

# Soil-Structure Interaction

**A technical seminar about modeling soil-structure interaction in the analysis of buildings and bridges, and how the design of structures is affected by the incorporation of SSI effects.**

**Friday and Saturday,  
June 25 and 26, 2010**

**University of British Columbia  
Woodward 2, IRC Building  
2194 Health Sciences Mall  
Vancouver, BC**

*Presented by:  
Structural Engineers  
Association of BC  
(SEABC)*



*Sponsored by:  
UBC Department of Civil Engineering  
The Canadian Society for Civil Engineering,  
Vancouver Section*



## **Synopsis:**

This seminar offers a guided tour through the various ways of accounting for soil-structure interaction (SSI) from analysis of the total soil-structure system to analysis of various approximate models of the system. The focus is on buildings and bridges, with both shallow and deep foundations. The seminar will highlight the benefits of including SSI analysis, from the perspective of improved understanding of actual system behaviour as well as improved efficiencies in structural designs that can be achieved.

When analysis of the total soil-structure system is carried out, the effects of soil-structure interaction (SSI) are implicitly included in the analysis and reflected in the results. However this type of analysis, while feasible, is rarely practical in practice because the structural analysis programs used by structural engineers cannot handle the nonlinear soil continuum directly.

Modeling the effects of soil-structure interaction for practical design means developing reliable simple models that include the flexibility of the soil and foundation system; the dissipation of energy from the soil-structure system through radiation and hysteretic soil damping; and the modification of the ground motion transmitted to the structure by soil-structure interaction.

For some cases, the results of the analyses of approximate models are compared with “best model” solutions and recorded response data. The comparison provides insight on the more important features of soil-structure interaction and guidance on the selection of approximate models.

## **Program:**

### **FRIDAY, JUNE 25, 2010**

|             |   |
|-------------|---|
| 07:30-08:00 | Registration  |
| 07:50-08:00 | Welcome & Introduction<br>(Carlos Ventura)                  |
| 08:00-09:00 | Overview of SSI<br>(Liam Finn)                              |
| 09:00-09:45 | Visualization of SSI effects<br>(Carlos Ventura)            |
| 09:45-10:30 | SSI effects on seismic demand<br>(Craig Comartin)           |
| 10:30-11:00 | Coffee Break  |
| 11:00-11:45 | SSI with rocking foundations<br>(Don Anderson)              |
| 11:45-12:30 | Stiff and flexible soil anchors<br>(John Sherstobitoff)     |
| 12:30-01:30 | Lunch   |
| 01:30-02:15 | Retaining and basement walls<br>(Ernie Naesgaard)           |
| 02:15-03:00 | SSI of piled foundations for buildings<br>(Blair Gohl)      |
| 03:00-03:30 | Coffee Break  |
| 03:30-04:30 | SSI of piled foundations for bridges<br>(Anoosh Shamsabadi) |
| 04:30-05:15 | Lions Gate bridge case study<br>(Bruce Hamersley)           |

### **SATURDAY, JUNE 26, 2010**

|             |  |
|-------------|--|
| 08:30-9:30  | Selection and processing of ground motions for SSI<br>(Adrian Wightman & Carlos Ventura)   |
| 09:30-10:30 | Dealing with liquefaction related problems (case studies)<br>(John Sherstobitoff & Upul Atukorala)   |
| 10:30-11:00 | Coffee Break   |
| 11:00-12:30 | Round table discussion on discussion on interactions between geotechnical and structural engineers and on effective communication between them.<br>(Moderator: Ron DeVall) |

## **Speakers:**

- Donald Anderson, Ph.D., P.Eng.  
Professor Emeritus of Civil Engineering  
University of British Columbia, Vancouver, BC
- Upul Atukorala, PhD, PEng.  
Principal  
Golder Associates Ltd., Burnaby, BC
- Craig Comartin, S.E.  
President  
CDCComartin Inc., Stockton, California
- Ron DeVall, Ph.D., P.Eng.  
Senior Consultant-Structural Engineering  
Read Jones Christoffersen Ltd., Vancouver, BC
- Liam Finn, Ph.D., P.Eng.  
Professor Emeritus of Civil Engineering  
University of British Columbia, Vancouver, BC
- Blair Gohl, Ph.D., P.Eng.  
Senior Associate  
AMEC Earth and Environmental, Burnaby, BC
- Bruce Hamersley, P.Eng.  
Principal  
Klohn Crippen Berger Ltd., Vancouver, BC
- Ernest Naesgaard, P.Eng.  
Principal  
Naesgaard Geotechnical Ltd., Bowen Island, BC
- John Sherstobitoff, P.Eng.  
Manager, Structural  
Ausenco Sandwell, Vancouver, BC
- Anoosh Shamsabadi, Ph.D, P.E.  
Senior Bridge Engineer  
California Department of Transportation,  
Sacramento, California
- Carlos Ventura, Ph.D., P.E., P.Eng.  
Professor of Civil Engineering  
University of British Columbia, Vancouver, BC
- Adrian Wightman, M.Sc., P.Eng.  
Principal Consultant  
BGC Engineering Inc., Vancouver, BC

## **Registration Fees:**

Attendees may registration online at:

[www.seabc.ca/ssi-seminar](http://www.seabc.ca/ssi-seminar)

or use the mail-in form attached.

Registration fees include lunch on June 25, coffee breaks both days, and handout materials.

The registration fees vary depending upon the registrant's membership status within SEABC or one of the other sponsoring or co-sponsoring organizations, as listed below. GST at 5% will be added to all fees.

|  |       |
|--|-------|
| SEABC Member .....   | \$350 |
| Member of Sponsor & Supporting Organizations:<br>CSCE, CAEE, CSRN, CGS, VGS,<br>IStructE, and WCSEA..... | \$375 |
| Non-member .....   | \$500 |
| SEABC Student Members.....   | \$110 |

**Fees listed also apply to on-line attendance.**

## **Discounts:**

An "early bird" discount of \$25 is available for those registering on or before June 7, 2010.

A "group" discount of \$25 per attendee is available to firms or organizations registering 3 or more attendees.

***These discounts are not available to students and those registering after June 7, 2010.***

## **SEABC Membership:**

Non-member registrants who wish to take advantage of the substantial discount offered to SEABC members may complete the membership application form and enclose it along with the a cheque for \$425+GST (includes \$350 seminar fee plus \$75 membership dues for 2010).

Students: please note that SEABC Student Membership is free for full-time students.

## **Handout Materials:**

Each seminar participant will receive a handout containing the presentation slides. Certain presentations will include complementary notes.

## **Professional Development Credits:**

Upon successful completion of the seminar, participants will receive a certificate showing a credit of 11 Professional Development Hours (PDH).

## **Finding your way to the seminar:**

The seminar will be held in the Instructional Resource Centre (IRC), Woodward 2 theatre, 2194 Health Science Mall. The IRC is located east of Health Sciences Mall and north-west of the UBC Hospital.

Convenient parking is available at the Health Sciences Parkade (2250 Health Sciences Mall). Additional Parking is available at the Thunderbird Parkade (6085 Thunderbird Blvd). From either parkade, walk north on Health Sciences Mall and turn right at Woodward Biomedical Library. The IRC Building adjoins the Woodward Library.

Additional details and maps are available at:

[www.maps.ubc.ca](http://www.maps.ubc.ca)

## **Additional Information:**

Additional information about this event is available on the SEABC website:

[www.seabc.ca/ssi-seminar](http://www.seabc.ca/ssi-seminar)

For further questions please email:  
[seminars@seabc.ca](mailto:seminars@seabc.ca)

or contact Carlos Ventura:

phone: 604-822-6946

e-mail: [ventura@civil.ubc.ca](mailto:ventura@civil.ubc.ca)



**Structural Engineers Association of BC**  
**Mail-in Registration Form:**  
**Soil-Structure Interaction Seminar**  
**June 25-26, 2010**

*You can also register online!*  
[www.seabc.ca/ssi-seminar](http://www.seabc.ca/ssi-seminar)  
 (secure credit card payment via PayPal)

**Contact Information:**

Name of Firm, Organization or Individual \_\_\_\_\_  
 (Receipt will be issued in this name to email provided below)

Mailing Address \_\_\_\_\_  
 Street Address City, Province Postal Code

Other Information \_\_\_\_\_  
 Telephone Fax E-mail (receipt will be issued to this email)

**Registration Fees:**

| Name(s) of Attendees(s) | Check if Attendance by Webcast* | SEABC Membership No. (Required for SEABC discount) | Fees                     |  |                          |                          |                          |                          |                          |                          |                          |                            |                          |          |
|-------------------------|---------------------------------|--|--------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------------------|--------------------------|----------|
|                         |                                 |  | SEABC Member \$350       | Newly enrolling SEABC Member - \$425** | CSCE Member \$375        | CAEE Member \$375        | CSRN Member \$375        | CGS Member \$375         | VGS Member \$375         | IStructE Member \$375    | WCSEA Member \$375       | SEABC Student Member \$110 | No membership \$500      |          |
| 1. _____                | <input type="checkbox"/>        | _____  | <input type="checkbox"/> | <input type="checkbox"/>               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | \$ _____ |
| 2. _____                | <input type="checkbox"/>        | _____  | <input type="checkbox"/> | <input type="checkbox"/>               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | \$ _____ |
| 3. _____                | <input type="checkbox"/>        | _____  | <input type="checkbox"/> | <input type="checkbox"/>               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | \$ _____ |
| 4. _____                | <input type="checkbox"/>        | _____  | <input type="checkbox"/> | <input type="checkbox"/>               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | \$ _____ |
| 5. _____                | <input type="checkbox"/>        | _____  | <input type="checkbox"/> | <input type="checkbox"/>               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | \$ _____ |
| 6. _____                | <input type="checkbox"/>        | _____  | <input type="checkbox"/> | <input type="checkbox"/>               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | \$ _____ |

Check one box per attendee

Number of Attendees: \_\_\_\_\_ SUBTOTAL: \$ \_\_\_\_\_

**Group Discount: (this discount is not available to students or after June 7, 2010) deduct**

Firms/Organizations registering 3 or more attendees deduct \$25 per attendee No. of attendees \_\_\_\_\_ x \$25 = \$ \_\_\_\_\_

**Early Bird Discount: (this discount is not available to students or after June 7, 2010) deduct**

PAID registration postmarked on or before June 7, 2010 deduct \$25 per attendee No. of attendees \_\_\_\_\_ x \$25 = \$ \_\_\_\_\_

**SUBTOTAL FEES \$ \_\_\_\_\_**

**ADD 5% GST \$ \_\_\_\_\_**

**TOTAL (PAYMENT ENCLOSED) \$ \_\_\_\_\_**  
 Cheque payable to SEABC

**Mail this form and payment to:**  
**SEABC SEMINARS**  
**#201-288 West 8<sup>th</sup> Avenue, Vancouver, BC V5Y 1N5**

Registration will be confirmed via e-mail. Registration closes June 22, 2010 and cannot be guaranteed if received after June 22. An administration fee of \$75 will apply to all cancellations received before June 22, 2010. No refunds given after June 22, 2010. \* Instructions on how to access the webcast will be sent by e-mail prior to the seminar. \*\* Fees of \$425+GST for newly enrolling SEABC Members include 2010 SEABC Membership Dues of \$75+GST. Please include a completed Membership Application form (attached) if you are selecting this option.



# Structural Engineers Association of British Columbia

## 2010 MEMBERSHIP APPLICATION

(For membership until December 31, 2010)

**MEMBERSHIP CATEGORY** ( Please see Note 1 below, and check appropriate box )

- Individual Member
- Associate Member
- Technologist or other discipline
- Student Member

### MEMBER INFORMATION

Name (Mr./Ms./Dr. please circle one) \_\_\_\_\_

Professional Designation (e.g. P.Eng., Struct. Eng., EIT, A.Sc.T., Student) \_\_\_\_\_

Licensing Authority (e.g. APEGBC ) \_\_\_\_\_

Company/Institution \_\_\_\_\_

Title \_\_\_\_\_

Mailing Address:  Home  Business

\_\_\_\_\_

\_\_\_\_\_

Phone \_\_\_\_\_ email \_\_\_\_\_

**PLEASE COMPLETE THIS FORM AND INCLUDE IT WITH YOUR SEMINAR REGISTRATION FORM. ON THE SEMINAR REGISTRATION FORM, SELECT "NEWLY ENROLLING SEABC MEMBER"**

### NOTES

1. Individual members must be registered as Professional Engineers or EITs. Associate members (Technologists, Students, and others) are entitled to all benefits of membership except that they may not vote at meetings of the SEABC Society. The membership fee for students is waived.
2. Under the Society Act of BC, SEABC is required to keep a register of the names and addresses of its members. Email addresses will be used for mailing the Newsletter and society notices. In accordance with the Canada Privacy Act, names and addresses will not be made available to the public.
3. Any member who is interested in participating in the work of SEABC by serving on one of the operating committees, is asked to contact SEABC through the website at [www.seabc.ca](http://www.seabc.ca)