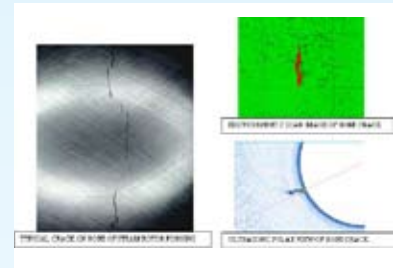


Rotor bore inspections



Many older steam turbine rotors have been bored to remove poor quality material from the centre. These bores need to be inspected for cracking which can be difficult and time-consuming due to the length and diameter of the rotors. RWE has a state of the art solution for this, which can greatly reduce the inspection time and improve the inspection quality.

The Problem

Many steam turbine rotors in service have bores which have been machined at the manufacturing stage to remove material of inferior mechanical and metallurgical properties from the central portion of the original forging. This has led to an unforeseen problem in that the thermal fatigue cycling which occurs during normal operation leads to the initiation of cracking from the bore surface which can in turn lead to catastrophic failure in service. These internal bore surfaces are difficult to inspect, particularly with the level of critical crack sizes flaw sensitivity required.

The Challenge

To develop a high integrity rotor bore inspection system with high repeatability, flaw detection and sizing capability which can interrogate rotor bores of different diameters and lengths. The inspection also needs to minimise inspection time, by simultaneous data acquisition for both volumetric and surface inspections.

Our Solution

An integrated system capable of volumetric and surface inspections of rotor bores of different diameters and changes of section, utilising ultrasonic and multiplexed eddy current probes scanning simultaneously. The scanning head moves on a helical path and the probes maintain contact with the bore surfaces by means of spring-loaded arms. The simultaneous encoded scanning allows data from both types of inspection to be displayed and reported using the same reference datums. The powerful software also allows options for visualisation of information, i.e. in polar view and C-Scan format. Overall, savings of up to 60% can be realised in the time taken for the inspection when compared with separate ultrasonic and MPI/Visual inspections.