

Three Dimensional Numerical Analysis for Longitudinal Seismic Response of Tunnels under Asynchronous Earthquake

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Abstract : Numerical analysis of longitudinal tunnel seismic response due to spatial variation of earthquake ground motion is an important issue that cannot be ignored in the design and safety evaluation of tunnel structures. In this paper, numerical methods for analysis of tunnel longitudinal response under asynchronous seismic wave is extensively studied, including the improvement of the 1D time-domain finite element method, three dimensional numerical simulation technique for the site asynchronous earthquake response as well as the 3-D soil-tunnel structure interaction analysis. The study outcome will be beneficial to aid further research on the nonlinear meticulous numerical analysis and seismic response mechanism of tunnel structures under asynchronous earthquake motion.

Keywords : asynchronous input, longitudinal seismic response, tunnel structure, numerical simulation, traveling wave effect

Conference Title : ICSDEE 2014 : International Conference on Structural Dynamics and Earthquake Engineering

Conference Location : New York, United States

Conference Dates : June 05-06, 2014