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Low-velocity Impact Monitoring Using a High Speed Strain FBG Interrogator

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Optical fiber strain sensors are utilized to monitor impact responses. Four multiplexed sensors of one optical cable are surface bonded on a composite panel. A newly developed fiber Bragg grating interrogator provides light to the sensors and measures the reflected wavelength of each sensor. The interrogator is fast enough to catch the dynamic strains of the panel. Localization of impact points is estimated using the Neural Network algorithm and strain signals measured. The impact response functions are used to reconstruct impact forces. The finite element model of the panel is applied to build the impact response functions. Low-velocity impact tests were performed to evaluate this approach. Even though this study is an initial investigation on a simple impact problem, the test and analysis results show possibilities that optical fiber sensors with high speed interrogators can become one of powerful tools for monitoring the low-velocity impact events on the aerospace structures.

Ключевые слова:

Содержание.

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