

# Composite Material Characterization using Computed Tomography and 3D Rendering Techniques

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## Abstract

Solid woven carbon fiber reinforced plastic (CFRP) consists of more than one material constituent. At the macroscopic level, each material is distinguishable and can be characterized by several destructive tests. Computed Tomography (CT) inspection is being deployed to verify the integrity of the composite material structure and analyze the bonding mechanism. Composites also contain voids and micro-cracks within the fiber and polymeric binder. The wide range of materials, processing and configurations used in composite fabrication are in constant need of new inspection methods. This paper describes the techniques used to evaluate ply layers and adhesive interfaces after performing CT inspection coupled with computer processing. A review of current equipment capabilities and deployment challenges encountered while scanning composite materials will also be discussed. Finally, a summary of the detection and analysis techniques developed to identify: bonding materials, lack of bonding at the laminate-to-laminate interface, porosity levels within a solid laminate and polymer starvation are presented.

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