

Non-Destructive Evaluation and Inspection of Composite Materials using Thermal and Fast Neutron Imaging

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Phoenix LLC has developed deployed several systems for non-destructive testing using neutron radiography for commercial, aerospace, and military applications. A brief overview of neutron imaging and Phoenix's current imaging systems will be presented. Phoenix has recently performed several successful studies using neutron radiography for the inspection of composite materials. Two such case studies will be presented as examples. The first study investigates composite matrix ceramics with systematic uneven boron nitride coatings applied during fabrication. These flaws were readily identified by neutron radiography. The second case study investigates uptake of aqueous gadolinium solutions into ceramics, demonstrating an application of neutron imaging for the removal process of ceramic cores from high-temperature aircraft turbine blades. New applications will also be presented including: delamination of layers of depleted nuclear fuel plates, gas diffusion and void creation in high-temperature carbon fibers, dis-bonding of adhesives and crack formation in aircraft de-icing boots, and void creation in the curing process of resins and epoxies.