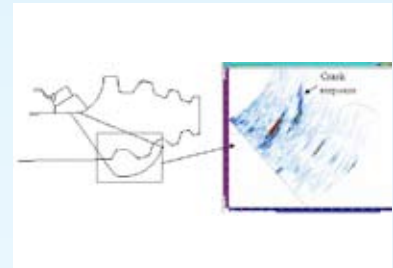


Blade roots and fixings



Phased array ultrasonic technology has greatly improved the critical inspection of complex geometry blade fixings, allowing this to be done without removing the blades and obtaining a permanent record of the inspection.

The Problem

Steam turbine rotors, particularly in the Low Pressure stages, can suffer from stress corrosion cracking. This manifests itself in the serrated root fixings and in the corresponding disc steeples areas. Because of the high stresses involved, the critical crack size is small and there have been some notable catastrophic failures.

The Challenge

To develop ultrasonic techniques, which can be deployed to inspect blade roots and disc steeples of various designs without removal of blades, and giving a high degree of confidence in the results, both in terms of minimum defects size and repeatability.

Our Solution

By way of combining flaw simulation using Electron Discharge Machining (EDM) and CAD modelling with ultrasonic beam tracing, we have been able to design scans which give full coverage of the required areas for inspection and are capable of reliably detecting flaws such as cracks well below the critical crack size for the component.

Products

- easily interpreted computer imaging of complex geometry
- validation of technique using a combination of CIVA modelling and simulated defects
- full digitized data capture possible creating fingerprint of responses and also allowing third party assessment of results.

Benefits

- very significant time-savings achieved
- highly repeatable method of fingerprinting critical components for Life Assessment of in-service plant
- clear visualisation of geometries and flaws readily allowing engineering.