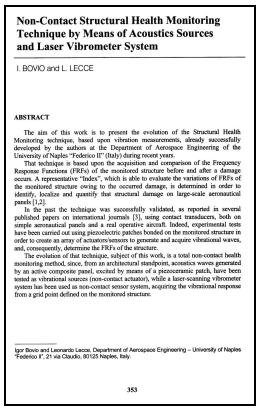
Non-Contact Structural Health Monitoring Technique by Means of Acoustics Sources and Laser Vibrometer System

I. BOVIO and L. LECCE

ABSTRACT

The aim of this work is to present the evolution of the Structural Health Monitoring technique, based upon vibration measurements, already successfully developed by the authors at the Department of Aerospace Engineering of the University of Naples "Federico II" (Italy) during recent years.

That technique is based upon the acquisition and comparison of the Frequency Response Functions (FRFs) of the monitored structure before and after a damage occurs. A representative "Index", which is able to evaluate the variations of FRFs of the monitored structure owing to the occurred damage, is determined in order to identify, localize and quantify that structural damage on large-scale aeronautical panels [1,2].

In the past the technique was successfully validated, as reported in several published papers on international journals [3], using contact transducers, both on simple aeronautical panels and a real operative aircraft. Indeed, experimental tests have been carried out using piezoelectric patches bonded on the monitored structure in order to create an array of actuators/sensors to generate and acquire vibrational waves, and, consequently, determine the FRFs of the structure.

The evolution of that technique, subject of this work, is a total non-contact health monitoring method, since, from an architectural standpoint, acoustics waves generated by an active composite panel, excited by means of a piezoceramic patch, have been tested as vibrational sources (non-contact actuator), while a laser-scanning vibrometer system has been used as non-contact sensor system, acquiring the vibrational response from a grid point defined on the monitored structure.

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Ключевые слова:

Содержание.