Automated High Throughput Fan Beam CT Turbine Blade Wall Thickness Inspection and Fast 3D Casting and Composite Qualification by Fast Gantry Based Helix CT

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Abstract

To ensure safety, in aerospace manufacturing processes each component has to be inspected. In the presentation two advanced NDT systems developed by GE Inspection technologies to ensure both – reliable CT inspection results and high throughput requirements will be presented.

With the new speed-scan fast CT system, GE’s proven medical helix CT technology is now available in a cabinet suitable for industrial environments and equipped with a loading system for large aluminium castings and composite parts. The presented new CT inspection system generation allows typical scan and inspection speed of 5 to 10 or more millimetres per second and thereby offering up to 200x higher throughput compared to typical industrial fan beam CT systems. In order to ensure the required image quality at short acquisition times it is equipped with a high power tube and efficient multilane detector. To meet high throughput requirements, a fully automated inspection method including the entire acquisition and 3D defect analysis process is therefore vital.

As an answer to the US Metals Affordability Initiative (MAI) requiring CT slices to replace ultrasonic inspections of more and more complex turbine blades, GE is going to introduce the fully automated 450 kV X-ray CT blade line system. Equipped with GE’s proprietary high resolving fast linear detector, it will be able to inspect up to 30 blades per hour by taking 10 CT slices per part for automated wall thickness analyses.

We will explain both innovative technology approaches and present different evaluation results to demonstrate efficiency, detail detectability and repeatability.