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Considerations on the Reliability of Guided Ultrasonic Wave-Based SHM Systems for CFRP Aerospace Structures

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Guided Ultrasonic Waves (GUW) are regarded as an effective technique for impact damage assessment of CFRP structures. Especially in the aerospace field, the introduction of such a system requires the compliance with the applicable standards and regulations. This is certainly mandatory due to safety considerations. Besides that, performance and reliability of SHM is as well of major importance to make an SHM system economically useful. Accuracy and precision of damage assessment is of high interest, which for conventional NDT methods is reflected in the probability of damage detection (PoD) and the false alarm rate. Here, the damage assessment performance (DAP) for a certain class of SHM systems is detailed as a transfer of the known PoD. The reliability analysis is an elementary step in particular in the development of SHM systems, including the inherent complexity of the utilized technique and the applicable boundary conditions.

In this paper, first considerations on this reliability analysis are presented, covering especially application dependant aspects.

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Ключевые слова:

Содержание

Abstract
Introduction
Performance and reliability of GUW-SHM system
Simplified GUW-SHM system description
Potential failure modes
Conclusion and outlook