Civil, Architectural & Environmental Engineering Presents

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Reliability-Based Foundation Design

The Subject and Workshop

Load and Reduction Factors Design (LRFD) is mandated for implementation by many state transportation organizations in 2007. Many of the concepts of LRFD are based on Reliability-based design (RBD) of foundations. This approach constitutes a potentially superior alternative to traditional deterministic design because:

- the design reliability can be maintained at a target value that is chosen rationally
- incompatibilities are minimized between structural and foundation design
- many of the complex relationships between uncertainties and risks can be assessed realistically, without resort to intuition and arbitrary decision-making processes

Current deterministic design is less specific than RBD and is more subject to considerable vagaries of individual use. Specifically, loading and geotechnical models rarely are specified in tandem, the specific way to use these models is rarely noted, guidance on selection of design parameters normally is lacking (i. e., should one use mean, upper range, lower range, etc.), and the selection of a factor of safety is not based on any degree of rigor or quantifiable function (tradition and experience tend to govern). The influence of varying design parameters and their ranges on design reliability is not addressed specifically, and subsequently the actual reliability level can vary substantially.

In this workshop, these issues are addressed in a fundamental, yet practical, manner. First, an overview is given of the development of geotechnical RBD for foundations. Necessary concepts and tools are presented, including uncertainty, risk, judgment, and RBD formulation. The uncertainty and variability of design parameters are discussed in detail, including load modeling and geotechnical variability, which arises from geologic development, in-situ testing and sampling, correlations, and calculation models. These factors are integrated into reliability-based equations for foundation design, with application examples. The resulting design equations have a "look and feel" that is familiar, but are significant extensions and formalizations of current equations because they incorporate uncertainty explicitly. This approach puts the key design decisions in the hands of the design engineer, who is the only person who can truly assess the degree of confidence in the design parameters and their variability. This approach also gives designers direct means of assessing the relative value of lower variability in the geotechnical data. Comprehensive notes and copies of the course video materials will be provided.

The Lecturer

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Professor Kulhawy is an internationally acclaimed educator, consultant, and researcher, who has won numerous prestigious awards. He heads the Geotechnical Engineering Program at Cornell, and he has lectured widely, giving over 1020 presentations in 83 cities within the U. S. and in 59 additional cities around the world. As a consultant, he has had extensive experience on six continents, with much of his experience dealing with foundation engineering and soil/rock property evaluation. In research, he has pioneered on many fronts, most notably with foundations and property evaluation since the early 1970s. In particular, since the early 1980s, he has focused on geotechnical uncertainty and RBD for the electric utility industry. His research on these topics constitutes a majority of this workshop.

REGISTRATION

Fee for the workshop is $100 and will include course notes, video materials and a luncheon. Attendees will also receive a certificate for six Professional Development Hours.
For registration and further information see our web site: http://campus.umr.edu/dce/conferences/geomo/ or contact Distance & Continuing Education, or Dr. Rick Stephenson, Course Director (573-341-6549, stephens@umr.edu).

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