

Ultrasonic inspections of steamchests



The accuracy and repeatability of ultrasonic inspection of steamchests for monitoring the growth of existing cracks can be difficult to ensure due to component geometry and wall-thickness. A combination of improved probes and ultrasonic imaging technology can greatly improve this.

The Problem

Steam Chests experience considerable cyclic thermal stresses during service. These stresses lead to the growth of thermal fatigue cracks which have been known to result in the catastrophic failure of chests. Due to limited internal access caused by complex geometry and internal 'furniture', inspections are usually limited to ultrasonic crack sizing from external surfaces. The accuracy of sizing is however compromised due to the geometry, unknown crack orientation and long beam paths giving rise to beam spread.

The Challenge

To improve existing ultrasonic procedures for inspections of steamchests, particularly, defect sizing accuracy and making interpretation of the ultrasonic data more straight forward.

Our Solution

The development of Phased-Array ultrasonics for both imaging complex geometries and critical sizing via focusing and flaw visualisation provides considerable benefits over manual ultrasonic inspection. The phased array image is much more

readily interpreted by non-NDT personnel and the complete cross section of the crack is seen due to the use of component CAD overlays.

Products

- component drawings and geometries can be overlaid on the phased array images enabling both inspection design and ease of analysis
- electronic data storage enables an available inspection fingerprint
- phased-array probes and focused single-element transducers both considerably reduce the effect of beam-spread at long beam-paths.

Benefits

- significant cost/time savings from fast high integrity scanning
- improved plant life management from better detection parameters and accurate, repeatable data for metallurgical appraisal
- sizing accuracy and repeatability is improved considerably using phased-array technology
- images are more easily interpreted by non-specialists, and can readily be incorporated into written reports.