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EB 310

A NUMERICAL VALIDATION OF A SIMPLIFIED METHOD FOR SEISMIC EARTH PRESSURE ON A TALL DRY DOCK WALL

Abstract

This presentation focuses on the performance of the simplified solution proposed by Durante et al. (2022), referred to as the “simplified UCLA method”. This study focuses on the unique challenges posed by subduction earthquakes in Pacific Northwest for estimating seismic earth pressure on complex waterfront structures. The simplified UCLA method requires estimation of ground-motion mean period (Tm) for controlling earthquake scenarios. To this end, a regional predictive Tm model is developed for Cascadia Subduction Zone earthquakes. The assessment is conducted using PLAXIS2D to run time-history analyses with dynamic soil-structure interaction, applied to a tall dry dock wall. The PLAXIS2D results demonstrate a good matching with the simplified UCLA method under low to moderate ground motions. However, discrepancies between the numerical model and the simplified UCLA method increase with the combination of high intensity and long duration of ground motions.In this presentation, we will briefly discuss the simplified UCLA method, the development of a regional predictive Tm model and the numerical modeling of a tall dry dock wall to validate the simplified method.

Biography

Emrah is a distinguished professional in Engineering Seismology, boasting over a decade of experience across a diverse range of seismic applications. Hailing from Turkey, where catastrophic earthquakes frequently strike, Emrah's journey in this field was profoundly influenced by the 1999 Kocaeli earthquake which occurred when he was finishing high school. This life-altering experience ignited his passion and dedication to understand earthquakes and their impact on the built environment.

Zhongze Steve Xu is a project geotechnical earthquake engineer at H&A, Seattle office. He has a Ph.D. in geotechnical engineering from the University of Texas at Austin, focusing on soil dynamics. He worked with Profs. Khosravifar and Moug from PSU on liquefaction projects during his Ph.D. study. At H&A, his role involves numerical modeling, site response analyses, data processing and software development. He has participated multiple seismic hazard projects as well as numerical modeling on heavy civil infrastructures.