

# Composites Non-Destructive Testing (NDT): Part 1 – General Overview of Available Methodology

Dr. Scott W. Beckwith, SAMPE International Technical Director  
and President, BTG Composites Inc., Taylorsville, UT

Composite materials and structures, being fabricated with a combination typically of reinforcement materials (fibers, fabrics, performs, etc.) and resin systems, often require NDT inspections somewhere in the process, post-process or application time frame. Usually inspections are performed prior to their placement into field service but NDT also may be required in the field or upon return to the original manufacturer if defects or structural problems are encountered (or suspected). Regardless of whether the composite product is used in an aerospace market, or a commercial market application, NDT of some sort often is required – if not mandated by an end use customer. The level of NDT conducted often depends on the complexity of the composite part as well as its value, its structural criticality and its field service environment.

Part 1 is intended to provide a quick overview of various techniques that will be elaborated on in future SAMPE Journal issues. Table 1 lists the various techniques by general category.

**Table 1.** Typical NDT methods available for inspecting composite materials and structures.

General NDT Category	Various Technologies Within Category
Optical or Visual	<ul style="list-style-type: none"> <li>• Visual examination</li> <li>• Moiré Interferometry</li> <li>• Shadow Moiré Interferometry</li> <li>• Laser Shearography</li> <li>• Holographic Interferometry</li> <li>• Speckle Interferometry</li> </ul>
Sound and Ultrasonic	<ul style="list-style-type: none"> <li>• Tap Testing</li> <li>• Ultrasonic Through-Transmission (UTT)</li> <li>• Ultrasonic Pulse-Echo (UPE)</li> <li>• Ultrasonic Polar Backscatter</li> <li>• Ultrasonic Resonance</li> <li>• Ultrasonic Correlation</li> </ul>
Thermal	<ul style="list-style-type: none"> <li>• Infrared Thermal Testing (Thermography)</li> </ul>
Radiation	<ul style="list-style-type: none"> <li>• X-Ray Imaging</li> <li>• X-Ray Backscatter Imaging</li> <li>• Computed Tomography (CT)</li> <li>• Neutron Radiography</li> </ul>
Acoustic Emission	<ul style="list-style-type: none"> <li>• Acoustic Emission</li> <li>• Acousto-Ultrasonics</li> </ul>
Eddy Current	<ul style="list-style-type: none"> <li>• Eddy Current</li> </ul>
Microwave	<ul style="list-style-type: none"> <li>• Microwave Testing</li> </ul>