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## ReStructure 2.0 Webinar Series

5pm April 13, 2022 (Time Zone: Europe/Rome)

# Seismic Earth Pressures on Retaining Walls based on SSI Principles

**Abstract:** During earthquake ground shaking, earth pressures on retaining structures can cyclically increase and decrease as a result of inertial forces applied to the walls and kinematic interactions between stiff wall elements and surrounding soil. The current state of practice is based on a limit analysis approach in which a pseudostatic inertial force is applied to a soil wedge behind the wall. This approach is a poor analogy for either inertial or kinematic wall–soil interaction, and not surprisingly, it is frequently unable to satisfactorily capture experimental observations. The kinematic component of interaction varies strongly with the ratio of wavelength to wall height ( $\lambda/H$ ) and relative wall-soil flexibility, among other factors. An analysis framework that captures these effects has been developed that can be applied rigorously (full response history) or in a relatively simplified manner (peak response estimated from ground motion intensity measures). The procedure has limiting assumptions, but its verification against more exact solutions and its validation against test data will be presented. The simplified approach is provided in a Resource Paper that was recently approved by the United States Building Seismic Safety Council for publication with the National Earthquake Hazards Reduction Program (NERHR) Provisions and Commentary.



**Presenter Bio-Sketch:** Jonathan P. Stewart is a Professor in the Civil & Environmental Engineering Department at UCLA, where he has been a faculty member since 1996. His technical expertise is in geotechnical earthquake engineering and engineering seismology. The work of his research group has impacted seismic guidelines and policy nationally and globally. Examples include the US National Seismic Hazard Model and recommended procedures for the seismic assessment of structures. He is a former Chief Editor for the Journal of Geotechnical and Geoenvironmental Engineering and Earthquake Spectra. He currently serves on the EERI Board of Directors, University of California Office of the President Seismic Advisory Board, USGS National Seismic Hazard Model Steering Committee, and Co-Chair of GEER, among other positions. As registered Professional Engineer in California, he maintains an active consulting practice, advising private and government entities on issues in geotechnical engineering and earthquake engineering.

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