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Advances in Structural Mechanics and Applications

Proceedings of ASMA-2021 (Volume 2)

Editors: José António Fonseca de Oliveira Correia, Satyabrata Choudhury, Subhrajit Dutta

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About this book

The proceedings of the conference is going to benefit the researchers, academicians, students and professionals in getting enlightened on latest technologies on structural mechanics, structure and infrastructure engineering. Further, work on practical applications of developed scientific methodologies to civil structural engineering will make the proceedings more interesting and useful to practicing engineers and structural designers.

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Keywords

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Smart Structures

Fluid-Structure Interaction

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Damage Localization in Reinforced Concrete Slab Using Acoustic Emission Technique

Soumyadip Das, Aloke Kumar Datta, Pijush Topdar & Sanjay Sengupta

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Abstract

Reinforced Concrete (RC) Pavement which is basically a reinforced concrete slab is becoming very popular in recent times due to its prolonged structural life. Like all the other types of RC structures, internal cracks are developed in RC pavement due to several reasons like external loads, shrinkage, thermal expansion, corrosion etc. Such cracks are detrimental to the overall health of the pavement structure. Available literature suggests that acoustic emission (AE) is a very effective technique used for structural health

monitoring (SHM) for detection of damage in similar kinds of pavements in real-time. Due to the development of crack, sudden release of strain energy causes elastic waves which can be detected using AE sensors. The literature indicates that such AE waves can be used for determining the location of damage. The further review of the available literature indicates that analysis of the AE waveforms in the frequency domain using Fast Fourier Transform (FFT) or Short Time Fourier Transform (STFT) or in time frequency domain using wavelet transform is also being used by the researchers in the past for localizing the damage in thin metal and multi-layered composite plates. However, as per the present knowledge of the authors the applicability of wavelet transform of AE waves in localizing the damage in RC slabs is found to be absent in literature. In the current study, the authors have made an attempt to localize the damage in a prototype RC slab using the higher symmetric & anti-symmetric modes and group velocity of AE waves. The results obtained for localization is found to be promising using the procedure.

Keywords

Reinforced concrete slab **Acoustic emission**

Structural health monitoring

Wavelet transform

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