

Mechanized UT Inspection of Turbine Rotor Discs - Way To Reduce Duration Time of Turbine Outages

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Abstract

To prevent damages of rotors of heavy duty turbines special mechanized UT inspection systems for these forgings were developed. Especially the discs are highly stressed components and during operation a crack initiation also by SCC is possible. The mostly critical area in that direction is the hub surface. This area has to be inspected by UT very sensitive and reliable. The new by Siemens PG developed inspection systems are multi axle mechanized techniques by using digital UT equipment.

At steam turbines Siemens PG has been performing the mechanized UT inspection of the large LP turbine discs since 1987. For this application the new developed mechanized disc inspection system is a seven axis robot. This system is able to examine the discs in a shrunk on condition from the accessible outside disc surface by using 90° technique (tangential beam scanning) for searching. For sizing of findings the TOFD technique and 0° technique (radial scanning) is used. By scanning in circumferential direction for several axial inspection zones using single probe and pitch catch technique the complete hub area, the shrink seat is inspected.

At the LTE (Life Time Extension) overhaul of combustion turbines all compressor and turbine discs have to be requalified by UT, especially the hub area. The new developed UT system is inspecting these hub areas from inside at every single disc separately (the rotor is destacked). The mechanized UT system is scanning in circumferential and in axial direction by an helicoidally movement for eight UT channels at one time.

With the presented new mechanized UT inspection systems Siemens PG has a reliable and qualified detection capability. The inspection results getting with these UT systems are a basis for future, service planning and service life time evaluation.