



B. Xu, M. Ruzzene

Beamforming of Wavefield Data After Frequency-Wavenumber Filtering for Damage Detection

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The development of effective damage imaging and characterization tools is a challenging task because of the dispersive and multi-modal nature of Lamb waves. An additional problem is the need for baseline data that is required by a number of existing techniques. This paper presents the development of imaging algorithms applied to filtered wavefield data received from piezoelectric disc sources. Frequency-wavenumber filtering is used to separate incident/backscattered waves and individual wave modes. Filtered data are provided as input to imaging algorithms that detect damage and estimate its location. The implementation of incident and backscattered waves separation procedures avoids the need for a baseline, while mode separation permits the analysis of modes that are most sensitive to damage. The concept is verified experimentally for imaging damage on an aluminum plate via parallel and ellipse delay-and-sum beamforming algorithms.

Ключевые слова:

Содержание.

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