

Selected Papers from the Proceedings of Geo-Chicago 2016

GSP 272



Geo-Chicago 2016: Sustainable Materials and Resource Conservation

EDITED BY Krishna R. Reddy, Ph.D., P.E., D.GE; Nazli Yesiller, Ph.D.; Dimitrios Zekkos, Ph.D., P.E.; Arvin Farid, Ph.D., P.E.; and Anirban De, Ph.D., P.E.

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Preface

Geo-engineers and geo-scientists have been playing a major role in providing, protecting, and preserving infrastructure and the environment. Many innovative technologies and practices are constantly being developed and implemented. Evolving global climate change and exploding world population are leading to major concerns such as extreme geohazards, increased environmental pollution, and rapid depletion of natural resources. These new challenges can be addressed with new and innovative concepts, materials, energy sources, technologies, and practices. Sustainability and resiliency have become essential in the development of new materials and infrastructure systems. *Geo-Chicago 2016: Sustainability, Energy, and the Environment* held in Chicago August 14-18, 2016, provided a unique opportunity to highlight recent advances, new directions, and opportunities for sustainable and resilient approaches to design and protect infrastructure and the environment.

The Geo-Chicago 2016 Conference attracted a significant amount of interest and in the end more than 350 papers were accepted for publication. The papers are divided into five Geotechnical Special Publications (GSPs) that capture the multidisciplinary aspects and challenges of sustainability and resiliency, energy and the geoenvironment.

The first GSP, *Sustainability and Resiliency in Geotechnical Engineering*, addresses major broad issues related to sustainability and resilience in geotechnical and geoenvironmental engineering, including carbon sequestration as well as characterization, analysis, monitoring, and response to geohazards and natural disasters, including earthquakes and landslides. Advances in emerging technologies and materials such as bio-mediated soils and nanomaterials are also presented.

The second GSP, *Geotechnics for Sustainable Energy*, tackles the new and innovative ways of storing and extracting energy in and from geotechnical media and structures such as shallow and deep ground, piles and foundations, and landfills. The second GSP also presents the challenges of the energy storage and extraction at the field and lab scales as well as its numerical and experimental modeling.

The third GSP, *Sustainable Geoenvironmental Systems*, addresses recent advances in landfill engineering and geosynthetics used for geoenvironmental systems, as well as advances in sustainable barrier materials and systems. The third GSP also presents studies into slopes, dikes, and embankment, the application of ground improvement in geoenvironmental applications, and the geoengineering of mine wastes and industrial byproducts.

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The fourth GSP, *Sustainable Materials and Resource Conservation*, describes the properties and applications of new, recycled, and residual materials, detailed/improved characterization of soils with laboratory and field testing methods, and effects of chemicals and other environmental factors on properties and behavior of soils. The fourth GSP also presents the approaches and use of modeling and simulations in geoengineering.

The fifth GSP, *Sustainable Waste Management and Remediation*, addresses various aspects of remediation, contaminated materials, containment, policy, and education. In addition, international perspectives are included to provide further context on challenges and innovations in geoenvironmental engineering on a global scale.

Following standards of practice of the Geo-Institute of the American Society of Civil Engineers, each paper published in these Geotechnical Special Publication (GSPs) was peer reviewed by at least two anonymous, qualified, technical reviewers (and in some cases three or four reviewers) and selected for publication by the proceedings editors. An advanced document management service was utilized in order to assure anonymity and maintain uniformity of standards. As such, the papers contained in these proceedings are eligible for discussion in the ASCE Journal of Geotechnical and Geoenvironmental Engineering and for ASCE awards.

The Editors

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Acknowledgments

The success of Geo-Chicago 2016 is credited to the session chairs and authors of the technical papers and also plenary session presenters for their valuable contributions to the geotechnical literature. The commendable quality of the Conference's technical content and these proceedings are also the result of the efforts of the hundreds of reviewers. We thank the session chairs, authors and reviewers for generously contributing their valuable time and expertise, in many cases, under time pressure and demanding deadlines.

The following individuals served as the conference program committee. They deserve special acknowledgment and recognition for their extraordinary efforts in making this Conference a reality and a resounding success:

- Conference Chair – Krishna R. Reddy, University of Illinois at Chicago
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The Editors sincerely appreciates the help and patience of Ms. Helen Cook and Mr. Brad Keelor of Geo-Institute of the ASCE for their help in managing the paper submissions and organization of the conference.

We hope that these GSPs will serve as valuable references to all working in geoengineering.

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Contents

New, Recycled, and Residual Materials: Properties

A Study on the Effect of Oxide Compositions on the Compressive Strength Characteristics of Geopolymer Concrete 1
M. Srinivasula Reddy, P. Dinakar, B. Hanumantha Rao, B. K. Satpathy, and A. N. Mohanty

Engineering Properties of Foamed Recycled Glass as a Lightweight Fill.....11
Robert H. Swan Jr., Seungcheol Yeom, Kurt J. Sjoblom, Timothy D. Stark, and Archie Filshill

Evaluation of the Compaction Characteristics of Untreated and Treated Red Mud 23
N. Gangadhara Reddy and B. Hanumantha Rao

An Experimental Study on Stone Dust and EPS Beads Based Material.....33
Vaishali R. Marjive and B. Ram Rathan Lal

Geotechnical Properties of Aged Municipal Solid Waste Incineration Fly Ash.....42
Yibo Zhang, William J. Likos, Ali Soleimanbeigi, Jiannan Chen, and Tuncer B. Edil

Improvement of the Geotechnical Properties of Sandy Soil Using Shredded Polyethylene Terephthalate (PET) Wastes.....52
Oluwapelumi O. Ojuri and Alex O. Ozegbe

The Shear Strength of "Tunable" Clay-Polymer Composite under Various Ionic Concentrations.....61
Bijoy K. Halder and Angelica M. Palomino

Stockpiling Recycled Concrete Aggregate: Changes in Physical Properties and Leachate Characteristics Due to Carbonation and Aging.....73
Aiyoub Abbaspour, Burak F. Tanyu, Bora Cetin, and Michael C. Brown

The Use of Sodium Pyrophosphate to Improve a Translucent Clay Simulate 83
Ryan D. Beemer, Elliese Shaughnessy, Kristen R. Ewert, Nicholas Boardman, Giovanna Biscontin, Charles P. Aubeny, and Francisco J. Grajales

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New, Recycled, and Residual Materials: Applications

Coast Guard Airport Rigid Pavement Rehabilitation and Storm Water Mitigation 94
J. Amendolara, B. Wolhaupter, E. Bogdan, B. Johannsen, J. Kramb, Hudson Jackson, and Kassim Tarhini

The Complete Recycling of Waste Concrete to Produce Geopolymer Concrete 103
Xin Ren and Lianyang Zhang

Effects of Shredded Rubber Tires on Bean Growth When Used as a Fill Material in Local Memphis Area Loess 112
Andrew Assadollahi, Jodie Crocker, and Brian Harris

Fly Ash and GGBS Mixtures for Geotechnical and Geo-Environmental Applications 121
Anil Kumar Sharma and P. V. Sivapullaiah

Improving Fine Dredge Material for Use as Fill Material 131
Andrew F. Lund, Curtis Cammack, and David A. Saftner

Innovative Cellular Confinement Systems for Retaining Walls 139
G. S. Manju and G. Madhavi Latha

Optimum Base Width of Gravity Retaining Walls of Narrow Backfilled with Recycled Materials 149
B. Munwar Basha, Shaik Moin Ahmed, Arif Ali Baig Moghal, and Kandukuri Shanker

The Sustainable Application of Fly Ash in Bridge Abutments 159
Vahid Alizadeh

The Sustainable Use of Plastic Waste in Engineering and Sewer Pipe Applications 167
Naji N. Khoury

Laboratory Characterization: Engineering Properties

A Review on the Influence of Rock Quarry Dust on Geotechnical Properties of Soil 179
Malaya Chetia and Asuri Sridharan

A Systematic Approach towards the Assessment of Sand Bed Preparation Using the Air Pluviation Technique 191
Priyanka Ghosh, V. Srinivasan, and Shubham Srivastava

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An Equation Describing the Shear Modulus of Unsaturated Soil 201
Corrie Walton-Macaulay, L. Sebastian Bryson, and Brock Kidd

Cohesionless Soil Fabric and Shear Strength at Low Confining Pressures.....212
Katherine E. Winters, Oliver-Denzil S. Taylor, Woodman W. Berry,
Wesley R. Rowland, and Mark D. Antwine

Deformation and Degradation of Railroad Granular Layers under High Frequency Cyclic Loading and the Benefits of Using Geosynthetics.....222
Sanjay Nimbalkar, Buddhima Indraratna, and M. Mahdi Biabani

Dependency of a Small-Strain Shear Modulus on Suction Stress.....233
Yi Dong and Ning Lu

The Development and Evaluation of a Time Domain Reflectometry Probe for Soil Moisture and Suction Measurement 242
Xinbao Yu, Nan Zhang, and Anand J. Puppala

Effect of Dust Ratios on the Strength of Aggregates with Low Plasticity Fines 253
Abdolreza Osouli, Sajjad Salam, Erol Tutumluer, Sheila Beshears, and Stefan Flynn

Effect of Temperatures on the Dynamic Properties of Asphaltic Core for an Earth Dam 266
Emad Gheibi, Inthuorn Sasanakul, Maria V. Sanin, and Humberto Puebla

Experimental Measurement of the Permeability of Calcareous Sands in the South China Sea.....276
Yin Wang, Yubin Ren, and Qing Yang

Experimental Study on Steel-Wire-Mesh Reinforced Flexible Pavements.....287
G. Narendra Goud, C. Hariprasad, and B. Umashankar

Infrared Oven for the Determination of Soil Moisture Content 297
S. T. C. So, T. M. F. Lau, and T. H. H. Hui

Small- to Large-Strain Shear Modulus and Damping Ratio of Sand-Tyre Crumb Mixtures 305
P. Anbazhagan and D. R. Manohar

Small-Strain Shear Modulus Model for Saturated and Unsaturated Soils.....316
Yi Dong, John S. McCartney, and Ning Lu

Undrained Strength Characterization of Compacted Earthen Embankment Core Material.....326
Robert V. Rinehart and Eric A. Bergstrom

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Laboratory Characterization: Chemical Effects

Effect of the Na_2SiO_3/NaOH Ratio and NaOH Molarity on the Synthesis of Fly Ash-Based Geopolymer Mortar.....336
P. Pavithra, M. Srinivasula Reddy, P. Dinakar, B. Hanumantha Rao, B. K. Satpathy, and A. N. Mohanty

Effects of LNAPLs Contamination on the Basic Properties of Silty Clay.....345
Hanliang Bian, Songyu Liu, Guojun Cai, Ya Chu, and Ling Tian

Evaluating the Effect of Fluorescence on the Raman Spectroscopic Analysis of Chlorinated Solvents.....355
Chike K. Monwuba and Joseph V. Sinfield

Experimental Investigation of the Effect of Salt Leaching on the Compression Behavior of Reconstituted Wenzhou Clay 367
Miaomiao Song, Zi Ying, and Chongqi Zhang

Impedance-Based Water-Quality Monitoring Using the Parallel-Plate Method.....378
Ali Nazari, Arvin Farid, and Ken Cornell

Laboratory Calibration of an Electronic Tongue for the Detection of Lead and Cadmium in Water 393
Connor Sullivan and Pradeep Kurup

Leaching Characteristics of Recycled Asphalt Shingles Mixed with Industrial Byproducts as Structural Fills.....400
Jiannan Chen, Ali Soleimanbeigi, Yibo Zhang, Tuncer B. Edil, and Lin Li

Long-Term Leaching Characteristics of Chromite Ore Processing Residue Using Synthetic Groundwater 411
Jongwan Eun, Jiannan Chen, and James M. Tinjum

Optical Characterization of Transparent Gelita Using the Modulation Transfer Function.....421
Manouchehr Hakhamaneshi, Jonathan A. Black, and Alireza Tatari

Shear Strength and Permeability of Granite Residual Soil—The Influence of BTEX Components.....433
L. J. Andrade Pais and L. M. Ferreira Gomes

Shear Strength of Transparent Gelita—The Effect of the Mixture Ratio, Displacement Rate, and Over-Consolidation Ratio.....443
Manouchehr Hakhamaneshi and Jonathan A. Black

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Field Characterization

Application of Terrestrial Laser Scanning for the Displacement Monitoring of GRS-IBS Abutments....453
Ahmad Alhasan, Michael P. McGuire, Pavana K. R. Vennapusa, and David J. White

Behavior of Large-Diameter Buried Pipes—A Case Study of a Parallel Trench Excavation....462
Jaykumar Shukla, Jignesh Chokshi, and Ashutosh Singhvi

Characterization of Weathered Limestone Using Cross-Hole Ground Penetrating Radar Techniques....475
D. Craig Jones and Nick Hudyma

Development and Testing of a Multiflow In Situ Permeameter....487
Clifton B. Farnsworth, Steven F. Bartlett, and Evert C. Lawton

Drained Soil Shear Strength Parameters from CPT and CPTu Data in Coastal Deposits by an Analytical Approach....497
Amin Mohammadi and Abolfazl Eslami

Evaluation of CPT-Based Empirical Characterization Methods for Sands 507
Abouzar Sadrekarimi

Evaluation of Field Hydraulic Conductivity Data: Comparing Spot Infiltrometer Test Data to Continuous Recession Data 517
Zachary Zukowski, Clay H. Emerson, Andrea L. Welker, and Brendon Achey

Geostatistical Modeling Resistivity of Cohesionless Soil Using RCPTU Data 527
Haifeng Zou, Guojun Cai, Songyu Liu, Tejo Vikash Bheemasetti, and Anand J. Puppala

Instrumentation and Monitoring of the Large-Scale Settlement in Thawing Clay 539
Martin A. Rodick, Charles B. Nourse, and Anders B. Bjarngard

Influence of Foundation Support Conditions on the Intelligent Compaction Measurements for Hot-Mix Asphalt 550
Pavana K. R. Vennapusa and David J. White

Interpretation of a Subsurface Soil Profile Using a Limited Data Set and Geostatistics 560
Tejo V. Bheemasetti, Aravind Pedarla, Haifeng Zou, Santiago R. Caballero, and Anand J. Puppala

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Machine Drive Power Based Roller-Integrated Compaction Measurements for Cohesive Embankment Construction 571
Pavana K. R. Vennapusa and David J. White

Prototype Wireless Sensing Nodes for Monitoring Substructure and Subsurface Conditions.....581
Xiaochao Tang, Zachary Hill, Elizabeth Yenser, Gregory Didomenico, and Joshua Mulzoff

Site-Specific Relationship for Strain Dependent Shear Modulus and Damping Using In Situ V_S and High Strain Cyclic Test Results.....589
Kaveh H. Zehtab and Mustafa Tolga Yilmaz

Modeling and Simulations

A Methodology to Determine the Viscoplastic Perzyna Model Parameters for Granular Materials under High Strain Rates.....600
M. Jafari, P. Kanopoulos, K. Xia, and M. Grabinsky

A Modified Method of Generating Specimens for a 2D DEM Centrifuge Model 610
N. Duan and Y. P. Cheng

Appraisal of the In Situ Variability and Modeling Uncertainty of Dynamic Soil-Piled Raft-Structure Interaction on Seismic Response: A Probabilistic Approach 621
Rajib Saha, Abhinava Pal, and Sumanta Haldar

Bayesian Updating of a Spatially Varied Soil Property for Enhancing Reliability in Drilled Shaft Design 631
Zhe Luo, James R. Martin, Lei Wang, Wenping Gong, and C. Hsein Juang

CFD-DEM Modeling of Piping Erosion Considering the Properties of Sands 641
Hui Tao and Junliang Tao

Coherent Dynamics of a Turbulence Structure around Streamlined Piers.....651
Junhong Li and Junliang Tao

Coupled DEM and CFD Simulations of Soil Erosion.....661
Yuan Guo and Xiong (Bill) Yu

Evaluation of the Performance of Scour Prediction Equations with Regards to Flow and Sediment Characteristics.....671
Fred T. Falcone Jr. and Nina Stark

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Finding Storage Tank Settlement on Granular Soil with Small-Strain Stiffness.....681
Majid Taherzadeh Dorobati, Alborz Hajiannia, Shahrzad Kasaeian, and Ramin Rasekh

Mechanical Behavior of Earthen Materials in Structural Applications.....691
Craig D. Foster, David A. Weed, M. Hosein Motamedi, and Adam G. Tennant

Numerical Investigation of the Reaction Kinetics and Expansive Behavior of Sulfate Bearing Soils.....701
Pawan Sigdel and Liang Bo Hu

Experimental Characterization and Microstructure Based Random FEM Simulation of Freezing and Thawing Effects on Soils.....711
Shaoyang Dong and Xiong (Bill) Yu

Rock Crushing Using Microwave Pre-Treatment.....720
Seunghee Kim and J. Carlos Santamarina

Study on the Interface Behavior of a Geosynthetics-Reinforced Fouled Ballast Using the Discrete Element Method.....730
Ngoc Trung Ngo, Buddhima Indraratna, and Cholachat Rujikiatkamjorn

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