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Impact Damage Assessment by Sensor Signal Analysis

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Aircraft that employ composites are prone to impact damage that can degrade structural performance and yet leave little visible sign. Manual inspection to detect such damage can be costly and time consuming. In this paper we investigate the use of damage detection sensors to discriminate between damaging and non-damaging impacts. In use it is likely that the impact magnitude and location will be unknown. To simulate this, a range of impact energies were performed at a varying distances from a piezoelectric acoustic sensor on composite panels. The sensor output was analysed to find distance invariant features that could be used to indicate whether an impact caused damage. In damaging impacts, a secondary signal burst, with amplitude significant when compared to the initial burst, was observed. An algorithm was produced to differentiate signals based on this feature which has the potential to contribute to a structural monitoring system and thus reduce the inspection burden ultimately leading to lower aircraft maintenance costs.

Ключевые слова:

Содержание.

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