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A DAMAGE IDENTIFICATION TECHNOLOGY OF STRUCTURE UNDER BASE EXCITATION
USING STRAIN MODAL ANALYSIS

Abstract

In the vibration test, it is difficult to identify the damage characteristic of the structure which under the base excitation only through the acceleration signals of the key components. In this paper, a damage identification method based on the strain responses of the structure is developed. Firstly, in the case of the structure under the base excitation, the transfer functions between the structural strains and the base accelerations are obtained and the modal parameters are extracted by these functions. Secondly, the structural damage characteristics of the structure are analyzed by the damage indicator parameters which are composed of the quantitative changes of the strain modal parameters before and after damage and the influences on the strain modal parameters due to the damage level and location are discussed. Finally, the vibration tests of the defect-free and defective cantilever beam are performed while the structural defects are set as closed round hole and opening fissure, the effectiveness of the damage identification technology is verified by the test results and the sensitivity of the structural damage on the strain modal parameters are analyzed.