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Imaging of Damage Position in Structural Elements

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This paper presents research on the development of damage localization method. This method is dedicated to monitor structural elements such as aluminium or composite panels. Investigated method is based on guided wave propagation phenomena. Propagating waves interact with cracks, notches, rivets, thickness changes, stiffeners and other discontinuities present in structural elements. It means that registering these wave one can obtain information about the structure condition - whether it is damaged or not. The goal of the research was to conduct defects detection and localisation. In reported research piezoelectric transducers were used to excite and register guided waves. Special configuration of these transducers was proposed. It was placed on a specimen selected for investigation. Damage simulating defects were introduced in the specimen. Numerical algorithms were developed to process the signals gathered by the proposed configuration. They were designed in such a way to output a user-friendly and easy to interpret information about the damage position. The principle behind it was to associate a damage index (DI) to a discrete set of points of monitored area. The DI value between the points was interpolated. All the algorithms within this work were created in MATLAB®. Proposed method allowed to find the location of damage. It was compared with the true position of introduced defect and the method error was established. Algorithm modifications were proposed to increase the accuracy of the damage localisation procedure.

Ключевые слова:

Содержание.

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