

Turbine drive train and generator overhauls showcase local capacity

Marthinusen & Coutts, a division of ACTOM, has successfully completed overhauls on a 70 MVA generator set for South 32's Metalloys – within six weeks – and a major repair at Eskom's Ingula pumped storage hydro-electric plant, which is the largest rewinding project ever conducted in South Africa. These achievements showcase a local capacity to take full control of large mechanical and electrical refurbishments.

In a recent major overhaul of a 70 MVA turbine generator set, ACTOM company, Marthinusen & Coutts, contracted with South 32's Metalloys to take full responsibility for the entire drive train refurbishment for the electrical generation plant at Metalloys' manganese plant in Meyerton, Gauteng.

Working in collaboration with business unit ACTOM Turbo Machines, Marthinusen & Coutts completed the work successfully within six weeks.

According to Mike Chamberlain, Marthinusen & Coutts' marketing executive, this achievement showcases the capacity of the divisions to take full control of large mechanical and electrical refurbishments. Chamberlain highlights that the customer did not want

to split the responsibility for the complete generator and turbine drive train between separate contractors.

"Marthinusen & Coutts and ACTOM Turbo Machines' capabilities enable us to control the entire process, offering peace of mind to customers, coupled with optimised cost efficiencies," says Chamberlain. "This also reduces customers' risk and managerial effort in dealing with multiple suppliers."

The scope included a complete inspection of the turbine rotor and internal components, as well as runout and dimensional inspection on the rotor. Inspections incorporated glass bead blasting and non-destructive testing of many components.

High-speed balancing of the 13 t rotor was conducted, and turbine rotor journals

were repaired. White metal bearings were relined and the thrust bearing was modified to improve fitment in the bearing casing. Positive material identification tests were conducted on all the studs, nuts and shaft seals. A complete 3D scan was done of the centreline to allow reverse engineering drawings.

At its repair facility in Cleveland, Johannesburg, Marthinusen & Coutts also performed a number of inspections, tests and repairs on the rotor. Dimensional inspections and electrical tests were conducted, as well as non-destructive testing such as phases array ultrasonic testing. Slip rings were ground, the diode wheel was inspected, and the diodes were tested.

ACTOM Turbo Machines inspected and refurbished the auxiliary mechanical equipment. This included lubrication and control oil systems, pumps, coolers and white metal bearings on the ID and FD fans. ACTOM Turbo Machines project manager Hannes de Jager notes that an overhaul of this magnitude and scope would usually take over two months.

"The excellent working relationship we had with Metalloys' technical staff, and the cooperation we got from them certainly contributed to completing the work as quickly as we did," says De Jager. Starting the inspections, tests and repairs in July, the team completed the overhaul by mid-August.

The Ingula pump storage repair

The completion of the repair at Eskom's Ingula pumped storage hydro-electric plant has been described as the largest winding installation ever conducted in South Africa.

The contract involved the complete rewind of a 373 MVA stator for one of Ingula's four 14-pole motor generators. According to Richard Botton, managing director of Marthinusen & Coutts, the 342 MW unit is among the biggest in South Africa with a core diameter measuring 5.0 metres, a core length of 3.2 metres and a rotor mass of 500 t.

"As the stator was located deep in the turbine floor, all the winding was required to be conducted on site," says Botton. "In this complicated repair, each replacement coil set was fitted, connected and brazed on-site from pre-manufactured and pre-packed

components supplied by the OEM. The most painstaking process, conducted to the highest standards, was the resistive brazing on 1 824 joints."

Marthinusen & Coutts carried out the work with a 14-man team, completing the work in November 2018 after 100 days on site. Their extensive preparation included the establishment of training jigs at its Johannesburg facility, allowing customised training for all technicians involved in the mammoth project.

"We also conducted detailed testing, and refurbishment where necessary, of all the winding equipment we would use on site," he says. "This contributed to smooth and uninterrupted operations, making us self-sufficient in rolling out the contract."

Working closely with OEMs and Eskom, Marthinusen & Coutts took full ownership of the rewind project from start to finish, he notes. The contract was successfully completed on-time with all test criteria well within specification.

"With our in-country expertise, supported by our Centres of Excellence in Benoni and Cleveland, the project showed the world class capability of Marthinusen & Coutts,"



In what has been described as the largest winding installation ever conducted in South Africa, Marthinusen & Coutts has completed a major repair at Eskom's Ingula pumped storage hydro-electric plant. The contract involved the complete rewind of a 373 MVA stator for one of Ingula's four 14-pole motor generators.

says Botton. "We could also contribute our specialised equipment and supply chain – elements that often present a challenge to

foreign service providers trying to conduct this kind of project work in South Africa," he concludes. □

Motor rehabilitation keeps Zambian mine pumping

Marthinusen & Coutts' Cleveland Engineering Services Division teamed up with the Marthinusen & Coutts Kitwe facility in Zambia to rehabilitate medium voltage pump motors in one of the wettest mines in Africa.

A pump OEM had approached Marthinusen & Coutts, the largest after-market service provider of electrical and mechanical rotating machines in Africa, to assess several underground pump motors. There was an urgency to the situation because of the risk of flooding should there be any undue interruptions in pumping operations.

Investigations revealed that the motors driving the pumps were in a poor condition, severely affecting the availability and the performance of the pump chambers. This required the initiation of a detailed refurbishment programme, involving the procurement of spare parts, the setting up of an on-site bearing store, and taking the lead in returning the motors to full service.

Where possible, the motors were repaired in situ – thus avoiding any possible crisis of underground flooding – while others were removed for full refurbishment. The highest levels of engineering practices were followed during repairs, re-installation and commissioning.

Ongoing support is also being provided,

including training of mine maintenance staff, development of installation and commissioning specifications, conducting of regular site inspections, management of spares, and continual engagement with mine engineering management.

Marthinusen & Coutts operates six

state-of-the-art repair and manufacturing facilities – in Johannesburg, Benoni, Sasolburg, Rustenburg, Harare and Kitwe. Supported by a network of technically equipped partners throughout Africa, it provides services not only in Africa but globally. □



Marthinusen & Coutts technical personnel monitoring the condition of a 3 300 kW pump motor in Zambia at one of the wettest mines in Africa.



Marthinusen & Coutts took full responsibility for the entire drive train refurbishment on a 70 MVA generator set for the electrical generation plant at Metalloys' manganese plant in Meyerton, Gauteng.