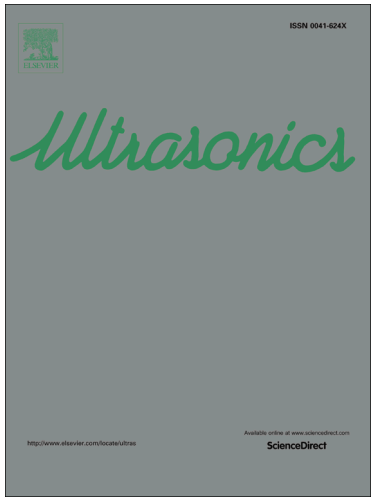

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Damage detection in bent plates using shear horizontal guided waves

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Abstract

Study of the interaction of shear horizontal guided mode with defects in the bend region of an isotropic top hat stiffener is presented. Compared with the SH0 wave in a plate, the shear mode in the bend is dispersive and its wavefield characteristics are affected by the curvature of the bend. The scattering studies showed that the sensitivity of the wave to outer surface cracks in the bend increases with increasing frequency compared to inner surface cracks. Further numerical simulations demonstrated that the shear mode is sensitive to the delamination in the bend due to non-zero transverse shear stress. Results of finite element modeling were validated by experiments and reasonably good agreements were obtained.

Keywords:
shear horizontal mode, defect scattering, curvature effect

1. Introduction

Top-hat stiffened plates provide an efficient structure for many engineering applications. For example, in aircraft applications, skin-to-stiffener joints are very common in fuselage panels and wings [1] as they help to prevent skin buckling during wing loading and increase the bending strength of the joint. Being manufactured either from metal or composite materials, various types of

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