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# Capacitive Imaging of Impact Damage in Composite Material

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## Abstract

This work presents capacitive non-destructive imaging of impact damage in woven fibre CFRP using a coplanar capacitive sensor. Novelty of the approach consists in that spectral characteristics of the capacitive sensor response to CFRP properties are firstly used to establish excitation frequencies for optimum imaging of delamination. For the tested samples optimum excitation frequencies were found to be above 200MHz. Clear capacitive images of delaminations were obtained on each sample. Ultrasonic (UT) C-scans of delaminations due to impacts were acquired using phased array technique to confirm presence and extent of the delaminations. Capacitive imaging technique can be used as complementary to UT for imaging shallow defects in composite materials at depths where UT has insufficient time domain resolution.

**Keywords.** Carbon fibre, delamination, non-destructive testing, capacitive imaging.

## 1. Introduction

Composite laminated materials find increasing use in modern engineering structures, such as wind turbine blades and especially airframes, due to their high specific strength and stiffness. However, such materials, e.g. carbon fibre-reinforced plastics (CFRP), are

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