# **Hlakani:** Differentiated by weld-quality management

***African Fusion*** **profiles ISO 3834-certified Hlakani Engineering, and talks to sales director Gerhard Holtshauzen about the company's successes and future outlook.**

Gerhard Holtshauzen was an Eskom employee at the turn of the century. "I left Eskom back in 2003 and went to work for one of the utility's key service providers, Steinmüller. Then in 2009, I decided to form a weld fabrication and repair company, Hlakani Engineering, to service some of the key needs we were seeing at our Power Stations. In 2010, Hermann Brümmer and Quereshini Naidoo joined me in team Hlakani," he tells *African Fusion*.

Initially operating out of a barn in the Arnot district, Hlakani soon won its first Eskom contract, the fabrication of riffle plates for splitter boxes at Duvha Power Station. "These plates are an essential part of the pulverised fuel (PF) burner inlet systems.

"Flow splitting is necessary to distribute even amounts of pulverized coal into each of the burners and the riffle plates help to prevent particle roping, which is when more densely packed areas of fuel collect in the inlet stream. PF Roping causes excess localised erosion and an uneven distribution of fuel between the burners, which increases the level of unburned carbon and raises NOx emissions," Holtshauzen explains.

Contracts for manufacturing PF burner spares for the Kendal, Lethabo and Duvha PF burners followed. Then, in late 2013, Hlakani Engineering was awarded a breakthrough project for the supply of 164 low-NOx burners for the Camden Power station. "This was a complex fabrication task, that involved welding three different steels: chrome-moly (16 Mo3) steel; 314 stainless steels; and Integra 100 and Integra 300 hardfacing deposits," he tells *African Fusion*.

All 164 of these burners were successfully fabricated and delivered and four of the boiler units at Camden are still running with these burners. Also noteworthy is that this is an Eskom-owned design that is contributing to a relatively reliable boiler performance at Camden, which is now nearing the end of its second life.

"The acceptance criteria by Eskom in terms of the tolerances they wanted were very tight for a welded construction – ovality acceptance criteria for the 1 000 mm OD, 10 mm wall thickness welded cylinders were limited to ±2.0 mm in eight places around the circumference," he continues.


*Hlakani engineering was adjudged the winner in the Afrox-sponsored Welding category at the 2018 Sassda Columbus Stainless Awards. From left are: Nocwaka Ntshangase, Sassda; Dillan Fernando, Afrox; Gerhard Holtshauzen, Que Naidoo and Hermann Brümmer from Hlakani Engineering; Afrox's Hennie van Rhyn; and Sassda's John Tarboton.*

*Hlakani Engineering's fabrication team poses in front of the last of 164 low-Nox PF burners the team manufactured for Eskom's Camden Power Station.*

"In addition, the Outokumpu SS 314 material is very difficult to work with, particularly with regard to hot cracking. Distortion and shrinkage problems were also encountered, making it difficult to achieve the required tolerances, he adds.

The design was therefore reviewed, specifically with regard to welding requirements, and several measures put in place. First, the boilermakers had to work on circumference dimensions and not on diameters to have any chance of achieving the tolerance requirements. They also had to apply careful sequencing and heat input control to limit distortion and weld shrinkage.

"The welders had to be specifically trained for the stainless steel sections. They were required to manage cleanliness, low interpass temperatures, sequencing and stop and start placement due to the intricacy of the components. This helped to overcome the high susceptibility to hot cracking of 314 stainless as well as other challenges.

"Each welder was given his own summarised weld procedure specification, together with the consumables including the consumable batch number. This allowed for easy recording of weld details by the inspector for the data books. They were also trained to do their own dye penetrant testing after cleaning to ensure sound welds throughout the process. This helped to ensure that, on X-ray testing, a failure rate of below 1.0% was achieved for the entire project – and some of our welders did not have a single X-ray failure for the duration of the three year project," says Holtshauzen proudly.

He adds that, for the overall success of the project, collaboration between the client and the fabricator was critical. "Dimensions coming from burner functionality requirements were defined and used to monitor actual single component dimensions and to optimise the sub-assemblies and final assembly to fit the critical dimensions," he explains. This required all components to be tracked individually throughout the fabrication process and relevant documentation to be maintained.

At the 2018 Sassda Columbus Stainless Awards, this project was adjudged the winner in the welding category for its "local fabrication standard for these high tolerance burners, overcoming significant welding challenge such as distortion and hot cracking on the way."

With both Holtshauzen and Brümmer having a quality management background, Hlakani Engineering was quick to adopt ISO 3834: Part 2-certification according to the SAIW Welding Fabricator certification scheme.

"People in the fabrication industry are underestimating the new SANS 347 Pressure Equipment Regulations (PER), particularly with respect to the Hazard categories. We find that clients are uninformed about what is legally allowable and what is not.

"We feel our ISO 3834 certification along with unbelievably good welders and our systemic approach to weld quality places us in an excellent position to take on work in the high hazard classes," Holtshauzen informs *African Fusion*.

*Above: A pulverised coal burner assembly for the Lethabo Power Station.*

*Right: Coal nozzle assemblies manufactured in 310 stainless steel for burners at Eskom's Kendal Power Station.*

He cites a the recent replacement of an acid line in the water plant at Lethabo Power station as an example, where stainless steel and rubber-lined carbon steel piping was fabricated to a high hazard category level.

"ISO 3834 certification is a key indicator to clients that we can deliver quality welded products and it is fast becoming the gatekeeper welding standard for company's such as Sasol and Anglo American.

"Producing welded constructions according to world-class standards such as ISO 3834 sometimes makes a job seem more costly. But years of experience tell us that taking short cuts can have disastrous and very expensive consequences.

"By delivering a superior product at the outset, clients can rest assured that their components will be safe and reliable in service, and reliable products require less maintenance and plant downtime. This is of huge financial benefit with respect to productivity levels and to the lifecycle costs of the plant," argues Holtshauzen.

"We believe ISO 3834 is a must for any credible fabricator of critical plant equipment," he says, adding that Hlakani is also a B-BBEE Level 2 contributor; has as CIDB Level 7 rating; and an ISO 9001: 2015 certificate.

"In addition, we have some wonderful welding talent and a very effective internal training system in place to develop new talent," he concludes.

| Hlakani Engineering Shop 1 Fabrication workshop | |
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| **Covered workshop area** | 1 914 m² |
| **Storage area** | 5 902 m² |
| **Total area** | 7 816 m² |
| **Max structure size** | 66×29×7 m |
| **Lifting capacity** | 1×30 t; 3×10 t; 1×7 t |
| **Materials handled** | Carbon steel, alloyed steel, stainless steel, aluminum |
| **GMAW/FCAW welding** | CEA Maxi 505s |
| **SMAW machines** | Thermamax TSA |
| **Other notable equipment** | Baking and holding ovens, hotboxes, mobile submerged arc welding systems, CEA Plasma Plus cutting systems. Adendorff pipe bender, Mac Africa pipe threading machines, and more… |