features, together with the switchgear's robustness and adaptability, have contributed a great deal to their success and widespread use in the market.

In developing the new product, while retaining these important features, we set out to add a great deal more. In this we were guided by the experience gained in manufacturing switchgear over the past 50 years.

While the earlier generation SBV models continue to be produced for the extensive installed market and with AMV12 fulfilling the demands of major utilities requiring a mid-mount withdrawable circuit breaker having a 31.5kA for 1sec internal arc classification, the new SBV4XE, with its compact design and floor-rolling circuit breaker carriage, fits neatly between the two ends of this spectrum.

However, in closing the gap we've been able to re-imagine the SBV4E product with a number of significant enhancements added.

SBV4XE's advanced features

The main features SBV4XE offers are:

- The spring-charging and cam-follower mechanisms are designed to incorporate less costly and more readily available alternative materials.
- The opening and closing releases require less energy to operate than in the earlier SBV models.
- With a lower parts count, the circuit-breaker operating mechanism requires less maintenance, so reducing the total cost of ownership.
- The vacuum interrupter pole assembly is more cost-competitive than the earlier models.
- Arc cooling pressure relief devices have been introduced into the housing assembly to reduce emissions released during an internal arc fault.
- The housing assembly is bolted and riveted, as opposed to being welded, making it more efficient to manufacture. It is primarily manufactured from aluminium and zinc coated steel sheeting in place of mild steel. The majority of parts therefore do not need to be painted and have inherent corrosion resistance and enhanced galvanic bonding properties compared with painted mild steel.
- As with the housing assembly, the carriage of the circuit breaker is also made of aluminium and zinc coated steel sheeting.
- The carriage latching, interlocking and racking mechanism has been redesigned to improve ease of operation, simplicity and functionality.
- The circuit breaker mechanism gears are a combination of polymeric and steel materials, resulting in an 80% reduction of steel compared to the traditional gears.
- The floor rolling circuit breaker carriage incorporates a chassis, the front of which is locked into position within the panel housing, allowing the circuit-breaker to be racked into and out of the service position on dedicated rails with greater ease while ensuring continuous alignment with the fixed contacts of the housing assembly.
- The circuit breaker carriage chassis has swivel wheels, allowing 360^0 rotation and greatly facilitating its manoeuvrability outside the housing assembly.
- The ring bar and base current transformers (CTs) are manufactured using epoxy resin insulation with an earth screened bar primary and toroidal core (ring-type) CTs.

SBV4XE switchgear assembly undergoing an internal arc test at SABS NETFA.

Type tests at KEMA and XIHARI

The first type tests to be carried out on SBV4XE by a world-recognised electrical test facility were conducted at the renowned KEMA electrical test centre in Arnhem, Holland, in mid-2018.

A 25kA new circuit breaker mechanism was successfully tested for short-time withstand current and the complete series of basic short-circuit switching duties in accordance with the international IEC 62271-200 and

IEC 62271-100 standards. These tests qualified it for use on 11kV non-effectively earthed systems, such as those earthed via a high-impedance device.

The next set of tests were carried out in April 2019 at the reputable Xi'an High Voltage Apparatus Research Institute (XIHARI) in Xi'an, China. These tests, which completed the short-circuit performance type tests required for the SBV4XE model's 630mm wide 25kA 800A and 1250A circuit breaker to conform to the latest edition of IEC 62271-100 standard, comprised:

- Electrical endurance testing for rapid auto-reclose applications, in which the circuit breaker achieved a Class E2 rating.
- Short-circuit test duties required to prove the circuit breaker's performance for effectively earthed networks, as found typically in older distribution systems.

Final round of type tests at SABS

The final series of type tests were conducted on five separate occasions between January and October 2021 at the SA Bureau of Standards' newly refurbished world-class National Electrical Test Facility's (NETFA) High Power Test Laboratory in Olifantsfontein, just outside Johannesburg.

The type tests on the SBV4XE circuit breaker and housing assembly comprised temperature rise tests, dielectric tests and internal arc classification tests.

The temperature rise tests, conducted to prove the continuous current rating, were carried out with a housing assembly ingress protection (IP) code of IP4X, signifying that no foreign bodies of a diameter greater than or equal to 1mm can enter the housing assembly.

The dielectric tests were:

- Lightning impulse withstand voltage tests, successfully achieving the target of 95kV.
- Power frequency voltage withstand tests, successfully achieving the target of 28kV.
- Partial discharge tests, successfully achieving zero detectable partial discharge at 1.1 times the rated voltage, thereby exceeding the target of 20pC.

The internal arc tests, carried out to ensure a tested level of safety to authorised personnel and operators in the event of a fault occurring within the switchgear housing assembly, proved an internal arc classification (IAC) of AFLR 25kA 1sec.

The arc coolers proved highly effective, as they were shown to significantly reduce the amount of emitted burning particles and hot gases caused by a fault.

Conclusion

MV Switchgear is now able to offer a type-tested SBV4XE solution for ratings up to 1250A and 25kA. Designated areas within the division's factory at Knights, Germiston, are being prepared for the manufacture of this range of switchgear, which will be introduced into the market early in 2022.

SBV4XE is a fully locally manufactured product. It combines the best features of its predecessors, the SBV4 and SBV4E models, together with other advantages, which include fewer parts, modern materials, more efficient manufacturing methods, enhanced operability and lower energy consumption.

By Rhett Kelly
Design & Development Manager
ACTOM MV Switchgear

Posing in front of the SBV4XE panel assembly after a successful internal arc test at SABS NETFA are (from left): Rhett Kelly, MV Switchgear's Design & Development Manager; Millcent Chokoe, Senior Test Officer, SABS NETFA Short-Circuit Laboratory; Piet Ferreira, MV Switchgear's Engineering Manager; Zinhle Nkosi, MV Switchgear's Development Assistant; and Seth Mnisi, Manager, SABS NETFA Short-Circuit Laboratory.

Marthinusen & Coutts refurbishes winder motor for Northam Platinum's new shaft

The South African market is steadily recognising Marthinusen & Coutts' capabilities in the area of restoration and modernisation of old electrical equipment to "as new" status. This capability is also associated with significant cost savings.

Northam Platinum recently acquired a used 4300kW winder DC motor to drive the hoist that is due to be installed in the new Number 3 Shaft for the Zondereinde Western Extension of the mine near Thabazimbi, Limpopo.

At the beginning of this year DRA, the consulting engineers for Zondereinde, contracted M&C to inspect and test the 37-year-old motor and drive shaft and perform any repairs that were required to be done. M&C was also commissioned as part of the contract to manufacture a number of key spare parts for the motor.

M&C's Large Motor repair facility in Benoni, which is equipped to handle very large rotating machinery, performed the work, completing it in

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mid-November this year.

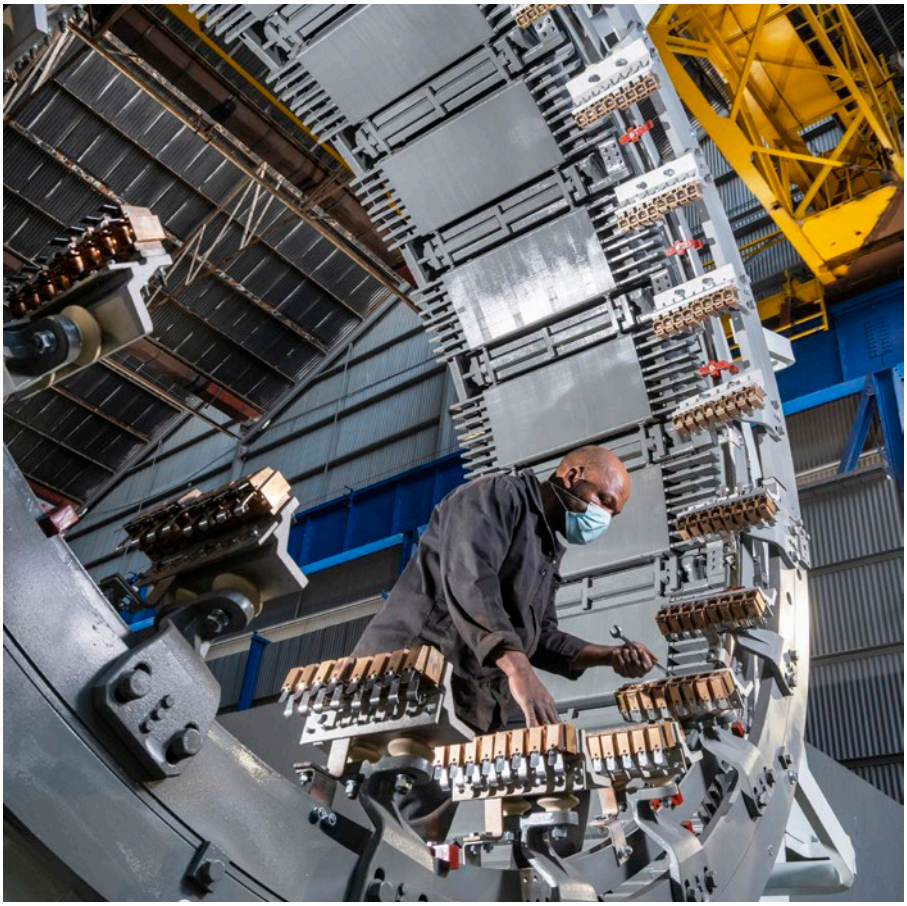
The motor's 42t armature was found to be in good working order, while the frame's interpole coils and brushgear were partially refurbished and cleaned.

M&C applied reverse engineering methods to manufacture the spare parts for the motor, which comprised three each of field coils, interpoles and pole shoes, plus a full set of 24 damper bars – eight for each of the three spare pole shoes.

"The units were extremely complex to assess and it was a challenge to manufacture all the new spares and replacement parts required," said **Rudi Els**, General Manager of M&C's Power Generation & Large Motor repair facility.

"There were literally thousands of different parts, which called for a great deal of attention to detail and specialist reverse engineering. It was also a major task to document and control the status of all these parts," he added.

The 38t 10.5m long drive shaft was found to be in good order.



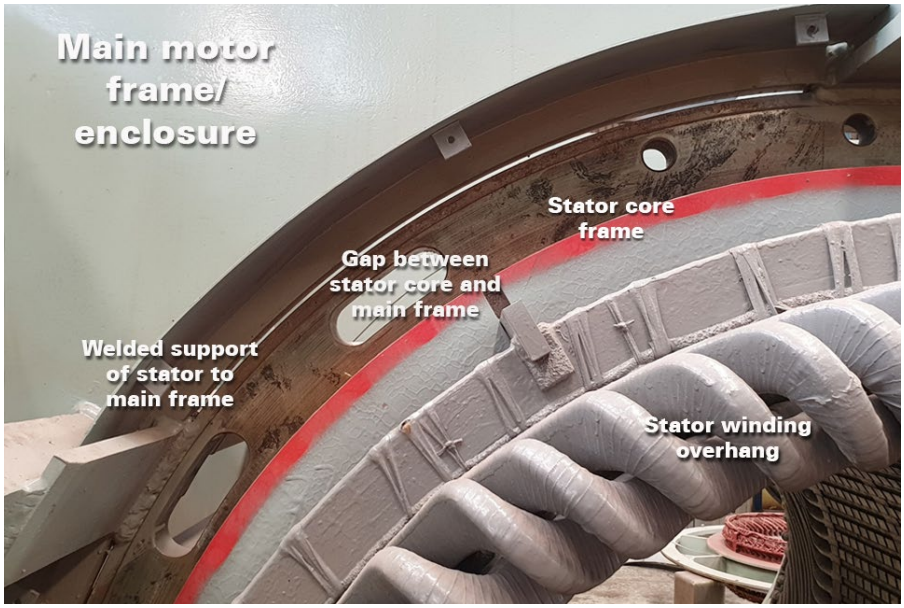
Winder Assistant Donald Kolobe aligns the brushgear of the 4300kW mine winder motor.

Marthinusen & Coutts' fault finding and redesign rectifies synchronous motor vibration problem

Introduction

In early-2020 a large South African petrochemical company asked Marthinusen & Coutts (M&C) to establish the cause of excessive vibration in a 17MW 11kV 4-pole synchronous motor that is used to drive a gas compressor.

The motor, designed and manufactured by a reputable Europe-based OEM, had been in operation for 13 years. No vibration problems had occurred in the early stages of its operation, but first became noticeable about five years ago and deteriorated in subsequent years, eventually becoming so severe that the motor could no longer be used and was sent to M&C for investigation and repair.



In this close-up view of a portion of the stator core fitted into the main motor enclosure, one of the welded connections as modified by M&C may be seen on the left.

Resonance anomaly

The investigation started with several non-destructive tests, but these failed to indicate the cause of the problem. Subsequent investigations however showed a resonance anomaly, as the motor's resonance frequency was found through specialised resonance test procedures to be extremely close to the motor's operating speed, even to the extent of impinging into that range at times – depending on ambient conditions.

The motor's originally intended

speed range was 1200 to 1500rpm, whereas the resonance frequency reading was between 1200 and 1300rpm. This clearly could not have been the intention of the OEM at the time of manufacture, as the resonance frequency of a motor is required to be well clear of its operating speed. In addition, the resonance frequency is supposed to be higher than the motor's rated speed, which would mean around 1800rpm or more.

While conducting the investigations and tests that revealed the abovementioned irregularity in the motor's resonance frequency against its operating speed, M&C also identified during testing a looseness of the stator core supports to the main stator enclosure, which was not supposed to be present in a healthy motor.

The next step the M&C team took was to remove the inspection covers of the motor for a close examination of the stator and its support structure to the main enclosure. A key discovery was finding that the OEM had applied a highly unorthodox method of fixing the stator to the main frame. Instead of following the normal procedure of employing a heat-shrink interference fit to bond the complete outer diameter of the stator to the frame, they used about eight small welded brackets for this purpose.

We deduced that the OEM, having discovered that the required resonance frequency could not be achieved if the stator was firmly fixed to the frame in the normal way, installed the brackets instead as a more flexible way of doing this for the express purpose of changing the resonance frequency to ensure that it would not coincide with the motor's rated speed. The motor was fortunately never operated under its originally intended variable speed capability. The measure that was applied failed to fix the resonance frequency higher than the motor's speed range, but it at least achieved the necessary objective of fixing sufficiently below the rated speed so as not to cause operational problems.

Machine design fault

The OEM's failure to achieve the desired resonance frequency by means of the proper fixing procedure was due to a design flaw in the motor, we deduced. The method the OEM adopted to circumvent this problem however revealed its shortcomings over time.

An additional discovery we made during our investigations into the problem was that there were cracks in the support structure between the stator and the main frame. We deduced that the cracks in the support structure – which, as stated above, consisted of the small welded brackets used as an improvised solution to address the resonance problem the OEM had apparently encountered during manufacture – had been caused by the welds of the brackets having been subjected to excessive strain during years of operation.

We then carried out the necessary repairs to return the motor to service. These had to be done with the customer's express permission, since they were of necessity a compromise – as was the case with the original manufacture of the motor.

We welded up new sections on the stator support structure, because we couldn't access many of the cracked sections to weld them. After re-assembling the motor we verified that the vibration had substantially improved but that the resonance frequency was now located very close to the rated speed, due to the increase in stiffness we had added to the structure. On our test base we proved that with the resonance located lower than running speed no problems would occur on site, since the site base is more flexible than our test base.

Offbeat add-on solution

This being a compromise solution, we could not provide a 100% guarantee of reliability on the work done. The client asked if any further measures could be taken to assure a full guarantee of successful operation first time on site. Our response was to offer a thoroughly offbeat add-on solution, which when tested and proven effective enabled us to confidently provide the assurance the client sought.

The add-on solution was providing a made-to-measure removable 7.5t mass of steel temporarily fitted onto the top of the motor. This mass both further reduced vibration of the motor and lowered its resonance frequency by a small but sufficient margin to guarantee correct operation on site. It was made removable because the customer wanted to first try running the motor without this additional measure.

The success of all this work was proven when the motor was put into service after an unplanned breakdown. It operated with lower vibrations than it had operated at for over a decade – and this without the 7.5t mass added!

By Rob Melaia
Engineering & Technical Executive
*Marthinus*en & Coutts

M&C's Large Motors Test Facility Chargehand Alwyn de Bruin monitors the final tests on the 17MW motor at the division's Cleveland facility after completion of the necessary repairs to the motor's stator.

ACTOM Turbo achieves rapid growth after further expanding its capabilities

ACTOM Turbo Machines (ATM) has made further important strides recently towards expanding its business and increasing its profitability.

Already recognised as one of the market leaders in the turbo-machinery field in the Southern Hemisphere and also enjoying the enviable status of an "essential facility" to power utilities, the division's latest growth spurt results from its acquisition of two used large processing machines on an auction a year ago – comprising a 5-axes CNC boring mill with the capacity to handle work-pieces of up to 20t and a CNC vertical lathe capable of handling work-pieces of up to 50t and 3,6m in height and 3.6m in diameter.

In addition, towards the end of last year the division extended its existing fleet of CNC lathes and CNC milling units by acquiring two used CNC lathes with a swing of 800mm diameter and 3m between centres and three used 3-axes CNC milling units, each with a capacity to handle work pieces of up to 6t. Another valuable item of used equipment purchased by ATM at about the same time is a low-speed balancing unit with the capability of balancing rotors from 100kg to 6t.

"We've been very fortunate in being able to have the opportunity of acquiring all this additional process equipment at very affordable prices. This applies especially to the large boring mill and vertical lathe, both of which we were able to purchase at around 10% of market value," commented **Chris Bezuidenhout**, ACTOM Turbo's Divisional CEO.

Senior CNC Programmer/Machinist Wensley Searle machines a blade carrier for a large oxygen machine on ACTOM Turbo's large CNC vertical lathe, which is capable of boring at very tight tolerances.

"It will be appreciated how much we have extended our boring and lathe capacities when I tell you that our boring capacity was limited to work-pieces of up to only 8t, and our previous highest lathe capability was limited to a work-piece of only 4t and 1,6m in diameter," he added.

"In addition, because of the hugely increased capacity the two newly-acquired machines provide, they have raised us into a new league in terms of what we're able to do, bringing in new and larger customers and opening up wider markets to us."

Among a number of projects that ACTOM Turbo has won and completed to date since these two machines were installed and put into operation at the division's Sasolburg plant in November last year were:

- The manufacture of parts for six steam chests for a local power station.
- Line-boring on compressors and turbines for a variety of major customers.

To accommodate the boring mill and vertical lathe ACTOM Turbo extended its workshop floor area by 500m^2 to a total 2500m^2, while with its subsequent acquisition of the other additional machinery it has further extended its covered working space by another 500m^2 to house these in.

In addition, it has greatly extended its Fabrication department's floor space to 2000m^2 now, from only 150m^2 previously. This included an increase in crane capacity to 10t and the acquisition and installation of a plate roller capable of rolling plates of up to 25mm thick and 2.6m in width.

"The expansion of the Fabrication section came about directly as a result of us winning more contracts, which necessitated it," Chris remarked.

Metalplus' first award for diesel engine crankcases repair contract

In August this year a major locomotives operator awarded a contract to Metalplus to repair four 2250kW 16-cylinder diesel engine crankcases from its fleet of GE and GM locomotives dating from the 1970's and 80's.

It is the first contract for the repair of diesel engine crankcases Metalplus has won from the operator, which operates a fleet of over 300 of the aging locomotives.

The contract extends the scope of repair work Metalplus performs for the operator, for which it has regularly done repairs of the crankshafts of large diesel motors for many years.

"The upgrade we carried out at our repair facility, which also included substantial extension of our capabilities to enable us to perform new types of work for markets we haven't previously served, contributed to our success in winning this contract," said **Roman Mornau**, Metalplus' General Manager.

Among the capability improvements Metalplus introduced at its repair facility was upgrading of its welding procedures to meet the operator's prescribed ASME (American Society of Mechanical Engineers) welding standards for this specific application. "We also requalified our welders to meet the ASME requirements in preparation for the contract, which we bid for in June this year," Roman stated.

The operator did an audit of Metalplus' equipment and repair capabilities prior to awarding the contract.

"We added a line boring tail stock to our 20t line-boring mill to be able to line-bore the motors' 4m long crank casings, which are longer than anything we have previously done in our machine shop. We also had to purchase specialised tooling, including serration cutting form tools and digital serration gauges, in order to perform the required repair work effectively,"

Roman explained.

Preparations using new cleaning technologies for hardened oil residue and complex pressure testing of oil manifolds were performed successfully by Metalplus' team.

"To accommodate a fast turnaround in cooperation with the operator we were tasked to install, leak test and remove cylinder liners. This work required in-house fabrication of tailor-made tooling," Roman remarked.

The contract was done on a fast turnaround basis to be completed in half the scheduled time. The only delays suffered were due to the industrial strike in October.

Weld repaired surfaces and bores of a locomotive diesel engine crankcase are machined on a large CNC boring mill.

Electrical Products' East London branch is latest 'Branch of the Year' award winner

Electrical Products' youngest branch, East London, outperformed all the other branches around the country to win the Branch of the Year award for the financial year to end-March 2021.

In announcing the Branch of the Year awards results on June 10 at the conclusion of Electrical Products' three-day annual conference at the Sabie River Sun in Hazyview, Mpumalanga, Divisional CEO **Rod Penaluna** congratulated East London Branch Manager **Braam Preston** and his first class team for their achievement and also picked out for special mention **Charles Rose-Innes** and **Dave Smith** for the groundwork leading up to the opening of the branch in 2011, and their subsequent support during its growth.

Last year's winner Bloemfontein won the Branch of the Year Runner-up award and was also named winner of the Best Stores award. Durban also featured high in the competition, winning both the Most Improved Branch and Best Sales Team awards.

A new feature introduced for the first time was the inclusion of long-service awards presentations to senior people in attendance at the conference.

Rod said he was struck by the large number of management personnel, as a proportion of the total number of long-service awards recipients in the division, who received recognition for long service. "I realised then what a big factor this is in the success of the Electrical Equipment division, which has performed exceptionally well in recent years, including the 2020/21 financial year. We are indeed very fortunate in having such a strong and experienced management team," he commented.

In addition to Electrical Products, The Electrical Equipment division's other business units are Genlux Lighting and Satchwell Controls.

The managers who were presented with long service awards at the conference (with years of service in brackets) were: **Daniel Horne** (35 years), **Craig Watt** (25 years), **Andrea James** (15 years), **Prince Ziqubu** (15 years), **Fritz Hattingh** (15 years), **Prevan Moodley** (15 years), **Irene Swanepoel** (15 years) and **Sello Tsoai** (15 years).

Other personnel who received long-service awards for the past year were:
43 years: Siva Chetty and Charles Rose-Innes.
35 years: Piet Moselesele and Mike Fry.
15 years: Stuart Black, Steven Mununguhala, Thanesh Suliman, Isaac More, Thamsanqa Dasi, Zellery Leshoro, Sikhumbuzo Mchunu and Esther Thwala.

Displaying the long-service award certificates presented to them at the 2021 annual conference of Electrical Products are (from left): Sello Tsoai, Genlux's General Manager; Andrea James, EP's Financial Manager; Fritz Hattingh, EP's Regional Manager, North; Prince Ziqubu, EP's Regional Manager, East; Prevan Moodley, EP's Branch Manager, Port Elizabeth (Gqeberha); Ben Wehmeijer, EP's HR Manager; Irene Swanepoel, EP's Branch Manager, Steelpoort; Craig Watt, EP's former Branch Manager, Johannesburg; and Daniel Horne, EP's Manager, Export, Municipal & BEE.

Genlux wins two major lighting contracts on the N2 national highway in the Eastern Cape

The Tsitsikamma Toll Plaza with Genlux's LED lights in place.

Genlux Lighting recently completed contracts for the manufacture and supply of energy-saving LED lights to replace less efficient older technology lights at two locations on the N2 national highway in the Eastern Cape – a 14 km stretch of the highway in Port Elizabeth and at the Tsitsikamma Toll Plaza near Storms River.

Genlux won both contracts against stiff competition from other local LED light manufacturers and suppliers.

The contract for the streetlights in Port Elizabeth was awarded in June this year by one of Nelson Mandela Bay Municipality's approved streetlights maintenance contractors. Also in June, Genlux supplied the lights – a total of 1400 of them – and the contractor installed them.

Genlux's GEN 2 LED streetlights replaced High-Pressure Sodium (HPS) lights.

The high luminosity GEN 2 streetlights, which are designed for lighting multi-lane arterial roads, were installed between the Swartkops offramp near Bluewater Bay on the east to Baywest on the western side of the city.

The 180Watt GEN 2 streetlights represent an energy saving of 62.9% compared with the 400Watt HPS luminaires they replaced.

"Not only are LED lights great energy-savers, but they are also significantly brighter and longer lasting than the older technology lights," said **Sello Tsoai**, Genlux's General Manager.

A further advantage of LED lights is that their colour rendition is far superior to that of HPS lights and the other older lighting system, High-Intensity Discharge (HID).

"What this means is that visibility of anything and anyone seen under LED lights is much clearer than under the others. This contributes to improved safety on the roads and is also better from a security point of view in many types of situations," Sello commented.

The contract for the Tsitsikamma Toll Plaza was to upgrade it from HID to LED lighting. The contract was awarded to Genlux in March this year by an electrical contractor approved by Tolcon, the owner and operator of the plaza.

The LED lights for the plaza comprise three types of lights – streetlights, floodlights and bulkhead lights.

Genlux chose the luminaires in accordance with best practise and ran a lighting simulation of their design at the Genlux plant in Driehoek, Germiston, to confirm the correct luminosity of the floodlights and streetlights before supplying them for installation by the contractor. Once the installation was completed, verification was done with a calibrated lux meter to confirm the installation was in accordance to specification and design.

"The GEN 1 streetlights are of differing light intensities, with those furthest from the plaza being of relatively low lumen output and then building up in luminosity as they get closer to the plaza. This enables motorists to acclimatise their eyes to the light as they approach the plaza where the light is brightest and adjusting to re-entering the dark as they leave," explained **Jack Carne**, Genlux's Area Manager for the Eastern Cape

The floodlights to light the exterior of the plaza and the area surrounding it are also GEN 1 lights, but are fitted with different optic lenses from the streetlights to light up the area they cover as fully and widely as possible. The function of Genlux's wall-mounted Vulcan bulkhead lights, which are mounted on pillars, is to illuminate the paypoints to allow operators to have a clear view of the motorists while paying.

The LED lights went into operation at the plaza on completion of installation and testing in early-May.

Key appointments

Kobus Swanepoel has been appointed Manager of ACTOM'S Technical Training Centre at Knights with effect from July 1, 2021.

Rhett Kelly has been appointed MV Switchgear's Design & Development Manager with effect from September 1, 2021.

Danie Hanekom has been appointed Manager of MV Switchgear's Vacuum Interrupter Plant with effect from April 1, 2020.

Greg Broughton has been appointed Production Manager Switchgear at MV Switchgear with effect from October 1, 2021.

Jeremiah Rabothata has been appointed Production Manager Breakers

at MV Switchgear with effect from October 1, 2021.

Simon Makgolo has been appointed Production Manager Indoor Switchgear at MV Switchgear with effect from October 1, 2021.

Gordon Webber has been appointed Technical Manager of LH Marthinusen's Transformers division with effect from August 1, 2021.

Hilary Castle-Hartnick has been appointed Design Manager at ACTOM Signalling with effect from November 1, 2021.

Varishma Hariparsad has been appointed HR Manager of Reid & Mitchell with effect from September 1, 2021.

Kenan Altaki has been appointed Technical & Quality Manager of Genlux Lighting with effect from September 1, 2020.

Clarissa Penzhorn has been appointed Product Developer & Marketer of Genlux Lighting with effect from August 1, 2019.

Sibusiso Mkize has been appointed Lighting Applications Designer at Genlux Lighting with effect from June 1, 2019.

Ian Marais has been appointed Systems Engineer at Genlux Lighting with effect from February 1, 2021.

Nhlakanipho Mahlangu has been appointed Junior Lighting Applications Designer at Genlux Lighting with effect from June 1, 2021.


Kobus Swanepoel


Rhett Kelly

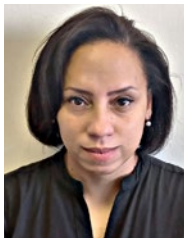

Danie Hanekom


Greg Broughton


Jeremiah Rabothata


Simon Makgolo


Gordon Webber


Hilary Castle-Hartnick


Varishma Hariparsad


Kenan Altaki


Clarissa Penzhorn


Sibusiso Mkize


Ian Marais


Nhlakanipho Mahlangu

John Thompson's B&E unit donates container kitchen for township school's feeding scheme

John Thompson's Utility Boilers & Environmental (B&E) business unit recently successfully completed a corporate social investment (CSI) project linked to its long-term contract for the maintenance of the fabric filter plant at Eskom's Grootvlei power station.

The project, initiated by Eskom, consisted in providing a kitchen for a school feeding scheme run by the Siyathemba Primary School in Siyathemba township in Balfour, Mpumalanga, which is situated close to the Grootvlei power station.

"We visited the school late last year when we saw that it was running a feeding scheme for the school's learners from one of its classrooms. We suggested providing them with a container kitchen for the feeding scheme, which would free up the classroom for teaching purposes," said **Shepard Jobe**, the B&E unit's Stakeholder Liaison Manager.

"The school's Principal, **Mr Teboho Moloi**, accepted our offer, whereupon we acquired a used 6m container at the beginning of this year and had it fitted out as a kitchen with all the necessary equipment and services," he explained.

An official handover ceremony was held in early-August, attended by Mr Moloi and some of the school's teaching staff, as well as an Eskom representative and a member of the school's governing body. At this event Mr Moloi presented a plaque to Shepard expressing the school's gratitude to John Thompson for providing the kitchen for its feeding scheme. The plaque, bearing the school's coat-of-arms at the top, reads: "In recognition of your generous donation of the kitchen built to offer hope to our learners. Siyathemba Primary School Nutrition Programme".

At the handover ceremony for the container kitchen donated by John Thompson to Siyathemba Primary School are (from left): School governing body member Thembi Nhlapo; Eskom Stakeholder Manager Selloane Mosia; School Principal Mr Moloi; and John Thompson's Shepard Jobe, who holds two plaques presented to him by the school – one addressed to John Thompson and the other to Shepard personally – expressing gratitude for the donation.

Jaco Theunissen wins 'In-House Rising Star' award in 2021 African Legal Awards competition

Jaco Theunissen, ACTOM's Group Commercial & Legal Officer, has won the In-House Rising Star Award in the prestigious annual African Legal Awards competition.

Jaco was among a total of 33 award winners in various categories announced in the online virtual awards presentations by the competition organisers, London-based Law.com International, on September 3.

The African Legal Awards, now in its eighth year, is aimed at recognising exceptional achievement by both practising attorneys and corporate legal advisers in Africa.

Jaco was chosen winner from a short-list of seven candidates who had been nominated for the award. The short-list comprised five in-house legal advisers employed by South African corporates and state-owned enterprises and one each from Kenya and Nigeria.

The In-House Rising Star Award is open to in-house legal advisers of 4 to 10 years' experience who have been afforded the opportunity to participate by their respective corporate legal associations – the association concerned in Jaco's case and that of the other South African candidates being the Corporate Counsel Association of SA (CCASA).

Jaco Theunissen

The candidates were required to submit their CV's covering their positions, responsibilities and achievements to date, together with supporting documentation, plus a testimonial supplied by a senior executive in their organisation.

Jaco has 10 years' experience as an in-house legal adviser, having admitted as an attorney and conveyancer in the North Gauteng High Court in 2011 and joining ACTOM in 2012 as Divisional Legal Officer for the Engineering Projects & Contracts division and appointed in 2019 to his present post.

He ascribes his success in winning the award to two things: "Firstly, the priceless opportunities the ACTOM group provides to enable me to apply my skills and expand my experience pertaining to the legal side of contracts in all sectors of industry across the engineering field."

Secondly, he paid tribute to **Annamarie van Wyngaardt**, ACTOM's Group Financial Director, to whom he reports. "The mentorship she gives me in my current position is very valuable and helps me perform my duties as effectively as possible," he said.

Heritage Day celebrations by ACTOM employees

Come rain or shine, ACTOM employees don't miss the opportunity to celebrate Heritage Day.

This year, however, on Thursday September 23 – the day before the Heritage Day public holiday – the celebrations were muted compared with the previous years, thanks to the continued COVID-19 restrictions on gatherings.

In most cases therefore many employees – who in more favourable circumstances would've organised a special celebratory lunch on the day, swopped stories with each other about their respective cultures and even sang and danced – had to be satisfied with just attending work in their traditional dress. But this still amounted to a celebration to mark the occasion.

Employees of Power Transformers in Wadeville, Germiston, posing in traditional attire in celebrating Heritage Day. They are (from left): Wilma Muller, Sales & Marketing Manager; Luyanda Mkatali, Trainee Designer; Tlou Monepya, HR Officer; Victor Ngoepe, Sales Engineer; Winile Mabutyana, Senior Buyer; and Sizwe Maquba, Deputy Chief Draughtsperson.

Balmoral College Grade 11 learner excels in national high schools quiz competition

Mayibongwe Ncube and Mr Ndlovu display the giant cheque for R3000 that Mayibongwe was presented with after attaining Third Place in the Final of Varsity College's 2021 national high schools quiz competition. Mayibongwe is wearing a special "high achievement" blazer that Balmoral College gives to learners who perform exceptionally well in any endeavour the school initiates or supports.

When he joined Balmoral College at the beginning of last year Teacher Nkululeko Ndlovu was keen to have the school participate in Varsity College's national annual high schools quiz competition.

At the school he'd previously taught at he'd been the driving force behind the participation in the competition by learners there and wanted to play a leading role at Balmoral in encouraging its learners to take part, as well as coaching the most promising of them to do well.

Due to the outbreak of COVID-19 early last year, however, with stringent restrictions being imposed by the government on gatherings and travel to contain the spread of the virus, Varsity College was obliged to cancel the 2020 competition.

Although the pandemic continued unabated in 2021, the easing of restrictions enabled the organisers to revive the competition and run it in the normal way with preliminary local and regional contests leading up to the national Final in early-October. Mr Ndlovu, who teaches Maths and Natural Sciences to Grades 7 & 8 at Balmoral, wasted no time about ensuring that the school took part in it for the first time.

The competition is open to schools all around the country for learners in Grades 9 to 11 and the topics covered encompass Geography, History, Science, Sport, Entertainment and Current Affairs.

The competition, which drew entries from more than 200 schools, commenced in mid-August with the local contests, with four contestants from each school taking part.

In this first round, in which Balmoral's contestants comprised one Grade 11 learner and three Grade 10 learners, 18-year-old **Mayibongwe Ncube**, the Grade 11 learner, came third, so qualifying for the next round, while the other three were eliminated.

In the regional contest, which was held a week later, Mayibongwe, now competing against 14 other qualifiers, put in an impressive performance to make the cut for the national Final by coming second, as only the top two in each regional round make it into the Final, which took place on October 2 at Varsity College's Sandton campus, featured a total of eight contestants – two each from the Eastern Cape, KwaZulu-Natal, Western Cape and Gauteng.

"Mayibongwe admitted to me afterwards that he found the Final very competitive and tough going, but he kept his nerve and did very well in coming Third," said a delighted Mr Ndlovu.

For this achievement he was awarded a cash prize of R3000, a tablet, a power bank and earphones and a speaker for a radio. He was also presented with a certificate as a record of his achievement. In addition, Balmoral College itself was also presented with a generous cash prize.

Mr Ndlovu said that despite his experience in coaching learners at his previous school for the competition he'd had misgivings early this year when he started testing Balmoral College learners in preparation for the 2021 event. "But I pressed on with running regular practice sessions to improve their knowledge in the various subjects covered by the competition, so by the time we selected our contestants for the first round I was much more confident about our prospects," he remarked.

Memory Wium, Balmoral's Principal, congratulated Mayibongwe for his achievement. She also commended Mr Ndlovu for his dedication in guiding and coaching Mayibongwe and the other Balmoral learners who participated.

"Our participation and success in the competition this year have further enhanced our reputation as one of the top schools in the country," she commented.

ACTOM businesses

POWER
John Thompson, Bellville: (021) 959-8400
John Thompson, Isando: (011) 392-0900
www.johnthompson.co.za
John Thompson is a leader in energy and environmental solutions through value engineering and innovation. We are firmly focussed on serving global and local markets and we offer the following products and services: design, engineering, manufacture, construction, repairs, maintenance, retrofit, installation and commissioning of industrial water-tube and packaged fire-tube boilers, and industrial air quality solutions including HVAC, bag filters, scrubbers and ESP systems.

Our Boiler and Environmental business unit offers the following solutions for utility plants: maintenance, repairs and retrofit of utility plant boilers, ESP systems, FFP systems, mills, HP piping and ancillary equipment – geared towards keeping large power plants operating optimally.

John Thompson also provides outsourced steam solutions.

ENGINEERING PROJECTS & CONTRACTS
Industry: (011) 430-8700
ACTOM Industry, the group's Mine winder experts with modern power electronic drive, control and switchgear technology, providing turnkey solutions worldwide for specialised industrial rotating drive and power applications in mining, metals, paper and process industries. We manage projects from design to commission; inspect & maintain; provide emergency support; do repairs and we perform magnetic rope testing.

Contracting: (011) 430-8700
Contracting is the electrical and instrumentation business unit which provides turnkey solutions for electrical power and instrument & control systems in the mining and manufacturing industries as well as the public sectors.

Power Systems: (011) 430-8700
ACTOM Power Systems, the group's substation construction contractor, is ACTOM's systems integrator, responsible for turnkey projects for the electrical power, mining and manufacturing industries, as well as for public sector infrastructure. It specialises in Renewable balance of plant installations.

Transport: (011) 871-6600
Transport has three trading units:

ACTOM Signalling; design, manufacture, install and maintain railway signalling equipment and turnkey systems.

ACTOM Transport Equipment and Projects (TEP); a contractor and supplier of rolling stock equipment, parts, maintenance and specialised depot machinery and test equipment.

ARNOT Vibration Solutions (AVS); suppliers of anti-vibration products and engineered solutions to a wide range of industries, including rolling stock.

ACTOM Energy: (021) 510-2550
ACTOM Energy is a solutions business and in collaboration with various divisions within the ACTOM Group, provides electrical automation, power automation, protection and control, remote condition monitoring and fluid technologies (motion controls, hydraulic and pneumatic) system integration services across all sectors.

LH Marthinusen - Coastal
Cape Town: (021) 555-8600
Durban: (031) 205-7211
Africa's leading maintenance partner for rotating machines – servicing traction, power generation, mining, utilities, oil & gas and general industry.

HIGH VOLTAGE EQUIPMENT
High Voltage Equipment: (011) 820-5111
High Voltage Equipment, is a designer, manufacturer, supplier and installer of high voltage equipment to power utilities, electricity generation, transmission and distribution industry, mining sector and contracting companies. It manufactures, Isolators, instrument transformers, outdoor circuit breakers, isolated phase busbars. It also supplies generator circuit breakers, high voltage gas insulated switchgear, compact hybrid switchgear, surge arresters, substation and overhead line insulators. It also specializes on the repairs and maintenance of high voltage equipment.

MEDIUM VOLTAGE SWITCHGEAR
MV Switchgear: (011) 820-5111
www.actomswitchgear.co.za
Leading manufacturer and supplier of air-insulated (AIS) and gas-insulated (GIS) switchgear for use up to 36kV. The product range consists of indoor switchgear, containerized switchgear solutions, compact substations for renewable energy applications, minisubs, free-standing outdoor kiosk ring main units and bulk metering units. The division also specializes in the repair and maintenance of electrical networks.

WPI Power Solutions: (011) 820-5111
24 Hour Emergency Service: (082) 801-3171
WPI specialises in the repair, installation, retrofitting and maintenance of electrical networks via MV Switchgear's After Sales department and WPI regional branch network that is technically well equipped and strategically placed close to the customer base. The department offers 24/7 customer support for substations, MV and LV switchgear and associated products.

Current Electric: (011) 822-2300
Current Electric designs, manufactures and supplies medium voltage current and voltage transformers to switchgear manufacturers and repairers, electrical distributors and a diverse range of end-users locally and internationally.

POWER TRANSFORMERS
Power Transformers: (011) 824-2810
Power Transformers designs, manufactures and supplies a wide range of power transformers from 2MVA to 315MVA up to 275kV to power utilities, renewables projects, electrical contractors, the mining sector, local authorities and industry locally and internationally.

DISTRIBUTION TRANSFORMERS
Distribution Transformers: (011) 820-5111
Distribution Transformers designs, manufactures and supplies distribution transformers to power utilities, the mining sector, local authorities and industry, and renewable applications locally and internationally.

LH MARTHINUSEN
LH Marthinusen: (011) 615-6722
www.lhm.co.za
LH Marthinusen repairs and refurbishes transformers, electric motors, alternators and industrial fans. Manufacture of electric motor components, insulation components and specialised transformers and motors. It also provides engineering services for its products to the mining, industrial and petrochemical sectors and local authorities, as well as for the export market.

REID & MITCHELL
Reid & Mitchell: (011) 914-9600
www.reidmitchell.co.za
Reid & Mitchell is a repairer and manufacturer of electrical equipment for open cast mining, steel, rail transportation and marine industries. Motors and generators for excavators, off-highway vehicles, locomotives, drilling and pumping applications. The division is also a specialist repairer of DC motors and generators, including rebuilds, rewinds and commutator manufacture.

Electrical Machines: (011) 899-1111
Electrical Machines supplies medium and low voltage motors, starters, gearboxes and speed reducers to the mining, industrial, processing and utilities markets.

Large Motors designs and manufactures medium voltage motors that include its reputable customised large UNIBOX series and its high specification MS4 totally enclosed fan-cooled (TEFC) cast-iron motors.

Laminations & Tooling manufactures laminated components and tooling for the electric motor manufacturing and repair industries.

Energy Namibia – Electrical Products: +264 (61) 423 150
Supplier of Electrical products throughout Namibia.

Namibia Armature Rewinders (NAR): +264 (64) 462 886
Repairer of electrical machines, hydraulics, boilers, transformers and switchgear throughout Namibia

MARTHINUSEN & COUTTS

Marthinusen & Coutts: (011) 607-1700
www.mandc.co.za
M&C repairs, maintains, services, and carries out specialised manufacture of HV, MV and LV, flameproof, DC and traction motors, transformers, generators, alternators and ancillary power generation equipment up to 373 MVA. M&C also provides a full range of 24/7engineering on-site services and unique motor and generator management and maintenance solutions and programmes.

ACTOM TURBO MACHINES

ACTOM Turbo Machines: (016) 971-1550
www.actomturbo.co.za
ACTOM Turbo Machines is a mechanical turbo-machinery and high-speed rotating equipment service provider, for manufacturing, maintenance, overhauls, repairs, installations and commissioning of all types of steam and gas turbines, compressors, blowers, pumps, fans, gearboxes, centrifuges, as well as general fabrication and machining.

METALPLUS

Metalplus (011) 433-1880
www.metalplus.co.za
Metalplus has earned a reputation over many years in the petro-chemical, power generation, machine repair, mining, and rail & transport industries, for its reliability, accuracy and speedy turnaround times in performing mechanical repairs that include submerged arc micro-welding, machining and grinding. Further to our multitude of shaft and crank shaft repairs our products extend to new shaft manufacturing, casing welding and stitching, hard facing, component manufacturing and specialised welding repairs.

ELECTRICAL EQUIPMENT

Electrical Products: (011) 878-3050
www.actomep.co.za
Electrical Products is ACTOM's trading and representation arm, with a national network of strategically located branches. The business unit supplies products produced by ACTOM divisions and other manufacturers, including cable, cable accessories, lighting equipment, heating and ventilation equipment, circuit breakers, distribution transformers, minisubs, protection and control equipment, electric motors, meters, fusegear and overhead line materials.

Satchwell: (021) 863-2035
Satchwell manufactures and supplies domestic and industrial heating elements, temperature controls, refrigeration components, solar water heating components and appliance spares to the domestic appliance manufacturing industry and the chemical, mining and construction industries, among others.

Genlux Lighting: (011) 825-3144
www.genluxlighting.co.za
Genlux Lighting is a leading designer and manufacturer of luminaires for roadway lighting, floodlighting, outdoor commercial lighting and industrial applications. It produces a wide range of high quality products in both HID and LED technologies.

ACTOM SMART TECHNOLOGIES

Protection & Control: (011) 820-5111
A market leader in the supply of protection, metering and low voltage solutions to the electrical industry. Our offering includes a comprehensive range of automation systems, protection relays, credit, smart and prepayment metering systems and hosted services as well as LV motor control centres and power DB's, variable speed drives (VSD's) and components and accessories.

Static Power: (011) 397-5316
Static Power specialise in the design and manufacture of AC and DC standby equipment for the Industrial, telecomms, rail and renewable energy markets including thyristor type chargers, (Micro Process Controlled option), industrial batteries, power supplies, industrial UPS's, furnace control panels, power distribution boards and battery tripping units. All systems are designed and engineering to suit their purpose for both the local and export markets.

Alkaline Batteries: (011) 397-5326
Alkaline Batteries is the South African distributor for ALCAD and SAFT nickel cadmium and Lithium Ion batteries as well as the Intelli Connect battery monitoring systems for the industrial, telecoms, rail and renewable energy markets. The local assembly plant on the East Rand includes a collecting point for spent nickel cadmium batteries for recycling. Services offered include Installation and Commissioning, Battery Sizing, Testing, Investigations, Maintenance and Repairs, Maintenance and Service Contracts, Discharge Tests and Training.

COM 10: (011) 552-8368
COM10 is a local assembler and integrator of Alpha switchmode rectifiers, DC/DC Converters with sophisticated supervisory controllers, Haze Batteries, stands, battery cubicles and power enclosures.

What's Watt is published by ACTOM (Pty) Ltd to inform staff, customers and other stakeholders of developments within the group.

Editorial contact: Julian Kraft, J Kraft Public Relations
Tel: (011) 472-6686, mwkraftj@mweb.co.za
Feature story editorial contact, Minx Avrabos
Tel: 082 467 3962, minxavrabos@gmail.com

Produced by: Jeroen Luyk, In Africa
082 951 5049, inafrica@saol.com

ACTOM contact:
Andries Mthethwa, Tel: (011) 820-5111
andries.mthethwa@actom.co.za

ACTOM your partner for greener electricity generation in South Africa and the rest of the continent.

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ACTOM

ACTOM (Pty) Ltd: 2 Magnet Road, Knights, 1413 | PO Box 13024, Knights, 1413
Tel: +27 (0) 11 820-5111 | Fax: +27 (0) 11 820-5044 | www.actom.co.za