عنوان مقاله:

Response of Underground Tunnels to Combined Dynamic Loadings of Running Metro-train and Earthquake

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خلاصه مقاله:

An earthquake is a random occurrence that can happen anytime in highly seismic active areas. Therefore, it might happen even when the metro-train is moving. In such a scenario, the vibrations produced by the dynamic loading of a moving metro-train and the dynamic loading due to an earthquake will impact the dynamic response of underground metro-tunnels. In this work, an effort is made to comprehend how the Delhi Metro's underground tunnels will respond to the combined dynamic loading from the earthquake and the running train. Therefore, the dynamic response of underground metro-tunnels is primarily influenced by the vibrations generated due to the dynamic loading of a running metro-train and the dynamic loading due to an earthquake. Both these loadings cause vibrations at the ground surface and the tunnel utilities. In this paper, an attempt is made to understand the response of Delhi metro-underground tunnels to the combined dynamic loading due to the earthquake and the train's motion. Two-dimensional and three-dimensional finite element analyses are carried out using the Plaxis software. The research work finds that the overall response at the ground surface increases due to the combined dynamic loading of the train and earthquake compared to the train's or the earthquake's sole dynamic loading. Maximum displacements in the soil-the tunnel system and forces in RC liners are found to be more significant for the combined loading of the earthquake and the train motion than those due to individual loadings.

کلمات کلیدی:

Dynamic loading, Underground tunnel, Metro train, Time History, Earthquake