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Contact Pressure and Ultrasonic Damage Feature(s) in Health Monitoring of L-Shape Bolted Joints in Aerospace Structures

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Though advantageous for allowing easy assembly and disassembly of a variety of structures, bolted joints often are the cause of structural failure. Checking the integrity of bolted joints after assembly is a critical but time consuming process. Recent advances in structural health monitoring (SHM) can provide techniques to automate this process. However, using SHM for the integrity check process requires relating damage feature(s) to physical quantities representing the structural integrity of bolted joints.

In this paper we describe an SHM technique to monitor the integrity of bolted joints for aerospace structures. The proposed technique is based on correlating the contact pressure at the joint interface with the magnitude of ultrasonic signals passing across the bolted joint. We present a case study on L-shape bolted joint. Presented experimental observations demonstrate the ability of the proposed technique to ensure bolted joint integrity. The correlation between the contact pressure and ultrasonic signals transmitted through the bolted joint interface is demonstrated.

Ключевые слова:

Содержание.

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