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Damage Detection in Stiffened Composite Panels Using Lamb Wave

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This paper presents a Lamb wave based methodology for damage detection in stiffened carbon-e-poxy composite panel with stiffener de-bonding. The specimen considered encompasses most of the complexities that may be encountered in implementing a real-life Lamb wave based structural health monitoring (SHM) system. These complexities include multiple reflections from the stiffeners and edges, cluttering of wave modes, effect of variable thickness on time of flight and amplitude. Piezoelectric patches are used as transducers and only A0 mode is excited through mode tuning. A damage index (DI) based on root mean square deviation (RMSD) is derived from the frequency spectra of the windowed A0 mode of the Lamb wave response. The efficacy of the DI for predicting the presence of damage is tested experimentally for a specimen with known location of damage. In addition, a 2-D finite element (FE) simulation is carried out to validate the experimental results.

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Ключевые слова:

Содержание

Abstract
Introduction
Experimental setup
Results and discussions
Conclusion