Olympus

Non-destructive Testing for Weld Inspection – Tailored Solutions

Olympus is a global leader and supplier of advanced non-destructive testing (NDT) equipment, specialising in innovative, turnkey solutions that offer the latest in weld inspection technology.

Olympus constantly strives to provide wider solutions for carrying out non-destructive testing within the rail industry. One such example to enhance the weld inspection process combines an automated non-destructive testing platform with a sturdy and compact cart, to create an innovative solution for large-diameter circumferential weld inspection.

The challenge of large-diameter circumferential weld inspection in relation to the manufacturing of large cylindrical structures, such as for rolling stock, requires accurate end-to-end alignment prior to welding around the circumference. NDT is commonly used to scan along the circumference to detect hidden flaws, maintaining integrity to ensure railways can continue to operate safely.

Railway manufacturers and operators can use handheld or remote-controlled ultrasonic scanners to inspect large-diameter circumferential welds. However, precisely detecting discontinuities in a large cylindrical system with compounding factors such as long scanning distances, overall size, and limited access to inspection areas, pose additional challenges when tracking the weld alignment. A system that offers automated

scanning would enable operators to more accurately and reliably detect weld flaws.

An Automated Solution for Circumferential Inspection

Olympus' NDT solutions offer just that, in the form of an innovative weld-tracking inspection head on a sturdy mobile cart. Several types of **ultrasonic probes** allow the inspection head to be positioned in orientations that enable the reliable and accurate detection of weld flaws. At the same time, the cart's inspection head is positioned against a weld in a cylindrical product that is horizontally orientated, enabling the laser camera on the head to track weld alignment while the product turns. The inspection head sends instant and continuous feedback to a horizontal actuator for a simplified inspection workflow.

The actuator continuously adjusts the head left or right, in conjunction with a pneumatic cylinder that applies constant pressure to the surface, with the large-diameter circumferential weld inspection cart automatically adapting to and maintaining its position over the weld. This ensures welded joints are fit-for-purpose and meet the required levels of quality.

The compact cart with large caster wheels enables operators to easily manoeuvre and lock positions for additional security. The cart contains all of the required components to inspect and analyse welds, including a water-coupling tank and pump, a **FOCUS PX** acquisition instrument, and a PC with **WeldSight™** inspection software.

Olympus' large-diameter circumferential weld inspection cart

Key Features of Olympus' Large-Diameter Circumferential Weld Inspection Cart

Size (application): Thickness *typically 11–32mm (0.44–1.25in); diameter: *approx. 2m minimum

Speed: Up to 178 mm/s (35 ft/min) for material thickness under 17mm (0.66in)

Coverage: 100% of butt weld with different weld bevels, such as single V, double V, and square groove, using two PA, two TOFD, and four UT probes (for transverse defects)

Real-time inspection results: A-scan, B-scan, C-scan and D-scan views, as well as high-definition S-scan merged views

Typical inspection modes: Shear and longitudinal waves, pulse-echo, pitch-catch, TOFD, and volume inspection

Surface temperature: Up to 40°C (104°F)

Compliance: Per ASME and ISO standard requirements

Report types: Inspection, calibration, and calibration-check user-configurable reports

Storage: Real-time inspection data storage

**alternative size and diameter available on request*

Inspection Head

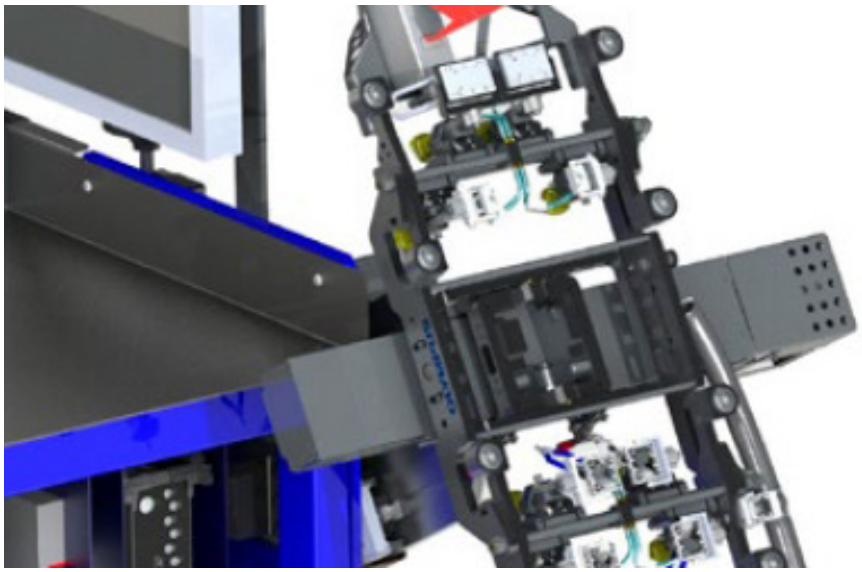
Combining phased array (PA), time-of-flight diffraction (TOFD), and conventional UT technologies, the inspection head offers powerful inspection features. In addition, the inspection head can be easily combined, changed, and adjusted to suit various inspection requirements thanks to a combination of eight spring-loaded arms that hold two PA, two TOFD, and four UT probes.

Olympus' inspection head utilises a tracking encoder that reduces the risk of the operator losing their position along the weld. This along with a quick-release latch to detach and reattach the head facilitates optimal maintenance, manual inspection, or calibration on a reference plate.

Generating Results with WeldSight™

The vast quantities of data generated during large-diameter circumferential weld inspection require a powerful software platform to manage, analyse and store data. Olympus' WeldSight advanced weld inspection software supports large data files to enable long, uninterrupted inspections, with volumetric views for efficient analysis and a streamlined workflow.

For operators conducting large-diameter weld inspection using PA and TOFD, WeldSight helps to optimise the workflow by considering repeatability requirements, code compliance and weld characteristics. With fully editable weld profiles, probes and wedges, the overall time and cost associated with weld defect detection is reduced.



Olympus' inspection head

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