

1.3.40. SINGLE CRYSTAL TURBINE BLADE INSPECTION USING A 2D ULTRASONIC ARRAY

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In this paper a non-destructive method for inspecting jet-engine turbine blades for root cracking is developed. This method utilises 2D ultrasonic arrays to enable the detection and characterization of sub-surface cracks in three-dimensions. However, the majority of modern turbine blades are manufactured from single crystals of nickel based super alloys which exhibit high elastic anisotropy. This complicates the inspection due to the complex behavior of ultrasonic wave propagation in anisotropic media and the variation of the crystal orientation in turbine blades. This paper, therefore, addresses these issues to develop a reliable inspection for a typical jet-engine single crystal turbine blade.