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Damage Detection in a Real Complex Structure with a Guided Wave SHM Sparse Array System—Performance and Artefact Suppression

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A sparse array SHM system based on guided waves was applied to the door of a commercial shipping container. The door comprised a corrugated steel panel approximately 2.4 m by 2.4 m surrounded by a box beam frame and testing was performed in a non-laboratory environment. A sparse array with 9 transducers was attached to the structure and signals from the undamaged structure were recorded at periodic intervals over a three week period and the resulting signal database was used for temperature compensation of subsequent signals. Defects in the form of holes with 5mm and 10mm diameter were introduced in the structure and signals from all transducer combinations were recorded for each condition. These signals were then used in imaging algorithms and localization of the holes was possible, but the signal-to-noise ratio in the images for the 5mm diameter hole was low. The source of the noise in the images was investigated and based on this study a method to enhance defect localization was proposed.

Ключевые слова:

Содержание.

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