

# UNION GRADUATE COLLEGE (UGC)

## CONTINUING EDUCATION PROGRAM

# EARTH RETAINING STRUCTURES

March 26-28, 2007

UNION COLLEGE CAMPUS  
Schenectady, NY 12308

# 21 PDHs



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<http://ce.union.edu>

### WORKSHOP PURPOSE AND DESCRIPTION

This three-day workshop aims at giving civil engineers a deep insight into the design of earth retaining structures. Lateral earth pressures will be addressed in detail. The geotechnical and structural aspects of design will be covered with practical examples. Topics include:

#### **Retaining Walls**

- Lateral Earth Pressure and Retaining Walls
- Lateral Earth Pressure At-Rest
- Rankine Active Earth Pressure
- Coulomb Active Earth Pressure
- Rankine Passive Earth Pressure
- Coulomb Passive Earth Pressure
- Angle of Wall Friction
- Rankine Active and Passive Earth Pressure
- Lateral Earth Pressure due to Surcharge
- Geotechnical Stability of Retaining Walls
- Proportioning of Retaining Walls
- Structural Design of Retaining Walls
- Drainage from the Backfill on the Retaining Wall

#### **Sheet Pile Walls**

- Sheet Pile Walls in Waterfront Structures
- Cantilever Sheet Piling Penetrating Sandy Soil
- Cantilever Sheet Piling Penetrating Clay
- Anchored Sheet Pile Wall
- Free Earth Support Method for Penetration of Sand
- Free Earth Support Method for Penetration of Clay
- Moment Reduction for Anchored Sheet Pile Walls
- Fixed Earth Support Method for Penetration of Sand
- Anchors and Bulkheads

#### **Braced Cuts**

- Braced Cuts
- Lateral Earth Pressure in Braced Cuts
- Design of Various Components of a Braced Cut
- Stability of Braced Cuts
- Failure of Single Wall Cofferdam by Piping

### PROFESSIONAL DEVELOPMENT HOURS (PDH)

Attendees of this workshop will earn 21 PDHs [equivalent to 2.1 Continuing Education Units (CEUs)] that can be applied toward PE license renewal required in the State of New York. Union Graduate College (UGC) is an authorized provider of PDHs (or CEUs) and an approved sponsor of continuing education for PEs in the State of New York.

### WHO SHOULD ATTEND

This workshop is structured to benefit engineers involved in the geotechnical and structural design of plain and reinforced concrete retaining walls, free standing and tie back sheet pile walls, sheet pile walls in waterfront structures, anchors and bulkheads, and braced cuts. Participants will receive extensive notes covering the theory and design procedure of earth retaining structures in addition to detailed design examples.

### TIME AND LOCATION

The workshop will be held on Monday, Tuesday, and Wednesday, March 26-28, 2007 between 9:00 AM - 5:00 PM. Lectures will take place at Union College campus, Schenectady, NY 12308. Upon receipt of the registration form, the participant will receive an email with detailed directions.

### WORKSHOP INSTRUCTOR

Ashraf Ghaly is a Professor of Engineering at Union College. He is a registered Professional Engineer (PE) in NYS. He received his M.Sc. and Ph.D. degrees in Geotechnical Engineering. He has over 17 years of teaching experience and received several teaching and research honors. He authored or co-authored numerous technical and professional papers. Dr. Ghaly is a Fellow of the American Society of Civil Engineers (ASCE).

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### NOTES

- Geotechnical design procedures used in this workshop are those detailed in the engineering code of practice. This includes ASCE published manuals, NYS design manuals, US Army Corps of Engineers Design Manual, and the US Navy Design Manual. These design procedures can also be found in textbooks on the subject of shallow and deep foundation engineering.

- Structural design procedures covered in this workshop are those detailed in the publications of the American Concrete Institute (ACI). Mainly, the Building Code and Commentary of ACI 318 is the source of the structural design procedure used in the workshop.
- Attendees are strongly encouraged to ask questions and share concerns and ideas of real or hypothetical design situations they may wish to address.

## Workshop Schedule

<b>Monday, March 26, 2007</b>	
Time	Subject
9:00AM-10:20AM	Introduction, Retaining Walls
10:30AM-12:00PM	Rankine's Earth Pressure Theory
12:00PM-1:00PM	Lunch
1:00PM-2:20PM	Coulomb's Earth Pressure Theory
2:30PM-3:40PM	Stability Analysis of Retaining Walls
3:50PM-5:00PM	Design Session 1 (Calculations of Earth Pressure)

<b>Tuesday, March 27, 2007</b>	
Time	Subject
9:00AM-10:20AM	Structural Design of Retaining Walls
10:30AM-12:00PM	Design Session 2 (Structural Design of Retaining Walls)
12:00PM-1:00PM	Lunch
1:00PM-2:20PM	Introduction, Sheet Piles
2:30PM-3:40PM	Analysis & Design of Sheet Pile Walls
3:50PM-5:00PM	Design Session 3 (Sheet Piles)

<b>Wednesday, March 28, 2007</b>	
Time	Subject
9:00AM-10:20AM	Design Session 4 (Sheet Piles)
10:30AM-12:00PM	Design Session 5 (Sheet Piles)
12:00PM-1:00PM	Lunch
1:00PM-2:20PM	Braced Cuts
2:30PM-3:40PM	Design Session 6 (Braced Cuts)
3:50PM-5:00PM	Design Session 7 (Equivalent Soil)

## REGISTRATION INFORMATION

### **ENROLLMENT**

Registration fee must be paid in advance. To register, complete and mail the registration form with your payment. Make check payable to UGC. Check, credit card, or purchase order are all acceptable forms of payment. Registration fee includes all course materials.

### **CONFIRMATION**

All registrants will receive email confirmation. If you do not receive confirmation within one week of the date of the workshop, please call or email.

### **CERTIFICATES**

Workshop participants will receive a letter of completion stating the number of PDHs earned.

### **TEAM DISCOUNT**

Three or more people attending the same workshop from the same company receive 10% discount off each enrollment fee when registering at the same time.

### **CANCELLATION/REFUND POLICY**

If you need to cancel your registration, please contact us as early as possible. Cancellation must be made in writing on your company letterhead with attendee's name, and the name and

date of the workshop. Cancellation note should be mailed or faxed. There will be a charge of \$99 for cancellation within 10 business days of the workshop, and no refunds for cancellation within 5 business days of the seminar. You can transfer the registration to another future workshop, but this must be done before the 5-day deadline to receive full credit for money paid. No transfers or refunds will be issued within 5 business days of the workshop. There will be no credits issued after the workshop has begun. Your registration may be transferred to another individual anytime, up to the first day of the workshop. If UGC cancels a workshop due to insufficient enrollment, full refund will be issued.

<b>Union Graduate College</b> <b>CONTINUING EDUCATION PROGRAM</b>
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## REGISTRATION FORM

# EARTH RETAINING STRUCTURES

**March 26-28, 2007**

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_ Cell \_\_\_\_\_

Email \_\_\_\_\_

<input type="checkbox"/> A check for \$1,500 is enclosed. <input type="checkbox"/> Charge my credit card    [MC]    [Visa] Card Number _____ Exp. Date _____ Name as it appears on card _____ <input type="checkbox"/> If faxing, include a copy of check/purchase order.
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### **Contact Information**

#### **Mail**

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Schenectady, NY 12308

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