

Fronius SA: from AR training to better structural integrity

AF visits Fronius South Africa's stand at Electra Mining Africa and talks to Edric van der Walt about the extended welding offering available to welder training centres and fabricators facing limited cash flows but still needing to raise their structural integrity and weld efficiency levels.

A key attraction at the Fronius stand at Electra Mining Africa 2024 was a new welder trainer solution, now called the Welducation Simulator. "Instead of just using virtual reality, we are now using augmented reality (AR) in our new training systems, which makes the transition from simulator to real equipment far easier for a novice welder," begins Edric van der Walt, Fronius South Africa's welding specialist.

The simulator, the virtual welding helmet, the plate and the torch look and feel real, and when viewed through the helmet, the training environment and all the people in the vicinity can still be seen so that the trainee welder always remains aware of

the surroundings. "Unfortunately, most training centres have very limited cash flow, so they tend to go for basic real welding systems. That often means that students seldom get the opportunity to try modern machines with process control that can make their lives easier.

"So as well as taking our new Welducation Simulator to demonstrate at welding schools, we also, from time to time, take some of our advanced equipment to the larger training centres' just to expose future welders to the new technology: the advantages of pulsed GMA welding and CMT (cold metal transfer), for example. We want our youngsters to be aware that this



technology is out there, to broaden their horizons a little and then, hopefully, once they qualify and start to experience difficulties in the field, they will remember seeing a system that is able to offer better control, better quality and more efficiency," van der Walt tells AF.

Demonstrating the Welducation Simulator, he asks me to put the helmet on and aim the torch at the red dot shown at the start of the weld, then press the torch trigger to start to weld. As well as showing and sounding like weld metal is being deposited, visual guides for the torch angle, the arc length and the welding speed are shown around the position of the simulated welding arc. The sound of the weld also changes depending on the arc length and the heat affected zone is shown developing around the weld bead.

After welding, I get a score: 58 out of 100 for the first run and 92 for the second. An analysis is also available on clicking the score: on the second weld, the arc length was good, as was the angle, but there was still an issue with the torch speed. "The system comes with a 'stinger' for electrode welding, and a TIG torch. There is even a piece of virtual TIG filler that gets shorter and shorter as you weld, so the welder needs to bring his hand steadily closer as the wire is 'consumed,'" Van der Walt explains.

It is quite authentic, yet clearly more accessible than real world welding can ever be. "And while these systems can never fully replace the need for trainees to weld for real, it can replace the physical torch manipulation aspect of a programme, getting the hand steady and the speed right, which is the starting point to being able to produce a quality weld joint," he explains.

He adds that it is during these stages of welder training when students tend to waste the most material and time. For every 'bad' real weld, the plate must be discarded or the weld metal ground back out, which is expensive and time consuming. It is also during this training phase when most students hurt themselves: they can get arc-eyes, burns, or they can inhale fume. Using an effective AR welder training system is much more efficient in terms of time and costs," he argues, adding that it is also proving a faster way of developing the necessary welding skills.

Fronius' CMT Advanced solution

Currently, according to Van der Walt, hand held laser welding is the new 'best thing'; "We don't think lasers are always a good solution, though. We've done a bit of internal research and consulted a lot of people, including one young gentleman who presented his Welding Engineering Master's thesis on laser welding. He agreed with many of our findings that for welding white-goods such as kitchen and wash-room goods and thin stainless steel sheeting where only the aesthetics really matter, laser welding works perfectly. But when it comes to anything structural, such as pipe root welding or motor vehicle chassis, then the problems start, especially with respect to wire feeding, which is not always as easy as people make it look on videos.

The underpinning problem, he adds, is that laser welding is too cold. "A lapped joint might look OK, but when it is tested, it is not structurally sound. We still believe firmly that our CMT process is able to match the speed of a hand-held laser welding solution, while delivering better welding results that can pass all structural tests," he says.

Fronius' CMT process, Van der Walt continues, is now better regulated than ever. It is much smoother, can deliver even lower heat inputs and it now includes multiple pre-programmed options for specific welding materials, thicknesses and joint types. "We have open root CMT welding procedures for pipeline welding, and low-dilution overlay cladding procedures, for example. We also have procedures for welding galvanised steel sheeting using 100% CO₂ shielding gas, developed to prevent porosity," he notes.

The new CMT Advanced process from Fronius is also available, which reverses the welding polarity during the short-circuit phase of metal transfer. This not only improves weld stability and reduces spatter, but it offers better heat input con-



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trol, higher deposition rates, and minimal distortion. "It also reduces the amount of fume produced, improving working conditions for the welders.

"CMT Advanced is now available with the new Fronius iWave AC/DC machines, which offer multi-process options including AC and DC TIG welding, MMAW and GMAW options, including LSC (low spatter control), PMC (pulse multi control), as well as CMT and CMT Advanced transfer modes.

"This single multi-process system can replace everything in a fabrication workshop with a modern machine that incorporates a host of process-specific advanced welding process control techniques," he says.

Also worth noting is that most of the Fronius iWave welding machines we sell around the world are destined for use by welders rather than welding robots," he says, adding however that the Fronius Robotic iWave is also about to be launched into South Africa.

"The most important market for us in South Africa, is still the steel fabrication market, which tends to rely on manual welding processes. For this we have our cost effective TransSteel range, which offers spatter free welding of steels in medium to heavy steel fabrication applications. It is the rugged partner for structural-steel fabricators," continues Van der Walt.

Available in compact versions – the 2200C to 3500C – and as split systems with external wire feeders in the 3500 and 5000 series welders, these robust machines are



Fronius still believes that the CMT process is able to match the speed of a hand-held laser welding solution where the weld has to pass structural tests.

reliable steel construction tools with an intelligent design and exceptional ease-of-use. And as with most Fronius systems, they are digitally controlled and come with expert built-in knowledge for steel welding that guarantees system performance.

Another advanced solution now available on the South African market is Fronius' battery-powered AccuPocket welder, which offers unlimited welding mobility for repair work at exposed locations that are difficult to supply with mains power. With a high-performing lithium-ion rechargeable battery and a low overall weight of only 11 kg, AccuPocket gives users unprecedented freedom for MMA and TIG welding.

"And in Hybrid mode, the unit can be used for welding at the same time as being charged – even when mains voltages are fluctuating or the power trips," Van der Walt adds.

Fronius products are available in South Africa through the B.E.D. Group, except in the Eastern Cape, where the brand is handled by Proac Engineering.

"As Fronius South Africa, we offer sales and technical support for B.E.D. Group, Proac and their customers and we have direct access to our overseas specialists should we need them," concludes Edric van der Walt.

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