

Comparison of Dynamic Characteristics of Railway Bridge Spans to Know the Health of Elastomeric Bearings Using Tri Axial Accelerometer Sensors

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Abstract : Ajakool, India, has a multi-span bridge that is constructed for rail transport with a maximum operating speed of 100 km/hr. It is a standard RDSO design of a PSC box girder carrying a single railway track. The Structural Health Monitoring System (SHM) is designed and installed to compare and analyze the vibrations and displacements on the bridge due to different live loads from moving trains. The study is conducted for three different spans of the same bridge to understand the health of the elastomeric bearings. Also, to validate the same, a three-dimensional finite element model is developed, and modal analysis is carried out. The proposed methodology can help in detecting deteriorated elastomeric bearings using only wireless tri-accelerometer sensors. Detailed analysis and results are presented in terms of mode shapes, accelerations, displacements, and their importance to each other. This can be implemented with a lot of ease and can be more accurate.

Keywords : dynamic effects, vibration analysis, accelerometer sensors, finite element analysis, structural health monitoring, elastomeric bearing

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