

GeoFlorida 2010

**Advances in Analysis, Modeling and
Design**

**Geotechnical Special Publication
No. 199**

**West Palm Beach, Florida, USA
20-24 February 2010**

Volume 1 of 4

ISBN: 978-1-61738-322-9

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2010) by the American Society of Civil Engineers
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact the American Society of Civil Engineers
at the address below.

American Society of Civil Engineers
1801 Alexander Bell Drive
Reston, VA 20191

Phone: (800) 548-2723
Fax: (703) 295-6333

www.asce.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

KEYNOTE LECTURES

Prediction in Geoenvironmental Engineering: Recommendations for Reliable Predictive Modeling	1
<i>Craig H. Benson</i>	
Reliability-Based Geotechnical Engineering	14
<i>Gordon A. Fenton, D. V. Griffiths</i>	
Dynamic Analysis of Free-Falling Penetrometers in Soil Deposits	53
<i>J. P. Carter, M. Nazem, D. W. Airey, S. H. Chow</i>	
Application of Numerical Analysis in Geotechnical Engineering Practice	69
<i>L. Zdravkovic, D. M. Potts</i>	

MODELING AND DESIGN OF GEOENVIRONMENTAL SYSTEMS

Parameters Controlling Strength of Coal Fly Ash-Lime Improved Soil	89
<i>N. C. Consoli, A. Dalla Rosa</i>	
Using WiscLEACH to Estimate Groundwater Impacts from Fly Ash Stabilized Layers in Roadways	99
<i>Lin Li, Li Jin, Nathan Kebede</i>	
Novel Implicit Automated Time Stepping Algorithm for Contaminant Transport through Soil	109
<i>Tadikonda Venkata Bharat, P. V. Sivapullaiah, M. M. Allam</i>	
Advances in Computational Limit State Analysis and Design	119
<i>C. C. Smith, M. Gilbert</i>	
State-of-the-Art: Consolidation-Induced Contaminant Transport for High Water Content Geo-Materials	129
<i>Patrick J. Fox, Charles D. Shackelford</i>	

MODELING OF GEOTECHNICAL ENGINEERING SYSTEMS

A Coupled Damage and Plasticity Drucker-Prager Model Based on Thermodynamics of Internal Variables	139
<i>Yaoting Zhu, Lu Sun, Haoran Zhu</i>	
Nonlinear Analysis for a Single Vertical Drain Including the Effects of Preloading Considering the Compressibility and Permeability of the Soil	147
<i>Buddhima Indraratna, Xueyu Geng, Cholachat Rujikiatkamjorn</i>	
Multi-Physical Simulation of Freezing Unsaturated Soil	157
<i>Zhen Liu, Xiong (Bill) Yu</i>	
Limit Equilibrium of 2D and 3D Nonhomogeneous Loaded Ground Masses	167
<i>J. B. Martins, G. A. Machado, H. J. C. Ribeiro</i>	
A Comparison of Numerical Algorithms in the Analysis of Pile Reinforced Slopes	175
<i>D. V. Griffiths, Hang Lin, Ping Cao</i>	
Numerical Study of Effect of Encasement on Stone Column Performance	184
<i>Majid Khabbazian, Christopher L. Meehan, Victor N. Kaliakin</i>	
Development of Performance Upgrade Technique of Existing Rockfall Protection Fence	194
<i>S. Tsuji, T. Hara, A. Yashima, M. Yoshida</i>	
Modeling Soil-Pile Interaction under Axial Loading Using a Bilinear Mohr-Coulomb Based Model	204
<i>Juan M. Mayoral, Manuel J. Mendoza, Francisco A. Flores, Miguel P. Romo, Enrique Ibarra</i>	

NUMERICAL MODELING OF DISCONTINUOUS ROCK MASSES

Fracture and Fragmentation of Rock Subjected to Uniaxial Cyclical Loading	214
<i>M. N. Bagde</i>	
Rock Catchment Area Design Charts	224
<i>L. Pantelidis</i>	

Load Transfer to Micro Pile Rock Socket	234
<i>Issa Oweis, Jeaan Hwang</i>	
Evaluating Ground Settlement above a Mined Area	244
<i>Timothy D. Stark, Erik J. Newman, Shahriyar Baig, Pedro Amaya</i>	
Rock Slope Stability Modeling	254
<i>O. Pekin</i>	
Prediction of Side Resistance in Poor Quality Rock: RQD vs. GSI	264
<i>Scott M. Mackiewicz, Arlan Rippe</i>	
Slope Stability with Permanent Rock Anchors	273
<i>Rasin Duzceer</i>	
Stability Analysis of Vertical Boreholes Using a Three-Dimensional Hoek-Brown Strength Criterion	283
<i>Lianyang Zhang, K. C. Radha</i>	
Simulation of Pore-Scale Fluid Flow through Glass Beads Using Lattice Boltzmann Method	293
<i>Wei Chen, Tong Qiu</i>	

UNSATURATED SOIL MODELING IN ENGINEERING PRACTICE

Analysis of Engineering Properties of Red Clay during Drying Process	301
<i>Ling-wei Kong, Ai-guo Guo</i>	
Shear Strength of Unsaturated Soil-Geotextile Interfaces	307
<i>Charbel N. Khoury, G. A. Miller, Kianoosh Hatami</i>	
Tidal Influence on Embankment Settlement in Coastal Louisiana	317
<i>Ching Tsai, Jesse Rauser, Sungmin Yoon</i>	
Dynamic Capillary Effect and Its Impact on the Residual Water Content in Unsaturated Soils	328
<i>Hui Chen, Changfu Wei, Huafeng Cao, Erlin Wu, Huan Li</i>	
Characterization of Unusual Ground Fissuring in a Dry Lakebed-Broadwell Basin, San Bernardino County, California	338
<i>William J. Johnson, Marcella G. Johnson, Edward G. Zullo</i>	
Performance of Reinforced Collapsible Soil	347
<i>Sherif Soliman, Adel Hanna</i>	
Unsaturated Hydraulic Conductivity of Compacted Lateritic Soil Treated with Bagasse Ash	357
<i>K. J. Osinubi, A. O. Eberemu</i>	
Analytical Model for Prediction of Strains for Tunneling in Swelling Grounds	370
<i>A. Fahimifar, D. Parsapour</i>	
A Refined True Triaxial Cell for Modeling Unsaturated Soil Response under Suction Controlled Stress Paths	381
<i>L. R. Hoyos, D. D. Perez-Ruiz, A. J. Puppala</i>	
Suction Stress Influence on Earth Retaining Structures	390
<i>Rafael Baltodano-Goulding, Diana Korte-Leiva</i>	
Soil Water Characteristic Curves of Compacted Clay Subjected to Multiple Wetting and Drying Cycles	400
<i>Ramil G. Mijares, Milind V. Khire</i>	
Impact of Effective Stress on the Dynamic Shear Modulus of Unsaturated Sand	410
<i>Ali Khosravi, Majid Ghayoomi, John McCartney, Hon-Yim Ko</i>	

COMPUTATIONAL METHODS IN UNSATURATED FLOW AND COUPLED PROCESSES

Design Charts for Vertical Drains Considering Soil Disturbance	420
<i>D. Basu, M. Prezzi</i>	
Modeling Rheological Properties of Coarse Grained Materials	430
<i>Erich Bauer</i>	
Strain Localization Based on the Bifurcation Theory: An Application to the Hypoplastic Constitutive Model	440
<i>A. M. Ramos, A. Lizcano</i>	
Visco-Hypoplastic Model for Structured Soils	452
<i>W. M. Fuentes, A. Lizcano</i>	
Modification of the Hypoplasticity Von Wolffersdorff Equation Using a Bounding Surface and State-Dependent Peak Dilatancy Criterion	461
<i>Camilo Herrera, A. Lizcano</i>	

Simulation of Expansive Clay Behavior under Simultaneous Heating-Hydration for Nuclear Waste Storage Applications	470
<i>Marcelo Sanchez, A. Gens, María Victoria Villar, Antonio Lloret</i>	

IMAGING APPLICATIONS

Application of Electrical Resistivity for Subsurface Characterization of Hattian Bala Landslide Dam	480
<i>Fawad S. Niazi, Habib Rehman, Tayyeb Akram</i>	
Application of Surface Geophysics for Providing a Detailed Geotechnical Assessment of a Large Resort Development Site in Anguilla, BWI	490
<i>Sandy Nettles, Bret Jarrett, Eric C. Cross</i>	
An X-Ray Computed Tomography Study: The Influence of Inherent Particle Characteristics on the Packing Density of Granular Materials	500
<i>Michael Bloom, Steve Thomas, Aliaksei Kustau, Keicha Muriel, David Rohmeyer, Shreekanth Mandayam, Beena Sukumaran</i>	
Using Outcrop-Scale Digital Images for Size Distribution of Boulders and Blocks	510
<i>Jeffrey R. Keaton</i>	
Imaging Piles in Bridge Foundations Using Tomography and Horizontal Seismic Reflector Tracing	520
<i>J. M. Descour, J. J. Kabir</i>	

MICROMECHANICAL MODELING OF GRANULAR MATERIALS INCLUDING CRUSHING

Static Fatigue Produces Time Effects in Granular Materials	530
<i>Poul V. Lade, Hamid Karimpour</i>	
Grain Shape Quantifications and Their Relationship to Dilatancy	540
<i>Melissa R. Cox, Muniram Budhu</i>	
Crushing of Particles under Simulated Static and Centrifuge Forces	550
<i>S. Lobo-Guerrero, L. E. Vallejo</i>	
Measurement of the Abrasion of Granular Materials Using Fractals	560
<i>L. E. Vallejo, Z. Chik</i>	

MICRO-MECHANICS OF GRANULAR SOILS: EXPERIMENTATION, MODELING, AND COMPUTATIONAL ANALYSES

3-D Arching Effect in the Trap-Door Problem: A Comparison Between X-Ray CT Scanning and DEM Analysis	570
<i>Bastien Chevalier, Jun Otani</i>	
From Micromechanics Particle Simulation to Macroscopic Experimental Phenomena of Cross-Anisotropic Soil Elasticity	580
<i>Young-Hoon Jung, Eui-Ryong Jang, Choong-Ki Chung</i>	
A Hypoplastic Sand Model Taking into Account Fabric Anisotropy	591
<i>Camilo Herrera, A. Lizcano</i>	
DSS Test Results Using Wire-Reinforced Membranes and Stacked Rings	600
<i>C. D. P. Baxter, A. S. Bradshaw, M. Ochoa-Lavergne, R. Hankour</i>	

MICROSCALE PROPERTIES TO MACROSCALE BEHAVIOR OF ENGINEERED SOILS

Settlement Behavior of Compacted Soils Containing a Small Amount of Organic Matter	608
<i>Tariq B. Hamid, Paul E. Burkart</i>	
Pamper Bacteria, They Will Help Us: Application of Biochemical Mechanisms in Geo-Environmental Engineering	618
<i>J. W. M. Lambert, K. Novakowski, M. Blauw, M. N. Latil, L. Knight, L. Bayona</i>	
Influence of Ionic Concentration and Internal Porosity on the Behavior of Diatom-Clay Mixtures	628
<i>Angelica M. Palomino, Sungho Kim, Alex Summitt, Dante Fratta</i>	
Analysis of Particle Shape Using Fractals	638
<i>L. F. Vesga, L. E. Vallejo</i>	

Behavior of Sand-Rubber Mixtures According to Strain Level	646
<i>Changho Lee, Yong-Hoon Byun, Jong-Sub Lee</i>	
Meso-Scale Heterogeneity Effects on Excess Pore Water Pressure Dissipation	656
<i>Hyun-Ki Kim, Jung-Yul Kim</i>	

CHARACTERIZATION OF PROBLEMATIC SOILS

New Developments in the Modeling and the Design of Geosynthetic Reinforcements of Platforms Subjected to Localized Sinkholes	664
<i>Laurent Briançon, Pascal Villard, Bastien Chevalier</i>	
Experimental Study on Subsurface Erosion of Peats	672
<i>Ming Xiao, Jose Gomez, Benjamin Adams, Nathan Shwiyhat, Exequiel Sinco</i>	
Development Mechanism and Remediation of Multiple Spontaneous Sinkholes: A Case History	681
<i>S. E. Jammal, J. W. Casper, A. M. Sallam</i>	
Load Deformation Behavior of Drilled Shafts in Residual Soil	689
<i>H. Sarhan</i>	
Florida Clay Gets a Bad Rap	699
<i>E. D. Zisman</i>	
Study of Expansive Soil Behavior Using Low to Medium Frequency Electromagnetic Waves	708
<i>B. Lin, A. B. Cerato</i>	
Equivalent Effective Stress in Unsaturated Fine Sand	717
<i>L. F. Vesga</i>	
A Case History of Construction Induced Sinkholes	727
<i>Wing Heung, Roger Gobin</i>	
A Case History of Pile Foundation Remediation for Karst Activity	737
<i>Roger Gobin, Wing Heung</i>	
Modeling and Numerical Analysis of Expansive Soil in Stress Path Tests	747
<i>Syed Abdul Mofiz, Mohammad Nurul Islam</i>	
Laboratory Performance Evaluation of Stabilized Sulfate Constaining Soil with Lime and Class C Fly Ash	757
<i>Dharamveer Singh, Rouzbeh Ghabchi, Joakim G. Laguros, Musharraf Zaman</i>	
Influence of Lime Dosage on Stabilization Effectiveness of Montmorillonite Dominant Clays	767
<i>Aravind Pedarla, Srinivas Chittoori, A. J. Puppala, L. R. Hoyos, Sireesh Saride</i>	
Experimental Study on the Creep Behavior of the Yangtze River Sand	777
<i>Fei Wang, Linchang Miao, Weihua Lv</i>	
Stiffness Response of Residual and Saprolitic Soils Using Resonant Column and Bender Element Testing Techniques	783
<i>J. A. Pineda, L. R. Hoyos, J. E. Colmenares</i>	
Characterization of Problematic Expansive Soils from Mineralogical and Swell Characterization Studies	793
<i>M. A. Shamrani, E. Mutas, A. J. Puppala, M. A. Dafalla</i>	
Particle Size Analysis of Shale-Rich Mined Clay from Appalachian Ohio	803
<i>Anthony R. Moran, Hiroshan Hettiarachchi</i>	
Laboratory and Field Investigation of Variation of Erodibility with Dry Unit Weight of Different Soils	813
<i>Matthew A. McClarren, Hiroshan Hettiarachchi, Donald D. Carpenter</i>	
Assess the Stress-Strain and Interfacial Frictional Behavior of Nonwoven Geotextile Reinforced Residual Soils	823
<i>Syed Abdul Mofiz, Mohammad Nurul Islam</i>	
Cyclic Triaxial Behavior of Pond Ash	833
<i>B. Mohanty, N. R. Patra, S. Chandra</i>	
Static and Dynamic Properties of a Calcareous Sand from Southwest Puerto Rico	842
<i>Joanna Catano, Miguel Pando</i>	

VOLUME 2

Characterization of Reinforced Asphalt Pavement Structures Built over Organic Soils Employing Falling Weight Deflectometer	852
<i>Khaled Sobhan, K. P. George, Daniel Pohly, Hesham Ali</i>	
A Case Study on the Geotechnical Characteristics of Collapsed Cut-Slope in Yeosu, Korea	862
<i>S. H. Kim, H. B. Koo, Ferdinand E. Bautista, Ji-yong Choi</i>	

NON-DESTRUCTIVE TECHNOLOGIES FOR GEO-MATERIALS AND INFRASTRUCTURE ASSESSMENT

Living with Deep Foundation Defects	872
<i>Edward J. Ulrich Jr.</i>	
Non-Destructive Test to Measure Pollutant Transport into Landfill Liners	882
<i>A. Bezzar, F. Ghomari</i>	
Estimation of Shear-Wave Velocity Profiles: Inversion of Spatial Autocorrelation Coefficients	892
<i>K. Firtana, A. Kocaoglu</i>	
Mapping Soft Soil Zones and Top-of-Bedrock beneath High-Traffic Areas in Honolulu Using 2D ReMi	900
<i>P. C. Sirls, Z. Batchko</i>	
A Simple Attenuation Prediction Method for Ground Vibration Induced by High-Speed Trains	910
<i>Yit-Jin Chen, Ting-Jui Chiu</i>	
Site Characterization and Modeling for an Underground Water Storage Tank, Black Hawk, Colorado	920
<i>Thomas A. Chapel, Douglas Laymon</i>	
The Effect of Water Content on Light Weight Deflectometer Measurements	930
<i>Faraz S. Tehrani, Christopher L. Meehan</i>	
Evaluation of Stiffness and Void Ratio by Field Velocity Probe in Soft Soils	940
<i>Hyung-Koo Yoon, Soon Hyuck Jung, S. J. Hong, Jong-Sub Lee</i>	
Relationships between Compression Wave Velocity and Unconfined Compression Strength for Weathered Florida Limestone	950
<i>Ariel Sarno, Raaaa Farah, Nick Hudyma, Dennis R. Hiltunen</i>	
A Smart Health Monitoring System for the New I-10 Twin Span Bridge over Lake Pontchartrain	960
<i>Murad Y. Abu-Farsakh, Sungmin Yoon, Da Ha, W. Allen Marr, Zhongjie Zhang, Ching Tsai</i>	
Motion Sensors for Scour Monitoring: Laboratory Experiment with a Shallow Foundation	970
<i>C. Yao, C. Darby, O.-Y. Yu, S. Hurlbaeus, K. A. Chang, J. Price, B. Hunt, J.-L. Briaud</i>	
Integrating Multiple Subsurface Exploration Technologies in Slope Hydrogeologic Investigation: A Case Study in Taiwan	980
<i>Shih-Meng Hsu, Hung-Chieh Lo, Cheng-Yu Ku, D. Isaac Jeng, Su-Yun Chi</i>	

IN SITU TESTING FOR GEO-ENGINEERING ANALYSIS AND DESIGN

Cone Tip Resistance of Highly Compressible Jeju Beach Sand	990
<i>M. J. Lee, S. J. Hong, J. J. Kim, Woojin Lee</i>	
Evaluation of the PVD Smear Zone Using Micro Penetrometer	998
<i>Raehyun Kim, Young-Min Choi, Jong-Sub Lee, Woojin Lee</i>	
Updating Uncertainties in Undrained Shear Strengths by Multivariate Correlations	1008
<i>Jianye Ching, K. K. Phoon</i>	
Estimation of Consolidation Coefficient from Piezocone Dissipation Tests in Jiangsu Quaternary Clay Deposits, China	1018
<i>G. J. Cai, S. Y. Liu, A. J. Puppala, L. Y. Tong, G. Y. Du</i>	
Application of Effective Cone Factor for Strength Characterization of Saturated Clays	1029
<i>Junhwan Lee, Kyunghum Seo, Beongjoon Kang, Sunghwan Cho, Changdong Kim</i>	
Suspension P-S Logging for Geophysical Investigation of Deep Soil and Bedrock	1037
<i>Emre Biringen, John Davie</i>	
Soil Parameter Evaluation from Hybrid In Situ Penetration-Geophysics Testing	1049
<i>Paul W. Mayne</i>	
Seismic Site Classification Using Boreholes and Shear Wave Velocity: Assessing the Suitable Method for Shallow Engineering Rock Region	1059
<i>P. Anbazhagan, T. G. Sitharam</i>	
Site Characterization of Clay Deposits in Northeast Nile Delta	1069
<i>Mohamed Farid Abbas, Ashraf Kamal Hussein, Mohamed I. Amer, Khalid M. El Zahaby</i>	
Demands for Seismic Site Investigation at Wind Power Station Foundation in Former Mining Areas	1079
<i>F. Wuttke, H.-G. Schmidt</i>	
Numerical Investigation of the Pressuremeter Results Affected by Anisotropy of Geomaterials	1090
<i>Robert Liang, Abdulla Sharo</i>	
Comparison of Underwater MASW, Seismic CPT, and Downhole Methods: Offshore Croatia	1100
<i>L. Paoletti, E. Mouton, I. Liposcak</i>	
End of Primary Consolidation for the Gulf Coast Soils	1108
<i>Jeong-Yun Won, Bryon Porter, Blake Cotton</i>	

Evaluating Shear Wave Velocity of In-Place Compacted Backfill	1116
<i>J. C. Damm, M. R. Lewis, K. H. Stokoe II, D. P. Moore</i>	
Characterizing Subsurface Conditions Using Drilling Parameters for a Deep Foundation Project in Boston, MA, USA	1132
<i>Stan S. Sadkowski, Kevin P. Stetson, Jean Benoît, John T. Roche</i>	

INSTRUMENTATION AND DATA ACQUISITION FOR SITE GEO-CHARACTERIZATION

Improvement of Rainer System with a Porous Plate	1142
<i>S. K. Choi, M. J. Lee, M. T. Tumay, Woojin Lee</i>	
Characterisation of an Urban Site by Ambient Noise HVSR Method: Resonance Frequencies and Site Amplifications	1152
<i>P. Harutoonian, B. Chapman, C. J. Leo, S. Liyanapathirana</i>	
Bridge Restoration and Landslide Correction Using Stabilization Pier and Grade Beam Structural System	1162
<i>Peter W. Chou, Swaminathan Srinivasan</i>	
Real-Time Slope and Wall Monitoring and Reporting Using 3-D MEMS-Based, In-Place Instrumentation System	1172
<i>Swaminathan Srinivasan, Aaron J. Muck, Peter W. Chou</i>	
Assessment of Slope Failure Using Advanced Geotechnical Tests: Case Study in Harrisonburg, Louisiana	1182
<i>Sungmin Yoon, Ching Tsai, Kim Garlington</i>	
Levee Evaluation Studies in Sacramento, California: Correlating Helicopter-Borne EM Data, Borings, and Geology	1191
<i>Dima Amine, Duston Marlow, Bob Woldringh, Greg Hodges, Selvaratnam Selvamohan</i>	
The Use of Forensic Engineering in Sinkhole Investigations	1201
<i>E. D. Zisman</i>	
Experimental Study on Triaxial Geogrid-Reinforced Bases over Weak Subgrade under Cyclic Loading	1208
<i>Yu Qian, Jie Han, Sanat K. Pokharel, Robert L. Parsons</i>	
A Study on the Development of Anisotropic Shear Modulus for Soft Clay during the K_0 Consolidation	1217
<i>Fu-Chen Teng, Chang-Yu Ou</i>	
A Suggested Approach to Study Variability of Impact Hardness Strength in Heterogeneous Rock Materials	1227
<i>A. Bandini, P. Berry</i>	
Installation of Downdrag Instrumentation on a Bridge Abutment Foundation: Lessons Learned	1237
<i>A. S. Budge, D. E. Dasenbrock</i>	
Landslide Stability Analysis Utilizing Shear Strength of Slip Surface Soil: Asato and Tyunjun Landslides, Okinawa, Japan	1246
<i>Sho Kimura, Seiichi Gibo, Shinya Nakamura, Shriwantha Buddhi Vithana</i>	
Measurement Techniques of Ground Vibration for Rail System	1255
<i>Yit-Jin Chen, Yi-Jiun Shen</i>	
Shear Deformation Behavior of the Cemented Interface between Concrete and Argillaceous Siltstone	1265
<i>C. J. Wu, Z. X. Zhang, Y. J. Lai</i>	
Photoelastic Sensors for Measurement of K_0	1275
<i>Thaweesak Jirathanathaworn, Roman D. Hryciw, Russell A. Green</i>	
Evaluation of Compacted Silt Characteristics by Ultrasonic Pulse Velocity Testing	1284
<i>Desislava Z. Slavova, David M. Weidinger, Adam F. Sevi, Louis Ge</i>	
Development of Opto-Laser Borehole Scanning System	1294
<i>Myung Sagong, Sunghyuk Ahn, Seonkeun Hwang</i>	

SITE CHARACTERIZATION BY SURFACE WAVE METHOD

Optimum Masw Survey-Revisit After a Decade of Use	1303
<i>Choon Park, Mario Carnevale</i>	
Characteristic Shear Velocity Profiles for Predominant Sediment Fill Units in the Las Vegas Basin	1313
<i>Barbara Luke, Helena Murvosh, Wanda Taylor, Jeff Wagoner</i>	
Shallow Marine MASW: A Case History and Lessons Learned	1321
<i>J. B. Shawver, Alex Fisher, Choon Park</i>	

The Use of MASW to Improve the Geotechnical Site Characterization of the 18.5 Km (11.5 Miles) Long Augusta Levee-Preliminary Findings	1330
<i>Amin A. Tomeh, Sam Alyateem, Hameed Malik, Abie L. Ladson</i>	
Joint Use of a Surface-Wave Method and a Resistivity Method for Safety Assessment of Levee Systems	1340
<i>K. Hayashi, C. Konishi</i>	
MASW Survey Identifies Causes of Sink Activity Along I-476 (Blue Route), Montgomery County, Pennsylvania	1350
<i>R. Lee, P. Callahan, B. Shelly, A. Iqbal, G. Kribbs</i>	
Improving MASW Results for a Site with Shallow Bedrock Through the Use of Higher-Mode Data	1360
<i>Daniel W. Casto, Carlos Calderón-Macías, Barbara Luke, Ronald Kaufmann</i>	
A Comparison of Linear-Array Surface Wave Methods at a Soft Soil Site in the Mississippi Embayment	1369
<i>B. R. Cox, C. M. Wood</i>	
The Use of Higher Modes in Surface Wave Testing	1379
<i>Mourad Karray, Guy Lefebvre</i>	
Towards Non-Contact Surface Wave Testing of Subsonic Soil Layers Using Microphones	1389
<i>N. Ryden</i>	
MASW Imaging of the Deccan Basalt Lava Flows and Their Weathering Zones: A Case Study from Ghatia, India	1394
<i>K. Satish Kumar, P. Senthil Kumar, P. Prabhakara Prasad, K. N. S. S. Srinivas, D. Mysaiah, T. Seshunarayana</i>	
Multiple Impact Surface Waves (MISW)-Improved Accuracy for Pavement System Thicknesses and Moduli vs. Spectral Analysis of Surface Waves (SASW)	1402
<i>L. D. Olson, P. K. Miller</i>	

DEEP FOUNDATIONS

Effects of Soil Improvement by Mass Mixing on the Lateral Capacity of Pile Group Using Finite Element Method	1412
<i>Z. Cheng, H. Law, Kyle M. Rollins</i>	
An Artificial Neural Network Approach for Prediction of Dynamic Pile-Soil-Pile Interaction Under Vertical Motion	1422
<i>S. K. Das, B. Manna, D. K. Baidya</i>	
Prediction of Pile Settlement Using Artificial Neural Networks Based on Cone Penetration Test Data	1432
<i>F. Pooya Nejad, Mark B. Jaksa</i>	
Predicting Non-Linear Response of Laterally Loaded Pile Groups Via Simple Solutions	1442
<i>Wei Dong Guo</i>	
Studies on Short Drilled Shaft Failures in Expansive Clayey Soils in a Cold Environment	1450
<i>Thornchaya Wejrungsikul, Richard Williamjee Jr., W. Thomas (Tom) Witherspoon, Nicasio Lozano, A. J. Puppala</i>	
Numerical Modeling of Rammed Aggregate Pier Construction	1460
<i>Mark Thompson, Muhannad T. Suleiman</i>	
Analysis of a Deep Shaft Excavation in Argillaceous Rock	1470
<i>A. Gens, B. Garitte, J. Vaunat</i>	
Birmingham Bridge Emergency Repairs: Micropile Foundation Retrofit	1479
<i>Donald E. Splitstone, Scott A. Stonecheck, Robert L. Dodson, Jason A. Fuller</i>	
Analysis of Large Diameter Pipe Pile Drivability in Tokyo Bay Using Piezocone Data	1488
<i>J. A. Schneider, D. J. White, Y. Kikuchi</i>	
Measured Soil-Pile Interaction Pressures for Small-Diameter Laterally Loaded Pile in Loose Sand	1498
<i>Muhannad T. Suleiman, Anne Raich, Timothy W. Polson, William J. Kingston III, Mary Roth</i>	
Reliability Analysis of Extrapolated Ultimate Load of Drilled Shafts Embedded in Weathered Rock	1507
<i>Sung Jun Jung, Sung Heon Kim, Sang Inn Lee, Jong Woo Jeon, Myoung Mo Kim</i>	
Pile Responses Due to Lateral Soil Movement of Uniform and Triangular Profiles	1515
<i>Hong Yu Qin, Wei Dong Guo</i>	
Axial Load-Displacement Behavior of Augered Cast-in-Place Piles and Pressure-Injected Footings	1523
<i>Jie-Ru Chen, Fred H. Kulhawy</i>	
Design and Construction Considerations for Offshore Wind Turbine Foundations in North America	1533
<i>Sanjeev Malhotra</i>	
Case Study of the Influence of Flexural Stiffness on the Developed Soil Reactions of Three Laterally Loaded Piles	1543
<i>Sixto Fernandez, Miguel Pando, Mohamed Ashour</i>	

Evaluation of Base Grouted Drilled Shafts at the Audubon Bridge	1553
<i>Steve Dapp, Dan Brown</i>	
Jet Grouting and Soil Mixing for Increased Lateral Pile Group Resistance	1563
<i>Kyle M. Rollins, Mark Herbst, Matthew Adsero, Dan Brown</i>	

PILE FOUNDATIONS IN WEAK SOILS

Setup Prediction of Piles Driven into Louisiana Soft Clays	1573
<i>X. Wang, Neha Verma, Ching Tsai, Zhongjie Zhang</i>	
Simulation of a Centrifuge Model Test of Pile Foundations in CDSM Improved Soft Clays	1583
<i>K. Kirupakaran, A. B. Cerato, C. Liu, G. A. Miller, K. K. Muraleetharan, J. D. Pinilla, S. Price, Z. M. Thompson</i>	
An Innovative Prefabricated Pile Installation Method Utilizing Jetting and Pressure Grouting	1592
<i>P. Lai, M. McVay, David Bloomquist, Heath Forbes</i>	
Increased Lateral Resistance of Pile Group in Clay Using Compacted Fill	1602
<i>Kyle M. Rollins, Jeffrey L. Snyder, J. Matthew Walsh</i>	
Design Challenges of a NYC Waterfront Development	1612
<i>J. Cermak, L. Brant</i>	
Characterizing Lateral Load Behavior of a Pile in Improved Soils Surrounded by Soft Clay Using the Winkler Analysis Concept	1622
<i>Sri Sritharan, J. Huang</i>	

SHALLOW FOUNDATIONS

Full-Scale Field Verification of Vibro-Replacement Ground Improvement for Improving Static and Seismic Shallow Foundation Performance	1633
<i>J. T. Blackburn, J. K. Cavey, K. C. Wikar, M. R. Demcsak</i>	
Part I: A Generalized Formulation of Continuum Models for Elastic Foundations	1641
<i>Asrat Worku</i>	
Part II: Application of Newly Derived and Calibrated Continuum Subgrade Models in the Analysis of Beams on Elastic Foundations	1651
<i>Asrat Worku, Yimer Degu</i>	
Analysis of Structurally Restrained Eccentrically Loaded Footings	1661
<i>Ryan Corey, Jie Han</i>	
Verification of the Load Transfer Mechanism of Geocell Reinforced Soil in Large Scale Model Tests and Different In Situ Test Fields	1670
<i>A. Emersleben, N. Meyer</i>	
Use of Rigid Foundation System on Expansive Soils	1680
<i>M. A. Dafalla, M. A. Shamrani, A. J. Puppala, H. E. Ali</i>	

VOLUME 3

Predicted Tunnel-Induced Settlement and Damage to Findlater's Church with Respect to Freefield and Constructed Side Considerations	1690
<i>J. Murphy, S. Gaynor, D. F. Laefer</i>	
Settlement Behavior of a Shallow Foundation in Dry Sand under Simulated Earthquake Motion on a Biaxial Shake Table	1700
<i>Horng-Jyh Yang, Sherif Elfass, Garry Norris</i>	
Estimation of Settlement of Footings under Working Loads Using Equivalent-Linear Elasticity	1708
<i>A. J. Sheehan, R. E. Olson, K. Park, K. H. Stokoe II</i>	

SOIL-FOUNDATION INTERACTION DUE TO GROUND MOVEMENTS

Prediction of Load Transfers in Granular Layers Used in Rigid Inclusions Technique-Experimental and Discrete Element Method Analysis	1718
<i>Bastien Chevalier, Laurent Briançon, Pascal Villard, Gaël Combe</i>	
Behavior of Uplift Pile Foundation during Large-Scale Deep Excavation	1727
<i>Jian-Jian Chen, Jian-Hua Wang, Robert Liang, Wei Fan, Wei-Dong Wang</i>	

A Numerical Case Study of Soil-Pile-Shield Tunneling Interaction for Guangzhou Subway Project	1737
<i>Lin Li, Xinliang Jiang, Robert Liang</i>	
Shear Strength Reduction at Soil Structure Interface	1747
<i>B. Tiwari, B. Ajmera, G. Kaya</i>	
Characterization of "t-z" Parameters and Their Variability for Auger Pressure Grouted Piles Using Field Load Test Data	1757
<i>Sungwon Park, Lance A. Roberts, Anil Misra</i>	
Simplified Design Approach of Laterally Loaded Short Piles on Finite Slope in Cohesionless Soil	1767
<i>Yeo Hoon Yoon, Wing Heung, Byoungjae Mun</i>	
Modeling Stability of Stacked Geotextile Tubes	1777
<i>Ming Zhu, Ramachandran Kulasingam, Jay Beech, Laura Brussel</i>	
Failure Analysis of an Instrumented Stiff Clay Slope	1786
<i>Walter G. Kutschke, Luis E. Vallejo</i>	
Failing Tunnels from Changed Conditions?	1796
<i>D. Joseph Hagerty, C. Robert Ullrich</i>	
Modeling Differential Settlement in the Partial-Cut and Partial-Fill Embankments of the Mountainous Expressways of China	1806
<i>Hongyuan Fu, Guiyao Wang, Jianjun Xu, Xiang Xin, Xudong Zha, Dar-Hao Chen</i>	
The Behavior of a Deep Retained Excavation in Soft San Francisco Bay Mud	1816
<i>Gregory P. Wilson</i>	
Design of Drilled Shafts for Slope Stabilization	1827
<i>Robert Liang, Mohammad M. Yamin</i>	
Field Study of Drilled Shafts Behavior during Surcharge Load Induced Slope Movement	1837
<i>Wassel M. Al Bodour, Robert Liang</i>	
Riverbank Instability from Imperfect Adherence to Instructions	1847
<i>D. Joseph Hagerty</i>	
Finite Element Analysis of an Offshore Wind Turbine Monopile	1857
<i>E. N. Hearn, L. Edgers</i>	
Deep Soil Mixing (DSM) Columns to Improve Foundation Support for Bridge Approach Embankments	1866
<i>Sireesh Saride, Ekarut Archeewa, A. J. Puppala, Soheil Nazarian, Richard Williamjee Jr.</i>	
A Case Study of Drilled Shaft Performance from Excavation Induced Slope Movements	1876
<i>San-Shyan Lin, Jen-Cheng Liao, Sheng-Der Yang</i>	

PRACTICAL RELIABILITY-BASED METHODS IN GEO-ENGINEERING

Estimation of Soil Properties and Deformations in Staged Constructions Based on MCMC Method	1885
<i>J. K. Park, P. Gardoni, G. Biscontin</i>	
Reliability Assessment of Excavation-Related Movements of Underground Structures	1895
<i>Anthony T. C. Goh, A. M. Hefney</i>	
Complexity of Limit Equilibrium Based Slope Reliability Problems	1904
<i>Jianye Ching, K. K. Phoon, Yu-Gang Hu</i>	
Reliability-Based Design for Basal Heave in an Excavation Considering Spatial Variability	1914
<i>Shih-Hsuan Wu, Chang-Yu Ou, Jianye Ching, C. Hsein Juang</i>	
Use of Reliability Methods as a Project Management Tool: The Cherry Island Landfill Expansion Project	1924
<i>M. F. Houlihan, C. A. Lazarte, R. D. Espinoza, A. M. Germain, C. Li</i>	

RISK ASSESSMENT TOOLS IN GEOTECHNICAL ENGINEERING

Coastal Wastewater Systems and the Mitigation of Geohazards	1934
<i>Brian J. Van Weele, Donald D. Treadwell</i>	
Risk Modeling Issues and Appropriate Technology	1944
<i>Gregory B. Baecher, John T. Christian</i>	
Comparison of Slope Reliability Methods of Analysis	1952
<i>D. V. Griffiths, Jinsong Huang, Gordon A. Fenton</i>	
Statistical Evaluation of Levee Design Data	1962
<i>Christopher Groves, Hollie Ellis, N. Kyle Tabor</i>	
Expected Design Factor of Safety from a Pile Load Test Program	1972
<i>J. Zhang, L. M. Zhang, Wilson H. Tang</i>	

Statistical Assessment of Repeatability of Soil-Geomembrane Interface Shear Tests	1982
<i>Ömer Bilgin, Bhavikkumar Shah</i>	

APPLICATIONS OF RISK ANALYSES FOR CIVIL INFRASTRUCTURES

Dynamic Risk Management System for Large Project Construction in China	1992
<i>Hong-bo Zhou, Hui Zhang</i>	
Safety Assessment of Quake Lakes	2002
<i>Xingguo Yang, Hongwei Zhou, Hongtao Li, Zhaohui Yang, Lu Qiao, Yuanyuan Lin</i>	
Geotechnical Baseline Reports for Foundation Projects	2012
<i>Elizabeth M. Dwyre, Zoran Batchko, Raymond J. Castelli</i>	
Probabilistic Analysis of Slope Stability of Earth Dams during Rainfall Infiltration	2022
<i>Qun Chen, Min Tang</i>	
Forensic Analysis of an Excavation Bracing System Failure	2032
<i>Daniel C. Brahana, William M. Tanner, Larry D. Mullins, Cameron Troxel</i>	

RANDOM FIELDS: MODELING, ESTIMATION, SIMULATION, AND DESIGN

Simulating Differential Settlement of Landfill Foundations Using Random Fields	2042
<i>K. C. Foye, T.-Y. Soong</i>	
A New 2D Failure Mechanism for Face Stability Analysis of a Pressurized Tunnel in Spatially Variable Sands	2052
<i>G. Mollon, K. K. Phoon, D. Dias, A.-H. Soubra</i>	
Random Fields for Site Response Analysis	2062
<i>Gonzalo A. Montalva, Adrian Rodriguez-Marek</i>	
The Importance of the Spatial Variability of Geotechnical Properties for Numerical Models of Downhole Seismic Arrays	2073
<i>E. M. Thompson, L. G. Baise</i>	
Reliability Analyses of Slopes Incorporating Head and Flow Anisotropy as Random Variables	2083
<i>Margela M. Shirley, Alfredo Urzua, John T. Christian</i>	

LRFD AND PARTIAL FACTOR DESIGN

Model Uncertainties in "Terzaghi and Peck" Methods for Estimating Settlement of Footings on Sand	2093
<i>Sami O. Akbas, Fred H. Kulhawy</i>	
Calibrating Resistance Factors of Single Bored Piles Based on Incomplete Load Test Information	2103
<i>Jianye Ching, Horn-Da Lin</i>	
Load Resistance Factor Design Using Target Reliability Approach for External Seismic Stability of Reinforced Soil Walls	2113
<i>B. Munwar Basha, G. L. Sivakumar Babu</i>	
Parametric Study of Seismic AASHTO Design Methods for Metallic Mechanically Stabilized Earth Walls	2123
<i>Fransiscus S. Hardianto, John E. Sankey, Kim M. Truong</i>	
Reliability-Based Analysis of Strip Footings Subjected to an Inclined or an Eccentric Loading	2133
<i>Dalia S. Youssef Abdel Massih, A.-H. Soubra, Nut Mao</i>	
A Reliability-Based Approach to the Design of Spread Footings on Granular Soil	2143
<i>Shadi S. Nijjar, Salah Sadek</i>	
LRFD Resistance Factors Including the Influence of Pile Setup for Design of Steel H-Pile Using WEAP	2153
<i>Kam W. Ng, Muhannad T. Suleiman, Sri Sritharan</i>	
Incorporating Geostatistical Aspects in LRFD Design for Deep Foundations	2163
<i>H. Klammner, M. McVay, P. Lai, D. Horhota</i>	

DAM DESIGN AND CONSTRUCTION

A Comparative Evaluation of Unbalanced Loads in the Stability Analysis of T-Walls Subjected to Hurricane Loading	2173
<i>J. Chatterjee, F. Amini</i>	

Case History: Finite Element Analysis of Time Dependent Settlement of Lake Jessup Bridge Embankment in Central Florida	2182
<i>A. M. Sallam, S. E. Jammal</i>	
Risk Analysis of Tangjiashan Landslide Dam	2192
<i>Ming Peng, Limin Zhang, Runqiu Huang</i>	
Raising a Rattlesnake: Rattlesnake Hollow Ash Pond Dam Crest Raise	2202
<i>James C. Pegues</i>	
Geotechnical Characterization of Dredging Sediments for Valorization in Road Embankments: Case of the Cheurfas Dam (Algeria)	2212
<i>M. A. Bourabah, N. Abou-Bekr, S. Taibi</i>	
Stability Analysis of Fault Rock Heterogeneity on the Left Pressure Shaft Collapse of Siah Bisheh Dam, North Iran	2222
<i>H. Hassani, Sh. Arshadnejad, H. Sarkheil</i>	

REINFORCED SOIL SLOPES AND WALLS

A Case History of MSE Wall Failure: Finite Element Modeling and Evaluation	2232
<i>D. Kim, S. K. Bhowmik, J. L. Willmer</i>	
Evaluation of Kinematic Constraints Based Method for Reinforced Soil Walls	2243
<i>A. Klar, T. Sas</i>	
Numerical Simulation of the Failure of Dense Sands Reinforced with a Smooth Brass Plate in Plane Strain Compression	2253
<i>Yanbo Cao, F. Peng, Yong Tan, M. S. A. Siddiquee</i>	
Seismic Behavior of Gravity Retaining Walls	2263
<i>M. Javanmard, A. R. Angha</i>	
Simplified Method of Design of Nailed Soil Wall	2271
<i>K. Premalatha, M. Muthukumar, A. Amala Raju Arul</i>	
A Model for Rockfall Protection Structures Based on a Multi-Scale Approach	2281
<i>F. Bourrier, P. Gotteland, F. Nicot, S. Lambert</i>	
Finite Element Simulation of Strip Footings Resting on Double Faced Wrap-Around Reinforced Soil Walls	2291
<i>S. Anubhav, P. K. Basudhar</i>	

TUNNELS

Nonlinear Analysis of Tunneling Effects on Building Using Macro-Elements	2301
<i>I. Elkayam, A. Klar</i>	
Investigation on Tunnel-Induced Successive Surface Displacements During Construction Period at Shallow Depths in Shanghai Soft Ground	2311
<i>Zi-Song Yang, F. Peng, Yong Tan, Yu-Yin Hu, Wei-Ping Chen</i>	
Risk Assessment of Voids behind the Lining of Mountain Tunnels	2319
<i>Jifei Wang, Hongwei Huang, Xiongyao Xie, Yadong Xue</i>	
Centrifuge Modeling of Face Excavation in Tunnels with a Deformable Lining	2329
<i>Herbert Walter, Charles James Coccia, Hon-Yim Ko, John McCartney</i>	
Numerical Modeling of Seismic Response of a Cut-and-Cover Tunnel with Improved Ground	2339
<i>Hong Yang</i>	
Three-Dimension FEM Analysis of Large Cross-Section Tunnel in Collapsible Loess Constructed by CRD Method	2349
<i>Fu-Chun Xue, Jian-Lin Ma, Liping Yan, Yong-Ming Zhao</i>	
Shallow NATM Tunnel with Advancing Face Support: Numerical Analysis with Hypoplastic Model	2359
<i>X. T. Wang, J. Brueckl, W. Wu</i>	
Health Monitoring of Tunnel Shotcrete Lining Using Nondestructive Testing Methods	2368
<i>Ki-Il Song, Gye-Chun Cho</i>	

SOIL IMPROVEMENT

The Behaviour of Ballasted Track Foundations: Track Drainage and Geosynthetic Reinforcement	2378
<i>Buddhima Indraratna, Sanjay S. Nimbalkar, Nayoma Tennakoon</i>	
Undrained Load Response of Soft Clays Reinforced with Geosynthetic-Encased Sand Columns	2388
<i>Salah Sadek, Shadi S. Najjar, Tarek Maakaroun</i>	

Large-Scale Plate Load Testing of Ground Improved Using Displacement Grout Columns	2398
<i>Timothy C. Siegel, Willie M. NeSmith</i>	
Wick Drains and Rock Fill Save the Day: A Case for Settlement and Stability Solutions	2406
<i>Pervaiz M. Alvi</i>	
Prediction of Earth Pressures in Soil-Bentonite Cutoff Walls	2416
<i>D. G. Ruffing, J. C. Evans, M. A. Malusis</i>	
A Practical Method to Account for Strength Variability of Deep-Mixed Ground	2426
<i>G. M. Filz, M. P. Navin</i>	
I-78 and PA-33 Sinkhole Mitigation Measures	2434
<i>Michael Perlow Jr., Michael Franceschina</i>	
Comparison of Measured and BEM Computed Contact Area between Roller Drum and Layered Soil	2444
<i>O. M. Musimbi, R. V. Rinehart, M. A. Mooney</i>	

SOIL-CEMENT: ADVANCES IN MIX DESIGN, GEOCHEMISTRY, AND PERFORMANCE

Stabilization and Erosion Control of Slopes Using Cement Kiln Dust	2454
<i>Ghazvinian Bahareh, Razavi Mehrdad</i>	
Behavior of Vertical Hydraulic Barriers Composed by Sandy Soil, Bentonite, and Cement Subjected to Alkaline Contaminants	2462
<i>K. S. Heineck, R. G. Lemos, C. E. R. Lautenschlager, N. C. Consoli</i>	
Design and Pilot Tests of Binder Stabilization of Oily Refinery and Dredged Marine Sediments	2472
<i>K. Fabian, V. Schifano, J. De Jong</i>	
A Laboratory Study of Binder Stabilization of Oily Refinery and Dredged Marine Sediments	2482
<i>V. Schifano, K. Fabian</i>	
Evaluation of Two Aluminum Powders for Soil-Cement Applications	2492
<i>Maria Chrysochoou, D. Grubb, Jeff Fair</i>	

ANALYSIS AND MODELING OF PAVEMENT LAYERED SYSTEMS

Yeager Airport Runway Extension: Tallest Known 1H:1V Slope in U.S.	2502
<i>John M. Lostumbo</i>	
A Best-Fit Rigid Pavement Back-Calculation Method Based on Site-Specific FEM Analysis	2511
<i>J. F. Marchant, A. T. Papagiannakis</i>	

VOLUME 4

Sensitivity Analysis and Calibration of the Alligator Cracking Model Using Regional Data	2521
<i>Vivek Jha, Yusuf Mehta, Alan Norton, Christopher Tomlinson, Leslie McCarthy</i>	
FDOT Testing and Evaluation of a Beneficial Re-Use Base Course Material	2531
<i>N. Mike Jackson, Scott Schultz</i>	
Finite Element Sensitivity Analysis of Permanent Deformation under Accelerated Loading	2541
<i>Zhong Wu, Xingwei Chen, Zhongjie Zhang</i>	
A Numerical Study on Stress-Strain Responses of Biaxial Geogrids under Tension at Different Directions	2551
<i>Y. L. Dong, Jie Han, X. H. Bai</i>	
A Review on Flexible Pavement Performance Life Assessment	2561
<i>Can Chen, Jie Zhang</i>	

MODELING OF SUBGRADE SOILS AND PAVEMENT MATERIALS

Bearing Strength and Swelling Behavior of Jingmen Expansive Soil	2571
<i>Ling-wei Kong, Ai-guo Guo</i>	
Controlling Preshear Relative Density in Triaxial Tests and Its Effects on Undrained Behavior of Sand	2581
<i>Assem A. Elsayed, Christopher W. Swan</i>	
Simulating Rate-Dependent Behavior of Geogrid-Reinforced Sands by FEM	2591
<i>Fu-Lin Li, F. Peng, Yong Tan, Warat Kongkitkul</i>	

Nonlinear Cyclic Characteristics of Soils	2601
<i>Fred (Feng) Yi</i>	
Applicability of Burger Model in Predicting the Response of Viscoelastic Soil Beds	2611
<i>Arindam Dey, P. K. Basudhar</i>	
Soft Computing Methodology to Determine Pavement Thickness from Falling Weight Deflectometer Testing	2621
<i>O. Pekcan, E. Tutumluer, J. Ghaboussi</i>	
Design of Effective Subsurface Drainage for Flexible Pavement	2631
<i>Robert Liang, Madhar Taamneh</i>	
Evaluation of EICM for Subsurface Moisture, Temperature, and Frost Depth in Flexible Pavements	2641
<i>Madhar Taamneh, Robert Liang</i>	
Application of Random Vibration Techniques to Resonant Column Testing	2651
<i>Jeremy C. Ashlock, Ronald Y. S. Pak</i>	

MECHANISTIC BASED PAVEMENT DESIGN

Modeling Fracture and Failure of Heterogeneous and Inelastic Asphaltic Materials Using the Cohesive Zone Concept and the Finite Element Method	2662
<i>Francisco Thiago Sacramento Aragao, Yong-Rak Kim</i>	
Sensitivity of Predicted Flexible Pavement Performance to Unbound Material Hydraulic Properties	2672
<i>Charles W. Schwartz, Rui Li</i>	
Plastic Deformation of Recycled Base Materials	2682
<i>B. R. Kootstra, A. Ebrahimi, T. B. Edil, Craig H. Benson</i>	

PHYSICO-CHEMICAL RESPONSE OF SOILS

Effect of Alkali Solution of Swell Behavior of Soils with Different Mineralogy	2692
<i>P. Hari Prasad Reddy, P. V. Sivapullaiah</i>	
An Assessment of Soil Parameters Governing Soil Strength Increases with Chemical Additives	2702
<i>N. L. Hussey, A. B. Cerato, J. G. Grasmick, E. S. Holderby, G. A. Miller, W. Tabet</i>	
Laboratory-Prepared Iron Oxide Coatings on Coarse-Grained Soils as Residual Soil Simulants	2712
<i>J. M. Larrahondo, S. E. Burns, W. C. Elliott</i>	
Revealing Fluoride Contaminated Aquifers in Hard Rock Terrain Using Electrical Resistivity and Induced Polarization (IP) Methods	2722
<i>N. C. Mondal, A. V. Rao, V. P. Singh</i>	

FIRING RANGE SOILS: ADVANCES IN CHARACTERIZATION, METAL SPECIATION, AND TREATMENT

The Effect of Plants on Lead Dissolution	2732
<i>A. D. Butler, C. C. Thomas, V. F. Medina, S. L. Larson</i>	
Fragmentation and Distribution of Lead Following Firing into Various Types of Range Soils	2741
<i>C. Griggs, S. L. Larson, G. O'Connor</i>	
Immobilization of Cu, Pb, and W in Mixed Munitions Firing Range Contaminated Soils by Various Amendments	2749
<i>Antonis Karachalios, Mahmoud Wazne, Nicolas Juan Betancur, Santhi Chandra Jagupilla, Christos Christodoulatos, Washington Braidia, G. O'Connor</i>	

GEOENVIRONMENTAL PROCESSES FOR SOIL REMEDIATION AND GEOHAZARD MITIGATION

Characterization and Evaluation of Stabilized/Solidified Heavy Metal Contaminated Clays	2759
<i>U. E. John, I. Jefferson, D. I. Boardman, G. S. Ghataora</i>	
An Experimental Setup for Electromagnetic Stimulation of Air Sparging	2769
<i>Arvin Farid, Harlan Sangrey, Jim Browning</i>	
Comparative Assessment of Contaminant Sorption in Lateritic Soil-Bentonite Mixtures	2779
<i>K. J. Osinubi, A. A. Amadi</i>	
A Feasibility Study on Reducing Flowability of Vacuum Tower Bottoms Using Aggregate	2787
<i>Jie Han, Cheng Lin</i>	

Passive Reactive Berm to Provide Low Maintenance Lead Containment at Small Arms Firing Ranges	2794
<i>M. Thompson, S. L. Larson, y Martin, G. O'Connor, D. Mackie, M. Warminsky</i>	
Treatment of Metals-Contaminated Soil by the Application of Lime and Grasses	2801
<i>A. D. Butler, A. Martin, S. L. Larson, G. Fabian, C. C. Nestler</i>	
Probabilistic Design and Cost Assessment for a Deep Geologic Repository	2811
<i>R. J. Heystee, G. J. E. Kramer, D. L. Petersen</i>	

LANDFILLS

Lysimtery Versus Deep Water Content Monitoring: Field Performance Evaluation of Alternative Landfill Covers	2821
<i>Tarek Abichou, Jubily Musagasa, Kamal Tawfiq, J. Chanton</i>	
Seismic Translational Failure Analysis of MSW Landfills Using Pseudo-Static Approach	2830
<i>Deepankar Choudhury, Purnanand Savoikar</i>	
Spatial Correlation of Groundwater and Leachate Quality Data from a Solid Waste Disposal Site	2840
<i>Banu Sizirici, Berrin Tansel</i>	
Lysimeters versus Actual Earthen Caps: Numerical Assessment of Soil Water Storage	2849
<i>Ramil G. Mijares, Milind V. Khire, Terry Johnson</i>	
Use of SHANSEP Design Parameters in Landfill Design: A Cost/Benefit Case Study	2859
<i>Richard A. Coffman, John J. Bowders, Peter M. Burton</i>	
In-Service Hydraulic Properties of Two Landfill Final Covers in Northern California	2867
<i>Paul D. Schlicht, Craig H. Benson, James M. Tinjum, William H. Albright</i>	

METHANE EMISSIONS AND OXIDATION IN LANDFILLS

Developing a Design Approach to Reduce Methane Emissions from California Landfills	2878
<i>Tarek Abichou, Terry Johnson, Koen Mahtieu, J. Chanton, Mehrez Romdhane, Imane Mansouri</i>	
Methane Emission Estimation and Control through the Life Cycle of MSW Landfills	2888
<i>L. Yuan, T. Abichou</i>	
Methane Oxidation in Landfill Cover Soils	2896
<i>J. Chanton, Tarek Abichou, Gary Hater, Roger Green, Jean Bogner</i>	
Comparison between Field and Laboratory Methane Oxidation Rates	2906
<i>C. D. Roncato, M. Létourneau, A. Cabral</i>	
Hydraulic Aspects of the Design of a Passive Methane Oxidation Biocover	2916
<i>A. M. Abdolazadeh, A. Cabral, J. Lafond, S. Allaire</i>	

SUSTAINABLE GEOTECHNICS: BENEFICIAL USE AND MATERIAL SUBSTITUTIONS

Sustainable Geotechnical Design	2925
<i>D. G. A. Holt, I. Jefferson, P. A. Braithwaite, D. N. Chapman</i>	
A Model for the Characterization of the Scrap Tire Bale Interface	2933
<i>B. J. Freilich, J. G. Zornberg</i>	
Design of Dredged Material Containment Area Dikes on Soft Foundations	2943
<i>K. Badu-Tweneboah, V. M. Damasceno, K. W. Cargill, P. E. Cargill</i>	
Characterization of Slag Fines for Use as a Dredged Material Amendment	2953
<i>D. Grubb, M. Wazne, N. E. Malasavage</i>	

EARTHQUAKE ENGINEERING

SCOP: Gaining Permission for Explosive Blasting near Cultural Resources on Bureau of Reclamation Lands	2963
<i>Jim Devlin, Robert Law, Indradeep Banerjee</i>	
Design Charts for Retaining Walls in Seismic Areas	2973
<i>Yingwei Wu, Shamsheer Prakash</i>	
Analysis of the Effects of Soil Behavior Law on the Transfer and Impedance Functions in Soil-Pile Interaction Models	2982
<i>Kamran Panaghi, Ahmad Mahboubi</i>	

Centrifuge Testing of Segmental Geosynthetic-Reinforced Soil Retaining Walls Subject to Modest Seismic Loading	2992
<i>Huabei Liu, Xiangyu Wang, Erxiang Song</i>	
Application of Interpolation Methods for Peak Ground Acceleration Estimation in Emergency Management of Metropolises.....	2999
<i>M. R. Ghayamghamian, A. Komak Panah, R. Behroo, N. Govahi</i>	
Dynamic Response of Pile Foundation in Partially Saturated Soils	3009
<i>Nadarajah Ravichandran, H. K. Shada</i>	
Wedge Stability Assessment of a High Rock Slope	3019
<i>Dean W. Smith</i>	
Experimental Calibration and Verification of Equivalent Linear Models for Intrinsic Damping in Soil-Structure Dynamics	3029
<i>Andrea Ham, Grant Mott, Judith Wang</i>	
Seismic Soil-Pile-Structure Interaction: Analytical Models.....	3039
<i>Sanjeev Malhotra</i>	
Challenges in Prediction Earthquake-Induced Settlements of Partially Saturated Sands	3052
<i>Majid Ghayoomi, Ali Khosravi, John McCartney, Hon-Yim Ko</i>	

LIQUEFACTION COMPUTATIONAL MODELS

Analytical Study on Mitigation of Liquefaction-Related Damage to Flume Channel Using Sheet-Pile with Drain.....	3062
<i>K. Otsushi, T. Kato, T. Hara, A. Yashima, Y. Otake, K. Sakanashi, A. Honda</i>	
Investigation of Critical Depth of Liquefaction in Soil Deposits Containing Double Loose Sand Lenses	3072
<i>Yadolah Pashang Pisheh, Majdeddin Mir Mohammad Hosseini, Navid Ganjian, Kaveh Shakiba Nia</i>	
A Simplified Coupled Soil-Pore Water Pressure Generation for Use in Site Response Analysis.....	3080
<i>Oscar Moreno-Torres, Youssef M. A. Hashash, Scott M. Olson</i>	

SLOPES

A Slope Stability Case Study by Limit Equilibrium and Finite Element Methods	3090
<i>Lei Wei, Therese Koutnik, Mark Woodward</i>	
Rational Analysis of Slope Stabilization with Piers and Determination of Unfactored Pier Load	3100
<i>Alan J. Esser, Daniel R. Vanden Berge</i>	
Stability Analysis for a Landfill Experiencing Elevated Temperatures.....	3110
<i>Timothy D. Stark, Kamran Akhtar, Manzoor Hussain</i>	
Wave-Induced Failure of Soft Cliff and Its Evaluation.....	3120
<i>S. Kawamura, S. Miura</i>	
Deterministic Landslide Hazard Assessment at Regional Scale	3130
<i>F. Cotecchia, F. Santaloia, P. Lollino, C. Vitone, G. Mitaritonna</i>	
Reduction in Factor of Safety for Various Landslide Repair Works with Earthquake Induced Ground Shaking.....	3140
<i>B. Tiwari, O. Jaime, D. Shrestha</i>	
Application of Recovered Strength in Stability Analysis of Reactivated Landslide, Xuechengzhen, China.....	3149
<i>Shinya Nakamura, Seiichi Gibo, Jun Yasumoto, Sho Kimura, Shriwantha Buddhi Vithana</i>	
Analysis of Landslide Reactivation Mechanisms in Daunia Clay Slopes by Means of Limit Equilibrium and FEM Methods	3155
<i>P. Lollino, G. Elia, F. Cotecchia, G. Mitaritonna</i>	
Influence of Laboratory-Created OCR on Large Deformation Shear Strength: Ring Shear Behaviour of Two Types of Landslide Slip Surface Soil	3165
<i>Shriwantha Buddhi Vithana, Seiichi Gibo, Shinya Nakamura, Sho Kimura</i>	
Examination of Simplified Displacement-Based Methods for Dynamic Analyses of Slopes.....	3175
<i>Farshid Vahedifard, Christopher L. Meehan</i>	
Evaluation of a Complex Landslide by Means of a 3D Geotechnical Model	3185
<i>Camilo Marulanda, Fabio Amaya, William Ruiz, Ramiro Gutiérrez</i>	
A Case Study on Geomorphological Characteristics of Cut Slope Failure in Soksil District, Korea	3196
<i>S. H. Kim, H. B. Koo, J. H. Rhee, J. Y. Lee</i>	
Use of Properly Designed Flexible Barriers to Mitigate Debris Flow Natural Hazards	3207
<i>Andrea Roth, Corinna Wendeler, Frank Amend</i>	

Drained Residual Strength for Landslides	3217
<i>Timothy D. Stark, Manzoor Hussain</i>	

EDUCATION

A Project-Based Introductory Geotechnical Laboratory Course	3227
<i>William A. Kitch, Donald P. Coduto</i>	
America's Research-Active, Geotechnical Faculty Members - A Snapshot of the Community	3237
<i>D. F. Laefer, C. McHale</i>	
Teaching with Case Histories Through Critical Thinking	3247
<i>D. Joseph Hagerty</i>	
Integrating Engineering into a General STEM Program for Middle School Girls	3257
<i>Tanya Kunberger, Kristine Csavina</i>	
Reinvigorating Geology Through Case-Based and Hands-On Learning	3266
<i>A. L. Welker</i>	
The Use of Term Paper Projects to Learn Geo-Engineering	3275
<i>Christopher W. Swan</i>	
Geoengineering and Refereed Journals: A Survey	3285
<i>D. Zekkos</i>	
Using Modern Sensors in High School Science Labs to Promote Engineering Careers	3295
<i>Maged Iskander, Vikram Kapila, Noel Kriftcher</i>	
GeoWall: Creativity, Statistics, and Reliability	3305
<i>Richard A. Coffman, Daniel R. Huaco, John J. Bowders</i>	
Author Index	