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Analytical Modelling For Active Rosette Piezotransducers Evaluation

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The objective of the present work is to continue the investigation about the feasibility of applying rosette piezotransducers for active structural health monitoring. It is expected that rosette piezotransducers will offer a simpler and more accurate solution than currently investigated concepts. The principle of operation of a rosette transducer would be analogous to the principle of operation of a strain gage rosette. A strain rosette can determine the state of strain (extensional and shear) on the surface of a part at a given location. It is expected that a piezotransducer rosette is also capable of sending and receiving longitudinal and shear elastic waves. This ability would provide additional information for better damage detection.

This present paper is complementary to the previously presented numerical study [1] and provides an analytical solution of the problem of elastic wave generation and propagation in an aluminium alloy plate by a rosette composed of three Macro Fibre Composite (MFC) transducers. This method is a combination of analytical solutions of circular crested Lamb waves with Huygen's principle. The displacement response can be predicted at a distance r when a signal is applied at a location (x, y) . The details of the analytical formulation and results obtained are presented in the paper.

Ключевые слова:

Содержание.

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