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M. Vospernig, M. Reiterer, M. Vill

## Simplified Crack Appearance Monitoring at Welded Joints with Strain Gauges

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In the last decade a lot of methods, sensors and algorithms have been developed to promote structural health monitoring (SHM). As a consequence of the SHM axiom: Sensors do not measure damage, feature extraction is one of the main concerns to receive reliable sensor information. In this introduced SHM approach a minimum number of strain gauge sensors are applied to a steel structure to minimize signal processing and feature extraction. In this investigation a numerical model of the structure is required to identify local stress intensities according to a cyclic load. Once these hot spots are identified, strain gauges are applied in these zones on the real structure. At these zones fatigue becomes apparent and cracks will appear. The stress redistribution causes significant signal changes in the strain sensors and is highlighted if they are related to unaffected sensors. This master-slave concept was tested on noise barrier pillars which were mounted on the edge beam of a bridge. Cyclic loads caused by passing trains were simulated with a single mass exciter and cracks occurred at the welds between the pillar and a head plate. All tests were accomplished under environmental conditions and varying temperature. The cracks were identified by the introduced method and clear relations between different stress ranges, load cycles and crack occurrence are determined. The data from the numerical model are in a good agreement with the measurements.

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**Ключевые слова:**

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