

A COMPREHENSIVE REVIEW IN ULTRASONIC NON-DESTRUCTIVE TESTING AND EVALUATION FOR CARBON FIBRE REINFORCED PLASTICS STRUCTURES

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In ensuring quality control and assessing the safety and reliability of Carbon Fibre Reinforced Plastics (CFRP) aircraft structures, it is imperative to detect any damage or defect across various stages, spanning from production to operational use. This paper delineates the research undertaken by the Advanced Composites Division (ACD) of CSIR-National Aerospace Laboratories (CSIR-NAL) concerning the diverse applications and scenarios wherein ultrasonic Non-Destructive Testing and Evaluation (NDTE) is applied to composite aircraft structures. CFRP laminates, incorporating simulated defects, impact damage, and structures from the home-built SARAS aircrafts, underwent ultrasonic inspection. The inspection observations were compared with through transmission (single-element water squirter systems), linear array pulse echo (roller probe systems), and air-coupled non-contact ultrasonic system in terms of their accuracy and found good correlation with ground truth.

Keywords: Air coupled ultrasonic, Carbon fiber reinforced plastic, Defect detection, Through transmission, Pulse echo.
