A flexible approach to eddy current weld inspections

Bill Ziegenhagen, product manager at global NDT equipment specialist, Zetec, talks about eddy current testing (ET) and the use of ergonomic, powerful and lightweight modern instruments such as Zetec’s MIZ-21C.

Eddy current testing (ET) is a fast, accurate, chemical-free way to detect surface and sub-surface defects, including cracks, corrosion and heat damage. It’s a proven technology for inspections of welds, rivet holes, tubing and other ferrous and non-ferrous components in aviation, aerospace, oil and gas and other industries.

ET has the added benefit of producing an electronic inspection record, a big advantage over dye penetrant testing (PT) and magnetic particle testing (MT). These digital test results can be analysed, saved, shared, stored and compared at any time.

Eddy current testers can also ‘see’ through non-conductive coatings such as paint, without technicians having to pre-treat the surface.

Modern ET insights

ET involves using a portable instrument and a probe with a coil in it that lines electronic currents into the material. Eddy current array (ECA) probes have multiple coils that fire at co-ordinated times and can capture more information in a single pass, transforming a process that might last several minutes per weld or joint to one that takes seconds.

One practical limitation of eddy current technology is that the coils in the probe need to be close to the material under test, which is a challenge when the inspection involves complex shapes or rough surfaces like a positive curvature of the circumferential weld crown bead or the non-uniform surface of the weld itself.

Because inspection points can be physically hard to reach, most technicians prefer instruments and tests that are battery powered and easy to handle yet don’t compromise data-acquisition speed, performance or probability of detection.

Fortunately, eddy current tools and probes are evolving in several important ways.

Portable Instruments

Taking their cue from consumer electronics, the latest instruments feature ergonomic designs with small form factor, powerful software, lightweight, long battery life and colourful multi-touch displays.

For example, Zetec’s MIZ-21C handheld eddy current instrument weighs just 1.2 kg and features an ergonomic design with a small form factor, powerful software, lightweight, long battery life and colourful multi-touch displays.

ET surface array indications for the butt weld of a mining drum. Zetec’s MIZ-21C has a large, colourful, sunlight-readable C-scan display that allows the technician to rotate, zoom and manipulate the data with his fingers.

The Surf-X line of probes is fully compatible with the MIZ-21C family, delivering a complete platform for eddy current inspections: making this a cost-effective handheld instrument with surface array capabilities, powerful embedded software and compatibility with new and legacy probes and scanners.

More coverage and versatility

Regardless of whether a custom probe shape, a flexible surface array probe or a modular approach is being used, today’s ECA probes provide greater inspection coverage in a fraction of the time compared to PT, MT or pencil probes.

The key is to focus the probe’s flexibility - literally, in terms of the surfaces and geometries it can handle, and figuratively in its ability to help technicians be more productive. With a focus on portability, ease of use, connectivity and high probability of detection, Zetec’s MIZ-21C and Surf-X probes deliver every inspection advantage available today, while also setting up for the future.

Zetec NDT instruments are available in South Africa through GammaTec.