



The Institution  
of Structural  
Engineers

# SEABC NEWSLETTER

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- SEABC's Newsletter is both edited and managed by The Communications Committee.  
[newsletter@seabc.ca](mailto:newsletter@seabc.ca)
- Submissions to the newsletter are encouraged and all members of the SEABC are asked to actively participate in contributing to our newsletter. Submissions letters to the Editor, questions and comments can be sent to:  
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- SEABC editing staff reserve the right to include or exclude submitted material and in some cases edit submitted material to suit overall space requirements. If submittals are not to be edited, please advise editor at submission time.

## Message from the President

May 2013

By Cameron Kemp, P.Eng.;  
SEABC President



### Paying It Forward

I was sitting at my desk this week filling in a reference form for a young engineer in the office seeking to gain his registration as a professional engineer and got thinking about him being at the “sunrise” stage of his career while I am at the “sunset” stage of mine. This got me reflecting about all of the people who helped me get to where I am today; an enthusiastic and wildly eccentric science teacher in grade school that got me interested in the maths and sciences, the extraordinary collection of professors I had at university, the more senior engineers that I have worked with that patiently answered my dumb questions and whom helped hone my technical skills and engineering judgment, my peers and colleagues that acted as sounding boards for my proposed solutions to a problem. All of them helped me along my way.

When I reflect on all that I’ve learned about design, engineering and construction I realize that my years at university taught me a lot but that they were just the foundation upon which everything I have learned subsequently has been built on. I realize that I have learned an order of magnitude more about our profession since I graduated then I did at school.

All of the people I have interacted with; architects that proposed wild schemes that I had no idea how to fulfill, more senior structural engineers that made suggestions and pointed me in the right direction, mechanical engineers that continually reminded me that they needed to distribute their systems throughout the building too (and usually determined that they needed to punch holes in my

beams and walls in the worst possible locations) and the construction superintendents that continually reminded me (usually not all that subtly) about what was practical and do-able on a construction site have given me a career’s worth of knowledge, experience and judgment that, somehow, I have to share with others while I still can.

I have been the beneficiary of all of these people who have “paid it forward” and I feel a strong responsibility to do the same. I encourage all of you with enough gray hair (or no hair) and battle scars to do the same. By sharing what we have learned we will make the next generation of structural engineers that much better. If our young engineers actively seek input and advice from those more senior (and carefully listen to the guidance and input they receive) then they cannot help but become better engineers themselves.

I can only hope that the young engineer whose forms I filled in this week benefits from the same kind of generosity of time, knowledge and experience that I was lucky enough to experience. “Pay it Forward”. When you try it you will find you will receive more than you’ve expended.

## Education Committee

By Cam Smith, Director SEABC



One of the recent initiatives of the Education Committee has been the live webcasting of seminars to provide members from both the Vancouver Island Branch and the Okanagan Branch the opportunity to participate in events held in the Lower Mainland. This has been a successful complement to the video archiving of events

which continues as a service to those members who are unable to attend in person. The Education Committee endeavors to provide opportunities for continuing education and professional development to structural engineers throughout BC.

It should be noted that the Education Committee has undergone a few recent changes with respect to personnel: we would like to welcome new members Saeed Niroumand of Associated Engineering, Mark Robertson of Halsall Associates, Tony Yang, UBC Department of Civil Engineering, and Jacquie Gaudet, BCIT Department of Civil Engineering. A sincere thank you to Habib Rahman for the time and commitment he gave to the Committee as the BCIT faculty representative. Finally, we are pleased to announce that Tejas Goshalia, P.Eng., PE, SE, Stantec, will take on the role of Chair of the Education Committee. It has been a pleasure to have been given the opportunity to fulfill this position over the last 2 years and I look forward to continuing my involvement with the Committee in the future.

As always, we appreciate feedback from members including comments on past events, suggestions for future topics, and proposals for presentations, so please do not hesitate to contact us at:- [education@seabc.ca](mailto:education@seabc.ca).

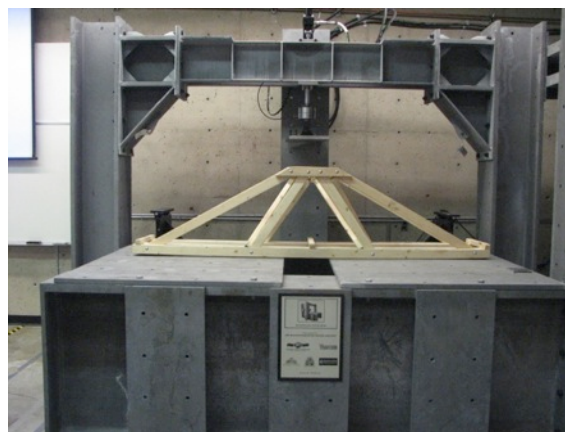
## **2013 Wine & Cheese / Opening Reception for the UBC Structural Teaching Laboratory (April 24, 2013 – UBC CEME Structures Lab)**

This year's Wine & Cheese event was held earlier than usual in order to also serve as the opening reception for the UBC Structural Teaching Laboratory to showcase their new testing frame. This event was well attended by SEABC members, UBC faculty and the various sponsors of the testing frame.



*Left to right: Dr. Reza Vaziri (UBC), Cameron Kemp (SEABC President) and Dr. Tony Yang (UBC)*

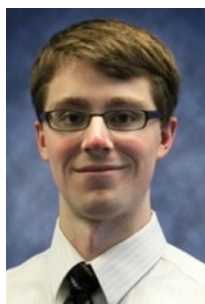
The evening began with a welcome from Dr. Yang (UBC) who provided an overview of the teaching lab and its equipment. Dr. Vaziri (UBC) then took the stage to individually thank and recognize the sponsors, Ebco Metal Finishings, George Third and Son Ltd., Varsteel Ltd., Pacific Bolt Manufacturing Ltd. and the SEABC for their contributions. The formal program ended with SEABC President, Cameron Kemp, saying a few words about the SEABC and a demonstration of the testing frame by Dr. Yang, during which attendees submitted their predictions of the failure load for the test specimen.



*New Testing Frame (and Test Specimen)*

## Young Members Group

By Grant Fraser



It has been a busy few months for the YMG. For the fourth successive year, the YMG sponsored a \$250 prize for the Greater Vancouver Regional Science Fair. The prize is awarded by members of the YMG committee to the best science fair project that exhibits

structural engineering principles. Our intent in sponsoring this prize is to encourage students to think about structural engineering from a young age, and to make them aware of the diverse possibilities within such a field.

This year we awarded the prize to Justine Hansen from Burnaby North Secondary for her excellent project: He Huffed He Puffed. This project looked at designing a tent that best resisted wind forces. Justine was enthusiastic, passionate, and made thoughtful and insightful conclusions about the effect of wind on structures. We were not the only ones impressed by her project: Justine's project was one of the few selected to compete at the national science fair representing British Columbia!



At the end of April, the YMG hosted an evening seminar on registration with APEGBC. Steven Kuan spoke to a full house about the process for registering as a Professional Engineer, including experience and reporting requirements, as

well as some helpful tips and insight into the application review process. Steven also presented an overview of the new 'Competency-

based' application process, and the differences between it and the current 'Work Summary' process.

The seminar concluded with a brief overview of the Struct.Eng. requirements and application followed by some engaging questions from the young members in attendance. This is the third YMG-hosted seminar professional registration seminar that Steven has presented and we would like to thank him once again for his enthusiastic presentation.



*Justine's science project*



*Justine with YMG Chair Ilana Danzig*



## Vancouver Island Branch

By Dr. Martin Turek, P.Eng. and Tyler Thompson EIT



*Dr. Martin Turek*



*Tyler Thompson*

Things are happening here in the Vancouver Island Branch. A new executive has been appointed, several events have been held, and planning is now underway for some future events.

On March 28<sup>th</sup>, 2013, we held our first executive planning meeting and we are happy to formally announce the new 2013 branch executive:

- Dr. Martin Turek, Ph.D, P.Eng – Chair
- Tyler Thompson, EIT – Vice Chair
- Thor Tandy, P.Eng, Struct.Eng – Past Chair

We also have a few other island members volunteering their time in planning and organizing branch activities. Everyone is motivated and excited to continue working with Thor on building the VI Branch.

Over the last few months we have hosted the following events:

- Live Webcast: Port Mann Bridge Design and Construction
- Live Webcast: Floor Response Spectra

- Live Webcast: Pitt River Bridge Design and Construction
- Hilti Breakfast Presentation

Planning is now underway for future events including possible site tours and presentations in the coming months (more details to come).

Our goals are to keep moving forward, increase our presence on the island, and encourage active participation and member engagement. We are striving to provide opportunities for SEABC members on the island to meet, discuss issues, and to benefit from the exchange of technical ideas and solutions.

We are also collaborating with the Okanagan Branch to develop plans for upcoming events, with thoughts around a one-day/half-day seminar involving timber design to be held in Victoria and in Kelowna. One meeting has already been held in Kelowna between our respective branch executive. That meeting also involved discussions on improving member engagement in the satellite branches.

If you are interested in getting involved with the SEABC VI Branch, or if you have any comments or suggestions for future VI Branch activities, please contact: [island@seabc.ca](mailto:island@seabc.ca). We look forward to hearing from you.

### OQM Program

Thor Tandy, P.Eng., Struct.Eng., SEABC member and former Director, has been nominated to be the Vancouver Island Representative for APEGBC's Organizational Quality Management (OQM) Program. For any of the Island Branch members looking for information on this new program, please feel free to contact him at: [vicpeng@telus.net](mailto:vicpeng@telus.net).

## Communications Committee

By David Harvey, P.Eng, Struct.Eng.  
Director SEABC



The Communications Committee continues to work hard for SEABC Members.

The Committee is responsible for:

- Website (see Webmaster's Report)
- Membership
- Broadcast e-mails
- Newsletter

SEABC continues to be strongly supported by its members and our membership numbers are holding firm. We believe our membership includes the majority of BC's structural engineers. Encouragingly, quite a few members live and work outside of BC – we are delighted that they see value in belonging to our association and can take advantage of our constantly improving on-line services. Our current membership is:

Active Members	845
Individual members:	609
Associate members:	20
Retired members:	0
Student members:	212
Life members:	1
Affiliate members:	4

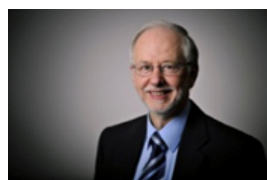
Our broadcast e-mail service provides advanced notice of upcoming events. We give priority to events organized or sponsored by SEABC, and where possible we include notification of events run by other organizations that we believe will be of interest to SEABC members. In particular we include many upcoming ASCE, AISC, and ATC

webinars that involve structural engineering education. For a complete list and details of webinars run by outside organizations please go to the relevant website.

Our newsletters contain the President's Message, the committee reports, IStructE News, YMG Report, event reports, articles submitted by members, and Mark Your Calendars. We also include occasional sustainability reports and announcements. To keep our newsletter as interesting and relevant as possible, please continue to send us your news, comments, and photographs which we'd be pleased to publish. We'll do our best to include as much coverage as possible and are happy to edit submissions on your behalf. Please keep up the excellent contributions!

## Technical Committee

By Renato Camporese, , P.Eng.,  
Struct.Eng., Director SEABC



The Task Group investigating the Seismic Design of Basement Walls is currently the only active task group. The non-linear analysis by graduate students at UBC under the direction of Dr. Mahdi Taibat appears to be complete and they have published a paper of the results. The committee is expecting to receive a copy of the paper for their review and to establish if design guidelines can be provided for wall design.

Draft documents regarding requirements for Fire Rating of Seismic Bracing and a Guardrail Design Guideline have been submitted to APEGBC for their review, endorsement and publication. The association has yet to respond to these proposed documents.

## ***Elements of Earthquake Engineering and Structural Dynamics – Third Edition***

**By Bryan Foltz Ph.D. P.Eng**



In order to reduce the seismic risk facing many densely-populated regions worldwide, including Canada and the United States, modern earthquake engineering should be more widely applied.

However, current literature on earthquake engineering may be difficult to grasp for structural engineers who are untrained in seismic design. In addition, no single resource addressed seismic design practices in both Canada and the United States until now.

**'Elements of Earthquake Engineering and Structural Dynamics'** was written to fill the gap.

It presents the key elements of earthquake engineering and structural dynamics at an introductory level and gives readers the basic knowledge they need to apply the seismic provisions contained in Canadian and American building codes. The scope of this book is not just limited to structural analysis and design; it also discusses the basics of other relevant topics such as seismology, seismic risk analysis and geotechnical engineering, to help structural engineers work efficiently with other specialists on earthquake-resistant construction projects. Each chapter ends with a set of problems giving readers an insight into practical aspects of the subject.

This book is intended for senior undergraduate and graduate structural engineering students,

university educators, and practicing engineers who will all find it a valuable resource. The publisher of the Third Edition is 'Presses Internationales Polytechnique', of Montreal.

Details of the book's content can be viewed at:

[www.presses-polytechnique.ca](http://www.presses-polytechnique.ca)

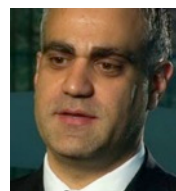
### **Authors**



• André Filiatrault, Eng., Ph.D., is a professor in the Department of Civil, Structural and Environmental Engineering at the State University of New York at Buffalo, NY, in the United States.



• Robert Tremblay, Ing., Ph.D., is a professor in the Department of Civil, Geological and Mining Engineering at École Polytechnique de Montréal, Canada.



• Constantin Christopoulos, P.Eng., Ph.D., is a professor in the Department of Civil Engineering at the University of Toronto, Canada.



• Bryan Foltz, Ph.D., P.Eng., is a faculty member in the Department of Civil Engineering at the British Columbia Institute of Technology in Vancouver, Canada.



• Didier Pettinga, P.Eng., is a project engineer with Holmes Consulting Group in Christchurch, New Zealand.

## ***Seismic Structural Health Monitoring of Bridges in B.C.***

**By Carlos E. Ventura Ph.D, P.Eng.**



The British Columbia Ministry of Transportation and the University of British Columbia have implemented a program to instrument key structures to provide confirmation of seismic capacity, assist in focusing retrofit efforts, perform structural health evaluations and provide

rapid damage assessment of those structures following a seismic event. The instrumentation system installed at each structure will automatically process and upload data to a central server via the Internet. The alert systems and public-access web pages can display real time seismic data from the structures and from the BC Strong Motion Network to provide input for assessments by the Ministry of non-instrumented bridges. These systems may also provide other agencies, emergency responders and engineers with situational awareness.

The British Columbia Ministry of Transportation (MoT) is responsible for 400 km of provincial Disaster Response Routes. The loss of any portion of one of these routes could significantly impact emergency response efforts and negatively affect public well-being. The Ministry maintains 900 structures in the highest seismic zones, many of which are vulnerable to extensive damage in even a moderate quake and potential collapse in a major earthquake. The loss of the use of several structures would not only have immediate impact on public well-being and the ability of emergency vehicles to respond effectively, but would also cripple the economic

recovery of the region. The better the information on which areas, structures and facilities are most vulnerable, the better planning and preparation can be done. By identifying those structures and facilities most susceptible to seismic forces, decision-makers can do effective risk management. Fast, accurate field intelligence immediately following an earthquake can ensure the most effective deployment of vital services and mitigate damage to the built environment.

The MoT has been instrumenting structures in collaboration with the Earthquake Engineering Research Facility (EERF) at the University of British Columbia (UBC) since the late 1990's. The primary purpose of the original systems was to capture the ground motion input. More recently, the instrumentation has been expanded to incorporate Structural Health Monitoring (SHM). Three design-build bridges have included instrumentation; one existing bridge has also been instrumented and up to eight more bridges will be added by the end of 2014.

In addition to the structural monitoring, the Geologic Survey of Canada (GSC) through the Pacific Geosciences Centre (PGC) maintains the Provincial Strong Motion Network (SMN) comprised of over 130 stations. As part of this network, the GSC developed a strong motion seismograph, which is permanently connected to the internet recording data continuously, rather than in "triggered mode". The instrument also continuously computes a set of parameters, which characterize the intensity of shaking and actively reports those values whenever ground shaking exceeds certain levels to the GSC's data centres. Over the last several years the MoT has been working with the PGC expanding the number of stations in the network.

Building on these collaborations, MoT and UBC embarked on a program called the British Columbia Smart Infrastructure Monitoring System (BCSIMS). The system integrates data from the instrumented structures and strong motion network, organizes and processes the information



in an efficient manner, to deliver that information to the appropriate parties.

The goals of the system are to:

- 1) Provide a real-time seismic structural response system to enable rapid deployment and prioritized inspections of the Ministry's structures.
- 2) Develop and implement a health monitoring program to address the need for safe and cost-effective operation of structures in BC.

The implementation of the BCSIMS will help transform the current practice of inspecting and evaluating all structures after an earthquake to a more rational and effective one that makes effective use of state-of-the-art sensing technology with fast and efficient techniques for data analysis and interpretation. Inspections can then be focused and prioritized to maximize the effectiveness of scarce resources.

## **BCSIMS System Architecture**

BCSIMS is a Supervisory Control and Data Acquisition (SCADA) system consisting of the following subsystems:

- i. Public available and restricted web-based Graphical User Interfaces capable of displaying relevant information (web interface).
- ii. One SIMS1 supervisory computer administrating the traffic between sensors, remote processing computers, remote users and database.
- iii. Remote SIMS2 processing computers connecting the on-site monitoring equipment to the system.
- iv. One or more SIMS3 computers used for post-processing that may be more computationally intensive.
- v. A Strong Motion Server to connect the Strong Motion Network (SMN) system operated by the Pacific Geosciences Centre to the database.

The key component of the system is the Global Database at UBC. This database contains all of the system data, analysis results, settings and other system information. The local database at each structure contains all of the same fields as the global database, but only data for that structural station. This synchronization includes settings, results and raw data. Event triggers are set at the structural station in the hardware; a trigger initiates a recording that is placed in the local database. This initiates the SIMS2 local analysis module; the results of the analysis are placed in the local database, and both raw data and results/parameters sync to the global database. Upon receipt of new data/results in the global database, the SIMS3 advanced analysis PC will initialize the report generator. Reports will be sent to the webpage and to selected user email accounts via HTML. The entire system will be run through the University of British Columbia with at least one backup server and PC's at the Pacific Geosciences Centre. In the future an additional out-of-province backup server will be set up.

In order to streamline the data transmission process, UBC has developed its own standards and protocols. The merit of this approach is that it helps achieve consistency and platform-neutrality across all hardware platforms thereby simplifying the downstream processing. In addition to being able to use the most suitable hardware for a specific bridge (e.g. for technical performance or cost effectiveness), it also offers flexibility in replacing (e.g. defective) sensors in the future. Furthermore, it also significantly facilitates in assimilating the legacy stations.

As a physical complement to the web based monitoring network a control room will be located at UBC. The Control Centre is envisioned as a situation-room with all the necessary skilled human resources plus enabling technologies available; and ensuring a continuous watch and attendance. Operational procedures will be enacted to regularly produce and syndicate to the subscribing stakeholders such as the MoT with 'sitreps' (situation reports of what is happening)

and 'progreps' (progress reports relative to a goal which has been set). The Control Centre is housed in the Institute for Computing, Information and Cognitive Systems (ICICS).

Several event reports will be issued to various parties according to a predetermined subscriber list. Currently there will be three types of reports; they can be either automatically or manually generated depending on the type of report or event. The 'BCSIMS Quick Event Report' will provide a snapshot of a seismic event, including typical parameters such as location, magnitude, depth, etc. It will also list the top triggered ground motion stations, and a list of all of the structures in the network and a quick summary of their performance. The second report is the 'BCSIMS Strong Motion Network Report' and it will contain all of the same information as the quick report but also include all of the ground motion stations and additional figures such as time histories and response spectra. The third report is the 'BCSIMS Structural Event Report'; it will provide information on the status and condition of the structure. Other details of the analysis from the various SIMS modules will be included. One report will be issued for each structure. The Quick Report and SMN Report will be automatically issued when the strong motion network triggers; the Structures Report may trigger for several reasons, such as a seismic event, impact, traffic, wind or simply for a scheduled health assessment.

The [www.bcsims.ca](http://www.bcsims.ca) website is the gateway for user interaction and operational management. There are two view modes – public and restricted, which dictate the nature and amount of information accessible on the webpages. The public view consists of a shake map intended for general public consumption and the restricted view contains further information for advanced users, such as downloadable data and unpublished results. Figure 1 shows a screen shot of the website homepage. The circles represent the strong motion network stations, and the squares are structural stations.

The structure stations and the sensors of the strong motion network are displayed as icons on a digital geomap. The interactive map allows zooming in/out and focusing on a particular station. Additional metadata for the structures such as location information and live links to webcams are also provided. Lists of recent events and recent seismic activities are provided from which the user can access published information for the corresponding events and activities.

In addition to the homepage and shake maps, links from each bridge icon in the map directs to the Structures Information Pages. The idea of the Structures Information Page (SIP) is to provide an overview of the status of the structure and more detailed results of the various structural assessments carried out by the system. The SIP is divided into several tabbed sections. The tabs include a summary view, analysis view, data view and structure view. The exact configuration of the tabs is being finalized and may differ from this list; however the content is generally the same. The concept is to separate into information relating to events, data, analysis and static data such as instrumentation drawings and photos of the site.

The provincial strong motion network (SMN) was developed and maintained by the Geologic Survey of Canada and the Pacific Geo-sciences Centre in Sidney, BC. A founding principle of the BCSIMS system is to incorporate the existing SMN into the network as a live map, which shows each station as a dot with acceleration and intensity. Additionally a shake map can be generated that is superimposed on a map of the province; the user is able to zoom in and out with a mouse. The current shake map capabilities of the system include Instrumental Intensity, Katayama Spectra Intensity and Japan Meteorological Agency Intensity. KSI is generated by the SMN instruments and is sent to the database directly. The other parameters are computed at the SIMS3 PC; all of the maps are generated at the SIMS3 machine. With respect to seismic monitoring in particular, complementary measurements from the GSC's SMN are integrated into the BCSIMS systems. The input

from SMN is vital in terms of sufficiency and robustness of the analysis.

The MoT has been instrumenting bridges and tunnels in collaboration with the University of British Columbia since the late 1990's. Four structures were originally instrumented prior to the inception of the comprehensive BCSIMS scope. These include the French Creek Bridge and Portage Creek Bridge on Vancouver Island; George Massey Tunnel (Hwy 99) and Queensborough Bridge (Hwy 91A) both south of Vancouver. Two of these systems will be incorporated into the BCSIMS network by the end of summer 2012, with the other two coming online in the future. In 2008 the new W.R. Bennett Bridge opened on Highway 97 near Kelowna, BC. The partially floating bridge was instrumented with a 12-channel accelerometer system (see Figure 2)

In 2009, the new Pitt River Bridge opened on Highway 7 near Maple Ridge, BC. The cable-stayed bridge was instrumented with a 46-channel system including accelerometers and wind. In 2011, instrumentation was installed on the 50-year old Ironworkers Memorial Second Narrows Bridge on Highway 1, between Vancouver and North Vancouver. The system features 122 channels of accelerometers, free-fields, downhole accelerometer, strain gauges, and temperature and wind sensors (see Figure 3)

The new Port Mann Bridge on Highway 1 between Coquitlam and Surrey has been instrumented and the monitoring system will be on-line in the next few weeks. The 10-lane cable-stayed bridge has been instrumented with 350 channels as part of the Port Mann Highway 1 improvement program (see Figure 4) This major infrastructure project also includes instrumentation of three underpass bridges, one 650 m long twin steel girder viaduct type structure, and seven more strong motion network stations. Another major infrastructure project in

British Columbia, the South Fraser Perimeter Road, will introduce several more interchange structures and ground motion stations into the network. As an illustration of the instrumentation of bridges, typical instruments installed at the Pitt River Bridge are shown in Figures 5 – 8.

## Future work

The next phase of development of the BCSIMS system will be through the European Union funded ISMS Project. This will feature development and implementation of new damage detection algorithms. It will also feature several upgrades to the existing BCSIMS framework such as more sophisticated graphical interfaces, expansion and revision of the current database functionality and more efficient analysis methods.

We are presently working with the BC Ministry of Education on the instrumentation of public schools. We have recently completed the instrumentation of the Burnaby Central Secondary School, and the system will soon become part of the BCSIMS project. Other agencies, like BC Housing and owners of private schools are interested in being part of the project. The City of Vancouver has also expressed interest in instrumenting some of their bridges and other critical facilities in the City.

## Acknowledgements

The primary funding for this project has been provided by the British Columbia Ministry of Transportation and Infrastructure. The key members of the BCSIMS project include Sharlie Huffman, P.Eng., and Dr. Martin Turek, P.Eng., of the MoT; Felix Yao, P.Eng., and Dr. Yavuz Kaya of UBC, and Dr. Andreas Rosenberger from the Pacific Geosciences Centre.

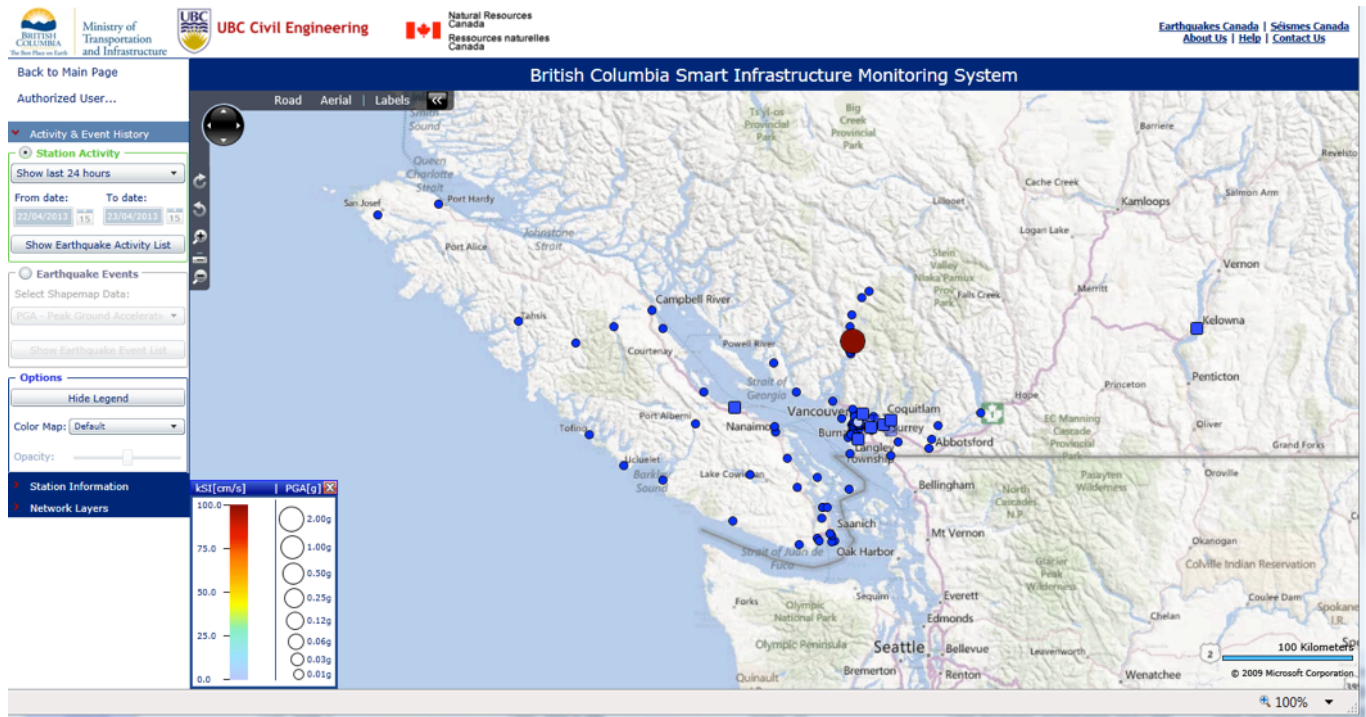


Figure 1 Screenshot of the BCSIMS Homepage ([www.bcsims.ca](http://www.bcsims.ca))

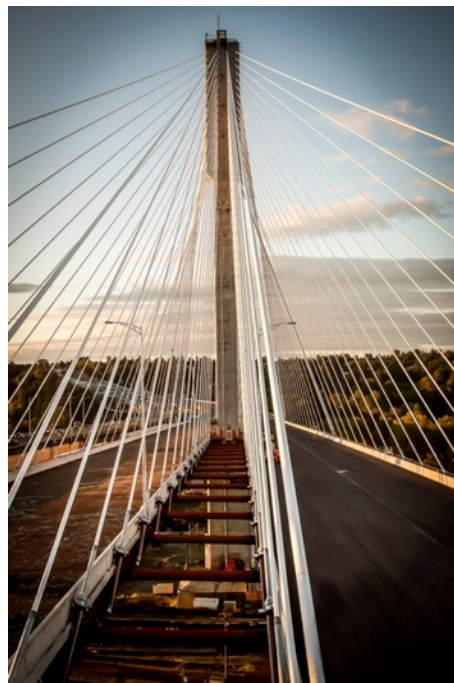


Figure 2 WR Bennett Bridge





*Figure 3 Ironworkers Memorial (Second Narrows) Bridge*



*Figure 4 Port Mann Bridge*

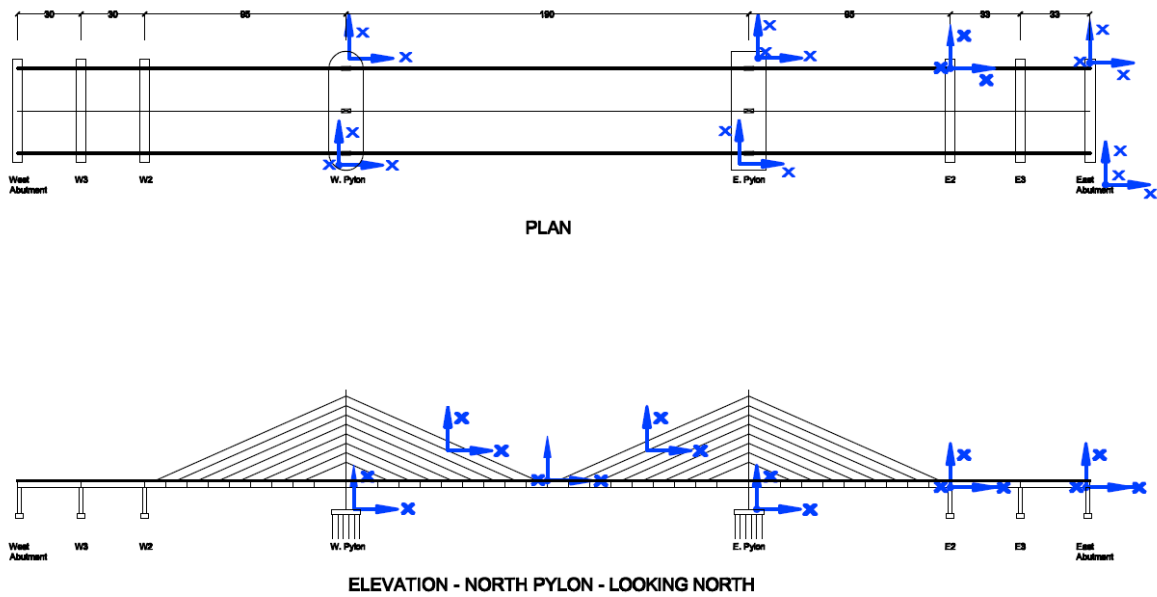


Figure 5 Example of Bridge Instrumentation (Pitt River Bridge Sensor Locations)



Figure 6 Accelerometer Mounted on Pier of Pitt River Bridge



*Figure 7 Wind Sensor Mounted on Top of Pylon at Pitt River Bridge*



*Figure 8 Accelerometer Mounted on Stay Cable of Pitt River Bridge*



## Great Northern Concrete Toboggan Race 2013

By Tyler Best E.I.T.



This past winter, Vancouver was the proud host of the 39<sup>th</sup> Annual Great Northern Concrete Toboggan Race (GNCTR), the largest and longest continuously running student engineering competition in Canada. For the first time since 1985,

GNCTR participants from across Canada, approximately four hundred and seventy in all, descended on the Lower Mainland to attend the three day long spectacle, the largest turnout for the event.

As the name suggests, the main event is racing a toboggan with a running surface of concrete down a hill but the teams are also ranked on a number of technical components, including producing a technical report and presenting the design to judges at an exhibit. Twenty one competing teams including UBC-Vancouver and UBC-Okanagan and a few non-competing teams including UBC Alumni, took to Mount Seymour on 'race day', which welcomed the return of the slalom event after a four-year hiatus.

Once the snow settled, the overall champion was University of Western Ontario, coincidentally the hosts for next year's event, with their first ever GNCTR win. Congratulations to all participants, organizers and volunteers on a fun and successful event!

If you are curious to learn more about GNCTR or to peruse this year's results, go to the GNCTR

2013 website at [www.gnctr2013.com/](http://www.gnctr2013.com/). If you missed out on this year's event but would still like to witness the greatness of GNCTR, you won't have to wait long, the competition will return to the region in two years when UBC-Okanagan hosts GNCTR 2015.



*UBC-Vancouver GNCTR 2013 Team  
Photo credit: RMKing Photography*



*UBC-Okanagan GNCTR 2013 Team  
Photo Credit: Stuart Betuzzi*



## ***So You Think You Can Give A Seminar?***

**By Tyler Best E.I.T.**

At the end of February, the SEABC Young Members Group hosted the final round of our second annual 'So You Think You Can Give a Seminar?' presentation competition. The event featured the final four of our young engineer participants each giving their short presentations in front of a modest but lively audience and a panel of judges, in hopes of claiming the \$1000 grand prize.

At the end it was Emma Slater, an E.I.T. with City of Vancouver who clinched first place with her intriguing presentation on 'Sustainable Concrete Made with FRP Scrap Aggregate'. In addition to the main event, Iain Ward of Ausenco joined us to give a fascinating discussion on worldwide construction practices entitled 'Sorry We Don't Have a Crane, but We Do Have Three Hundred People and Some Trees'.

A big thank you to everyone who attended and made the evening such a success, particularly our competitors, speaker and judges.

With nearly twice as many applicants this year as last year, we are excited to see that this event is growing in popularity. We strongly encourage young engineers to consider participating in next year's competition. Anyone interested should keep an eye out for a 'Call for Applicants' in late fall. For everyone else, keep this event in mind for late winter of next year and we hope to see many of you there!



*From left to right: Tyler Best, Emma Slater the 2013 winner and Kate Thibert*



*The 2013 Judges, from left to right:  
David Harvey – Associated Engineering  
Brian Maver – WHM Engineers  
Tyler Best – Event Organizer  
Svetlana Brzev - BCIT*

## AGM Report and Keynote Speaker Address

By David Harvey, P.Eng, Struct.Eng.

The 2013 Annual General Meeting of SEABC took place on May 29<sup>th</sup> at the Sutton Place Hotel. Addressing the 100 members attending SEABC's flagship event, President Cameron Kemp highlighted the various reports which had been distributed to the membership earlier by email. He also confirmed that notwithstanding the incorrectly-reported numbers in the AGM package, membership in the Association remained strong and had increased over the past year.



*Cameron Kemp Addresses the Members*

David Harvey introduced the keynote speaker, Mike Cook. Mike is the current Chairman of international structural engineering consultancy Buro Happold and is an adjunct professor at Imperial College, London. Mike is also a Vice President of the Institution of Structural Engineers and a Fellow of the Royal Academy of Engineering.

Mike has been with Buro Happold throughout his career, standing as an engineering student in the

1970s when the practice was formed by company founder, Ted Happold. In his presentation to SEABC, entitled *Natural Design*, Mike described the many projects he had worked on, starting with load testing of a model of the novel Mannheim timber grid shell structure design by the then fledgling practice for German architect/engineer Frei Otto.

Mike has spent most of his career on lightweight structures, including grid-shells, domes, tensile structures, and unusually, air-supported structures. He described many roof structures, which are typically covered with ETFE fabric 'cushions' or glass panels. At one point Mike had worked on *58 North*, a plan to enclose a community near Fort McMurray, Alberta, in a massive air-supported dome to provide weather protection. The plan was not pursued but Mike is convinced it is viable. Building physical models of his designs is a real source of enjoyment for Mike, who believes that models are a powerful means of convincing others of the merits of a particular design.



*Mike Cook Explains Natural Design*

One of Mike's early projects was a new shell roof for the Great Court of the British Museum, London. The ingenious finished shell is a continuous torus – the shape of the dome is due in part to height restrictions. Because the copper-clad dome of the Reading Room is one of London's classic landmarks, the existing sight lines had to be maintained which resulted in the toroidal shape roof above the 0.5 Ha court yard instead of a more conventional arch. The triangulated grid used for the roof allows ultra-slender 200 mm deep steel framing to be used which creates the impression of a very lightweight structure indeed.

Mike selected four of his projects, which he then described in detail.

## **The Sage Music Centre, Gateshead**

The famous ultra-light glass and steel shell encloses three separated entertainment buildings which have revitalized an economically-depressed region of the UK. The shell structure's dramatic appearance has helped to attract many music events to the facility – all achieved with the bare minimum of structural material.

## **Dresden Railway Station**

Dresden station is one of the largest rail stations in Germany. Damage in wartime and neglect in the years following forced the station into a state of disrepair. In 1997 a redevelopment program commenced and the renovation of Dresden Station was completed in 2006. The challenge was to protect the delicate 19th Century filigree steelwork that made up the roof, much of which was unsafe and degraded. The approach was to expose the existing arches and foundations, and develop a way of covering the roof to maintain and increase its longevity while introducing daylight. The aim was to re-establish the station's former glory, and make it suitable for modern operation. The solution was to cover the 30,000 m<sup>2</sup> roof with a fabric membrane, supported by the original arches, with the loads transferred from the

membrane to the end-trusses. This relieved pressure on the aging steel, and stabilized the structure. The fabric allowed natural daylight to flood the station and reveal the intricate structure. The restoration of the station's steelwork has allowed Dresden to once again become an energetic and exciting place for travelers – the sad, decaying relic has once more become a well-used and well-loved community facility.

## **The Smithsonian American Art Museum Courtyard**

The new Smithsonian roof is a steel grid shell of square glass-clad panels. The flexural stiffness on the beams is more significant in this height-restricted design, particularly in the vicinity of the eight supporting columns. The increased depth of the grid is used to support acoustic panel cladding which made the courtyard into a very usable event space.

## **Khan Shatyr Entertainment Centre**

Rising majestically from the Kazakhstan steppe, the Khan Shatyr Entertainment Centre is thought to be the world's largest tent. This vast, temperate oasis provides respite from the Kazakhstani capital city's harsh extremes of climate, with temperature's ranging from -40°C to + 40°C, and a much needed leisure focal point for the people of Astana. The very challenging construction of the building was facilitated by raising the 150 m tall tripod from the horizontal to its final position using a temporarily hinged based connection and heavy lifting lines. Once erected, the tripod provided a strong platform for installation of the tension net roof.

.....

Mike then switched to education of structural engineers, his enduring passion, which unfortunately sometimes conflicts with his role as company chairman. Mike teaches *Creative Design* to a class of civil engineering students,



and challenges them to complete a week-long project in teams, meeting a series of deliverables in the process. Mike's teaching style inspires many students to be better designers and instills in them the importance of engineering to our lives and wellbeing.

Mike's keynote address was well received by those attending, many of whom were already thinking of ways of adopting Mike's philosophy. Few will think of lightweight structures in quite the same way again!

*Great Court of the British Museum*



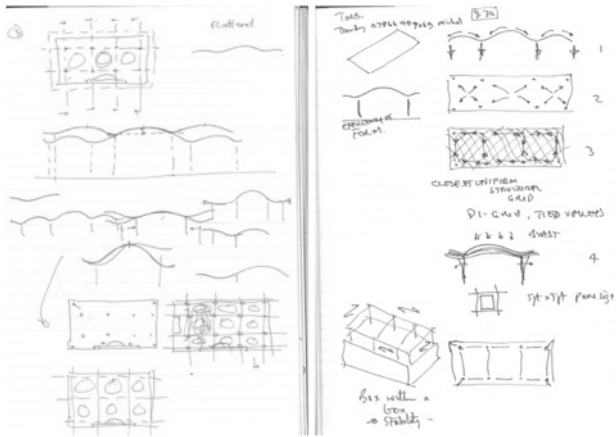
*Mike Cook Models Dresden Station*



*Dresden Railway Station Revitalized*



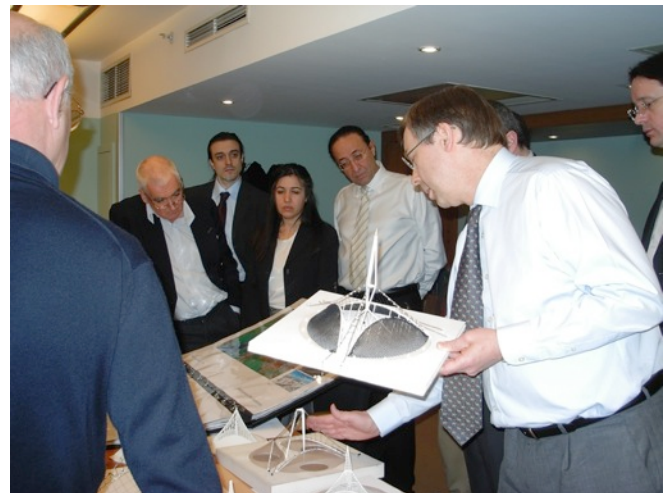




*Mike Cook's Sketches of the Smithsonian Grid  
Shell*



*The Smithsonian American Art Museum  
Courtyard*



## Mike Cook Explains the Khan Shatyr Structure Using Models





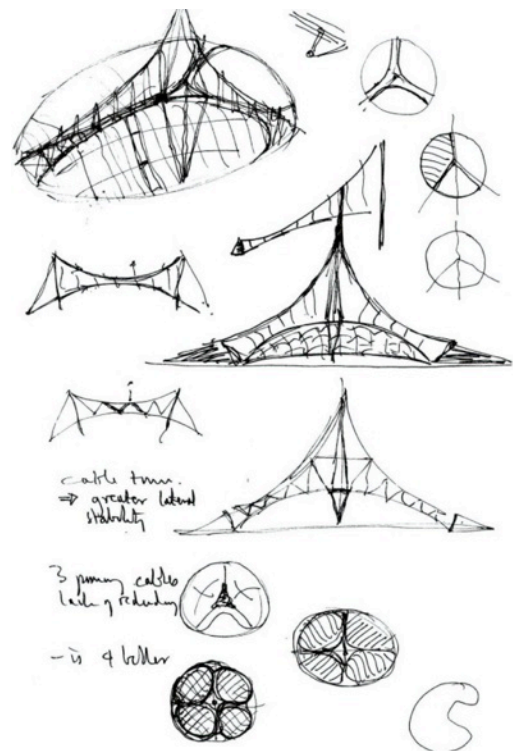
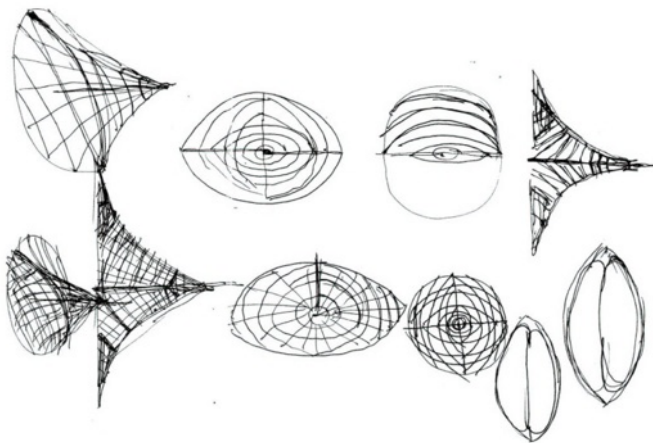
*Khan Shatyr Tripod Erection*



*Inside the Khan Shatyr Entertainment Centre*



*Completed Khan Shatyr Entertainment Centre*



*Mike Cook's Sketches of Khan Shatyr*



## On the Web

By Stephen Pienaar, P.Eng; Director SEABC



The Communications Committee strives to provide an up-to-date and relevant service to members via the SEABC website and other online services. We feel that we have been successful in doing this, thanks to countless hours by

the Education Committee, Corporate Committee, Young Members Group and other volunteers. At this time of the Annual General Meeting, it is appropriate to reflect on our efforts during 2012.

### Some goals reached

- The SEABC Education Committee has had another stellar year hosting evening seminars, with six of them recorded and available for viewing by members. You can view recordings of past seminars at [www.seabc.ca/seminar-downloads](http://www.seabc.ca/seminar-downloads).
- Directory of Structural Engineering Firms: The Directory launched in the summer of 2011 and has grown to over sixty listing.
- Twitter Feed: The Young Members Group is doing a great job feeding the SEABC Twitter Feed with announcements interesting structural engineering news items. You can follow the feed at: [www.twitter.com/SEABC](http://www.twitter.com/SEABC).

### Goals not (yet) realised

- While the 2009 Members Survey showed strong interest for a member's forum, in reality, support by members was lukewarm at best. After careful consideration, the

Board decided to terminate the SEABC Forum in May 2012.

- Many improvements and integrations have been in the pipeline for some time, including enhanced co-operation with IStructE and the MediaSite system that hosts SEABC seminar recordings. The systems and policies in place are complex, causing the wheels to turn slower than one would hope. We continue working on putting these improvements in place.
- We hope to introduce a fresh look to the SEABC website, newsletter and email broadcasts in the coming year. Suggestions and contributions from members will be welcome.

### 2012 in numbers

- Total number of website page views: 150,012
- Average number of website visitors per month: 1,524
- Number of seminar recordings added to online repository: 6
- Number of active listings in the Directory of Structural Firms: 63
- Number of tweets on Twitter during the year: 59
- Number of email broadcasts to members : 74
- Total number of email messages sent to members: 62,190

### Help make it better

We welcome your comments for improving and expanding on the SEABC's website and other online services. Please send your suggestions to: [webmaster@seabc.ca](mailto:webmaster@seabc.ca).

## Ask Dr. Sylvie

*CISC published Ask Dr. Sylvie articles in Advantage Steel up until Edition 34 available at:*

[www.cisc-icca.ca/content/publications/publications.aspx](http://www.cisc-icca.ca/content/publications/publications.aspx)

*See also the list of CISC technical resources at:*

[www.cisc-icca.ca/content/technical/default.aspx](http://www.cisc-icca.ca/content/technical/default.aspx)

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## Mark Your Calendars



### Seminars

#### Seismic Retrofit of Masonry Buildings

**Date:** June 5 2013

**Venue:** Vancouver Marriott Pinnacle Downtown Hotel, 1128 West Hastings Street, Vancouver.

**Time:** Sign-in at 12.30pm, Seminar 1.00-5.00pm

**Presenters:** Jason Ingham, Ph.D., MBA, University of Auckland, Michael Schuller, P.E., Atkinson-Noland & Associates, Inc. Ken Elwood, Ph.D., P.Eng., University of British Columbia, Bret Lizundia, SE, Rutherford + Chekene Consulting Engineers.

**More details:** [www.seabc.ca/commerce](http://www.seabc.ca/commerce)

### Events

#### Successful interviewing workshop

**Presenter :** Wilma Marais, Certified Human Resources Professional

**Date :** Friday June 21 and Monday June 24, 2013

**Time :** Refreshments 6:00 pm, Presentation 6:30 pm, Q&A 8:30 pm

**Venue :** Community Stage, Vancity Credit Union, 5064 Kingsway, Burnaby

**Cost:** Free



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## Lateral Design of Wood Structures: Load and Design Considerations for Engineers



**Wednesday - Friday, June 26<sup>th</sup> ~ 28<sup>th</sup>, 2013**

Delta Vancouver Airport Hotel  
3500 Cessna Drive, Richmond, BC

Breakfast & Registration: 8:00am  
Workshop: 8:30am – 4:00pm

### Who should attend?

This full three day workshop is designed for structural engineers looking for an opportunity to learn more about load and design considerations in the lateral design of wood structures.

### In this workshop you will:

- ✓ Understand the development of loads according to the 2010 National Building Code (NBCC)
- ✓ Learn about the most recent lateral design provisions based on the wood design standard (CSA O86-09)
- ✓ Learn how to become proficient in the use of the Canadian Wood Council's WoodWorks® Design Software to conduct seismic and wind design
- ✓ Learn about the prescriptive design provisions based on the Engineering Guide for Wood Frame Construction and the NBCC Part 9
- ✓ Develop proficiency in lateral design including mid-rise and hybrid buildings
- ✓ Acquire design tools to perform lateral design, including the use of software, closed-form solutions, and spreadsheets

### Instructor Bios:

**Ghasan Doudak, Ph. D., P. Eng.**  
Professor of Structural Engineering  
Civil Engineering Department, University of Ottawa

Dr. Doudak's expertise includes multi-scale understanding of how complete structural systems function, encompassing issues like how complete buildings respond to effects of wind storms, ground shaking during earthquakes, or other actions like impacts and blasts. Prior to joining the Engineering Faculty, Dr. Ghasan Doudak held the position of Manager, Wood and Structural Standards at the Canadian Wood Council. Dr. Doudak grew up in Denmark where he received his Master of Science degree from the Technical University of Denmark (DTU). Following his graduation, he worked as a structural engineer where he designed commercial and residential buildings. His Ph.D. research was aimed at determining the load paths in wood light-frame buildings under various stages of construction using a holistic design approach. He has worked closely with researchers from North America, Europe and Australia.

**Robert Jonkman, P. Eng.**  
Manager Structural Engineering & WoodWorks® Software  
Canadian Wood Council

Completing a Bachelor of Civil Engineering and Management degree at McMaster University in Hamilton in 1994, Mr. Jonkman worked for one year at a structural engineering consulting firm and over nine years at Normerica Building Systems, a Canadian manufacturer of post and beam homes and clubhouses as their design and engineering supervisor. Joining the Codes & Engineering division of the Canadian Wood Council in September 2005, Mr. Jonkman's primary focus is overseeing the ongoing development of the WoodWorks® Engineering Software to better meet the needs of practicing engineers and architects.

**Adam Robertson, M.A.Sc., EIT**  
Technical Services Specialist  
Canadian Wood Council

Adam joined the Canadian Wood Council in 2011 as a Technical Services Specialist in the Codes and Engineering Department. He completed his Bachelor of Applied Science in Civil Engineering at the University of Toronto and also holds a Master of Applied Science degree from the Department of Wood Science at the University of British Columbia. Adam has experience as a consulting structural engineer who has worked in construction management and building development. At CWC, Adam is involved in building codes and standards initiatives and the revision of CWC's design tools and publications. Adam is also responsible for technical support of the WoodWorks® Sizer, Shearwalls and Connections software for both Canada and the U.S.

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## Lateral Design of Wood Structures: Load and Design Considerations for Engineers

Wednesday - Friday, June 26<sup>th</sup> ~ 28<sup>th</sup>, 2013

### Registration Fee:

Includes breakfast, lunch & breaks as well as daily parking: \$495.00 plus \$24.75 GST = **\$519.75**

**\*\*\*SEABC Members Receive 10% off!\*\*\***

**Registration Deadline:** Monday, June 17<sup>th</sup>, 2013

**BRING YOUR LAPTOP on Friday, June 28<sup>th</sup>** for a hands-on computer lab on the Canadian Wood Council's WoodWORKS® Design Software which will allow participants to walk through several design examples aimed at increasing their efficiency on the use of the Shearwalls program.

Name

Company

Phone

Email

☐ Visa      ☐ Cheque (payable to Wood WORKS!/CWC)      ☐ Mastercard      ☐ AMEX

Card Number

Expiry Date

Cardholder Signature

**Return Completed Registrations to: [zcaul@wood-works.ca](mailto:zcaul@wood-works.ca)**

Registered participants will receive a confirmation by email.

Cancellations must be received by Wednesday, June 19<sup>th</sup> for refund. Substitutions accepted anytime.

**Questions?** Zena Caul at [zcaul@wood-works.ca](mailto:zcaul@wood-works.ca) or call toll free 1-877-929-9663 (ext. 4)

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