GSP 302

PanAm Unsaturated Soils 2017

Applications

Papers from Sessions of the
Second Pan-American Conference
on Unsaturated Soils

Dallas, Texas
November 12–15, 2017

Edited by

Laureano R. Hoyos, Ph.D., P.E.
John S. McCartney, Ph.D., P.E.
Sandra L. Houston, Ph.D., D.GE
William J. Likos, Ph.D.

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SELECTED PAPERS FROM SESSIONS OF THE SECOND
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Preface

The Second Pan-American Conference on Unsaturated Soils (PanAm-UNSAT 2017) was held in Dallas, Texas, November 12-15, 2017, featuring the latest research advances and engineering-practice innovations in the area of Unsaturated Geotechnics, with a focus on characterization, modeling, design, construction, field performance and sustainability.

PanAm-UNSAT 2017 follows a now well-established series of regional and international conferences on Unsaturated Soils, bringing together researchers, practitioners, students and policy makers from around the world, particularly the Americas. The conference built upon the success of PanAm-UNSAT 2013 (First Pan-American Conference on Unsaturated Soils, Cartagena, Colombia), as well as that of previous conferences on unsaturated soils hosted in the United States, including UNSAT 2006 (Fourth International Conference on Unsaturated Soils, Carefree, Arizona) and EXPANSIVE'92 (Seventh International Conference on Expansive Soils, Dallas, Texas, 1992).

Proceedings of PanAm-UNSAT 2017 have been documented in four Geotechnical Special Publications (GSP) of ASCE including Volume 1: Plenary Session Papers; Volume 2: Fundamentals; Volume 3: Applications; and Volume 4: Swell-Shrink and Tropical Soils.

Current Volume 3 (Applications) consists of five sections:

Section I, General Field Applications, includes 11 papers dealing with case histories of geotechnical structures constructed in the field and field measurements of different variables relevant to unsaturated soil mechanics. Field situations investigated include embankments, slopes, and pan lysimeters. Field testing approaches include interpretation of cone penetration testing in unsaturated soils, and monitoring of variables such as the suction, degree of saturation, effective stress, temperature, earth pressure, and creep displacements.

Section II, Stability of Unsaturated Slopes, includes 10 papers dealing with the performance analysis and design of slopes and excavations involving unsaturated soils. Seasonal effects on slope stability and triggering mechanisms are described, as well as consideration of probabilistic analyses, reliability, and risk evaluation.

Section III, Pipelines and Transportation Infrastructure, includes 5 papers dealing with analyses of pipelines and roadways involving unsaturated soils. One paper on pipelines focused on uplift effects and movement of pipelines in unsaturated soils, focusing on the deformation response of this challenging topic. The four papers on transportation involve evaluation techniques for pavements on unsaturated soils, as well as analyses techniques for evaluating the deformation of roadways on expansive soils.

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Section IV, Climate Effects and Permafrost, includes 6 papers dealing with soil-atmosphere interaction in terms of both infiltration and evaporation as well as freezing and thawing. Papers focus on the impact of climate variations on natural unsaturated soils, the role of climate in drying mine tailings, and use of simplified climate interaction approaches such as the Thornwaite moisture index.

Section V, Bioremediation and Energy Geotechnics, includes 9 papers dealing with energy piles in unsaturated soils, energy storage, and bio-modification for both mechanical and hydraulic benefits. Papers also include energy storage systems involving storage of thermal energy in borehole arrays in the vadose zone and storage of energy in the form of compressed air in the subsurface. This section also includes a paper on an evaluation of unsaturated soils in providing barriers for nuclear waste repositories. The bio-modification studies focus on hydraulic properties of biochar-amended soils for landfill covers, bioremediation of unsaturated soils contaminated with seawater after tsunamis, and the impact of gas generation due to biological activity on the pore pressures in unsaturated soils.

Each paper was subject to rigorous technical review during a three-phase submission process and received a minimum of two positive peer reviews before final acceptance by the corresponding session chair(s).

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The conference Program Committee would also like to acknowledge the conference Session Chairs, who guided authors and reviewers through the draft and final phases of paper submission and review. In most cases, these chairs also served as on-site moderators during the conference itself.

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14/ Field Applications of Unsaturated Soils
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15/ Stability of Unsaturated Slopes, Part I
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16/ Stability of Unsaturated Slopes, Part II
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21/ Expansive Soils: Mitigation
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22/ Expansive Soils: Modeling
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23/ Pipeline and Transportation Structures in Unsaturated Soils
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24/ Modeling of Cracked Soils and Effects of Cracking
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27/ Energy Geotechnics, Bio-Geo, and Sustainability
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Contents

General Field Applications

Behavior of the Air Phase within Embankment Due to Rainfall 1
Katsuyuki Kawai, Daichi Hazama, and Ryunosuke Nose

Classifying Unsaturated Soils via Cone Penetration Testing 11
Rodney W. Collins and Gerald A. Miller

Comparing In Situ Soil Water Characteristic Curves to Those Generated in the Lab 18
Colin Campbell, Alton Campbell, Neil Hansen, Bryan Hopkins, Shane Evans, Emily Campbell, and Douglas Cobos

Comparison of Percolation of Flat and Slope Section Vegetated Lysimeters Using Field Soil Water Characteristic Curve.....28
Md. Jobair Bin Alam, Md. Sahadat Hossain, Asif Ahmed, and Mohammad Sadik Khan

Creep Behavior of Soil Nails in High Plasticity Clay under Various Load Level 38
Mohsen Mahdavi Kharanaghi, Marcelo Sanchez, Jean-Louis Briaud, and Gang Bi

Effect of Temperature on Field Water Content Measurements Using Water Content Reflectometers 49
Duraisamy S. Saravanathiiban and Milind V. Khire

Experimental Investigation on At-Rest Earth Pressure Acting on Walls Retaining Collapsible Soil Subjected to Inundation 59
Nhut Nguyen and Adel Hanna

Integration of Laboratory and Field Investigation on the Slope Aside of the Highway in a Brazilian Coastal Hillside 69
A. F. R. Pontes, M. N. B. Trevizolli, L. B. Passini, L. P. Sestrem, F. A. M. Marinho, and A. C. M. Kormann

Monitoring Suction Stress and Effective Stress in a Silty Sand Levee under Seasonal and Tidal Changes 81
Xavier A. Rivera-Hernandez, Farshid Vahedifard, and Ghada S. Ellithy

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Observation and Use of Soil Suction, 20 Years of Experience 92
Ronald F. Reed

Relating Moisture Content, Suction and Shear Strength of an Ore 105
Adrian R. Russell, Thanh Vo, and Hongwei Yang

Stability of Unsaturated Slopes

A Probabilistic Approach to the Stability of a Dam under Rapid Drawdown Conditions.....115
Ana Carolina Rios, Manoel Porfírio, and André Assis

Analysis and Performance Monitoring of a Temporary Excavation in Highly Plastic Clay and Comparison of Predicted and In-Situ Soil Strength Due to Unsaturated Soils.....124
Yonghoon Lee and Noel W. Janacek

Moving from 2D to a 3D Unsaturated Slope Stability Analysis 136
Murray D. Fredlund, Delwyn G. Fredlund, and Lulu Zhang

Quantifying Landslide Risk.....146
Bruce Hargreaves

Rainfall Induced Shallow Slope Failure over Yazoo Clay in Mississippi.....153
M. S. Khan, M. Nobahar, J. Ivoke, and F. Amini

Seasonal Variation of the Safety Factor and Stability of a Diabase Slope Located in Florianopolis, Brazil 163
L. G. Campos, N. S. Massocco, G. B. Nunes, O. M. Oliveira, R. A. R. Higashi, and Fernando A. M. Marinho

Slope Failure and Landslide Triggered by an Intense Rainfall Event–Forensic Investigations and Remedial Design.....174
Charbel Khoury, Kofi B. Acheampong, and Kwabena Ofori-Awuah

Stability Analysis of Unsaturated Infinite Slopes A Reliability Perspective 185
A. S. S. Raghuram and B. Munwar Basha

The Failure Characteristics and Evolution Mechanism of the Expansive Soil Trench Slope.....196
Zhangjun Dai, Shanxiong Chen, and Jian Li

Understanding Shallow Slope Failures on Expansive Soil Embankments in North Texas Using Unsaturated Soil Property Framework.....206
Anu M. George, Sayantan Chakraborty, Jasaswee T. Das, Aravind Pedarla, and Anand J. Puppala

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Pipelines and Transportation Infrastructure

Air-Coupled Acoustic Testing for Pavement System 217
Hiba Al-Adhami and Nenad Gucunski

Application of Euler-Bernoulli Beam on Winkler Foundation for Highway Pavement on Expansive Soils 228
Md Adnan Khan and Jay X. Wang

Behaviour of Unsealed Stabilized Road Pavements Using Non-Linear Strength Model.....240
D. J. Robert, S. Setunge, and B. O'Donnell

Study of a Natural Unsaturated Clay and Its Effect on Railroads 250
Dong Wang, Marcelo Sánchez, Esteban Sáez, Carlos Ovalle, and Jean-Louis Briaud

Uplift Resistance and Mobilization of Buried Pipelines in Unsaturated Sands.....260
D. J. Robert and N. I. Thusyanthan

Climate Effects and Permafrost

Characterization of Mine Waste Materials after 50 Years of Climate Interaction 270
Lucas M. Garino, Germán J. Rodari, and Luciano A. Oldecop

Comparison and Applications of the Thornthwaite Moisture Index Using GIS.....280
Austin H. Olaiz, Sai H. Singhar, Jeffry D. Vann, and Sandra L. Houston

Cryosuction–A Model to Describe the Mechanism during Ground Freezing 290
Florian Unold and Ludmilla Derk

Mechanical Behavior of Soil Subjected to Freezing-Thawing Cycles.....300
Bohan Zhou, Marcelo Sanchez, Ajay Shastri, and Juyoung Lee

Numerical Analysis of Climate Effect on Slope Stability.....308
Soumia Merat, Lynda Djerbal, and Ramdane Bahar

Influence of Maximum Water Storage on Thornthwaite Moisture Index 319
Lizhou Chen, Rifat Bulut, James B. Nevels Jr., and Christopher R. Clarke

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Bioremediation and Energy Geotechnics

Analysis of the Hydration of an Unsaturated Seal 329
Daniel F. Ruiz, Jean Vaunat, Antonio Gens, and Miguel A. Mánica

Bioremediation of Unsaturated Saline Soil 339
M. Azizul Moqsud, Y. Kodama, K. Omine, and N. Yasufuku

Characterization of Hydro-Mechanical Behavior of Compressed Air Energy Storage Systems 347
Ajay Shastri, Marcelo Sanchez, and Thi Minh-Le

Effect of Biogenic Gas on Skempton's Pore Pressure Parameter Bw 359
S. Ghatak, D. Roy, and S. Roy

Evaluation of Coupled Thermal and Hydraulic Relationships Used in Simulation of Thermally-Induced Water Flow in Unsaturated Soils 370
Tuğçe Başer, John S. McCartney, Yi Dong, and Ning Lu

Evaluation of Ground Coupled Heat Pump Systems in a Hot and Semi-Arid Climate 381
Vaibhavi Tambe, T. Agami Reddy, and Edward Kavazanjian Jr.

Field Measurements on Geothermal Foundations.....394
M. R. Keshavarz, M. Sanchez, G. Akrouch, and J. L. Briaud

The Economic Viability of Ground Couple Heat Pump Systems in a Hot and Semi-Arid Climate 404
Vaibhavi Tambe, T. Agami Reddy, and Edward Kavazanjian Jr.

Unsaturated Hydraulic Properties of Biochar and Biochar-Amended Soils for Landfill Covers 417
Girish Kumar, Jairo E. Yepes, Laureano R. Hoyos, and Krishna R. Reddy

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