Slope Stability and Landslides

April 28–30, 2014
Madison, Wisconsin

- Field investigation methods
- Shear strength and soil/rock parameters
- Slope stability analysis, program demonstration, and remediation techniques
- Sample problems and case studies
- Geological aspects of soil and rock instability
- Slope stability design, construction, and remediation
- Bioengineering the slope protection

“Excellent course with shear strength, field techniques, analysis methods and parameters, geological and rock mechanics, seismic, and other needed content. My expense and time was worth it.”

Jim Fisher, Soil Program Supervisor
Clackamas County, Oregon City, Oregon

Department of Engineering Professional Development
432 North Lake Street
Madison, Wisconsin 53706
Slope Stability and Landslides
April 28–30, 2014 in Madison, Wisconsin

Advance Your Knowledge
Attend Slope Stability and Landslides and advance your professional knowledge and experience! You will:

• Gain a working knowledge of effective engineering and geological approaches to identify and analyze unstable slopes
• Understand how landslides and other slope displacements caused by natural and human activities are identified, analyzed, prevented, and controlled
• Know the importance of engineering, geology, and local experience in effectively dealing with landslides and slope instabilities

Who Should Attend
• Civil, geotechnical, and geological engineers
• Environmental and engineering geologists
• Geologists and geoscientists
• Earthwork contractors and construction personnel
• Transportation engineers
• Public works professionals
• Environmental specialists
• Foresters and conservation specialists
• Industry tech and sales representatives

Previous advanced study of soil engineering is not a prerequisite, but some working knowledge of this field is recommended to develop your understanding of the basics.

Expert Instructors
During the course you will have many opportunities to interact with and learn from our experienced instructors, all of whom are experts in their fields and dedicated to your learning.

Dr. Tuncer B. Edil, PE, is a professor of civil and environmental engineering and geological engineering at the University of Wisconsin–Madison. His research and teaching interests include engineering properties and behavior of soils, geotechnical and foundation engineering, geosynthetics, waste disposal and containment, and construction over soft organic ground. Edil is active in ASCE, ASTM, ISSMFE, and other national and international organizations.

Jay Gehler, PLA, ASLA, is a landscape architect and project manager at Agrecol LLC/Envirolok LLC, a grower of native plant communities in Wisconsin. Gehler's practice is dedicated to creating, restoring, and preserving sustainable landscapes. He currently serves as Chair of the ASLA Design-Build Professional Practice Network and President-Elect of the Wisconsin Chapter ASLA.

Dale R. Marcum, PE, is a principal geologic engineer with Cotton, Shires & Associates, Inc. in the San Francisco Bay Area. He has a background in both geology and engineering, and specializes in rock slope stability projects involving canals, penstocks, diversion pipelines, dams, quarries, and highways. Marcum has presented numerous rock slope case histories at national conferences, was a guest lecturer on instrumentation at U.C. Berkeley, and participated and presented a technical paper at the 13th International Conference and Field Trip on Landslides in Japan.

J. David Rogers, PE, RG, is the Karl F. Hasselmann Missouri Chair in Geological Engineering Department of Geological Sciences & Engineering Missouri University of Science & Technology. Dr. Rogers has 25 years of experience in evaluating the stability of natural slopes, embankments, stream channels, highways, and hydraulic structures. Between 1979 and 2001, he managed over 500 projects in the western United States, Hawaii, Taiwan, the Philippines, and the Middle East.

James M. Tinjum, PE, is an assistant professor at Engineering Professional Development, University of Wisconsin–Madison. He has experience in private practice and extensive technical knowledge in geotechnical and slope investigations, design, and construction. Active in ASCE, Tinjum has received a number of awards including a Dwight D. Eisenhower Fellowship and the ASCE Wisconsin Section Outstanding Young Engineer.

Recent Attendees Say…

“I very much enjoyed the opportunity to interact with colleagues and subject matter experts from across the country and learn about geotechnical dilemmas from Wisconsin to Guam!”
Jason Dearborn, Geologist
MTC, Inc., Olympia, Washington

“The course was great. A great way to start off a venture into slope stability analysis. I will be using it.”
Rick Guenther, Environmental Engineer
Natural Resource Tech., Inc., Pewaukee, Wisconsin

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Jim Fisher, Soil Program Supervisor
Clackamas County, Oregon City, Oregon

“It was a lot of information to take in but very informative and useful in the discussions of what strength to input to use. Excellent and well worth the class.”
Erica Mikesh, Civil Engineer
EBA Engineering, Santa Rosa, California

Valuable References Included!
You will receive a comprehensive set of course notes and references, plus our unique Soil Classification Board, for use back home in your practice. (Reminder: Leave room in your suitcase for a two-inch notebook and the board.) Included is a reference CD with An Engineering Manual for Slope Stability Studies, NRCS EFH Chapter 18 Soil Bioengineering for Upland Slope Protection and Erosion Reduction, and other relevant references. These materials will enable you to learn in the future as you work with slope stability problems.

Persons not attending this course may acquire copies of the slope stability manual from Virginia Tech, 540-231-5052 or email cjs@vt.edu, and the soil bioengineering Chapter 18 from the USDA Natural Resources Conservation Service.
Course Outline

Day 1
Welcome and Course Introduction
Professor James M. Tinjum, PE
Department of Engineering
Professional Development
University of Wisconsin–Madison

Introduction and Geological Aspects of Slope Instability
• Definitions, fundamentals, and socioeconomic significance
• Geological materials and processes affecting slope stability
• Landslide mechanisms and climatic conditions
Dale Marcum, PE
Principal, Geologic Engineer
Cotton, Shires and Associates, Inc.
Los Gatos, California

Shear Strength of Soil and Strength Analysis Methods
• Shear strength of soil and methods to obtain strength parameters
• Field and laboratory techniques for strength determination
• Effective and total stress definitions and principles

Soil Field Investigation
• The four G’s of slope stability (Geometry, Geology, Hydrogeology, and Geotechnical)
• Investigation techniques, drilling, and sampling
• In situ testing and subsurface instrumentation
• Case study
Professor James M. Tinjum, PE

Rock Slope Investigations
• Rock slope investigation
• Mapping of rock slopes
• Geological engineering of rock slopes
Dale Marcum, PE

Rock Engineering and Case Studies
• Methods of estimating the shear strength of discontinuities
• Rock slope failure modes and analysis
• Remediation approaches
• Quarry slope case study
• Rock toppling case study
Dale Marcum, PE

Day 2
Slope Stability Analysis Methods, Part 1
• Critical conditions for stability (drained and undrained conditions)
• Analysis methods (Bishop’s, Spencer’s, Morgenstern-Price’s, etc.)
• Slope stability charts
Professor Tuncer B. Edil, PE
Civil and Environmental Engineering
University of Wisconsin–Madison
Madison, Wisconsin

Slope Stability Analysis Methods, Part 2
• Types of slopes and appropriate method of analysis and properties
• Limit equilibrium versus deformation analysis
• Deterministic approach versus probabilistic analysis
Professor Tuncer Edil, PE

Demonstration of Slope Stability Analysis Programs
• Slope stability software and evaluation of capabilities
• Win-stabil and SVSlope® demonstrated
• Case study, step-by-step
Professor Tuncer B. Edil, PE and Professor James M. Tinjum, PE

Slope Stability Design, Construction, and Remediation
• Recompacted buttress fills, keying, and benching
• Engineering and administrative controls
• Slope remediation case study

The Mechanics of Biotechnical Stabilization
• Role of vegetation in biotechnical stabilization
• Mechanics of root reinforcement
• Biotechnical modification of soil mechanical processes
• Anchorage, arching, and buttressing
Professor James M. Tinjum, PE

Bioengineering the Slope Protection
• Concepts of bio/green/soft slope protection
• Vegetation selection
• Biowalls
• Construction and long-term maintenance
Jay Gehler, PLA, ASLA
Agrecol LLC

Day 3
Overview of Landslide Mitigation Techniques
• Subdrainage
• Structural solutions (gravity walls, tie-backs, cantilever walls)
• Mechanically stabilized embankments
J. David Rogers, PE
Department of Geological Engineering
Missouri University of Science & Technology

Analysis and Remediation of Levee Systems
• Common levee failure mechanisms
• Engineering and geologic characterization
• Maintenance, repair, and reconstruction
J. David Rogers, PE

Specialty Applications
• Finite element methods and a brief example

Specialty Applications in Slope Stability
• Landfills (impoundments, dikes, cover stability)
• Evaluation of unsaturated slopes
• Probabilistic methods
• Seismic deformation
Professor James M. Tinjum, PE

Note: The course outline is somewhat flexible and may be adjusted to best fit the needs of the audience and speakers. You will be asked upon arrival about your specific interests, needs, and questions. We will do our very best to tailor our presentations to address your concerns.

Course Schedule
Registration and course will be held at
The Pyle Center
702 Langdon Street
Madison, WI

Day 1
7:15 a.m. to 8:00 a.m.  Registration/Continental breakfast
8:00 a.m. to 5:25 p.m.  Class

Day 2
7:15 a.m. to 8:00 a.m.  Continental breakfast
8:00 a.m. to 5:25 p.m.  Class

Day 3
7:00 a.m. to 7:45 a.m.  Continental breakfast
7:45 a.m. to 2:45 p.m.  Class

The daily schedule includes midmorning and midafternoon refreshment breaks and lunch at noon on days one and two, and lunch at 11:45 a.m. on day three.

ENROLL ONLINE TODAY! Or visit our Web site.
Earn Continuing Education Credits

*Slope Stability and Landslides* is a qualifying course for continuing education credits with clear purpose and objectives, which will maintain, improve, or expand your skills and knowledge.

By participating you will earn 21 Professional Development Hours (PDH) and 2.1 Continuing Education Units (CEU).

If you have questions or would like further information about license renewals, please call the program director, James M. Tinjum, PE, at 608-262-0785.

**Tax Deduction**

Expenses for this continuing education course (including enrollment fees, travel, meals, and lodging) taken to improve and maintain your professional skills are tax deductible subject to the limitations set forth in the Internal Revenue code.

**Need to Know More**

Call toll free **800-462-0876** and ask for

- **Program Director:** James M. Tinjum, PE
- **Program Associate:** Sandy Krentz
- Or e-mail: custserv@epd.engr.wisc.edu

**General Information**

- **Fee Covers** Comprehensive course notes, including our unique Soil Classification Board, publications on CD, reference lists for further study, continental breakfasts, break refreshments, lunches, and a University of Wisconsin Certificate of Participation recognizing educational achievement. Fee does not include lodging or other meals. We do not publish proceedings, and due to copyright laws, course materials are not available for sale after the course.

- **Enrollment and Confirmation** We recommend enrollment in advance by fax, phone, online, or mail. Be certain you receive our confirmation before the course or call 608-262-1299.

- **Cancellation** If you cannot attend please notify us seven days in advance of the course, and we will refund your fee. Cancellations received after this date and no-shows are subject to a $150 administrative fee. You may enroll a substitute at any time before the course starts.

- **Course Location** This course will be held at The Pyle Center, 702 Langdon Street, Madison, WI. Phone messages: 608-262-1122.