Featuring: Business in unusual times



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ACTOM introduces measures to sustain business and employees' livelihoods

The past year has seen immense pressures by way of the Covid-19 pandemic impacting on the world. This has resulted in a humanitarian and financial crisis globally.

ACTOM has acted swiftly by instituting austerity measures in an effort to preserve cash and business sustainability. I would like to thank all of our employees for their understanding with regards the tough decisions which needed to be taken. We have also undertaken various restructuring initiatives in the business in order to right-size in accordance with our current economic climate.

My condolences go out to the families of our four colleagues, **Andries Ndlovu** (M&C), **Dawood Patterson** (ACTOM Energy), **Bethuel Motsai** (EPC) and **Archie Arendse** (John Thompson Boilers), who we have lost to Covid-19. I'd like to pay tribute to their contributions to the business during their many years of service.

As the government has eased lockdown regulations over the past months it is of utmost priority that we retain our health and safety protocols relating to Covid-19 in order to prevent the spread of infections.

We have seen in various countries a tendency for infections to spread quite drastically as lockdowns were eased. As such, we cannot become complacent and drop our guard, so we need to be cautious and as proactive as possible to avoid exposure to this virus, which may be in our midst for some time.

Economic conditions remain very

What's Inside



tough in South Africa and globally. It is worth noting that our President has acknowledged the importance of infrastructure projects which will be prioritised together with various initiatives to strengthen South Africa's generating capacity.

There has been particular focus on supporting local companies by way of product designation which will help manufacturing companies like ourselves. We hope that this will stimulate the industrial economy and thereby lead to job creation.

ACTOM has endured and sustained itself through a very tough period and that has been achieved by all stakeholders working together. I'd like to commend all members of our staff and management for the marked improvement in the statistics relating to health, safety, risk, environment and quality over the past year.

The past year has seen ACTOM involved as a major product supplier to various renewable energy projects in

South Africa as part of the programme to increase the renewable energy mix into South Africa's generation capacity. I would like to commend our teams on what has been achieved on these projects. A picture of such an operational wind farm is as depicted in the background of the accompanying picture.

We've done extensive work in terms of increasing our capacity to position ACTOM for the manufacture of more product for renewable energy projects, which we foresee growing quite extensively over the next 10 years.

Export initiatives over the past year have been seriously constrained due to travel restrictions, but this has however been well supplemented by various products and services diversification initiatives. I would like to commend our various management teams for the innovation that has been displayed in achieving this.

Our John Thompson business has been awarded an interesting milestone contract which encompasses the operation and maintenance of a 25MW biomass power plant.

The team is commended for their innovation in piloting such a project, which will realise opportunities for the broader ACTOM group.

I would like to wish all staff a wonderful festive season and a blessed New Year. 2020 has been an exceptionally challenging year from all perspectives and I hope we will start to see some improvement in 2021.

Mervyn Naidoo

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Cover: From left to right: Sakhile Mthembu (Tester), Lucas Johnson (Assembler), Lemond Msikinya (Assembler/Setter) and Simon Mokgolo (Foreman) standing with a VLX SBB (Single Bus Bar) which is ready to be sent to Australia.

Stimulating business in unusual times

There is no doubt that 2020 has been challenging for ACTOM, but it has also encouraged management to think differently, to look for opportunities through innovation and product development, to diversify service offering and even to operate remotely and embrace online technology solutions.

The awarding of the operation and maintenance of a 25MW biomass power station to John Thompson illustrates how ACTOM is actively seeking opportunities to extend their service offering. Increasingly, customers are looking for accountability and integrity in business partners. ACTOM has developed a reputation for professionalism and innovative and reliable service provision and is ideally placed to provide end-to-end solutions.

"Africa's fast-growing population and increased urbanisation will require a significant investment in power generation capacity. This is where John Thompson will be very well placed with our ability to supply a complete power island. To illustrate the point, we have quoted two power generation projects, similar to Ngodwana, into Africa using John Thompson boilers and ancillary plant where we will be considered for the operating and maintenance of the plant. We believe that Ngodwana will be the start of many operating and maintenance contracts in Africa with the outsourcing of non-core activities and the lack of expertise driving these opportunities," commented John-Paul Andre, Divisional CEO of John Thompson.

During 2020, Reid & Mitchell secured contracts outside of their traditional scope of business.

They have been appointed to modify a 60 Hz dragline based in North America which is being relocated to a new site in North Africa and to convert the dragline to operate in a 50 Hz environment.

"This is new business for Reid & Mitchell, but our extensive experience of the mining sector enables us to easily and successfully diversify," explained **Mike Shaw**, Divisional CEO of Reid & Mitchell.

John Thompson also diversified their service offering when they were awarded a contract to refurbish two cooling towers at Tutuka Power station. The refurbishment entails the removal of the current cooling tower packs, the distribution pipes as well as the drift



Sandile Nyembe, an Assembler with Reid & Mitchell checks a 788-wheel motor before it is dispatched.

eliminators, all of which contain asbestos. ACTOM is using the services of a local company specialising in the removal, and appropriate disposal of these components. The towers will then be washed down and declared asbestos free before the new components are installed. The new packs have been redesigned and are made of a durable polypropylene. They will be manufactured by a locally based contractor working with John Thompson on this project. The new distribution pipes and drift eliminators have been engineered by Hamon. Once all the components are delivered, John Thompson will install and commission.

Gladstone Mbili, General Manager of John Thompson's Utility Boilers and Environmental Solutions explained how John Thompson got involved in this new line of work, "We have a technology co-operation agreement with Hamon and we partnered with them to tender for this business. Our partnership meant that we met the required technical and local regulatory requirements that were specified in the tender. We were successfully awarded the contract in July this year and the refurbishment is well underway."

Many of the ACTOM businesses have developed new technologies or improved existing technologies that will extend the life cycle of products.

Reid & Mitchell are supplying

components, on a unit exchange basis (UnX), to the off-highway vehicle (OHV) market.

"Our customers are always looking for cost effective ways in which to extend the lifespan of their older trucks. With the truck fleets equipment with 776-wheel motors reaching the end of their expected lifespan, it makes sense to sell complete refurbished components, that we issue with a guarantee, to keep them running. We believe that this service offering is of particular interest to our customers" said Mike Shaw.

With the success of the 776-wheel motor UnX programme, Reid and Mitchell has now developed the model to also supply 788-wheel motors and GTA22 alternators.

Another challenge Reid & Mitchell believe they have found a solution for relates to the cooling systems on draglines. Mike Shaw explains, "Increasingly we see larger buckets being fitted to draglines which means the motors are working harder and at higher temperatures. For every 10 degree increase in temperature, you potentially cut that motor's lifespan by half. It is imperative that we find effective ways of keeping these motors cool and we believe that, together with TLT - Turbo, we have found a solution that will prove to be successful."

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The final forming and alignment of equiliser leads.

Draglines are currently fitted with heavy centrifugal scroll fans. The newly developed composite axial fan has a number of advantages - it delivers more air flow which cools more effectively, it uses far less energy through the motor and it weighs a lot less which is helpful in reducing stresses on the cantilever mounting arrangement.

Reid & Mitchell have introduced two other innovative processes this year.

Equaliser rings are now being vacuumed after they have been epoxied and this takes out any air pockets resulting in higher product integrity. And, the spin seasoning plant was upgraded to an AC drive system resulting in a more modern and efficient plant. This has resulted in the successful reintroduction of spin seasoning to ensure the quality and durability of product.

ACTOM Electrical Machines launched its new range of Airstream rated electric motors. This new range, designated the PQ3, is a range of 3-phase, low voltage, aluminium PAD mount electric motors.

After extensive market research on potential customers, market size, price levels and product requirements a year-long R&D program was initiated. During this period, new patterns, tooling and samples were manufactured and approved. The result is a wellengineered, price competitive and high-quality range of electric motors. The PQ3 range will find application in domestic, commercial and industrial fan units.

The PQ3 range is available in frames sizes 71 to 132, with a power rating from 0.25kW to 9.2kW. It is available for 400V supply in 2, 4, 6 pole speeds.

Other businesses have further developed and tested technology that

will come to fruition in the years ahead.

One such concept is Centralised Substation, Protection, Automation and Control Systems (CSPACS). Although not a new concept (it was first proposed in the early 1970s), it is now only becoming a viable option as a result of the development of computer hardware and software and the communication technology able to support it.

With plans to connect renewable and intermittent energy resources to the grid, protection and control systems need to be more flexible and have the capability of reconfiguring quickly.

The IEC 61850 international standard defines communication protocols for intelligent electronic devices at electrical substations. These protocols can run over TCP/IP networks or substation LANs using high speed switched Ethernet, resulting in the necessary response times for protective relaying and is the basis on which centralised solutions are built.

ACTOM Protection and Control, together with a technology partner, have been evaluating various substation protection and control architectures and **Herman Mare**, General Manager designate for Protection and Control commented, "It is important that we stay on top of developments in this area in order to deliver these solutions as soon as possible. A centralised protection and control solution offers a number of benefits including increased flexibility and improved performance as



ACTOM Electrical Machines' new range of Airstream rated electric motors.

well as an overall reduction in costs."

ACTOM Turbo Machines used this turbulent year to expand their workshop, adding a further 300 m² of floor space, that will house a horizontal boring mill as well as a vertical lathe. This extra-large machinery will increase their machinery handling capacity.

"These machines will put us in a different league as we will no longer need to outsource this work. This will improve our turnaround times and enable us to manufacture more cost effectively. I believe this will boost turbo machinery manufacturing not only in South Africa, but for the African continent," **Chris Bezuidenhout**, Managing Director of ACTOM Turbo Machines proudly explained.

Chris also mentioned how important this upgrade to the factory and the purchase of additional equipment is to the Vaal area, "Having grown up here, it is important for me personally to be able to continue to provide employment and to develop the skills of the people from this community."

ACTOM Turbo Machines is considered an essential service provider and operated throughout lockdown. Strict hygiene measures were adopted and included daily sanitising of all work areas. Chris explained their lockdown strategy, "We always look for the positive in every situation and we saw lockdown and the restriction on international travel as an opportunity to showcase what we, as a local OEM, are capable of. I believe that we have proven ourselves and I hope to build long-term business partnerships with those companies we worked with this year."

ACTOM Turbo Machines was recently awarded a service contract with Illovo Sugar and also recently became a vendor to Engen Refinery, Impala Platinum and Tongaat Hulett Sugar.

There is still a great deal of uncertainty around how South Africa will recover from the enormous economic impact of Covid-19. However, it is encouraging to hear how the various ACTOM businesses are seeking opportunities and using this time to plan for an uptake in business in the future.



Jack Mofokeng, CNC Machinist, Chris Bezuidenhout, Managing Director and Mark Gulbis, Business Development Manager with the horizontal boring mill recently acquired by ACTOM Turbo Machines.

MV Switchgear's Chinese technology partner donates PPE to ACTOM

When YIHE, MV Switchgear's technology partner in Qingdao, China, got word early this year that there was a shortage of personal protective equipment (PPE) in South Africa to protect people against contracting Covid-19, it wasted no time about purchasing a large quantity of PPE to help out.

When YIHE communicated with MV Switchgear's **Greg Whyte**, Design & Development Manager, and **Rhett Kelly**, Technology Development Specialist, to notify them that the PPE were packed and ready for shipment to South Africa, ACTOM's Shipping Department at Knights initially tried to arrange for the equipment to be flown in, but soon discovered not only that cargo flights from China were extremely few and far between, but that the cost of this means of transport was extraordinarily high.

"It was then decided that the PPE would be brought with the next shipment of switchgear panels scheduled to be supplied by YIHE to MV Switchgear in May, with the PPE being stored in various available spaces in between the equipment," said **Vony Botha**, ACTOM's Logistics Manager, who heads the Shipping Department.

While the shipment was still on the water Vony's team made sure to obtain a permit from South Africa's International Trade & Commerce authority to authorise entry of the special shipment on arrival at Durban. "Despite this we still encountered some complications which held up the release of the goods for about two weeks. We had to negotiate with the Customs authorities to convince them it was legitimate; in this we were greatly assisted by our Preferred Trader status with Customs," Vony commented.

ACTOM was accredited by Customs as a Preferred Trader in mid-2018, which put it on a much stronger footing than previously in expediting the movement and delivery of imports and exports.

The PPE generously donated by YIHE, which was delivered at the group's Knights premises at the end of June, comprised 20 000 protective masks, 100 sets of protective overalls, 1000 pairs of disposable gloves, 10 **To page 6**

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sensor-activated soap dispensers and 20 infrared thermometers.

It was decided that the PPE would be made available not only for MV Switchgear's use, but for all occupants of the Knights site.

"The masks are provided on entry to the site by our Covid-19 screening staff to any visitor or employee who doesn't have one already, the protective overalls, disposable gloves and infrared thermometers are available for the screening staff's use at the main gate and for clinic staff, while the soap dispensers have been installed at washbasins so that people can wash their hands as safely as possible, since the dispensers are automatically activated without needing to be touched," said **Ulrich Behr**, MV Switchgear's Purchasing Manager.

Shortly after being notified by YIHE in early-May that the shipment of PPE's was about to be sent from Qingdao port to South Africa with a cargo of switchgear, **Martin Kelly**, MV Switchgear's then Divisional CEO,



Posing with the shipment of PPE shortly after its delivery to MV Switchgear at Knights are (from left) Mandla Mkwaqa, VISA SHE Rep; Vony Botha, ACTOM's Logistics Manager; MV Switchgear's Rhett Kelly, Technology Development Specialist; Atwel November, Stores SHE Rep; Craig Lebelo, PMU Supervisor; Golden Mlambo, Highbay SHE Representative; Linky Mdaka, Technical Sales Consultant; Greg Whyte, Design & Development Manager, and Simon Mashayi, Stores Supervisor.

sent an e-mail message to YIHE via **Amanda Wang**, Managing Director of PMME Supplies CC, to **Zhang Ping**, Production Manager of YIHE, expressing great appreciation for the donation.

Electrical Equipment named winner of Chairman's Award for 2019/20

The Electrical Equipment division has been named winner of ACTOM's annual Chairman's Award for the financial year 2019/20.

The announcement was made by Chairman Andries Mthethwa as part of the Executive Committee Meeting (EXCO) held at the the group's head office at Knights on 25 November. The announcement is usually made at the group's annual review, however, due to the COVID-19 restrictions it was presented at the EXCO this year. The annual review will take place during guarter 1 of 2021 where Dr Azar Jammine, head of the well-known Johannesburg based economic consultancy, Econometrix, will do a presentation on the economic conditions in South Africa with particular reference to the electrical supply sector of industry.

In announcing Electrical Equipment as winner of the Chairman's Award for being the best performing division in the group, Andries said it is the first time it has won since the inception of the Award in 2012.

"We have always regarded Electrical Equipment as the barometer of trading conditions for the group as a whole, so this achievement says a lot for the prospects of the group in the foreseeable future, despite the continuing adverse economic conditions we were faced with during the past financial year. This however was prior to the advent of the Covid-19 pandemic which has hit us since, making conditions even more challenging than before," Andries commented.



Rod Penaluna (front left) and Martin Kelly, Divisional CEO's of the Electrical Equipment and Medium Voltage & Protection divisions respectively, proudly display their Chairman's Award certificates, accompanied by (back row, from left) Distribution Transformers Divisional CEO Alan Buchholtz; Metalplus General Manager Roman Mornau; ACTOM Chairman Andries Mthethwa; Group CEO Mervyn Naidoo; newly-appointed Divisional CEO of Medium Voltage & Protection Faisal Hoosen and Signalling General Manager Peter Colborne. Inserted right top to bottom is, John-Paul Andre Divisional CEO of John Thompson; Terrance Kalichurand General Manager of LH Marthinusen Durban and on the right Francois Marais, Senior Design Engineer at John Thompson.

He commended **Rod Penaluna**, Divisional CEO, and his management team on their success, commenting in particular on the successes achieved by Electrical Products in diversifying into supplying product to the local power line erection sector and in substantially increasing export sales into Eswatini, Botswana and other neighbouring countries. A further achievement to the division's credit was the recent restructuring of Satchwell Controls, which has helped to make it more profitable.

The divisions are assessed according to a range of performance criteria, which include EBIT growth, free cash flow conversion, export orders, B-BBEE level, risk management, lost time injury frequency rate and environmental considerations.

Medium Voltage & Protection, last year's winner of the Chairman's Award, came a close second to Electrical Equipment and was awarded the Runner-up Award this year, while three other divisions, John Thompson, Distribution Transformers and Power Conversion earned Divisional Certificates of Excellence for performing exceptionally well.

The separate competition for group business units, which are chosen from a short list based on meeting their budgets and on EBIT growth, ended with three units being selected as winners out of six contenders, the main factor taken into consideration in their selection being the extent to which they succeeded in converting profit into cash during the review period. The recipients of Business Unit Certificates of Excellence were LH Marthinusen Durban, Metalplus and ACTOM Transport.

Finally, **Francois Marais**, Senior Design Engineer at John Thompson's Industrial Watertube Boilers business unit, was named winner of the Certificate of Recognition for the Best What's Watt Semi-technical Article 2019 for his article published in the June 2019 issue of the magazine entitled "Application of machine learning algorithms in boiler plant root cause analysis".

ACTOM provides inductors for LISN test facility at Wits Electrical Engineering School

ACTOM has continued its ongoing support of Wits University's School of Electrical & Information Engineering by manufacturing and supplying complimentary equipment it requires to enable it to provide more advanced services to industry, while further enhancing learning opportunities for its students.

Projects at the School to which the group has contributed funding, equipment and skills on previous occasions were:

• Funding and supplying a range of equipment for a major upgrade of the School's energy laboratory in 2011 and 2012. The modernised lab, named the ACTOM Energy Lab, was officially opened in early-2013.

• Donation by Electrical Machines of two 5.5kW 400V 4-pole foot-mounted cast iron motors in August 2013.

• Servicing and repairing the aging motor-alternator sets in the School's ACTOM Energy Lab by Marthinusen & Coutts on ACTOM'S behalf in 2015.

• Donating 24 high accuracy 15 VA current transformers from Current Electric for incorporation in a standalone electrical micro-grid the School established in the ACTOM Energy Lab in 2017.

The latest project in which ACTOM has been involved is a substantial upgrade of a line impedance stabilisation network (LISN) the School requires for testing of high power AC and DC equipment, particularly when measuring and **To page 8**



M&C's Maria Drodskie, Test Department Foreman, and John Mtimkulu, Coil Former, perform the final inductance measurements of the four inductors for the School of Electrical & Information Engineering's new LISN.

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evaluating the emissions from a piece of equipment.

The school already has a range of impulse generators that can create lightning-like surges to perform immunity tests on equipment fitted with lightning arrestors, etc.

A LISN performs an important filtering function when testing electrical equipment for electromagnetic compatibility (EMC) between it and its power source, as equipment that is not designed and tested for EMC can create conducted interference, which can compromise sensitive electronic equipment around it. There is also legislation and standards that regulate EMC and the testing required for it.

The School's first LISN was designed with the ultimate aim of using it in service to industry to test industrial equipment for EMC related to its emissions.

However, the original equipment commissioned around 2009 was rated for a continuous current of 15A, which is only suitable for testing of domestic appliances and DIY equipment like electric drills and grinders.

The new LISN allows testing of three-phase equipment up to 600A and 400V and is well suited for testing of a wide range of industrial electrical machines.

"The design is modular and will allow single and three-phase testing. The maximum power rating facilitates not just testing in the laboratory but also in-situ testing in the field," said **Prof Willie Cronje**, the School's Head of the Alstom Chair for Clean Energy Systems Technology, who is leading the LISN project.

The School developed some of the equipment for the new LISN in-house, while approaching ACTOM for the highcurrent inductors and EMC specialist companies to provide the balance of equipment, such as the capacitors and shielded enclosures.

Marthinusen & Coutts (M&C) has suitable infrastructure and experience in making high-current coils, so they agreed to design and manufacture the inductors for the LISN.

"We don't normally manufacture

inductors, but we are accustomed to undertaking research to design and manufacture specific items as part of our services, so producing these inductors posed no problems for us," said **Rob Melaia**, M&C's Engineering & Technical Executive.

The new LISN can be configured up to a four-wire three-phase system requiring four inductors, which M&C designed and produced during September, October and November this year.

"The inductors are air-cooled, as well as air-cored, and hence linear, which is the correct design for achieving and maintaining constant inductance. The inductors are manufactured with thick cross-section copper bus bar (10mm x 40mm) in a square coil configuration with substantial clearance between adjacent turns to minimise parasitic capacitance," Rob explained.

Prof Cronje commented: "This LISN with the right spectrum analyser and other equipment will facilitate troubleshooting and fix problems that contribute to interference in nearby systems."

Technical Training Centre trains two groups of 'outside company' apprentices

The Technical Training Centre at Knights, ACTOM's main training facility, provided apprenticeship training for two groups of electrician apprentices from a company outside the group this year.

The total of 21 apprentices from a well-known Gauteng-based electrical

equipment manufacturer comprised: • 10 first-year apprentices who were given the initial six-months' intensive practical training that is required at the start of their total three- to four-year apprenticeship, and

• 11 final-year apprentices for six weeks' training to prepare for their final

trade tests at the end of the year. The Technical Training Centre provided all the members of this group with their initial first-year apprenticeship training in 2017.

The Technical Training Centre, which provides apprenticeship training for many ACTOM divisions and



Electrical Officer Teboho Mmusi (left) gives instruction to a fourth-year apprentice electrician on an oscillating forward and reverse panel.

business units as its main function, 11 years ago, introduced apprenticeship training for companies outside the group that do not have training facilities of their own.

"We have to give priority to training of apprentices within the group, so in years when demand for apprenticeship training within the group is low we can accommodate more from other companies, which has been the case in 2020 when our internal intake of first-year apprentices in mid-February was a lot lower than normal at 21," said Technical Training Manager **Danie de Kock**.

The 10 first-year electrician apprentices from the outside company and the electrician apprentices from among ACTOM's own first-year apprentices were trained together. The ACTOM first-year trainees also included apprentices for other trades besides electricians, such as fitters & turners, armature winders and boilermakers.

Due to the severe restrictions

placed on business activity nationwide by the Covid-19 lockdown in March, April and May this year, the first-year apprenticeship training was interrupted for 2-1/2 months and consequently finished at the end of November, instead of the usual timing of end-July each year.

The training of the second group of apprentices from the outside company started in mid-June and ended in early-October.

ACTOM's employment equity status



Faisal Hoosen, Divisional CEO of the Medium Voltage and Protection division photographed in the factory at Knights, Germiston.

Towards its goals of inclusion and providing optimum conditions for growth of talent, ACTOM is proud to be able to provide employees with career advancement opportunities and those who previously did not have access to such opportunities are now provided for.

The Group operates three apprenticeship training centres for all divisions and business units. **Faisal Hoosen**, Divisional CEO of the Medium Voltage and Protection division fondly recalls his journey with ACTOM, which began with his P1 and P2 engineering practical modules.

"I had just finished studying Mechanical Engineering at the University of Johannesburg and I was looking for the practical experience essential to the completion of my course. It is an interesting story, but I guess you could say that I knocked on the right door at the right time and I joined, what was ALSTOM at the time, in June 1999."

Faisal completed his engineering diploma and started with the company as a Production Engineer responsible for Low Voltage Switchgear. He was hungry to learn, in what proved to be highly customized and configured products, and quickly supplemented his mechanical design experience with the electrical engineering requirements of the business. He then became Technical Manager overlooking industrial, electrical and mechanical engineers before taking up the role of Product Manager for Low Voltage Switchgear and Metering when his long-time mentor **Paul Lepora** moved to the Electrical Machines business. After a short period outside the Group, in which he became very involved in the incubation and development of new businesses, he returned as the General Manager of the Protection & Control business in 2015, a position which he has held until his current promotion in August 2020.

"I literally started at Knights on the factory floor and in field installations which helped me understand the intricacies of the job and gave me a unique perspective on the incredible value our skilled workforce makes to our business. Many opportunities within the Group have kept me here and I feel I owe it to our upcoming talent to make **To page 10**

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some new journeys possible. Over the years I have been fortunate enough to also mentor others and I hope that even if people move on from ACTOM, we continue to live up to our responsibility of adding to the pool of skilled people in this country." said Faisal.

ACTOM actively encourages mentorship programmes to further enhance skills throughout the Group and this, together with focused succession planning has resulted in valuable skills transfer and successful business continuity.

Gladstone Mbili, General Manager of John Thompson's Utility Boilers and Environmental Solutions joined John Thompson in September 2018 in a business development and stakeholder management role. This was vastly different to his previous positions that were very much engineering focused. He gained his extensive experience with Eskom, Sasol and General Electric with jobs ranging from Laboratory Technician to Head of Engineering for Sub-Saharan Africa.

"After a technical career that spanned just more than 20 years, I was ready for a change and I wanted to learn more about the business side of business. I was introduced to tenders, contracts, pricing and the delicate task of community stakeholder engagement, all of which fascinated and challenged me – exactly what I was looking for," said Gladstone.

Six months after starting with John

Thompson, Gladstone was appointed as the General Manager designate and had the opportunity of working with **Tobie Jansen** for a year.

"I was so grateful for the opportunity to work with Tobie. I felt supported by all levels of staff right from day one. We employ such experienced people within the Group and to be able to tap into that knowledge and to build on their relationships with customers and their connections with industry influencers is invaluable," added Gladstone.

In April 2020 Gladstone officially took over as General Manager of John Thompson's Utility Boilers and Environmental Solutions business unit, a smooth transition that he attributes to the hands-on mentorship he received.

"As a Group we understand our responsibility as an employer, and we are committed to the sustainable transfer of skills as well as relevant and empowering education and training.

By providing opportunities for people to empower themselves we hope that they will empower others within the communities in which they live and, in this way, ultimately address the legacy issues in our country," said Mervyn Naidoo, ACTOM CEO.

As part of this empowering policy, it is important to regularly review progress with regards to the implementation of employment equity within the group. An analysis of statistics for the past 10 years indicates notable results: • A 3% increase in the total number of African, Coloured and Indian people employed

• An increase of 18% in the number of African, Coloured and Indian people appointed to senior and top management positions

• The appointment of 120 disabled persons within our business of which 87% of these people are African, Coloured or Indian

• 46% of ACTOM's employees are female

"These comparisons show further advances in employment equity and we will continue to assess the equity mix and align to regulatory requirements aimed at achieving a true representation of the demographics of South Africa," said **Mervyn Naidoo**.

ACTOM retained its B-BBEE Level 1 accreditation having been evaluated by SANAS accredited Honeycomb BEE Ratings, using the Amended Codes of Good Practice, Gazette number 36928, on Broad Based Black EconomicEmpowerment for large enterprises at the end of November 2020. ACTOM achieved the following:

- B-BBEE Contribution: Level 1
- Procurement Recognition Level: 135%
- Empowering Supplier
- 52.91 % Black Owned and 31.97 % Black Women Owned.



Gladstone Mbili, General Manager of John Thompson's Utility Boilers and Environmental Solutions business unit.

ACTOM JV company secures operation & maintenance contract for biomass power plant

The first biomass power plant to be established under South Africa's independent power producer (IPP) programme will be operated and maintained by a joint venture partnership company formed between ACTOM and another reputable local company, Lesedi Nuclear Services.

Construction of the 25MW power plant on a site adjacent to the Sappi Ngodwana pulp mill in Mpumalanga is currently in progress and is due to commence operation in May 2021, with the Ngodwana mill supplying the biomass to fuel it. The project for the power plant, which is owned by a consortium known as Ngodwana Energy, in which leading pulp & paper producer Sappi Southern Africa is among the shareholders, is part of Round 4 of the national Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

The JV company, held 51% and 49% by ACTOM and Lesedi respectively, was awarded the five-year operation and maintenance contract at the end of September this year by KC Cottrell, the engineering, procurement and construction (EPC) contractor for the plant.

The ACTOM business unit that will be directly responsible for the contract in conjunction with Lesedi in the JV company is John Thompson's Industrial



The biomass power plant under construction on a site adjacent to the Sappi Ngodwana pulp mill in Mpumalanga.

Watertube Boilers (IWTB) business unit. 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 plant. John Thompson's IWTB unit installed the imported watertube boiler for the plant under a separate contract.

Prior to the new power plant coming on stream the ACTOM/Lesedi JV will recruit a power plant manager to manage the operation and maintenance contract and will also assist KC Cottrell in selecting staff for the pre-commissioning and commissioning of the plant.

"At the same time we will be recruiting approximately 40 electrical and mechanical artisans and other staff and train them to perform all the work involved in operating and maintaining the plant in accordance with the contract requirements," said **Russell Warren**, General Manager of John Thompson's IWTB unit.

John Thompson secures watertube boiler order for Philippines sugar mill

John Thompson's Industrial Watertube Boiler business unit, despite stiff competition from Indian boiler manufacturers and difficulties caused by the worldwide Covid-19 pandemic, has succeeded in securing a new watertube boiler order for Universal Robina Corporation's (URC) Sonedco sugar mill in the Philippines.

The Philippines is the second largest sugar producer among the Association of Southeast Asian Nations countries. URC is one of the largest sugar companies in the Philippines, operating a total of six sugar mills there.

The order for the 80tph capacity boiler, awarded in September this year and due for completion in January 2022, is a strategic breakthrough for John Thompson in South East Asia.

"Negotiations were tough, but **To page 12**



General arrangement drawing of new 80 tph bagasse boiler for URC.

From page 13

through constant price optimisation, a competitively priced, reliable and world class quality John Thompson boiler was brought to the table, securing the order," said **Lauren Barnard**, Design & Applications Engineer at John Thompson's Industrial Watertube Boilers unit in Durban.

The boiler is a girth-supported bidrum watertube boiler and will burn mill bagasse with its combustion equipment comprising a stationary pinhole grate, three-drum feeders and pneumatic spreaders. The final steam conditions are 32bar(g), 400°C, with steam temperature control achieved via a two-stage superheater configuration with interstage spray attemperation.

"The boiler will be unique in the sense that it incorporates a number of innovative features which contribute to the unit's high efficiency and reliability, at the same time reducing cost by adopting a value engineering approach to every aspect of the boiler," Lauren commented.

The innovative features include:

• First new watertube boiler to be supplied into the Philippines.

• Furnace sizing and panel wall configuration is non-standard in order to fit in a higher number of fuel feeders for reliability, while keeping the width of the boiler as small as possible. The fuel feeders will be custom designed to fit the narrow width of the boiler.

• First bi-drum watertube boiler with furnace tubes of 63.5mm OD pitched at 90mm, as per the John Thompson Microgen configuration. This higher fin-to-tube ratio results in a lighter pressure part component.

• High efficiency heat recovery tower incorporating an airheater-economiserairheater arrangement. The final airheater makes it possible to achieve a very high boiler efficiency far more economically compared to an economiser.

• Novel system employed to elevate airheater tube metal temperatures to avoid cold-end corrosion.

• Advanced over-fire air system developed by the Industrial Watertube Boiler unit's R&D department.

• Dry ash collection on all throw out hoppers for reduced effluent loading.

• Fixed vane scrubber gas cleanup plant with modular turn down capability.

• Simplified desuperheater (based on superior feedwater quality provided by the customer).

Optimised value-for-money offering.



Inventor model of boiler pressure part arrangement.

"Based on successful implementation and testing at a local sugar mill in KwaZulu-Natal, the boiler will be supplied with a novel hot overfire air system, which has proven to improve combustion and ignition of the fuel – a big advantage when burning high moisture fuels like bagasse and other fibrous biomass," said Lauren.

The innovative airheater-economiser-airheater arrangement in the heat recovery tower provides significant advantages.

"The airheaters are linked on the air side in a counterflow arrangement, thereby resulting in high undergrate air temperatures for efficient and stable combustion of wet bagasse, as well as a low final gas temperature to maximise boiler efficiency," Lauren explained. Fly ash disposal will be via a dry system with the boiler ash drop-out hoppers custom profiled to facilitate ash flow to the discharge points fitted with motorised double flap valves to maintain a gas-tight seal.

Emissions will be controlled using twin fixed vane wet scrubbers, allowing for turn down to 50% load. "The scrubbers will include a recycle system which recirculates the majority of the scrubber water, which will – together with the dry disposal system on the rest of the boiler – considerably reduce the load on the client's existing ash water clarification system," Lauren commented.

The furnace tubing and frame size configuration and fuel feeder pitching are specially customised to reduce cost.

John Thompson had to take a critical look at every component and aspect of the standard watertube boiler product in order to reduce costs and ensure its product remained competitive in the face of stiff competition from Indian and Chinese boiler manufacturers.

"As examples of the lengths we went to reduce costs, we have de-

signed our own steam silencers, which were previously expensive, bought out items and optimised the superheater interstage header arrangement and auto-vent system," Lauren remarked.

Proprietary John Thompson components such as the boiler pressure parts and combustion equipment will be manufactured in the John Thompson Bellville Works, while non-intellectual property components, such as ducting and steelwork, will be fabricated in the Philippines or neighbouring countries, to get the benefit of lower fabrication rates as well as reduced shipping costs.

Koeberg life extension welding contract awarded to John Thompson's B&E unit

John Thompson's Utility Boilers & Environmental (B&E) business unit has been awarded a contract to perform all the welding work involved in the replacement of the steam generators at Koeberg nuclear power station near Cape Town.

The steam generator replacement project, involving removal of the original steam generators and replacing them with brand new generators, forms a major part of a R20-billion programme being undertaken by Eskom to extend Koeberg's life by a further 20 years.

The six new steam generators, delivered to Koeberg in late-September and early-October this year, were manufactured and supplied by Framatome, a leading international designer and manufacturer of nuclear equipment. Each generator weighs about 380t and is 20m long.

Koeberg's existing steam generators, which were installed in the early-1980's when the nuclear plant was under construction, were also produced by Framatome.

Framatome will be removing the existing steam generators and will install the new generators in their place, while contracting John Thompson's B&E unit to remove all the existing piping and replace it with special steel piping imported from Europe. The B&E unit's contract involves welding of primary piping between the nuclear reactors and the new steam generators and secondary piping between the steam generators and the turbines.

The changeover operations at Koeberg's two generating units will be performed during two shutdowns next year, each lasting several months. One of the units is scheduled to shut down in February and the other in September, with three steam generators being installed in each unit.

John Thompson's B&E unit, based

in Kempton Park, Gauteng, is the only welding contractor in South Africa that has RD 0034 Level 1 status, representing official recognition by the National Nuclear Regulator of its competency to perform welding work in accordance with the stringent safety and quality standards applicable to nuclear power plants. The B&E unit is also the first South African operation of its kind to be commissioned to undertake such a contract.

"We have extensive experience with welding of main steam piping from boilers to turbines in coal-fired power stations, which is exactly equivalent to the work our welders will be required to perform in the present contract," commented **Herman Steyn**, the B&E unit's Nuclear Department Manager.

Up to 30 highly skilled welders employed by the unit will perform the welding involved and the unit will deploy in excess of 100 people on site at peak times during the shutdowns.

All personnel engaged on the con-

tract are required to undergo intensive safety training before being permitted to enter the Koeberg plant. Nuclear safety is in many respects different and more rigorous than the safety rules and procedures that are followed in other industries, due to the unique radiation hazards and dangers workers can be exposed to in a nuclear environment.

"The procedures we adhere to are in accordance with the Nuclear Safety Culture adopted by the International Atomic Energy Agency in the late-1980's following the Chernobyl nuclear disaster in 1986," said Herman.

"In the Nuclear Safety Culture and the integrated management system that forms part of it overriding priority is given to safety over all other issues. What this amounts to is that the Nuclear Safety Culture is far more than a set of rules and procedures to be followed – it is a way of life that people working in a nuclear environment have to be conscious of at all times while attending to their work," he emphasised.



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One of the first of a total of six new steam generators to replace the original generators at Koeberg is seen ready to be transported from Cape Town docks to the nuclear power plant.

Electrical Machines awarded pump motors order for Mapleton pumping station extension



Paulus Ngwenya, After Sales Operator, and Brian Robertson, Mechanical Designer, carry out final inspections of two large pump motors at Electrical Machines' plant in Benoni. These motors are similar to the pump motors the business unit is currently manufacturing for Rand Water's Mapleton pumping station in Gauteng and the Voelvlei High Lift pumping station in the Western Cape.

ACTOM Electrical Machines was recently awarded a contract by Sulzer Pumps SA to manufacture and supply a range of customised medium voltage motors to drive new pumps to be installed at Rand Water's Mapleton pumping station on the East Rand.

The new horizontal split-case pumps from Sulzer form part of an extension that is currently under way to double the pumping station's present pumping capacity of 600MI/day to cater to future growth in demand up to the year 2030.

The contract Sulzer awarded to Electrical Machines at the beginning of October this year for delivery at the end of April next year is for a total 12 x 11kV motors in ACTOM's well-known UNIBOX range of MV motors. Eight of the motors are intended for immediate installation and operation, while the other four are to be retained as spares. Those for immediate use comprise four 1950kW, two 1590kW and two 475kW motors. The spares consist of two 1950kW motors, one 1590kW motor and one 475kW motor.

In November last year Electrical Machines won a contract for the manufacture and supply of six 3.3kV motors to replace aging pump motors at Voelvlei High Lift pumping station at the Voelvlei water treatment plant, Western Cape, which forms part of the water supply system for Cape Town.

The contract, awarded by Inenzo Water, a Cape Town based contractor, manufacturer and supplier of water and wastewater treatment equipment, will be completed at the end of March 2022. It comprised five 1450kW UNIBOX motors to drive new horizontal split-case pumps produced by Inenzo to replace existing pumps at the pumping station and a single 450kW motor in Electrical Machines' MS4 hi-spec range of cast-iron MV motors to drive an existing horizontal split-case pump.

"In both the new contract for Mapleton and the contract for Voelvlei stringent technical specifications applied to the motors as ordered," said **Antonio Teixeira**, Electrical Machines' General Manager.

"Also for both contracts it was required that the product comply with a minimum local content in accordance with the Preferential Procurement Regulations. This requirement is applicable to designated sectors for product supply to state-owned enterprises and municipalities," he pointed out.

Medium voltage motors were designated in accordance with these regulations with effect from January 2018.

New substation for northern Ekurhuleni set to transform area into major growth point

ACTOM Power Systems (APS) has been awarded a contract for the establishment of an extensive new 88/11kV intake substation in northern Ekurhuleni, an area poised as a major industrial growth point.

The new Witfontein Ext 90 main intake substation will occupy a 1.5ha site adjacent to Eskom's Esselen 88/11kV substation. It is being established as a self-build project by a private sector developer on behalf of the City of Ekurhuleni, with the initial goal of powering a new IT facility.

"But the new substation goes well beyond catering solely for this project's immediate demand, as it will also provide a secure backbone for longer term development and expansion of the entire district," said **John McClure**, Power Systems' Operations Manager.

In addition to 80MVA of 11kV power dedicated to the developer's campus, the new substation will be initially equipped with a further 40MVA to cater for immediate municipal supply needs over the next few years.

"At the 88kV level the new substation provides Ekurhuleni Municipality with the flexibility and capacity to reconfigure the surrounding electricity distribution network from a basic rural layout to a fully-fledged industrialpurposed system," John commented. The project includes the erection of two 88kV incomer bays from the adjacent Eskom Esselen substation to the new substation and four outgoing 88kV overhead feeder bays for the extended district distribution.

The substation contract, worth over R70-million, was awarded to Power Systems in November 2020 and is scheduled for completion in October 2021. "This is a very tight programme, resulting from a delay caused by geotechnical complications surrounding a dolomite rock formation that could ultimately lead to sinkholes," John said.

This necessitated the appointment of a civil engineering consultancy to design specialised bulk earthworks, drainage and reinforced concrete raft foundations for ACTOM's equipment to attain sufficient loss of support coverage to withstand any foreseeable ground subsidence.

"Our responsibility consequently shifted towards integrating the electrical and civils interfaces and installing the substation underground earthing during the initial design and construction phase," John pointed out.

The bulk of the equipment for the substation will be supplied by ACTOM group divisions, as follows:

• Three 40MVA 88/11kV power transformers manufactured and supplied by ACTOM Power Transformers.

• HV circuit breakers, current transformers, voltage transformers, isolators and surge arrestors supplied by ACTOM's High Voltage Equipment division.

• NECRT transformers manufactured and supplied by ACTOM Distribution Transformers.

• Battery chargers and batteries supplied by ACTOM's Static Power business.

• Power and control cable and accessories supplied by ACTOM Electrical Products.

In 2018 APS was contracted by the same customer on a similar self-build project to extend the 132/11kV Airport Super Substation adjacent to the OR Tambo Airport to provide additional power needed for a related expansion project in Isando.

The extension contract required special vertical-make isolators identical to those installed in the original Airport Super Sub many years earlier. These isolators were obsolete, but ACTOM undertook to co-opt the services of the original designer, who was eventually tracked down after a prolonged search, and arranged with ACTOM High Voltage Equipment to manufacture a batch of these bespoke isolators for installation in the substation extension.



This graphic shows the layout and contents of the extensive new 88/11kV Witfontein Ext 90 main intake substation that ACTOM Power Systems has been contracted to establish in northern Ekurhuleni.

MV Switchgear successfully carries out internal arc testing of **RMV** ring main unit

ACTOM MV Switchgear has successfully carried out internal arc testing of its RMV ring main unit at the SABS National Electrical Test Facility's (NETFA) recently refurbished High Power test laboratory.

The tests on the RMV ring main unit, which was housed in an outdoor steel kiosk, were conducted in late-September this year in accordance with the SANS/IEC 62271-202 standard to achieve an internal arc classification of IAC-AB for an arc fault current of 20kA and duration of 0.5 seconds.

"This classification provides a classified level of safety in the event of an internal failure to both authorised operators and the general public, as required by the SA National Standard SANS 1874 for ring main units," said **Rhett Kelly**, MV Switchgear's Technology Development Specialist.

"Two tests were involved. One, designated IAC-B for the general public, had to be carried out with the kiosk doors closed, while the other, IAC-A for authorised personnel, was performed with the doors open," he explained.

Greg Whyte, MV Switchgear's Design & Development Manager, commented: "What makes this test unique for ACTOM and the industry is that the arc initiation point was within the switching compartment of the ring main unit, in contrast to internal arc testing we carried out previously, where the arc initiation point was located in the cable termination compartment.

"An important implication of initiating the arc fault in the switching compartment is that the fault is a full three-phase fault at 100% of the short circuit current rating, as opposed to a phase to phase fault at 87% of the rated short circuit current rating, as applicable to arc faults initiated in the cable compartment, where outer cone separable connectors are used," he said.

The ring main units used for testing had to be specially manufactured with the fault wire required for the arc initiation located inside the gas tank.

MV Switchgear's latest testing of its RMV ring main unit were the first tests performed since the NETFA High Power test laboratory, which had been out of service for many years, was returned to service recently after undergoing a comprehensive refurbishment of much of its test equipment this year. The refurbishments were performed



Posing in front of a RMV ring main unit in MV Switchgear's plant are (from left) Engineering Draughtsperson Victor Ferreira; Engineering Manager Piet Ferreira; Contracts Engineer Lucky Sengwayo; Technical Sales Consultant Linky Mdaka; Foreman James Schoeman and Technology Development Specialist Rhett Kelly.

jointly by ACTOM 's Marthinusen & Coutts and ACTOM Turbo Machines (**See story on Pg 21**).

"We are delighted that the SABS NETFA High Power test laboratory is up and running again, as the absence of any suitable alternative test facilities in South Africa meant that internal arc testing over the last number of years had to be carried out overseas at significantly higher cost," said Greg.

Rhett is an active member and task force leader of the IEC maintenance team 29 (MT29) responsible for the IEC 62271-202 standard to which the tests were carried out. He was also a task force leader on the working group 38 (WG38) responsible for the new IEC technical report (IEC 62271-312) providing guidance on the transferability of type tests carried out on equipment designed and manufactured in accordance with IEC 62271-202.

"The new IEC 62271-312 document, apart from providing for other options as agreed between manufacturer and user, can be used for the transferability of type tests performed on one or more prefabricated substations with a defined set of ratings and arrangement of components to another prefabricated substation with a different set of ratings or different arrangement of components. It supports the selection of appropriate representative test objects for that purpose in order to optimise the type testing procedure for a consistent conformity assessment," Rhett said.

"For example, the internal arc tests carried out on our 3-way ring main unit can be transferred, without further testing being required, to a 4-way ring main unit housed in a larger kiosk, provided the conditions of IEC 62271-312 are fulfilled," he explained.

"Following on from the publication of IEC 62271-307, which provides guidance for the extension of validity of type tests carried out on medium voltage metal-enclosed switchgear and controlgear, this concept provides a sound technical basis to optimise the number of type-tested variations and associated costs," Rhett concluded.

The RMV ring main unit, MV Switchgear's first co-developed gasinsulated ring main unit on offer in the local market, forms part of a range of non-extensible and extensible secondary distribution medium voltage switchgear for use in miniature substations, outdoor kiosks and indoor substations.

The non-extensible RMV ring main units, typically used in miniature substations and outdoor kiosks, includes three or four primary functional units with switching devices available in various combinations as required for the "ring main" and tee-off functions and include a switch-disconnector, switchfuse combination and circuit-breaker.

Available up to 24kV, the product was developed by MV Switchgear in conjunction with LS Electric, the industrial division of the South Korea-based multinational company LG Corporation.

Harmony Doornkop Gold Mine takes delivery of MV Switchgear's first SBV4XE switchgear order

The first sale of ACTOM MV Switchgear's new SBV4XE switchgear was made by the division's Carletonville branch in mid-2019 following the introduction into the market of the state-of-the-art airinsulated range at the reputable Electra Mining Africa exhibition in Johannesburg in September 2018.

The purchaser was Harmony Doornkop Gold Mine near Randfontein, which placed an order for an eight-panel 11kV SBV4XE board to replace an old eight-panel board comprising SBV2 switchgear originally manufactured and supplied several decades ago by ACTOM MV Switchgear for one of the mine's ventilation shafts.

"MV Switchgear's introduction of the new SBV4XE switchgear provided the mine with the opportunity it was looking for to upgrade the switchgear serving the ventilation shaft," explained **Jacques Smith**, Manager of the Carletonville branch.

"Not only had the mine already been experiencing difficulties finding spare parts for the old switchboard since the discontinuation of production of SBV2 switchgear several years ago, but it had also made a decision recently to install an extra feature in the ventilation shaft that made it essential to have a completely reliable switchgear board in place.

"The new feature is an emergency escape route in the vent shaft to permit mine personnel to exit the mine quickly and easily in the event of a system failure or accident underground," Jacques said.

Upon completion of production, senior technical personnel from the mine visited MV Switchgear's factory at Knights at the end of July to witness factory acceptance tests of the panels, which were delivered in early-August and installed and commissioned in October.

"The mine also ordered additional circuit breakers and a spare protection relay as backup to ensure that if any of the existing units failed they could be replaced without delay," Jacques pointed out.

Members of MV Switchgear's Carletonville branch installation team install cabling for the new SBV4XE switchgear board for a ventilation shaft at Harmony Doornkop Gold Mine.



P&C supplies automated test bench to City Power

ACTOM Protection & Control (P&C) was successful in winning a contract from Johannesburg's City Power in September last year to supply and install a specially customised automated test bench for the testing of meters.

The automated bench, designed and manufactured by P&C's Sloveniabased international metering technology partner Iskra Automation & Management Systems, was delivered and installed at City Power's meter test department's premises in February this year.

City Power purchased the stateof-the-art test bench to upgrade its capability for testing meters. The bench supplements and greatly enhances the capabilities of portable meter testing equipment that the test department was previously reliant upon for all test-



City Power staff-members, including Mokgadi Kahumba (second from left), Project Planner for the test department, pose in front of the automated test bench shortly after its installation in February this year.

ing of meters.

"The test bench ensures that our meters are verified to measure within the correct accuracy limits as per approved standards.

Our aim is to improve the accuracy of all meters for the sake of both City Power and its customers. We want to avoid losing revenue due to undercharging and at the same time ensure that consumers are not unfairly overcharged," said **Mokgadi Kahumba**, Project Planner for City Power's test department.

The bench is designed to perform tests on up to 20 meters of similar type simultaneously in a controlled environment. Tests on conventional (post-paid) and pre-paid meters of various accuracies can be conducted, ranging from Class 2.0 through to precision Class 0.2.

Active, reactive and apparent energy parameters from both direct connected (rated up to 100A) or instrument transformer connected meters, in both solid-state and electro-mechanical meter design, may be tested on the bench.

P&C wins protection and automation contract for Nampower's new Orange substation

Protection & Control (P&C) has secured a contract from Nampower for protection, automation and control equipment for the utility's new 132/33kV Orange substation in southern Namibia.

A worldwide relaxation in recent years of former longstanding tight relationships between OEM's and system integrators on protection, automation and control equipment enabled P&C to secure the highly prized contract.

The business unit has had contracts from Nampower before for such equipment until about 10 years ago, when the utility adopted a new set of specifications for its protection, automation and control equipment, resulting in P&C not being able to provide a compliant solution from its international technology partners.

In the interim, however, practices in the market have changed to allow system integrators like P&C to offer and sell equipment available from OEM's other than their own technology partners when their partners' equipment does not meet the specs as required by the end-user.

This change enabled P&C to bid for the Orange substation contract, which Nampower awarded in September this year against stiff competition from other suppliers. The contract is for the design, manufacture, testing, supply and delivery of protection, automation and control equipment for the new substation, which is being built alongside the Orange River on the border with South Africa.

"This is an important breakthrough for us. It is a great opportunity for us to re-establish the longstanding good relationship we previously enjoyed with Nampower. We look forward to winning more contracts in future with this key customer," commented **Marius van Rensburg**, P&C's Tender Manager for Protection Schemes & Substation Automation.

The panels to be supplied include HV feeder panels, transformer protection schemes and a buszone scheme. "All of these schemes are IEC 61850 Ed 2 compliant and will be integrated into a remote terminal unit (RTU) panel for communication to the control centre, as well as having a built-in local human machine interface (HMI)," Marius explained.

The contract, scheduled for completion in mid-January 2021, incorporates supply of protection and automation intelligent electronic devices (IED's) from US-based Schweitzer Engineering Laboratories (SEL).

"We have built up a lot of engineering knowledge and experience with 132kV substations and IEC 61850 based automation and control solutions. We are also familiar with SEL IED's, having undertaken a number of contracts in recent years that incorporated this equipment," Marius stated.

"Aside from the SEL IED's, all the design, manufacturing, integration and testing involved in the contract will be handled in-house by our capable engineering team," he added.

The balance of equipment to be manufactured and assembled includes panel housings, auxiliary relays, terminals and wiring.

Distribution Transformers meets new SABS standard for 16kVA to 3.15MVA units

ACTOM Distribution Transformers has successfully achieved the SA Bureau of Standards' new SANS 780: 2019 Edition 5 standard for single-phase 16kVA to 3.15MVA distribution transformers after having a sample unit undergo a series of tests at the SABS' National Electrical Test Facility (NETFA) recently.

The new standard represents a significant advance as it demands lower no-load and load losses than required under the SANS 780: 2009 Edition 4 standard that formerly applied to this range.

The transformers to which the newly-introduced standard applies are extensively used in the local market by Eskom, municipalities and electrical contractors.

The sample transformer that was put through the required tests at NETFA during July and August this year was a 200kVA 11000/420V oil immersed unit.

Distribution Transformers decided to provide a sample from the lower end of the range for testing to ensure that the fullest possible battery of tests



Junior Projects Engineer Augustine Baloyi conducts a routine test on a 200kVA 11kV/420V transformer under the supervision of Chief of Test Harness Mashicila in Distribution Transformers' test facility.

could be performed by NETFA on the unit, thereby enabling the division to assure its customers that all the requirements applicable in terms of the new standard have been met.

After a pre-test inspection and full routine tests monitored by a NETFA en-

gineer were carried out on the sample unit at Distribution Transformers' own test facility in Knights, Germiston, the following tests were performed on the unit by NETFA:

• Temperature rise test at the NETFA High Current lab.

OLD vs NEW REQUIRED LOSSES FOR A 200kVA TRANSFORMER						
Rating	Losses	"old" SANS 780:2009 Ed4	"new" SANS 780:2019 Ed5	Reduction / Saving (%)		
200kVA	No load loss	520W	320W	38%		
11kv/420V	Load loss	2700W	2600W	3.8%		

The above table shows the old vs new required losses for a 200kVA transformer.

• Short circuit withstand test at the NETFA High Current lab.

• Lightning impulse test at the NETFA High Voltage Lab.

Following the successful outcome of the NETFA tests, a post-test inspection for mechanical deformation of the windings and full routine tests were conducted at DistributionTransformers' facility, again monitored by a NETFA engineer.

"The reduction in losses will further assist our strained electricity generation sector," commented **Lee Mbenge**, Distribution Transformers' Projects Manager.

"The SANS type and special testing is onerous on the transformer, espe-

cially when it comes to demonstrating the ability to withstand short circuit by testing, whereby 115% of Un is used to calculate the short circuit currents, the total change in inductance does not exceed 4.0% per phase and the successive shorts can be repeated until there is less than 0.25% change," Lee concluded.

Distribution Transformers manufactures specially customised transformers for new solar plant

A contract awarded to ACTOM Distribution Transformers in March this year to manufacture specialised renewable energy transformers for a new solar photovoltaic (solar PV) plant in the Northern Cape had to be fast-tracked due to a delay resulting from the national lockdown aimed at limiting the spread of Covid-19.

The severely restrictive early stages of the lockdown placed a hold on business activities and production until the beginning of June. "We introduced overtime work to meet the deadline of end-August for completion of the contract. We therefore performed the whole contract in three months, in place of the period of about 5-1/2 months that had originally been scheduled for it," commented **Lee Mbenge**, Distribution Transformers' Projects Manager.

The contract comprised the design, manufacture and full type and special testing of the first unit, then manufacture and supply of the balance of 12 x 5.1MVA 33kV/660-660V liquid immersed, hermetically sealed renewable energy transformers for the Greefspan No.2 solar park located near Douglas in the Northern Cape as part of Round 4 of the national Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The plant will have a total production capacity of 55MW.

Distribution Transformers' client, Siemens Gamesa Renewable Energy (Pty) Ltd, the EPCM contractor for the project, stipulated that the units had to be able to withstand higher harmonic content that is generated by the Pulse Width Modulation (PWM) convertors without damage or degradation.

The division was required to prove this in advance by conducting a temperature rise test on the first unit it manufactured. "This was successfully conducted at a higher loading factor, taking into account the additional losses that would be generated by the higher harmonic content," Lee pointed out.

A further noteworthy feature in the design of the transformers is that they incorporate two independent low volt-

age compartments instead of just one.

"This is a relatively new feature which was also incorporated in the design of transformers we produced in a previous successful concentrated photovoltaic (CPV) plant contract we have done," Lee said.

"Each of the two LV compartments is linked separately to an inverter in the solar plant. This ensures continuity of supply, because if one happens to fail the other will continue to operate at its full capacity and maintain supply of power into the grid without generating any internal hot-spots which may be generated by leakage flux," he explained.



Chief of Test Ms Khuliso Mutheiwana (seated) monitors Test Technician John Seloga (centre) and Junior Projects Engineer Augustine Baloyi as they conduct a test on one of the renewable energy transformers for the Greefspan No.2 solar PV park in the Northern Cape.

LH Marthinusen repairs large induction motor

LH Marthinusen (LHM) recently repaired a 6t induction motor rotor, whose laminations were subjected to Stress Corrosion Cracking, a material failure mechanism which introduces cracks in susceptible material, due to a combination of applied stress and a corrosive environment.

"During machine assessment the rotor ventilation finger plates were found to be protruding from the surface perimeter. The core needed to be replaced due to the high risk of a consequential stator failure" said **Boris Breganski**, LHM's Electrical Engineer.

The original laminations and finger plates were individually manufactured from a single sheet and not as a segmented configuration. Cracking of the sheet material was observed on both the coated lamination steel and mild steel ventilation finger plates.

"Based on the manufactured single sheet configuration, the plate protrusions could only have occurred if the sheet material had fractured. It was deduced that the ventilation air contained certain contaminants or gaseous compounds, which had reacted with the sheet material, causing the observed corrosion," Boris pointed out. It was further observed that the lamination plates were found to be discoloured in the back iron region.

Samples of the fractured lamination

material were sent to a metallurgical laboratory for metallographic examination, hardness and chemical analysis tests.

The hardness test on both the discoloured and non-discoloured areas revealed that discolouration did not affect the material's properties.

A section of the coated plate sample was heated to 150°C for 30 minutes with no notice of discolouration. The conclusion was that temperature did not affect the coating, with the discolouration being more a product of a chemical reaction.

The metallographic examination revealed that the cracks were intergranular in nature with a branched appearance. The discoloured crosssection showed that heating had no visible effect on the microstructure and consisted of non-orientated, mostly polygonal, grains of ferrite.

The Scanning Electron Microscopy (SEM) examination on a section of material with cracks revealed high levels of Sodium typically associated with Caustic Soda (NaOH).

The failure mechanism was deduced as Stress Corrosion Cracking with the involvement of three elements. These elements are, firstly, stress caused by the outward radial, or centrifugal force due to the spinning rotor body; next, a corrosive environ-



This close-up picture shows some of the cracked lamination plates found in the induction motor sent to LH Marthinusen for analysis and repair.

ment, namely Sodium found in the cracks and, finally, susceptible material as evidenced by deterioration of the coating which exposed the alloy material to the environment," Boris said.

"Research showed that Sodium Hydroxide in certain chemical plant processes creates a corrosive environment for certain materials and may result in Stress Corrosion Cracking," he added.

The rotor was re-cored using the highest quality coated lamination steel available and put back into service.

Reid & Mitchell manufactures motor suspension units for wide-gauge rail locomotive

Reid & Mitchell (R&M) recently designed & manufactured motor suspension units (MSU's) and retrofitted them to three RM80 traction motors, operating on a standard gauge diesel-electric shunting locomotive.

The locomotive is to be deployed at Bombela Maintenance (Gautrain) as a special rescue and maintenance shunting vehicle.

R&M designed and manufactured the three traction sets with 292kW traction motors within four months, as required in terms of the contract awarded in August this year by Centurionbased railway company Evorail. Evorail specialises in bespoke technology for the maintenance, design and manufacturing of various types of shunting locomotives.

This followed the award to Evorail by Bombela Maintenance, the concessionaire company responsible for



A graphic representation of a traction motor with an MSU incorporated into it, as Reid & Mitchell is required to do with three 292kW motors in terms of its current contract for Evorail.

the maintenance and operation of the Gautrain, of a contract for the design and manufacture of a brand new standard gauge diesel-electric shunting locomotive.

The locomotive will be used on the Gautrain network for rescue of failed passenger units and the movement

of maintenance wagons. The locomotive was designed in line with strict international standards and in close collaboration with Bombela Maintenance to ensure seamless integration with the rest of their network. It features improved braking capabilities with a fully configurable braking system, including dynamic braking, retractable buffer stops and a configurable coupling system that allows full integration with a passenger train or a normal wagon.

The MSU's designed and manufactured by R&M replace an axle cap system formerly used to link the traction motors to the axles. The more modern MSU system is well proven to be more efficient than the axle cap system in performing this function.

This is the first MSU manufacturing contract R&M has been awarded for a wide-gauge rail locomotive. It successfully undertook a very similar contract five years ago involving the design, manufacture and retrofitting of MSU's for the traction motors of narrow-gauge line diesel locomotives.

NETFA's High Power test lab back in service after refurbishments by M&C

Marthinusen & Coutts (M&C) and ACTOM Turbo Machines (ATM) recently completed the refurbishment and return to service of the rotating machines at SABS's world class National Electrical Test Facility's (NETFA) High PowerTest Laboratory, just outside Johannesburg.

The High Power Test facility can generate up to 40kA and 14kV high power surges for short-circuit and internal arc testing – among other tests. There are only a handful of similar facilities in existence globally, using highly specialised 85MVA BBC Oerlikon generators to produce the very high currents and voltages required.

The work on these units required great skill, experience, dedication, meticulousness and infrastructure which M&C and ATM are known for in the industry.

The refurbishment of the equipment for the laboratory, which had been out of action for several years, was performed between November 2019 and August this year – with much of this being carried out during the tough conditions of the Covid-19 Lockdown. The refurbishment was for the lab's three main drivetrains, consisting of two 85MVA 14kV 3000rpm generators driven by 1MW wound rotor induction motors and one exciter drivetrain comprising an 800kW 1000rpm drive motor driving two DC generators supported by a 12.5t flywheel.

"The project is a good example of our division's electromechanical full solution offering and project management capability, giving the customer the peace of mind of having a single service provider ultimately responsible for their project," commented **Mike Chamberlain**, M&C's Commercial & Marketing Executive.

The full scope of work undertaken by M&C and ATM was:

• The removal, refurbishment and



Working on one of the 70MVA 3000rpm synchronous generators in the NETFA High Power test lab are (from left) M&C Field Service Technicians Sergio Bernardes and Andries de Lange and Field Services Manager lan Solomon.

recommissioning of the two 85MVA generators, drive motors and all the exciters.

• On-site refurbishment of the liquid resistance starters.

• Repair and servicing the lubrication system.

• Repair and servicing the ventilation system.

• Servicing the de-watering pump system.

• Refurbishment of switchgear components, bus bars and bushings.

• Cleaning and painting of the High Power Testing facility.

• Numerous additional aspects that arose during the recommissioning.

The High Power test laboratory is just one of three test facilities at NETFA, the other two being a High Voltage test lab and a High Current test lab. The High Power lab is also one of only three such facilities globally and is unique in being the only such facility located at an altitude substantially above sea level.

The world-class facility is now fully operational again and ready for testing

the following products:

- Power and distribution transformers
 Medium voltage switchgear and control gear
- High voltage fuses
- Prefabricated substations

 Medium voltage flameproof plugsocket assemblies

- Substation conductors and accessories
- High voltage switches
- Power cables
- Medium voltage terminal boxes
- Overhead line fault detection devices
- Current and voltage transformers
 - Earthing and short-circuiting cables.
 Lucas Monyai, Senior Manager of

NETFA's Laboratory Services Division, and **Seth Mnisi**, Manager of the High Power testing laboratory, complimented M&C and ATM for completing the project under difficult circumstances and for going well beyond their original scope to address unusual problems that arose during the recommissioning process.

ACTOM Turbo appointed local distributor for top international manufacturer of industrial bearings

An agreement appointing ACTOM Turbo Machines as exclusive distributor in Sub-Saharan Africa for Miba Industrial Bearings (Miba IB), one of the world's leading manufacturers of industrial bearings, was signed recently.

The agreement became effective at the beginning of March this year. Miba IB designs and manufactures the well-known Sartorius, Orion and TCE brands of industrial bearings for industrial equipment. The company has two manufacturing facilities in the US and one in Germany

"The distribution agreement enables us to offer a comprehensive bearing solution to the industrial market in the Sub-Saharan region," said **Mark Gulbis**, ACTOM Turbo's Project Engineer responsible for business development.

"Besides covering all sales of Miba IB products in the region, the agreement also makes provision for us to perform customer support services that include installation of new bearings as well as carrying out inspections and exchanging new bearings as required."

He added that there is a substantial installed base of Miba IB's bearing products in the region. "In addition to there being scope for us to grow the user-base through sales of new product, the distribution and product support agreement places us in a position to provide new product at more competitive prices and improved deliveries than previously."

He explained that ACTOM Turbo is the first local distributor appointed for Miba IB products. "Prior to this the company's bearings were supplied and supported via OEM's for the equipment, resulting in end-users generally having to pay higher prices. A further important advantage we offer customers as exclusive local distributor is that we are on call to attend to all their bearing requirements at short notice," Mark pointed out.

He described the tie-up with Miba IB as "a perfect fit". "They offer a range of superb products, while we at ACTOM Turbo, with our extensive experience as a turbomachinery and high speed rotating equipment specialist service provider, have the expertise to complement this with fully comprehensive service and support to customers," he commented.



Tilting pad journal/thrust bearings – one of a wide range of products now on offer by ACTOM Turbo Machines as a result of its recent agreement with Miba IB.

Rubystar solar-powered domestic geyser heating system from Satchwell proves a winner

A unique solar-powered domestic geyser heating system on offer by Satchwell Controls, ACTOM's Paarl-based heating element and temperature control specialists, is proving a winner, thanks to a host of advantages it has over conventional solar geyser heating systems.

Since it introduced the system, known as Rubystar, into the local market in 2017 in partnership with Stellenbosch-based Rubystar, developers of the system's control unit, Satchwell has won contracts all over South Africa to supply it for installation in individual households and multistorey residential developments.

Satchwell's latest contract, completed in August this year, was for Waterfall Ridge Estate, a new multistorey residential complex in Midrand, Gauteng, comprising a total of 384 units.

"The Rubystar smart control unit is the crux of the whole system and incorporates all the features that make it unique. Satchwell, which supplies the solar photovoltaic (solar PV) panels that comprise the system's other key component, has an exclusive agreement with Rubystar to market and sell the system in Southern Africa," said **Chanelle Keyser**, Satchwell's National Sales Manager.

The Rubystar control unit overcomes many of the problems associated with conventional solar geyser heating systems, as it converts solar panel generated DC power to AC power to heat a standard mains-powered geyser element directly. "This involves retrofitting a geyser that is normally powered by Eskompower to enable the user to rely on low-cost solar power while continuing to have access to Eskom power as an alternative electricity source if and when needed," Chanelle explained.

Rubystar is well-suited for use in multi-level residential complexes because it eliminates the need for solarheated and piped water, as required in a conventional solar heating system. At



Pieter van Zyl, Managing Director of Rubystar, holds a main internal processor board of a Rubystar inverter. On the display board behind him is a Rubystar inverter, while a sample solar thermal flat plate collector is displayed on the right.

the same time it is much less costly to install and maintain, as not only does it make use of the already existing geyser, but no piping is required and maintenance costs are minimal.

"Finally, Rubystar is also highly efficient, due to heating the element in the geyser directly, instead of having solar-heated water piped from the roof

to the point of use, with resultant heat loss, as applies with a conventional system," Chanelle remarked.

A major advantage, among others, of converting DC power to AC power, as Rubystar does, is that it overcomes the problem of electrolysis, which DC power causes when used for heating a geyser element. Electrolysis causes

a gradual clogging up on the element of minerals and other impurities contained in the water, resulting in steadily reduced heating efficiency in the element over time. DC power also tends to shorten the life of the thermostat due to arcing, whereas with AC power this risk is avoided.

Key appointments

Herman Mare has been appointed General Manager of Protection &Control (P&C) with effect from August 1, 2020.

Roman Mornau, has been appointed General Manager of Metalplus with effect from September 1, 2020.

Herman Steyn has been appointed Nuclear Department Manager at John Thompson's Utility Boilers & Environmental business unit with effect from February 1, 2020.

Sanette Smith has been appointed Quality Assurance Specialist and Nuclear Safety Culture Coordinator at John Thompson's Utility Boilers & Environmental business unit with effect from February 1, 2020.

Terrance Kalichurand, has been appointed General Manager at LH Marthinusen Durban, with effect from

Herman Mare



Roman Mornau



Nepile Nyakane

Silas Moabi



Simon Liutluleng

May 1, 2020.

Baldwin Senoamadi has been appointed Key Account Manager at LH Marthinusen with effect from September 1, 2020.

Nepile Nyakane has been appointed Manager HV Motor Coils at LH Marthusen with effect from March 1.2020.

Silas Moabi has been appointed Manager Small Transformers at LH Marthusen with effect from February 14, 2020.

Maryna Tusik has been appointed Tendering Specialist at Signalling with effect from October 19, 2020.

Johan Botha has been appointed Project Office Manager at ACTOM Industry with effect from January 6, 2020

Andreas Bahne has been appointed Application Engineer at ACTOM Industry



Herman Steyn



Maryna Tusik



Milton Xaba



Sanette Smith



Johan Botha



Lucky Sengwayo

with effect from August 24, 2020.

Dewald van Vuuren has been appointed Winder Engineer at ACTOM Industry with effect from October 12, 2020

Simon Liutluleng has been appointed Production Manager: Highbay at MV Switchgear with effect from February 1, 2020.

Milton Xaba has been appointed Production Manager: Primary & Welding at MV Switchgear with effect from June 8, 2020.

Lucky Sengwayo has been appointed Production Manager: Outdoor at MV Switchgear with effect from October 1, 2020.

Syndicate Buthelezi has been appointed Production Control Assistant Manager at MV Switchgear with effect from August 1, 2020.





Terrance Kalichurand Baldwin Senoamadi



Dewald van Vuuren



Andreas Bahne

Syndicate Buthelezi

Signalling's installation subcontract on East Rand provided work for local communities

In the second half of this year ACTOM Signalling undertook a signalling installation subcontract at four Metrorail stations on the East Rand for which it hired semi-skilled and unskilled people recruited from nearby townships to perform much of the work involved.

The subcontract was for the installation of new signalling equipment at Oosrand and Driehoek stations in Germiston and at Katlehong and Kwesine stations in Katlehong township.

The terms of the subcontract included a requirement to provide employment to jobseekers from local formerly disadvantaged communities.

Signalling recruited and employed a total of about 130 people, among whom were also employees of several black-owned small businesses operating in the area.

"The recruiting was done with the assistance of community liaison officers recommended to us by local councillors. Everyone we employed had to go through medical induction to ensure they were fit to work, including getting medical clearance for Covid-19. We also provided work induction training aimed at making sure everyone observed safe procedures while working on the railway lines," said **Leonard de Villiers**, Signalling's Contracting Manager.

"Community members were employed as general workers, while for the more specialised work such as trenching and backfilling, security and concrete pouring we took on various suitably equipped and qualified small businesses," he explained.



Workers recruited by ACTOM Signalling from nearby settlements lay cable and perform concrete work at Oosrand Station.

Signalling staff celebrate SA's cultural diversity in style on Heritage Day

The Covid-19 restrictions didn't prevent Signalling staff-members from celebrating Heritage Day in grand style.

Whereas some ACTOM divisions elected to treat Friday, September 25 – the day after the Heritage Day public holiday – as just another working day, staff from Signalling at Driehoek and MV Switchgear and Protection & Control at Knights took the opportunity to make the most of this once-a-year celebration of the great diversity in cultures and traditions among South Africa's population groups by dressing up and enjoying the occasion as much as the Covid-19 restrictions would allow.

There was a large turnout of staff from Signalling in particular on that day, with many dancers dressing up in their respective colourful national and tribal outfits and the majority of them taking part in dancing in unison in the courtyard at the division's Driehoek premises in time to the popular South African ballad "Jerusalema" that has taken the world by storm in recent months – not neglecting to have the dancers and music recorded on video to show to family and friends at home afterwards.

The dancers were supported and encouraged by the rest of Signalling's staff.



Signalling staff-members celebrate Heritage Day dressed in traditional attire (from left): Loretta Kunn, Ayanda Hlatswayo, Sifiso Skhakhane, Esme Hector, Violet Barends, Mmareta Modise, Roger Marakalala, Nozipho Mbangula, Lethiwe Mpofu, Joyce Mtshali and Silindile Matola.



Getting into the spirit of Heritage Day are Protection & Control (P&C) staffers (from left): Gavin Mthembu, Internal Sales and Administrator; Patricia Masegela, Senior Technical Sales - Metering; Herman Maré, P&C's General Manager, and Marna Kirkland, Personal Assistant to the GM.

Mphumuzi Khoza of MV Switchgear named SA winner of IEC Young Professionals Competition

Mphumuzi Khoza, 24, a Trainee Tendering Engineer at MV Switchgear, is the South African winner for 2020 of a technical essay competition that is held annually by the International Electrotechnical Commission (IEC).

Mphumuzi was one of nine local participants shortlisted to take part in the IEC Young Professionals 2020 Competition. All participants in the competition from around the world were required to write an essay on the same topic, which was about the threats associated with remote monitoring and controlling of industrial machinery and how they may be mitigated in the standardisation process.

The local entries were assessed during June this year by a panel of expert assessors appointed by the local committee of the global standards authority based at the SA Bureau of Standards (SABS). Mphumuzi was notified at the end of July of his success in winning the South African competition.

"It is very unfortunate for Mphumuzi that he missed out on attending this year's IEC General Meeting that was to have been held in Stockholm, Sweden, in October this year but which had to be cancelled due to the restrictions on travel and the holding of gatherings arising from Covid-19," said **Rhett Kelly**, MV Switchgear's Technology Development Specialist, who together with **Greg Whyte**, the division's Design & Development Manager, have been mentoring Mphumuzi in his training at MV Switchgear.

However, the 2020 young profes-



Rhett Kelly and Mphumuzi Khoza, SA winner of the IEC Young Professionals 2020 essay competition, pose together in front of MV Switchgear's vacuum interrupter plant clean room.

sionals will be eligible to participate in the 2021 IEC Young Professionals Programme, including the Workshop at the 2021 General Meeting in Dubai, UAE.

The SA National Committee (SANC) of the IEC, of which Rhett is a core member, is responsible for the South African candidate selection process and essay assessments. The programme is aimed at young engineers, technicians and managers between the ages of 20 and 35, with the primary purpose of exposing young professionals to the standardisation work of the IEC.

Mphumuzi commented: "I am honoured to be awarded this opportunity, as participation in such a programme will be a vehicle for learning and understanding IEC work and its objectives, such as IEC standards development processes, foundations for leadership and technology strategies. In addition, it will grow me personally and professionally in my career. It is also valuable for the company to encourage young professionals as part of IEC and SABS standardisation succession planning."

Mphumuzi joined MV Switchgear in September 2017 as a Power Engineering Trainee and was appointed to his present position as a Trainee Tendering Engineer in December 2018. He has a National Diploma in Electrical Engineering from Durban University of Technology and a Bachelor of Technology in Electrical Engineering from the University of Johannesburg.

Two ACTOM participants in hazardous Lowveld Croc canoe race experience mixed fortunes

With almost all the major canoe races being cancelled in 2020 due to the Covid-19 pandemic, the Lowveld Croc Canoe Marathon near Nelspruit in Mpumalanga, one of the few that did happen, attracted a strong field of paddling enthusiasts.

Among the more than 60 K1 contestants who turned up at the start on the Crocodile River below Kwena Dam on the morning of October 17 were two of ACTOM's well-known campaigners, Sub-veteran **Loveday Zondi** of Electrical Products and Grandmaster **Craig Johnston** of LH Marthinusen.

Loveday said that due to not being as fit as he would've liked to be on account of not getting sufficient training and being unable to participate in other races beforehand, as well as taking a couple of spills and getting



Loveday negotiates one of many rapids encountered on the hazardous course.

tangled in a bunch of trees along the way, he didn't do as well this year as on his previous five outings on this narrow and hazardous 30 km course. "I always finished among the first five in the other Lowveld Croc races I've taken part in, but this time I ended up in seventh place," he said. He recorded a time of 2 hrs 25 mins.

Craig, who has participated in the Lowveld Croc race on at least three previous occasions, said he found it "very tricky" this time round.

He was forced to withdraw from the race about 8 km from the finish after his boat sustained damage that prevented him from continuing.

ACTOM divisions and business units

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 offers 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 environmental solutions. We offer a comprehensive range of air filtration and dust collection equipment for both utility and industrial plants. John Thompson also provides outsourced steam solutions.

POWER CONVERSION

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: (011) 899-1111

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: (011) 899-1111

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

HVAC Systems, Durban: (031) 700-3286 HVAC Systems, Cape Town: (021) 981-0111

www.actom-hvac.co.za

HVAC Systems designs, supplies and installs industrial ventilation, heating and air-conditioning systems for the petrochemical, paper, pharmaceutical, mining, food, textile and various other industries.

Static Power: (011) 397-5316

Static Power Specialize in the design and manufacture of AC and DC standby equipment, including thyristor type battery chargers (Micro Process Controlled option), industrial batteries, power supplies, rectifiers, DC/DC converters, DC/AC inverters, furnace control panels, capacitor trip units, battery trip units, power distribution boards. All systems are designed and engineered to suit their purpose.

Alkaline Batteries: (011) 397-5326

Alkaline Batteries, is the South African Distributor for ALCAD and SAFT industrial nickel cadmium and Lithium Ion batteries for the industrial, telecoms, rail and renewable energy markets. Services offered; Installation, Commissioning, Battery Sizing, Testing, Training, Maintenance and Repairs.

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.

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.

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 & PROTECTION

MV Switchgear: (011) 820-5111

Leading manufacturer and supplier of air-insulated (AIS) and gasinsulated (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.

Protection & Control: (011) 820-5111

ACTOM Protection & Control is a market leader in the supply of protection and metering 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.

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 to power utilities, 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 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.

MARTHINUSEN & COUTTS

Marthinusen & Coutts: (011) 607-1700

www.mandc.co.za

M&C 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: (016) 971-1550

www.actomturbo.co.za

ACTOM Turbo Machines is a mechanical turbo-machinery and highspeed 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: (011) 433-1880

www.metalplus.co.za

Metalplus is an expert mechanical facility. It has pioneered Submerged Arc Micro welding in South Africa. It's core competencies are machining of new shafts and repair, grinding and micro welding of all types of rotating equipment and other mechanical components, as well as the mechanical repairs of a wide range of electrical components (traction motor casings, electric motor casings, end/bearing caps, etc.).

ELECTRICAL EQUIPMENT

Electrical Products: (011) 878-3050

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 and employs a team of expert designers, with further technological support available from a leading international designer and manufacturer of luminaires.

ACTOM ENERGY

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.

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