G-I Technical Committees

Speaker Program

Technical Committee*	**Contact info**	
Deep Foundations	Luis Garcia	logarcia@geocim.com
Unsaturated Soils	Laureano Hoyos	hoyos@uta.edu
Risk Assessment & Management	Vauhan Griffiths	d.v.griffiths@mines.edu
Engineering Geology & Site Characterization	Xiong (Bill) Yu	xxy21@case.edu
Earthquake Engineering & Soil Dynamics	Menzer Pehlivan	menzer.pehlivan@gmail.com
	Adrian Rodriguez-Marek	adrianrm@vt.edu
Earth Retaining Structures	Anne Lemnitzer	alemnitz@uci.edu
	Glen Anderson	gandersen@eustiseng.com
Underground Engineering & Construction	Tom Pennington	Pennington@mcmjac.com
	Debra Laefer	debra.laefer@nyu.edu

*Topics will focus on the Technical Committee's area of expertise. Contact individual listed for more information and/or to schedule

ASCE Geo-Institute (G-I)

Risk Assessment and Management (RAM) Committee

Lectures on Offer from the RAM Committee (2017-2018)
Expenses associated with any visiting lecturer will be covered by the G-I

Case Histories in Forensic Geotechnical Engineering
R.B. Gilbert (University of Texas, Austin, TX)

The practice of geotechnical engineering is guided by lessons learned from failures and successes. This talk will describe recent case histories in forensic geotechnical engineering, including a landfill cover slope failure, a pile foundation failure and success, and a natural slope failure. The lessons learned from these cases histories include the importance of designing for interim conditions during construction, the importance of collaborating with versus working for structural engineers, and the importance of considering and communicating risk and uncertainty clearly.

Risk Assessment in Geotechnical Engineering
D.V. Griffiths (Colorado School of Mines, Golden, CO)

Geotechnical engineering has seen a rapid growth of interest in risk assessment methodologies. This seems a logical evolution, since soils and rocks are among the most variable of all engineering materials, and geotechnical engineers must often make do with materials they are dealt with at any particular site. A probabilistic analysis may lead to a “probability of failure”, as opposed to the traditional “factor of safety”, representing a fundamental shift in the way engineers need to think about the suitability of their designs. The seminar will review some of the benefits and potential pitfalls of these different approaches, and describe some introductory methods of probabilistic analysis.

A Probabilistic Approach for Earth Dam and Levee Filter Design and Internal Erosion Risk Assessment
Sangho Lee (East Bay Utility Municipal District, Oakland, CA)

Backward erosion or piping phenomena of fine particles within cohesionless soils cannot be predicted with current deterministic dam/levee filter design which simply compares two selective particle sizes from the base soil and filter gradations. Accurate evaluation of base soil internal stability is very important in order to predict filter performance after dam/levee construction. Many filter design failures have stemmed from ignorance of progressively changed field conditions, such as inhomogeneous seepage flow generation and a subsequent change of soil relative density and gradation, which contrasts unfavorably with the homogenous and uniform flow regimes presumed in the design stage. The author has introduced a new probabilistic filter design method for improvement of filter performances in terms of both retention and drainage purposes. This probabilistic method can handle entire particle size distributions (PSD) of base soil and filter material to compare the constriction size distribution (CSD) of pore structures between two discrete media, which is closely related to

the mechanisms of internal stability against "piping" and self-filtration process called "bridging". The reliability analysis of internal erosion risk
can cope with the full spectrums of non-homogenous and random features of alluvial soils, generally identified from the field investigation.

Practical Insights from Geotechnical Reliability-based Design and links with LRFD
B.K. Low (Nanyang Technological University, Singapore):

Excel-based reliability analysis and reliability-based design (RBD) can reduce the language barrier shrouding the elegant first-order reliability method (FORM) and overcome some potential limitations in the Load and Resistance Factor Design (LRFD) approach, for example in situations where loads contribute not only destabilizing but also stabilizing effects, situations where output sensitivities to load and resistance may vary due to different geometric and other details, situations with spatial variability and parametric correlations, and situations with different targets of probability of failure. This seminar will describe practical Excel-based reliability analysis and illustrated with soil and rock engineering examples which offer interesting insights pertinent to LRFD design. Potential limitations of RBD will also be described.

Performance based earthquake engineering.
A. Rodriguez-Marek (Virginia Tech, Blacksburg, VA)

Performance Based Earthquake Engineering (PBEE) is a framework that enables the design of a civil engineering systems based on stated performance objectives or annualized losses rather simple failure/no failure criteria. These performance objectives may depend on the frequency of the driving earthquakes. For geotechnical systems, PBEE often entails designs that are based on target deformations. In this talk we review the concept of PBEE and consider some illustrative examples of geotechnical design with the framework of PBEE. These examples include the computation of annualized losses due to liquefaction and the estimation of mean annual rates of exceedance of target displacement levels for an engineered slope.

Calibration and Full-scale Evaluation of Reliability-based Serviceability Limit State Design Procedures
A.W. Stuedlein (Oregon State University, Corvallis, OR)

This lecture describes the use of an existing reliability-based serviceability limit state (RBSLS) procedure to illustrate some of the critical elements in the calibration of RBSLS models and to serve as guide for future calibration work and application in practice. The application of the RBSLS described in this lecture centers on the performance of spread footings resting on aggregate pier (stone column) reinforced ground. The lecture begins with the introduction of the proposed ultimate and serviceability limit state design models that have been calibrated with full-scale test results. Then, the general reliability calibration framework and the implementation of a “lumped load and resistance factor”, or pseudo-factor of safety, is introduced and illustrated with examples. The lecture then switches gears to introduce the idea of correlated serviceability limit state model parameters, and statistical simulation models to account for correlated model

parameters is described. Examples demonstrating how certain decisions on statistical model selection can affect the resulting lumped load and resistance factor is presented to help designers ascertain appropriate reliability-based design procedure calibrations. The accuracy of the proposed RBSLS procedure is then examined by comparing predictions to new full-scale footing loading tests conducted at the field research site at Oregon State University, which included small (0.76 m) and large (2.7 m) footings.

Terzaghi's observational method and Bayesian updating

T.H. Wu (The Ohio State University, Columbus, OH)

The presentation will state Terzaghi's "observational method", followed by examples of its use by Terzaghi and Peck. The last part states Bayes rule and its use as a model of the observational method, with examples.

Terzaghi's Observational Method (Terzaghi 1961, Peck 1969)
Early Examples Theory of Consolidation (Terzaghi 1925), MIT buildings, Springfield Dam, Chicago Subway (Terzaghi 1943)
Late Examples Cheakamus Dam (Terzaghi 1960), Mission Dam (Terzaghi 1964)
Examples From Peck **(**Peck 1969)
Bayesian Updating Bayes Theorem (Wu 2011; Cheung and Tang, 2005 *Geotechnique*, 55:85-90).

References

Terzaghi 1943, Trans. ASCE 108;970-1007; Terzaghi 1960, J. BSCE, 47:64-94;
Terzaghi 1961, J. BSCE, 68:110-139; Terzaghi 1964, Geotech. 14:14-50;
Peck 1969, Geotech., 19:171-187; Wu 2011, JGGE, 137:862-873; Wu 1976, Bjerrum Memorial Vol.,247-26

Geo-Institute of ASCE

Earthquake Engineering & Soil Dynamics Committee

Potential topics are:

- **Seismic Design of Retaining Walls**
- **Seismic Design of Gated Spillways**
- **Performance-Based Liquefaction Assessment**
- **Next Generation Liquefaction (NGL)**
- **Ground Motion Prediction Equations**
- **Induced Seismicity**
- **Seismic Slope Stability**
- **Building Code Provisions**
- **Soil Structure Interaction**
- **Reconnaissance Efforts from Recent Earthquakes**
- **UAV-Based Geotechnical Reconnaissance**
- **Waterfront Structures**
- **Emerging Topics (i.e., "where is geotechnical engineering heading" type of topics)**

Speaker**: Russel Green, Ph.D., P.E., M.ASCE**

- Role of paleoliquefaction studies in assessing the seismic hazard in the central-eastern US
- Evaluating liquefaction potential in the central-eastern US
- Evaluating liquefaction hazard from induced seismicity
- Overview of the 2010-2011 Canterbury, New Zealand, Earthquake Sequence

Other Speakers:

Katerina Ziotopoulou, A.M.ASCE
Anne Lemnitzer, A.M.ASCE
Kevin Franke, P.E., M.ASCE