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Design of Drilled Shafts to Enhance Slope Stability

In urban environments, drilled shafts are often used by geotechnical engineers to stabilize existing landslides, improve the stability of steep slopes and reduce lateral displacements for construction along the top of slopes. Because the permanent drilled shafts used in landslide stabilization must resist the considerable lateral loads imposed by deep landslides, they typically consist of large diameter, 1 – 2.5 meter, closely spaced drilled shafts. This paper describes a numerical approach for the design of those shafts to reinforce slopes. The approach uses the program FLAC and the strength reduction method to predict the Factor of Safety of the improved slope. The method successfully predicted the maximum demands (shear force and bending moments) necessary for the structural design of stabilizing piles. The method also successfully predicted the critical mode of failure and slope stability Factors of Safety for piles with a plastic bending moment.



Dr. Daniel Pradel is a Professor of Practice at The Ohio State University in Geotechnical Engineering. Previously he was Vice-President of Shannon & Wilson in Glendale, California, and an Adjunct Associate Professor in the Department of Civil & Environmental Engineering at UCLA. He holds a Certificate of Postdoctoral Studies from UCLA, a Ph.D. from the University of Tokyo in Soil Mechanics and Foundation Engineering, and a Diploma from the Swiss Institute of Technology in Lausanne.

Dr. Pradel is currently registered as GE in California and PE in the CA, HI, UT, and NV. His areas of expertise include Slope Stability and Geo-mechanical Numerical Modeling. He has performed numerous reconnaissance visits after major natural hazard events such as Earthquakes, Landslides and Hurricanes. He is a Fellow of the American Society of Civil Engineers, and a Diplomate of the Academy of Geo-Professionals. He is a member of several ASCE-GI committees, including Embankments, Dams and Slopes, Retaining Walls, Awards, and the AGP Examination committees. In the Deep Foundation Institute he is a member of the Slope Stabilization and Foundation Testing committees. He is a member of the ASCE Committee on Accreditation Operations, and has been serving as an evaluator of ABET since 2008. Between 2007 and 2012 he served on the board of the ASCE Geotechnical & Geoenvironmental Journal (JGGE) where he became Associate Editor.

Interested in this presentation? Contact the ERS committee: Mr. Joel Dellaria or Dr. Anne Lemnitzer at jbdellaria@haywardbaker.com or alemnitz@uci.edu