

IFCEE 2018

Developments in Earth Retention, Support Systems, and Tunneling

**Selected Papers from Sessions of the International
Foundation Congress and Equipment Expo 2018**

Geotechnical Special Publication Number 297

**Orlando, Florida, USA
5 – 10 March 2018**

Editors:

**Armin W. Stuedlein
Anne Lemnitzer
Muhannad T. Suleiman**

ISBN: 978-1-5108-6516-7

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© (2018) by American Society of Civil Engineers
All rights reserved.

Printed by Curran Associates, Inc. (2018)

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

Earth Retention and Support

Finite Element Analyses of an Urban Cofferdam Using Hypoplasticity Clay Model	1
A. Felipe Uribe-Henao, Luis G. Arboleda-Monsalve, Juan Garcia, and Lisa Star	
Temperature and Concrete Time-Dependent Effects on Urban Cofferdams	12
A. Felipe Uribe-Henao, Luis G. Arboleda-Monsalve, Alejandro Velasquez-Perez, David G. Zapata-Medina, and Fernando Sarabia	
Analysis of Predicted Capacity versus Load Test Results of Ground Anchors in Multi-Geology Installation	23
Eric S. Backlund and Noel W. Janacek	
Innovations in Removable Post Tensioned Strand Ground Anchors	33
Lucian Bogdan and Patrick Wörle	
Numerical Modeling of a Tiedback Wood-Lagging Wall during Excavation	43
Soheil Kamalzare, David E. Weatherby, Matthew J. Niermann, and Dominic Parmantier	
Investigation on the Effects of Different Nail Diameters, Soil Elastic Moduli and Pullout Rates on the Pullout Shear Resistance of Soil-Nail Interface.....	54
A. Saeedi-Azizkandi, M. H. Baziari, H. Dashtara, and A. H. Kolahdouzan	
Empirical Method to Estimate Lateral Wall Deformation Profiles and Bending Moment in Excavation Retaining Walls	65
L. Sebastian Bryson, David G. Zapata-Medina, and Jorge Romana-Giraldo	
Numerical Investigation of the Performance of a Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS) under Working Stress Conditions	76
Murad Abu-Farsakh, Allam Ardah, and George Voyiadjis	
Lateral Resistance of Abutment Piles Near Mechanically Stabilized Earth Walls.....	88
Kyle M. Rollins, Andrew Luna, Ryan Budd, Jason Besendorfer, Cody Hatch, Jarell Han, and Robert Gladstone	

Numerical Investigation on the Performance of Geosynthetic-Reinforced Soil Piers under Axial Loading.....	99
Mahsa Khosrojerdi, Tong Qiu, Ming Xiao, and Jennifer Nicks	
Prediction Model for Estimating the Immediate Settlement of Foundations Placed on Reinforced Soil.....	109
Mahsa Khosrojerdi, Ming Xiao, Tong Qiu, and Jennifer Nicks	
Interface Studies on Geogrid and Fly Ash	119
K. P. Bhargav Kumar and B. Umashankar	
Cyclically Induced Deformations in Lightweight Cellular Concrete Backfilled Retaining Structures	130
Binod Tiwari, Beena Ajmera, and Diego Villegas	
Fragility Analysis of Seismic Response of Cantilever Retaining Walls with Cohesive and Cohesionless Backfill Materials.....	139
Siavash Zamiran and Abdolreza Osouli	
Seismic-Induced Deformations of a Geosynthetic Reinforced Soil Bridge Abutment Subjected to Longitudinal Shaking	147
Wenyong Rong, Yewei Zheng, John S. McCartney, and Patrick J. Fox	
Experimental and Numerical Investigation of Lateral Earth Pressures Generated from Repeated Loading.....	158
Jakob R. Walter, Amr M. Morsy, and Jorge G. Zornberg	
Comparison of Measurements and Limit State Solutions for Soil Pressures on Deep Flexible Underground Structures.....	169
Lohrasb Keykhosropour and Anne Lemnitzer	
Assessment of Dynamic Load Allowance for Buried Culverts.....	179
Mehdi Kadivar, Kalehiwot Nega Manahiloh, Victor N. Kaliakin, and Harry W. Shenton III	
Compensation Grouting Program to Mitigate Settlement of Utilities from Tunneling	189
James C. Myers, Jonathan Taylor, and Lucian P. Spiteri	
Design Methodology to Evaluate Hydraulic Jacking in Pressure Tunnels	201
Mohammad Moridzadeh and Peter Dickson	
<i>Ground Improvement and Seepage Control</i>	
Soil-Bentonite Slurry Trench Cutoff Wall Longevity	214
Daniel Ruffing, Jeffrey Evans, and Nathan Coughenour	
Emergency Bridge Pier Foundation Repair with Pressed-in Piles	224
Takefumi Takuma and Takayuki Sakai	

Evaluation of Water Vapor Sorption and Electrical Conductivity Methods to Determine Bentonite Content of a Soil-Bentonite Barrier	238
Idil Deniz Akin, Jiannan Chen, Craig H. Benson, and William J. Likos	
<i>Slopes, Dams, and Embankments</i>	
Geotechnical Stability Analysis of Earthen Levees in the Face of Uncertainty.....	247
Lei Wang, Michael Powers, Michael Studiner, Mohammed Fallatah, and Wenping Gong	
Strain in a GRS Bridge Abutment: Strain Gauge Attachment Techniques, Performance and Survivability during Construction and Operation	257
Majid Talebi, Christopher L. Meehan, and Tyler M. Poggiogalle	
Changes in Temperature Distribution in a Geosynthetic Reinforced Soil Abutment and Their Effect on Measured Strain.....	267
Tyler M. Poggiogalle, Majid Talebi, and Christopher L. Meehan	
Lessons Learned: Oklahoma State Highway 99 over the Washita River.....	278
Kristi K. Bumpas, Chad E. Grinsteiner, and Jennifer Koscelny	
Influence of Slope Density on the Stability and Deformation of Clayey Slopes	293
Binod Tiwari, Beena Ajmera, Mohammed Khalid, Samin Donyanavard, and Rosalie Chavez	
Impact of Variation of Small Strain Shear Modulus on Seismic Slope Stability Analysis of a Levee: A Sensitivity Analysis	302
Sayantan Chakraborty, Aritra Banerjee, Jasaswee T. Das, Leila Mosadegh, and Anand J. Puppala	
A Landslide Model with the Shear Band Propagation: Modification for Unsaturated Condition.....	314
Sihyun Kim, Brian J. Fiedler, and Seunghee Kim	
Effect of the Core on the Upstream Stability of Dams under Sudden Drawdown Conditions.....	324
Salama Al-Labban and Manoj Chopra	
Experimental Investigation of Effects of Sliding Distance on Impact Force from Granular Sliding Mass to a Rigid Obstruction.....	333
Amir Ahmadipur and Tong Qiu	
Design Optimization of I-Wall Levee System Supported by Sand Foundation.....	341
Parishad Rahbari and Nadarajah Ravichandran	