Short Courses

Choose among four courses to expand your knowledge of practical applications of karst science. Space is limited and registrations are processed on a first-come, first-served basis. Onsite registrations can only be accepted on a space-available basis.

Short Course 1: Conducting Geotechnical Investigations in Karst

Instructor:

Michael J. Byle, D. GE, F. ASCE (National Discipline Lead, Civil/Geotechnical Engineering, Tetra Tech, Inc.)

Course length – 4 hours

Course Description:

Carbonate and Evaporite geologic formations underlie a large portion of the world. These formations contain soluble compounds that result in portions of the formations dissolving over time to produce cavities, conduits, enlarged joints, caves, etc. The landforms resulting from these features are referred to as karst. Karst poses many geotechnical concerns such as subsidence, sinkholes, uneven structural support, high groundwater production, and groundwater sensitivity to contamination.

Locating and characterizing karst features at depth is a challenging task. Even large features can be easily missed by conventional borings and may not be detectable by some geophysical methods. This makes it necessary to employ a specially focused investigation that incorporates geological, geotechnical, statistical, and geophysical approaches to evaluate risks and determine the appropriate level of investigation.

This presentation will include a brief introduction to karst and the associated geotechnical issues. A discussion of karst factors to various land use, construction, and development will be presented. Methods and strategies for investigating and characterizing various aspects of karst will be discussed and examples provided. Methods of investigation including, geologic data review, borings, test excavations, and aerial and terrestrial geophysics will be discussed with particular focus on developing an integrated approach to characterizing karst conditions.

Short Course 2: *Stormwater Management in Karst*

Instructor:

Robert K. Denton Jr., CPG, LPSS (GeoConcepts Engineering Inc., a Terracon Company)

Course length - 4 hours

Course Description:

The short course will detail general principles of karst characterization used for the siting and design of stormwater best management practices (BMPs) in karst. Topics to be covered will include:

1) Using terrain, hydrogeological, and subsurface investigation analyses (borings, electrical resistivity, etc.) to properly characterize and design stormwater BMPs in karst.
2) Environmental issues including the mitigation of the transport and migration of soil-adsorbed contaminants into the karst aquifer.
3) Design of stormwater BMPs for internally drained sites (onsite absorption, dry ponds, Class V injection wells, etc.)
4) The impact of limestone saprolite on pond design and failure.
5) Understanding and utilization of the Karst Reduction Factor.
6) A review of regional guidelines and regulations governing karst stormwater BMPs.

Short Course 3: *Designing and Conducting Tracer Studies in Karst*
With Emphasis on Sites with Actual or Potential Contamination Releases

Instructors:

Ralph Ewers, Ph.D. (President, EWC - Ewers Water Consultants, Inc.)
Keith White, CPG (Vice President/Principal Geologist, Arcadis, Inc.)

Course length: 4 hours

Course Description:

Tracer investigations, particularly those conducted with fluorescent dyes, have been shown to provide essential information regarding the fate and transport of contaminants in karst aquifers. They do this quickly, reliably, and inexpensively in most karst terranes. Modern

spectrofluorometric analytical techniques provide part-per-trillion sensitivity and identify each dye by its characteristic wavelength, allowing several dyes to be used simultaneously.

Test Design Essentials – The four essential steps in conducting a tracer test: 1-reconnaisance, 2-tracer background assessment, 3-tracer introduction, and 4-tracer monitoring will be explored and the rational for each will be given.

Tracer Dyes – This short course will provide details on the usefulness of each of the common fluorescent tracer dyes and their individual characteristics. We will discuss the means by which the tracers can be introduced and how, where, and when to monitor for them. The pros and cons for each of the analytical methodologies will be examined.

Example Tests – Recent and historical tracing examples will be examined in detail, offering a wide range of karst settings in which tracing has been successfully used. In these examples the hydrogeology demonstrated by the tracing will be compared to the hydrogeology inferred by traditional well data.

Qualifications – The presenters have a combined experience of 70 years in karst studies and have been involved in nearly 1,000 tracer tests.

Short Course 4: *Geologic Site Characterization in Karst Settings*

Instructor:

Michael J. Byle, D. GE, F. ASCE (National Discipline Lead, Civil/Geotechnical Engineering, Tetra Tech, Inc.)
Peter Hutchinson, P.G., Ph.D. (President and Principal Scientist, THG Geophysics, Ltd.)

Course length - 4 hours

Course Description:

Geologic site characterization is the technical foundation for all geotechnical and environmental projects. The objective of a geologic site characterization is to gain an accurate and complete understanding of subsurface conditions that will impact the engineering or environmental decisions made at a site. If the site characterization is done right, these decisions will be made with a high degree of confidence and be supported by reliable technical data.

This 4-hour course is based upon an integrated approach to site characterization. Therefore, we will cover a wide range of topics ranging from a discussion of the problem, a strategy, appropriate

levels of site characterization, the impact of scale, the methods available and case histories to illustrate the process.

This topic is covered in detail in the recent book titled *Geologic Site Characterization in Karst and Pseudokarst Terrains* authored by the presenter and Richard C. Benson, PG, CPG (founder and Sr. Engineering Geologist of Technos, Inc.) The book is based upon their combined and diverse experience specializing in site characterization with an emphasis on karst.