

WHAT'S WATT

December
2023



Featuring: ACTOM – Celebrating 120-years



Your One-Stop Global Energy Supply Partner



Though faced with dire challenges, ACTOM performed remarkably well in 2023

As you all know, this year marks our 120th year celebrations. This is a key milestone in ACTOM's history. The group, through its divisional portfolio of manufactured products and after-market repairs and services, has done incredibly well in navigating through various economic cycles.

We are all aware that the world economy remains highly volatile and fluid, as we have seen high inflation rates, triggering increased interest rates, with major recession risks in many large economies. This has resulted in reduced commodity pricing, which ultimately has an adverse impact on the South African economy. Our current economic situation as a country is dire, with major pressures on government and the fiscus.

The country is experiencing major challenges across energy, logistics and security, with major service delivery challenges across many municipalities. Our unemployment levels remain challenging and inequality prevails.

Despite the bleak macro-economic situation in South Africa, ACTOM as a group has fared exceptionally well, as we've seen some industry segments triggering increased demand for our group's products and services. We've particularly seen increased activity levels stemming out of independent power producer (IPP) generation projects, as well as increased activity levels for products in the transmission and distribution sectors. This increased demand has yielded increased factory loading across the various divisions.

ACTOM has tactically been increasing factory capacity in various areas of



Mervyn Naidoo

the business to cater for the predicted increased demand. The weakened rand positions the company and the local manufacturing industry well for local manufacture and exports.

It is imperative that we as South Africa Inc. use the infrastructure spend that is required in our country to resuscitate industrialisation and create desperately needed jobs and thereby increase our economically active population and so stimulate GDP growth.

ACTOM is in the process of developing a larger training centre at the Driehoek site which will be operational early in 2024. This will give us the capacity to make a greater impact on the development of skills, bearing in mind that we have a youth unemployment rate of 75% in the country.

We find ourselves and our operations facing electricity load-shedding, as well as occasional water shortages. The ACTOM group is actively involved in rolling out backup power and alternative energy sources (solar power), as well as water storage systems, to mitigate the risks which exist and also to ensure the sustainability of our business. We have also as a group made good progress in strengthening the balance sheet of the company, which is key to business sustainability.

We have also this year concluded the acquisition of a manufacturing business in Kenya, which is a key strategic platform for entry of the group's full product and service offerings into the East African market, which has a population in excess of 400-million people.

Our health and safety performance is currently at a LTIFR of 0,39. I would like to commend everybody for maintaining a safe working environment.

ACTOM continues to actively engage and impact positively on our neighbouring communities and informal settlements. We have in this year developed and executed a project called Izintombi Zodwa that manufactures clothing for our company.

Despite the hardships and challenges that we encounter as South Africans, we are a resilient nation, with hope for a positive future for all. This can only be achieved by us standing together as a nation.

I'd like to wish everybody a Merry Christmas and a Blessed New Year and I thank you for all your hard work and commitment over the past year.

Mervyn Naidoo

What's Inside

ACTOM – a 120-year legacy	Pg 3	ACTOM Energy Namibia wins substation contract	Pg 22
Static Power provides solar systems for divisions	Pg 8	M&C completes rapid repair of winder motors	Pg 24
John Thompson again wins Chairman's Award	Pg 9	ACTOM Turbo's cold repair solution for pulp mill roll	Pg 25
ACTOM's STEM-programme	Pg 10	Unique weld repair method of turbine	Pg 27
Modelling power islands	Pg 12	Satchwell launches solar generation solutions	Pg 28
Improving boiler efficiency	Pg 14	Genlux sets up state-of-the-art light testing laboratory	Pg 29
Automated testing system for VI plant	Pg 18	Key appointments	Pg 31
R&M introduces all-inclusive safety programme	Pg 20	LHM's Mandela Day painting project at local school	Pg 32
Cutting edge equipment enhances R&M's workshop	Pg 21	Group's Heritage Day celebrations	Pg 33

Cover: A selection of images illustrating highlights of the earliest times in the development and expansion of the group.

ACTOM – a 120-year legacy

Once upon a time, a long, long time ago, in the land of Philadelphia, a scientist, famous only as an author at the time, experimented with a kite, a key, and a thunderstorm.

The rest, as they say, is history.

Benjamin Franklin may not have been the first to theorise about the potential of harnessing electricity. Still, his famous experiment is generally accepted as the catalyst for our journey into the muddy waters of today's power generation.

The world of power generation has dramatically changed since that day in 1752. Electricity, the harbinger of the industrial revolution, is now a powerful economic driver and no longer a mystical fairy tale.

Before the Industrial Revolution, our energy needs were modest. We relied on the sun for heat and burned wood, straw, and dried dung when the sun failed us. The power of the wind in our sails took us to every corner of the world, and for work, we used animals to do jobs that we couldn't do with our own labour and water and wind drove the simple machines that ground our grain and pumped our water.

With the low-cost automobile and the spread of electricity, our society's energy use changed forever. Power plants became larger and larger until we had massive coal plants and hydro-electric dams. Power lines extended hundreds of kilometres between cities, bringing electricity to rural areas.

Energy use snowballed, doubling every ten years. The cost of energy production was declining steadily, and the efficient use of energy was simply not a concern.

South Africa's growth and diversification

In South Africa, the late 19th century saw rapid change from an agricultural society to an industrial organisation, with the primary driver being the discovery of large diamond deposits in Kimberley in 1867, followed in 1886 by the discovery of gold on the Witwatersrand.

Electricity was publicly used in South Africa for the first time with the opening of the electric telegraph line between Cape Town and Simon's Town on 25 April 1860. The first electric streetlights, driven by a coal-powered plant, were installed in Kimberley in 1882.

The first central power station and



In 1903 British General Electric established an office in Johannesburg.

distribution system in South Africa, consisting of a 150kW generator with two boilers at Cape Town Harbour, was completed in 1891 to supply power to government buildings. In 1893, Wynberg, in Cape Town, opened a power station to provide power to a local tram system and public streetlights. Due to the rapid need for consumer electricity and railway electrification, the Electricity Supply Commission (ESCOM) was formed in 1923.

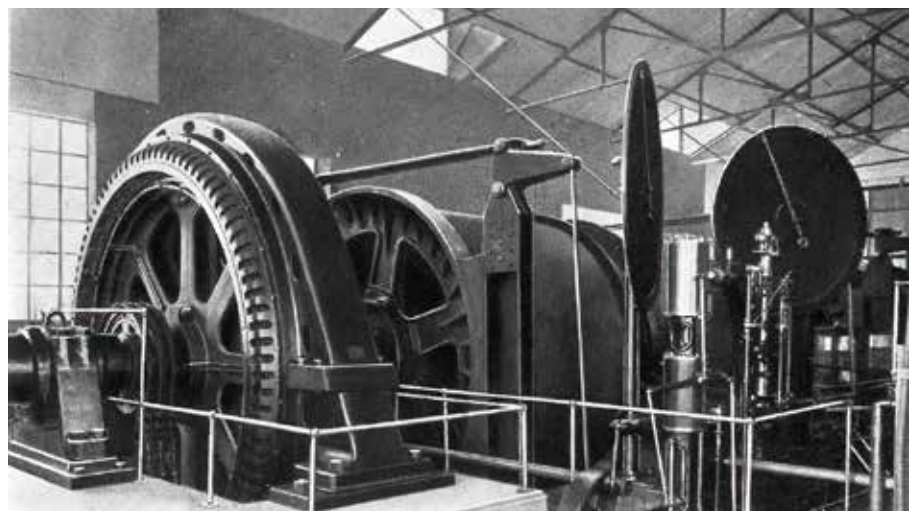
ACTOM sprouting its roots

Due to the rapid industrial revolution in South Africa, the British General Electric Company (GEC), a prominent British industrial conglomerate involved in consumer and defence electronics, communications, and engineering, found its African footprint in the Cape of Good Hope in 1903, so, the ACTOM

journey began.

The discovery of diamonds and gold in South Africa started a mining boom that required significant electrical mining equipment and, by default, more power plants. To meet demand, GEC built the first power plant in Uitenhage in 1908 with an order consisting of two diesel-driven 90kW electric generators and switchgear. Within a few years, power stations in three other towns, Oudtshoorn, Queenstown and Stellenbosch, had placed similar orders.

Mergers, acquisitions and liquidations characterised GEC's next 100 years as the South African market took shape internationally and navigated through wars and political challenges. The importance of local manufacturing became one of the cornerstones that



The 1500-hp a.c. winder motor was supplied by Metropolitan Vickers and used in early mines on the Witwatersrand. This unit was installed in 1909.

To page 4

From page 3

would later position ACTOM as an industry leader.

By the late 1970s, the pressure on multinational companies operating in South Africa to disinvest had intensified, and GEC decided to convert its South African arm from a wholly owned subsidiary to an associate company of its UK parent. In 1978, the UK group sold 50% of the local Group's equity and management control to Barlow Rand, South Africa's largest mining and industrial conglomerate.

When economic sanctions were lifted against South Africa in 1991, positive influences increased export and import trade, with many new companies appearing in local markets. By the first democratic elections in 1994, South African manufacturers saw boosted confidence from overseas trading partners and investors. The new South Africa took its place in the world community, which led to the South African government implementing a Black Economic Empowerment (BEE) policy to encourage transformation into the private sector. Multinational companies reshaped and strengthened their South African operation and realised their growing need to bring black equity partners into their local businesses.

In 1996, GEC ALSTHOM South Africa appointed a task team to formulate a strategy for the BEE implementation. In 1998, a partnership was formed with three black empowerment groups, who jointly owned BEE companies in the transformer repair, projects and product distribution fields. The European stakeholder's name changed to ALSTOM in 1999 after its significant stakeholders reduced their holdings in the Group.

In July 2002, ALSTOM SA (Pty) Ltd was formed, in which the goal of bringing together the four key stakeholders, namely the technology provider, BEE partners, management, and the finance providers as owners of the new entity was realised, making Alstom SA, a South African owned company for the first time - a fitting, and triumphal conclusion to the Group's first 100 years in South Africa.

Read more about the history in "The first 100 years of ALSTOM South Africa" on the ACTOM website under the newsroom link.

South Africa had experienced strong economic growth since the end of apartheid in the early 1990s, and a



At 424 MW, mighty Klip was the largest power station in the Southern Hemisphere in 1939 and a magnificent showpiece of pre-war engineering expertise.

profound restructuring of the economy had borne fruit in the form of macro-economic stability, booming exports, and improved productivity.

The performance of the South African economy in 2004 was encouraging, with growth accelerating above 5% in the second half of the year and enabling ALSTOM South Africa to leverage off the significant growth and establish itself as a leading manufacturer and distributor of various electrical-related products, diesel engines, industrial brakes, and clutches.

By February 2005, the economy had grown more strongly than ever in the previous 20 years. South Africa's fiscal deficit was reduced from 46% of gross domestic product (GDP) in 1996 to 1,5% in 2005. Not surprisingly, South Africa's global competitiveness had soared and manufactured value-added products were increasingly eating into commodities as a traditionally dominant share of exports. With the increase in demand for locally manufactured products and Eskom's drive to implement an aggressive policy of promoting local content, ALSTOM SA committed to invest over R40m in the production capacities of three of their divisions. The capital investment increased production output by approximately 50% by the middle of 2006. According to Mark Wilson, Group Managing Director, ALSTOM SA at the time, "the group had been increasing its manufacturing capabilities over the previous 18 months, strengthening our ability to meet higher local content quotas."

Business acquisitions

With ALSTOM well positioned as a leading local manufacturer and service provider, the next logical step in establishing the company as the definitive market leader in South Africa, as well as the rest of Africa, was to define a clear growth strategy, both organically as well as through mergers and acquisitions.

The ALSTOM Group experienced unprecedented growth in 2007, with their order intake exceeding R4,5bn and doubling their business growth over the previous three years. This exceptional growth led to ALSTOM acquiring MikroPul SA, a leading air-cleaning and dust control specialist that was renamed Air Pollution Control.

In 2008, ALSTOM South Africa saw significant investments by new majority stakeholders Actis and Old Mutual and substantial reinvestment by all its BEE stakeholders. In 2009, ALSTOM SA's name was formally changed to ACTOM due to the renewal of partnership agreements between Ariva T&D and ALSTOM. The Group employed, at the time of the name change, more than 6000 people and had an annual order intake of R5bn. The group, consisting of 27 operating units, 22 production facilities and 25 distribution centres throughout South Africa, marked the largest private equity deal and one of the largest ever in the electrical engineering sector in South Africa at the time.

ACTOM continued with its drive to establish a competitive, diversified

and market-leading offering of a one-stop engineering solution through mergers and acquisitions of strategically positioned and company-aligned businesses. In line with this strategy, ACTOM acquired Luwa SA in 2011. Luwa, a market leader air-conditioning specialist company formed in 1971, was subsequently renamed ACTOM HVAC Systems and integrated into the John Thompson division.

February 2012 saw ACTOM announcing the acquisition of Savcio (Pty) Ltd, a well-known South African group providing maintenance and repair services for rotating equipment and transformers throughout Africa. The acquisition increased ACTOM's annual order intake by 40% to more than R7,5bn. It increased the number of operating units from 33 to 42, with the total staff complement rising from 5,400 to 7,500. All the former Savcio divisions, namely LH Marthinusen, Marthinusen & Coutts, Reid & Mitchell, Transwire, Wilec, Metalplus, (Hydon Hydraulics and Electrowave Cape) renamed to ACTOM Energy, all continue to operate within their brand identity under the ACTOM flag. The then CEO and Chairman, **Mark Willson**, stated, "The acquisition reinforces the group's ongoing local added value and technology development strategy. Strong partnerships with multinational companies support this approach. It is specifically targeted at supplying technical solutions, but not exclusively tailored to the African Market."

2012 also saw ACTOM acquiring Genlux Lighting, a leading designer and manufacturer of outdoor and indoor luminaires. The acquisition was significant and underpinned by a technological partnership with a leading international designer and manufacturer of luminaires and 14 established branches throughout South Africa.

In 2014, Marthinusen & Coutts (M&C) extended its service offering with the acquisition of Cetus Turbo Machinery, which is currently being complimented by adding a comprehensive repair service to electric motors and generators within the division and was later renamed ACTOM Turbo Machines. Today, ACTOM Turbo Machines specialises in inspecting, repairing, and refurbishing both OEM and non-OEM rotating equipment.

In July 2016, WPI Power Solutions, a Gauteng-based company specialising in the repair and maintenance of

electrical networks, was incorporated to boost ACTOM's electrical maintenance offerings in their MV Switchgear division and brought with it extensive experience and expertise in undertaking large-scale projects involving preventative maintenance and repairs of networks.

In October 2018, ACTOM consolidated its Namibian operations, Namibia Armature Rewinders (NAR) and Electrical Products Namibia (EPN), into a subsidiary business unit of ACTOM Energy Namibia. Based in Swakopmund, NAR repairs electric rotating equipment, while EPN, based in Windhoek, operates as a sales-and-service branch for Electrical Products. This change consolidated the management and financial administration of the two businesses under one holding company, enabling them to operate more efficiently. The merging of the two subsidiaries led to improved competitiveness and targeted broadening of their scope of business activities in Namibia's rail, mining, and power sectors, with the potential that ACTOM's other divisions could cater to new projects.

In August 2023, ACTOM acquired a low-voltage electrical manufacturing facility in Kenya, which is seen as an entry point into East Africa, where the company plans to target Tanzania, Uganda, Rwanda and Ethiopian markets. This facility will also provide equipment repair and maintenance and offer attendant services. The idea is to transfer ACTOM's technology into Kenya, where significant growth op-

portunities exist. ACTOM Group Chief Executive, Mervyn Naidoo emphasised the potential of this factory as being immense and strategically aligned with the group's drive to expand further into Africa.

Growth strategies & initiatives

At the G20 summit in Australia in 2014, South Africa delivered its economic objectives over the short and medium term, anchored around the National Development Plan (NDP), released in 2011. It outlines South Africa's objectives for development up to 2030 and provides a diagnostic overview of critical blockages to development. The Medium-Term Strategic Framework (MTSF) for the period 2014-19, released in 2014, offered key interventions to prioritise key policy actions to be undertaken in the next five years. South Africa's growth strategy, which is aligned with the NDP and MTSF, aims to improve the environment for growth in employment, investment in infrastructure, trade and competition. In supporting the South African government with its objectives, ACTOM has made significant progress since 2002 in growing its infrastructure; the progress, however, did not come without challenges and setbacks.

During 2017, ACTOM faced environmental challenges due to political and policy uncertainty, loss of business confidence, and a loss of trust between businesses and the government. This created a toxic environment for further investment in infrastructure and re-

To page 6



This 30 year old large 2150 kW synchronous mill motor was repaired by Marthinusen & Coutts for a Zimbabwean gold mine in 2017.

From page 5

sulted in forced restructuring, consolidation, and unavoidable retrenchments throughout all divisions.

ACTOM sold off its Elmacast foundry in 2017 following a strategic decision to outsource castings.

In 2018, ACTOM restructured its interests in TLT ACTOM which resulted in ACTOM acquiring the fan services business, which it integrated into its LH Marthinusen (LHM) Division. This was part of a strategy to extend into draft fan services at ESKOM's Power stations. This strategic repositioning led to LHM being awarded a major draft fan repair contract by ESKOM in 2021.

In 2019, Wilec, a key supplier of input materials required by several of ACTOM's divisions, was sold to Makareng Electrical Industries (MEI), a wholly black-owned company. The disposal of Wilec formed part of the Group's growth strategy to review its extensive vertical integration of copper processing. The transaction demonstrated ACTOM's commitment to government policy of encouraging the development and advancement of black industrialists where merited.

Exports

With intensified competition from imported products, particularly from China and other Southeast Asian countries, local manufacturing became increasingly difficult. However, the weakening rand brought increased opportunities for ACTOM to develop and expand their locally manufactured product offerings into international markets.

ACTOM, to retain its competitive-

ness and increase its market share, started to focus abroad and saw a surge in profits due to increased orders from the United States, Australia, and Indonesia. ACTOM implemented a bold export incentivisation programme in 2014 as a key part of their group-wide strategy to boost business growth in the medium term and sustained expansion in the longer term. The decision to expand internationally became instrumental to the group's drive to concentrate on its African footprint and grow cross-border exports to neighbouring countries. The decision yielded significant results, and R1,56bn in export orders were generated by the end of the 2014 financial year, which was 67% higher than the previous year.

One of their many success stories and the group's main strategies is diversifying geographically. Most of ACTOM's divisions and business units recognise that African countries offer the best opportunities for export and growth and, therefore, direct their efforts mainly at expanding and developing in these countries. ACTOM believes in developing a strong export sales pipeline and actively promotes export opportunities through its association with Proudly South Africa and their membership with the South African Electrotechnical Export Council (SAEEC). "It is important for us to partner with organisations that help drive investment, promote locally manufactured products and break down barriers to international trade. We support the efforts of those finding ways to confront, and more importantly, to resolve, the issues underpinning the current

economic crisis we find ourselves in. We realise there is no quick-fix solution, but we are confident that we are on the right track," commented ACTOM's Chairman, **Andries Mthethwa**.

With their various partnerships and operations in 31 African countries, there is no doubt that business opportunities exist outside South African borders. Their unified approach offers excellent advantages for the Group and their business units, especially with the cost savings achieved, providing a more competitive deal overall. ACTOM's geographic diversification strategy is continually being reviewed and adapted to strengthen its local manufacturing arm.

Local manufacturing

Export opportunities are high on ACTOM's agenda, and their strategy for local partnerships and role in developing the country's critical infrastructure are taken extremely seriously. The Minister of Energy's announcement in 2017 that the government needs to support and intervene to protect and stimulate the local manufacturing sector was a positive turn for the Group. Between 2013 and 2023, ACTOM invested approximately R1Bn in capital expenditure in its local businesses to boost manufacturing as well as after-market repairs and services.

ACTOM, with its long manufacturing history and various divisions, has expanded to offer world-class manufacturing facilities. John Thompson, with a manufacturing facility in Bellville, South Africa, has a total of 30,000m² under one roof and is Africa's leading supplier of industrial boilers.

ACTOM's Power Transformer division has been manufacturing power transformers for nearly 60 years and supplies to electricity distribution utilities, the mining sector, industrial plants, public works authorities and turnkey contractors. ACTOM ensures they only import what they must and manufacture the balance of products locally. This is an integral element of their strategy to create employment and promote local manufacturing.

With South Africa on the cusp of the Fourth Industrial Revolution (4IR) and the uncertainty of what it means for local manufacturing, ACTOM restructured a few of its divisions to meet the new market demand and created ACTOM Smart Technologies, which focuses explicitly on enabling



Distribution Transformers factory workers are seen above tanking 64kVA 22kV low-loss transformers as part of the new interim distribution transformers contract for Eskom.



Steve Jordaan (left) and Mervyn Naidoo (right) accompanying Minister of Trade and Industry, Ebrahim Patel, during his visit to ACTOM Power Transformers in November 2022.

the Group to embrace 4IR. Many of the ACTOM businesses have already been proactive in implementing automated processes and exploring new and diverse manufacturing opportunities for the future. Some of ACTOM's businesses have initiated case studies on automation to identify what and how this could negatively affect their businesses. The Group is cognisant of the fact that the business landscape is changing rapidly and brings with it enormous responsibility in stimulating employment. "By creating jobs, we remove the social burden of unemployment and associated issues," said **Mervyn Naidoo**.

Localisation and designation

According to Stats SA, South Africa is expected to register the highest unemployment rate in Africa in 2024, a statistic that is tragic and requires that companies formulate growth strategies that are aligned with growing localisation and supporting communities across South Africa, sustainable labour and recruitment is and must be a priority.

Building local industrial capacity for the South African market has become a priority for the Department of Trade Industry and Competition. It highlights a growing need for organisations to promote localisation within the manufacturing sector. This is a crucial step towards reducing unemployment, improving skills development, and enhancing local demand through high-quality services and solutions. In addition, it serves up local ingenuity

and solutions to the global market as local capacity equals growth for export markets and encourages a move away from the exclusive provision of raw materials.

The government has had this focus in place for nearly ten years and has, in that time, seen the development of solutions for the local market and identified several key sectors that require a significant shift towards local manufacture – the government has to date earmarked 27 of these sectors and continues to drive this narrative in 2023.

The importance of the narrative cannot be ignored or circumvented, particularly in light of the slow growth in the manufacturing sector, which decreased by 2.3% in May 2022 compared to the same time in 2021 and by 4.7% in December 2022 compared to December 2021. These figures highlight a distressed sector that requires consistent investment and strategic support to ensure measurable growth in 2023. In a recent interview, Naidoo, who is passionate about localisation and designation, said, "Localisation has a serious impact on the whole supply chain. When you localise manufacturing, all the sub-components of manufacturing fall into place and benefit communities."

ACTOM is actively involved in localising its products and services and offers on-the-job training on construction skills, including bricklaying, plastering, painting, concrete formwork, cable terminating and electrical wiring. While the site crew's engagement is only transitory and for the duration of any project,

the skills transferred can improve their future employability prospects and possibly even inspire some to go into business.

ACTOM commits to a greener future

Eskom's Just Energy Transition (JET) Office was established in 2020 and has made significant strides to progress the evolution of the transition towards a cleaner and greener energy future. JET's vision focuses on achieving "Net Zero" carbon emissions by 2050, with an increase in sustainable jobs. Traditionally, ACTOM has been geared toward coal-fired power stations but has realised that, with Engineering Procurement Contractors (EPC) requiring integrating offerings, they must migrate towards evolution engineering in new design technologies. With renewable power plants scattered across South Africa, applying condition monitoring to individual systems was tricky. ACTOM thus invested in developing new software, systems and technologies that allow users remote access – yes, you can be sitting in Johannesburg whilst having live access to the management and maintenance systems of a plant in the Karoo.

It was reported that in September 2023, South Africa had 34 operational wind farms, adding a combined capacity of 3,400 MW to the South African electricity grid. The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) implemented in 2011 has awarded 123 projects to the private sector, with a total investment committed of R256bn. Four of the six bid windows have come online, totalling 6200 MW installed capacity.

All building systems and components require maintenance, and renewable energy systems are no exception. It should be a rule that all renewable energy systems practise proper annual care to ensure efficient power delivery and distribution. ACTOM Energy, a project business with front-end engineering capabilities and technical expertise, is well positioned and geared towards capitalising on the many opportunities with greener electricity generation locally and globally.

Sustainability

In 1987, the United Nations Brundtland Commission defined sus-
To page 8

From page 7



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

tainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

The economy of South Africa is beset by poverty and inequality, considerable unemployment, carbon-intensive, water insecurity, and slow GDP growth. Furthermore, the COVID-19 epidemic has caused the economic crisis to worsen further. It emphasises the need for a new development strategy to spur economic recovery.

According to the Daily Investor, elevated levels of load-shedding so far in 2023 could cost the South African economy R1.6 trillion in lost economic activity – R400 billion more than last year. The JET programme allows ACTOM growth and sustainability for most of their divisions and business units and reflects on the group’s adaptability to manufacturing and supporting the industry while at the same time implementing initiatives to migrate away from carbon energy production. With their market-leading technologies and product advancement, ACTOM is well-positioned to offer large-scale infrastructure installations to smaller projects and services.

It is one of the first manufacturing companies to provide a complete turnkey power island solution in South Africa. Simply put, the concept means the independent operation of a whole network or part thereof can be isolated after it becomes disconnected from an interconnected system. ACTOM custom designs and manufactures medium voltage motors and prides

itself in offering every element of a power island.

ACTOM celebrating 120 years

From humble beginnings as a European-based company all those 120 years ago, ACTOM today can stand tall and proud as a truly South African company that is fully invested in local economic and community growth. A company that is proudly a Level 1 B-BBEE Contributor with 52.89% black and 35.64% Black Women ownership, sporting a staff complement of more than 6800 employees, and have an annual order intake of more than R11bn.

At their recent 120-year celebration ceremony, ACTOM hosted **Dr Robert Nkuna**, Director General in the Presidency; **Sivuyile Ngodwana**,

Mayor of Ekurhuleni; Stakeholders and guests. “This event was a celebration of a legacy company that is over a century old, and the fact that we have managed to navigate multiple industrial revolutions, technology changes, a pandemic, and economic cycles and survive by reinventing the company is testimony to our strength. This event aimed to celebrate what we’ve achieved and the people who have been involved in helping us reach this achievement,” said **Mervyn Naidoo**.

According to **Andries Mthethwa**, who started his career at ACTOM (GEC) in 1976, when asked about the future of ACTOM, he said, “I strongly believe that the tried and tested key drivers can continue to grow the company in the future. We need to continue with the training of the new generation of employees, and we need to embrace and promote new technology as we go forward.”

However, having a 120-year-old historical legacy should not define a company; what should define us is how we navigate the future and build the next 120 years. True ongoing success can only be achieved by embracing the philosophy of “Stewardship”. A simple philosophy is that we own nothing - everything we have is loaned to us. Our only responsibility is to ensure that when we do hand over the responsibility, it is in a better condition than when we first received it. ACTOM’s true legacy is in what comes next and how we ensure that the company and our country are handed to the next generation in the best sustainable condition possible.



From left: Andries Mthethwa, Chairman at ACTOM; Sivuyile Ngodwana, Mayor of Ekurhuleni; Mervyn Naidoo, CEO at ACTOM; Dr Robert Nkuna, Director-General at Department of Monitoring and Evaluation within the Presidency.

Static Power oversees provision of PV solar systems to ACTOM divisions

Two years ago Static Power decided to extend its operations to cater to the growing trend by industrial and commercial businesses in South Africa to establish solar power generation systems of their own to offset both the unreliability of power supply from the national grid resulting from the ever increasing frequency of loadshedding and the higher electricity supply prices that Eskom has sought to impose on consumers.

The first step the business unit took was to appoint a suitably qualified and experienced PV solar practitioner as Engineering Manager to provide the overall leadership in marketing the new service, in which Static Power establishes the PV solar generation requirements of a potential customer, writes the specification and then goes to the market to assess suitable contractors, prepares tender documents and manages the tendering process and makes recommendations to clients accordingly, as well as taking overall project management responsibility for each project.

Jaco Weyers, who had handled various PV solar projects in South Africa over a period of 10 years prior to joining Static Power, was appointed to this key post. During that period he managed two large PV solar farms in the Northern Cape for an independ-

ent power producer (IPP), then as part of a team of consulting engineers he assisted in designing and building a 50MW PV solar farm for the De Wildt agricultural area near Brits, North West Province, assisted in the design, procurement and erection of a 220kW dual-axis “proof of concept” tracking platform PV solar plant for the CSIR in Pretoria, and assisted in designing and building smaller fixed solar rooftop PV solar installations in Gauteng and Cape Town.

The new department has initially focussed on providing PV solar systems for divisions within ACTOM. To date it has sourced contractors for the design, supply and erection of PV solar generation systems for ACTOM Turbo Machines in Sasolburg, MV Switchgear at Knights, Germiston, and Reid & Mitchell (R&M) in Benoni.

All the above projects were done on a turnkey basis by contractors selected by Static Power through a tendering process.

“The client makes the final selection based on our recommendation and appoints Static Power to do the project implementation, project management, final handover and sign-off of each project to the client upon completion,” Jaco explained.

ACTOM Turbo’s 200kW capacity grid-tied PV solar system, commenced operation early last year. MV

Switchgear’s 1.1MW grid-tied PV solar system, which *What’s Watt* featured in its June issue this year, went live in July, with an official handover event being held at Knights on July 19.

Reid & Mitchell has gone a different route than the other two divisions, installing a 50kW hybrid PV solar system, which, unlike the others, includes a lithium batteries backup system and is designed to supply continuous solar-generated power supply independently of the grid.

The 1.1MW of power the PV solar system at Knights is capable of generating is just short of MV Switchgear’s total power consumption at peak load and is about 50% of the peak load drawn by all the factories at the Knights site.

“Due to some unexpected complications that arose the system had to be partly redesigned during the course of the project,” Jaco said.

“The roof was found not to be designed to handle the additional load of the PV solar system and some roof space was therefore unavailable for use in the project, so we had to redesign the project using the largest commercial solar panel available at that stage to make the most of the available area. A total of 1676 large panels therefore were used where the initial aim was to use 2230 small wattage panels,” Jaco concluded.



At the official handover of the PV solar system at ACTOM’S Knight’s premises on July 19, displaying a framed photograph of the solar panels mounted on MV Switchgear’s factory roof are Peet Schoeman (left) and Douglas le Roux, Site Manager and Senior Project Manager respectively of Solar Africa Energy, the contractor that carried out the project. Included among the large group of senior ACTOM and Solar Africa Energy personnel in attendance, as shown in the above picture, are (back row, 3rd, 4th & 5th from left) Jaco Weyers, Static Power’s Engineering Manager; Elsabe Swart, Static Power’s General Manager; and Mervyn Naidoo, ACTOM’s Group CEO.

John Thompson yet again attains top honours in winning the group's prized Chairman's Award

John Thompson was yet again the top achieving division in ACTOM in the past year. As in the previous year – and on many other occasions – it has won the Chairman's Award for 2022/23.

John Thompson ticked all the right boxes in, firstly, achieving earnings before interest and taxes (EBIT) growth of 27% over the previous year, secondly, an extremely high cash conversion level of 68%, and thirdly, a highly impressive growth in export sales of 54%.

The division also scored very high marks on all four of the other criteria that are taken into account in measuring the performance of divisions competing for the Chairman's Award, achieving a Level 1 black economic empowerment (BEE) rating and attaining 97% for risk management, 95.7% for environmental performance and a lost time injury frequency rate (LTIFR) of 0.4.

MV Switchgear ran a close second to John Thompson to win the Runner-up Award, followed by Engineering Projects & Contracts, LH Marthinusen and Reid & Mitchell, which were awarded Divisional Certificates of Excellence.

Andries gave notice that the competition for the forthcoming 2023/24 financial year will see the introduction of an additional criterion for judging the group's divisions for the Chairman's Award.

"This new factor that will be taken into account along with the existing ones is economic value-add (EVA), whereby the increase in your division's EVA contribution during the year compared with the previous year will be measured and assessed," he explained.

In the business units section of the current competition as many as eight business units earned recognition for putting in exceptional efforts to achieve

high profit growth and good conversion of profits to cash during a year beset with many difficulties and obstacles.

This was the largest number of business units to win Business Unit Certificates of Excellence in a single year since the inception of the Chairman's Award competition in 2012. The eight units which were accorded this honour are, in no specific order, Genlux, Contracting, Power Systems, Protection & Control, Metalplus, Electrical Machines, Electrical Products and John Thompson Utility Boilers.

Finally, the award for the best semi-technical article published in What's Watt during the past year went to **Wilma Muller**, Power Transformers' Sales Manager, for the article "Power Transformers launches unique online condition monitoring system for transformers," which was published in the magazine's December 2022 issue.



Chairman Andries Mthethwa, accompanied by Group CEO Mervyn Naidoo, presenting the award to John-Paul Andre, John Thompson's Divisional CEO, at the awards ceremony in Johannesburg on July 14 this year.

ACTOM's STEM-programme bearing fruit for the youth



The Top Scholars from Size Secondary School at ACTOM's 120-year celebration.

According to The Organisation for Economic Co-operation and Development (OECD), 27% of students who have attended school for six years cannot read. After five years of school, only about half can do basic mathematics. Only 37% of children starting school in grade 1 go on to pass the matriculation exam, and just 4% earn a degree.

The South African Government Gazette recently published a list of 142 critical skills needed in the country, all related to Science, Technology, Engineering and Mathematics (STEM) subjects. As experienced during the response to COVID-19, technology is a powerful tool to increase the resilience of our societies and promote growth. Innovations are powering the fourth industrial revolution and have become indispensable for thriving in a fast-changing world with new and emerging challenges and opportunities. These technological innovations have something in common: they are anchored on solid scientific knowledge, cutting-edge technology, and advanced engineering and mathematical skills, which can be acquired through STEM education and training.

Over the last three decades, a global wave of market liberalisation has led some nations to enhance how they master and utilise STEM as critical economic growth, development, and security determinants. In response, most African countries have developed national policies that promote STEM education. Though educational policies that encourage STEM education are often coherent with national development visions, there is often a gap between policy and practice. As a result, African countries still fall behind in STEM education outputs compared to the rest of the world. Moreover, the lack of implementation of STEM plans in African countries has further exacerbated the economic development gap between Africa and the rest of the world, undermining African countries' innovation capacities. One of the main challenges for implementing these plans is that most of Africa's education and training programs through which STEM fields are taught suffer from inequalities and exclusion at all levels, poor resourcing, inadequate teacher development programs, limited access to electricity and internet, and inadequate infrastructure for STEM

teaching and learning.

In support of STEM studies and to aid in the engineering future of South Africa, ACTOM has been actively involved in upliftment projects and educational support in their local communities. ACTOM offers the top students from the Katlehong Engineering School of Specialisation, Sizwe Secondary School and Erasmus Monareng Secondary School personal tutoring and mentoring services in STEM subjects. "Because we are actively involved in the STEM industry and cognisant of the critical skills our country needs, we look at the bigger picture of ensuring the students will be able to further their careers and complete their studies," said **Sylvester Makamu**, HR Executive, ACTOM.

In 2019, ACTOM adopted the Katlehong Engineering School of Specialisation (SoS) into their STEM programme. The programme is so successful that the School Principal praised his learners' and teachers' hard work and dedication in a recent radio interview. Since entering the STEM tutoring initiative, the matric average of the top 20 learners has

To page 12

From page 11

increased by 43%. At the beginning of 2023, Basic Education Minister Angie Motshekga praised the class of 2022 for obtaining a record 80.1% matric pass rate. This is a remarkable feat for children who sometimes have to be parents as well. According to Mr **Daniel Malindi**, Head of Department, "The ACTOM group learners have had an above-average increase of 43% for maths since inception, and we are incubating this group as a pivotal control group. We have purposefully structured our second group by teaching them Technical Mathematics and will, for this reason, be incorporated into ACTOM's training centres as Artisans. Once they have completed their studies, these young people will find employment in ACTOM's various divisions."

Sizwe Secondary School has faced numerous challenges in the last 18 months since the inception of the STEM programme. At a recent press conference, Mr **Matome Chiloane**, MEC for Gauteng Education, said: "Sizwe High School is one of 75 prioritised schools out of 245 in the province

identified as high-risk." This statement was made during Mr Chiloane's visit to the school as part of his "Operation Kgutla Molao" in October 2023. According to the Department of Education, the operation is a safety strategy recently launched by the MEC in reaction to reports of safety concerns at Gauteng schools.

With all the students' challenges, the top 20 Grade 12 STEM students from Sizwe Secondary School remarkably increased their matric pass rate. The ACTOM-elected Tutors assist 45 learners with Physics and Mathematics and 35 with mathematics and accounting in Grade 11.

Within the Grade 12 group at Sizwe Secondary School, they assist 45 learners in Physics and Mathematics and 20 with mathematics and accounting. According to Mr **David Khoza**, Principal of Sizwe Secondary School, "I have definitely seen a sharp increase since ACTOM's involvement with my school and am very proud to say that the Matriculants' average pass rate has increased from 45% in 2021 to 90%

in 2022" and added, "we are looking forward to the 2023 results".

The Erasmus Monareng Secondary School, based in Vosloorus, entered the ACTOM STEM programme in 2013. They offer the top 20 students from Grades 11 and 12 the opportunity to be tutored in mathematics and physics. The school has seen an increase of 36% in mathematics and a 26% increase in physics.

As it is a celebratory year, ACTOM recently hosted scholars from Sizwe Secondary School and Katlehong Engineering School of Specialisation at their 120-year celebration in Johannesburg. The Top 20 Students from each school were awarded a Certificate of Excellence by Makamu on the day, with spirits high. ACTOM has employed a third party, "Gradesmatch", to assist these matriculants with their applications to tertiary establishments.

The need for the private sector to partner with the government to create innovative models to address this crisis is increasingly apparent by following ACTOM's example.



The top students from Katlehong Engineering School of Specialisation receiving their Certificates of Excellence.

Modelling power islands using simulator & design software for biomass power plants

Abstract

This article explores the utilisation of power plant simulator & designer software (PPSD) in modelling power islands, with a specific focus on biomass-based power plants. The article showcases the modelling procedure with respect to full plant simulation through the use of a case study. The model was validated against measured operational data and provides an accurate model for the power station. The thermal model was used in conjunction with a data analysis study to establish one of the root causes of reduced export of electrical power from woody biomass-fired power island over recent years.

Introduction

The growing importance of sustainable and renewable energy sources has led to the development and operation of biomass power plants. The use of forestry remnants and rejected lumber from the paper and pulp industries serves as a promising biomass fuel for power generation. This is the case for the independent power island which utilises these sources of biomass to export approximately 25MWe of electricity to the national grid in accordance

with a power purchase agreement (PPA). It is important to consider the entire system from the pre-boiler to condenser when modelling such power islands. Since changes in the thermal layout, geometry and steam supply can affect areas such as the boiler efficiency, thermal efficiency and operating costs, which go unnoticed when various components are considered in isolation.

Accurate modelling and simulation of such power plants are crucial for optimising their design, operation and performance. The use of PPSD provides a powerful tool that facilitates this process in a fast and sufficiently accurate manner.

A power island firing woody biomass was selected as the primary case study since John Thompson currently operates and maintains the plant on behalf of the owner, hence operational data was readily available for model tuning. The developed model was used to illustrate the potential such models can provide to the operator of the plant when troubleshooting performance issues on site and provide a possible resource that can be utilised in boiler operator training programmes.

Simply put, PPSD is a standard calculation program that captures the heat, mass and energy transfer in

various heat exchanging devices. The following sections highlight the major components utilised in the modelling of the power island for both the flue gas scheme and water/steam side scheme.

Flue gas scheme

The flue gas scheme of the simulation primarily captures the mass, energy and heat transfer to/from any heat exchanger in the flue gas flow path. In addition to the flue gas flow path, the combustion air flow path is also incorporated into this scheme. Figure 1 highlights the flue gas path, the air path, and the furnace for the power island.

One of the critical aspects of modelling biomass power plants is simulating the heat transfer process within the furnace. For utility scale combustion, the Blokh or Gurwich method is often employed due to its effectiveness in capturing the complex heat transfer mechanisms involved to provide an estimate on the heat absorbed by the furnace walls, the exit flue gas temperature and radiative heat transfer component exiting the furnace in a computationally efficient manner. The flue gas path captures the flue gas interactions (i.e. heat and mass transfer) between the various heat exchangers, from the furnace through

To page 14

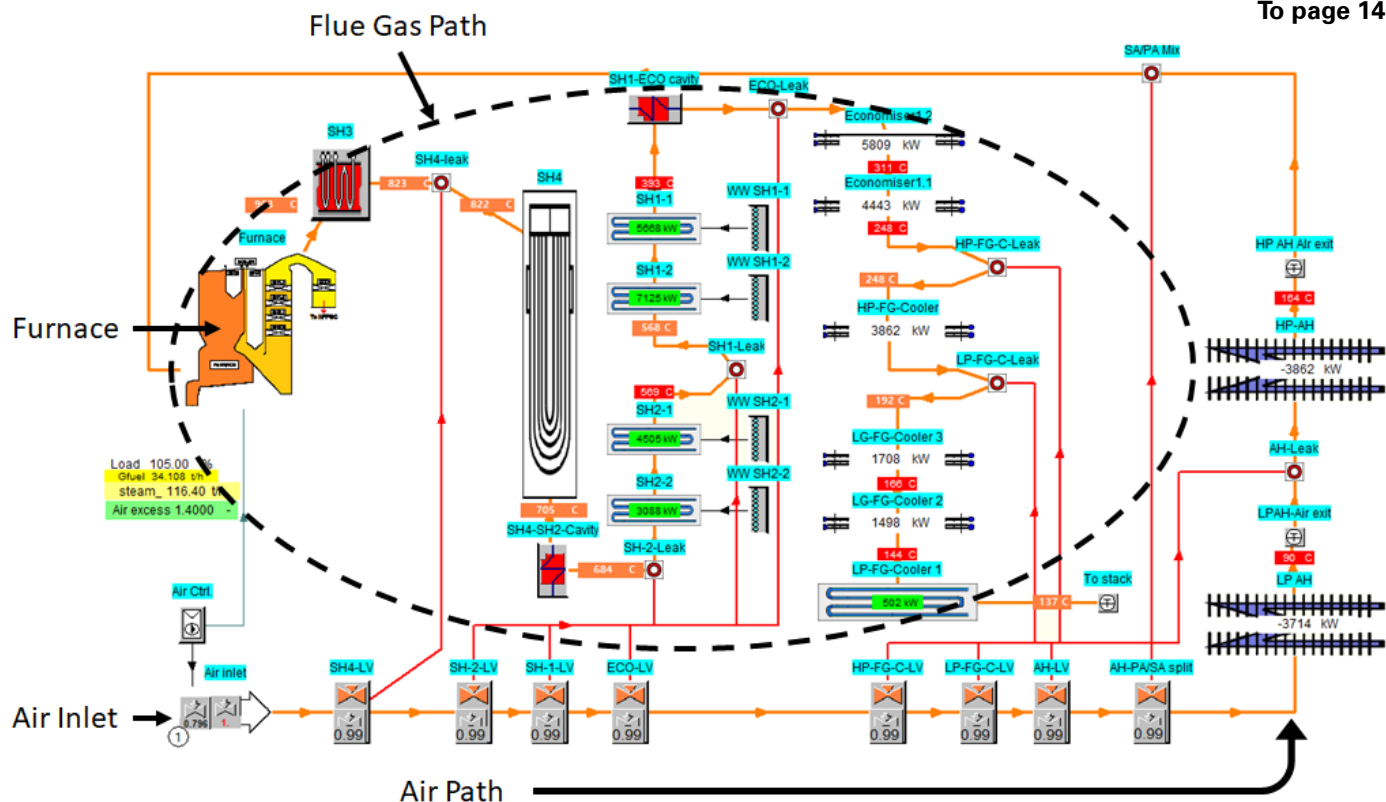


Figure 1: Modelled flue gas scheme for the woody biomass fired power island.

From page 13

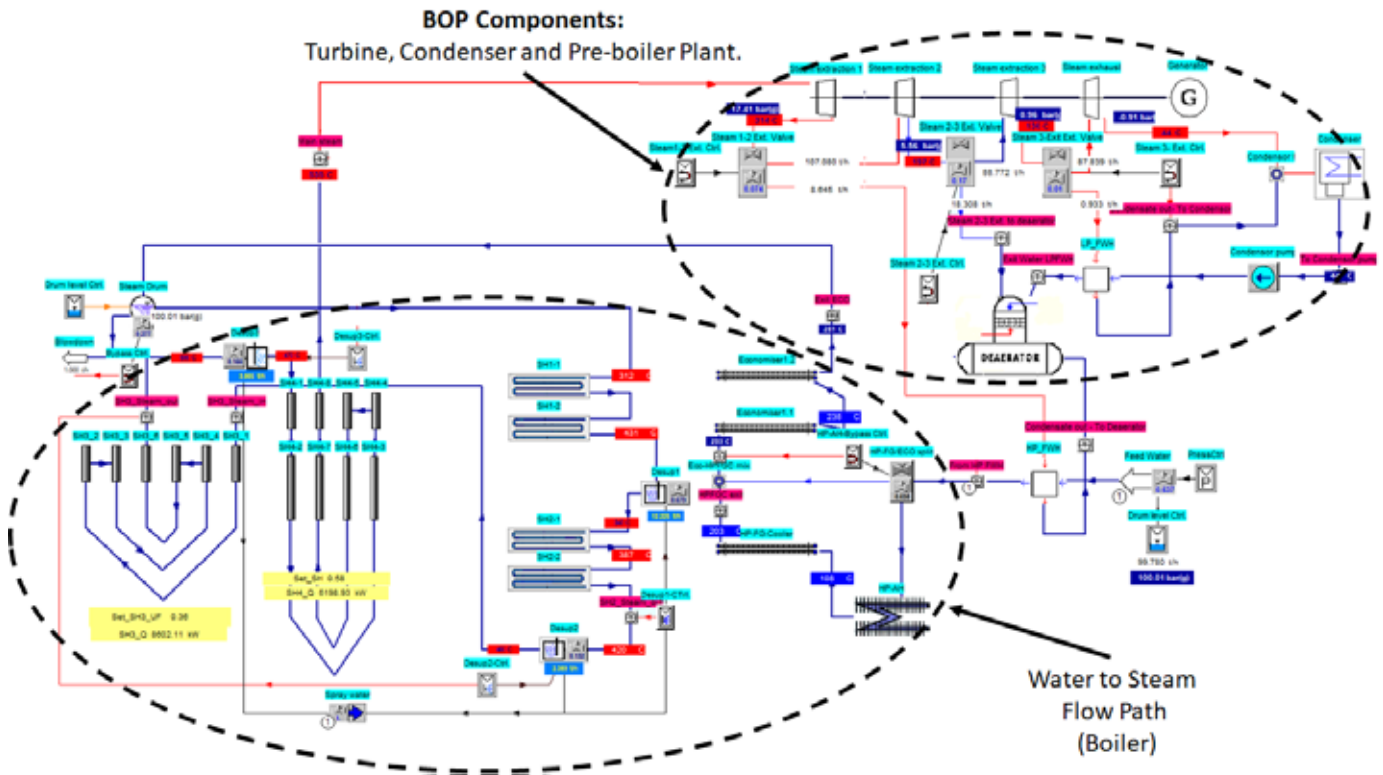


Figure 2: Modelled water/steam scheme of the woody biomass fired power island.

to the superheater and heat recovery towers, eventually ending off at a node that represents the flue gas conditions before the stack. It is helpful if the flue gas scheme is set up to correspond to the general arrangement of the boiler, making the thermal model a lot easier to convey to boiler operators and other engineers.

Water/steam side scheme

As the name suggests, the water/steam side scheme captures the corresponding heat exchanger that incorporates water or steam as its working fluid. In addition to the water side heat, mass and energy considerations, the furnace walls and subsequent circulation system as well as the balance of plant (BOP) components are captured in this scheme. Figure 2 provides an overview of a power island’s water/steam scheme highlighting the main boiler water/steam flow path and the BOP components.

PPSD offers a comprehensive library of pre-defined BOP components, allowing users to assemble a complete power plant model. These components are configured, interconnected and simulated to represent the behaviour of the power island. As with the flue gas path, the water/steam path should also correspond to the general

arrangement of the boiler. Since it is important to ensure the correct water/steam flow direction, input temperatures and qualities are captured in each heat exchanger, as this will affect the mechanism of heat and energy mass transfer in the system.

Thermal model development and validation

As with all numerical modelling approaches, validation is paramount for establishing a sufficiently accurate and representative model. The thermal model development and validation was performed as follows:

1. The model was developed using available drawings and operating manuals capturing the geometric layout and configuration of the power island, from the boiler to the BOP setup.
2. Validation was performed using available plant performance data. From this data the various fouling factors and operational assumptions were tuned to minimise the errors between the operational data and the model predictions at 100% MCR.
3. Using the tuned model, further low load cases were conducted using the thermal model and compared to measured data to showcase the model’s suitability for various load cases.

The thermal model was shown to

provide sufficiently accurate predictions for load range from 40% to 110% MCR, with errors ranging from 0.5 to 6% for the various parameters of interest, which included the flue gas path temperatures, the heat exchanger steam loads and the water/steam temperatures.

Modelling results

One of the primary issues that the operators at the power island in question have experienced since the performance tests were conducted is that the exported electrical power delivered has decreased in the past year. In conjunction with the development of the thermal model, a detailed data analysis of the available operational data was conducted to investigate and try to pinpoint the cause of the problem through the comparison of year-on-year data. Having access to the operational data allowed for further tuning of the thermal model.

One of the key parameters of interest was the exhaust steam pressure or turbine condenser vacuum pressure. The data analysis showed a vast operational difference in comparison to previous years. The developed thermal model proved useful in determining the effects the turbine condenser vacuum pressure has on the amount of power

that can be generated. Figure 3 illustrates this effect, showing that for an increase in the exhaust pressure the generated power will decrease.

These findings tied up well with the data analysis study. The findings were subsequently presented to the operational staff of the power island. Further discussions confirmed that they have had issues with air ingress into the steam ejection system, resulting in a higher operational condenser pressure.

Conclusion

Modelling power islands, especially those using biomass as a fuel source, is a complex but essential task for design, optimisation and performance assessment. PPSD provides a powerful platform to achieve this by incorporating advanced modelling techniques like the Blokh or Gurwich method for furnace heat transfer and captures of the BOP components have on the entire system. The entire system, from the pre-boiler plant to the condenser, can be modelled.

The power island PPSD model was validated against both performance tests and current operational data. Further use of the developed thermal

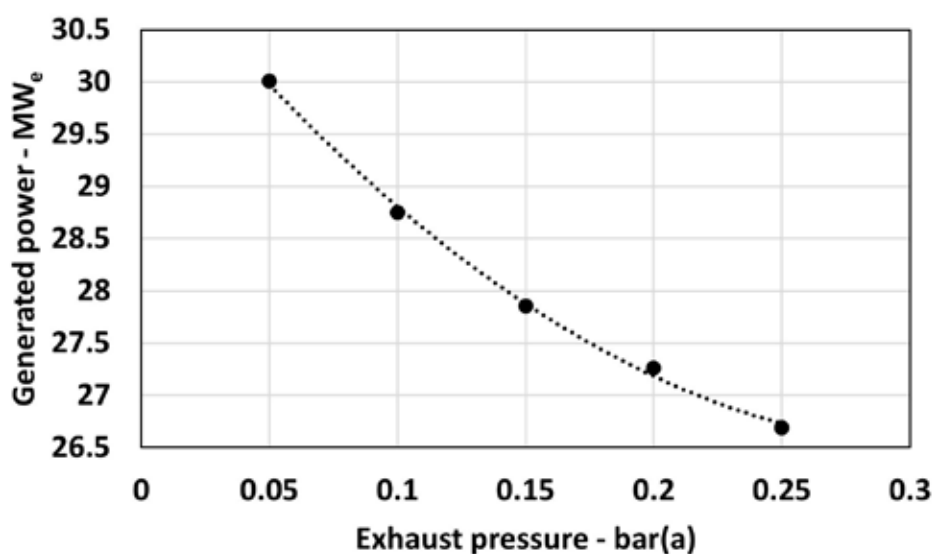


Figure 3: Generated power from the turbine versus the turbine condenser vacuum pressure (exhaust pressure).

model highlighted the effects the turbine condenser vacuum pressure has on the generated power. These findings correlated well as to what was being seen by the operational staff and from the data analytical study.

The accuracy, computational efficiency and simple user interface make

PPSD a valuable tool for modelling power islands, allowing for the investigation into the interactions between the boiler and BOP equipment.

By Brad Rawlins

Design Engineer – Industrial
Watertube Boiler Business Unit
John Thompson

Four ways of improving boiler efficiency

Abstract

This paper presents four ways of increasing the efficiency of an industrial watertube boiler by means of small modifications to the boiler plant. It covers the efficiency gain of a double tube plate airheater, controlled superheater with attenuator, sealing of air leaks to prevent air ingress, and a flash vessel. These are proven modifications that yield a good return on investment through increased energy efficiency and plant reliability that can be applied to the majority of installed boilers in the sugar industry.

Introduction

There are many ways to improve the overall efficiency of a boiler plant and in order to determine the optimum solution there are many site specific factors that need to be considered, such as:

- Layout of boiler backend (arrangement of backend components and available space)

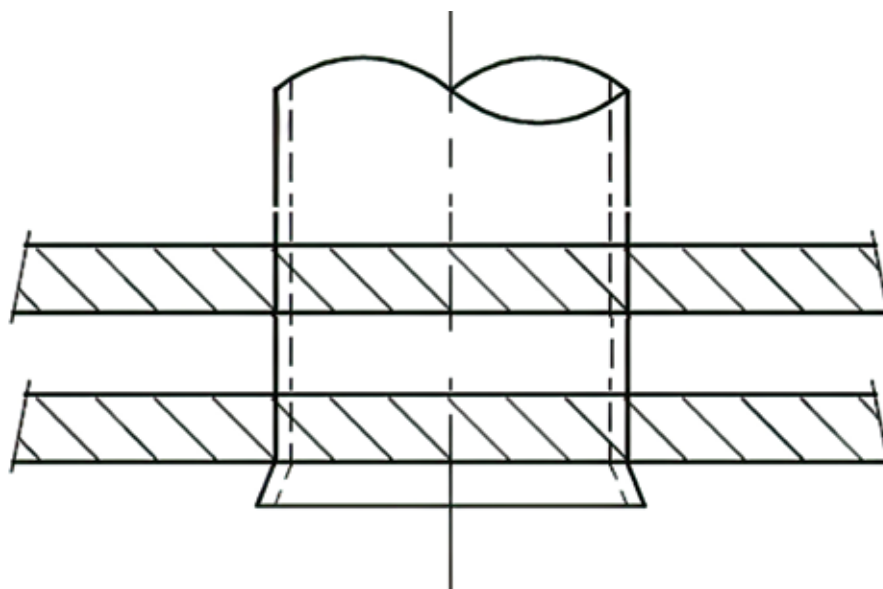
- Boiler design/type of boiler
- Fuel(s)
- Turn down

The four ways of improving boiler efficiency were chosen because they are proven technologies that can be

implemented on most boilers in the sugar industry. None of these options come at the expense of reduced life expectancy of the boiler and all of them have proven to be financially viable.

Although the gain in efficiency is

To page 16



Double tube plate airheater.

From page 15

boiler specific, some typical values are quoted along with some specific examples.

Double tube plate airheater

Most biomass fuels used in the industry have high moisture content, typically varying between 30% and 60%. In order to combust these fuels efficiently high temperature combustion air, 180-240°C, is required to drive the moisture off as quickly as possible to allow the fuel to burn and to ensure combustion stability.

The dew point temperature of the combustion flue gas is a function of the moisture content of the fuel and its chemical composition. Chemicals such as sulphur, for example, result in a significant increase in the dew point temperature, depending on its concentration. The metal temperature has to be kept above the dew point temperature to prevent corrosion and blockages.

To prevent dew point the air can be preheated in a steam airheater. However, steam airheaters are expensive and by increasing the air temperature the heat transfer rate in the tubular airheater located in the gas stream is reduced due to the reduction in log mean temperature difference (LMTD). Alternatively, the airheater can be installed before the economiser, where the gas is hotter. The latter is the most common approach to prevent dew point.

The feedwater is normally set at 105°C for biomass firing and at 140°C when firing coal or any other fuel containing sulphur. Due to the low temperature difference between the water and the flue gas, especially during coal firing, there is not much scope to reduce the gas temperature by adding more economiser area. One option to improve the boiler efficiency is to install an airheater after the economiser.

To overcome the problems associated with dew point, John Thompson employed double tube plate airheater technology. In order to keep the tube plates above the dew point temperature, a second tube plate is installed on the air side with a gap in between to act as insulation. This design feature ensures that the tube plate exposed to the flue gas is above the dew point temperature and as a result is not attacked due to dew point corrosion. The second tube plate on the air side operates below the dew point temperature

of the flue gas, but it too is safe since it is not exposed to the flue gas.

The gas velocity is optimised to reduce the risk of blockages and allowance is made to high pressure water washing to keep the tubes clean.

There are three options to extend the life of the tubes:

- Thicker tubes
- Corten corrosion resistant steel
- Stainless steel tubes

The final gas temperature can be reduced to as low as 140°C (instead of 160°C on new generation high efficiency boilers) by installing a second double tube plate airheater as the last heat transfer bank. The efficiency gain is a function of the reduction in final gas temperature. The boiler efficiency increases by roughly 1% for every $\pm 15^\circ\text{C}$ reduction in final gas temperature.

To prevent dew point corrosion, the feedwater temperature should be increased to above the dew point temperature. For typical South African coal it is around 140°C. The temperature can be increased through a mud drum or steam feedwater heater. However, the higher feedwater temperature results in reduced heat transfer in the economiser due to the lower LMTD, resulting in a reduction in boiler thermal efficiency, which can be offset by installing a double tube plate airheater after the economiser.

This technology is ideally suited for high efficiency plants requiring a final gas temperature below 160°C on biomass. It can also be installed with

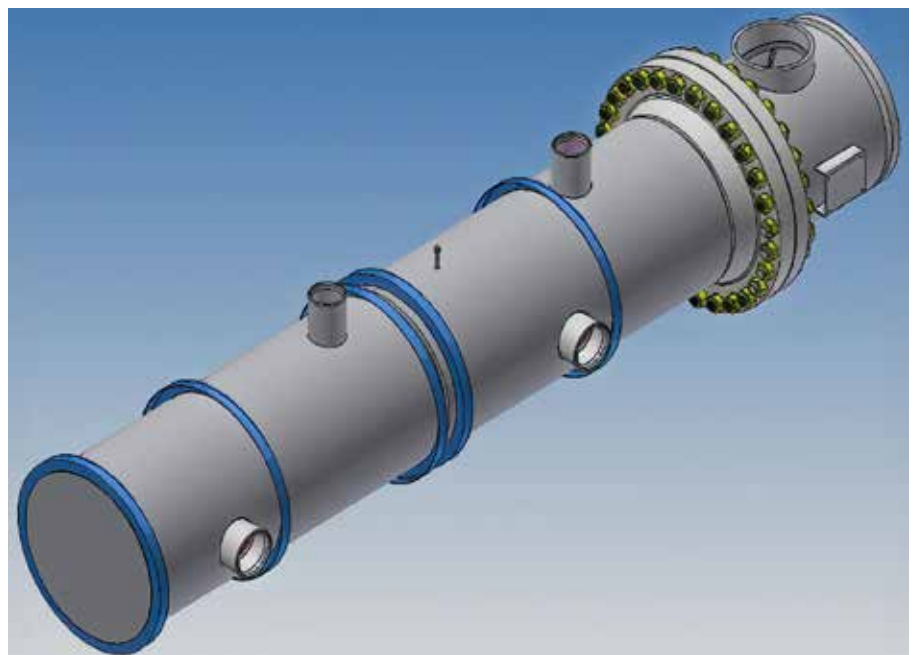
minimal modifications to the back end of existing boilers, thereby increasing boiler efficiency and combustion stability through increased combustion air temperature.

Advantages of this design:

- Increased boiler efficiency
- Improved combustion stability due to higher air temperature
- Longer life expectancy of the second airheater. The double tube plate airheater heats the air above the dew point temperature, thereby ensuring that the top airheater never operates below the dew point even at low loads
- It is a proven design that has been in use for several years at a number of different plants
- No pressure parts are involved, therefore no specialist maintenance is required

Controlled superheater with attemperation

Most industrial watertube boilers are fitted with uncontrolled superheaters. The steam temperature of these boilers varies with boiler load and fuel properties (chemical composition and grading). The variations in boiler load and fuel properties influence the gas volume and flame height, resulting in variations in steam temperature. The differences between fuels, such as coal and bagasse, will result in large variations in steam temperature. The steam temperature on coal firing is significantly lower than during biomass firing.



External vessel attemperator.

A drop in steam temperature will result in a drop in the electricity generated by a turbo alternator due to the reduction in the available energy in the steam as well as the drop in turbine efficiency. Therefore to ensure optimum output from the turbine the steam temperature has to be controlled.

A controlled superheater, in addition to having some positive effects on boiler efficiency, has a noticeable effect on the overall cycle efficiency by ensuring that the turbine operates at optimal efficiency across the load range.

The two types of attemperation systems available are Contact and Non-contact, as follows:

- Contact:
 - Spray attemperation using a sweet water condenser
 - Spray attemperation using feedwater

Non-contact:

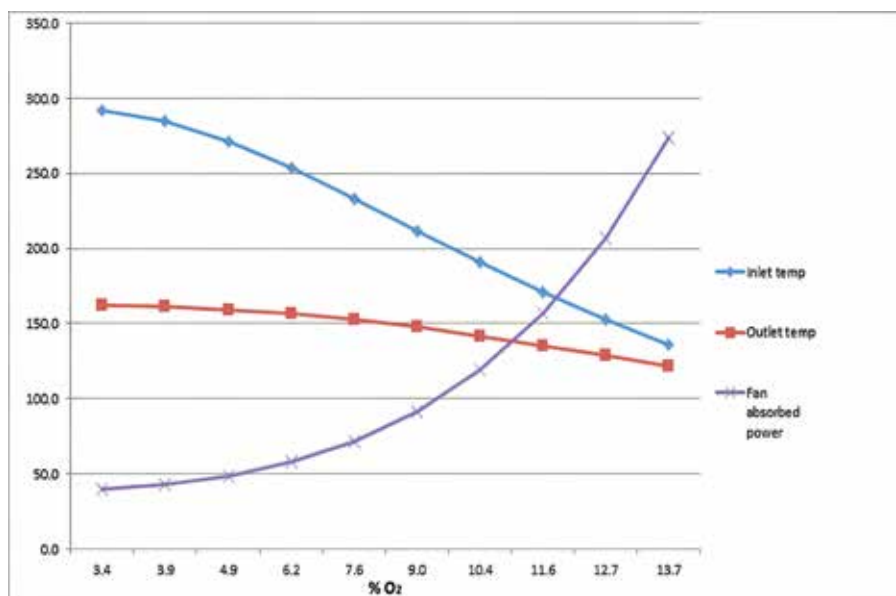
- Mud drum attemperation
- External vessel attemperation

 Spray attemperation relies on water injection into the steam to control the final steam temperature. The water quality is of utmost importance for this type of attemperator since any solids in the water will be left behind to form scale when the water evaporates. The scale will form an insulating layer on the inside of the superheater tubes, resulting in overheating. It can also form deposits on the turbine blades and steam lines. Therefore a sweet water condenser is most commonly employed at lower pressure, while feedwater spray attemperation is more common at higher pressures, 80 bars and above, where the feedwater quality is sufficient to be used as spray water.

Mud drum attemperation relies on a set of coils inside the mud drum to cool the steam between the two stages of the superheater. The final steam temperature is controlled by controlling the amount of steam bypassing the attemperator. An external vessel attemperator relies on the same operating principle as a mud drum attemperator, but instead of the heat exchanger being located in the mud drum it is placed inside an external vessel tied into the natural circulation circuit of the boiler.

The non-contact type overcomes any water treatment/quality issues. However, it has a slower response and a smaller turn down than spray attemperation.

This technology is ideally suited



Effect of air ingress on gas inlet temp, outlet temp and fan absorbed power.

for multi-fuel boilers, boilers operating at part load/reduced load and plants concerned with optimising power generation.

Advantages of this design:

- Increased overall cycle efficiency
- Constant steam temperature results in lower thermal stress on turbines and steam lines
- It is a proven design that has been in use for several years at a number of different plants

Sealing of air leaks to prevent air ingress

Many old boilers can no longer achieve their original efficiency and some cannot reach their design capacity, with air ingress being one of the most common causes thereof. Air ingress results in a reduction in gas temperature and as a result reduced heat transfer. It also results in increased gas volume flow which, in turn, increases the pressure drop and as a result requires more fan power. There are boilers in the industry that can no longer reach their original MCR due to the effects of air ingress. In most cases the ID fan runs out of capacity before the boiler reaches MCR.

Air ingress can be considered as an easy fix, since it is both easy to detect and to correct. It can be detected through smoke or chalk testing; all the holes can be marked during the test and sealed afterwards.

All boilers suffer from air ingress to some extent and considering how easy it is to detect and fix, all boilers should be checked on an annual basis.

Advantages of reducing air ingress:

- Increased boiler efficiency
- A reduction in ID fan absorbed power
- Reduced erosion rate
- May result in the boiler achieving MCR

Flash Steam Recovery

All boilers are equipped with a blow down system in order to control the TDS of the boiler water. Boiler feedwater contains dissolved solids that accumulate in the boiler as the boiler steams and the only way to control the TDS is by means of blowing down some of the boiler water. Usually a continuous blow down system is employed. However, an intermittent blow down system can also be used, although it is not ideal. The water is normally blown down into an atmospheric vessel where some of it flashes to steam and vents to atmosphere, while the rest is dumped into the sluice water system.

Most of the energy and some of the water can be captured by blowing down into a pressurised vessel connected to the low pressure steam system. The remaining water is blown into the sluice system. The percentage of the water and energy captured is a function of the pressure difference between the boiler water and the operating pressure of the flash vessel.

The relevant parameters of a typical flash vessel are:

- Boiler capacity: 100tph
- Boiler pressure: 45bar(g)

To page 18

From page 17

- Blow down rate: 3%
- Flash vessel operating pressure: 145kPa(g)
- Water recovered, in terms of steam: 27.6%
- Energy recovered based on 105°C feedwater: 524kW

The above example is based on recovering the continuous blow down only. Some sites recover the auto-drain as well as the intermitted blow down. However, this poses operational and safety challenges. Introducing the steam from the auto-drain – also referred to as superheater vent – into the flash vessel can result in the design temperature of the low pressure steam system being exceeded. Furthermore, the intermittent operation of the auto-drain and the intermittent mud drum blow down can result in pressure spikes in the low pressure steam range, upsetting the pressure control thereof. Therefore it is not considered

to be worthwhile to capture the auto-drain and the intermittent blow down streams.

A flash vessel usually vents into the exhaust steam range. However, the steam can also be used for other applications.

A flash vessel is a standalone unit that can easily be integrated into existing plants with minimal modifications. Furthermore, since it can be isolated it does not interfere with the operations or maintenance of the existing plant.

This technology is ideally suited for all biomass and coal fired plants without flash vessel recovery.

Advantages of this design:

- Standalone unit
- Very little maintenance. The only component requiring maintenance is the level control/blow down valve
- Can easily be integrated into existing plants

Conclusion

Most boilers in the industry are old, in excess of 20 years, and few were designed to have a high efficiency. Due to coal being relatively cheap in the past, it was not deemed financially feasible to design ultra-efficient plants. Electricity was also much cheaper so there used to be little incentive to optimise electricity generation and to export electricity.

Although the economics have changed, making it essential to improve boiler plant efficiency, the current economic climate often prohibits replacing these boilers. Therefore the industry has to focus on existing technology that can be employed to improve the efficiency of existing plant.

By Christof Kotze

*Welding & Manufacturing Engineer –
Corporate Engineering
John Thompson*



Your One-Stop Global Energy Supply Partner

ACTOM

A division of ACTOM (Pty) Ltd. 42 Diesel road, Isando, 1609 | Tel: +27 (0) 11 392-0900
infojhb@Johnthompson.co.za | www.johnthompson.co.za

Automated testing system for vacuum interrupters now operating in MV Switchgear's VI plant



Together (from left) VI plant Manager Danie Hanekom, his predecessor John Schultz and automation specialist Wes Allan devised and developed the ingenious automated VI testing system, in which a special trolley for carrying VI's for testing is shown here plugged into one of the test stations.

MV Switchgear recently completed the establishment of an automated vacuum interrupter (VI) testing facility in the VI manufacturing plant at its Knights, Germiston, factory.

The automated test facility, which was completed in September this year and commenced operation at the beginning of October, has been established to test the VI's that are being manufactured by the division for a US switchgear company that has launched the new product into the US market.

MV Switchgear undertook in the partnership agreement, signed in early-2020, to expand the production capacity and develop the manufacturing and testing capabilities of its VI plant to enable it to produce the US company's VI's in accordance with its specific requirements.

The division is committed to manufacturing up to 20 000 of the US company's VI's per year. The product differs substantially from the VI's that MV Switchgear manufactures in the VI plant for its own switchgear equipment, as it has, among other differences, a higher voltage rating, more stringent tolerance requirements and is more compact than the local product.

"The volume of VI's we are manufacturing for our US partner is significantly larger than the numbers we produce for our own switchgear. It was therefore essential that an automated testing facility be established in the

plant to keep pace with the output of the new product," said **Rhett Kelly**, MV Switchgear's Design & Development Manager.

The division contracted a reputable local automation specialist, who had earlier assisted with the integration of the newly refurbished braze furnace control systems, to build a customised automated testing system to meet these requirements.

"There are four types of tests that have to be done on each new VI produced. The system consists of automated test stations for each of the test procedures, plus moveable trollies that can be plugged into each of the test stations respectively. Each trolley is equipped with a robotic arm and contains a tray holding 150 VI's for testing.

The robotic arm is programmed to pick up each VI in turn, read the QR code to capture the serial number and insert it into the test station, where it is tested. It then picks it up and places it back in the tray," Rhett explained, adding that the robotic arms and test procedures are all centrally controlled by a SCADA system, which also automatically records and logs the test results.

"The trays have to be loaded and the trollies moved into position and plugged into the test station bays manually. But once the test procedures get under way it is a fully-automated process from start to finish, with the

different types of tests being able to be conducted simultaneously on the VI's.

"The testing process occurs without any human intervention. So, for example, at the end of the production day the tests may be started and left to independently complete themselves overnight," Rhett pointed out.

The trays for the VI's are stored in a special cabinet with environmental controls including air purification units to protect the VI's from contamination between tests.

The different types of tests are:

- High voltage conditioning of the contacts,
- Pressure measurement using a magnetron,
- Electrical contact resistance measurement, and
- Power frequency withstand test, combined with an X-ray test.

In addition to the functions performed by the robotic arms as described above, they are programmed to adjust the contact gap of the VI's for three of the abovementioned tests, as different contact gaps apply for these tests.

"The control system for the robotic arms is also programmed to enable the robots to continue from where they left off in the testing process when the power is restored after any power interruptions, including load-shedding," commented **Johan Jordaan**, MV Switchgear's Technology Development Specialist.

Ansie breathes new life into R&M's safety programme by encouraging full staff participation

Ansie van den Berg, Safety Manager of Reid & Mitchell (R&M), is not only very passionate about safety in the workplace, but she has a lively, innovative approach to it.

She believes all staff-members from top to bottom need to be actively involved to minimise risks of injury to ensure that the division's safety rules and procedures are adhered to.

"My key duty, as I see it, is to keep all the staff in touch with what safety is about, to enable them to fully understand its importance and how they can contribute continuously towards keeping everyone at work safe. It's essential therefore that the safety programme be all-inclusive, involving the willing participation of all staff," she says.

The short answer to Ansie's above-mentioned summary of how to establish and maintain a safety programme successfully is that she has achieved just that – with the full support of top management – since joining R&M as Safety Manager in March last year.

Rene Rajzman, R&M's Operations Executive, has been especially helpful in assisting her to establish a new safety programme based on her innovative approach. They started by putting their heads together in developing a set of Safety Values for the division.

These comprise, in brief, three values, which are: Take Responsibility, Show Respect and Be Reliable. Each of these Safety Values is explained more fully on the special poster that was printed and put up on the walls of the workshop and offices of the division for all staff to read for basic guidance relating to safety.

The new programme got fully under way with the launching by Ansie in June last year of her first monthly "Safety Drive" in the form of a newsletter distributed by e-mail to all staff – with hard copies being printed by managers and supervisors for staff-members who don't have direct online access to them.

Ansie has produced and issued a "Safety Drive" every month since then as her main vehicle of communication with staff on safety matters. Each issue is devoted to a specific topical theme. For example, the theme of the July issue this year was "Let's review what we've learned in the first half of the year", followed in August by "In case of emergencies and incidents".

In the meantime Ansie and Rene moved the safety programme forward



After dipping his hands in green paint, Muzi Ngwenya, Storeman, prepares to print leaves on one of the painted trees at the "wall of commitment" during the special event in which all staff members participated on September 1 to welcome in the start of the Spring season.

into a new stage by drawing up six "commitments" around safety which they sought to convince R&M's entire staff, comprising a total of 168 people, to commit themselves to.

To do this they devised an impressive strategy guaranteed to get everyone's attention and participation. They arranged to hold an event on Friday September 1 to celebrate the beginning of the Spring season, consisting of getting everyone in turn to place green leaves on painted bare brown trees that had been painted beforehand on the wall of the passage linking the workshop with the main office building, with staff-members dipping their hands in green paint and "printing" the leaves on the trees from them.

After everyone had imprinted the leaves on the trees on the "wall of commitment", as it's called, they all got together outside for a braai lunch.

"It was great fun and everyone enjoyed themselves. Not only did it help to get across the importance of safety and what it's about, but it strengthened team spirit among employees at all levels," Ansie commented.

She explained that the six commitments are not confined only to safety matters, as they also encompass other important aspects of the business that complement it. Consequently, in addition to the commitment "We are dedicated to our Safety Values" they include such pledges as: "We are devoted to Continuous Improvement"; "We em-

brace Creativity & Innovation” and “We build a Positive Team Environment”.

“The six commitments demonstrate our approach of customising our safety programme to fit our corporate culture and place of work. They also seek to get the message across that everyone’s opinion is important,” Ansie said.

The September “Safety Drive” she produced towards the end of the month was a bumper issue with the theme “We commit! It’s a new season – goodbye to old habits.” In it the Spring celebration and introduction of the “wall of commitment” in which the whole staff had taken part on September 1 was prominently featured.

Elaborating on her approach, Ansie said: “I try to make it entertaining and interesting for the staff by getting them involved in various activities, including safety competitions and games, rather than lecturing to them, or only supplying them with endless figures about safety targets and the like, which the average person finds boring.

“By getting involved in doing things together, they can learn what they need to about safety while getting involved in activities and enjoying themselves at the same time. Also we get most of the content of every issue of our monthly ‘Safety Drive’ from our own people, which also helps to keep them interested and remain involved,”



Ansie van den Berg (centre), flanked by NOSA's Chief Operating Officer Justin Hobday and Managing Director Chantal Gray, displays her award certificate after winning the 2nd Place Award for the second year running in NOSA's international Safety Excellence competition.

she added.

R&M has consistently maintained a good safety record over the years, with it gaining a top 5-Star rating by the National Occupational Safety Association (NOSA) over the past two years.

Early in November this year NOSA notified R&M that it had again been

successful in achieving a 5-Star rating in the current year.

Earlier, at the end of September, NOSA held an awards presentation at which Ansie received, for the second year in succession, the 2nd Place prize in NOSA's International competition for Safety Excellence by individual safety managers.

R&M enhances capacity through acquisition of advanced processing equipment

Reid & Mitchell (R&M) recently greatly extended and enhanced its production and processing capacity at it Benoni works by installing and commissioning a range of state-of-the-art equipment used in the repair and refurbishment of large rotating machines.

“We were fortunate in being afforded the opportunity to acquire this equipment after the international company that owned it disinvested. This opportunity was doubly fortunate for us because not only is the equipment very modern and technically advanced, but it has hardly been used – it’s as good as new,” enthused **Rene Rajzman**, R&M’s Operations Executive.

“In most instances the newly-acquired equipment represents a substantial technological advance on the

technology we currently have in use, so enabling us not only to increase and speed up our output to enhance the efficiencies of the applicable processes, but also and importantly further enhance product quality,” he pointed out.

The new equipment, all dealing with various aspects of AC machine component manufacturing, includes:

- A fully automated Vacuum Pressure Impregnation (VPI) plant and two fully automated roll-bake curing ovens. “These are substantially larger and more automated than our existing VPI plant and ovens. They greatly increase our throughput and size capacities and enable us to now do VPI processing in-house of larger motors and stators than previously, when we had to send them elsewhere for this work to be done,” said Rene.

- A state-of-the-art CNC coil spreading machine, which greatly increases and speeds up R&M’s existing coil-winding capabilities.

- A set of winding tables that are fully electro-hydraulically operated. “These further increase our winding capacity and make it speedier, as they automatically turn the windings, which represents a big upgrade in our winding department. They also make the process more efficient, safer and more ergonomically sound than before,” Rene commented.

- A fully-automated taping machine, adding extra taping capacity to R&M’s existing two operator-controlled taping machines.

- A state-of-the-art coil looping machine which both increases the divi-

To page 22

From page 21

sion's looping capacity and enables it to perform an array of things which its existing older model looping machine doesn't have the capacity to do.

- An induction brazing machine, which has replaced the manual flame brazing process R&M has used up to now. "The induction brazing machine has vastly improved our brazing efficiencies," Rene remarked.
- Three overhead cranes complete with gantries, comprising a single-hoist 5t capacity crane that has been installed to utilise previously unused floor space in the division's mechanical and electrical assessing section; plus a double-hoist 5t capacity crane and a single-hoist 4t capacity crane, which have both been installed at R&M's storage premises on a separate site from its main workshop premises.
- Auxiliary test equipment, which include a state-of-the-art Risatti automatic winding analyser, which can perform mega testing, polarisation index testing and search testing up to 12kVA. "Our test efficiencies on these three test parameters have been greatly improved as a result of acquiring this advanced instrument, which also automatically

supplies a full consolidated test report on them. It replaces three separate instruments we previously used to test

each of these parameters, for which we also had to generate reports manually," Rene stated.



Test Technician Maxwell Jiyane performs a pre-shift inspection on R&M's newly-installed VPI plant.

ACTOM Energy Namibia awarded R100-million contract for new substation in Swakopmund

ACTOM Energy Namibia (AEN) has been awarded a R100-million contract by Namibia Power Corporation (NamPower) to design, manufacture, supply, install and commission specialised switchgear and substation protection and automation systems for a new indoor 132/66/33kV substation the utility is to establish in Swakopmund, Namibia.

The new Sekelduin substation, due to be completed in early-2025, is being constructed to meet increased demand for power resulting from rapid growth of the coastal city and surrounding areas and to cater for future expansion in the region.

With the exception of the transformers, all the substation equipment will be supplied by ACTOM group divisions and business units, namely ACTOM High Voltage Equipment, ACTOM MV Switchgear and ACTOM Protection & Control.

"NamPower initiated the construction of a substation building on the outskirts of Swakopmund to house all

the substation equipment to protect it from the salty air blowing in from the ocean, which would cause corrosion and deposits of coastal pollution were it to be erected in a conventional open yard substation," explained **Struan Steele**, AEN's General Manager.

Consequently, the 132kV and 66kV switchgear from GE Grid, ACTOM High Voltage Equipment's international technology partner, will comprise hybrid equipment in which air-insulated switchgear (AIS) and gas-insulated switchgear (GIS) are combined into single switchgear units that are much more compact than the equivalent AIS units normally used in open air substation yards.

This HV switchgear, branded HyPact, is well-proven and widely used worldwide in similar applications. A total of 11 HyPact switchgear units, comprising six 132kV units and five 66kV units, will be supplied by GE Grid to the project.

The 33kV switchgear for the new indoor substation will comprise a 4-panel

switchboard of type GHA single busbar GIS switchgear from Schneider Electric, ACTOM MV Switchgear's international technology partner.

This product is already widely in use in South Africa and many other African countries. MV Switchgear will assemble the switchboard, as well as design, manufacture and assemble the LV compartments for the panels, at its Knights, Germiston, plant.

The protection, automation and control scheme to be supplied by ACTOM Protection & Control (P&C) will provide the necessary protection and control of the HyPact switchgear units and the GHA switchgear panels. The scheme is designed and manufactured by P&C utilising product and services from leading US-based international company Schweitzer Engineering Laboratories (SEL).

The scheme, based on the international standard for communication between the primary plant and the substation IED's, namely IEC61850-9-2, came into effect in 2005 and has been

in use in NamPower substations since 2009. It utilises an Ethernet network and replaces the traditional analogue cabling between the protection and metering IED's and the primary plant comprising current and voltage transformers as well as circuit breakers and switches.

The chief advantages of substation automation and communication equipment based on this standard are:

- Replacement of all substation cabling with a fibre optic LAN, with associated cost savings.
- Establishment of redundancy, which have proved difficult with analogue cabling.
- Flexibility in the design and maintenance of the automation system throughout the life of the substation.
- Reduction of copper cabling and the associated risk of cable theft.

P&C will collaborate with SEL in the design, manufacture, installation and testing of the substation automation system for the Sekelduin substation project.

"We are looking forward to working with NamPower and SEL to deliver on this project, which will be a first for us," commented **Herman Mare**, P&C's General Manager.

All the control cabling for the project will be manufactured and supplied by ACTOM's long-standing associate Metal Fabricators of Zambia (ZAMEFA), based at Luanshya in the Copperbelt.

Installation and commission-

ing of the substation equipment will be undertaken, under supervision by ACTOM, by Megatron Engineering Namibia, a Windhoek-based Engineering, Procurement and Construction Management (EPCM) contractor, which AEN has previously subcontracted to install electrical equipment for various projects around the country.

The tender, issued early last year, was strongly contested between a number of electrical equipment manufacturers and suppliers.

"The preparation of our tender was of course a joint effort, in which all the ACTOM divisions involved played an important role, for which I thank them," said Struan.

"I am especially grateful to ACTOM High Voltage Equipment for their invaluable assistance in preparing their part of the tender, which contributed greatly to our success in winning this highly prized contract," he added.

The contract is the largest AEN has been awarded since its inception in 2013.



Simson Haulofu, NamPower's Managing Director, and Struan Steele, ACTOM Energy Namibia's General Manager, shake hands after signing the Sekelduin substation contract at the Signing Ceremony in Windhoek on October 20.



ACTOM, proud suppliers of product to Nampower for the new Sekelduin substation.

ACTOM Energy Namibia
A division of ACTOM (Pty) Ltd



Your One-Stop Global Energy Supply Partner



M&C coordinates skills for rapid repair and swop-over of winder motors at Northam Platinum mine



Danie Gouws, M&C's Chief Field Service Technician, (in orange shirt) assists the mine's technical personnel in the installation of the rock-winder motor into the man-winder position.

Marthinusen & Coutts (M&C) recently successfully met an extremely tight deadline it had been set as a contract condition for the repair of a 94t 4736kW DC mine winder motor that had failed at Northam Platinum's Zondereinde mine near Thabazimbi in Limpopo Province in July this year.

The motor had driven the man-winder hoist serving the mine's No.1 shaft.

M&C was given just five days to perform all the necessary repairs after taking delivery of the motor at its Cleveland, Johannesburg, workshop.

"The clock started ticking when we took delivery of it on July 24, with the repairs having to be completed and the motor fully reassembled by July 29, when it was due to be collected and returned to site for re-installation," said **Owen Kilian**, M&C's Projects & Field Service Manager.

One of the motor's field coils that was found to be damaged had to be rewound and the insulation, which had deteriorated over time, was replaced. "We also chemically washed all the parts in our Power Generation workshop in Benoni and dried out the halves in our dedicated drying-out ovens," Owen said.

The contract also incorporated M&C having to provide a field service team to assist mine personnel in transferring an identical motor driving the rock-winder hoist at No.1 shaft to replace the other to keep the man-winder hoist working so as to minimise the disruption of underground operations while the failed motor was being repaired.

"The plan was to install the repaired motor to drive the rock-winder upon its return, which our field service team was also assigned to assist in installing as part of our contract," Owen

explained, adding that an additional five days was allowed by Northam under the repair contract for the on-site work undertaken by M&C's field service team. Some repair procedures were also done on site, including refurbishing the armature of the repaired winder motor.

"We worked 24 hours a day over the 10 days we spent on the total project for the two winders. Without the excellent teamwork we were fortunate enough to share with the expert mine personnel and their rigging subcontractors we wouldn't have completed the job in the very limited time we were given," Owen commented.

"ACTOM Industry, representing the OEM for the winder motors, proved invaluable in ensuring that everything was done in accordance with the OEM's quality standards," he added.

ACTOM Turbo performs super-fast repair on pulp mill roll after devising cold repair procedure

ACTOM Turbo Machines accepted an extremely difficult challenge when it agreed to perform an emergency repair of a broken portion of a large counter roll from a pulp mill that had been damaged during operation.

Danie Bloem, ACTOM Turbo's Project Manager responsible for the contract, said the roll was found to be cracked beyond repair, with a long crack right through the 200mm thick outer shell.

"What made the task difficult was that we were asked by the client to perform a cold repair, instead of the usual hot repair that is done in such cases, which is a relatively simple job," he explained.

The client insisted on a cold repair being done to preserve the roll's existing rubber coating.

"A hot repair would have involved welding the replacement portion onto the roll, which however would have necessitated heating both that portion and the undamaged part of the roll itself to ensure that the weld was effective. But at the same time the outer rubber coating would be severely damaged during the hot repair process and would have to be replaced entirely.

"A cold repair procedure also has the significant advantage of offering

a much speedier repair than can be achieved by the standard hot repair process. However, we'd never done a cold repair like this before, but we took on the challenge," Danie stated.

After taking delivery at ACTOM Turbo's Sasolburg workshop of the huge 23t roll, which was 7m long and had an OD of 1.2m, Danie and his team, in consultation with the client, devised a cold repair procedure that required the application of three distinct methods for attaching and securing the new portion of the roll ACTOM Turbo had manufactured to replace the broken end.

ACTOM Turbo had to take into account the three attachment methods when designing and manufacturing the replacement portion of the roll, or "spacer". The attachment methods used were:

- Making abrasive faces by grid blasting on the axial face of the stub end to which the spacer attaches, as well as making abrasive faces on the spacer cup to the main roll. "Making the matching faces abrasive ensures that this acts as a locking mechanism to reduce movement between the axial faces," Danie commented.
- Longer spigot fits than normal to reduce bending, thereby reducing wear

on the matching components between the two parts.

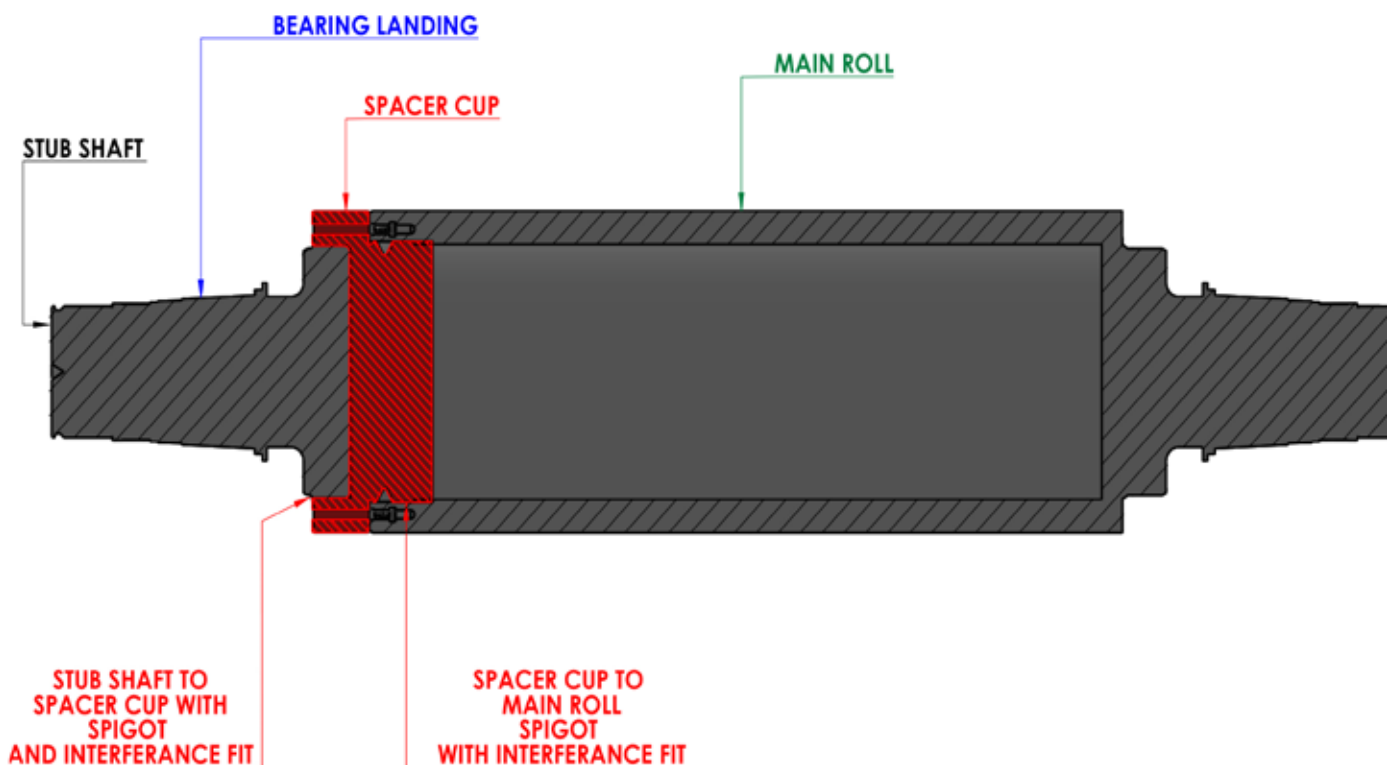
● Executing interference fits from the spacer cup to the main roll and from the stub end to the spacer cup. "We had to manufacture special tooling to enable us to perform this extremely difficult process," Danie said.

"With the alterations being done for a cold repair, we also had to manufacture and fit a full new modified set of bolts, and install and torque to the required settings," he added.

To test the effectiveness of the three-fold combination of cold repair methods, ACTOM Turbo performed a total indicated run-out (TIR) on the complete roll on one of its large horizontal lathes, achieving a TIR of less than 0.15mm over the entire roll section.

The contract was executed and the repaired roll delivered back to site in just under four weeks in July and August this year.

"Having a big vertical lathe and CNC milling machine enabled us to complete the job in-house and achieve the repair in the shortest possible time. A conventional hot repair would've taken not less than six months to perform, thereby demonstrating our innovative cold repair solution to be an outstanding achievement," Danie concluded.



This illustration shows how the three cold repair attachment methods were applied by ACTOM Turbo in repairing the large counter roll for a local pulp mill.



Metalplus are pioneers in the industry and as a result of Metalplus' tremendously successful repair procedures, we are able to do repairs on a number of components.



Your One-Stop Global Energy Supply Partner

METALPLUS

ACTOM

Metalplus uses innovative method to weld-repair shroud bands of sugar mill turbine

Metalplus has successfully devised an innovative welding technique in which it has applied two welding systems to operate together in a seamless process.

In the latest project the robotic arm that forms part of Metalplus' cold metal transfer (CMT) welding system was used to operate a combination of low temperature CMT welding and high current pulse multi-control (PMC) electric arc welding in a single process to achieve the required result.

"I believe this is the first time these two welding processes have been applied in this way in Southern Africa for turbine blade and shroud connection," **Roman Mornau**, Metalplus' Divisional CEO commented.

The welding repair work was a critical part of an emergency contract awarded to Metalplus' sister division ACTOM Turbo Machines recently to repair a 3 MW power generation steam turbine deployed at a sugar mill in Kwazulu-Natal after it had failed during operation. ACTOM Turbo subcontracted Metalplus to weld the turbine's shroud bands, which had been damaged during the failure.

"We devised the welding solution combining the CMT and PMC systems in a seamless robotically-controlled operation on the basis that it results in good penetration with strong fusion and still allows thin metal sections to be welded. The required procedure could be executed more rapidly and at substantially lower cost than any of the alternative methods available," Roman explained.

Metalplus first put its combo repair method to the test by performing it on a test piece and then subjecting it to destructive testing by pulling apart the sample shroud band from the sample turbine blade. "The destructive test, performed by an independent SANAS-approved metallurgical laboratory, showed that the shroud band was able to hold more than 1.6tonne in the welded construction – four times the original design strength," Roman pointed out.

A total of 1650 turbine blades had to be welded to 18 new shroud bands, which had been fabricated by ACTOM Turbo to replace the damaged ones.

"Each individual combination weld was performed within an exact timing sequence precisely programmed within 0.1sec increments, starting with a high current PMC electric arc weld



Steven Rudd (left), Metalplus' Workshop Supervisor, and Nsindiso Mzimela, Engineer in Training, are shown setting up the shroud bands for robotic welding on the top casing of the turbine.

at the base of the weld and switching without any delay to a low temperature CMT weld to complete the ideal weld geometry," Roman said.

Metalplus performed its task, encompassing the preparatory testing and applying its unique welding solution, in a total of four weeks.

In combination with the welding work assigned to Metalplus to weld the new shroud bands in place, the work performed by ACTOM Turbo Machines on the failed turbine comprised:

- Removal of the damaged shroud bands by machining
- Manufacturing new shroud bands
- Final machining of all shroud bands to correct axial and radial clearances
- Nozzle labyrinth seal replacement
- Turbine rotor bearing journal and probe track refurbishment
- Turbine rotor dynamic low speed balancing
- White metal bearing refurbishment
- Bearing housing pin and key replacement
- Centreline pre-site assembly checks between turbine rotor, bearing housings, and refurbished main casing

ACTOM Turbo manufactured the new shroud bands by a reverse engineering process.

"This necessitated performing

3D scans of both the top and bottom casings to ensure correct references and sizes were adhered to," said **Christopher Austin**, ACTOM Turbo's Service/Product Engineer.

"After completing manufacture and machining of the new shroud bands, we trial fit all 18 rows for each casing half to ensure the correct fit as well as blade pitching was achieved, as very little room for error was allowed with such a small blade surface to weld to."

While Metalplus was carrying out the welding work, ACTOM Turbo performed the remainder of inspections and repairs required, as summarised above. After the shroud bands had been welded in place, ACTOM Turbo set up the top and bottom casings to enable it to machine all the shroud bands back to standard to ensure maximum operational efficiency of the machine.

"Finally, we conducted a centreline check of the casings and bearing housings in our workshop to trial fit the turbine rotor to make sure the extremely narrow 0.3mm clearance between the shroud bands and the rotor was correct," Christopher concluded.

ACTOM Turbo performed its scope of work within five weeks, as scheduled in the contract.

Satchwell enters residential and light commercial PV solar/inverter/battery market

Satchwell, ACTOM's Paarl-based manufacturer and supplier of domestic and industrial products and components, has entered the solar power generation market by offering system components to contractors, as well as providing turnkey solutions on a select and small-scale basis.

The recent incorporation of Electrical Products' heating and ventilation unit, with brands Xpelair, Redring and Tempadair, into Satchwell now positions the business firmly in the HVAC&R market.

Satchwell's recognised domestic and light industrial heating elements and controls, its range of refrigeration components and gas, and now its ventilation and heating appliances places it as a major supplier to the market, with the added benefit of being a local manufacturer.

The boom in the inverter/battery/PV market has provided Satchwell with the opportunity to grow its presence in the domestic/light industrial market as the business has a solid reputation and brand, built up since 1948. Further benefits include Satchwell's national distribution network in the market and its embedded knowledge of photovoltaic (PV) science gained in the solar water heating space.

"We view our entry into this market as taking the logical next step by introducing solar back-up and photovoltaic installations, from our existing well-established base in the residential market of supplying solar-powered geyser systems to householders nationwide," said **Chanelle Visser**, Satchwell's National Sales Manager.




"Our primary objective is to sup-



One of Satchwell's residential PV solar systems that have been supplied and installed around the country since its introduction into the market late last year.

ply quality system components to the market, including solar panel mounting structures, to installers and contractors. It is important for us to understand what the market requires, so we participate directly in the instal-

lation activity on a very small scale because this is where we learn what contractors are faced with in their daily lives, which enables us to develop and roll out products that make their lives easier and profitable," Chanelle added



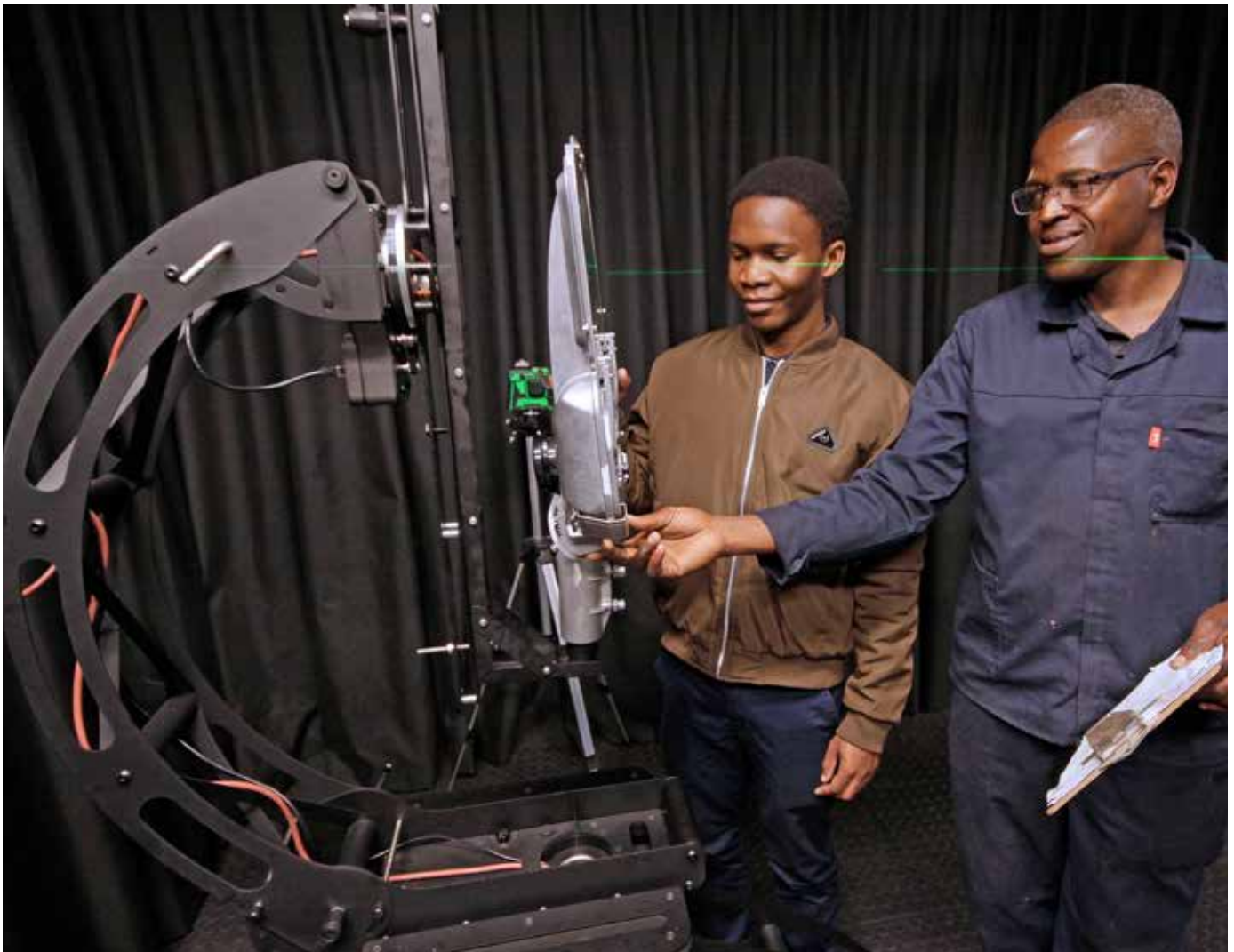
www.satchwell.co.za

AUTHORISED DISTRIBUTORS FOR LUMAX ENERGY.

We offer expert advice and assistance with regards to all your photovoltaic mounting requirements.



Genlux Lighting sets up its own in-house lighting laboratory



Genlux's Mukelani Sehlako (left), Product Development Engineer, and Lucky Tshianzi, Incoming Goods Quality Control Inspector, set up a luminaire on the goniophotometer in the laboratory for testing. The green light beam that can be seen running across their faces was generated by the automatic laser levelling system that ensures precise setup of the luminaire.

Genlux Lighting has acquired its own specialised light testing equipment and has set up a laboratory at its Triangle, Germiston, office premises to test its lighting products and designs.

"We are now able to conduct a much greater variety of tests than we were able to do previously, when we were wholly reliant on external certified third-party labs for testing purposes. We are also able to conduct tests much more frequently than before," said **Ian Marais**, Genlux's Systems Engineer who heads up the business unit's team of product developers and lighting designers.

"Having our own in-house test facility enables us to do batch testing to more accurately establish the integrity of our products in accordance with their official certification requirements. We can now do more detailed

and customised testing than before. In addition, it gives us much more scope than previously to develop and test workable new lighting designs," he pointed out.

"This facility gives us the important advantage of enabling us to meet our customers' requirements more efficiently, accurately and rapidly."

The lab has been operational since the beginning of August this year. The cutting-edge high-tech test equipment Genlux has acquired for it comprises a goniophotometer and a spectrometer, which operate automatically in tandem when testing lighting products or simulations of lighting designs.

"The synergy between the two instruments enables them to optimise lighting designs, ensure uniform illumination, evaluate colour quality and enhance energy efficiency," Ian explained.

"The goniophotometer may best

be described as a sophisticated specialised computer and is situated at one end of the rectangular lab, while the spectrometer, which is situated at the other end of the lab facing the goniophotometer, is a specialised high-tech camera.

The luminaire that has to undergo testing is mounted on the top of the goniophotometer and in the test procedure the luminaire is rotated in a series of different angles to enable the two instruments to register and record the luminaire intensity and distribution.

"The pair of instruments produce photometry data files in accordance with an internationally-recognised data file format which are fed into lighting design software programs, which in turn generate the lighting design simulations that are tested for accuracy and effectiveness," Ian concluded



Genlux Lighting is not waiting for someone else to find a solution. We are changing the way we think about sustainable living."

HIGH PERFORMANCE IN EVERYWAY

Genlux Lighting's philosophy to energy management is focused fundamentally on lighting. We approach lighting design, technologies and controls as not merely a plug and play solution, but rather through a holistic system approach to achieve reliable and sustainable improvements. We at Genlux Lighting ensure cost savings and waste reductions through energy efficient lighting, design and control systems.

SOLAR LED LIGHTING



SUSTAINABLE LIGHTING

Choosing energy saving LED Solar Lighting Systems is an opportunity to harness natural energy to realise sustainable returns.

It is our mission to empower our customers and their communities with leading edge, sustainable lighting solutions and controls."



02

ENERGY EFFICIENT LED LIGHTING



03 LIGHT MANAGEMENT SYSTEMS

A good lighting design includes a good control design. The goal of an effective control system is to support the lighting application and design which often translates to eliminate energy waste while providing a productive visual environment.



GENLUX LIGHTING

a lighting technology company

A division of
ACTOM (Pty) LTD

Website: www.genluxlighting.co.za
Tel: (011) 825-3144

ACTOM participated in AMEU and CIGRE SA exhibitions in October

ACTOM was among a number of Electrical Sector companies that participated in two trade exhibitions staged in Gauteng in October.

Both exhibitions, by the Association of Municipal Electricity Utilities (AMEU) from October 1 to 4 and by CIGRE Southern Africa from October 24 to 27, took place at the CSIR International Convention Centre in Pretoria.

The ACTOM divisions represented at the AMEU exhibition, which formed part of the association's 69th Convention, were MV Switchgear, Protection & Control, Power Transformers, Distribution Transformers, LH Marthinusen, Current Electric and Genlux Lighting.

Two group divisions High Voltage Equipment and MV Switchgear participated in the CIGRE SA exhibition, which formed part of its 11th Regional Convention.



The ACTOM stand was designed to be a networking platform enabling representatives and customers to meet in a relaxed atmosphere over snacks and refreshments.



Daniel de Bruyn (centre), High Voltage Equipment's Business Development Manager, speaks to a visitor on the group's stand at the CIGRE SA exhibition.

Key appointments

Phillip Dukashe has been appointed Group Operations Executive with effect from August 21, 2023.

Fahmida Campbell has been appointed Group Audit & Compliance Manager with effect from August 1,

2023.

Rodney Berry has been appointed Financial Executive of Marthinusen & Coutts with effect from September 1, 2023.

Owen Kilian has been appointed

Projects & Field Service Manager of Marthinusen & Coutts with effect from April 1, 2023.

Etienne Carstens has been appointed Sales Manager of Marthinusen **To page 32**



Phillip Dukashe



Fahmida Campbell



Rodney Berry



Owen Kilian



Etienne Carstens



Dominik Krob

From page 31

& Coutts with effect from April 1, 2023.

Dominik Krob has been appointed Project Manager at Marthinusen & Coutts with effect from October 2, 2023.

Chris Holly has been appointed Operations Manager of Electrical Machines with effect from July 1, 2023.

Tumelo Ramafikeng has been ap-



Chris Holly



Tumelo Ramafikeng



Christiaan Lombard



Fiona Seleke



Francois Marias



Amon Mtsweni

pointed Health & Safety Manager of John Thompson's Utilities Sector with effect from September 1, 2023.

Christiaan Lombard has been appointed Finance & Administration Manager – Industrial Sector at John Thompson with effect from November 1, 2023.

Fiona Seleke has been appointed Legal Officer of John Thompson's

Industrial Sector with effect from November 1, 2023.

Francois Marais has been appointed Engineering Manager of John Thompson's Industrial Sector with effect from September 1, 2023.

Amon Mtsweni has been appointed Project Manager at Protection & Control with effect from July 1, 2023.

LHM staff celebrate Mandela Day by participating in painting project at local school

After deciding towards the end of 2022 to "adopt" the struggling parents-funded private primary school Educational Programme Centre in Denver, Johannesburg, LH Marthinusen (LHM) focussed its attention on this school when celebrating Mandela Day in July this year.

The school, the latest addition to the beneficiaries of LHM's social responsibility programme, was found at the time of its adoption by the division to be in dire need of additional financial help to keep going.

At that time it had been devastated by vandalism, which left it with a badly broken perimeter fence, which in turn resulted in parts of the school buildings being vandalised, including having the learners' toilets and wash-basins trashed and much of the metalwork, including the steel taps from the wash-basins, stolen, rendering these facilities unusable.

LHM came to the rescue by hiring contractors to replace the perimeter fence, including fitting it with razor wire to prevent any further entry by intruders, refurbishing the toilets and wash-basins, restoring the sewerage system to working order, replacing all broken windows throughout the school, and removing piles of rubbish that community members living nearby had previously dumped into the school property from the road bridge

Before and after: (Right) one of the classrooms before it was painted, and (bottom) a teacher conducts a lesson in the newly-painted classroom.



overlooking it.

By the time Mandela Day came round on July 18 this year the school had been restored to a presentable and workable state that its administrators, teachers and 150 Grades 1 to 8 learners could be justifiably proud of, thanks to LHM's commitment to make it functional again and taking the necessary steps to ensure that it remains so.

For Mandela Day LHM staff decided after consultation with the Principal,

Ray Dhlwayo, and his staff to re-paint the classrooms, doors and blackboards, as well as the school hall, which they agreed to do on Friday July 21.

LHM's sales team arranged food and drinks for the day for all the children, school staff and LHM volunteers.

"It was a great experience to see the smiles of the children as they witnessed the transformation of the rooms they spend most of their week in," commented **Charmaine Hall**,

LHM's Divisional HR Manager.

Mr Dhlwayo expressed his thanks to LHM for its generosity and public spiritedness in helping to put the school properly back on its feet and helping to overcome the serious setbacks it had suffered in recent years, "You have enabled us to look forward to a brighter future now, which we wouldn't have been able to do without your help," he said.

Heritage Day again proves popular among ACTOM employees as an occasion worth celebrating

With Heritage Day (September 24) falling on a Sunday this year, Monday was declared a public holiday, giving South Africans a long week-end to look forward to and enjoy celebrating their various national heritages.

As in previous years, many employees of ACTOM divisions and business units turned up at work in their national costumes on the Friday before the Heritage Day long week-end to celebrate the occasion together, in some instances bringing along some of their traditional dishes and sweetmeats to share with their colleagues.

"Heritage Day is very popular every year, with many staff-members taking part in the celebrations, because it not only gives them an opportunity to dress up, but also to socialise with their fellow-workers and learn more about the tribal and national cultures they belong to or come from," one of the celebrants commented.

The pictures show the conviviality enjoyed by staff-members of ACTOM divisions who participated in the latest Heritage Day celebrations and the variety of national costumes they wore.



Protection & Control staff dance for joy in celebrating Heritage Day.



Heritage Day revellers from MV Switchgear (above picture) and Power Transformers (right).



Getting fully into the spirit of the occasion are WPI Power Solutions' Emalaheni (Witbank) branch staff-members (from left) Colinda Schoultz, Lindy Dlamini, Sandra Venter and Cordelia Mashele.



Looking impeccable in their traditional garb and makeup, women at LH Marthinusen pose for the camera.

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, burners, ducting, HP piping and ancillary equipment - geared towards keeping large power plants operating optimally, as well as providing a plant and equipment hire solution for construction work.

John Thompson also provides outsourced steam via its Energy Management Solutions business unit. Our service further includes capacity and efficiency improvements to older boilers, supply of original equipment manufacturer (OEM) spares, reliability studies, metallurgical services and computational fluid design (CFD) modelling.

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

Durban: (031) 205-7211

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

HIGH VOLTAGE EQUIPMENT

High Voltage Equipment: (011) 820-5111

High Voltage Equipment, is a designer, manufacturer, supplier and installer of high voltage equipment to power utilities, electricity generation, transmission and distribution industry, mining sector and contracting companies. Manufacturer of isolators, instrument transformers, outdoor circuit breakers and insulated phase busbars. Supplier of high voltage Gas Insulated Switchgear, Compact Hybrid Switchgear, surge arresters, substation and overhead line insulators. HVE specialises in the repairs, supply of spares and maintenance of high voltage equipment.

MEDIUM VOLTAGE SWITCHGEAR

MV Switchgear: (011) 820-5111

www.actomswitchgear.co.za

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

WPI Power Solutions: (011) 820-5111

24 Hour Emergency Service: (082) 801-3171

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

Current Electric: (011) 822-2300

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

POWER TRANSFORMERS

Power Transformers: (011) 824-2810

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

DISTRIBUTION TRANSFORMERS

Distribution Transformers: (011) 820-5111

Distribution Transformers designs, manufactures and supplies distribution transformers ranging from single phase 16kVA to three phase 7MVA up to 44kV, can be Single or Dual MV or LV and NECRT's up to 44kV to power utilities, the mining sector, local authorities and industry, and renewable applications locally and internationally.

LH MARTHINUSEN

LH Marthinusen Johannesburg: (011) 615-6722

Cape Town: (021) 555-8600

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) 220 352

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

MARTHINUSEN & COUTTS

Marthinusen & Coutts: (011) 607-1700

www.mandc.co.za

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

ACTOM TURBO MACHINES

ACTOM Turbo Machines: (016) 971-1550

www.actomturbomachines.co.za

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

METALPLUS

Metalplus (011) 433-1880

www.metalplus.co.za

Metalplus has earned a reputation over many years in the 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

www.actomep.co.za

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

Satchwell: (021) 863-2035

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

Genlux Lighting: (011) 825-3144

www.genluxlighting.co.za

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

ACTOM SMART TECHNOLOGIES

Protection & Control: (011) 820-5111

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

ACTOM Kenya: Pedro.adams@actom.co.za

The product offering includes the supply of transmission and distribution equipment including power transformers, distribution transformers, MV Switchgear, HV products and protection and metering equipment. Under the John Thompson business it also includes the sale of steam (biomass boiler, ancillary equipment).

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 engineered to suit their purpose for both the local and export markets. We offer specialized technical training to enhance practical and theoretical knowledge of our products. After Sales division to support and maintain installed equipment in the field.

COM 10: (011) 552-8368

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

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 re-newable 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.

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

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

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

ACTOM contact:

Mamiki Matlawa, Tel: +27 (0)10 136-0200
mamiki.matlawa@actom.co.za

Disclaimer:

This publication is designed, compiled and produced on behalf of ACTOM (Pty) Ltd. Whilst the compilation and production of What's Watt is done with care and with every effort being made to avoid errors, ACTOM, its shareholders and staff do not accept responsibility for any errors or the consequences thereof.

ACTOM

1958

Merger of Metvick and BTH under the Associated Electrical Industries (AEI) banner.

1948

English Electric built its first new factory, outside the UK, in Benoni – now the site for Electrical Machines.

1935

Louis Jacobson started Alpha Electrical Company in Johannesburg to recondition electrical machinery. This was renamed First Electric in 1945 with a factory at Knights (site of present head office)

1925

British Westinghouse, later Metropolitan Vickers (Metvick), the leader in supplying generating plant, mine winding equipment and electric locomotives set up a subsidiary in South Africa.

1919

British Thompson Houston Company (BTH), suppliers of traction substation equipment and generating sets; and English Electric, suppliers of medium voltage switchgear and transformers, registered their first companies in Cape Town.

1910

One of the first hydro-electric stations, equipped with GEC plant, was commissioned at Ceres.

1908

First power plant supplied by GEC was in Uitenhage, followed by Oudtshoorn, Queenstown and Stellenbosch.

1903

British General Electric Company (GEC), manufacturers of all electrical machinery, supplies and accessories, opened offices in Cape Town.

1962

English Electric's new MinEEsub fully tested and ready for the market.

1967–1969

Takeover of AEI by GEC, and subsequent merger with English Electric.

1970–1972

Reorganisation and consolidation of former South African businesses GEC, AEI, English Electric and First Electric into seven factories and six regional offices.

1972

Duvha Power Station order placed with GEC, followed by Tutuka in 1979 and Majuba in 1985. ALSTHOM / MAN secured most of the other six-pack power station orders for turbine generators plus the Koeberg nuclear station.

1978

GEC sold 50% of the equity and management control to Barlow Rand, later unbundled to Reunert Ltd.

1988

Establishment of a vacuum-bottle manufacturing facility at Knights for the supply of MV Switchgear.

1989

The ALSTHOM group, including companies such as MAN Energie, SPRECHER Energie and Cegelec, merged with GEC's power systems businesses. This merger was duplicated in South Africa and the local company gained access to ALSTHOM's technology.

1992

GEC ALSTHOM South Africa and Siemens merged their electric motor manufacturing businesses, and four years later GEC ALSTHOM South Africa gained 100% control.

1994

GEC ALSTHOM purchased Cullinan Power Projects, which allowed the company to expand its transmission, distribution and projects divisions.

1996

GEC ALSTHOM South Africa introduced a comprehensive black economic empowerment (BEE) policy, and began a phased transformation of four key areas: equity, management and skills development, procurement, enterprise development and social responsibility.

1999

GEC ALSTHOM's name changed to ALSTOM and the company listed on the Paris, London and New York stock exchanges. Local group renamed ALSTOM South Africa – in October became a wholly owned subsidiary with the exit of Reunert. ALSTOM South Africa also purchased Conelectric, which further strengthened the group's transmission and distribution division.

2001

ALSTOM South Africa made further key acquisitions to its transmission and distribution portfolio and extended their power division when they acquired Bonar Long, Cutler Hammer, John Thompson Africa and Meissner Power Systems.

2002

For the first time the control shifted to local shareholders. ALSTOM SA (Pty) Ltd was formed, which brought together the technology providers, BEE partners, management and the finance providers.

2004

ALSTOM's global operations sold its transmission and distribution division to AREVA. The local transition saw AREVA taking over half of ALSTOM's equity stake and the technology licensing and distribution agreements.

2008

Investment by new majority shareholders, Actis and Old Mutual, and significant reinvestment by all existing BEE shareholders.

2009

Alstom SA (Pty) Ltd.'s name changed to ACTOM (Pty) Ltd. Renewal of co-operation and partnership agreements with partners ALSTOM and AREVA T&D.

2023

ACTOM celebrate it's 120-year anniversary.

2019

Sale of ACTOM's business, Wilco.

2016

WPI Power Solutions was acquired allowing ACTOM to expand its repair and maintenance of electrical networks capabilities.

2014

ACTOM acquired Genlux Lighting expanding its outdoor lighting business. It further acquired Cetus Turbo Machinery, renamed to ACTOM Turbo Machines, expanding its operations into the turbo-machinery market

2012

Following the sale of CHI Control and Meissner in 2011, the company acquired SAVCIO, and expanded its operations into the maintenance and repair services industry.



Your One-Stop Global Energy Supply Partner

ACTOM