

Automated Ultrasonic Weld Quality Inspection

Current Condition

Traditional weld inspection has utilized cumbersome x-ray imaging equipment that provides 2-dimensional imaging inspection of welds. In addition to requiring time to process film and needing careful and time-consuming manual evaluation of the results, the inspection process requires shielding and evacuation of the inspection area during the acquisition of x-ray data. In addition to the operational restrictions, several types of defects, including porosity, are very difficult to detect using x-ray technology.

Solution

MISTRAS Products & Systems Large Structure Inspection (LSI) System, is an automated, programmable, configurable ultrasonic inspection system that provides a 100% C-Scan image of weld seams on a variety of structures and geometries.

The LSI System performs inspections quickly (on the order of ½ Meter (Yard) per minute linear scanning velocity, with resolution, in this case of 1.25 [transverse to weld] x 6 mm [0.050 x .25 in.].* The results are available in real-time,

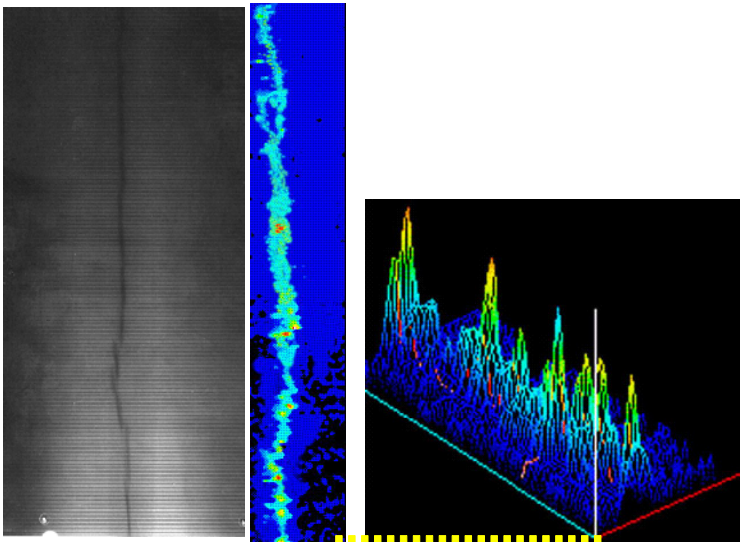
and consist of color-coded amplitude “maps” corresponding to the severity of the indications found. Location (depth) of defects can be determined using time-of-flight data, which is also recorded along with the amplitude data. As shown on the accompanying figures, the ultrasonic data, which is available as either 2-D or 3-D C-Scan images, shows both the presence and location of a weld defect. The same defect is shown on the corresponding x-ray image on the left. In addition to the color-coded amplitude (which corresponds to the “severity” of the defect), direct location information is also available through the use of the B-Scan image information (not shown here). Please note that for clarity, the 3-D image “zooms in” to show the most severe portion of the defect only.

The Ultrasonic inspection shown here was performed using the MISTRAS Products & Systems LSI system employing the available dual angle beam adapter head with 2.25 MHz, ½ inch transducers mounted on 45 degree irrigated shoe wedges.

**These rates are for comparison purposes; higher or lower resolutions may be appropriate for differing conditions*

MISTRAS Products & Systems division, is a team of skilled researchers, engineers, technicians and manufacturing personnel dedicated to the development of practical and cost saving solutions to your challenging inspection needs.

For a demonstration or additional information, please contact our Princeton Junction headquarters at 609-716-4000.



Comparison of X-ray vs. Ultrasound C-Scan image (2 and 3-D) of weld defect on tank seam. 3-D Image is for zoomed portion only.

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