



Earthquake Drain Mitigation of Seismic Damage: Research and Practical Applications

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Earthquake Engineering Research Institute, New England Chapter, Lecture Series

Thursday December 3, 2020, 12:00 – 1:00 PM (Eastern Time)

The Zoom Seminar is FREE!

For registration please email Debra McKnight (Debra.Mcknight@tufts.edu)

Abstract: Soil liquefaction is an important design consideration. A technique finding increasing use due to its simplicity and low cost is mitigating liquefaction using earthquake drains (EQ-Drains). EQ-Drains are perforated vertical plastic conduits that function by accelerating the dissipation of excess pore water pressures. This seminar will describe general characteristics of EQ-Drains and present the results of state-of-the-art research for the design and use of EQ-Drains. The presentation will discuss coupled pore pressure-deformation dynamic finite element analyses of liquefiable soils improved with EQ-Drains. It will discuss coupling of the soil domain with simpler structural models incorporating advanced dynamic p-y springs. It will finally discuss the use of fragility analysis to understand the seismic risk of geosstructural components. The seminar will include detailed comparisons with centrifuge and field experimental testing as well as practical applications for practitioners. EQ-Drains, if designed and installed correctly, can provide a cost-effective means to combine the benefits of both strength- and drainage-based liquefaction mitigation.

Biography: Dr. Vytiniotis has background in structural and geotechnical engineering, geotechnical earthquake engineering, and numerical analysis. He has worked on numerous projects in more than 20 states and multiple countries, assisting project owners, law firms, utility companies, insurance companies and developers. His analyses consist of assessing soil improvement, soil-structure interaction, effects of vibrations and vibration isolation, construction defects, premises code compliance, dam safety, landslides, LNG and diesel tank condition assessments, API tank inspections, assessing wind turbine failures, causation of MSE wall failures, effects of adjacent construction, soil heave or settlements, frost-induced effects on soils, pipeline installation, effects of soil movements on pipelines, water intrusion, flooding, scour and backfill quality. Dr. Vytiniotis has performed research and consulting work on the seismic response of pile-supported wharves, seismic slope stability, the effectiveness of prefabricated vertical drains (earthquake drains) and soil densification in reducing liquefaction risk, the effect of gravel drains in amplifying seismic accelerations, and numerical simulations of centrifuge experiments. He also has research experience in constitutive soil modeling and evaluating settlements in soft soils associated with staged levee construction. He is also a member of Geo-Institute's Deep Foundation and Computational Geotechnics committees.