

EERI and GESO Joint Seminar

Tuesday, November 27, 2018 | 12:00 Noon, Newmark Lab 2310

Influence of Tall Buildings on Seismic Response of Shallow Underground Structures

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and

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Abstract

Shallow underground structures are commonly built in close proximity to tall buildings in dense urban environments. Although it is well known that such buildings have the potential to affect ground motions in their vicinity and transmit significant forces and moments into their foundations and surrounding soil during earthquakes, their impacts on adjacent underground structures are not well understood. This study evaluates the impact of an adjacent midrise or high-rise building on the seismic response of a cut-and-cover tunnel structure and a braced excavation in centrifuge experiments and corresponding numerical simulations. The underground structures are first studied without buildings present, and then with an adjacent 13-story midrise or 42-story high-rise structure. Results indicate that adjacent buildings transmit large lateral loads to the underground structures during ground shaking and that the distribution of loading is nonlinear with depth. The loading is strongly correlated with building base shear and is dependent upon the geometric details of both the underground structure and the building foundation.

refreshments will be provided