Pile under earthquake loading: new evidence and emerging issues

Dr. Raffaele Di Laora, Assistant Professor
Engineering Department, University of Campania “Luigi Vanvitelli”

The lecture focuses on the design of piles under earthquake loading, highlighting some aspects which are often overlooked in design practice while being relevant for the seismic behaviour of piles themselves and of the supported structure. Along with the seismic forces coming from the oscillations of the structure (the so-called inertial interaction), piles are subjected to internal forces coming from the deformation of the surrounding soil under earthquake shaking (kinematic interaction). These forces, despite generally neglected by designers, in some cases are larger in magnitude than the inertial forces. The lecture will discuss existing design formulae for pile moments of kinematic nature, highlighting the key parameters controlling the development of bending. The potential of piles to transmit a lower seismic demand to the structure due to kinematic interaction will be also discussed, furnishing simple tools aimed at considering this effect in the seismic design of pile-supported structures.

Reference: Prof. Gabriele Della Vecchia (gabriele.dellavecchia@polimi.it)

Biosketch

Dr. Raffaele Di Laora is Assistant Professor of Geotechnical Earthquake Engineering at the Engineering Department of University of Campania “Luigi Vanvitelli”.

His research activity is mainly focused on pile foundations, with special regards on the design and analysis of piles under seismic actions. Further topics covered by his research interest are retaining walls under seismic actions, slope-stabilizing piles and thermal piles. He has been invited speaker in both academic and industrial organizations worldwide. He has been appointed as Secretary of Evolution Group 6, a European group of experts to revise Eurocodes with reference to Geotechnical Design under seismic actions. He is currently Secretary of the Technical Committee (TC212) on pile foundations of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE). He is designed member of the working group for the drafting of the International TC212 Guidelines on Piled Rafts and of the Italian Recommendations on Pile foundations. He is author or co-author of about 20 papers on International Journals. He serves as reviewer for more than 10 journals.