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Influence of Site-City Interaction on the Response of Buildings on Trapezoidal Basin

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Abstract

The paper presents the response of cluster of buildings located on soft sediment in double resonance situation. In order to comprehend the influence of Site-city interaction on the response of the buildings, two symmetrical models- Cluster 1 (9 buildings) and Cluster 2 (25 buildings) situated on trapezoidal shaped basin are simulated using Finite Difference algorithm. The analysis of FDM simulation for 3D SCI reveals a reduction in spectral amplitude at natural frequency of building which increases with the number of buildings. The reduction of spectral amplitude is of the order of 65% in the case of cluster 2 with 25 buildings as compared to standalone building located at the centre of closed 3D trapezoidal basin. The S-wave response of buildings shows much larger value of spectral amplitude (approx. 180) for standalone building for 3D analysis in comparison with that of 2D analysis for SH and SV-wave and also there is larger reduction of SAF (Spectral Amplification Factor) at fundamental frequency with the splitting of bandwidth for both Cluster 1 and Cluster 2. These findings call for the urgent need of 3D Site-City Interaction studies in urban environment in development of the seismic resilient and sustainable city.

Keywords: Site-city interaction, Basin effects, S-wave response