Phased Array Corrosion Mapping

Phased Array technology is fast becoming a recognised and trusted method of volumetric inspection, with typical applications being weld inspection and crack detection. The unique ability to produce a fully active volumetric ultrasonic beam allows for increased sensitivity along with rapid data collection. The Oceaneering system incorporates the Olympus NDT Hydroform water box probe and custom built X-Y scanner allowing for circumferential and axial data collection.

The system was designed to offer the best inspection solution for detecting wall thickness reductions due to corrosion, abrasion and erosion. The systems high resolution is achieved from utilizing an effective ultrasonic beam that is 60mm wide that can collect A-scan information every 0.5mm. This ensures 100% coverage of the inspection area.

The high sensitivity of the phased array beam allows for detection of deflected and/or diffracted signals which ultimately allows for in-depth defect characterisation by imaging the true morphology of the damage mechanisms.

FEATURES

- Highly effective inspection solution
- Detects wall thickness reductions
- Utilizes an effective ultrasonic beam
- Detects deflected and/or diffracted signals

www.oceaneering.com/asset-integrity
APPLICATIONS

• Testing carbon steel vessels with a stainless steel clad lining.

The purpose of the inspection was to clarify if visual erosion damage had propagated into the vessel substrate or actually remained contained within the lining. Due to the slight variance in acoustic properties the high sensitivity of the system was able to identify the substrate to lining interface. By identifying this interface, it was then determined that the damage was contained within the clad layer.

• Detection and periodic monitoring of hydrogen induced damage and associated cracking.

There are many different forms of hydrogen damage that originate from fabrication anomalies such as inclusions and lamination, and then migrate into hydrogen accumulation, then blistering, then blister with stepwise cracking. It is important to determine these stages and the best way to do this is by 0° PA raster map scanning. The 0° beam will detect these laminar indications with accurate sizing, and based on analysis, the technician can determine what stage or classification the damage is. The image below shows PA data including C-Scan display (left) and cross-sectional view. The image on the right details the defect morphology of Hydrogen Induced Damage.