Rotor disc inspections

Turbine rotors are often constructed using forged discs 'shrunk on' to a central spindle. They can be prone to environmentally assisted cracking and ultrasonic inspection of these areas is time-consuming due to disc geometry. The TRIM system has improved this considerably, both in speed and accuracy of scanning.

The Problem

Certain rotors are susceptible to cracking at disc bores and at blade fixing locations. Ultrasonic inspections on components with complex geometries such as these can give rise to confusing signal patterns, which influence both the speed and integrity of inspections. Inter-disc access restrictions often limit probe movement, further affecting test integrity.

The Challenge

To develop high integrity ultrasonic inspection techniques that enable imaging of complex geometries and scanning of components where access is restricted as found at the disc bore and disc head locations on turbine rotors.

Our Solution

Utilising the bespoke Turbine Rotor Inspection Manipulator (TRIM) coupled with ultrasonic hardware and analysis software, high integrity, high speed scanning and imaging of complex components can be carried out from a static position where access is restricted.

Products

- the TRIM locates the probes for inspection via a motorised 'arm', and enables changing probe angle requirements to be adjusted remotely. Additionally, the TRIM is mounted on a track parallel to the rotor for ease of movement between rotor stages, and consistent scanning positioning
- a phased array probe contains multiple elements, and scanning can be mechanical (probe movement), electronic (pulsed beam sweep), or a combination of both
- component drawings and geometries can be overlaid on the phased array images enabling both inspection design and ease of analysis.

Benefits

- significant cost savings from fast high integrity scanning
- offers an alternative to removing discs or blades for inspections
- improved plant life management from better detection parameters and accurate, repeatable data for metallurgical appraisal
- improved insurance profile from reduced failure risks (some insurers have insisted on utilising phased array on certain turbine rotor inspections).

RWE
The energy to lead

RWE Power International
Electron
Windmill Hill Business Park
Whitehill Way, Swindon
Wiltshire, SN5 6PB
United Kingdom

T +44 (0)1793 892900
F +44 (0)1793 892421
E rwepi@rwe.com
I www.rwepi.com