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Monitoring of Flexible Support Effects Using the Responses of Multi-Span Bridges Via Wavelet Transform

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In this paper the temporal and spectral effects of the flexible support on the response of multi-span bridges subjected to spatially-varying differential support motions are investigated by using wavelet transform. The Modified Littlewood-Paley wavelet basis is used for the analysis. In the case study of a two-span bridge, the spatially-varying earthquake motions at support bases are simulated. Two finite element-based models of the bridge, the rigid-base support model that assumes rigid soil from the foundation beds, and the flexible-base mid-support model accounting for actual soil stiffness, are analysed. In addition to shortening structural vibration period and amplifying the response amplitude, the flexible base is found to act as a time delay operator to the bridge responses.

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Ключевые слова:

Содержание

Abstract

Introduction

Modeling of a multi-span bridge with flexible support under spatially-varying support motions

Simulation of spatially-varying non-stationary motions

Continuous wavelet transform

Case study

Conclusions

Acknowledgements