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Fatigue Crack Monitoring with an Ultrasonic Sparse Array on a Real Steel Structure Component

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Based on the fundamental knowledge of guided waves (GW) and structural health monitoring (SHM) a technique is presented, that monitors the structural changes at the hotspot of a running steel component fatigue test. The fatigue test is applied to a cantilever I-beam vibrating at its first natural frequency. A sparse array, consisting of four capsuled piezoelectric (PZT) sensors, is used to detect the initial flaw at a weld on the web of the beam and records the subsequent crack growth. The influence of the mechanical stress in the structure to the ultrasonic recordings is estimated. Thus the signals can be evaluated and the signal changes regarding to a flaw are useful. These changes are used to determine when and consequently where a flaw appears. The ellipse algorithm is used to image the localization and the growth of the crack.

Ключевые слова:

Содержание.

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