

# A METHODOLOGY FOR VIBRATION-BASED NON-DESTRUCTIVE TESTING USING WAVELET AND HILBERT-HUANG TRANSFORMS

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## ABSTRACT

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We present a new technique for structural damage detection based on vibration testing and post processing of the measured time series by combined Wavelet and Hilbert-Huang Transforms. The structure tested is a steel hollow cylinder with one edge fixed. By applying short pulse excitation, we show that the applied transforms are capable of identifying small defects. The damage detection is performed by studying the instantaneous frequencies and mode shapes of the intrinsic mode functions (IMFs) resulting from application of the HHT, and comparing these frequencies to wavelet spectra. We show experimentally that certain high-frequency IMFs are sensitive to the presence of defects, and, hence, can be used to detect the presence of damage.