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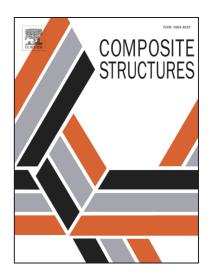
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Title

Numerical analysis and experimental observation of ultrasonic wave propagation in CFRP with curved fibers

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Abstract

The relationship between the propagation directions of ultrasonic wave and the direction of the principal axis of anisotropy in uni-directional CFRP with straight fiber is well known. However, the behavior of ultrasonic wave in CFRP with curved fibers is not clarified in details. In this paper, numerical analyses using the finite difference method were conducted to visualize the behavior of ultrasonic waves in CFRP with concentrically curved fibers. Numerical simulation results showed the energy of quasi-longitudinal ultrasonic wave curved along the fiber direction. In order to confirm the analytical result, CFRP specimen with curved fibers were prepared by utilizing 3D-printer and the behavior of ultrasonic propagation was observed by using Laser ultrasonic system. The observed results confirmed the analytical results that the ultrasonic wave curved along carbon fibers.

Keywords

CFRP, concentrically curved fiber, non-destructive testing, ultrasonic wave, finite-difference method

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