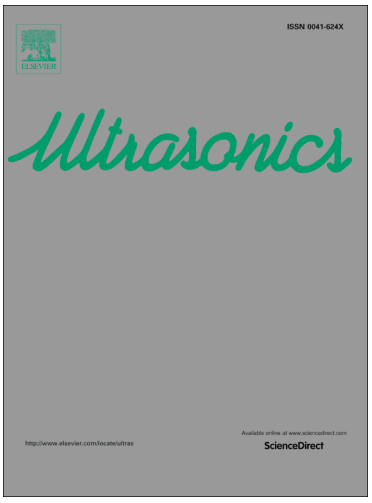


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# Use of the Reciprocity Theorem for a Closed Form Solution of Scattering of the Lowest Axially Symmetric Torsional Wave mode by a Defect in a Pipe

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## ABSTRACTS

Guided waves can effectively be used for inspection of large scale structures. Surface corrosion is often found as major defect type in large scale structures such as pipelines. Guided wave interaction with surface corrosion can provide useful information for sizing and classification. In this paper, the elastodynamic reciprocity theorem is used to formulate and solve complicated scattering problems in a simple manner. The approach has already been applied to scattering of Rayleigh and Lamb waves by defects to produce closed form solutions of amplitude of scattered waves. In this paper, the scattering of the lowest axially symmetric torsional mode, which is widely used in commercial applications, is analyzed by the reciprocity theorem. In the present paper, the theorem is used to determine the scattering of the lowest torsional mode by a tapered defect that was earlier considered experimentally