

1.

Accession Number

12234825

Author

Lopato P. Chady T. Sikora R.

Author/Editor Affiliation

Lopato P. Chady T. Sikora R. : Department of Electrical and Computer Engineering, West Pomeranian University of Technology, Szczecin, Poland

Title

Testing of composite materials using advanced NDT methods

Source

COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering, vol.30, no.4, 2011, 1260-70. Publisher: Emerald, UK.

Abstract

Purpose - The purpose of this paper is to present capabilities of terahertz imaging technology in case of various composite materials and to propose a new defect detection algorithm. Design/methodology/approach - This paper first discusses an applicability of the terahertz technique in composite materials inspection. It then describes source of terahertz radiation (photoconductive antenna) and general structure of terahertz time domain imaging system. Next the terahertz imaging results of composite anticorrosion coating, glass- and carbon-fiber-reinforced laminates are presented. Then the signal processing and identification scheme based on time domain A-scan signal equalization and C-scan thresholding is presented. Data processed in this way are parameterized and defect identification database is prepared. The proposed procedure is verified using the exemplary inspection results of glass-fiber laminate delamination. Finally, some comparison of terahertz time domain inspection with low energy digital radiography is presented. Findings - This paper shows terahertz imaging as a well-suited technique for composite structures inspection. The terahertz imaging results of composite anticorrosion coating, glass- and carbon-fiber-reinforced laminates are presented. An application of proposed signal processing algorithm enables accurate defects detection and effective data collection for identification database purpose. Originality/value - The paper provides an insight into the potential of terahertz imaging of various composite structures. Proposed signal processing and defects detection scheme is applicable to wide range of composite structures. (5 References).