



# BHI: world-class heavy fabrication for all OEMs

*African Fusion* visits the Richard's Bay manufacturing facility of Bell Heavy Industries (BHI) and talks to Henk de Villiers, the company's production manager and ISO 3834 Welding Coordinator, about the extended customised heavy fabrication offering now available, not only for OEMs of South Africa's mining, construction and agricultural equipment fleets, but for all heavy fabrication requirements in the Southern African region.

Bell Heavy Industries is a newly formed company that is wholly owned by Bell Equipment, the South African-born global OEM of Bell ADTs for the mining industry and a host of other specialised equipment for the construction and agricultural sectors. This flagship manufacturer has been designing and manufacturing the Bell brand of machines in South Africa for many years and exporting them from Richards Bay to destinations all over the world, Henk de Villiers points out.

In recent years, however, Bell Equipment has been expanding its European manufacturing hub in Germany to reduce Richards Bay's import and export logistics for machines destined for sale in the European and USA markets. Moving more of the manufacture of the highly successful Bell ADT range to Europe, explains De Villiers, has freed-up capacity in Richards Bay.

"We now have the opportunity to offer customised heavy fabrication for any other equipment brand or any heavy fabrication requirements; hence the new company, BHI, which is not restricted to manufacturing for Bell-branded machines. BHI can offer heavy fabrication expertise to all local

equipment distributors, suppliers or users of any OEM's equipment," he says.

He adds that Bell Equipment has long been customising and manufacturing optional low-density bins for existing and new trucks, along with water tanks to expand the Bell Versatruck offering and repurpose used Bell ADTs. "We have also been manufacturing new buckets for Kobelco excavators and JCB machines, for delivery to customers through our local Bell Equipment distribution network," he adds. BHI, therefore, fits very comfortably into Bell Equipment's existing fabrication facility in Richards Bay.

## ISO 3834 certification

"We are a globally competitive company that manufactures to world-class quality standards and being an ISO 9001-2015 accredited company is a given. In terms of welding for our own OEM equipment, we are obligated to work under the strict quality control measures, typically AWS D14.3, the American National Standard for welding earthmoving, construction and agricultural equipment," says Henk de Villiers, adding that complying with this standard is essential for exporting earth-



moving vehicles into Europe and the US. The offering is not limited to this standard and, with certification in place, BHI has the expertise and equipment to handle most structural, sheet metal and low-pressure piping systems.

When asked why BHI has adopted ISO 3834 certification, he responds that while ISO 3834 was never a core requirement for internal OEM components for Bell Equipment: "It is necessary to assure external customers, including other OEMs and end users, that all our quality systems, procedures and welding process controls are perfectly aligned with ISO 3834. So, we have now been officially audited by Herman Potgieter from the Southern African Institute of Welding (SAIW) for certification to ISO 3834-Pt 2, the comprehensive quality requirements for this welding standard," De Villiers responds.

He mentions though that everything necessary for accreditation was already in place, as Bell had aligned itself to these standards years ago.

"In principle, our local customers need to know that all the welding on their products is done under fully controlled conditions: the materials and consumables are correct, the welding procedure is approved and consistently adhered to, and the post weld inspection shows that the welds meet the requirements. So, BHI can now say that any product a customer asks us to manufacture will meet all weld quality requirements of AWS D14.3, or most other requested standards under the direct guidance of ISO 3834-Pt 2.

## Niche welding expertise

In South Africa, there are not too many other companies that can fabricate the large and complex components needed for heavy equipment, De Villiers continues. "Our facility is equipped with numerous 10 t cranes, each with an 6,2 m clearance, which enables us to accommodate several large fabrications simultaneously," he says.

On the skills side, he emphasises that the company has over 400 welding machines and operators, working multiple shifts. All are recruited locally and every one of them is trained in-house. "On the welding side, we employ skilled, semi-skilled and novice welders. We recruit people with the basic knowledge of the welding processes and test their hand-eye coordination and basic welding skills.

All new welders are put through a formal 12-week training course on the specific applications we need them for. And before they are asked to do any production welding work, they are coded on the processes and procedures they will need to use," De Villiers informs African Fusion.

A qualified in-house welding inspector formally assesses the welders, based on the test sample/coupon produced. "If a customer requires us to code welders working on their jobs, signed off by an Authorised Inspection Authority (AIA), BHI will be happy to comply. At the end of the day, though, training and coding are the duty and responsibility of the manufacturer. It is up to us to assure our customers that our welding personnel, and the procedures we use, meet the agreed welding standard and ISO 3834 requirements," he says.

In terms of processes, he explains that most of the welding at BHI is done using the down hand (1G, 1F and 2F) positions, where solid wire, gas metal arc welding (GMAW) is preferred. "We also use flux-cored arc welding for out of position application. If welding in the gravity position, nothing can beat solid wire GMAW in terms of costs, but to weld in the horizontal, vertical up or overhead positions – 2G, 3G or 4G – higher deposition rates and better fusion can be achieved with flux-cored wires, because a hotter weld pool can be supported by the fast-freezing slag from the flux," he explains.

Bell Equipment also has a very limited need for shielded metal arc welding (SMAW), mostly applied where special consumables are needed, such as for some welding on hydraulic cylinders, for example, he adds.

Most notably for hydraulic cylinders, though, he says, Bell has implemented and perfected the friction welding technique to join the hydraulic pistons and rod ends to the chrome-plated push-rod material. "There are not too many fabricators with a friction welding capability. We have developed our own tooling design for this machine that includes all the clamps, jaws, hydraulics, and electronic controls," he says.



BHI can offer heavy fabrication expertise to all local equipment distributors, suppliers or users of any OEM's equipment.

Another key feature of friction welding for this application is that no added consumable is needed. The fully fused weld is very narrow and neat and very little of the chrome plating is affected. "We seldom need to do more than clean out expelled dross. Also key to successful friction welding of this material is slow cooling after welding, which Bell does by simply covering the finished welds with an insulating material in a 'bead bath,'" De Villiers explains.

## Secure consumable supply

In support of Bell Equipment's ongoing fabrication needs for its local distribution network and customers, along with the new BHI needs, a dedicated consumable supply agreement has been struck with ESAB South Africa. ESAB has now established a dedicated warehouse for the daily supply of welding consumables into Bell and BHI's Richard's Bay fabrication facilities. For solid wire GMAW, the facility has standardised on ESAB OK Aristorod 12.50, which is a copper-free solid wire that has been treated with ESAB's Advanced Surface Characteristics (ASC) process to reduce post weld cleaning requirements, which was a "key differentiator" for De Villiers.

And for flux-cored welding, the Dual Shield 7100 Ultra wire has been chosen, a high strength wire developed specifically for out of position welding.

"For us, the key benefit of this warehouse is that, as part of our ISO 3834 certification, we must show that all the consumables we use are being properly stored and controlled. I can now take a customer or an auditor to a warehouse across the road and show them how our consumables are being kept, managed, and controlled."

Also, he continues, Bell/BHI does not have to keep large stocks of consumables. "We take deliveries of what we need every day, and the warehouse always keeps at least two months' worth of stock on hand.



Robot welders and manipulators are typically used for long-section welding where surface finish is important.

We just call off that stock at a rate of between one and two tons every day, 40 to 50 t per month," he explains.

## Global expertise for local needs

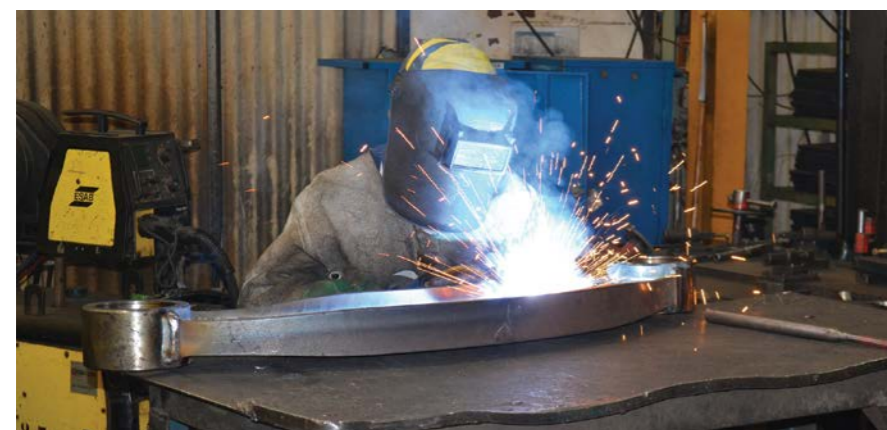
Underpinned by Bell Equipment's fabrication experience for global markets, BHI has all the welding processes and expertise, including robot welders and manipulators; laser, plasma and flame cutting equipment; and heavy plate rollers, boring mills, and large machining centres to deliver complex heavy fabrications to meet any local need.

"For anyone needing a special machine for earthmoving, construction, military or agricultural use; a bucket, bin or water tank for a vehicle; or any heavy steel structure that might be too big or too complex to manufacture in a conventional fabrication shop, we are willing and ready to help," he concludes.

[www.bellheavyind.com](http://www.bellheavyind.com)



Scan the QR code to view a quick introduction to BHI.



Most of the welding at BHI is done using the down hand (1G, 1F and 2F) positions, where solid wire, gas metal arc welding (GMAW) is preferred.

