

FE model and experimental test bench for vibration analysis in aeronautic composite structures

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Abstract

Structural Health Monitoring (SHM) systems are developed with different techniques to assess Barely Visible Impact Damage (BVID) inside CFRP materials. In order to certify the airworthiness of the system, the SHM equipment must be compliant with RTCA standards in terms of vibration. In the present work, a test setup for vibration certification of electronic components mounted on CFRP lamina plates is presented. The proposed system reconstructs the boundary conditions of a fuselage composite plate, to be equipped with the SHM system. The experimental test bench is realized and vibration data are obtained from the panel via MEMS accelerometers. From these results, a dynamic implicit FE model is developed to assess the effects of vibrations on the SHM system. Further developments involve tuning of the model physical constants, concerning in particular the material stiffness and damping, to improve the correspondence with the actual results.

