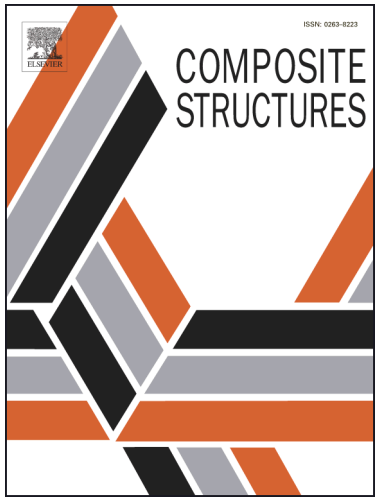

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Detection and characterization of delaminations in composite plates via air-coupled probes and warped-domain filtering

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Abstract

In this work, a novel baseline-free procedure aimed at detecting and sizing delaminations in composite plates is proposed. To such a purpose an air-coupled probe is used to measure the sound pressure in air that is generated by leaky guided waves traveling along the plate and scattered by defects. In particular, by scanning the plate surface with a proper probe tilt angle and lift-off, wavefields dominated by a single guided mode can be obtained. Then, a processing procedure based on warped time-frequency operators is used to filter out the main wavefield generated by the acoustic source in order to enhance the one scattered by defects. Such operators are designed basing on the dispersion curves of the dominant guided mode considered. Finally, it is shown how the scattered wavefield can be further processed to infer the defect position and size by means of the Circular Hough Transform.

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