

1.12.8. ADVANCED ULTRASONIC APPLICATION FOR THE INSPECTION OF TURBINE COMPONENTS

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Today world wide a big number of Power Plants already reached or exceeded their designed life and therefore reduce their safety and availability. During operation, several turbine components suffer performance changes and a reduction of their loading reserves.

Crack initiation and crack growth can lead under service conditions to damages on components and has been probably already influenced by operating- or environmental conditions.

Adequate assessment of steam turbine components is a key issue in life management of steam turbines.

To prevent any further events, a defect assessment procedure needs the assessment of the actual and exact material condition of stressed components. Investigation of service lifetime of turbine components gains therefore considerably significance. SIEMENS Energy Service has developed a concept for service life analysis of highly-stressed turbine components which takes account of factors such as year of manufacture, i.e. the forging process, materials and service conditions to enable power plant operators to initiate timely actions to ensure future safe and reliable plant operation. In addition to material databases which contain not only material criteria but also act as a repository for long-term empirical data, nondestructive examination (using ultrasonic, eddy-current, magnetic-particle and liquid penetrant techniques) has an increasingly important role to play in providing precise descriptions of the condition of examined turbine components. Especially Ultrasonic test methods, which ensure mechanized in-situ tests without additional expenditures for disassembling of blades and blade attachments are required to fulfil the prerequisites of the service – NDE on power plants. The paper describes several advanced inspection techniques, which ensure an reliable ultrasonic inspection of turbine blade attachments and blade roots during outages. The used inspection technique allows the inspection of blade attachments grooves of turbine rotors, were even smallest indications of possible defects can be detected.