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A Seismic Study on The Settlement of Superstructures Due to the Tunnel Construction

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Abstract : Rapid urban development leads to the construction of urban tunnels for transport. Passage of tunnels under the surface structures and utilities prompted the changes in the site conditions and hence alteration of the dynamic response of surface structures. Therefore, in this study, the effect of the interaction of tunnel-superstructure on the site response is investigated numerically. For this purpose, Fast Lagrangian Analysis of Continua (FLAC 2D) is used, and stratification and properties of soil layers are selected based on the line No 7 of Tehran subway. The superstructure is modeled both as an equivalent surcharge and the actual structure, and the results are compared. A comparison of the results shows that consideration of structure geometry is necessary for dynamic analysis and it leads to the changes in displacements and accelerations. Consequently, the geometry of the superstructure should be modeled completely instead of the application of an equivalent load. The effect of tunnel diameter and depth on the settlement of superstructures is also studied. Results show that when the tunnel depth and diameter grow, the settlements increase considerably.

Keywords : tunnel, FLAC2D, settlement, dynamic analysis
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