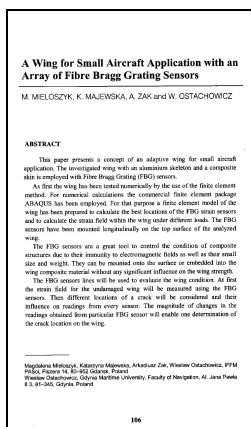


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A Wing for Small Aircraft Application with an Array of Fibre Bragg Grating Sensors

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This paper presents a concept of an adaptive wing for small aircraft application. The investigated wing with an aluminium skeleton and a composite skin is employed with Fibre Bragg Grating (FBG) sensors.

As first the wing has been tested numerically by the use of the finite element method. For numerical calculations the commercial finite element package ABAQUS has been employed. For that purpose a finite element model of the wing has been prepared to calculate the best locations of the FBG strain sensors and to calculate the strain field within the wing under different loads. The FBG sensors have been mounted longitudinally on the top surface of the analyzed wing.

The FBG sensors are a great tool to control the condition of composite structures due to their immunity to electromagnetic fields as well as their small size and weight. They can be mounted onto the surface or embedded into the wing composite material without any significant influence on the wing strength.

The FBG sensors lines will be used to evaluate the wing condition. At first the strain field for the undamaged wing will be measured using the FBG sensors. Then different locations of a crack will be considered and their influence on readings from every sensor. The magnitude of changes in the readings obtained from particular FBG sensor will enable one determination of the crack location on the wing.

Ключевые слова:

Содержание.

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