
Fibre Bragg Grating Sensors Applications for Damage Detection and Localisation in Isotropic Structures

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ABSTRACT

Structural Health Monitoring (SHM) technology allows significant improvement of safety and ecological awareness. SHM systems allow users to reduce maintenance costs which is directly connected with non-destructive techniques used for monitoring of important structures.

In this paper the Authors present an applications of Fibre Bragg Gratings (FBGs) for damage detection and damage localisation in isotropic structures. FBGs sensors are excellent tools to evaluate the conditions of a structure due to the immunity of the sensors to electromagnetic field interferences as well as their small size and weight. The isotropic structures taken into consideration by the Authors are of beam an plate type. A system of FBG sensors before installation on a structure must be subjected to precise analysis. To achieve this the Authors prepared numerical models for all cases investigated using a commercial finite element package ABAQUS and/or MD NASTRAN/PATRAN. The finite element model prepared by the Authors allowed them to calculate strains within the selected structures under different loading conditions as well as consider a damage scenario. In the next step the structures will be equipped with and examined by the use of a FBG sensor array.

This line of research is planned to be extended for the purpose of evaluation of the condition of more complex structures like wing and skin elements of an airplane.

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Ключевые слова:

Содержание.