

Short Courses

Choose among four courses to expand your knowledge of practical applications of karst science.

Short Course 1: *Stormwater Management in Karst – A Regional Perspective*

Instructor:

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

Course length – 4 hours

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:



Improper stormwater designs can lead to future problems.

1. Utilization of terrain, hydrogeological, and subsurface investigation analyses (borings, electrical resistivity, etc.) to properly characterize and design stormwater BMPs in karst, with special emphasis on the karst terrain of the Appalachian regions of Virginia, West Virginia, and Maryland.
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.

About Your Instructor:

Robert K. (“Bob”) Denton Jr. received his bachelor’s degree in natural science from Thomas Edison State College in Trenton, NJ in 1988. Bob worked as a research scientist in the chemical and medical device industries for over 20 years, specializing in physical methods of analysis. He relocated to Winchester, Virginia in 1995, and is currently a senior geologist and karst geology “Subject Matter Expert” (SME) with Terracon’s DC Metro office, located in Ashburn, VA. His specialties include environmental science, engineering geology, hydrogeology, and karst

characterization, remediation, and management. He is considered a national expert on stormwater management in karst terrains.

Bob has been an avid caver since his teen years, and this led to his interest in geology from an early age. He has been a member of the Virginia Cave Board, an advisory board on caves and karst to the governor of Virginia and VA legislature since 2008 and is currently serving as the Chair of the Board.

Bob is a Certified Professional Geologist, a State of Virginia Licensed Professional Soil Scientist, and a State of West Virginia Licensed Environmental Remediation Specialist. He is a member of the National Speleological Society, Society of Vertebrate Paleontology, Association of Environmental and Engineering Geologists, the Geological Society of America and the American Society for Testing and Materials. Bob has published numerous articles on subjects including karst, vertebrate paleontology, and materials science. He has been awarded five United States Patents on various discoveries and innovations.

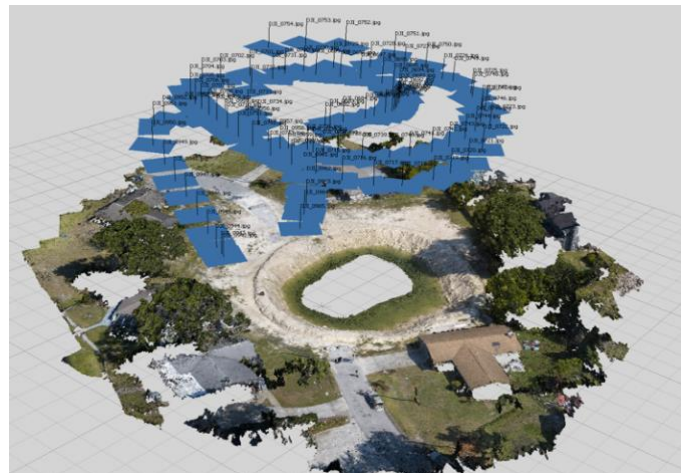
Short Course 2: GIS Approaches with LIDAR and Imaging Technologies for Sinkhole Documentation and Analysis

Instructors:

Benjamin Mittler, MS, GISP, GIS
Administrator (Center for Digital Heritage
and Geospatial Information, University of
South Florida)
Jorge Gonzalez, 3D Applications Engineer
(Center for Digital Heritage and Geospatial
Information, University of South Florida)

Course length – 4 hours

**THE NUMBER OF STUDENTS IS
LIMITED TO 20**



Sinkhole drone monitoring.

In this workshop we will examine case studies from Florida, including from a major collapse sinkhole event, where aerial and terrestrial LiDAR applications and drone-based Structure from Motion and imaging were utilized for sinkhole documentation, analysis, and modeling techniques. Workshop attendees will learn about types of aerial and ground-based survey strategies, and workflows for producing high-resolution digital surface models (DSMs) and applications for 3D point cloud and terrain modeling. Attendees will learn sources and applications for incorporating available geospatial data, and gain knowledge and experience in producing digital terrain

information in GIS using aerial and terrestrial LiDAR and imaging from drone-based information. Using case studies and laboratory exercises, we will explore applications for hazards documentation using sinkhole case studies for characterization, modeling, monitoring, and visualization in GIS.

Introductory and general knowledge of GIS is helpful, with workshop geared toward GIS beginner-level applications.

About Your Instructors:

Ben is a licensed drone pilot and is a certified Geographic Information Systems Professional with a decade of professional experience working in GIS roles across multiple disciplines, including previous GIS Analyst roles with the Florida Department of Environmental Protection and the Hillsborough County Sheriff's Office. His expertise includes utilizing Web GIS to publish innovative applications for heritage and environmental datasets. Ben earned his Master of Science in Aquatic Environmental Science from Florida State University in 2014 and serves as the Center for Digital Heritage and Geospatial Information's GIS Administrator and Site License Manager for the university of South Florida.

Jorge began as an industrial designer and has worked with automotive and wind energy companies, developing advanced skills in computer aided design (CAD) and computer aided manufacturing (CAM). He has been a trainer for CAD/CAM engineering software in aeronautics, metal working, molding, and naval industries. He started heritage work in 2004 working for a new company that preserved and restored Spain's history and heritage using laser and 3D printing technologies. In 2008 he created his own company providing 3D scanning and documentation services for archaeological sites across Spain, including several UNESCO World Heritage Sites. Mr. Gonzalez is the Center's lead in 3D modelling, laser scanning, CAD, and 3D printing. His unique experiences include the 3D documentation of several active sinkhole formations in Central Florida, including a house-swallowing cover-collapse event where LiDAR was used to model and map temporal change.

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

Instructors:

Ralph Ewers, Ph.D. (President, Ewers Water Consultants, Inc.)

Keith White, CPG (Principal Geologist, Arcadis, Inc.)

Course length: 4 hours

Course Description:

Tracer investigations, particularly those conducted with fluorescent dyes, provide essential information regarding groundwater movement and the fate and transport of contaminants in karst aquifers. They do this quickly, reliably, and inexpensively in most karst terranes. This short course will provide students with a primer on karst hydrogeology and then delve into the various aspects of planning and conducting tracer studies in karst terranes, including:



Introducing tracer is just one step in a successful trace.

Test Design Essentials – The four essential steps in conducting a tracer test – reconnaissance, tracer background assessment, tracer introduction, and tracer monitoring – will be explored, and the rationale for each will be given.

Tracer Dyes – Details on the usefulness of each of the common fluorescent tracer dyes and their individual characteristics will be provided. 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 methods will also 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.

About your instructors:

Dr. Ewers' karst aquifer experience is worldwide, including most of eastern North America, western Canada, Mexico, the Caribbean, central and western Europe, the British Isles, and central and South America. He is Emeritus Professor of Geology and former Director of the Groundwater Research Laboratory at Eastern Kentucky University. His publication list includes more than 50 titles relating to carbonate aquifer studies. Dr. Ewers was given the Burwell Award for outstanding

contributions to engineering geology by the Geological Society of America. This award recognized his contributions to the problems of contaminant monitoring in Karst aquifers. Dr. Ewers is a fellow of the Geological Society of America and the National Speleological Society. He served on several state and local advisory boards dealing with groundwater regulation and an instructor for the National Groundwater Association and E3 short courses entitled, *Practical Karst Hydrogeology, With Emphasis on Groundwater Monitoring*. He is president and senior geologist at Ewers Water Consultants Inc.

Mr. White has 33 years of experience as a hydrogeologist, focusing on the contaminant hydrogeology of karst. Mr. White leads ARCADIS' karst practice and is responsible for seeing that karst sites are identified, properly characterized, and remediated. He provides in-house, corporate-wide training on the topic of karst hydrogeology to junior geologists and scientists. Mr. White has taught short courses in karst hydrogeology for the National Ground Water Association and the Alabama Department of Environmental Management and has been invited as a guest lecturer at several universities and geological societies. He has chaired multiple sessions on remediating karst aquifers at Battelle's International Conference on the Remediation of Chlorinated and Recalcitrant Compounds. He holds a bachelor's degree in Geology with a concentration in Environmental Science at the State University of New York and has performed Masters-level coursework in hydrogeology at Syracuse University. Mr. White is a licensed professional geologist in Illinois, New York, and Pennsylvania.

Collectively, the instructors have a combined experience of 70 years in karst studies and have been involved in nearly 1,000 tracer tests.

Short Course 4: Conducting Geotechnical Investigations in Karst

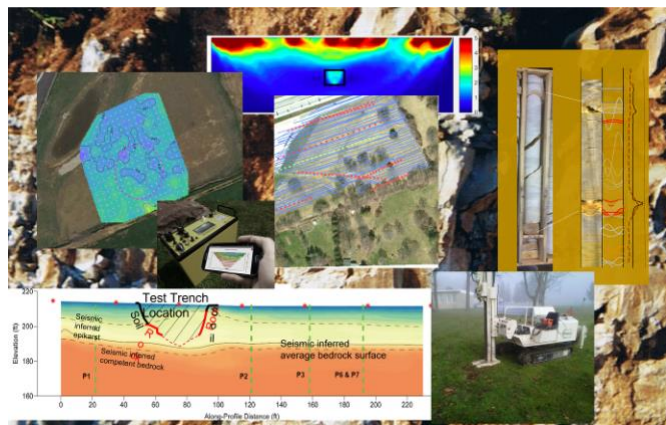
Instructor:

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



Identify the right suite of investigations for you project.

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.

About your instructor:

Mr. Byle has more than 40 years of professional experience in civil and geotechnical engineering. His experience includes for corporate technical and quality management, management of complex projects; staff training; expert consultation; and professional development. Mr. Byle has worked in karst across the U.S. and overseas including the Middle East and South America. His background includes extensive experience in investigation and characterization for projects involving ground improvement; grouting; stormwater management, including infiltration and Best Management Practices; mitigation design for karst; groundwater resource impacts; and litigation. Relevant expertise includes applications of drilling and boring, remote sensing, environmental geotechnology, and engineering geophysics for site characterization.