

One-stop drive-train services and partnerships

On November 1, 2018, Marthinusen & Coutts unveiled a new 140 t lathe at its 14 000 m² Power Generation facility in Benoni. *MechChem Africa* attends and talks to Mike Chamberlain, the business' marketing executive.

Marthinusen & Coutts (M&C), a division of ACTOM (Pty) Ltd, started out as a motor rewinding company and has generated considerable expertise and a large number of successful references over the years. Its original site in Cleveland, Johannesburg, remains the head office and its centre for rewinding excellence, while the design team and most of its expensive electrical testing equipment still resides in Benoni.

The repositioning of M&C began about 12 years ago when the company found itself in a shrinking market. "It had long held the Number 1 position with respect to repairing electric motors, but that was not helping it to grow.

"Based on our historical mission to improve our customers' businesses by understanding their needs and providing best possible solutions, we undertook an expansion programme that consisted of a geographic expansion along with moves into power generation, large machines and onsite maintenance projects," explains Chamberlain. "This has all helped us to re-establish growth in South Africa and north of our borders.

"We bought this 14 000 m² site in Benoni about seven years ago, specifically to help us service large motors and generators for the power generation sector," Chamberlain continues.

"Also, about four years ago, we acquired a mechanical company, now called Actom Turbo Machines, which allowed us to upgrade our offering to include the mechanical machines and components of a drive-train: turbines, compressors, gearboxes, and all of the associated alignment, installation and maintenance services," he adds.

"Along with our industry leading motor rewinding service, this has made Marthinusen & Coutts able to offer a one-stop solution for the entire drive-train of large machines and power generation systems," Chamberlain tells *MechChem Africa*.

In addition, M&C has expanded its electrical offering to include transformers, switchgear and motor control centres (MCCs), which enable installations and services that include every aspect of powering the drive train, from the incoming electricity supply to the output drive-shaft or from steam or gas turbines and connected generators, through transformers to create the outgoing electrical power needed.

"We are now striving to be recognised as the first choice service partner for all electrical and mechanical rotating equipment," says Chamberlain. "We offer the full suite of drive-train maintenance services, which we can do from one of our seven facilities – four across South Africa and one each in Namibia, Zambia and Zimbabwe – or through agents



with workshops across Africa," he notes.

Also, M&C has become a specialist in on-site repair and refurbishment projects. "We have always had to carry out the very big motor rewinds onsite. We will build the coils at one of our workshops or import them and then ship them with the insulation in a container to site. Now all of the actual re-installation and rewiring of the stator coils and the refitting is done onsite.

"We did some rewinding for the Ingula Hydro Power Station this way: a complete rotor pole refurbishment and stator rewind of the 373 MVA, 14 pole reversible motor-generator. Every replacement coil set was fitted, connected and brazed onsite from pre-manufactured and pre-packed components supplied by the OEM," he informs *MechChem Africa*.

Describing the use of the new 140 t lathe in Benoni, he says that with a 3.2 m swing diameter, the new machine can be used to machine rotors weighing up to 40 t between centres. "A typical refurbishment of a large motor or generator will involve weld overlay cladding of the worn bearing surfaces followed by precision machining. The length between centres makes this a difficult task as we need to make sure that the journals run in precise alignment with each other along the full length of the axis, which can be several meters," Chamberlain explains.



Marthinusen & Coutts' new 140 t lathe at its 14 000 m² Power Generation facility in Benoni.

"Micron tolerances are required to ensure that the rotor spins precisely true inside the stator of the motor or generator," he adds.

In the past, large rotor machining had to be outsourced to facilities such as Eskom's Rotek, which is one of the few facilities in Africa with machining capabilities of this size. "This machine now gives us another in-house capability, which we hope will steer more of the work that goes to overseas OEMs our way," says Chamberlain.

As a result of its partnership with National Electric Coil, a world leader in generator stator winding manufacture, Chamberlain says M&C can now conduct precision machining on almost any size of generator and guarantee the end result will be as good as that from any of the OEMs. "We also offer a local service built around the awareness of our capabilities and the specific needs of clients.

"Localisation gives us a competitive edge in terms of turnaround times, responsiveness and price – all without having to compromise on quality – and we are better than anyone in Africa on these issues. We offer the same warranty as any OEM and our refurbished machines have proved to last – typically 20 years for the larger machines," Chamberlain assures *MechChem Africa*.

In many cases, M&C can also reverse engineer an OEM motor to overcome inherent design issues, improving the original design for better reliability and performance. "We are currently near the end of a programme to rewind all the 36 MW motors that drive the compressors at Sasol's oxygen plant.

"After having run for 20 years, arcing on the rotor bars was found to have occurred due to expansion and contraction issues. We were able to design out the problem by adding an expansion joint and replacing the electrical connection from a dovetail joint to a brazed joint, which reduces electrical resistance and heat generation. We have now rewound and modified seven of these motors and have one or two more to do.

"We have an excellent design team with many years of experience they can apply to improve the performance, reliability and efficiency of older OEM equipment.

Other notable successes include:

- In Panama, M&C won the contract to rewind two 150 MW Skoda Doosan turbines and Siemens generators through its relationship with First Quantum, while Actom Turbo Machines did the full centreline installation of the steam turbine generator sets for the supply of power to a mine 450 km from Panama City.
- The installation of the largest motors in the world for gearless mill drives. M&C has completed six of these for Zambia, and seven for Panama. These machined items are up to 30 m in diameter.



Marthinusen & Coutts divisional CEO Richard Botton and senior artisan Shepherd Chigwa inspecting the 60 MW generator stator at Kelvin Power Station prior to repair.



Andrew Step, final year apprentice fitter and turner and qualified armature winder, Ricardo Bernardes, lower a refurbished field coil for Ingula onto its pole body using a custom rigging tool that applies even pressure along the coil surface.

- Kelvin Power Station, where M&C takes full responsibility for both mechanical and electrical reliability. "This has been very successful for us. There are six 60 MW machines at Kelvin and right now they have five machines running continuously compared to only two before we took over the maintenance," says Chamberlain.
- NamPower Van Eck Power Station in Namibia, where four 30 MW turbines were refurbished.
- For Gold Fields South Deep Twin Shafts, an Alstom 6 063 kW, 47 rev/min 1 470 V squirrel cage induction winder motor was refurbished.

"From a life extension point of view, old mine winders, for example, can be refurbished and moved to a brand new mine or shaft for around 10% of the cost of a new installation – and new modern controls and drives can also be included. In the current climate, investing in solutions such as these just makes sense," Chamberlain argues.

What makes M&C different? "Today, Marthinusen & Coutts is the largest repairer of electrical rotating machines in Africa. We have machine shops equipped with the latest

CNC lathes, full load test facilities for HV, LV and DC motors and a 32 t balancing machine; we offer a choice of four insulation systems and three VPI systems; we have redesign and re-engineering capabilities; and we offer 24-hour field site service support and on site diagnostics using Elcid, PD, TVA and Flux probe technologies. We also strive to partner with our customers on continuous improvements programmes," he says.

We can now offer single supplier responsibility and OEM partnerships for total system care. In addition, our field services value add includes:

- On site installations, repairs and refurbishment contracts.
- Emergency breakdowns.
- Planned periodic maintenance.
- Level based maintenance.
- In-house and on site training.

"Our all round capability is stronger than ever. With our combined electrical and mechanical capabilities and our increased rotor machining capacity, we can now offer better turnkey engineered services for the drive-trains on large machines than ever before," Chamberlain concludes. □