

SEISMIC RESPONSE OF A BASE ISOLATED BUILDING THROUGH STRUCTURAL HEALTH MONITORING USING WAVELET TRANSFORM

Joseph Jaramillo^{1,2} , Miguel Diaz^{1,2} 

Ricardo Quispe^{1,2} 

¹ Civil Engineering Faculty, National University of Engineering, Lima, Peru

² Japan-Peru Center for Earthquake Engineering Research and Disaster Mitigation, Lima, Peru

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ABSTRACT

The Structural Health Monitoring based on vibration measurements, is a process that implements the instrumentations of sensors and methodologies to provide information regarding the condition of a structure, which allows the evaluation of the safety and integrity of structural systems. Because of this, in the last decades several algorithms have been developed, among them, the Wavelet Transform is considered an efficient method for the elimination of the error contained in the accelerations recorded by the sensors. However, due to the complex nature of earthquake and the particularity of the structural systems, the parameters used by Wavelet Transform for the error elimination in the seismic response are frequently variable. This paper proposes a methodology to get the seismic response of a base-isolated building subjected to ground strong motions through numerical simulations of a mathematical model of the structure, using synthetic records based on historical seismic events occurred in Peru. In this way, the research found that the optimal intrinsic parameters of the building are those corresponding to an approximate frequency interval of 0.35 to 12.50 Hz. Finally, the results show that this methodology is valid and can be applied in Structure Health Monitoring systems reliably.

Keywords: Structural Health Monitoring, Wavelet Transforms, Seismic Response, Monitoring System, Sensors.

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