

Featuring: ACTOM'S dedication to employee's complete wellbeing.



Positive developments signal better prospects for Group business

Our country started off this year with a very tough spate of COVID-19 infections resulting from the second wave and this had a direct impact on our operations and on the lives of many of our colleagues. We have however managed to get things under control over the past few months.

As we are currently in the midst of the third wave it is important that we be extra vigilant and take precautions to safeguard ourselves and those around us. As the COVID-19 vaccine rollout continues it is imperative that we maintain the precautionary protocols in place, as this virus and varying strains of it may be with us for years to come.

Our economy is projected to grow at approximately 3.1% for this fiscal year. This growth is expected to result from global stimulus packages which are triggering a commodity boom. South Africa and sub-Saharan Africa will benefit from this and we are starting to see this throughout our operations.

On the energy front there have been various positive developments emanating from the REIPPP programme as well as the launch of the Round 5 IPP programme. These developments are expected to manifest in firm orders over the next six months. This would give relief to our manufacturing operations, which have been relatively subdued over the past year.

I would like to commend our management teams for the results delivered over the past financial year. We have done relatively well under extremely tough conditions. Working

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capital and cash were managed on an exemplary basis. I would also highlight that our management teams have been extremely creative to adapt business operations to be aligned to market conditions. More than 75% of company profit came out of repairs and services activities, which is indicative that customers have been in a careand-maintenance mode by maximising utilisation of existing assets.

I am very optimistic that the coming year will see a major positive trajectory as various infrastructure initiatives start to gain momentum and this would result in a capital cycle stimulus.

Government has reaffirmed its commitment to localisation and industrialisation, as is evident through various initiatives of the DTIC. It is also interesting to note that there are various positive developments as regards the African Continental Free Trade Agreement. The intent is to grow trade activities and industrialisation which will ultimately grow the African continent. As part of a recent reorganisation of some of the divisions within ACTOM, a new division, ACTOM Smart Technologies, has been created which is specifically focussed on enabling the group to embrace the Fourth Industrial Revolution. The new division forms the basis of a platform from which to expand ACTOM's business in the information and communication technology (ICT) space.

It is absolutely crucial as a country and a company that we grow by developing skills and attracting talent which is aligned with the requirements of the Fourth Industrial Revolution. We need to position ourselves to have resources required for jobs in 5 to 10 years from now. We need to embrace the new technologies available and actively seek to reinvent ourselves with regards efficiency and product offerings which are linked to the demands of the future.

There is a growing trend of community unrest which stems from the present unemployment crisis. This is a social crisis which is a major sustainability risk to our economy and country. It is crucial that companies like ourselves proactively seek opportunities to embrace local communities wherever we undertake activities in our operations. We need to actively create employment opportunities and develop people so that they have the required skills sets and avenues to sustain themselves.

All South African citizens need to stand together to turn around the current crisis.

Mervyn Naidoo

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Cover: An illustration depicting the all-encompassing and inextricably linked components of wellbeing.

Wellness at ACTOM

Never before has the resilience of ACTOM's wellness programmes been tested like they have since the onset of the COVID-19 pandemic. Staff have needed support on so many levels – health, mental and trauma counselling, and financial support through advice and job stability. It's at times like these where the value of established and trained HR teams and partnerships with specialised, in-house, and outsourced wellness networks become evident.

Wellness is so much more than just health and physical well-being. It relates to the material or financial, physical, psychological, social, cultural, environmental, and spiritual wellness of each member of the team.

"An employee cannot possibly be doing their job to the best of their ability if they're doing it on an empty stomach or wondering which debt collector would call next about outstanding accounts, or worse still, mourning the loss of a loved one," explains **Sylvester Makamu**, Group HR Executive.

"As a company, we believe it's our responsibility to help our employees, as much as we are able to, to lead well-balanced lives. We achieve this by empowering our human resource staff with the resources and knowledge to enable employees to make educated choices, or to direct employees to the professional help they may need when they find themselves in a difficult situation."

Many of the divisional HR teams outsource various aspects of wellness management to companies specialising in this field.

"Our employees' overall wellness impacts the health of the business performance and climate. When we come to work, we bring along with us everything that is a part of us, and for this reason, it's important that we support our employees to be the best that they can be in the workplace," said **Alleyzandt Verhufen**, Divisional HR and Training Manager, John Thompson.

Alleyzandt goes on to explain that the business contracts the services of a wellness group for all business units across the John Thompson division. This group provides psycho-social services to the John Thompson employees to ensure financial, legal, mental, social, and emotional well-being. Concerns are addressed through telephonic counselling, one-on-one coun-



The Occupational Medical Clinic at Knights is staffed by, from left to right, Occupational Health Practitioner Ina Snyman; Occupational Health Technician Rehka Pillay; Occupational Health Assistant Makotong Bosoma; and Occupational Health Practitioner Suzan Monare.

selling or through a coaching process. Should certain trends develop among employees, these are highlighted and addressed with management and in some instances management on a group basis.

"We've previously, through our wellness provider, facilitated a group financial clinic to help staff better understand how to manage debt and plan for the future, as many of our staff were battling with their finances. Prior to the COVID-19 lockdown, we facilitated a session on planning and prioritising techniques to reduce stress."

John Thompson hosts annual wellness days for staff. This has, however, not been possible during the COVID-19 pandemic. Traditionally, wellness days form part of a wellness prevention strategy. A network of service providers are invited to share information with staff on a variety of wellness topics and themes.

"I believe another important aspect of wellness is employee retirement planning. We encourage employees to take an active interest in their retirement savings and to start saving early! We arrange meetings with our consultants to allow employees to use the planning tools available to one day retire comfortably and continue to live well," said Alleyzandt Verhufen.

The divisions situated at Knights in Germiston all use the services of the on-site Occupational Medical Clinic and the services provided by Occupational Health Practitioner **Ina Snyman** and her team.

The team is responsible for the physical wellness of some 1,600 individuals. They conduct regular medi-

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Ofentse Mosaka, a Dismantler at Reid & Mitchell receives his annual flu vaccine from Occupational Health Nursing Practitioner, Pulane Jiyana.

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cals with all staff, with the regularity depending on the nature of the employee's work. If any issues are picked up during these medicals, they are referred for further check-ups, and the clinic assists them in any way they can.

"This past year has been slightly different for us because of the sudden need to provide support with the COVID-19 pandemic. The ACTOM COVID-19 pandemic strategy has been detailed in What's Watt, but the one thing that stands out for me is how we all pulled together as a team and tackled an unseen enemy doing its best to attack the wellness of not only our organisation, but the world. I believe that it has made us stronger," said Sister Ina Snyman.

"It's far from over, and we need to be mindful of the mental strain this pandemic has had on so many. But we've also seen such a great sense of community. We won't let our guard down now, and we'll continue to fight this pandemic and provide the support we have since the start."

Wellness education is also addressed through Toolbox Talks at Knights. Shift managers or supervisors discuss topics often determined by the workforce. The staff at the clinic assist in putting this material together.

Those divisions contracted to outsourced wellness groups receive regular educational material to share with staff as **Leticia Marais**, Manager: Human Resources, Medium Voltage Switchgear explains: "Our outsourced wellness partner shares regular and relevant awareness material with us



John Thompson has an on-site clinic at its Bellville office, run by Occupational Health Nursing

Practitioner Annah Tladi. Here, Annah is conducting a basic medical on staff member Jack Bredenkamp. that we circulate to colleagues to raise awareness of wellness issues. The material is eye-catching and easy to understand, making communication of complex issues much easier." with testing conducted on-site as well as assistance for ARV programme registration and ongoing management. Many ACTOM sites have their own clinics which regularly monitor

Counselling and support for staff based at Knights is handled by an outsourced company which sends qualified counsellors once a week for face-to-face counselling.

Through these outsourced arrangements, many of the ACTOM divisions and businesses provide staff with access to dedicated, unlimited telephonic counselling and support via a 24 hour a day, seven day a week counselling and support call centre for employees battling mental health illness, stress, and trauma.

Outsourced companies also provide HIV management and support



Ferdi Swart, Divisional HR Manager, ACTOM Engineering Projects and Contracts, provides regular counselling and support to staff.

with testing conducted on-site as well as assistance for ARV programme registration and ongoing management. Many ACTOM sites have their own clinics which regularly monitor diseases such as high blood pressure, cholesterol, glucose, and obesity. In some instances where such clinics are not available, chronic diseases such as these are managed through medical aids or outsourced wellness groups.

"The wellness of our staff is very important but is also a specialised field and one that M&C has outsourced for many years now," said **Paul De Nobrega**, Division Risk Manager for Marthinusen & Coutts.

He went on to explain that M&C has an onsite clinic where pre- and post-employment health checks and regular medicals are conducted. There is also a referral system should staff need to see a doctor. The Occupational Health Nursing Practitioner carries out checks on first aid boxes in the factory for health and safety compliance. Outsourced partners ensure that staff receive regular wellness information across a broad range of relevant topics.

Pulane Jiyana is the full-time Occupational Health Nursing Practitioner at the on-site clinic at Reid & Mitchell. She is responsible for the wellness of its staff and provides occupational and primary healthcare services. She is supported by a doctor who visits the clinic once a week and an outsourced wellness group which sends a representative to assist with HIV testing and counselling. Sister Jiyana receives educational material from this partner and other suppliers, and displays it in the clinic to share in-

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Occupational Nursing Practitioner Pulane Jiyana is also responsible for health and safety audits in public areas such as ablution facilities and the canteen.

formation with staff members relating to their condition.

"Another area of wellness that I'm passionate about is physical fitness because I understand the importance of exercise for good health. I hope, after this COVID-19 pandemic, to be able to initiate some sporting or exercise programmes within Reid & Mitchell," says Sister Pulane Jiyana.

"I think something we mustn't forget about as part of wellness is job

security," says **Sybrand Nel**, Divisional CEO of ACTOM Engineering Projects and Contracts.

"We have worked tirelessly to ensure job security for our staff during the COVID-19 pandemic, and for the long-term wellness of our staff and their families. Although we aren't out of the woods yet, we believe that we have a sound business plan in place."

"The COVID-19 pandemic has taught us that we can't take well-being or business-as-usual for granted. Now more than ever, people are looking more closely at their lives and weighing up what really matters. It shouldn't take a pandemic for us to do that, though. We should be looking after ourselves and our loved ones all the time. It's so important that we educate ourselves and choose wisely for the future, and I hope that through our various wellness programmes we are able to share information with our colleagues to aid this process," says Mervyn Naidoo, Group CEO.

Group supplies oximeters to assist employees who test positive for COVID-19

An initiative aimed at providing additional assistance to ACTOM employees during the COVID-19 pandemic was launched in February 2021, when the group purchased 20 oximeters to enable employees who have tested positive to monitor their own condition.

The oximeters have been distributed to the group's sites on the East Rand and a decision to acquire and distribute more meters to sites elsewhere around the country is likely to be made later, based on how effective the present initiative proves to be.

An oximeter is a device that instantly displays the oxygen saturation in a person's blood, as well as his heart rate, after being placed on a finger.

"It is very simple to use, just put your finger in the oximeter and check the oxygen saturation level and heart rate once it appears on the meter. If a person's saturation level falls below 90 or his heart rate is higher than 110 beats per minute then he is at risk and must immediately consult a doctor or arrange to be admitted to hospital," explained **Sister Ina Snyman**, ACTOM's Principal Occupational Nurse based at Knights, who also manages the COVID-19 screening facility at the



Paul de Nobrega, Marthinusen & Coutts' Risk Manager, demonstrates to an M&C employee how an oximeter is used to check one's oxygen saturation level and heart rate.

Knights site.

The safety managers at the East Rand divisions, who are managing the positive cases at their sites, are responsible for handing out oximeters to anyone who tests positive for the disease and also instruct them how and when to use them.

"They take the oximeters home with them and are advised to check their saturation levels and heart rates at least three times a day and whenever they experience shortness of breath. It is strongly emphasised to them that they need to take immediate action to go to hospital or see a doctor if either of the two readings shows them to be at risk, since early intervention can save their lives," said Sister Ina.

"Without the aid of an oximeter a person is unable to detect that his/her condition is deteriorating. They therefore run the risk of being admitted for treatment too late, resulting in severe disease, more complications afterwards and even death," she added.

University of Pretoria presents 'Chancellor's Medal' to Andries Mthethwa

ACTOM's Chairman, Andries Mthethwa was honoured by the University of Pretoria in April this year in recognition of his contributions to industry, society and the Faculty of Engineering, Built Environment & Information Technology over the past seven years as a member of the Faculty's Industrial Advisory Board.

The University's prestigious Chancellor's Medal (Gold) was presented to Andries by Prof Wiseman Nkuhlu, the Chancellor, on 19th April 2021 at the start of the virtual graduation ceremony for under-graduate and post-graduate students in the Faculty who completed their studies in the 2020 academic year.

At the invitation of the University, Andries gave a speech as part of the Chancellor's Medal award presentation. In the speech, delivered mainly for the benefit of the new graduates who attended the graduation ceremony online, he focussed attention on the challenging circumstances that the majority of engineering graduates entering the job market could expect to have difficulty securing a job in their chosen field, despite the well-known fact that engineers are in short supply in Southern Africa.

He further emphasised the need for engineering graduates to engage in continuous professional development, especially in view of the rapidly evolving digital and information technologies.

He urged graduates to strive to come to terms with the need to acquire extra skills to add to their engineering qualification to improve their chances of being employed in the current difficult economic climate. They should therefore set out to learn management, sales, marketing, commercial and accounting skills, among others, to add to their technical qualifications.

"I would also advise you to give serious consideration to the idea of launching your own business and start taking the necessary steps towards achieving this. In short, start exploring ways of establishing yourself as an entrepreneur, thereby becoming a job creator rather than a job seeker," he suggested.

"This potentially offers better job security and a clearer career path than if you are exposed as an employee to the vagaries of a struggling economy," he added.



Andries displays the Chancellor's Medal and Certificate he was awarded by University of Pretoria in April.

Group divisions restructured to better meet market requirements and trends

Several ACTOM divisions have recently been restructured to enable the group to better meet the requirements of the various markets it serves, as well as cater to burgeoning new markets and needs.

A key part of the restructuring, which took effect on April 1, 2021, is the repositioning of the group to meet the challenges posed by new technological and other developments that are taking place in the electro-mechanical market, in which ACTOM plays a leading role in Southern Africa and beyond.

"One of the main developments which we have taken steps to address is the Fourth Industrial Revolution (4IR), which is in the process of rapidly changing the face of the principal markets we serve," said Group CEO **Mervyn Naidoo** in announcing the changes.

"One of three new divisions that

have been created in the restructure, the ACTOM Smart Technologies division, is specifically focussed on enabling the group to embrace 4IR, while its constituent business units will continue to cater to the ongoing existing requirements of their present markets," Mervyn said.

The ACTOM Smart Technologies division comprises the Protection & Control (P&C) business unit and the Static Power family of business units, consisting of Static Power, Alkaline Batteries and COM 10.

"The creation of the ACTOM Smart Technologies division highlights the key purpose on which the divisional changes are based, which is to achieve synergy to integrate offerings wherever there are opportunities to do so, with the final aim of meeting the requirements of our customers more effectively and to extend our capabilities to enable us to penetrate new markets," Mervyn added.

"The new division forms the basis of a platform from which to expand ACTOM's business in the information and communication technology (ICT) space, as the P&C business possesses the elements of electronic engineering and information technology, while the Static Power family of businesses incorporates elements of UPS's, chargers, batteries and energy management," Mervyn explained.

"We intend also to add other businesses specialising in ICT onto this platform over a period of time," he pointed out.

The other new divisions that have been created in the restructure are ACTOMTurbo Machines and Metalplus, which were both formerly business units under the overall management of the Marthinusen & Coutts (M&C) division, but are now divisions in their own right.

The Power Conversion division has been disbanded, resulting in the business units that were formerly under its control – namely the Static Power family of businesses, Electrical Machines and HVAC Systems – being migrated to other divisions. Electrical Machines has been placed under the overall management of the Reid & Mitchell division, while HVAC Systems is now part of the Air Quality Solutions business unit in the John Thompson division.

HVAC Systems is due to partner the other environmental control business units in JohnThompson to work together in jointly offering a range of air quality solutions in the power generation and industrial markets. HVAC Systems is also now able to add maintenance services to its portfolio with John Thompson's direct assistance to add to the manufacturing and contracting work it already provides for industrial HVAC projects.

"A further potential opportunity for new business resulting from bringing HVAC Systems on board at John Thompson is that among the processes involved in HVAC projects is the generation of heat, which needs to be dissipated.

This opens up opportunities for such heat to be converted into energy to generate power, which John Thompson is ideally placed to do," Mervyn remarked.

Other changes involved in the restructure included:

• The former Medium Voltage & Protection division, which P&C was previously part of, has been renamed the MV Switchgear division.

• **Martin Kelly**, the former Divisional CEO of Medium Voltage & Protection, has been appointed Interim Divisional CEO of the ACTOM SmartTechnologies division.

• Chris Bezuidenhout and Roman Mornau have been appointed Divisional CEO's of ACTOM Turbo Machines and Metalplus respectively and have also joined the ACTOM Executive Committee.

In an earlier reshuffle within the group ACTOM Energy was consolidated under the Engineering Projects & Contracts (EPC) division, as its business is very much in line with the project contracting that the major business units within EPC undertake, except on a smaller scale.



ACTOM's newly-established ACTOM Smart Technologies division intends to provide solutions in selected areas and activities shown in the above composite image.

Balmoral maintains proud record of 100% matric pass rate, despite COVID-19 restrictions

Despite complications and disruptions caused by COVID-19 in 2020, Balmoral College again succeeded in achieving a 100% matric pass rate, as it did continuously over the previous 12 years.

Of the total 72 matric learners, as many as 65 – or 90,27% – attained university entrance passes.

The school was rated the top school in the Ekurhuleni South district in 2020. With a total of 1643 learners, from Grade R through to Grade 12, in attendance, it maintained excellent pass rates for the school as a whole, averaging 95%.

Balmoral College, which is situated next door to ACTOM's head office and factories site at Knights in Germiston, is one of the main beneficiaries of the group's diverse social responsibility programme,

"Other outstanding achievements by the matric class last year were that their average mark in Mathematics was 63%, in both History and Tourism they averaged 75% and in English 71%," said **Cobus Matthee**, the school's HOD for Further Education & Training (FET).

The top achieving matriculant was **Munashe Kasinauyo** with seven distinctions, followed by **Muano Makumbane** with six distinctions and



Lucy Nyasvisvo, Balmoral College's Economics teacher, who won two awards last year in recognition of her teaching skills.

Juliet Monare with five distinctions.

Three Balmoral College teachers were presented with awards at the district's annual matric awards ceremony for the best results in their subjects. They are **Roan Halgryn** for Tourism, **Gugulethu Tshuma** for Life Sciences and **Lucy Nyasvisvo** for Economics. In addition, the City of Ekurhuleni presented Ms Nyasvisvo with a special award for being an outstanding educator in Economics.

When the COVID-19 pandemic made its appearance early last year, necessitating the imposition by government of a series of lockdowns starting with the Stage 5 hard lockdown towards the end of March which forbade live teaching in schools for several weeks, Balmoral College wasted no time about putting in place the necessary procedures to provide remote learning online to ensure that all learners could continue to be taught without interruption and so keep pace with the school curriculum. Learners were provided with resources packs containing learning material and work sheets to guide them in home study and in support of the regular online sessions the teachers conducted with them during the hard lockdown period.

"When learners were allowed to come back to school, we weren't permitted to have all grades in attendance at the same time, so we introduced a rotational timetable to ensure that they got all the teaching instruction they needed. This involved having extended teaching days and extra classes on Saturdays to make up for time lost," said Matthee.

R&M wins Chairman's Award for outstanding performance in tough 2020/21 'Covid year'

Extraordinary circumstances demand unusual responses.

This sums up the situation ACTOM found itself in during the past financial year, when the appearance of the COVID-19 pandemic threatened the sustainability of the group's business.

Along with the restrictive measures introduced by the government to contain the spread of the disease, the unprecedented pandemic prompted ACTOM's senior management to adopt special measures to ensure the group's survival through the tough new conditions in which it was forced to operate.

"What it boils down to is that we had to place greater focus on the group's sustainability during the 2020/21 financial year than had been necessary in previous years," said **Andries Mthethwa**, ACTOM's Chairman.

The same change of approach filtered through to the adjudication of the Chairman's Award contest for 2020/21,



The Winner: ACTOM Chairman Andries Mthethwa presents the Chairman's Award trophy and certificate to Mike Shaw, Divisional CEO of Reid & Mitchell.



Other recipients (Top row from left followed by bottom row from left): Runner-Up Award recipients: Alan Buchholtz, Distribution Transformers' Divisional CEO; David Sullivan, LH Marthinusen's Divisional CEO. Divisional Certificates of Excellence recipients: John-Paul Andre, John Thompson's Divisional CEO; Christian Baret, ACTOM Energy's Divisional CEO; Richard Botton, Marthinusen & Coutts' Divisional CEO. Business Unit Certificates of Excellence recipients: Chris Bezuidenhout, ACTOM Turbo Machines' Managing Director; Antonio Teixeira, Electrical Machines' General Manager; and Best What's Watt Semitechnical article winner Etienne de Villiers, John Thompson's Divisional Technical Manager.

the group-wide annual competition in which all divisions and business units seek to win recognition as top-ranking performers.

"The various adjudication criteria for the competition have been weighted more heavily in favour of the financial criteria as opposed to the non-financial criteria than previously to take into account the changed business conditions and requirements resulting from COVID-19," Andries explained when announcing the eagerly-awaited competition results on May 27.

The Awards event formed part of the group's annual review, which was a virtual meeting attended by senior group executives countrywide.

Previously the financial and nonfinancial criteria for the competition were given 60% and 40% weightings respectively. "Because of the greater emphasis on sustainability that was put into effect during the past financial year, the weighting for the financial criteria was increased to 75%, while the non-financial criteria weighting was reduced to 25%," Andries pointed out.

Award winners

Reid & Mitchell (R&M) was a clear winner of the Chairman's Award for

the best performing division during the year under review. The most noteworthy of its achievements were:

• Outstanding Earnings Before Interest and Taxes (EBIT) growth of 11% over the previous year.

• Conversion of profit into free cash of 106% of EBIT.

• Growth in export orders of 51% over the previous year.

The Runner-Up award was shared by Distribution Transformers and LH Marthinusen (Inland) as this was a close-run race in which the two divisions' scores were closely matched.

Three divisions were selected as recipients of Divisional Certificates of Excellence, these being John Thompson, ACTOM Energy and Marthinusen & Coutts.

Business Unit Certificates of Excellence went to ACTOM Turbo Machines and Electrical Machines, the two top-performing business units in the group.

The main criteria taken into account in adjudicating this part of the competition are the ability of business units to meet budget, achieve high EBIT growth and meet set cash flow conversion targets.

The winner of the Certificate of

Recognition for the Best What's Watt Semi-technical article for 2020 was **Etienne de Villiers**, John Thompson's Divisional Technical Manager, for his article in the July 2020 issue of the magazine entitled "MicroGen power and steam generation for small generation solutions".

Tribute to employees

Discussing the group's performance as a whole during the challenging year of COVID-19, Andries said: "The business has been good in responding swiftly to the series of lockdowns in terms of controlling costs, securing as much profitability as possible and securing cash flow.

"It is also important to acknowledge the cooperation management received from employees, some of whom had to work through the strict lockdowns and in so doing risked exposure to the disease, while others took salary cuts without resistance when told they couldn't be paid in full.

"The willing cooperation we have received from employees across the board has contributed greatly towards sustaining the business," Andries concluded.

Leading during a pandemic

Leading an organisation prior to COVID-19 has been a challenge. The events of 2020 changed the dynamic completely and forced executives, their teams, and their businesses to adapt overnight in order to survive.

"I will never forget that lockdown announcement and the days that followed. Some of the executives were on leave which they immediately cancelled and came into the office to start planning.

We understood that we needed to make tough decisions upfront; decisions that would not be popular and may even be viewed by some as overreacting. We had one goal in mind, and that was the sustainability of the business and ensuring that at the end of the pandemic our people still had jobs," says **Mervyn Naidoo**, CEO of ACTOM.

The strategy required a fine balance of drastically reducing and managing costs, while ensuring that business continued with the necessary safety measures in place to protect staff.

Sylvester Makamu, Group HR Executive, had the unenviable task of guiding the process of changing terms and conditions of employment in the Group, requiring staff to take temporary salary cuts.

"One never wants to have to ask people to work more for less, but I



Mervyn Naidoo, CEO of ACTOM

believe that our colleagues understood what we were trying to achieve, and that we would all be better off in the end" said Sylvester.

Sylvester believes that his role as the Chairman of the Electrical



Sylvester Makamu, ACTOM Group HR Executive

Manufacturers Association of South Africa assisted his decision making since he was able to ascertain what other businesses in the industry were doing to prepare.

"Of course a business must be financially strong to survive, but for me it was imperative that we ensured the livelihoods of everyone working at ACTOM and, in turn, the families they support. I asked my team to keep that in mind while managing our cashflow. I didn't have a problem chasing customers for money – peoples' lives were at stake, and we had a responsibility to keep this business afloat," says **Annamarie van Wyngaardt**, Group Finance Executive.

Mervyn together with **Andries Mthethwa**, Chairman of the Group were responsible for the operational and technical aspects of the strategy. Ensuring business-as-usual in the most unusual circumstances was not easy. But then, neither of these gentlemen have ever seen adversity as an obstacle.

"ACTOM operates a decentralised business model, and any strategy we develop must be flexible enough for the businesses to adopt and adapt. As an executive team, we provide best practice and guidelines, with certain boundaries that cannot be crossed.

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Then it's up to the Divisional CEOs to run their businesses," explains Mervyn.

Mervyn reiterates the importance of the value they gain from industry insight, and their personal involvement in various industry leading organisations and government-driven initiatives in helping shape strategic direction for the business.

"At times like these, it's important to stay in touch with what's happening around you and not become so inwardly focused that you forget about life beyond the pandemic.

We've gained a great deal of insight on how to deal with our current circumstances, but also very importantly, this pandemic has highlighted how we need to look at doing things differently going forward."

Diversification was a strategy ACTOM adopted prior to the onset of the pandemic.

This certainly proved valuable during this time as Andries explains: "Previously, some of our businesses operated in very niche markets, and this was identified as a threat, necessitating a process of relatively rapid business diversification.

Thankfully, this took place as successfully as it did because a number of industries were hard hit by the pandemic and could have had a real impact on our businesses had we not



Annamarie van Wyngaardt, ACTOM Group Finance Executive.

diversified when we did."

This relates to another key attribute of leadership – VISION – which was highlighted by Andries.

In his words, "A leader needs to be a visionary. This is not always easy



Andries Mthethwa, Chairman of ACTOM

because it often means having to take difficult and unpopular decisions." He adds, "What's important is the confidence to deliver on your promise, and you're only ever able to do that if you can trust your team to have the same moral ethic."

The executives all agreed that communication helped everyone remain focused during this time.

"The executive team met with the Divisional CEOs every week leading up to and during lockdown. Communicating and sharing information ensured that our strategy remained relevant, and I was encouraged to receive feedback on how valuable these sessions were," says Mervyn.

In summarising the pandemic strategy process, Annamarie commented on how impressed she was with the team and the way everyone contributed with such single-minded focus and willingness to get the job done.

"We all come from diverse backgrounds and have such differing opinions and leadership styles, but everyone listened and respected each other's opinions.

We debated until the culmination of our broad expertise and views, and our collective desire to overcome this challenge, pulled us together so successfully."

John Thompson's largest CAD stoker commissioned in Mexico

By far the largest continuous ash discharge (CAD) stroker designed and manufactured by John Thompson to date was commissioned at a sugar mill in Mexico late last year.

Although manufacture of the stoker was completed and delivered on schedule in late-2018, the final commissioning was delayed due to unexpected complications arising on site which prevented it from being installed as planned.

John Thompson was contracted at the end of 2017 to custom design and manufacture the extra-large stoker for a new 300tph 8750kPa(g) pressure bagasse-fired watertube boiler for the Mexican sugar mill. The contract was awarded by Caldema, a Brazil-based watertube boilers manufacturer for which John Thompson has previously manufactured watertube boiler stokers.

The stoker, weighing 170t and with a total grate area of 99m², is substantially larger than the previous largest CAD stoker JohnThompson has produced, which had a grate area of 76.7m² and was manufactured several years ago for the Xinavane sugar mill in Mozambique.

"In contrast to what we've done before in designing large stokers, with this one the drive beam and idler beam had to be re-engineered to withstand the large span. In addition, the zoning arrangement was optimised for greater ease of installation," said **Christof Kotze**, John Thompson's Welding & Manufacturing Engineer.

Upon completion of manufacture the stoker was assembled in John Thompson's plant in Bellville, Cape Town, to enable visiting senior Caldema personnel to view it as it would be when finally assembled on site at the mill. It was then dismantled for shipment to its final destination.

However, when it was installed on the foundation that had been built to support it, the foundation and the stoker's four corner supports sank into the ground because the underground water table was higher than had been anticipated.

This necessitated having to cast new stronger and deeper foundations next to the failed foundations and then lift the stoker with hydraulic jacks from where it had sunk and re-install it on the new foundations.

John Thompson wrote the procedure for the lifting of the stoker and also designed additional steel supports which it advised be installed on the stoker. These were manufactured locally.



A close-up view of the stroker drive for the CAD stroker. The reduction gearbox and motor seen on the right are exceptionally large due to the very low speed and high torque requirements of the stoker.

Further advances in the use of 4IR tools to simulate boiler function

Background

With the continuous emergence of technological breakthroughs, we are being pushed closer into the 4th Industrial Revolution which may represent a new stage in organisation and control in industry.

The 4th Industrial Revolution (4IR), also referred to as Industry 4.0, is defined as the fusion of advances in technology that amalgamate the physical, digital and biological worlds. Examples of such technologies would include artificial intelligence, robotics, Internet of Things, 3D printing, quantum computing and cyber-physical systems.

At John Thompson there is a drive to incorporate cyber-physical systems and more advanced control within current boiler systems and business practices. With interest in exploring systems that have a more practical function, there have been two control

systems that have been explored and implemented for testing.



Model predictive control (MPC)

Model predictive control (MPC) is an advanced control algorithm that has the objective of forecasting the system's behaviour. It attempts to follow a specific pattern through manipulation of output variables.

The MPC will map out the timeline of the system for a predetermined number of time steps. This is known as the prediction horizon. Using the prediction horizon (Figure 1) the controller will change the output variables to guide the system to closely follow the desired reference. The MPC will do this evaluation at every time step to ensure more stability to disturbances.

Figure 2 shows the architecture of the MPC. The plant model shown is a dynamic environment of the actual plant.

This is where the abovementioned prediction horizon is carried out and it allows the MPC to simulate the state of the actual model. In order to ensure that the plant model mimics the behaviour of the actual plant, a cost function is used. The cost function quantifies the margin between the plant model and the actual plant. The optimiser component is used to reduce this margin as far as possible by changing the plant model till the lowest cost is obtained.

The MPC methodology is very effective at exploiting the plant's dynamics and with the advantage of being generic can be expanded over a wide range of applications. However, like all complex algorithms, an MPC controller requires high computational power



Figure 2: Architecture of the MPC

and is not suitable for cost effective microelectronics.

World models algorithm (WMA)

Figure 3 is a diagram of the world models algorithm (WMA), which is a suggested solution for generating a virtual environment of the actual environment.

The reason the WMA has the ability to generate a virtual environment lies within its architecture, which is built up from a combination of powerful machine learning concepts.

The first component of the control flow is known as the variational autoencoder (VAE) and its job is to take packets of observation data and convert them into a more condensed form. This is very useful since input data, especially if it is visual data, comes in with high dimensions which are often not practical as inputs to other parts within the control flow.

The next component in the control flow is known as the MDN-RNN which is a combination of a mixed density

> network and a recurrent neural

This component is the memory component of the model and stores the generated virtual environment. The purpose of the MDN-RNN is to provide the future state of the environment to the controller.

The final component in the control flow is the controller. Its

function is to combine the observation data from the VAE and the future state data from the MDN-RNN and provide an action that will give the desired reference. The control method used within the controller can be whatever the developer desires.

The ability of the WMA to mimic an environment based on observation data has proven to be fairly accurate. In addition, one of the greatest strengths of the WMA is that once the virtual environment has been generated the controller can be trained offline.

Practical implementation

In most cases it is difficult to determine whether a control scheme will be more or less effective without testing it in a practical application.

The boiler house at Lentegeur Psychiatric Hospital has a 10t/h coal package boiler. The stream flow output remains quite steady during operation, making it an ideal system to test control schemes without interfering in operations.

Each control system was given the damper positions as control handles and given the objective to control the O² level at a specified reference. Doing this in turn should improve the combustion and improve the boiler's efficiency. Both control systems were shown to improve the stability of the O² levels around the reference point. The increased stability is a promising outcome leading to improved efficiency within the boiler.

Currently there are plans to further the exploration by adding more control handles and adding features such as online learning.

By Christopher van den Berg Cvber-Physical Systems Engineer John Thompson



Figure 3: World models algorithm (WMA).

Power Systems secures substation upgrade for new data centre

ACTOM Power Systems has secured a new data centre self-build substation contract in Gauteng.

Worth over R50-million, the contract involves a complete refurbishment of the 132/11kV Kosmosdal-A substation in Samrand, Centurion in the City of Tshwane Metropolitan Municipality.

The upgraded substation, a selfbuild project by Growthpoint Properties by arrangement with the municipality, is being established for a dedicated supply of power to a new data centre currently under construction nearby.

ACTOM businesses will supply most of the new equipment to be installed in the substation.

This is the third substation contract that Power Systems has been awarded within the past three years by a private sector company on a self-build basis by arrangement with a municipality for supply of power to a new or extended data centre.

Both of the previous two contracts were for substations in the City of Ekurhuleni Metropolitan Municipality. The first of these, completed in September 2019, involved an extension of the 132/11kV Airport Super Substation next to OR Tambo International Airport in Kempton Park, while the second, awarded in November last year and due for completion in October this year, is for an entirely new substation, the 88/11kV Long Avenue substation in northern Ekurhuleni.

Long Avenue substation – originally referenced as Witfontein Ext. 90 – includes provision of additional power supply to enable substantial further development throughout northern Ekurhuleni.

The Kosmosdal-A substation contract, awarded at the end of February this year and overseen by consulting engineers Geopower, is scheduled for completion by January 2022.

"Working to an already tight programme, we have had to field a couple of curved balls to ultimately achieve a workable execution plan," said **Hannes Horn**, Power Systems' Senior Contracts Manager responsible for the contract.

The first was the discovery that an OEM in Europe which ACTOM had routinely approached to manufacture specialised 132kV disconnecting circuit-breakers in the past, had unexpectedly discontinued their production



Apart from the imported specialised 132kV disconnecting circuit-breakers required for part of the refurbishment of the 132/11kV Kosmosdal-A substation, the rest of the substation will have a conventional open-yard configuration, similar to that seen in the above picture showing a portion of a substation extension erected by Power Systems in Kempton Park two years ago

line after initially quoting for the supply of this equipment.

"As a result we've had a mad scramble to explore various alternative compact-design solutions, as well as trying to locate substitute suppliers that could still meet the local delivery constraint without negatively impacting the overall programme," said Hannes.

The second complication posed an even greater threat of impacting the entire data centre development programme beyond merely the substation portion of the works. A local manufacturer, with which the order for the two free-issue 40MVA 132/11kV power transformers had been placed, suffered a devastating fire at its factory in March.

"This serious setback was successfully overcome by negotiating with our customer to incorporate the supply of the two power transformers into our contract and switch manufacture thereof to our in-house factory, ACTOM Power Transformers, instead. While some overall delay slippage was unavoidable we have still managed to curtail this to within the constraints of the broader data centre deadline," Hannes remarked.

The other ACTOM businesses involved for product supply are:

• High Voltage Equipment: conventional circuit breakers, isolators, earth switches, current transformers, voltage transformers and surge arresters.

• Distribution Transformers: NECRT transformers.

• Static Power: batteries and chargers.

• Protection & Control: protection and automation systems.

• Electrical Products: all power and control cable and accessories required to renew the substation.

The 11kV switchgear is to be freeissued by the City of Tshwane for relocation to the substation.

Signalling agrees to endorse newly-launched signalling training courses

Fazi Rail Academy, a technical training college in Kempton Park, Gauteng, specialising in the training of railway infrastructure personnel, signed an endorsement agreement with ACTOM Signalling in March this year.

The agreement authorises Fazi Rail to use ACTOM's in-house training material for signalling products and systems to base its training courses on.

"As part of this we've undertaken to provide them with the training material we use to train our clients' signalling technicians when we supply and install new or upgraded signalling systems for them," said **Peter Colborne**, Signalling's General Manager.

Portia Nkuna, Fazi Rail's Managing Director, said: "The endorsement by ACTOM Signalling of our courses and its agreement to provide all the required information pertaining to its products and systems ensures that our course content will be correct."

She added that ACTOM Signalling had been selected as the best possible

source for the content of Fazi Rail's courses because it has the largest installed base of signalling equipment in South Africa and also offers the greatest variety of signalling products and systems in the country.

Fazi Rail, which is a SA Qualification

Authority (SAQA) accredited training provider, offers training to anyone who has qualified in terms of the National Qualification Framework (NQF) Levels 2 through to 5, corresponding to Grades 10 through to a post-matric certificate.



Signalling's General Manager Peter Colborne and Fazi Rail's Managing Director Portia Nkuna sign the endorsement agreement, while Andre Wienekus, Signalling's Engineering Manager, and Tshitso Mafole, a training consultant to Fazi Rail, look on.

MV Switchgear appointed exclusive distributor of state-of-the-art SIS switchgear product

MV Switchgear recently signed a value-added reseller and channel partner agreement with a international designer and manufacturer of solid insulated switchgear (SIS).

The agreement with GELPAG Advanced Technology GmbH of Germany gives MV Switchgear exclusive distribution rights for the product throughout Southern Africa.

Within a month of the agreement coming into effect late last year, the division secured its first order for an eight-panel 6,6kV 1250A board from GELPAG's MSS range of MV switchgear to replace an aging board in UmgeniWater's Verulam pump station on the north coast of KwaZulu-Natal.

"Unlike air-insulated switchgear (AIS) and gas-insulated switchgear (GIS), SIS uses neither air nor gas for the primary insulation. It comprises a fully screened epoxy resin dielectric, which makes the switchgear performance independent from environmental pollution, humidity and altitude," said **Rhett Kelly**, MV Switchgear's Technology Development Specialist.

SIS technology is becoming increasingly sought after as it requires significantly less maintenance than AIS, which is subject to environmental pollution and humidity, while GIS, although also requiring minimal maintenance, uses SF6 gas, which is being discouraged worldwide due to its adverse environmental impact if released into the atmosphere.

"Graphene nano materials are used in the GELPAG SIS range of switchgear to optimise not only the dielectric performance but also the thermal conductivity of the switchgear's primary insulation," Rhett added.

The MSS range of switchgear is available up to 40kA and has a footprint

that is approximately 30% smaller than AIS. It offers panel widths of 500mm for up to 1250A units and 700mm for up to 2500A units.

"The MSS range is one of the first of its kind in the world to achieve a 2500A rating using solid dielectric insulation without forced cooling," Rhett pointed out.

The SIS board for Verulam pump station, ordered from MV Switchgear by Germiston-based APE Pumps on behalf of Umgeni Water in November last year, was installed and commissioned at the pump station in May this year.



Continued success of AMV12 switchgear – with variants

MV Switchgear's AMV12 range of air-insulated switchgear has proven to be highly successful since its launch into the market at the beginning of 2015.

About 750 panels of the advanced new product, which MV Switchgear developed in partnership with YIHE Electric Group, a reputable Chinese manufacturer of electrical equipment, have been sold in the 6-1/2 years since the launch.

"This sales tally applies to the original standard product that was introduced in 2015, namely the AMV12 single busbar bottom-entry air-insulated switchgear rated for 12kV, with ratings of 1250A and 2500A and having an internal arc classification (IAC) of AFLR 31,5kA for 1 second, in accordance with IEC 62271-200," said **Greg Whyte**, MV Switchgear's Design & Development Manager.

"In the interim, however, in response to market demand, we have developed six variations to meet the requirements of various customers. These variations account for a further 150 panels sold, bringing total sales of AMV12 panels to 900 in all, which decisively demonstrates the success MV Switchgear has achieved in meeting the market's diverse requirements with the AMV12 range," he stated.

The six variations of AMV12 developed since 2015 are:

• In 2016 MV Switchgear introduced a 650mm wide compact panel version, rated at 800A for use in instances where space constraints apply. By comparison, individual standard AMV12 panels are available in widths of 800mm and 1000mm.

• In 2017 a 400A 650mm wide contactor panel was developed, which is ideally suited to motor switching applications requiring a higher mechanical and electrical switching endurance.

• At the end of 2017 MV Switchgear began developing a double-busbar variant with on-load busbar transfer capability. "The double-busbar design incorporates fully motorised and interlocked busbar disconnectors to allow for the safe transfer of load from one busbar system to the other while the circuit-breaker remains racked in and closed," Greg commented.

• In 2019 an arc cooling pressure relief system, it had developed with YIHE Electric Group was introduced as an alternative to the arc deflector system to limit hot arc emissions from the



MV Switchgear technicians do finishing touches to an AMV12D double busbar switchboard manufactured for the upgrade and extension of Bronkhorstspruit substation.

switchgear. "The arc coolers are wellsuited for use in substations where there are space constraints, as they are substantially more compact than the arc deflectors," Greg remarked.

• In 2020, in response to enquiries received mainly from the mining industry, MV Switchgear introduced top power cable entry panel variants of AMV12, which is applicable in cases where the substation layout requires it in preference to the standard bottom-entry arrangement.

• In late 2020, in response to customers looking to have venting of arc emissions outside the switch-room, an arc ducting solution was developed and type tested.

Orders for double-bus switchgear panels have comprised the bulk of the sales of AMV12 variants to date. The most noteworthy of these comprise two City of Tshwane Metropolitan Municipality substation upgrade and extension projects that are currently in progress:

• The first is the Shoshanguve substation upgrade and extension, awarded to ACTOM Power Systems in mid-2019, for which MV Switchgear recently supplied a 53-panel double-bus AMV12 switchboard.

• The second is the upgrade and extension of Bronkhorstspruit substation, for which MV Switchgear has been contracted to manufacture and supply double-bus AMV12 switchgear in two separate portions – a 20-panel extension board for installation in a newly-constructed building next to the existing building housing the substation's original switchboard, and a 19-panel board to replace the old board, which once installed will be connected to the extension board to operate as a unified 39-panel board.

Eskom welcomes LHM's innovative procedure for balancing of large ID fan rotors

A proposal was put forward by LH Marthinusen (LHM) to Eskom two years ago to introduce a new procedure for balancing of large induced draught (ID) axial fan rotors, as used on the boilers, after undergoing repairs.

This was readily accepted by the utility due to the substantial advantages it offers over the previous system applied for this purpose. As a result, the new procedure was brought into effect by LHM for the first time last year as part of the periodic inspections and overhauls it performs on the ID axial fan rotors of Majuba, Medupi and Kusile power stations.

The new procedure is a balancing test that is performed on each ID axial fan rotor after its condition has been comprehensively assessed and all wear and damage each unit has sustained during years of operation in the power plant have been repaired to "as new" condition at LHM's main repair facility in Denver, Johannesburg.

"Previously the ID fan rotor balancing was done in situ after the repaired rotor was re-installed in the plant. This involved having to test run it repeatedly with corrective adjustments being made as imbalances were detected, resulting in delays on each occasion of up to 24 hours before full operation could be resumed," said **Craig Johnston**, General Manager of the Fan Service division.

"Having balanced the ID fan rotors at our plant prior to delivery, they can go into full operation immediately after being re-installed. This means significant time- and cost-saving benefits for the power station, as it eliminates down-time on balancing before startup, as well as saving production time lost as a result of the prolonged balancing procedure applied previously."

Craig said putting the ID fan rotor testing system into effect was simply a matter of piggy-backing on LHM's Large Rotating Machines division's existing large test bay at Denver. "All that's required to temporarily convert the large machines balancing bay into a test bay suitable for our purposes is the addition of a few items of ancillary equipment to the test bay," he remarked.

To date the new balancing test procedure has been applied to a total of four large ID fan rotors from Majuba and Medupi over the past year.

"The test is carried out once the comprehensive inspection-andrepair procedure we perform on each ID fan rotor and its set of detachable axial fan blades, after having operated continuously for a period of years, has been completed," Craig explained.

The function of the ID fan is extraction of flue gas from the boiler in the power plant. The design of the ID fan rotors and their axial fan blades for each of the three power stations differ substantially from each other and also have a different mass and power rating in each case.

"For example, a rotor at Majuba weighs 13.5t and is driven by a 7.2MW motor, whilst a rotor from Kusile weighs 19.5t and operates at 10.2MW," Craig pointed out.



A test technician conducts a test on a large ID fan rotor from Majuba power station in the Large Rotating Machines test bay at LH Marthinusen's Denver facility.

'Black band' test confirms R&M's success converting dragline MG set for North Africa

Reid & Mitchell (R&M) recently converted for the first time ever a dragline's motor generator (MG) set from 60Hz to 50Hz operation.

The complex project involved extensive redesigning and remanufacturing of components to meet the new requirement. The dragline, originally designed and manufactured to operate in North America, where the national grid operates at 60Hz, has been sold to an opencast mine in North Africa, resulting in its MG sets having to be converted to 50Hz operation, as per the normal African grid frequency.

The conversion contract, commenced in October last year and due to be completed in November this year, involves the conversion of a total of four Ward Leonard MG sets, comprising total items of equipment as follows:

- Two 2000HP synchronous motors
- Two 3000HP synchronous motors
- Ten 1045kW generators
- Four 836kW generators

 22 pedestals with white-metal bearings "All of these items have to be comprehensively altered to meet the new specifications. With our completion and successful testing recently of the first converted set of the four MG sets requiring conversion we have overcome the bulk of the challenges we faced initially due to a lot of the work involved being new to us at that stage," commented **Willie Liebenberg**, R&M's Technical Executive.

"Converting the first set involved dealing with new challenges, but having gained that experience we now expect to carry out the other three conversions more easily and speedily than with the first," he added.

The conversion involves:

• Redesigning and manufacturing a new rotor and stator for the AC synchronous motor, including installing new coils on both.

• With the DC generators only the frames of the original units were retained, while the replacement armatures had to be manufactured to new designs – one design for the three 1045kW generators and another for the 836kW generators – while the coil designs of the new units also differ from the original 60Hz versions. As with the new rotor and stator for the synchronous motor, the new components for the generators are manufactured inhouse by R&M.

"The challenge was to design the generators to produce the same output at a slower speed than what the 60Hz generators used to operate at. The main constraint is that the frame sizes of the 50 and 60Hz frames are significantly different from each other," said Willie.

The 60Hz frame is in fact smaller in diameter and shorter in length than the standard 50Hz frame. This means having to redesign the 50Hz coils to fit into a smaller and shorter frame than normal, while at the same time designing and manufacturing a bigger armature than normal to reduce the air gap between the coils and the armature to meet the necessary flux **To page 18** From page 17



R&M's test and assembly teams are shown above standing in front of the first motor generator (MG) set converted from 60Hz to 50Hz, with three more MG set conversions to follow in coming months. Among them are Willie Liebenberg, R&M's Technical Executive (fourth from left); Shaun Dengler, Test Bay Foreman (fourth from right); and Albert Sibisi, DC Motors and Generators Foreman (second from right), who headed the assembly team.

requirements," he explained.

To achieve the right combination of coil design and armature the new coils had to be made thinner and longer than the normal 50Hz coils, resulting in the coils projecting outside the frame.

Four different tests have to be carried out on the converted generators, which are:

- A saturation test.
- A short circuit test.
- A partial load test.
- A full load back-to-back test.

Because it is a new generator design, there is an additional special design test – known as the "black band" test – that also has to be carried out on one of the four generators after completion of the conversions to confirm that the generators have been converted correctly.

The conversion of the first of the four SG sets covered by the current contract was successfully completed in mid-March this year and dispatched a few days later to North Africa for installation on the dragline.

Fine-tuning DC commutation by 'black band' method

The aim of the "black band" test carried out at Reid & Mitchell (R&M) recently on one of the generators in an MG set it has converted from 60Hz to 50Hz operation was to fine-tune the DC rotating equipment to its optimum commutating condition.

"It is a method of commutation adjustment that involves intentionally misadjusting the magnetic strength of Inter Poles (commutating field) by adding or subtracting current to find the limits of sparking. This data is also used to adjust neutral setting and IP shimming to effect good commutation over the range of speeds and loads," explained Willie Liebenberg, R&M's Technical Executive, who conducted the "black band" test at R&M's Benoni facility after the division had converted the first of four MG sets for a dragline due to be deployed at an opencast mine in North Africa.

"It is the most accurate practical method of ensuring that the brush rigging is in the proper position, and that commutating field strength is of the proper value for optimum commutation," he added.

A "black band" test must be performed under controlled factory conditions and the testing must be done under conditions of steady load.

"For the test an 85kW exciter genset was set up as buck-boost power supply, producing low voltage, high current. The armature circuit was connected in parallel with the commutating field circuit of the generator being tested," said Willie.

Two DC current meters with metering shunts were required to measure buck-boost current and generator load current. A power supply and a forward/ reverse Variac was used to control the polarity and shunt field current of the exciter. "Polarities must be determined to know when the exciter is bucking (opposing) or boosting (increasing) current," he pointed out.

Initially the generator was run at no-load (0%) and rated voltage. A small amount of current was introduced in the commutating field circuit from the exciter. This current was increased until a very slight sparking was observed. The value of the exciter value was recorded at this point. The exciter supply was then reversed and increased in the opposite direction until the same level of sparking was observed. The amount of current applied in both directions indicates the "band limit" at no-load. At this point the neutral position of the brushgear can be determined.

The generator was then operated at various loads (100% to 150%) during which sparking was observed with the application of buck and boost currents.

"The results were plotted on a set graph to determine the deviation direction of the black band, which refers to no sparking in the area between a set of two curves," Willie stated.

The results from the test proved that no adjustments of brush rigging position or shimming of IP poles were required.

> By Willie Liebenberg Technical Executive Reid & Mitchell

What's Watt June 2021

Sasol extends scope of Electrical Machines' 'Approved Vendor' status for MV motors

Sasol has extended ACTOM Electrical Machines' (AEM) "Approved Vendor" status for medium voltage motors after carrying out a successful technical audit at the business unit's Benoni manufacturing facility late last year.

The extended supply approval, which took effect on February 3 this year, authorises AEM to manufacture and supply MV motors of up to 5MW to Sasol.

"This is a huge step forward for

us," commented **Antonio Teixeira**, Electrical Machines' General Manager.

"With the new approval we have the opportunity of increasing our sales to Sasol compared with what they have been up to now. The previous approval, which was in force for two years, was limited to MV motors up to 1MW, whereas the new approval encompasses for the first time the 1MW to 5MW range, which is where the bulk of Sasol's demand for MV motors exists, as they have a large installed base in this range," he pointed out.

The new approval brings AEM in line with the other MV motors manufacturers and suppliers that enjoy Approved Vendor status with Sasol.

Motors to be manufactured in the higher power ratings will be in Electrical Machines' well-known UNIBOX range. "All those above 2MW are UNIBOX's and for MV motors below 2MW we have the option of either UNIBOX's or MS4's," Antonio stated.

Electrical Machines manufactures specially customised MV motor for Taiwan plastics plant

In late-2018 Electrical Machines received an enquiry from a Taiwanbased agent on behalf of a plastic products producer to see if it could design and manufacture a specially customised medium voltage motor for it.

It was looking for a 775kW 16-pole 3300V 60Hz motor to operate at a slow speed for its application of driving a reciprocating compressor in a hazardous area in the plant. The design had to be a single bearing arrangement design that shared a bearing with the load. In addition, international certification was required. The order for the motor was received in early 2019.

As part of meeting the customer requirements, there were three major motor design components:

• A single bearing motor design sharing a common bearing with the compressor.

A pressurised motor to meet the



Posing with the specially customised 775kW 16-pole motor shortly before it was dispatched to Taiwan from Electrical Machines' factory are (from left): Okkie Nel, Senior Design Draughtsman; Derek Wood, Engineering Manager; Johnny Nunes, Design Engineer; Martin Abbot, Draughting Manager; and JA Erasmus, Contracts Engineer.

hazardous area requirement.

• Ingress protection testing. The single bearing design required a special shaft seal at the drive-end of the motor. This seal was required for both mechanical considerations as well as the pressurised enclosure requirement. In addition, a unique support was required at the motor drive-end so that the motor could be tested.

International certification was done through TUV Rheinland of Germany. Explolabs, a local authority, was contracted to conduct the local inspections and testing and to correspond with TUV.

As this was the first export pressurised MV motor that Electrical Machines has made for hazardous environments, a number of purging and over pressure tests were conducted. The design incorporates a purge controller with a relief valve. The ingress protection testing had two components to it, namely:

• Testing for dust ingress; a purposebuilt dust chamber was manufactured for this test.

• Testing for water ingress; a wet spray test was conducted.

Due to the COVID-19 restrictions on international travel, the certification of the motor had to be conducted remotely with TUV, with videos and digital medium being used by Electrical Machines and Explolabs to show key manufacturing and test procedures and outcomes.

Thanks to the efforts of **Derek Wood**, Electrical Machines' Engineering Manager, and **Johnny Nunes**, Design Engineer, all certification as well as customer requirements were met. The motor was completed in June 2020.

M&C breaks new ground rewinding large submersible pump motor stators

Early in 2020 a copper mine in Zambia – a longstanding customer of Marthinusen & Coutts (M&C) – after notifying M&C's workshop in Kitwe that one of its large 1846kW submersible pump motors used to dewater the mine was faulty and sent it through to the workshop for assessment and repair.

The workshop established an earth fault to be the likely cause of the malfunction, but not being equipped itself to repair such a large motor, it arranged for it to be sent through to M&C's Power Generation and Large Motor Repair facility in Benoni, Gauteng, which is fully equipped to assess, test and repair very large machines and has a substantial amount of factory floor space to accommodate them.

After long use extending over decades, the motor suffered from extensive wear and tear of the rotating mechanical parts and there was water ingress into the motor which damaged some of its internal components, resulting in the earth fault.

"To fix it we had to do a rewind of the stator. For this we had to arrange for the OEM in Germany to provide a specialised rewind kit consisting of all the materials required for the purpose," explained **Rudi Els**, General Manager of the Power Generation facility.

The stator is about 2.5m long, with an external diameter of 900mm. "Due to the specialised winding and construction of the submersible pump motor, M&C designed and manufactured specialised tooling to perform these rewinds," Rudi said.

Upon the successful completion of the rewind the motor was returned for reinstallation in the mine in August



Armature Winder Shepard Thigwa is shown pulling new conductors through the slots of the rotor of one of the large submersible pump motors repaired recently at M&C's Benoni facility.

last year.

Within a month of delivery of this motor M&C was contracted by another longstanding customer to repair an almost identical submersible pump motor manufactured by the same German OEM as the first. "In addition, the stator of this motor also required a rewind, so again we procured the specialised rewind kit from the OEM as before and were able to use the same specialised tooling we had made for the first one," Rudi remarked.

Although more powerful than the earlier unit, at 2595kW, the later motor and its stator were the same size as the Zambian motor. "All these favourable factors, including the experience we'd gained doing the first rewind, enabled us to perform this rewind more speedily than before," he said. The repaired motor was delivered to the customer within only two months of M&C commencing the work. The customer in this instance was a Johannesburg-based company that extracts acidic water from local gold mines and purifies it before releasing it into rivers and streams.

"M&C have successfully shown that they are very capable to rewind submersible pump motors," commented **Mike Chamberlain**, the division's Marketing & Commercial Executive.

"They have also shown once again that they are flexible to assist customers to carry out complex electrical and mechanical refurbishments of rotating machines."

M&C has subsequently received more dewatering pump motors to repair from other customers.

M&C performs complex stator winding at Eskom's Drakensburg Hydro power station

Marthinusen & Coutts (M&C) performed a significant rewind last year after being contracted by leading international hydro generation OEM Voith Hydro of Germany to wind the stator of Unit 1 at Eskom's Drakensburg Hydro pump storage power station near Bergville in KwaZulu-Natal.

The massive stator winding contract, performed by a winding team from M&C under the supervision of Voith, was the final stage in the refurbishment of three of the station's four 250MW motor-generator units. Eskom engaged Voith to refurbish Unit 1.

Richard Botton, M&C's Divisional CEO, who project-managed the winding of the stator of the 281,5MVA reversible motor-generator, said: "We have worked with Voith over several years, during which time we have performed similar projects, such as a stator rewind at Eskom's Ingula pumped storage scheme, among others. These have stood us in good stead and almost certainly played a key role in Voith's decision to award us the contract for Unit 1."

The contract was due to have commenced early last year, but only got under way in late-August as a result of COVID-19 occurring and the subsequent strict lockdowns.

"This left us with only three months to complete the rewind – half the original period allocated. We introduced two shifts per day with a 10-man team on each shift to ensure the work was completed on time," Richard explained.

The 6,5m diameter stator was



M&C technicians are seen working in the large area left inside the stator after removal of the rotor as they install some of several hundred stator bars as part of the complex stator winding operation.

wound in situ under Voith's supervision after removal of the rotor. Deploying a Voith-supplied winding kit, the winding teams were required to install a total of 720 heavy duty stator bars that had to be connected in an extremely complex bus arrangement.

"Our teams had to undergo special training by Voith technicians beforehand before getting started on it," Richard pointed out.

The contract was completed on schedule in mid-November last year.

A further demonstration of the depth and variety of expertise M&C has on offer in its field came when M&C's Engineering & Technical Executive **Rob** Melaia recommissioned the unit.

M&C's Rob Melaia steps in to recommission Unit 1 of Drakensberg Hydro station

When it was brought to Voith's attention that the restrictions on travel between countries resulting from the COVID-19 pandemic prevented it from flying in one of its own senior engineers from Germany to recommission the unit, it asked **Richard Botton**, M&C's Divisional CEO, if M&C could assist.

He had no hesitation recommending Rob to perform the recommissioning, as Rob has previously commissioned other power plants as part of repair and refurbishment contracts M&C has undertaken. These included the N'zilo hydro station in Katanga province, DRC, in 2013 and the SA Bureau of Standards' National Electrical Test Facility's High Power test laboratory in Gauteng last year.

Voith duly assigned the recommissioning to M&C after checking and approving Rob's credentials.

Then followed hours of conference calls between Rob in his office at M&C's main repair facility in Cleveland, Johannesburg, and senior technicians at Voith's head office in Heidenheim, Germany, who provided detailed instructions on the required procedures.

Rob successfully performed the recommissioning of Unit 1 over a period of five days in March this year.

Commenting on it, he said: "By the time I got there I was thoroughly briefed about what I was required to do. The process was challenging and I had to give it all my attention. The one single thing that gave me the greatest confidence was knowing that M&C had done the winding of the stator; I wouldn't have felt so confident if anyone else had done it."

Richard commented: "It is a mas-

sive feather in our cap that M&C was able to offer to put the unit back into service. This is yet another set of skills we have in our division, further demonstrating M&C's ability to partner with international OEM's and proving that local competency is of a high standard."

Mike Chamberlain, M&C's Marketing & Commercial Executive, commented: "In this contract M&C have again demonstrated their ability to rewind complex large machines, including complying with the OEM's stringent specifications. M&C also showed flexibility when encountering delays caused by circumstances outside their control by doing their utmost to ensure that the project was delivered on time."



Rob Melaia.

M&C repairs three defective alternator stators for local petro-chem company

At the beginning of last year Marthinusen & Coutts (M&C) was requested by a petro-chemical company to investigate the cause of partial discharge damage to the stator windings of one of a number of 9.7MW 15kV alternators operating in the company's plant.

An off-line partial discharge test conducted on the stator at M&C's repair facility in Cleveland, Johannesburg, confirmed that the anti-corona tape forming the outermost layer of the slot portion of the stator coils had been electrically eroded, in some instances extending deep into the core.

"We considered the likely causes to be a combination of three possible factors, namely high load cycling of the alternator during roughly eight years of operation, imperfect fitting of the coils in the slots during manufacture and the use during manufacture of low viscosity VPI resin applied on the outside of the coils after taping as added protection against electrical erosion," said **Rob Melaia**, M&C's Engineering & Technical Executive.

The two last-mentioned probable causes formed the basis of the repair procedure that M&C adopted and applied in repairing the stator winding in early-2020. They subsequently applied the same procedure last year in repairing the windings of two other alternator stators from the same plant that were similarly damaged.

"As an alternative to the original





This composite "before-and-after" picture shows (left) damaged stator windings of one of the alternators sent to M&C to assess and repair, and (right) the same unit after M&C had identified the causes of the problem and restored it to its original condition.

anti-corona slot protection tape we applied anti-corona slot protection varnish and also applied anti-corona stress grading varnish in place of the original anti-corona stress grading tape. Furthermore, to achieve reduced secondary resin drainage we considered future application of an improved VPI process using more viscous resin than had been applied during manufacture," Rob explained.

"The scope of the repair – and the patience and meticulousness required to implement it effectively – can be appreciated from the physical size of the stator and the 108 slots it is made up of. This means there were 432 coil ends to mask off and apply varnish to. The varnish has to reach between the top and bottom coils but not run down along the overhang – all addressed by the masking process," he added.

Tests carried out after completion of the repairs to the three stators included a high voltage test to determine the integrity of the insulation and a repeat of the initial off-line partial discharge test to confirm that the windings were exhibiting less partial discharge than before.

Referring to high thermal cycling as a probable contributary cause to the partial discharge damage to the stator windings, Rob said: "We have engaged with the relevant people at the company regarding operational measures that would reduce thermal cycling related electrical erosion in future."

In addition, on M&C's advice, capacitive bus-couplers have been fitted to all three machines to allow regular scheduled on-line partial discharge testing on site.

Metalplus revamps its repair facility to extend offerings to customers

Metalplus has invested in a variety of additional plant equipment and introduced new processes at its Robertsham, Johannesburg, repair facility with the dual aim of providing additional services to most of its existing markets as well as enter markets it hasn't previously served.

Metalplus has earned a reputation over many years in the petrochemical, power generation, machine repair, mining, and rail & transport industries, among others, for its reliability, accuracy and speedy turnaround times in performing mechanical repairs that include submerged arc micro-welding, machining and grinding

"Our existing repair services embrace a wide range of different processes and involve many items of industrial equipment, but there is scope to include more services and cater to more types of equipment and products than we have provided for up to now," said **Roman Mornau**, who initiated the expansion of operations at Metalplus following his appointment as General Manager in September last year.

To achieve these objectives requires a combination of improving some of the business unit's existing operations and selectively introducing additional processes that haven't previously been offered but have good potential for development of new business, he points out.

"To achieve this doesn't require enormous expenditure, but the expenditure involved is more than offset by the extra business it brings in, both in terms of extending our offerings to our existing markets and opening the door to business opportunities in new sectors," Roman commented.

The main changes that have been

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put into effect to date are:

• The petrochemical industry, for which Metalplus' main focus has been providing shaft repairs for turbines and compressors, is now offered additional services that include repair of casings, seals, bushings and impellers and provision of probe track correction.

• The power generation industry, where the business unit's work has been concentrated until now on the repair of large fans and generators, now has access to the services of TIG welding to execute repairs on valve seats for emergency shut-off and control valves for turbines.

• Repairers of electrical rotating machines, in addition to typically having rotors refurbished by Metalplus, are now offered additional services that include motor rotor fan repairs and a mechanised linear tractor welding manufacturing facility for rib-shafts.

• The mining industry, for which the business unit has previously provided a range of repairs to crusher shafts, crusher cones and gearboxes, now has available to it additional repair services that include hard-facing of shaft-sinking equipment and chrome carbide cylindrical grinding of large hydraulic rams.



TIG Welder Steven Rudd performs valve seat hardfacing on the emergency shut-off valve of a 60MW steam turbine in Metalplus' plant.

• The rail & transport industry sector, for which Metalplus' work has previously focussed mainly on the repair of large diesel motor crankshafts, now have access to repairs of turbo casings of large diesel engines, including sleeves and bushing inserts.

"The current expansion of our capabilities also includes replacing some of the work we have routinely subcontracted to other companies with the development of inhouse capabilities to perform this work at reduced cost," Roman stated.

In addition, the business has purchased – and in some instances designed and manufactured itself – a range of specialised tools and process measuring equipment to help it in its drive to further improve the efficiency and accuracy of its plant equipment, which has seen many years of use and is undergoing modernisation to elevate performance standards.

'Closer contact with customers' was main focus of Electrical Products' latest training course

Electrical Products launched its latest Elite Hunter training course with particular focus on understanding critical project requirements resulting from the widespread disruptions to business caused by the COVID-19 pandemic.

The Elite Hunter course, held from September last year through to March this year, was attended by a total of 14 people, comprising eight sales representatives and six managers.

The series of lockdowns the government imposed nationwide since late-March last year to contain the spread of the disease adversely affected the economy, which was already struggling to recover from the prolonged economic recession before COVID-19 hit.

"One of the biggest challenges our business is faced with are the difficulties of maintaining the manufacture and supply of product, which are hampered by shortages of materials, factory disruptions and staff shortages resulting from the detrimental impact of the pandemic and lockdowns on supply chains," commented **Mike Ullyett**, Electrical Products' Sales & Marketing Executive.

In line with these developments, the focus of the latest Elite Hunter

course was changed to approach "business unusual", which is also known within the course as "business as war".

"The main focus in the training course has been on getting our sales force and managers to recognise the



Elite Hunter training course participants. They are (**back row, from left**): Rod Penaluna, Divisional CEO; Sylvester Makamu, Group HR Executive; Johan Havenga, Facilitator; Renee Mare, Nelspruit; Lucas Mchunu, Durban; Brightman Zungu, Durban; Hein Ferreira, Rustenburg; Aron Mavhungu, Genlux; Chanelle Keyser, Satchwell; Marge Hendricks, Satchwell; Farrell Pieterse, Johannesburg; Bevil Mellem, Satchwell; Otto van Jaarsveld, Nelspruit. **Front row, from left**: Mike Ullyett; Quinton Brittion, Overhead Line Equipment; Jacques Church, Welkom; Lutho Botya, East London; Dennis Keyter, Polokwane; Kesavan Naicker, Durban.

need for closer communication, involving fully understanding project challenges and providing our customers with constant feedback on the status of their orders." Mike said.

"Setbacks and delavs are often unavoidable in the current circumstances, so the best remedy is to notify our customers about them as soon as they occur and what steps are being taken to deal with them. This enables the customer to plan accordingly.

"The need for our sales staff and managers to have more regular contact with customers than under normal circumstances was strongly stressed in the course. It also provides customers with more opportunities to express their needs."

A further aspect that was given high priority in the training course was key account management.

"Here the emphasis was placed on the need under the present exceptionally difficult business conditions to give key customers especially close and regular attention." Mike concluded.

Rhett Kelly awarded certificates of recognition by standards authorities SANC and SABS

Rhett Kelly, MV Switchgear's Technology Development Specialist, was recently awarded two certificates of recognition for his contributions over the past six years to both international and national standardisation of high voltage switchgear, controlgear and switchgear assemblies.

Both the SA National Committee (SANC) of the International Electrotechnical Commission (IEC) and the SA Bureau of Standards (SABS) presented him with certificates late last year recognising and commending him for demonstrating consistent dedication and participation in various IEC and SABS working groups and maintenance teams.

The SANC is responsible for South Africa's electrotechnical interests in the IEC's management, standardisation and conformity assessment work and represents all of South Africa's stakeholders in interactions with the **IFC**

Rhett has been a core member



Rhett displays the certificates of recognition awarded to him by the SA National Committee of the International Electrotechnical Commission (IEC) and the SA Bureau of Standards.

of the SANC since 2014. He is an executive committee member of the Electrical Manufacturers Association of SA (EMASA) and represents the industry association as a full participating member in various SABS technical committees responsible for the standardisation of various types of electrical equipment.

Rhett is also the Chairman of the IEC technical committee TC17 for high voltage switchgear and controlgear in South Africa and represents South Africa at international meetings.

Industry with effect from July 1, 2020.

appointed Application Engineer at

ACTOM Industry with effect from April

Site Supervisor at ACTOM Industry

with effect from from May 3, 2021.

Tshepisho Maunye has been

Guy Bridges has been appointed

Key appointments

Elizabeth Senatle has been appointed Commercial Manager, Protection & Automation at Protection & Control with effect from January 1, 2021.

Esaias de Bruyn has been appointed Draughting & Production Supervisor at ACTOM Industry with effect from April 1, 2021.



Flizabeth Senatle

Esaias de Bruvn

Themba Nhlapo

Themba Nhlapo has been appointed Project Manager at ACTOM Industry with effect from April 1, 2021.

Quentin McQuire has been appointed Field Engineering Services (FES) Manager at ACTOM Industry with effect from April 1, 2021.

Mbongeni Nkosi has been appointed Application Engineer at ACTOM



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Mbongeni Nkosi







Tshepisho Maunve

1, 2021.

Guy Bridges

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Distribution Transformers' and ACTOM Transport's long-service awards for 2020

As many as 34 of Distribution Transformers employees received long-service awards at the end of last year, with lengths of service ranging from 25 to 10 years.

The two longest-serving employees, with 25 years' service, were Sazi Khupe, Wireman, and Dibeo Malakoane, Guillotine Operator.

However, in accordance with the COVID-19 restrictions on large gatherings, Distribution Transformers didn't have its usual large get-together for its long-service awards presentation event for 2020, but limited the number of attendees to a small group which it divided into two - one comprising employees and the other retirees - with all adhering to mask-wearing and social distancing as required.

Transport - comprising Signalling, Transport Equipment & Projects (TEP) and Arnot Vibration Solutions (AVS) also normally have a get-together of



most of its employees for its annual long-service award presentations.

For its 2020 awards, however, it held no actual event either, but arranged for the awards to be delivered to recipients individually.

Among the total 15 recipients involved, Frans Weygertze, TEP's Business Development Manager, and Philip Meyer, Signalling's Business Development Manager, were the longest-serving employees, both with 40 years' service, followed by Cheryl **Barrie**, Signalling's Financial Accountant and **Barry Joffe**, Signalling's Financial Manager, with 35 and 30 years' service respectively.

The other Distribution Transformers long-service award recipients were:

15 years: Y. Grobler, T. Kakudi, J. Nkabinde, M. Mpithi, J. Seloga, M. Mathebula, B. Ndebele, J. Lekgoathi, S. Ntando, V. Ngamlana, E. Mogotsi, J. Madigoe, L. Manaka, A. Thamana,



R. Thai, M.Mlambo and J. Mashaba. 10 years: V. Sotyiwa, M. Mavuso, D. Seleise, S. Machete, T. Sethuntsa, T. Maluleke, R. Vongwa, N. Mbatha, A. Maseko, C. Forbay, T. Nedzamba, M. Maponopono, J. Ciya, S. Maphanga and J. Moshia.

Distribution Transformers' 2020 retirees were: P. Grove (38 years), P. Booysen (34 years), B. Mashilwane and W. Mokoena (both 18 years), N. Mfene and K. Nare (both 12 years) and M. Tjikana (9 years)

The rest of Transport's long-service award recipients, besides those already mentioned, were:

20 years: Leonard de Villiers, Conrad Lunderstedt, Leon Pienaar, Botha Nthunya and Pat Lutchmiah.

15 years: Johan Joubert. 10 vears: Paul Steggink, Emmanuel

Moya and Anthony Wright.

5 years: Mmarena Modise and Ayanda Hlatshwayo.



Left: Sazi Khupe is presented with her 25 years' service award by Alan Buchholtz, Distribution Transformers' Divisional CEO. Centre & right: Philip Myer and Cheryl Barrie of Signalling, who were presented with awards for 40 years' and 35 years' service respectively.

ACTOM's Loveday Zondi again shows his mettle in major canoe races

Loveday Zondi of Electrical Products, ACTOM's top canoeist, after suffering a setback in this year's threeday 120 km Dusi Marathon, which he finished in 25th place overall on March 20, recovered his form in the subsequent races in which he competed, including the ultra-gruelling NonStopDusi on April 9, finishing fifth overall in 9 hours 48 minutes.

Another contest the 36-year-old took part in during the first half of the year included the two-day Umkomaas race near Ixopo in northern KwaZulu-Natal at the end of March, when he and his racing partner Richard Cele, 33, made it to the finish in seventh place overall.

A new challenge came in the form of the 27 km Freedom Challenge around Robben Island off Cape Town on Freedom Day (April 27), when Loveday and his partner for this event - none



Loveday Zondi (front) and Seseko Ntondini in the Freedom Challenge – their first sea race. other than Seseko Ntondini, 26, one of the two top canoeists whose experiences while doing Dusi in 2014 provided the basis for the exciting 2017

adventure movie "Beyond the River" - both competing in a sea race for the first time, did well to finish in 65th place overall out of a total 250 contestants.

ACTOM businesses

POWER

John Thompson, Bellville: (021) 959-8400 John Thompson, Isando: (011) 392-0900 www.johnthompson.co.za

John Thompson is a leader in energy and environmental solutions through value engineering and innovation. We are firmly focussed on serving global and local markets and we offer the following products and services: design, engineering, manufacture, construction, repairs, maintenance, retrofit, installation and commissioning of industrial water-tube and packaged fire-tube boilers, and industrial air quality solutions including HVAC, bag filters, scrubbers and ESP systems.

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

John Thompson also provides outsourced steam solutions.

ENGINEERING PROJECTS & CONTRACTS

Industry: (011) 430-8700

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

Contracting: (011) 430-8700

Contracting is the electrical and instrumentation business unit which provides turnkey solutions for electrical power and instrument & control systems in the mining and manufacturing industries as well as the public sectors.

Power Systems: (011) 430-8700

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

Transport: (011) 871-6600

Transport has three trading units:

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

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

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

ACTOM Energy: (021) 510-2550

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

LH Marthinusen - Coastal Cape Town: (021) 555-8600

Durban: (031) 205-7211 Africa's leading maintenau

Africa's leading maintenance partner for rotating machines – servicing traction, power generation, mining, utilities, oil & gas and general industry.

HIGH VOLTAGE EQUIPMENT

High Voltage Equipment: (011) 820-5111

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

MEDIUM VOLTAGE SWITCHGEAR

MV Switchgear: (011) 820-5111

www.actomswitchgear.co.za

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

WPI Power Solutions: (011) 820-5111

24 Hour Emergency Service: (082) 801-3171

WPI specialises in the repair, installation, retrofitting and maintenance of electrical networks via MV Switchgear's After Sales department and WPI regional branch network that is technically well equipped and strategically placed close to the customer base. The department offers 24/7 customer support for substations, MV and LV switchgear and associated products.

Current Electric: (011) 822-2300

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

POWER TRANSFORMERS

Power Transformers: (011) 824-2810

Power Transformers designs, manufactures and supplies a wide range of power transformers from 2MVA to 315MVA up to 275kV to power utilities, renewables projects, electrical contractors, the mining sector, local authorities and industry locally and internationally.

DISTRIBUTION TRANSFORMERS

Distribution Transformers: (011) 820-5111

Distribution Transformers designs, manufactures and supplies distribution transformers to power utilities, the mining sector, local authorities and industry, and renewable applications locally and internationally.

LH MARTHINUSEN

LH Marthinusen: (011) 615-6722

www.lhm.co.za

LH Marthinusen repairs and refurbishes transformers, electric motors, alternators and industrial fans. Manufacture of electric motor components, insulation components and specialised transformers and motors. It also provides engineering services for its products to the mining, industrial and petrochemical sectors and local authorities, as well as for the export market.

REID & MITCHELL

Reid & Mitchell: (011) 914-9600 www.reidmitchell.co.za

Reid & Mitchell is a repairer and manufacturer of electrical equipment for open cast mining, steel, rail transportation and marine industries. Motors and generators for excavators, off-highway vehicles, locomotives, drilling and pumping applications. The division is also a specialist repairer of DC motors and generators, including rebuilds, rewinds and commutator manufacture.

Electrical Machines: (011) 899-1111

Electrical Machines supplies medium and low voltage motors, starters, gearboxes and speed reducers to the mining, industrial, processing and utilities markets.

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

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

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

Namibia Armature Rewinders (NAR): +264 (64) 462 886

Repairer of electrical machines, hydraulics, boilers, transformers and switchgear throughout Namibia

MARTHINUSEN & COUTTS

Marthinusen & Coutts: (011) 607-1700

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

ACTOM TURBO MACHINES

ACTOM Turbo Machines: (016) 971-1550

www.actomturbo.co.za

ACTOM Turbo Machines is a mechanical turbo-machinery and 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

Metalplus (011) 433-1880

www.metalplus.co.za

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

ELECTRICAL EQUIPMENT

Electrical Products: (011) 878-3050

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

Satchwell: (021) 863-2035

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

Genlux Lighting: (011) 825-3144

www.genluxlighting.co.za

Genlux Lighting is a leading designer and manufacturer of luminaires for roadway lighting, floodlighting, outdoor commercial lighting and industrial applications. It produces a wide range of high quality products in both HID and LED technologies.

ACTOM SMART TECHNOLOGIES

Protection & Control: (011) 820-5111

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

Static Power: (011) 397-5316

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

Alkaline Batteries: (011) 397-5326

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

COM 10: (011) 552-8368

COM10 is a local assembler and integrator of Alpha switchmode rectifiers, DC/DC Converters with sophisticated supervisory controllers, Haze Batteries, stands, battery cubicles and power enclosures.

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12222222 Thank you!

ACTOM extends its deepest appreciation to all healthcare and frontline staff who have worked tirelessly tackling the COVID-19 pandemic head on!

Thank you for your continued commitment and selflessness!





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