

Maintenance projects lead to Steinmüller innovations

Welding Operations Manager, Morne Kidson, and Divisional Manager, Leon Olivier talk about innovations such as explosive welding that have emerged at Steinmüller Africa as a result of its OEM and plant maintenance history.

In 2016 Steinmüller Africa completed a planned maintenance project for state-owned national oil company PetroSA's Mossel Bay-based Gas-To-Liquids refinery in the Western Cape. Steinmüller Africa Welding Operations Manager, Morne Kidson, explains that the scope of work involved replacing the internal coil U section of the Synthol Reactor, and structurally replacing and welding all the pipe components. The outside diameters of the pipes varied from 40 to 90 mm with the wall thickness varying between 3.0 and 25 mm.

Divisional Manager, Leon Olivier, explains that the Vaal workshop services Sasol Secunda during shutdowns. "We maintain Sasol's La Mont Boiler at its Nitric Acid plant, which entails boiler-making plate work and welding pressure and non-pressure parts, as well as the supply of fabricated stainless steel plates from our workshop in Sasolburg," he adds.

Additionally, Olivier notes that Steinmüller Africa is an original equipment manufacturer (OEM) for various state-owned power utility boilers and has ongoing boiler and high-pressure piping maintenance service contracts at 11 coal-fired power stations.

Kidson highlights the increasing demand for explosive welding technology

during the maintenance of high-pressure heat exchangers at power stations. "Explosive welding is used to fuse tubes to tube plates or headers in high-pressure heat exchangers. It is performed when a tube is propelled against the tube plate material using the energy from an explosive discharge. In the process, expansion and fusion occur due to the high-energy impact rate," Kidson explains.

Ageing coal-fired power stations, such as Kriel and Arnot in Mpumalanga, had several heat exchangers that needed to be refurbished/replaced. They weigh several tons and have up to several thousand tubes that needed either to be plugged during maintenance or replaced during refurbishment. "Since traditional welding methods are time-consuming, explosive welding, with a weld metal travel speed of more than 8 000 m/s, reduces welding time, plant downtime and relative repair costs. It also achieves a weld that is expanded, fused and sound," Kidson says.

Explosive welding is also suitable for welding components of different metals, as well as for welding dissimilar metals, such as carbon steel to stainless steel and stainless steel to titanium. "Steinmüller can apply the process to manufacturing in workshops, or in-situ at the power sta-

tions," Kidson highlights. The explosive welding technology was mostly applied for in-situ heat exchanger tube plugging, and Steinmüller is the first company worldwide to manufacture a brand new heat exchanger from scratch using the technology. It is important to note that the process actually fuses the two materials into one homogenous material, ensuring that the fusion line is not detectable through a microscope or etching.

Although Steinmüller Africa originally introduced explosive welding to Eskom in 2010 under licence from TEI, it remains the only company in South Africa qualified and approved to perform explosive welding for the power generation sector.

Innovation is one of Steinmüller's values, and it constantly evaluates the market for opportunities. The company is 60 years old and must therefore evolve continually. It is vital to keep abreast of new innovations and technologies, as this allows the company to anticipate end-user needs.

As the welding sector continues to grow, South Africa's ventures into the adherence of reduction of carbon emissions in the production of energy means there are substantial opportunities in the renewable energy market.

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Steinmüller's 30 000 m² fabrication facility in Pretoria houses its world-class welding, fabrication and pipe bending equipment – including a Pemamek boiler wall panel welding system (depicted here); an Oerlikon Automatic Welding machine; and the Cojafex Induction Bending machine, which is unique to the African continent.