



Large Structure Inspection (LSI™) System

MISTRAS Products & Systems, a member of MISTRAS Group Inc., Large Structure Inspection (LSI™) System is a fully automated, turnkey Ultrasonic Inspection System, designed to perform high-speed ultrasonic C-Scan imaging, of large structures such as:

Pipelines

Ship Hulls

Storage Tanks

Pressure Vessels

Designed for wall thickness mapping, weld quality imaging and TOFD applications, this automated turnkey inspection system is configured as a fully-integrated system in which all components, including a rugged notebook PC, are stored within a heavy-duty custom case (as shown in *Figure 1*).



Figure 1. LSI™ System with Major Components



Inspection using LSI™ System is performed by qualified inspector

Key features of the system include:

- High speed scanning capability with over 20 inches (500 mm) per second scanning bridge speeds. Optional unique dual transducer capability for double-speed scanning coverage. Several sizes of bridge lengths are available from 10 to 24 inches (250-600 mm) scan length.
- Full 2-Axis 2-D and 3-D C-Scan and B-Scan with file export (to MS Excel) for automated data analysis. 100% data retention.
- IP-65 splash-proof water-resistant motors and gearboxes, all fully shielded and enclosed.
- Wall thickness (corrosion/delamination), dual-angle beam pulse-echo shear, TOFD capability for weld inspection.

The system is fully protected and transportable for field or plant use and comes complete with heavy-duty, wheeled cases.

C-Scan Ultrasonic Data Acquisition and Reporting

Whether configured for wall thickness mapping or for weld flaw detection using either the optional dual-channel pulse-echo shear transducer adapter or TOFD head. The system saves a complete record of each inspection and can produce detailed inspection reports with either standard imaging maps, TOFD software or the MS Excel file export feature for numerical reports and summary thickness data. Examples of B and C-Scan images and data presentation are presented below.

Figure 2 presents an example of a C-Scan image of a calibration plate scanned with the LSI system and containing several areas of wall corrosion as well as a set of calibration blocks and flat-bottom holes. The calibration hole pattern is shown to the right of the Figure. Note the thickness color scale on the left of the C-Scan image. The C-Scan horizontal direction is the scan axis, while the vertical direction is the index (climbing) axis. Note the presentation of the calibration blocks and holes relative to the drawing shown.

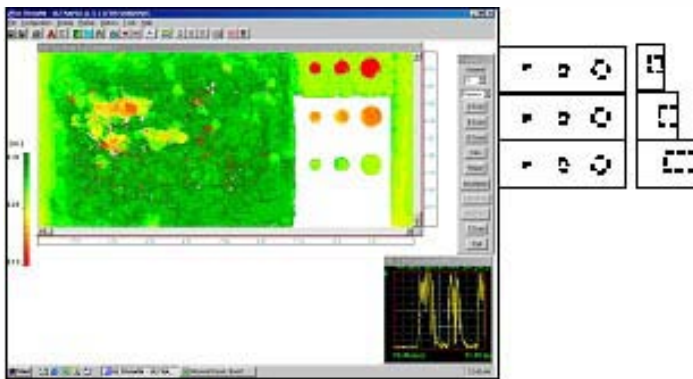


Figure 2. LSI™ LSI C-Scan showing actual plate corrosion along with calibration block flat-bottom hole pattern.

In addition to the color-coded C-Scan image, ALL LSI thickness and amplitude data points can be numerically exported into Excel and can be presented with a user-selected color code to easily identify thinning areas. In addition to the individual data values, the Excel export file also presents all ultrasonic setup values and automatically calculates the minimum, maximum and average thickness of the complete scan for reporting purposes.

Both A and B-Scan data are also shown to validate the UT data quality and setup.

LSI Application Examples

Figure 3 shows an LSI system performing a thickness mapping (corrosion) inspection of a complete ship hull. One half of the hull result is shown on the C-Scan image below the photo. Note the superimposed area of hull plates on the scan data, which are used for the analysis of data on a plate by plate basis.

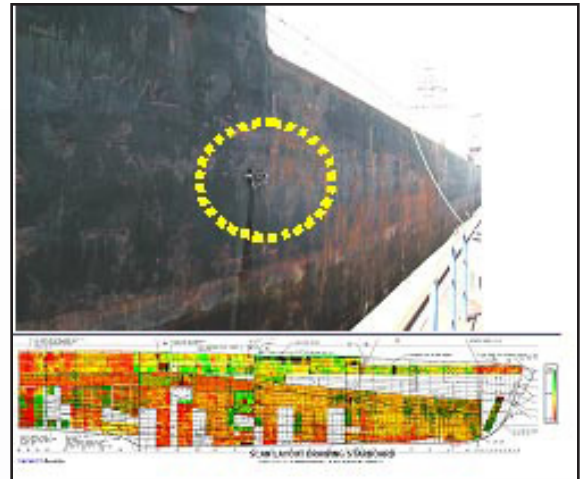


Figure 3. Operation on ship hull with composite color-coded thickness scan

An example of a TOFD-based data analysis screen is shown in **Figure 4**. A dual-head angle beam adapter is available to provide either pulse-echo (shear-based) weld inspection or TOFD capability

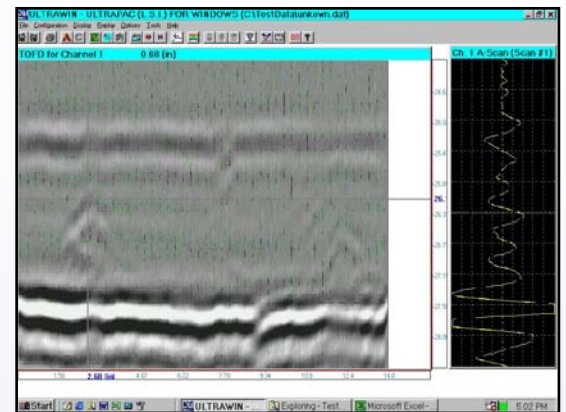


Figure 4. Weld inspection TOFD Scan analysis screen

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