Research with Hatch Mott MacDonald

Testing tunnel lining for the Toronto Transit Commission - Spadina subway extension

The Geotechnical Research Centre is currently undertaking contract research for Hatch Mott MacDonald to test steel fibre reinforced concrete (SFRC) tunnel lining segments of the Toronto Transit Commission - Spadina subway extension. These SFRC lining rings are being tested for structural and durability criteria in Western's department of Civil and Environmental Engineering research laboratories.

The objectives of the research are to characterize the compressive and tensile strength of the SFRC, subject to chloride exposure, and to assess the flexural resistance of the SFRC segments. This will provide experimental data that can be used to develop strength parameters and improve analytical models used for designing SFRC segments for tunnels.

Each segment is nominally 3 metres long by 1.5 metres wide, and weighs approximately 3 metric tons. This work is being supervised by GRC research director Tim Newson, and associate members of the GRC, including Sean Hinchberger and Moncef Nehdi, who specialize in concrete durability. K.Y. Lo is providing the overall direction of this project.

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Membership Information

If you would like to become a corporate member please contact K.Y. Lo at 519.661.2125 .

Annual membership is $250.

Western Engineering

Geotechnical Research Centre

2012 Winter Newsletter

Inside This Issue

Geotechnical Research Centre Distinguished Alumni Speaker

Dennis E. Becker, PhD'81
April 3, 2012
1:30 p.m.
Room 1200, Spencer Engineering Building
Western University

Talk title: Slope stabilization of a section of the Welland Canal

The St. Lawrence Seaway System is a very significant civil engineering achievement and has high economic importance. The Welland Canal, constructed between 1913 and 1932 through extensive deposits of soft to firm clay, forms a key element of the Seaway. Several slope failures occurred during original construction, and some sections of the canal bank slopes remain only marginally stable.

Becker's presentation will describe a case history of an anchored caisson wall that was constructed in 2001 to stabilize a problematic section of the Canal in St. Catharines, ON.

Since original construction, this section has experienced ongoing deformation and a slope failure of the bank. The resulting ground deformation displaced a timber pile supported bridge pier to an extent that impacts the operation of the lift bridge. The results of 15 years of slope indicator monitoring have shown that the ground movements are a result of operational cyclic canal water levels.

Becker will also describe the historical background and original construction problems, the results of several site characterization studies, the results of the 15 years of slope indicator monitoring, the stabilization options considered, the design and construction of the anchored caisson wall, and observations of pier movement during the first dewatering cycle following construction of the remedial works.

Everyone is welcome to attend.

Dennis E. Becker
Dennis E. Becker, PhD, FEIC, PEng. is a Senior Geotechnical Engineer and Principal of Golder Associates.

Becker has 30 years of national and international experience. He has substantial experience with all aspects of geotechnical engineering and has developed extensive and varied areas of expertise.

He is responsible for the overall technical and administrative control of projects that involve difficult ground conditions and/or require the development of innovative solutions using both standard and new technologies.

His prime areas of expertise include site characterization, foundations, stability of slopes and excavations, earthquake effects and seismic stability of earth dams and tailings management areas, soil-structure interaction, soft ground tunnelling, ground improvement specialized geotechnical analysis/modeling, and fundamental soil behaviour.

Becker is the International Leader of the Ground Engineering Discipline Network in Golder.

Western Engineering

GRC Short Courses

www.eng.uwo.ca/research/grc/short_course.htm

Workshop on Design of Machine Foundations

June 11 - 13, 2012

Instructor: M.H. El Naggar

This short course and workshop will be of interest to geotechnical engineers and civil engineers who wish to have a better understanding of the current practice of analysis and design of machine foundations. Topics will include flexible, rigid and pile foundations subjected to all types of dynamic loads. All key concepts and terminology will be explained and emphasis will be placed on the practical application of the information provided. This course will include computer work on DYNA6.

Seismic Analysis and Design of Structures

June 18,- 20, 2012

Instructor: A. El Damatty

In this course, students will gain a better understanding of the fundamentals of structure dynamics; perform seismic analysis of buildings; apply the seismic provisions of the building code of Canada; understand the concept of capacity design; design seismic-resistant steel buildings; and design seismic-resistant reinforced concrete buildings. This course will include seismic provisions of the National Building Code of Canada NBCC (2005) and (2010).

Tunnels and Underground Structures in Rock

Instructors: K.Y. Lo, C. Yuen and Guest Lecturers

The GRC is pleased to offer an intensive course on Tunnels and Underground Structures in Rock for practicing engineers, to be held at Western University. For the convenience of practicing engineers, the course will be divided into three sections, so participants may take one, two or three sections of their choice. Each section is comprised of two days - Mondays and Tuesdays - during the weeks of July 9, July 16 and July 23, 2012.

Themes

- Initial in-situ stress conditions in different rock formation
- Measurements and evaluation of rock mass deformation and strength parameters for design purpose
- Measurement of time-dependent deformation and design for rock-structure time interaction
- Consideration of excavation methods according to rock conditions: Drill and blast, Tunnel Boring Machines
- Scheduling and costing of tunnel construction
- Assessment of roof stability, floor heave and depth of overbreak
- 3-D concept of advance of tunnel face, rock burst and rock squeeze
- Design of temporary supports
- Design of permanent lining
- Monitoring and interpretation of stresses and displacement during construction
- Instructive "successful" and "unsuccessful" case histories of tunnel construction

Early registration deadline: April 30, 2012

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Engineering Institute of Canada (EIC) Awards

2012 K.Y. Lo Medal Award Winner

In February 2012, the EIC awarded Eco-Tec Inc. President and CEO, Phillip (Rocky) Simmons, the K.Y. Lo Medal for significant engineering contributions at the international level. The award was presented at an EIC Awards Gala in Ottawa, ON.

"This is a high level EIC award emphasizing international impact. The candidates are normally very distinguished, as is Dr. Simmons," says B. John Plant, Executive Director, Engineering Institute of Canada.

Under the leadership of Simmons, Ontario-based Eco-Tec Inc. has become a Canadian global success story in water treatment, chemical recovery, and gas purification, with 2,000 systems installed in nearly 60 countries. Today, a number of Eco-Tec's environmentally and economically sustainable systems have become standard processes for several different industries throughout the world.

Phillip (Rocky) Simmons

"This is a high level EIC award emphasizing international impact."
- B. John Plant
Executive Director, Engineering Institute of Canada

El Naggar elected fellow of EIC

Hesham El Naggar, professor and associate dean - research and graduate at Western Engineering, has been elected a fellow of the Engineering Institute of Canada (EIC). He will be awarded the honour at the EIC Awards Gala in Edmonton, AB on June 7, 2012.

El Naggar has made many outstanding contributions to the engineering profession in Canada and beyond, including:

- Seminal contributions to the field of design of shallow and deep foundations, seismic design and foundations for vibrating equipment
- Contributions to the 4th Edition of the Canadian Foundation Engineering Manual - which are widely recognized by the profession
- 2002 G.G. Meyerhof Award, presented by CGS for "outstanding and significant contributions to the art and science of Foundation Engineering"
- Graduated more than 40 doctoral and masters students
- Published more than 250 technical papers.

Hesham El Naggar