



The DFI-ADSC Joint Committee on Micropiles



Presents

# DFI/ADSC Micropiles Seminar Industry Trends & Developments

A one day event to discuss the History of Micropiles, Industry Challenges, Load Testing, Design and Construction in Canadian Geology, Materials and Equipment, and Case Histories.

**April 8, 2010**  
**Mississauga, ON, Canada**

**Hilton Toronto Airport  
Hotel & Suites**

**Benefitting:**  
Design Engineers,  
Structural Engineers,  
Specifiers, Contractors,  
Material/Equipment  
Suppliers, Project Owners  
and Government  
Departments in  
Design/Construction of  
Micropile Systems

In Cooperation With:



GEO-  
INSTITUTE



Exhibit Space Available  
Register at [www.dfi.org](http://www.dfi.org)

# Seminar Program\*

6:30-7:30 am	<b>Exhibitor Set-up</b>	12:00-1:00 pm	<b>Lunch and Exhibits</b>
7:30-8:00 am	<b>Seminar Registration / Continental Breakfast / Exhibits / Speakers' Preparation</b>	1:00-1:45 pm	<b>Micropiles with Lateral Load</b> <i>Jesús E. Gómez, Ph.D., P.E., Schnabel Engineering LLC.</i>
8:00-8:15 am	<b>Welcome and Introductions</b> <i>Committee Co-Chair: Jonathan Bennett, P.E., Geostructures, Inc.; Moderator: Nadir Ansari, P.Eng., Isherwood Associates</i>	1:45-2:15 pm	<b>Typical Case History Using a Titan Micropile</b> <i>Dan MacLean, P.E., Con-Tech Systems Ltd.</i>
8:15-9:00 am	<b>The Evolution of Micropiles in North America</b> <i>John Wolosick, P.E., Hayward Baker, Inc.</i>	2:15-2:45 pm	<b>Rockyview General Hospital</b> <i>Cory Yacyshyn, P.Eng., North American Caisson Ltd.</i>
9:00-9:45 am	<b>Micropiles in Ontario: Selected Case Studies from the Past 10 Years</b> <i>Jim Bruce, P.Eng., Geo-Foundations Contractors, Inc.</i>	2:45-3:00 pm	<b>Break and Exhibits</b>
9:45-10:00 am	<b>Break and Exhibits</b>	3:00-3:30 pm	<b>Case Study of Micropiles at the St. Joseph's Healthcare, Hamilton, Ontario</b> <i>Mark Montgomery, B.A.Sc., P.Eng., HC Matcon, Inc.</i>
10:00-10:45 am	<b>An Overview of Micropile Equipment and Material</b> <i>Thomas Tuozzolo, P.E., Moretrench</i>	3:30-4:15 pm	<b>Micropiles in Middle Age: Triumphs, Failures and Challenges</b> <i>Donald Bruce, Ph.D., C.Eng., Geosystems, Inc.</i>
10:45-11:30 am	<b>Micropile Load Testing and Acceptance Criteria</b> <i>Thomas Richards, Jr., P.E., Nicholson Construction Company</i>	4:15-4:45 pm	<b>Panel Discussion</b>
11:30-Noon	<b>Seismic Design and Testing Considerations for Micropiles</b> <i>J. Troy Issigonis, M.Eng., P.Eng., Horizon Engineering, Inc.</i>	4:45-5:45 pm	<b>Meet and Greet Reception in Exhibit Area</b>
		5:45-6:15 pm	<b>Exhibitor Breakdown</b>

**Earn 6 Professional Development Hours\* (PDH's):** Meets PDH requirements of NY State Board of Engineers and Florida Board of Professional Engineers (Provider #4072)

\*New York State approval pending.

*\*Program and speakers are subject to change.*

## Seminar Details

### Venue and Accommodations

Hilton Toronto Airport Hotel & Suites  
5875 Airport Road  
Mississauga, ON CANADA LV4 1N1  
Tel: 905-677-9900  
Toll Free: 1-800-HILTONS  
Fax: 905-677-5073  
www.hilton.com

A limited number of rooms have been reserved at a rate of \$119 (CDN) per night. Specify "Deep Foundations Institute" or code "DFI10" for this rate.

*\*Please make reservations early. Space and rate are subject to availability with a cut-off date of Monday, March 15, 2010.*

### Parking

Provided by the Hotel free of charge.

### Transportation

From the Toronto Pearson airport to the Hotel, call CDC Dispatch Shuttle at 1-416-233-3333 or www.cdclimo.com. No reservations in advance are needed.

### Travel Arrangements

Blue Ribbon Travel is DFI's official travel coordinator. Call Lorraine Engleman (Lorraine@blueribbon.travel) at 718-767-5455 for assistance with your travel and accommodations needs. Please be sure to have your passport updated.

### Exhibitor Information

Standing Exhibit: Includes one attendee registration fee and 6' x 2' table. Displays cannot exceed 8'W x 2'D x 7'H.

Table-top Exhibit: (No Standing Displays Allowed!) Includes one attendee registration fee and 6' x 2' table. A fee will apply to attendees having Standing Displays for table spaces!

- All persons tending exhibits, for all or a portion of the seminar, must be registered as full seminar attendees.
- Exhibitor set-up Thursday, April 8, 2010, 6:30 am.
- Exhibitor tear-down 6:15 pm.

### Labels should be marked as follows:

Hilton Toronto Airport Hotel & Suites  
5875 Airport Road  
Mississauga, ON LV4 1N1  
Hold for Guest Name,  
Deep Foundations Institute Seminar – 4/8/10

## Promotional Opportunities

### Direct Marketing Program

Any organization with an interest in the deep foundations industry is invited to participate and maximize their company's marketing efforts.

ONLY \$250 PER SEMINAR provides you with the opportunity to:

- Increase your company's visibility
- Market your products and services
- Improve your recruiting efforts
- Reach industry leaders and decision makers – your potential clients

You will be asked to provide brochures, flyers or CDs containing information on your company's products and services. They will be handed out to all seminar attendees in their registration packet. Brochures/flyers must be 8.5" x 11" or smaller and no more than 6 pages total.

### DFI/ADSC Member Seminar Sponsorship Opportunity

For ONLY \$350 PER SEMINAR, DFI/ADSC members have the additional opportunity to get their logo in front of key industry personnel and to be recognized as a DFI/ADSC and deep foundations industry supporter. In addition to the marketing materials mentioned above, you may also provide an electronic file of your company logo which will be displayed on the seminar handout binder cover and on the session room presentation screen during breaks, as well as in emailed seminar announcements with a link to your website if received far enough in advance.

See the registration form on how to contact DFI for details.

# Presentation Descriptions

## The Evolution of Micropiles in North America

By John Wolosick, P.E., Hayward Baker, Inc.

The history of micropile development in North America since 1980 will be discussed. Topics will include how micropiles were initially used as low capacity foundation elements and how their development has led into carrying ultra-high capacities of hundreds of tons.

## Micropiles in Ontario: Selected Case Studies from the Past 10 Years

By Jim Bruce, P.Eng.,  
Geo-Foundations Contractors, Inc.

This presentation will chart the evolution of the local micropile market by covering such projects as tiptop lofts, Art Gallery of Ontario, CPR Credit River Bridge, Pembroke Courthouse and MTO Highway 7 Scugog River Bridge.

## An Overview of Micropile Equipment and Material

By Thomas Tuozzolo, P.E., Moretrench

There will be a focus on the various equipment and materials that are used in everyday micropile construction. A variety of different equipment will be shown utilizing case studies as part of the talk.

## Micropile Load Testing and Acceptance Criteria

By Thomas Richards, Jr., P.E.,  
Nicholson Construction Company

Load testing is an important part of almost every micropile project. Topics covered will include: typical procedures and equipment, new ASTM rules, strain gauges, acceptance criteria, and apparent elastic length.

## Seismic Design and Testing Considerations for Micropiles

By J. Troy Issigonis, M.Eng., P.Eng.,  
Horizon Engineering, Inc.

There are many factors that affect the behaviour of Micropiles that are difficult to account for, particularly with respect to seismic design. Some of the factors can

be determined, confirmed and/or addressed with testing data, particularly when the testing is specified to meet the seismic design considerations. Cyclic testing is not usually carried out for developments where they are designed to meet Building Codes that require that 'pseudo-static' loads be estimated. The presentation will identify some of the factors and suggest a test specification and criteria for such cases.

## Micropiles with Lateral Load

By Jesús E. Gómez, Ph.D., P.E.,  
Schnabel Engineering LLC

This presentation explores the elements of design of vertical micropiles subject to lateral loads. It focuses on the selection of material properties, definition of boundary conditions, and common procedures for analysis of micropile response to lateral loads and bending moments. It describes issues related to lateral loading that are specific to micropiles such as P-Delta effects and buckling, and includes a quick analysis procedure to design micropiles against buckling. It also includes the results of recent research into the response of micropile-pile cap systems to lateral load when the pile cap is not embedded within the soil and, thus, does not benefit from lateral soil resistance. These results suggest that micropiles may be able to resist larger lateral loads than previously thought. Practical examples and case histories will be presented.

## Typical Case History Using a Titan Micropile

By Dan MacLean, P.E., Con-Tech Systems Ltd.

This presentation will first explain what a micropile is, and the different types of micropiles as defined by the FHWA. It will quickly look at typical applications of micropiles in the industry today. Then it will look specifically at the Titan Micropile explaining the Type E classification. The two major benefits of the systems is discussed, both the speed of installation and the ground improvement created by the Titan Micropile. The components of the systems, including the steel elements, couplers, nuts, bits and flushing heads will be explained in detail. The installation procedure is commented on, including the drilling and grouting equipment to achieve the maximum benefits of the Titan

Micropile. It will then go through one example design calculation, looking both at the structural and geotechnical limits of the design, using building codes and site specific geotechnical reports. A quick overview of testing is presented, and the topic concludes with a look at two case histories.

## Rockyview General Hospital

By Cory Yacyshyn, P.Eng.,  
North American Caisson Ltd.

In 2008, Engineers for Rockyview General Hospital selected micropiles as a deep foundation solution to structurally support a new hospital operating room structure located in an enclosed courtyard. Project-specific constraints such as restricted access, difficult drilling through fill soils past an older shoring wall and minimized vibration requirements influenced the choice for micropiles. Limited geotechnical information and a specified total pile head movement not exceeding 20 mm at design load levels contributed to a challenging micropile application.

## Case Study of Micropiles at the St. Joseph's Healthcare, Hamilton, Ontario

By Mark Montgomery, B.A.Sc., P.Eng.,  
HC Matcon, Inc.

The paper will look at how micropiles were used to facilitate a multi-story tower addition within the existing hospital structure. Micropiles were compared to hand dug caissons, also done on the site, and determined to offer overall savings to the project. Access issues and the solutions will be discussed as well.

## Micropiles in Middle Age: Triumphs, Failures and Challenges

By Donald Bruce, Ph.D., C.Eng., Geosystems, Inc.

The technology of micropiles has matured over a period of 58 years. This paper, The Lizzi Lecture, recently given at the 9th ISM Workshop in London, England, gives a historical perspective on significant triumphs, failures, and challenges recorded during the period. It also discusses the various factors and influences on the significant growth in the use of micropiles, especially over the last 10 years or so.

