

Geotechnical and Structural Engineering Congress 2016

**Phoenix, Arizona, USA
14-17 February 2016**

Volume 1 of 3

Editors:

**C. Yoga Chandran
Marc I. Hoit**

ISBN: 978-1-5108-2388-4

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© (2016) by American Society of Civil Engineers
All rights reserved.

Printed by Curran Associates, Inc. (2016)

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

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

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: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Contents

Blast and Impact

Blast Testing of Pre-Cast Concrete Load-Bearing Wall Panels	1
Michael J. Lowak, Barry L. Bingham, Thomas J. Mander, and John R. Montoya	

Performance of RC Members under Impact Loads	14
S. J. AuYeung and A. Alipour	

Blast and Impact Loading and Response of Structures

Experimentally-Validated Analysis Methods for Steel-Plate Composite (SC) Walls Subjected to Blast and Impact Loads.....	25
Jakob C. Bruhl and Amit H. Varma	

Blast Vulnerability of Underground Tunnels	35
Yousef Alosta	

Bridge and Transportation Structures

PHX Sky Train Phase 1—The Interaction of Structural and Geotechnical Design Considerations	44
John C. Niedzielski	

Advanced Integration and 3-D Visualization of Data from Multiple Nondestructive Evaluation Technologies	57
Jinyoung Kim, Nenad Gucunski, Kien Dinh, and Trung H. Duong	

Tendon Duct Assessment Using Impact-Echo and Ultrasonic Pulse-Echo in Combination with an Automated Scanning System.....	67
Daniel Algernon, Dennis R. Hiltunen, and Christopher C. Ferraro	

Bridges

Effective Width of Integral Bent Caps in Reinforced-Concrete Box-Girder Bridges	77
M. A. Moustafa and K. M. Mosalam	

Nonlinear Dynamic Analysis of Hybrid Sliding-Rocking Bridges	90
Mohammad Salehi and Petros Sideris	

Wind Actions on Cable-Supported Bridges	103
S. O. Hansen, A. D. Horn, and R. G. Srouji	

Seismic Performance of Curved Bridges on Soft Soils Retrofitted with Buckling Restrained Braces.....	118
A. Upadhyay, C. P. Pantelides, and L. Ibarra	

Analysis of Laterally-Loaded Piles in MSE Embankments.....	138
Patrick Wilson, Andrew Lee, and Hubert Law	

Case History: Effects of Permanent Casing on the Axial Resistance of Drilled Shafts	151
John Lee, Curt Basnett, and Saffraz Muhammad	

Buildings

Behavior of Stiffened Skewed Extended Shear Tab Connections.....	163
Mustafa Mahamid and Mutaz Al Hijaj	

Strut-and-Tie Capacity of Partially-Grouted CMU Shear Walls	177
Robin Tuchscherer	

Suitability of Techniques of FRP Retrofit for Historic URM Buildings	190
Brad Cross, Jianwei Huang, and Sara Alinia	

Stability of Trusses: Direct Analysis Method Compared to Experimental Results	201
Jonathan East and Frederick R. Rutz	

Monolithic “Unibody” Light-Frame Structures: An Integrated Solution for Multi-Hazard Mitigation and Building Energy Enhancement	212
Hongyu Zhou, Adam L. Brooks, Zhenglai Shen, and Dominic Hanna	

Numerical Model of an Innovative Damping System Using Superelastic Shape Memory Alloy Rings	226
N. Gao, J.-S. Jeon, R. DesRoches, and D. E. Hodgson	

Business and Professional Practice

Differing Site Conditions—Engineering and Legal Perspectives.....	239
Nick Hudyma and Carolyn J. Fox	

Codes and Buildings

Seismic Performance of Cold-Formed Steel Framed Buildings Using Corrugated Sheet Shear Walls	252
Wenying Zhang, Jie Wang, Mahsa Mahdavian, and Cheng Yu	
Verification of Proposed Seismic Response Factors and Performance Assessment with the Economics of Code Designed High-Rise Steel Buildings.....	264
Nadeem Hussain and M. Shahria Alam	
Seismic Response of High-Rise Mega-Braced Frame-Core Buildings through FE Analysis	276
E. Brunesi, R. Nascimbene, and G. A. Rassati	
Cost-Effective Seismic Isolation Retrofit of Heritage Cathedrals in Haiti.....	288
H. Kit Miyamoto and Amir S. J. Gilani	
On the Upgrading of Hospitals in Mexico City by Using Buckling-Restrained Braces	299
Hector Guerrero, Tianjian Ji, and J. Alberto Escobar	

Earth-Retaining Structures

Risk Evaluation and Mitigation for Mechanically-Stabilized Earth (MSE) Walls—Perspectives from an EPC/EPCM Contractor.....	314
J. L. M. Clemente, K. A. Lamote, J. R. Davie, and M. R. Lewis	
Finite Element Investigation on Patterns of Soil Arching in a Geosynthetics-Reinforced Piled Embankment	329
Young-Hoon Jung, Taehee Lee, Su-Hyung Lee, Il-Wha Lee, and Taesik Kim	
What Voids a Retaining Wall's Stability?	339
Genevieve Tullar Sollenberger, Noel Janacek, and Ronald Gibson	
Combining Multiple Techniques to Complete an Urban Deep Excavation	351
Joel Dellaria and Brett Zitny	
Support of an Excavation—Novartis Institute for Biomedical Research.....	365
Rasim Tumer and Franklin Gryniewicz	
Floating a Building and Deepening a Site: How Strategic Decisions and Strong Collaboration Ensured the Success of a Complex Project	376
T. A. Nelson and S. Burnworth	

Slurry Wall Excavations for a Starter Trench and Receiving Shaft of a New York City Siphon Tunnel Project.....	387
Andrew Cho, Tom Bowers, and Brian Larsen	
Second Avenue Subway Project: Deep Excavation Support of a Cut-and-Cover Station	402
R. Grigson, C. Ho, and P. LeMus	
Feasibility of a Diaphragm Wall with Post-Tensioned Anchors in Non-Controlled Fill Material.....	416
Rozbeh B. Moghaddam, Carlos Yzquierdo Lopez, and Priyantha W. Jayawickrama	
Analysis, Design, and Performance of Anchored, Cast-in-Place Soldier-Pile Walls in Sand, Gravel, and Cobble Soils	428
Samer R. Rabab'ah, John C. Niedzielski, and Madhar M. Taamneh	
Soil Structure Interactions of Retaining Walls.....	439
Ashok K. Chugh, Joseph F. Labuz, and C. Guney Olgun	
Nuclear Safety-Related Drilled Shaft Retaining Walls	455
Paul J. Eggers, Jonathan Dwight, Charles B. Grant, and Maxwell C. Hurd	
As-Built Verification, Condition Assessment, and Forensic Analysis of Mechanically-Stabilized Earth Walls Incorporating Terrestrial Lidar	467
M. P. McGuire, M. B. S. Yust, and J. G. Collin	
Service-State Behavior of Segmental MSE Walls: Evaluation of Design Factors Using Finite Element Analyses	483
B. Leshchinsky and Y. Xie	
The Effect of a Facing Unit on the Stability of Two-Tier MSE Walls	490
Jie Huang, Sepehr Rezaeimalek, Mohammad Rafat Sadat, Charles Aubeny, and Sazzad Bin-Shafique	
Seismic Earth Pressures on Deep Stiff Walls	499
N. Wagner and N. Sitar	
Different Conclusions for a Retaining Wall Failure with Saturated vs. Unsaturated Soil Mechanics	509
Burt G. Look	
Perspectives on the Design of Deep Basement Walls in Southern California before and after Earthquakes.....	522
Marshall Lew	

Design of a Deep Tied-Back Excavation Adjacent to the Los Angeles Metro Red Line Subway	537
Martin B. Hudson, David A. Cefali, Marshall Lew, and Matthew R. Crow	
Fractal Analysis of Crack Evolution in Desiccating Clay and Some Engineering Applications.....	551
Luis E. Vallejo	
Fractal Evaluation of the Evolution of the Void System in a Simulated Granular Material under Direct Shear	560
Luis E. Vallejo	
Temperature Effects on the Unsaturated Hydraulic Properties of Two Fine-Grained Soils and Their Influence on Moisture Movement under an Airfield Test Facility.....	569
Yutong Lu and Claudia E. Zapata	

Embankments, Dams, and Slopes

Effect of Slope Steepness, Void Ratio, and Intensity of Rainfall on Seepage Velocity and the Stability of Slopes	584
B. Tiwari, D. Tran, B. Ajmera, Y. Carrillo, J. Stapleton, M. Khan, and S. Mohiuddin	
Slope Stability Evaluation of Highway Embankments in Large Transportation Projects	591
Behzad Amir-Faryar	

Emerging Topics

Optimized Maintenance Policies for Deteriorating Structures	602
Dena Khatami and Behrouz Shafei	
Bending Deformation of the Steel Core of Buckling-Restrained Braces.....	613
Mitsumasa Midorikawa, Shunsuke Hishida, Mamoru Iwata, Taichiro Okazaki, and Tetsuhiro Asari	
Experimental Evaluation of Steel Moment Resisting Frames with a Nonlinear Shear Fuse.....	624
F. Mahmoudi, K. M. Dolatshahi, M. Mahsuli, A. Shahmohammadi, and M. T. Nikoukalam	
Development of a Geotechnical Engineering Software Package in R and Its Implementation in the Civil Engineering Curriculum.....	635
James Kaklamanos and Kyle T. Elmy	

Parametric Investigation of Factors Influencing the Dynamic Response of Buried Reinforced Concrete Culverts	648
A. Wells, H. Shenton, and K. N. Manahiloh	
Calibration of the Load and Resistance Factors for Axial Pile Capacity Design	660
Suzanne Lacasse, Farrokh Nadim, Zhongqiang Liu, and Young Jae Choi	
Options for the Anchorage of Composite SC Walls to a Concrete Basemat.....	674
Efe G. Kurt and Amit H. Varma	
Rehabilitation of Reinforced Concrete Structures Using Shape Memory Alloys.....	685
Sherif M. Daghash and Osman E. Ozbulut	
Sustainability Comparison of a Geosynthetic-Reinforced Soil Abutment and a Traditionally-Founded Abutment: A Case History.....	699
Erin K. Phillips, Craig M. Shillaber, James K. Mitchell, Joseph E. Dove, and George M. Filz	
Building Code Evolution Due to Extreme Events.....	712
S. Nikolaou and R. Gilsanz	

Foundations

Optimization of Drilled Shaft Design Using High Strain Dynamic Monitoring	724
E. A. Sellountou, P. Hagerty Duffy, and T. P. Holman	
Geotechnical Engineering for the Remediation of Structures on Collapsing Soils	735
Robert W. Thompson and John Mechling	
Remediation of Differential Settlement in Residential Structures on Collapsible Soil in Western Colorado	747
Kenneth Cobb and James Robert Harris	
Structural Engineering for the Remediation of Masonry Buildings on Collapsible Soils	760
Frederick Rutz, James Harris, and Jennifer Harris	
Construction of the Remediation of Masonry Buildings on Collapsible Soils	774
Robert Schiermeyer and Joe Harris	

Mitigation of Unforeseen Subsurface Conditions through Geotechnical and Structural Collaboration	785
Duncan Paterson and Doug Voegeli	
Repositioning of the Cumberland River Swing Bridge.....	794
Duncan Paterson and Justin Anderson	
Innovative Design for the Colton Flyover Grade Separation of UPRR and BNSF, Colton, CA	801
J. Anderson and J. Teig	
Innovative Design for the Merchants Bridge West Approach Reconstruction for TRRA in St. Louis, MO.....	817
Lyndsie Janbakhsh, Justin Anderson, and Kevin Kriete	
Study of Combined Pile Raft Foundations for Heavy Dynamic Equipment	829
Zhong (John) Liu, Jerold A. Bishop, and Jon K. Lindsey	
High-Rise on Spread Footings and Piles: A Design Solution as a Flexible Mat on Piles	841
Evelio N. Horta	
<i>Foundations and Rain Loads</i>	
Why Worry about Existing Bridges Recently Designated as Scour Critical?	851
William A. Horne	
<i>Geohazards</i>	
Compressive Strength Behaviour of Stone Dust and EPS Beads-Based Material	862
Vaishali R. Marjive and B. Ram Rathan Lal	
<i>Ground Improvement</i>	
Control Water Leaks in Cracked Concrete Using Epoxy Grout	871
C. Vipulanandan and M. B. Kazez	
Nanoparticle and Surfactant-Modified Smart Cement and Smart Polymer Grouts	884
C. Vipulanandan, K. Ali, and P. Ariram	
System Identification of a Steel Frame Using Defective Sensor Data.....	897
T. J. Matarazzo, M. Kurata, M. Nakashima, and S. N. Pakzad	

Temperature-Based Model Updating of Bridge Structures	909
M. T. Yarnold and B. R. Murphy	
Ground Improvement on Strip-Mined Sites: Using Dynamic Compaction to Remediate Mine Spoil Sites	921
Christian B. Woods, Samuel J. Drumheller, and Joe C. Drumheller	
Thermally-Induced Displacement and Stress Analysis of Geothermal Energy Piles in Sand.....	931
Rajni Saggan and Tanusree Chakraborty	
Large-Scale Bio-Cementation Improvement of Sands.....	941
Michael G. Gomez, Jason T. DeJong, Collin M. Anderson, Douglas C. Nelson, and Charles M. Graddy	
Recent Developments of Vacuum-Assisted Consolidation of Soft Estuarine Clays.....	950
Buddhima Indraratna, Cholachat Rujikiatkamjorn, and Rui Zhong	
Roger Arena, South Tower, Vancouver, BC, Canada: Jet Grouting for the Structural Underpinning of the Existing Georgia Viaduct Foundations and Temporary Excavation Support.....	960
Paolo Gazzarrini, Matt Kokan, Stephen Jungaro, and Dan Hunt	
Assessing Soil Disturbance while Installing Vertical Drains	971
Cholachat Rujikiatkamjorn, Darshana Perera, and Buddhima Indraratna	
Targeted Ground Engineering for a Gas Plant in Pilbara Region, Australia	982
Mahi Galagoda, Mark J. Wahler, Pramod Rao, Michael Sholley, and Fredrick Tajirian	
Centrifuge Tests on Laterally-Loaded Footings Supported by Rigid Inclusion-Reinforced Clay	996
Alfonso J. Rivera, C. Guney Olgun, John S. McCartney, Frederic Masse, and Thomas L. Brandon	

Grouting

Soil-Hydraulic Conductivity Control via a Biopolymer Treatment-Induced Bio-Clogging Effect	1006
Ilhan Chang, Jooyoung Im, and Gye-Chun Cho	

Infrastructure Health Monitoring

- Innovative Sensors for Monitoring the Corrosion of Steel Embedded in Concrete Structural Components**1016
Udaya B. Halabe, Jonas Kavi, and Hota V. S. GangaRao

- Effects of Temperature Variations on Structural Vibration Properties**1032
Navid Zolghadri, Marvin W. Halling, and Paul J. Barr

- Application of a Pre-Scaling Assembly Approach in the Automation and Improvement of Global Mode Shapes Computation through Subspace-Based Modal Analysis**1044
M. Farshchin and C. V. Camp

Nonbuilding Structures, Nonstructural Components, and Their Foundations

- Seismic Analysis of Ground-Supported Tanks Using the Vertical Response Spectrum.....**1054
Jordan Morris, Leonel Almanzar, and Ronnie Chu

- Modeling the Impact of Adjacent Spans in Overhead Distribution Lines on the Wind Response of Utility Poles**1067
Yousef Mohammadi Darestani and Abdollah Shafieezadeh

- Evaluation and Design of a Foundation System for Automated Stacking Cranes at the Port of Los Angeles, Berths 144-145 Automated Terminal**1078
Milind Desai, John Lee, Adrienne Fedrick, and Christina Sar

- Stability Analysis of an Excavation Based on the Regression Analysis of an In Situ Stress Field**1092
Qi Ge, Xin Chen, Xinguo Yang, and Feng Xiong

- Seismic Site Response Analysis of a Cairo Metro Tunnel.....**1114
M. A. Adam, A. M. Elleboudy, and M. F. Soliman

- Natural Frequency Analysis of a Wind Farm Turbine-Pile-Foundation System**1127
D. Pan, Z. Cheng, and A. Lucarelli

- Field Test and Numerical Analysis of Monopiles for Offshore Wind Turbine Foundations**1138
D. Pan, A. Lucarelli, and Z. Cheng

- Geotechnical Design Considerations for Onshore Wind Turbine Shallow Foundations**1153
Eric Ntambakwa, Hao Yu, Carlos Guzman, and Matthew Rogers

Pavements

Performance Comparison between Fiber-Reinforced and Rubber-Modified Asphalt.....	1166
Chun-Hsing Ho and Junyi Shan	
Fractal Analysis of the Cracking and Failure of Asphalt Pavements.....	1176
Luis E. Vallejo	
Expansive Subgrade Behavior on a State Highway in North Texas	1186
Md. Sahadat Hossain, Asif Ahmed, Mohammad Sadik Khan, Al Aramoon, and Boon Thian	
Determination of the Structural Coefficient of Different Combinations of Cement-Treated/Untreated Recycled Base Materials.....	1198
M. Faysal, M. Mahedi, Al Aramoon, B. Thian, M. S. Hossain, M. A. Khan, and M. S. Khan	

Pavements and Wind Issues

Innovative Meshless Computational Method for the Analysis of Fiber-Reinforced Concrete (FRC) Structures	1209
Mi G. Chorzepa and Amin Yaghoobi	
Alternative Approaches to the Local Calibration of AASHTOWare Pavement ME Design Jointed Plain Concrete Pavement (JPCP) Smoothness Models.....	1222
Orhan Kaya, Halil Ceylan, Sunghwan Kim, and Kasthurirangan Gopalakrishnan	
Strength Characterization of Untreated and Cement-Treated Recycled Flex-Base Materials	1233
M. Faysal, M. Mahedi, Al Aramoon, B. Thian, M. S. Hossain, and M. S. Khan	
Engineering Objectives for Performance-Based Wind Design	1245
Russell Larsen, Ron Klemencic, John Hooper, and Kevin Aswegan	
Wind Performance Assessment of Buildings	1259
J. P. Judd and F. A. Charney	
Performance-Based Engineering of Wind-Excited Structures: A General Methodology	1269
S. M. J. Spence, W. C. Chuang, P. Tabbuso, E. Bernardini, A. Kareem, L. Palizzolo, and A. Pirrotta	

Development of Empirically-Based Fragilities of Residential Damage in the 2011 Joplin, Missouri, Tornado	1283
David B. Roueche, Franklin T. Lombardo, and David O. Prevatt	
How Are the Subsurface Drainage Outlets in Iowa Roadways with Recycled Concrete Aggregate Base Performing?	1295
Sunghwan Kim, Halil Ceylan, Kasthurirangan Gopalakrishnan, and Bo Yang	
Effect of As-Compacted Moisture Content and Density on Pavement Performance in Different Climatic Regimes	1303
Pugazhvel Thirthar Palanivelu, Claudia E. Zapata, and Shane Underwood	

Performance-Based Design

Evaluating the Effectiveness and Optimal Design of Isolation Bearings and Fluid Dampers for a Highway Bridge Using a Fragility Function Method and Genetic Optimization	1317
Yazhou Xie and Jian Zhang	

Reliability and Risk Assessment

Seismic Risk Assessment for Northern Haiti Based on Geotechnical Investigation and Building Typologies.....	1331
Amir S. J. Gilani, H. Kit Miyamoto, Michael E. Kalinski, and Tsutomu Nifuku	

Seismic Fragility Analysis for Semi-Actively Controlled Structures Using MR Dampers	1343
J.-W. Bai and Y.-J. Cha	

Time-Dependent Reliability Analysis of Reinforced-Concrete Bridges Including Deterioration Effects	1354
Hussam Mahmoud and Adeel Zafar	

Application of Bayesian Methods to Probabilistic Seismic Demand Analyses of Concrete Box-Girder Bridges	1367
S. Mangalathu, J.-S. Jeon, R. DesRoches, and J. Padgett	

Extended Kalman Filter for the Inverse Analysis of a Supported Excavation Based on Field Monitoring Data for Improving Predictions of Ground Responses.....	1380
Lei Wang, Sara Khoshnevisan, Zhe Luo, and C. Hsein Juang	

Resiliency and Sustainability

Compression Behavior of Foundry Sands	1392
Jie Yin, Ali Soleimanbeigi, William J. Likos, and Tuncer B. Edil	
Geotechnical Properties of Clays Modified with Recycled Crumb Rubber.....	1404
Beena Ajmera, Binod Tiwari, and Janak Koirala	
Preliminary Results of Two Large-Scale Experiments on Ring-Shaped Steel Plate Shear Walls.....	1414
A. R. Phillips and M. R. Eatherton	

Creep Behavior of Recycled Asphalt Pavement Compacted at Elevated Temperatures	1426
Jie Yin, Ali Soleimanbeigi, Benjamin J. Warren, William J. Likos, and Tuncer B. Edil	
Effect of Bagasse Fiber on the Properties of Compressed Cement Stabilized Earth Blocks	1435
Rakshith P. C. Gowda and Claudia E. Zapata	

Seismic and Geo-Hazards

Building on Liquefiable and Compressible Soil for a Major Transit Project in Salem, Massachusetts	1450
T. H. Fuselier, J. K. Morrison, and Z. Zafir	
Effect of Shaking History on the Cone Penetration Resistance and Cyclic Strength of Saturated Sand.....	1460
K. M. Darby, J. D. Bronner, A. M. Parra Bastidas, R. W. Boulanger, and J. T. DeJong	
Liquefaction Case History: Comparing Methods.....	1472
M. D. Boone, R. J. Williams, and M. R. Lewis	
Potential for Liquefaction-Induced Lateral Spreading in Interbedded Deposits Considering Spatial Variability	1484
S. K. Munter, C. P. Krage, R. W. Boulanger, J. T. DeJong, and J. Montgomery	
Vertical Ground Deformations Induced by the Mobilization of a Strike-Slip Fault Segment and Their Effects on Engineering Structures	1495
Luis E. Vallejo and Mahiru Shettima	

Geotechnical and Structural Observations and Considerations—Buildings	
Overlying Fault Rupture.....	1504
A. Kropp and C. Comartin	
Influence of Mineralogy and Plasticity on the Cyclic and Post-Cyclic	
Behavior of Normally Consolidated Soils.....	1522
Beena Ajmera, Binod Tiwari, and Thomas Brandon	
Mineralogical Effect on Idealized, Normalized Strength Curves for	
Over-Consolidated Clays	1532
Beena Ajmera, Binod Tiwari, and Krishna Pantha	
Effect of Pre-and Post-Earthquake Rainfall Events on the	
Deformation and Stability of Slopes	1540
B. Tiwari, D. Tran, B. Ajmera, H. Oli, and J. Stapleton	
Why the Oso Landslide Caused So Much Death and Destruction.....	1545
Rupert G. Tart	
Static and Seismic Analyses of the Zipingpu Dam Using an Advanced	
Bounding Surface Plasticity Model.....	1555
Mojtaba E. Kan and Hossein A. Taiebat	
Numerical Analysis of the Response of Soft Foundation Soils under Tall	
Embankments and Retaining Walls.....	1567
M. G. Bozkurt and D. Fratta	
Physical Vulnerability of Building Structures to Debris Flow Events	
Using Empirical and Numerical Methods	1578
Hyo-Sub Kang, Dae-Ho Yun, and Yun-Tae Kim	
Mapping Climate Change, Landslide Hazards, and Vulnerability:	
A Case Study from Seoul, South Korea.....	1588
Ananta M. S. Pradhan, Hyu-Sub Kang, and Kim Yun-Tae Kim	
Reconnaissance Study on the Rainfall-Induced Failure of the Izu-Oshima	
Volcanic Mountain Slope	1596
Ikuo Towhata	
<i>Seismic Hazard Analysis—Geotechnical and Structural Implications</i>	
History and Practice of Geotechnical Performance-Based Seismic	
Design in Seattle	1606
Doug Lindquist, Ben Blanchette, and John Hooper	

Site Characterization

Load-Deformation Behavior of a Stone Column Using the Coupled DEM-FDM Method	1618
N. T. Ngo, B. Indraratna, and C. Rujikiatkamjorn	
Computational Modeling of an End-Bearing Heat Exchanger Pile Subjected to Mechanical and Thermal Loads.....	1627
M. Miletić, D. Perić, and X. Wu	
Settlement from Seismic Compression at a Vertical Array near a Nuclear Power Plant.....	1638
Eric Yee and Jonathan P. Stewart	
Static and Dynamic Properties of Compacted Soil-Cement Mixtures	1646
S. Upadhyaya, B. Tiwari, and G. Olgun	
Correlation between Laboratory Tested Soil Samples to Obtain Effective Strength Envelopes Based on Field Data.....	1655
Oswaldo Bravo, Deepak K. Neupane, Steven M. Levorson, and Elizabeth M. Smith	
Effect of Prior Strain History on the Cyclic Strength and CPT Penetration Resistance of Silica Silt.....	1664
A. B. Price, J. T. DeJong, R. W. Boulanger, A. M. Parra Bastidas, and D. Moug	
Optimizing Non-Invasive Techniques for Surface and Sub-Surface Soil Characterizations for a Slope in Lebanon.....	1675
E. Ibrahim, N. Salloum, C. Cornou, D. Youssef Abdel-Massih, C. Abdallah, F. Hage-Chehade, J. Harb, L. Khalaf-Kairouz, G. Nasr, M. Rahhal, and A. Sursock	
Application of MASW Methods for Investigations of Shear Wave Velocity in Residual Soils of Singapore	1688
Sung-Woo Moon, Qasim Khan, and Taeseo Ku	
The Deformation and Degradation of Granular Material under High-Frequency Cyclic Loading	1700
Q. D. Sun, B. Indraratna, and S. Nimbalkar	
Hydraulic Behavior of Infilled Fractured Rocks under Unsaturated Conditions.....	1708
Ali Khosravi, Sayedmasoud Mousavi, and Ali Dadashi Serej	
Dynamic Testing of a Laboratory Stadium Structure	1719
Osama Abdeljaber, Adel Younis, Onur Avci, Necati Catbas, Mustafa Gul, Ozan Celik, and Haiyang Zhang	

Active Control of Concert-Induced Vibrations	1729
E. J. Hudson, P. Reynolds, M. Nelson, N. Christie, and V. Salcedo	
 <i>Soil-Structure Interaction</i>	
Strain Compatibility and Safe Use of High-Strength Steel Reinforcement in Confined Micropiles	1742
T. P. Holman, J. R. Wolosick, and Thomas D. Richards Jr.	
A Case Study of Risk Assessment and Mitigation during Design and Construction in Karstic Geology	1755
N. Textor and E. Backlund	
Micropiles Ease Historic Pittsburgh Bridge Replacement	1766
B. D. Barkauskas, D. E. Splitstone, J. A. Fuller, and J. A. Nemmer	
Office Building Settlement and Remediation.....	1775
M. A. Sabry and M. Sabry	
Mixed Foundation Design Methodology for the Dr. P. Phillips Performing Arts Center, Phase 1	1785
R. Kenneth Derick	
Case History: Iterative Foundation Design for a New Women's Hospital in Orlando, Central Florida.....	1793
A. M. Sallam and K. G. Casey	
Monitoring of a Los Angeles Metro Red Line Subway Deflection Due to Adjacent Deep Excavation	1805
Martin B. Hudson, Tomasz Dobrowolski, Marshall Lew, Matthew R. Crow, John T. Waggoner, and Pierre Romo	
Prediction and Observation of a Los Angeles Metro Red Line Subway Tunnel's Response to Adjacent Deep Excavation.....	1820
Yiming Sun, Martin B. Hudson, John T. Waggoner, Roozbeh Geraili Mikola, Jacqueline L. Patterson, Matthew R. Crow, and John Yao	
Tunnel Lining Design: Seven Things You Need to Know.....	1834
Gary Brierley, Mohamed Gamal, and Russell Berends	
Soil-Structure Interaction Response of Deeply Embedded Structures—The Racking Phenomenon	1850
L. M. Anderson, N. Deng, and F. Ostadan	
Uplift Performance of Spun-Cast Ductile Iron Piles	1860
Ahmed Fahmy and M. Hesham El Naggar	

- Foundation Alternatives for Ground Mount Solar Panel Installations.....1873**
Alan J. Lutenegger

Structural Health Monitoring of Geotechnical Systems

- Dynamic Evaluation of a Bridge Substructure with Experimental Modal Analysis.....1886**
Qiang Mao, John DeVitis, Matteo Mazzotti, John Braley, Ivan Bartoli, Kurt Sjoblom, Franklin Moon, and Emin Aktan

- Bridge Foundation Stiffness Identification1897**
Masoud Sanayei and Nathan Davis

- A Comparative Study of Compressive Sensing Approaches for a Structural Damage Diagnosis1910**
Nur Sila Gulgec, S. Golnaz Shahidi, and Shamim N. Pakzad

- Real-Time Dynamic Structural Monitoring for Urban Construction1920**
A. M. Ramakrishna, R. R. Mankbadi, D. S. Tuckman, and A. Guirguis

- Cost-Effective Bridge Safety Inspections Using Unmanned Aircraft Systems (UAS).....1931**
Matthew N. Gillins, Daniel T. Gillins, and Christopher Parrish

Sustainability and Resilience

- Joint Seismic and Scour Fragility Assessment of a Steel Building Incorporating Soil-Structure Interaction1941**
Junwon Seo and Raunak Shukla

- Learning to Survive: Disaster Resilience in Developing Countries1952**
Erica C. Fischer and Sally J. Gimbert Carter

- Collapse Performance of Existing Buildings after Loss of Load-Bearing Walls and Columns.....1966**
H. Sezen

- Integrity of Precast Concrete Structures to Resist Progressive Collapse.....1976**
Kai Qian, Bing Li, and Yi Liu

- Evaluation of Stiff Stories for Robustness in Steel Buildings1987**
G. Cortes, J. Liu, and R. Chicchi

Testing and Modeling

- Low Cycle Fatigue Propagation in Steel Moment Frames Subjected to Seismic Loads**1999
E. K. Abbas and M. R. Eatherton

- Serviceability Behavior of Reinforced Concrete Discontinuity Regions**2010
Jessica Kettelkamp and Robin Tuchscherer

Underground Construction

- Optimum Design of a Shallow-Buried Urban Metro Station Using the Diaphragm Wall Construction Method.....**2023
Reza Nemai and Ali Payandeh

- Comparisons of Two Approaches for the Design of Retaining Walls Supported on Drilled Piles**2035
M. A. Dafalla, M. A. Al-Shamrani, F. S. Al Subaie, S. K. AlFouzan, and A. Charif

- SEM Crossover Cavern in Downtown L.A.**2043
Carlos Herranz, Derek Penrice, Justin Lianides, and Zsolt Horvath

Unsaturated Soils

- Effect of Desiccation Cracking on the Swell and Swell Pressure of Expansive Clay.....**2054
S. Abbaszadeh, S. L. Houston, and C. E. Zapata

- Challenges in the Seismic Modelling of Soil-Structure Systems with Unsaturated Soils Using Geotechnical Centrifuge.....**2066
Morteza Mirshekari and Majid Ghayoomi

- Modelling the Load-Settlement Behavior of Model Piles in Unsaturated Sand and Glacial Till.....**2075
Mohammed Al-Khazaali, Zhong Han, and Sai K. Vanapalli