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Advances in Unsaturated Soil, Seepage, and Environmental Geotechnics

EDITED BY Ning Lu
Laureano R. Hoyos
Lakshmi Reddi

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EDITED BY
Ning Lu
Laureano R. Hoyos
Lakshmi Reddi

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Preface

Advances in Unsaturated Soil, Seepage, and Environmental Geotechnics selects 42 papers that represent the latest advances in applied unsaturated soil mechanics, and coupled phenomena in geotechnical engineering practice.

All of the papers were presented at the GeoShanghai Conference, sponsored by the Geo-Institute of the American Society of Civil Engineers, held in Shanghai, China, June 6-8, 2006. The papers are selected from the following 3 technical sessions: *Applied Unsaturated Soil Mechanics* (chaired by Laureano Hoyos and Ning Lu), *Seepage and Drainage in Porous Media* (chaired by Lakshmi Reddi and Ming Xiao), and *Geoenvironmental Engineering* (chaired by Ning Lu and Pierre Delage). This conference provided a showcase for recent developments and advancements in geotechnical engineering and offered a forum to discuss and debate future directions for geo–engineering in the 21st century.

Two state-of-the-art articles are presented in this GSP: *Field Application of Unsaturated Soil Mechanics* by Professor Eduardo Alonso of Universitat Politècnica de Catalunya and *Waste Mechanics: Recent Findings and Unanswered Questions* by Professor Edward Kavazanjian of Arizona State University. In the section of *Unsaturated Soil Phenomena*, this GSP showcases some new experimental evidence and theoretical developments on strength and deformational behaviors of both expansive soil and collapsible loess, as well as some new testing techniques to characterize volumetric change and strength of these problematic soils. The section also provides an array of practical geotechnical problems such as impacts of wetting and shear strength on slope stability, wave propagation in unsaturated soil, and application of unsaturated soil mechanics in CO_2 sequestration in geologic formation. The latest understanding of various coupled phenomena in soils such as hydro-biological, hydro-mechanical, hydro-thermal, thermal-mechanical, and hydro-chemical coupling are reported in the section *Coupled Phenomena*. Finally, some latest advances in geoenvironmental applications including the sustainability of landfills, removal of various contaminants from soils, soil-contaminant interactions, and soil stabilization are addressed in the section *Transport Phenomena*.

Each paper published in this ASCE Geotechnical Special Publication was evaluated by two or more reviewers and the editors, and received at least one positive peer review. The authors of the accepted papers have addressed all the reviewers' comments to the satisfaction of the editors. All published papers are eligible for discussion in the ASCE/G-I *Journal of Geotechnical and Geoevironmental Engineering*, and are also eligible for ASCE awards.

We would like to thank the anonymous reviewers for their quality and timely reviews. Without their significant contribution, it would be impossible to finish this publication. In producing this GSP, the editors also would like to acknowledge the assistance of Donna Dickert at ASCE and Carol Bowers at ASCE Geo-Institute.

Ning Lu
Professor, Colorado School of Mines, Golden, CO, USA

Laureano Hoyos
Associate Professor, University of Texas-Arlington, Arlington, TX, USA

Lakshmi Reddi
Professor, Kansas State University, Manhattan, KS, USA

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