

Nondestructive damage detection in large structures via vibration monitoring

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ABSTRACT

In this paper Nondestructive Damage Detection (NDD) in large/complex structures is investigated via vibration monitoring of such structures. The theory of NDD for truss type structures is formulated. To examine the feasibility of the theory, a finite element model of a 3-D truss structure, which consists of sixteen bays and includes 246 elements, is developed to simulate damage. Four damage cases are simulated numerically. The cases range from the structure being damaged in one location to the structure being damaged in three locations. Next, the theory is applied to the experimental results of a 1:6 scale model of a typical hexagonal truss. These tests consist of 17 damage scenarios subjected to three different types of damage. The performance of the method on simulating experimental data is evaluated and discussed.

KEYWORDS

Nondestructive damage detection, large structures, vibrational modes, mode shapes.
