Application of Damage Detection Techniques using Wind Turbine Modal Data[*]

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Abstract

As any structure ages, its structural characteristics will also change. The goal of this work was to determine if modal response data from a wind turbine could be used in the detection of damage. The input stimuli to the wind turbine were from traditional modal hammer input and natural wind excitation. The structural response data was acquired using accelerometers mounted on the rotor of a parked and undamaged horizontal-axis wind turbine. The bolts at the root of one of the three blades were then loosened to simulate a damaged blade. The structural response data of the rotor was again recorded. The undamaged and damage-simulated datasets were compared using existing damage detection algorithms. Also, a novel algorithm for combining the results of different damage detection algorithms was utilized in the assessment of the data. This paper summarizes the code development and discusses some preliminary damage detection results.