

# Flawed weld collaboration helps ensure Hinkley Point safety

Welding and inspection specialists from the Nuclear AMRC and Sonaspection have produced a series of intentionally flawed test pieces which will help ensure the quality of welded components for new nuclear plant.

Lancashire-based Sonaspection, part of the Institution of Mechanical Engineers, is the longest-established maker of flawed test pieces for the non-destructive testing (NDT) industry.

The company was contracted to produce a series of test pieces by the Inspection Validation Centre (IVC) operated by global engineering group Wood, which is supplying inspection qualification services to the Hinkley Point C project.

Wood's role is to assess and qualify suppliers of NDT inspection services at Hinkley Point C. The test pieces will be used in practical trials to ensure that inspectors can identify the implanted defects before they are certified to inspect and validate real components and assemblies.

The test pieces needed to be produced using mechanised welding processes in a range of material combinations, featuring a variety of artificial defects and replicating various types of weld used in nuclear plant.

With limited experience in the required mechanised welding techniques, the Sonaspection team called on the Nuclear AMRC's welding specialists for support.

*"The Nuclear AMRC has a wide range of skilled people, from operators to welding engineers, who are experienced in the specialist areas we were looking for when manufacturing these test pieces,"* says Neil Kelly, group operations manager for Sonaspection.

*"As the centre has a commitment to R&D work, they were very happy to work with us to perfect techniques and procedures where other suppliers would have classed this as not commercially viable. As an organisation, they can also handle the type of quality assurance requirements which are set out by Sonaspection and our customer Wood."*

Sonaspection produced weld preparations with deliberate internal flaws, which the Nuclear AMRC team joined using the centre's mechanised narrow-groove welding facilities.

The project presented a number of welding challenges, says Stuart Park, arc welding technical lead for the Nuclear AMRC. For example, the first weld preps featured a block of material on the side of a narrow groove, which restricted the welding head's access to the joint.





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*“We had to steer the head around this by doing some manual adjustment as we were operating, before we came up with procedures to get round that obstruction,” Park says.*

The welding became more technically demanding as the project moved from plates to large-diameter thick-walled pipes, including some of the largest parts to be welded at that time by the Nuclear AMRC arcs team.

*“It’s been a good learning curve for our operators,” Park notes. “It’s been a valuable experience for us to demonstrate that the equipment we have works in a robust manner on these very challenging welds.”*

The welding team used narrow-groove gas tungsten arc welding cells provided by Nuclear AMRC member companies Polysoude, Arc Machines Inc and ITW Welding Products.

After welding, the centre’s NDT engineers ensured that the testpieces did indeed feature the intended flaws and no unintended defects, using a variety of techniques including ultrasonic testing, visual inspection, dye penetrant and magnetic particle inspection.

The partnership between Sonaspection and the Nuclear AMRC was welcomed by Chris Curtis, technical manager at Wood’s IVC.

*“The test pieces had to be representative of the site components in terms of base material and weld structure and also potential defect characteristics,” Curtis says.*

*“Sonaspection had proved previously that they could manufacture defects to our specification, so the addition of the Nuclear AMRC to produce acceptable automated welds was a massive positive for the project.”*

The Nuclear AMRC team have now developed full mechanised processes for producing the flawed welds to a consistent quality in future test blocks, and transferred the associated intellectual property to Sonaspection.

*“Throughout the work, we have gained valuable knowledge on the defecting of narrow gap welds with different welding processes which we can apply to projects for other customers in the future,” says Kelly.*

*“Sonaspection has an excellent working relationship with the Nuclear AMRC – we find the staff to be constructive, knowledgeable and amenable to change. These projects have required a real team effort to achieve the end goal, and the Nuclear AMRC has really bought into that ethos which made a sometimes difficult process much easier.”*


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