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Local Stress Analysis in Multi-strands Anchorage for Optimal Impedance Monitoring

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ABSTRACT

This paper presents an investigation on local stress variation in damaged multi-strands anchorage to optimize the location of impedance monitoring. Firstly, a full-scale experiment on 9-strands anchorage is conducted to analyze anchorage's responses sensitive to strand breakage. Variation in strain signals obtained from ESGs (electrical strain gauges) is used to compute stress change. The optimal location of impedance monitoring is determined based on linear tomography analysis of stress variation. Secondly, a finite element model of an equivalent physical 9-strands anchorage is established to numerically verify the experimental results. Finally, selection of the optimal location for impedance monitoring based on stress analyses is experimentally confirmed on the multi-strands anchorage. A piezoelectric-based impedance monitoring technique is briefly outlined. Impedance responses acquired from PZT interfaces under strand breakage scenarios are statistically quantified to analyze the optimal location of impedance monitoring.

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