GEORISK 2011

Geotechnical Risk Assessment & Management



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Edited by
C. Hsein Juang, Kok Kwang Phoon,
Anand J. Puppala, Russell A. Green,
and Gordon A. Fenton

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GEORISK 2011

GEOTECHNICAL RISK ASSESSMENT AND MANAGEMENT

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EDITED BY
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Preface

This Geotechnical Special Publication is the official proceedings of GeoRisk 2011, the Geo-Institute (G-I) conference on Geotechnical Risk Assessment and Management. GeoRisk 2011 is the first G-I specialty conference held in this field since the 1996 "Uncertainty in the Geologic Environment: from Theory to Practice" conference presented in Madison, Wisconsin.

Uncertainties in the geologic environment, and their effects, are well recognized by geotechnical engineers. Use of higher factors of safety in geotechnical practice than in other disciplines is a reflection of the greater uncertainties the geotechnical engineers face. In his 1965 Terzaghi Lecture, Arthur Casagrande introduced the concept of "calculated risk" as a means for accounting for these uncertainties in design. This concept was further elaborated by Robert V. Whitman in his 1981 Terzaghi Lecture on "evaluating calculated risk" and by Norbert R. Morgenstern in his Casagrande Lecture in 1995 on "managing risk." Over the past few decades, geotechnical engineers have become increasingly aware of the need and benefits of risk assessment and management in geotechnical engineering, as well as of the need to effectively communicate risk among and between engineers, clients, regulatory agencies, and the public. Risk assessment and management is also a critical aspect of geotechnical practice from perspective of private industry. This Geotechnical Special Publication contains peer-reviewed technical papers that address such issues, covering new and continuing work on geohazard mitigation, uncertainty modeling, and risk assessment and management in all fields of geotechnical engineering from theory to practice.

Held in Atlanta, Georgia, on June 26-28, 2011, this GeoRisk 2011 conference was initially proposed by C. Hsein Juang of the G-I Technical Committee on Risk Assessment and Management and approved by the G-I Conference Coordination Committee (CCC) in April 2008. Steve Kramer was appointed as the CCC liaison to the Organizing Committee of the Conference, which included C. Hsein Juang (Chair), Kok-Kwang Phoon and Glenn Rix (Co-Chairs), Gordon A. Fenton, Edward Glynn, Russell A. Green, D.V. Griffiths, Anand Puppala, and Xiong "Bill" Yu. In addition to papers submitted in response to the Call for Papers, the conference proceedings also includes the keynote lectures delivered by the following world renowned experts:

"Risk of Limit-Equilibrium Failure of Long Earth Slopes: How it Depends on Length" by Erik Vanmarcke
"Development of a Risk-based Landslide Warning System" by Wilson Tang
"Unresolved Problems in Geotechnical Risk and Reliability" by John Christian and Gregory Baecher
"Learning to Live with Geohazards: From Research to Practice" by Suzanne Lacasse and Farrokh Nadim
"Geo-Risks in the Business Environment" by William Brumund
"The Practical Application of Risk Assessment to Dam Safety" by Gregg Scott

All papers, both "submitted" and "keynote" papers, were reviewed following the same procedures and using the same technical standards of practice of the Geo-Institute of the American Society of Civil Engineers. More than 260 abstracts and 155 papers were received in response to the Call for Papers. All papers were subject to a peer review process coordinated by the various session organizers and supervised by the conference editors. Two positive reviews

were required for acceptance and two negative reviews were required for exclusion. Standard editorial review forms (online version) were applied to maintain uniform technical standards of the papers. As a result, 127 papers were accepted for presentations at the conference and published in this Geotechnical Special Publication. The editors expect that diverse assortment of papers written by a distinguished group of national and international authors will be both stimulating and inspiring to their readers. The papers are eligible for discussion in the *Journal of Geotechnical and Geo-environmental Engineering* and for ASCE award nominations.

A publication of this quality would not have been possible without the dedication and professionalism of the session organizers and paper reviewers, the names of which appear in our subsequent acknowledgment. For those additional reviewers who were inadvertently omitted, we offer our sincere apologies.

We wish to acknowledge the marvelous efforts of the invited keynote speakers, authors, reviewers, and session organizers for their significant contributions. We also wish to extend our special thanks to the organizers and panelists of the three important discussion panels,

"Impact of Public Policy on Risk"
"The Future of Risk, Reliability, and Probabilistic Methods in Geotechnical Engineering"
"Geotechnical Business Risk"

The first panel on "Impact of Public Policy on Risk" was organized by Robert B. Gilbert and its panelists included Joe D. Manous, Marty McCann, Jr., and Brian Pallasch. The second panel on "The Future of Risk, Reliability, and Probabilistic Methods in Geotechnical Engineering" was organized by John T. Christian and Gregory B. Baecher and its panelists included Gregory B. Baecher, William Roberds, and Robert C. Patev. The third panel on "Geotechnical Business Risk" was organized by Todd H. Rees and its panelists included Michael Davis, Roger Jinks, Alan J. Krause, W. Allen Marr, and William F. Brumund.

We also wish to convey our sincere gratitude to Steve Kramer, the CCC liaison to the Organizing Committee of the GeoRisk 2011 Conference, and the ASCE/G-I staff especially Elaine Watson, Robert Schweinfurth, Sean Scully, Lauren Tighe and Helen Cook for their coordination and enthusiastic support to this conference. All of the submission activities of the papers for this conference were managed online by MIRA SMART and we wish to express our thanks to Patrick Driscoll for his unceasing effort. The editors also wish to acknowledge the assistance of Ms. Kate Gunberg of Virginia Tech and Ms. Donna Dickert at ASCE Geo-Institute in the final production of this Geotechnical Special Publication.

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Table of Contents

Keynote Lectures

Risk of Limit-Equilibrium Failure of Long Earth Slopes: How It Depends on Length 1
Erik Vanmarcke

Development of a Risk-Based Landslide Warning System 25
Wilson H. Tang and L. M. Zhang

Unresolved Problems in Geotechnical Risk and Reliability 50
John T. Christian and Gregory B. Baecher

Learning to Live with Geohazards: From Research to Practice 64
Suzanne Lacasse and Farrokh Nadim

Geo-Risks in the Business Environment 117
William F. Brumund

The Practical Application of Risk Assessment to Dam Safety 129
Gregg A. Scott

Characterization and Modeling of Variability of Soils across Scales

Random Field Model Parameters for Columbia River Silt 169
Armin W. Stuedlein

Reliability-Based Design for Allowable Bearing Capacity by Considering Differential Settlement on Highly Fractured Rock Masses 178
Jianye Ching, Yu-Gang Hu, Zon-Yee Yang, and Jang-Quang Shiau

Assessment of Levee Site Variability As a Function of the Number of Explorations 186
Christopher B. Groves, Hollie L. Ellis, and N. Kyle Tabor

Influence of Geotechnical Dataset on the Range of Influence of Undrained Shear Strength 193
Site Onyejekwe and Louis Ge

Reliability Based Approach to Quantify Montmorillonite Mineral in Expansive Clays 201
Bhaskar Chittoori and Anand J. Puppala

Probabilistic/Simulation Methods

Subset Simulation and Its Application to a Spatially Random Soil 209
Ashraf Ahmed and Abdul-Hamid Soubra

Probabilistic Analysis of Basal Heave in Deep Excavation 217

Y. G. Tang and Gordon T. C. Kung

Influence of the Scale of Fluctuation of the Friction Angle on the Face Stability of a Pressurized Tunnel in Sands 225

M. Guilhem Mollon, Kok-Kwang Phoon, Daniel Dias, and Abdul-Hamid Soubra

Probabilistic Finite Element Analysis of a Raft Foundation Supported by Drilled Shafts in Karst 233

D. V. Griffiths, D. Dotson, and J. Huang

Probabilistic Slope Stability Analysis As a Supplement to a Deterministic Study 240

Nishant Dayal, A. Rafael Prieto, J. Paul Lewis, and R. David Scherer

Liquefaction Probability by Probabilistic Version of Robertson and Wride Model 247

Chih-Sheng Ku, C. Hsein Juang, Jianye Ching, and Der-Her Lee

Uncertainty Modeling

Design Criteria for the Differential Settlement of Landfill Foundations Modeled Using Random Fields 255

K. C. Foye and X. Zhao

Bayesian Updating of Load Settlement Curves for Footings on Cohesionless Soil 263

Shadi S. Najjar and Michel Saad

Stochastic vs. Deterministic Analysis of Consolidation Problem in Natural Alluvial Deposits 271

Pouya Pishgah Gilani and Reza Jamshidi Chenari

Bearing Capacity of Strip Footings on Spatially Random Soils Using Sparse Polynomial Chaos Expansion 279

Tamara Al-Bittar and Abdul-Hamid Soubra

Spatial Variability of Aperture in a Rough-Walled Crack in Surface Soil 287

J. H. Li, Z. F. Wang, and L. M. Zhang

Parameter Estimation and Uncertainty Analysis Incorporating Engineering Judgement by Bayesian Inversion 295

C. P. Lin and Y. C. Hung

Earthquake Engineering and Soil Dynamics I

Site Response Effects on Partially Ergodic PSHA 303

G. A. Montalva and A. Rodriguez-Marek

A Case Study of Alternative Site Response Explanatory Variables in Parkfield, California 310

E. M. Thompson, L. G. Baise, Robert E. Kayen, Eugene C. Morgan, and James Kaklamanos

Estimating Repair Cost and Downtime Due to Earthquake-Induced Damage at Container Ports 318
L. M. Ivey, G. J. Rix, S. D. Werner, and A. L. Erera

Effect of Fabric Anisotropy on Seismic Response of Strip Foundations 326
Bo Li, Xiangwu Zeng, and Hao Yu

Seismic Response of Reinforced Soil Retaining Walls: Is PGA-Based Design Adequate? 336
J. B. Varnier and K. Hatami

Performance Based Assessment of Dynamic Soil-Structure Interaction Effects on Seismic Response of Building Frames 344
Behzad Fatahi, Hamid Reza Tabatabaiefar, and Bijan Samali

Geotechnical Assessment, Characterization, and Design for Risk Management I

Effects of Slenderness Ratio on Seismic Behavior of Vertical Micropiles 352
Gholamreza Saghaee and Reza Noorzad

Multichannel Analysis of Surface Waves (MASW) at the National Geotechnical Engineering Site at Texas A&M University (NGES/TAMU) 361
R. T. Williams and D. Penumadu

Probabilistic Compressible Soil Thickness from Field Settlement Data 371
Sangho Lee and Masud Alam

A Novel Application of Risk Analysis Methods to Evaluate the Future Viability of Two Large Concrete Stormwater Detention Tanks 379
M. Eddleston and P. J. Mason

Risk Management for Large-Scale Foundation Design and Construction in Challenging Karst Geology 387
John I. Yao and Emad Farouz

Effect of Spatial Variability and Model Uncertainty on the Design of Sockets in Weak Carbonate Rocks 395
Khaled H. Charif and Shadi Najjar

Engineering Geology and Site Characterization

CPT-Based Probabilistic Characterization of Effective Friction Angle of Sand 403
Zijun Cao, Yu Wang, and Siu-Kui Au

Prediction of Embankment Settlement from PCPT Measurements: A Case Study at Courtableau Bridge 411
Xinbao Yu and Murad Abu-Farsakh

Geochemical and Geotechnical Features of Terra Rossa in Karst Areas of Southern Appalachians 420

A. Nandi and J. Moore

Characterizing Spatial Variability of Cone Penetration Testing through Geostatistical Evaluation **428**
D. A. Saftner, R. A. Green, R. D. Hryciw, M. F. Fadden, and A. DaCosta

Case Study—A Landslide on Coastal Slope in Bellingham Bay **436**
X. Huang

Developing Resistance Factors for Design of Piles in Sand **444**
K. C. Foye, M. Prezzi, and R. Salgado

Quantitative Risk Analysis for Embankments, Dams, and Slopes

Probabilistic Slope Stability Analysis of a 300 m High Embankment Dam **452**
Qun Chen and Li-Ying Chang

Identification of Hazardous Loose Landslide Deposits and Scars Formed during the 2008 Wenchuan Earthquake **460**
H. F. Zhao and Limin Zhang

Bounding the Probability of Failure for Levee Systems **468**
Justin C. Hollenback and Robb E. S. Moss

Breaching of Changkai Levee in June 2010 in Jiangxi Province, China **476**
M. Peng and L. M. Zhang

Distinct Element Modelling for High Rock Slopes in Static and Dynamic Conditions: A Case Study **484**
Ganesh W. Rathod, A. K. Shrivastava, and K. S. Rao

Reliability Analysis of Stone Columns for Ground Improvement **493**
Jose A. Alonso and Rafael Jimenez

Earthquake Engineering and Soil Dynamics II

Application of SCPTU for Assessing Liquefaction Potential of the 1976 Tangshan Earthquake, China **501**
Guojun Cai, Songyu Liu, and Anand J. Puppala

Characterizing the Liquefaction Potential of the Pleistocene-Age Wando Formation in the Charleston Area, South Carolina **510**
T. Heidari, R. D. Andrus, and S. M. J. Moysey

Influence of r_d on Liquefaction Triggering Evaluation at Two Case History Sites **518**
John Liao and Jorge Meneses

Evaluating Bias of Liquefaction-Induced Settlement Methods for Performance-Based Design **526**

H. Hayati and R. E. S. Moss

Estimating CSRs for Evaluating Liquefaction That Are Consistent with Building Code Design Spectra **534**
Aaron S. Bradshaw and Russell A. Green

Potential Differences between Time Series and Random Vibration Theory Site Response **544**
Albert R. Kottke and Ellen M. Rathje

Geotechnical Assessment, Characterization, and Design for Risk Management II

Understanding Uncertainty: Assessment and Management of Geotechnical Risk in Tunnel Construction **552**
Thomas W. Pennington and Donald P. Richards

Communicating and Managing Risk in Geotechnical Engineering Practice **560**
Jessee A. Scarborough

Reliability Analysis of Deep Excavation Based on a Semi-Empirical Approach **568**
J. K. Park, G. Biscontin, and P. Gardoni

Jet-Grouting in Cohesive Soils for Ground Improvement in Hawaii **578**
John Y. L. Chen, Robin M. Lim, and Kyle Furuhashi

Risk Assessment of Success Dam, California: Evaluation of Operating Restrictions As an Interim Measure to Mitigate Earthquake Risk **586**
D. Bowles, M. Ruthford, and L. Anderson

Load and Resistance Factor Design (LRFD) for Foundation Systems

Some Observations on Reliability-Based Design of Rock Footings **600**
Widjojo A. Prakoso and Fred H. Kulhawy

A Practical LRFD Design Method for Deep Foundations Using Side Friction and End Bearing **608**
H. Klammler, M. McVay, Jeongsoo Ko, P. Lai, and R. Herrera

Reliability-Based Design of Shallow Foundations in Cohesionless Soils under Compression Loading: Serviceability Limit State **616**
Sami O. Akbas and Fred H. Kulhawy

Quantile Framework for Simplified Geotechnical Reliability-Based Design **624**
Jianye Ching and Kok-Kwang Phoon

Reliability Assessment of Eurocode 7 Spread Foundations Design Methodology **632**
Sónia H. Marques, A. Topa Gomes, and A. Abel Henriques

Deterministic and Probabilistic Seismic Analyses of a Slope-Footing System 640
Nancy Salloum, Dalia Youssef Abdel Massih, Abdul-Hamid Soubra, and Jacques Harb

Limit State Design in Geotechnical Engineering

A Comparative Study of Drilled Shaft Design Using LRFD and Expanded RBD 648
Yu Wang, Zijun Cao, and Fred H. Kulhawy

Limit States Design of Pile Foundations in Clay under Combined Action of Transient Uplift Loads and Frost Jacking 656
Konstantin Ashkinadze

Safety Margin in Design of Pile-Supported Structural Slabs for Frost Action 664
Konstantin Ashkinadze

Statistical Characterization and Stochastic Simulation of Load-Displacement Behavior of Shallow Footings 672
Marco Uzielli and Paul W. Mayne

Reliability Based Design of Base Heave Stability in Wide Excavations 680
Shih-Hsuan Wu, Chang-Yu Ou, and Jianye Ching

Probabilistic Analysis of Shallow Foundations on Rocks Obeying Hoek-Brown Failure Criterion 688
Nut Mao, Tamara Al-Bittar, and Abdul-Hamid Soubra

Risk and Reliability in Geoenvironmental Engineering

Influence of Aging on the Mechanical Behavior of Municipal Solid Waste 696
A. Nayebi, N. Shariatmadari, M. H. Hamzeie Tehrani, and P. Oskouie

Effect of 1D Infiltration Assumption on Stability of Spatially Variable Slope 704
Anastasia M. Santoso, Kok-Kwang Phoon, and Ser-Tong Quek

Old Sewer, Big Risks: Managing Risks during the Design and Construction of a 21-Story Building Adjacent to a Critical 100-Year-Old Sewer Structure 712
Damian R. Siebert, Joel S. Mooney, Richard Marks, Daniel Ocasio, and Kevin McKenna

Effect of Leachate Recirculation and Extent of Degradation on the Stability of Bioreactor Landfill Slopes 720
Amit Srivastava, G. L. Sivakumar Babu, Krishna R. Reddy, and Hanumanth S. Kulkarni

Sustainable Flood Risk Management: Lesson from Recent Cases 728
Xiong (Bill) Yu and Yuewen Huang

Life Cycle Approaches for Brownfields Redevelopment 736
Patricia M. Gallagher and Sabrina Spatari

Retaining Structures I

Strain Localization Effect on System Reliability Based Design of Bridge 744

Abutments under Earthquake Loading
B. Munwar Basha and G. L. Sivakumar Babu

Serviceability Considerations in the Design of Sheet Pile Walls for Risk Management **754**
Ömer Bilgin, Eman Mansour, and Mohamad Gabar

Reliability Based Performance Evaluation of Earth Retaining Structures **762**
Manojit Chakraborty, A. Murali Krishna, and Arunasis Chakraborty

Wall and Ground Responses in a Braced Excavation Considering Spatial Variability **770**
Zhe Luo, C. Hsein Juang, and Fu-Kuo Huang

Evaluation of LRFD Resistance Factors and Risk for Mechanically Stabilized Earth Walls **778**
S. Wasman, M. McVay, D. Bloomquist, M. Harrison, and P. Lai

Hazards/Risks I

(Sub)Global Rock Slope Stability: Using Rock Mass Indices to Characterize and Manage Rockfall Risk **787**
Brian Bruckno

Evaluation of the Susceptibility of Landslides and Debris Flows on Costa Rica's National Road Network: Analysis of a Segment of National Route 32 **795**
Diego A. Cordero Carballo

Spatial Prediction of Groundwater Depth to Trigger Liquefaction in St. Louis **804**
Jae-Won Chung and J. David Rogers

Study on Risk Assessment for an Individual Landslide **812**
Juan Du and Kun-Long Yin

Geohazard Interpretation of the Cagliari Slope (Southern Sardinia, Italy) **820**
William J. Johnson, Francesca Zolezzi, James Nicholls, Eric J. Parker, and Ennio Morgante

Delineation of Slope Profiles from Digital Elevation Models for Landslide Hazard Analysis **829**
Mesut Turel and J. David Frost

Earthquake Engineering and Soil Dynamics III

Establishing Confidence in Surface Wave Determined Soil Profiles **837**
P. Michaels

Surface Wave Benchmarking Exercise: Methodologies, Results, and Uncertainties **845**
B. R. Cox and C. M. Wood

Analysis of Surface Wave Benchmarking Data **853**

Don Zhao

An Assessment of Surface Wave Techniques at the Texas A&M National Geotechnical Experimentation Site **859**

Khiem T. Tran and Dennis R. Hiltunen

Analysis and Interpretation of the Texas A&M University Benchmark Data Using the Refraction Microtremor Technique **867**

A. Pancha and S. Pullammanappallil

Determination of the Dynamic Soil Characteristics at the NGES **875**

S. A. Badsar, M. Schevenels, and G. Degrande

Analysis of SASW, MASW, and Passive Surface Wave Data Collected at the National Geotechnical Experimentation Site at Texas A&M University **886**

A. J. Martin

Geotechnical Assessment, Characterization, and Design for Risk Management III

Active Risk Management in Geotechnical Engineering **894**

W. Allen Marr

Risk Assessment of Success Dam, California: Flood Related Potential Failure Modes **902**

Loren Anderson, Michael Ruthford, Vlad Perlea, David Serafini, Jack Montgomery, and David Bowles

Geotechnical Risk in the Peruvian Andes **910**

A. Carrillo-Gil and A. Carrillo-Acevedo

Quantified Risk Assessment of Shield Tunneling Effects on Urban Cement Concrete Pavement **915**

Q. F. Hu and H. W. Huang

Risk Assessment of Success Dam, California: Earthquake Induced Potential Failure Modes **923**

M. Ruthford, V. Perlea, D. Serafini, M. Beaty, L. Anderson, and D. Bowles

A Parametric Study on Factors Affecting Ground Vibrations during Pile Driving through Finite Element Simulations **931**

Mo Zhang and Mingjiang Tao

Retaining Structures II

Tunnel Face Support Pressure and Associated Risk **939**

Mahmoud Ahmed and Magued Iskander

Risk Analysis of Pile Pressing-In on an Adjacent Earth-Retaining Wall **948**

Amy D. D. Lu and Albert T. Yeung

Numerical Study on the Dynamic Behavior of Retaining Walls Backfilled with Shredded Tires 955
E. Huggins and N. Ravichandran

Probabilistic Analysis of the Deflection of Retaining Walls in Deep Excavation 963
Y. G. Tang

Risk Management with Performance-Based Geoengineering Monitoring: APM Tunnel Extension at Hartsfield-Jackson International Airport 971
Thomas Allen Tye and W. Allen Marr

Hazards/Risks II

Probability-Based Risk Assessment of Landslide/Slope Failure 979
Y. Y. Chi, Y. F. Lee, C. H. Juang, Y. L. Wu, and Y. P. Wu

Road Slopes Risk Assessment of the Northern Part of Gifu Prefecture, Japan 988
Yusuke Honjo, Yu Otake, Shuzi Moriguchi, and Takashi Hara

Managing Settlement Risk Due to Tunneling beneath Downtown Seattle 996
Michael A. Lach

Assessing the Probability of Occurrence of Earthquake-Induced Landslides Offshore the U.S. East Coast: A First-Order, Second Moment Approach 1004
Eugene C. Morgan and Laurie G. Baise

An Innovative Landslide Risk Assessment System: Application to Highway Embankments 1012
L. Pantelidis

Seismic Risk Assessment and Application in the Central United States 1020
Zhenming Wang

Earth Structures/Slopes

Implicit Expression Solution of Slope Reliability on Kinematical Element Method and Response Surface Method 1028
Ping Cao and Ke Zhang

Field Performance of a New Approach Slab System 1036
Qiming Chen and Murad Abu-Farsakh

External Stability of Geotubes Subjected to Wave Loading 1044
M. Khalilzad and M. A. Gabr

Probabilistic Assessment of Commercial Design Guides for Steep Reinforced Slopes: Implications for Design 1055
W. A. Kitch, R. B. Gilbert, and S. G. Wright

Using Computer Simulations to Take a Closer Look at Load and Resistance Factors for Designing Geosynthetic-Reinforced Walls 1063

Stanley M. Miller

Impact of Non-Analytical Factors in Geotechnical Risk Assessment of Levees **1073**
Mary Perlea and Edward Ketchum

Geotechnical Assessment, Characterization, and Design for Risk Management IV

Rockfall and Mitigation Evaluation with 3-D Discrete Element Modeling **1082**
R. Zhang and A. Rock

GeoRisk in the Design-Build Procurement Process **1090**
John Christos Daoulas

Owner Involvement—Choosing Risk Factors for Shallow Foundations **1098**
Roger A. Failmezger and Paul J. Bullock

Model Test Study of Soil Variation Impact on Shield Tunnel Segment Structure **1109**
Hongwei Huang, Dongming Zhang, Qunfang Hu, and Jie Zhang

Mitigating Risk and Managing Foundation Cost and Schedule on "Mega" Transmission Line Projects: Beginning with the End in Mind **1117**
K. Yamatani and A. Jahangir

Comparison Study on Computer Simulations for Bridge Scour Estimation **1125**
Xinbao Yu, Junliang Tao, and Xiong (Bill) Yu

Uncertainty Analysis

Updating Uncertainties in Friction Angles of Clean Sands **1133**
Jianye Ching, Jieru Chen, and Kok-Kwang Phoon

Constructing Joint Distributions of Multivariate Geotechnical Data **1141**
Jianye Ching, Kok-Kwang Phoon, and Wen-Chao Huang

Extension of CSRSM for the Parametric Study of the Face Stability of Pressurized Tunnels **1149**
Guilhem Mollon, Daniel Dias, and Abdul-Hamid Soubra

Beam on Spatially Random Elastic Foundation **1157**
S. Haldar and D. Basu

Teaching Reliability at the Undergraduate Level **1165**
Robb Eric S. Moss