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*Apple Park Reception Building, Cupertino, CA*



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## Message from the President



David Harvey, P.Eng.  
SEABC President

### SEABC Activities

In wrapping up SEABC's first ten years of operation, it strikes me what a fantastic decade it was. To start with, several of our Board of Directors have served SEABC throughout its history. In doing so, they have helped to preserve our core values in constantly changing times. Thankfully, as former Directors have stepped down, others have joined us and brought valuable fresh thinking. While a lot of our business takes place during our Board meetings, there are several other hubs of activity that deliver the member services.

Underpinning SEABC's operations are our members. A strong membership enables us to operate, inform, and put on events. Thankfully, our membership has been loyal to our Association which leads me to conclude that we are delivering value. After ten years of registering members, we have noted many newcomers. Some will not have practiced their profession without SEABC – this points to SEABC's established position in professional life, and not only locally. It is worth reflecting that we are Canada's only Structural Engineering Association. Reflecting our uniqueness, we have several members who reside in other parts of Canada, and a few who live in other countries.

There are many SEAs in the United States who do great work for local members; however, each US-based SEA is set up quite differently to serve local needs. Some are quite small, but quite a few have more significant memberships reflecting their state populations. In California, SEAOC is so large it is subdivided into several regions. Notwithstanding their size, the majority do not offer the range of services offered by SEABC. While our US counterparts belong to their national organization, NCSEA, SEABC has elected to work closely with other

international structural engineering organizations. The Institution of Structural Engineers is perhaps the largest and has an important qualifying and educational mandate. IStructE liaison is crucial to SEABC's core business and so we have a working agreement with IStructE to provide services to their 150-strong local membership. We have another agreement in place with Engineers and Geoscientists BC, which respects their regulatory function and provides the structural engineering advice APEGBC needs. We belong to the regional body, the Northwest Council of SEAs, which holds an annual conference in which we participate. We have close international ties, including with US-based engineering giant, ASCE and their structural engineering division, the Structural Engineering Institute, which have a key code-development role and a large annual conference. Internationally, we have links to the Swiss-based International Association for Bridge and Structural Engineering, which publishes a well-respected journal, and holds two annual symposia. You will no doubt recall that SEABC hosted and organized IABSE's fall symposium last year. This was a fantastic opportunity to bring a prestigious international event to our region and strengthen organizational and personal connections. In consequence, SEABC is well known in the global structural engineering community. We report on IStructE connections regularly under IStructE News.

The last decade has seen continuity and enhancement of educational programs developed by the former Vancouver Structural Engineers Group. As our core business, we focus heavily on education – a popular SEABC activity. We communicate with our members via the website or email broadcasts, and our Technical Committee provides key comment on current structural issues and standards. We also field enquiries from the public asking for advice. These are important areas for professional associations, although I think our services are particularly valuable – well done, SEABC! However, we must look ahead. Our Young Members Group is energetically run and has organized some excellent programs. They liaise with external groups and are well-received. The YMG is constantly looking for new programs which deserve our support. Describing SEABC's YMG programs to others is helping to develop youth programs elsewhere. Our YMG's success points strongly to the future of SEABC and the structural engineering profession.

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## 2018 NW Conference



David Harvey, PEng.,  
Struct.Eng.

The 2018 Northwest Conference has just wrapped up, and I am pleased to report that it went very well. SEABC Administrative Assistant Cecilia Bernabe and I attended the event which was held this year in Richland, WA. Attendance was strong despite the event being located a drive of several hours from the region's major centres. This year's conference was organized by Richland native, John Tait and a group of volunteers from SEAW's South Central Chapter.

The conference was preceded by a Council meeting which for the first time included the Young Member delegates – this must have been quite an experience for the newcomers whose familiarity with NWCSEA was limited. The meeting updated delegates on last year's conference which was held in Vancouver, BC, and outlined plans for future conferences. Finances were discussed, and happily, the fiscal picture is improving after recovering from a loss-making conference in 2009. The Council heard that SEAW was having issues after its former long-serving Administrator retired in 2016. SEAW had been unable to hire a replacement and contracted out the work. This underlined how critical administrative services are to a non-profit society – SEABC is extremely fortunate to be in the good hands of the long-serving trio: Webmaster, Stephen Pienaar; Registrar, Melanie Fung; and Administrative Assistant, Cecilia Bernabe.

The conference included excellent technical sessions, including the following presentations:

- "Seismic Retrofit and Restoration of Unreinforced Masonry Buildings" by Cale Ash and Amy Woods
- "Advancements in Force Transfer around Openings" by Jerrod Hensley
- "Masonry Design with Vertical and Lateral Loadings" by John Hochwalt and Tom Young

- "Structural Fire Protection" by Dave Gamlich and Steve Dannaway
- "Post-Installed Concrete Anchors with Structural and Components" by John Silva
- "Designing with Carbon-Fibre Grid Reinforced Enclosure Systems" by Bob Holland and Blake Johnson
- "Cold-Formed Steel Framing – Lateral and Axial Design" by Jason Warren.

Also included was a 'hands-on' masonry construction and assembly demonstration workshop, along with several vendor presentations from the accompanying trade show. It was clear that the competing construction materials were all working hard to help designers navigate around code requirements efficiently and accurately, and were bringing new research information and software along to help their causes.

For me, the highlight was the talk by John Silva, Senior Director, Codes and Standards at Hilti. John talked extensively on anchorage design, a topic covered poorly by codes and for which research information is scant. John showed code-compliant rebar-anchorage groups used extensively in the nuclear industry that when tested, failed in shallow-cone failure mode at considerably less than their designed capacity. Designers – take note!

The Thursday Dinner included an revealing talk on the Manhattan Project – "History" by Jerry White of the National Parks Service; and "Hanford Cleanup" by Ben Vannah of the US Department of Energy. Manhattan was the code-name for the World War II project to develop an atomic bomb and build the nuclear power plants to produce plutonium. Three nuclear reactors were built at the Hanford Site in Washington under top-secret conditions. The B Reactor has been preserved as a museum while the rest of the site has been de-commissioned. The B Reactor was the world's first nuclear plant and was built in just two years for USD 350M. A construction camp to house 150,000 workers was built and rapidly became the fourth-largest city in Washington. The town of Richland, WA was built to house the 45,000-staff needed to operate the Hanford facility.

Only an experimental 500 W atomic pile had been built in a laboratory before Hanford; however, on



start-up, the B Reactor immediately produced 250 kW of power, and later 2 MW. The B Reactor produced the plutonium used in the 1945 Nagasaki bomb that ended the Second World War.

Today the Hanford site is slowly undergoing careful cleanup and disposal of waste materials stored in underground tanks. Leakage areas are being carefully excavated, and recovered materials are being encapsulated in glass and stainless-steel capsules. The plan is to return the military site to civilian use – residential, where economically feasible, and to industrial use in the previously-contaminated zones.

The conference ended with a scenic “Water-to-Wine” dinner cruise on the Columbia River. Sixty five delegates and guests enjoyed the gorgeous weather, spectacular views of the river’s elegant bridges and a simply stunning river-sunset.

The 2019 Northwest Conference will be held next July in Portland, OR – look out for announcements, I hope to see you there.



*Water-to-Wine Cruise, Richland, OR*



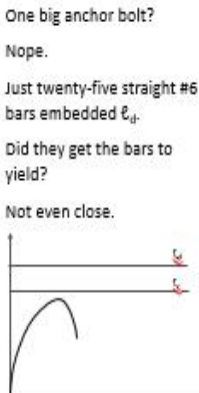
*Masonry Demonstration*



*Conference Delegates learn about heat transfer analysis in Structural Fire Protection*

*Rebar-Group Anchorage Failure  
by John Silva*

**ACI 318 AND THE ANCHORING CONUNDRUM**



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## Committee Reports

### Vancouver Island Branch



Thor Tandy, P.Eng, Struct.Eng,  
MISTructE

Branch Chair

#### Contact:

Thor Tandy

[island@seabc.ca](mailto:island@seabc.ca)

### Communications Committee



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

Director SEABC

In talking to SEABC members, the impression I am left with is that we finally have hit the communications 'sweet spot'. By that I mean that you are kept informed, but do not feel pestered by your Association. I am pretty sure this is correct because that is exactly how I feel about it. You may notice other organizations who send you electronic 'junk mail' at regular intervals. We do not do this because I do not know anyone who will admit to reading junk mail! Does anyone? So, the Communications Committee is careful about what is distributed.

My impression is backed up by the fact that we do not get feedback. Acting on the assumption that 'no news is good news' we continue to communicate and operate the website in a manner that we hope you find useful and informative.

I have just looked at a member survey we carried out in 2009 – which I expect would mostly look similar 9 years later. Of interest is that our newsletters and the website received good scores, as did our Annual Dinner Meeting. Most members expressed interest in contributing to SEABC operations, but only two respondents were interested in communications!

So, do you like what we do? Are we overlooking anything? Can we communicate better? We would welcome your constructive comments. While we do not need to hear from you if you are satisfied with our service, your contributions are important – it is your Association and your newsletter. Your articles will help to keep our correspondence interesting. So, please send information for publication to:

[newsletter@seabc.ca](mailto:newsletter@seabc.ca)

And if you happen to be interested in communications, consider joining our team – we'd really appreciate some help!



### Young Members Group



Thomas Duke, EIT.

The 2017-2018 academic year was another big success for the UBC and BCIT engineering teams that received financial support from the SEABC YMG. This newsletter edition highlights each of the student engineering teams and their accomplishments.

Through the summer months, the SEABC had been working hard to plan upcoming events and to increase the group's presence on social media platforms. Overviews of these initiatives are also provided below.

## **University of British Columbia Engineering Teams Highlights**

### **UBC Earthquake Engineering Research Institute Team**

The UBC EERI Seismic Design Competition Team is currently constructing and assembling their model in preparation for the 2018 EERI Seismic Design Competition in Los Angeles. This international competition will see the UBC team competing against teams from around the world including the United States, Turkey, and Bucharest.



*The UBC EERI Team*

This year's design is inspired by the Petronas towers in Malaysia. Their model is 19-storeys tall with the residential floors taking the shape of an 8-pointed star. This configuration is an efficient way to allow light in the building as well as improve building insulation. Recently, they were able to present their design to Dialog, one of their sponsors, for a design review. Best of luck to the UBC EERI Seismic Design Competition Team!

### **UBC Concrete Canoe Team**

The UBC Concrete Canoe team, for 2018, created "Volcanoe" (Vol-canoe), a personal challenge to create a dynamic-looking, colour-blended concrete mix while at the same time adding lightness to the canoe with a jaunty pun.

Having the addition of colour to the canoe was a first for the team. The design was created by making two separate mixes and merging them on casting day.

This created a risk of having a "cold joint" in the canoe but the join was strong and successful. Additionally, the team was proud to continue their reputation of being the only team at the ASCE Pacific Northwest competition not to use bulkheads (styrofoam) to float; their mix was buoyant enough to float the canoe on its own!

While races were cancelled this year in the Pacific Northwest Regional competition in Klamath Falls, Oregon, due to severe winds, the team placed 8th at the Canadian Nationals competition in Waterloo.



*The UBC Concrete Canoe Team*

### **UBC Concrete Toboggan Team**

The Concrete Toboggan Team introduced a new innovation to this year's Great Northern Concrete Toboggan Race (GNCTR) with the creation of an electronic data logging module that recorded the stress that was experienced in their concrete skis, a first for the GNCTR. This is combined with other instruments on the toboggan (e.g. recording acceleration data during cornering and braking), as well as the acceleration data during cornering, braking, and potentially a collision. The team's mix continued building on their experience of using seashells as a sustainable large aggregate replacement, as well as implementing rubber tire fibres instead of the typical PET fibres.

Race day was rainy and slushy and the UBC team was unfortunately part of the 50% of teams that were not able to make it down the hill, placing 8th out of the 19 competing schools. However, the team placed highly in many of the individual design categories, most notably:

- 1st in Sustainability
- 2nd in Concrete Reinforcement Design



- 2nd in Steering Design
- 2nd in Innovative Design
- 2nd Best Theoretical Toboggan
- 2nd in Technical Reports
- 2nd in Technical Presentations
- 3rd in Team Safety
- 3rd in Concrete Mix Design
- 4th in Superstructure Design

To get these results, the team collaborated with UBC professors and PhD candidates, including Dr. Nemkumar Banthia and Mohammed Farooq.

### UBC Steel Bridge Team

Members Luc Harvey and Daisy Ma of the Steel Bridge team presented their design and results of their first competition to the SEABC YMG group in April's meeting. The group presented their innovative ball-and-socket tension connections that allowed for fast assembly and for tension connections to be loaded in bearing. The capacity of the connection along with speed of assembly that they allowed contributed to the team's 3rd place result in the Pacific Northwest Regional competition in Klamath Falls, Oregon and 4th place in the Canadian National Steel Bridge Competition that took place from May 10-12th in Waterloo.

The team competed in the National Student Steel Bridge competition on May 25 hosted at the University of Illinois Urbana-Champaign where they placed 32nd out of 200 teams.



*UBC Steel Bridge Team*

## British Columbia Institute of Technology Engineering Teams Highlights

### BCIT ACI Fiber Reinforced Concrete Bowling Ball Team

BCIT's American Concrete Institute Student Chapter entered the 2018 ACI Fiber Reinforced Concrete (FRC) Bowling Ball Competition. During the Fall and Winter semesters approximately 30 students spent over 1000 project hours testing mix designs, researching and constructing forms, and fabricating competition bowling balls under the direction of faculty advisor Sudip Talukdar, PhD., PEng.

The competition between 54 schools from around the world took place at ACI's Annual Spring Convention in Salt Lake City, Utah. BCIT's team had a disappointing first day and started out low in the rankings – their compressive strength test results were less than half the predicted values. However, the BCIT team gained top scores in nearly every other category. Bowling a perfect game elevated the team to place first in design, and third in the analysis categories.

The project taught the club's members how to transfer their theoretical knowledge into practical application to find innovative solutions to design problems. The members who represented the team at the competition were Loisa Abag, Michelle Chung, Kayla Field, Erin Tattrie, Josh Saffold, Brandon Tang, Mandy Yu, and Alexandra Zavarukhina.



*2018 CSCE BCIT FRC Bowling Ball Competition Team in Salt Lake City, UT*

## BCIT Troitsky Team

This year again, the BCIT Troitsky team, 'Insane in the Endgrain', built a bridge to take with them to Montreal. A team member's summary is as follows,

"We are excited to say that our bridge exceeded our expected load of 15 kN, with an ultimate failure load of 16.6 kN. Our bridge performed well enough to place our team in the top four bridges based on load carrying capacity. Overall, the competition was an amazing experience for everyone involved. It was a unique opportunity to represent BCIT among other well-known Canadian universities, as well as networking with other students from various engineering disciplines."

With the help of funds received from SEABC YMG, the BCIT Troitsky team gained a lot of valuable insight that will be put to good use by the 2019 BCIT Troitsky team.



*The "Insane in the Endgrain" Team*

## SEABC YMG LinkedIn and Twitter!

Want to get the latest updates about the structural engineering community or find out about upcoming events and interesting structural engineering knowledge? Check out the young members group LinkedIn page, "SEABC Young Members Group", and follow our twitter feed @SEABC\_YMG. See the links below:

[www.twitter.com/SEABC\\_YMG](https://www.twitter.com/SEABC_YMG)

[www.linkedin.com](https://www.linkedin.com)

## "SEAQ"-ing Young Engineers of BC

The YMG of SEABC is excited to announce a new and exciting initiative called Structural Engineers Ask/Answer Questions – SEAQ.

SEAQ is a meet-up group of young practicing and non-practicing engineers that come together to ask and answer each other's questions in a non-judgmental and open environment. At SEAQ events three to four questions asked by organizers or attendees are focused on. Each session is about one hour, and has a topic of focus, such as software, concrete, or as specific as shear wall design. Complimentary snacks and drinks are also provided!

The first SEAQ event will be focused on 'Modeling Structures' and will take place on Monday, September 10, 2018, with time and location TBA on the SEABC-YMG LinkedIn page. Join us and come with any questions you may have!

## SEABC YMG Upcoming Events and Committee Update

Young Members Group's mission is to promote the interest of our young members through initiatives in the areas of Professional Development, Networking, Registration Assistance, Communications and Outreach. The following are some of the upcoming YMG initiatives for 2018/2019.

- **Notable Book List Initiative- (Summer 2018)**
  - New SEABC library of notable inspirational books for young members
  - Champion: **Thomas Duke, Connor Ferster**
- **YMG SEAQ (Structural Engineer Asking/Answering Questions)- (Summer 2018)**
  - Monthly knowledge sharing and networking sessions for young members
  - Champion: **Eytan Fizman, WeiKe Qu**
- **Professional Registration Seminars (Fall 2018)**
  - Seminars on P.Eng & Struct.Eng registration for young members
  - Champion: **WeiKe Qu, Arman Shahnaz**
- **Automated/Computational/Parametric Design Initiative (Fall 2018)**



- Workshops and seminars in the topic of advanced design technology
- Champion: **Omar AlHarras**

- New SEABC award (travel/research grant) for young members
- Champion: **Monrit Chatha, Michael Dunn**

- **2019 YMG Presentation Competition (Winter 2019)**

- 8<sup>th</sup> Annual Presentation Competition with \$1000 top prize
- Champion: **Navpreet Bharaj, Eytan Fiszman**

The YMG Committee is made up of passionate and like-minded young volunteers who are committed to improving and expanding the YMG's services to our young members.

We encourage you to get in touch with your YMG Committee at [ymg@seabc.ca](mailto:ymg@seabc.ca) if you have any new ideas or would like to get involved with the YMG Committee.

- **SEABC Young Members Award- (Spring 2019)**

### YMG Committee 2018/2019 Roster

YMG Role	Name		Company
Chair	Stanley Chan	P.Eng.	RJC Engineers
Secretary	Omar AlHarras	P.Eng.	Glotman Simpson
Finance	Siyao Ma	E.I.T.	Equilibrium Consulting
Communications	Thomas Duke	P.Eng.	Fast+Epp
Social Media Coordinator / Presentation Completion Coordinator	Eytan Fiszman	E.I.T.	RJC Engineers
Presentation Completion Coordinator	Navpreet Bharaj	E.I.T.	Kiewit Infrastructure Engineers
Networking Coordinator	Vacant		
Outreach and Student Coordinator 1	Dan Dela Peña	E.I.T.	Dynamic Structures
Outreach and Student Coordinator 2	Matthew	E.I.T.	RJC Engineers
Outreach and Student Coordinator 3	Vacant		
Professional Development Coordinator	Monrit Chatha	E.I.T.	RJC Engineers
Registration Assistance Coordinator	Weike Qu	E.I.T.	Equilibrium Consulting
Education Committee YMG Rep	Qusay Al-Chatti	E.I.T.	
Education Committee YMG Rep	Anas Alsaid	P.Eng.	Starline Architect

BCIT Student Rep 2018-2019	Matthew Elgersma		BCIT Student Rep
BCIT Student Rep 2018-2019	Alejandro Coronado		BCIT Student Rep
UBC Student Rep 2018-2019	Connor Ferster		UBC Student Rep
YMG Committee Member-at-large	Anna Lemaire	E.I.T.	COWI North America
YMG Committee Member-at-large	Craig Fowler		Equilibrium Consulting
YMG Committee Member-at-large	Michael Dunn	E.I.T.	RJC Engineers
YMG Committee Member-at-large	Yang Du	E.I.T.	RJC Engineers
YMG Committee Member-at-large	Saman Hashemi	E.I.T.	
YMG Committee Member-at-large	Arman Shahnaz	E.I.T.	Mott MacDonald
YMG Committee Member-at-large	Frances Wee	E.I.T.	Stantec
YMG Committee Member-at-large	Fatemeh Alapour	EIT	COWI North America
YMG Committee Member-at-large	Parham Joulani	E.I.T.	COWI

## Technical Committee



Kevin Riederer, M.A.Sc.  
P.Eng.,  
Director SEABC

The task group developing a practice guideline for the “Structural Condition Assessments of Existing Buildings” is in full swing with the task of completing a draft guideline by the end of 2018.

SEABC has provided a review, and will soon provide an endorsement, of the updated practice guideline for “Designing Guards on Buildings” which will be released by Engineers and Geoscientists BC later this year. Anyone with interest in participating on a Technical Subcommittee or task group is encouraged to contact SEABC. Any member with an issue or concern that they would like to have the Technical Committee consider is also encouraged to reach out to us.

## On the Web



Stephen Pienaar, P.Eng.  
Webmaster

SEABC volunteers are taking a break from organising evening seminars and Young Members Group events during the summer months. But that does not mean that there is nothing of interest for members on the SEABC website...

### Current activities on the website

- September 2018 Term of the Certificate in Structural Engineering Program:**  
 The upcoming term offers four courses, all available in classroom and live interactive webcast formats. See page 15 for further details.

[www.seabc.ca/certificate-program/course-list/](http://www.seabc.ca/certificate-program/course-list/)

- **Struct.Eng. Resources:**

We recently expanded the archive of IStructE exams with 2017 exam papers, examiner's reports, and a collection of possible solutions.

[www.seabc.ca/resources/struct-eng/](http://www.seabc.ca/resources/struct-eng/)

- **Recordings of past seminars:**

Members can log in to watch **video recordings** of seminars.

[www.seabc.ca/category/events-archive](http://www.seabc.ca/category/events-archive)

- **Be the first to know:**

Follow us on **Twitter** for announcements of SEABC events:

[twitter.com/SEABC](https://twitter.com/SEABC)

## We want to hear from you

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

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## Photos of the Month- Columbia River Bridges, Richland, WA



*Pioneer Memorial Bridge with Ed Hendler Bridge Downstream*



*Ed Hendler Bridge with the Pasco-Kennewick Northern Pacific Railroad Bridge Downstream*



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## IStructE News



David Harvey, P.Eng.  
Struct.Eng.

### Council Meeting

Robert Jackson and I have just attended an IStructE Council meeting in the UK. We both thoroughly enjoyed the visit and strengthened our many international contacts. Networking is important to build global relationships and attending the Council meetings to provide regional input is also SEABC's responsibility as a joint Regional Group of The Institution of Structural Engineers.

The Council meeting consisted mainly of formal business, but the real value obtained from the conference of more than 60 international delegates was the series of workshop sessions which explored current topics of interest to the Institution's Executive Board. There were sessions spent discussing Regional Groups – how they should be established and organized (particularly the domestic groups) and made more effective. One thought was what the domestic groups could learn from the international groups which are more independent. International members typically require different services from the members residing in the UK.

Another session was devoted to considering how to chair the Institution's Executive Board. Currently, Board meetings are chaired by the President, but the chairmanship demands are becoming excessive, and the Institution is looking to appoint a Chair. The debate concluded that the person with the best skills and experience should be hired and remunerated for the services provided. The Chair may not be an IStructE member. To allow independence and avoid chairmanship influence, the Chair should not be an Institution Trustee. The outcome was unanticipated, but largely stemmed from a realization that the Board could become more productive with a skilled Chair working between meetings.

The Council meetings were held remote from the Institution at the Crystal, a new sustainable development in the Docklands area of London. This attractive building proved to be a great venue for the meeting sessions. The networking dinner was a barbeque held on the deck of the stylish Sunborn Yacht Hotel, moored nearby.



*The Crystal – London, UK*



*Sunborn Yacht Hotel – London, UK*

### Examination Training

The Institution's Chartered Membership Examination is still as popular as ever – candidates sitting the exam are growing in number. The examination has been held for most of the Institution's existence and remains a well-respected test of structural engineering competence. Known for challenging candidates to solve and complete the design of a complex building problem in only seven hours, the CM Exam is tricky to pass, and candidates can benefit from knowing what is required of them and

practicing solution development using past exam questions.

Well for prospective candidates, life just got better! You will have to work hard preparing for the exam, but SEABC has uploaded valuable additional resources for you. If you check out:–

[www.seabc.ca/resources/struct-eng](http://www.seabc.ca/resources/struct-eng)

you will see examinations and examiners' reports up to 2017, and a useful new section **Archived Possible Solutions** has been added. The past examinations provide plenty of practice material and give you great insight into the style of questions you may be asked to solve. The examiners' reports include commentary on how the questions were tackled, and on the successful and unsuccessful solutions offered. Helpful tips on what to avoid can be found. The archived solutions are not definitive but provide clues of what the question writers are anticipating, and how your thought process can be presented. As in 'real life', there is never just one solution, and you can certainly think of other designs and better ways of answering the questions. However, for candidates gaining familiarity with the CM Exam, the archived solutions are a big help.

The Institution is increasingly developing E-learning opportunities. The E-library, webinars and recorded lectures have been available for some time and have now been joined by the first on-line examination, *Understanding Structural Behaviour*. This strong E-learning trend will continue, fuelled by the international membership base, and the convenience of accessing recorded material. For some time now, the goal has been to develop on-line examination training, to ensure that this important educational material is universally available. While this is still not the case, potentially a CM Exam training course could appear within a few years. This may not help our current crop of candidates, but could be there for recent graduates, currently in training, gaining design experience. Watch this space!

## Grades of Membership

Other than Member, the Institution's grades of membership are not well known. Member is the most common grade of Chartered membership which for most candidates, requires passing the Chartered Membership exam. Another membership

grade of interest is Fellow – a grade for senior members who have made a significant contribution to the profession. The other grade that you may have heard of is Graduate – a non-professional grade for academically qualified candidates working towards Chartered membership. There are other grades for technicians and technologists. All these grades imply membership of the Institution, with the option for involvement in Institution activities and access to services, the cost of which is an annual membership fee.

Canadian structural engineers may encounter the Institution through qualification for the Designated Structural Engineer registration with Engineers and Geoscientists BC. Passing the well-respected and recognized Chartered Membership exam opens the door to becoming a Chartered Structural Engineer. Although not everyone takes up this opportunity, many chose to become Members of the Institution and enjoy access to extensive information on the profession.

In general, SEABC members are not Institution members, but these options are available to join the Institution:

- **Graduate Member.** This is a non-chartered membership grade which requires an application to join the Institution. Although intended as a step towards Chartered membership, there is no requirement to apply, and some remain long-term Graduate members. The grade requires a Washington-Accord accredited degree; non-accredited degrees require evaluation for equivalence. The current annual fee for Graduate membership is approximately \$277.
- **Associate.** This is a chartered membership grade which requires an application to join the Institution. It is intended for members of another organization with which the Institution has a mutual recognition agreement (MRA) who have qualified under a similar rigorous qualification process. The good news is that the Institution has an MRA with Engineers and Geoscientists BC who have a similar rigorous qualification process – the Designated Structural Engineer program! This implies that anyone registered as a "Struct.Eng." could apply to the Institution to become an Associate.

Annual dues for the Associate grade are currently about \$566.

- **Affiliate.** Affiliate does not require an application to join the Institution. The Affiliate scheme is open to anyone interested in Institution activities wishing to gain access to the current issue of The Structural Engineer and receive regular news and correspondence from IStructE. Two

levels of information access are available. Annual dues for the Affiliate scheme are currently about \$86 at the standard rate and \$120 at the enhanced rate of access to information. If you are interested in the Affiliate scheme, check out what could be available for you at:

[www.istructe.org/membership/affiliate](http://www.istructe.org/membership/affiliate)

## Morandi Bridge Failure



David Harvey, P.Eng.  
Struct.Eng.

On August 14 in Genoa, Italy, a section of the Morandi Bridge including the westernmost tower failed during a violent storm. It was reported that lightning struck the bridge. At least 39 people died and many more are missing. The bridge was one of the major links to France and its failure will have a massive economic impact. The 1182 m long multi-span bridge was built between 1963 and 1967 and opened on 4 September 1967. Named after its prominent designer, Professor Riccardo Morandi, the bridge, with its roadway some 45 m above grade, is an icon in the port city. Morandi designed several similar structures during that era – the closest to home being the Kinnaird Bridge in Castlegar, BC. While the Morandi Bridge and several others were early cable-stayed bridges, the Kinnaird Bridge is a multi-span girder bridge.



*Aftermath of Morandi Bridge Collapse*

No one likes a structural failure and a tragic outcome. Our profession works really hard to prevent such events. Fortunately, failures on this scale are rare, but when they do happen, as is the case for the aircraft industry, the most important thing we can do is to understand the cause and learn what went wrong. At this time, we do not know what caused the disaster to occur, but there are indicators. We do know that there was a loss of support and suspicion has fallen onto the cable-stays. The structurally similar Wadi el Kuf Bridge in Libya was closed in 2017 after potential fractures had been identified. The cable-stays on the Morandi bridge, were known to be problematic and repairs had already taken place. IStructE Past President Ian Firth described the design as “very unusual” and, regarding the collapse, that “corrosion of tendons or reinforcement may be a contributory factor”; while Past President Professor Tim Ibell reminded us that the world’s bridges “stand safely due to extraordinary abilities of structural engineers”.

It is interesting to note that Morandi’s cable-stayed bridge designs were essentially multi-girder spans supported by singular stays and are statically determinate, typically with intricate support frames that appear to be very delicate. Other designers did not follow Morandi’s direction, aiming for redundancy and robustness, and generally, such desirable attributes are built into our modern codes. Other cable-stayed bridges of a similar vintage have successfully undergone cable supplementation or replacement – in some cases because such eventualities had been considered. Clearly, where designers consider structural vulnerabilities, operation and maintenance, it can pay dividends.



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# Certificate in Structural Engineering Program



Shannon Remillong,  
CSE Program Co-ordinator

The September 2018 term will begin in a short five weeks with an offering of 4 courses:

- E10 Structural Analysis Fundamentals: A Refresher
- E13 Computer Software Applications in Structural Engineering
- E25 Structural Health Monitoring
- C4-1 Introduction to Earthquake Engineering and Seismicity

Course details are available through Certificate in Structural Engineering Program website: [www.seabc.ca/certificate-program/current-term/](http://www.seabc.ca/certificate-program/current-term/). Registration is now open until Monday, September 10. SEABC Members will receive a discounted rate, and additional savings with early-bird rates apply until Friday, August 17. Classes begin the week of September 11 and end the week of December 6 with a mid-term break in the week of October 23.

Courses fill up fast so make sure to register early and take advantage of the savings!

## New Course for September 2018!

### E25 Structural Health Monitoring

This course covers basic principles of seismic structural health monitoring and provides the students with additional knowledge about the different vibration measurement techniques; instrumentation type and location selection for real

life structures; structural condition evaluation; and damage detection for civil engineering structures. Simple demonstrations and experiments will be conducted during class hours in the classroom.

Review of Structural Dynamics; Damping Calculation Methods; Data Acquisition Systems and Measurement Instruments (e.g., Data Recorders, acceleration sensors, A/D converters, etc.); Fast Fourier Transform (e.g., Power Spectral Density Spectrum); Basic Data Analysis methods (e.g., Sampling, Baseline Correction, Decimation; Aliasing, convolution and correlation of signals, etc.); Designing Digital filters (e.g., Low-pass, High-pass, band-pass filters); structural properties extraction from vibration data (e.g., Modal frequency, damping ratio, and mode shapes); Finite Element Model Calibration/Updating; Structural Condition Evaluation; Damage Detection methods (e.g., natural frequency based, permanent displacement based, and wave propagation based methods); sensing needs in structures and various types of sensors; smart materials, smart concrete and its use as a sensor; beyond strain and vibration such as moisture monitoring, chemical environment, cracking, leakage, radioactivity and bio-degradation.

For each topic to be discussed, the theory behind the concept will be introduced and explained first, and then several illustrative practically-oriented examples will be presented and discussed.

Looking forward to a brand new term after long break!

Registration Inquiries and Requests/Suggestions: Please contact Shannon Remillong, Certificate Program Executive Assistant, at email: [courses@seabc.ca](mailto:courses@seabc.ca)

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# Mark Your Calendar

## Upcoming Seminars/Webinars and Events

### Annual Family Picnic- EGBC

**Date:** Sunday August 26, 2018

**Location:** Bertram Creek Regional Park Gazebo- 5680 Lakeshore Rd Kelowna, BC V1W 4J4

**Time:** 12:00pm – 4:30pm

**Cost:** \$10 plus GST per family or group

**More Information:** [www.egbc.ca/Events](http://www.egbc.ca/Events)

### Engineers and Geoscientists Annual Conference

**Date:** October 18-20, 2018

**Venue:** Vancouver Convention Centre East

**More Information:**

[www.events.egbc.ca/ehome/301294](http://www.events.egbc.ca/ehome/301294)

### MEL One-on-One Consultations — Vancouver

**Date:** Thursday August 30, 2018

**Venue:** UBC Robson Square Campus (800 Robson St, Vancouver, BC V6Z 3B7)

**Time:** 8:00am – 7:00pm

**More Information:** [www.apscpp.ubc.ca](http://www.apscpp.ubc.ca)

### CSCE Masonry Seismic Design with CSA S304-14.

**Date:** September 17, 2018

**Venue:** Sandman, Vancouver

**Time:** Registration 7:45am – 4:30pm

**More Information:** [www.csce.ca/wp-content\\_Masonry](http://www.csce.ca/wp-content_Masonry)

### Advanced Project Management

**Date:** Thursday September 6, 2018

**Venue:** Richmond, B.C.

**Presenters:** Dr. George Jergeas, P.Eng.  
Professor, Project Management, University of Calgary

**Time:** 8:00am – 8:30am: Registration and Continental Breakfast- Day 1 and Day 2

8:30am – 4:30pm: Advanced Project Management- Day 1

8:30 am 4:30pm: Advanced Project Management- Day 2

**More Information:** [www.egbc.ca/Events](http://www.egbc.ca/Events)

### Seismic Analysis and Design of Steel and Reinforced Concrete Buildings

**Date:** Wednesday, September 12, 2018- Friday, September 14, 2018

**Venue:** Vancouver, B.C.

**Time:** 8:00am – 8:30am: Registration

8:30pm – 4:30pm: Day 1–3

**More Information:** [www.egbc.ca/Events](http://www.egbc.ca/Events)

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# Final Words

## Editorial Information

The SEABC Newsletter is published by the Structural Engineers Association of British Columbia. The current and past issues are available on the SEABC website at [www.seabc.ca](http://www.seabc.ca).

The Newsletter is edited and managed by the SEABC Communications Committee.

- Committee Chair: David Harvey
- Newsletter Editor: Catherine Porter
- Webmaster: Stephen Pienaar

Submissions are welcomed and all SEABC members are encouraged to actively contribute to the Newsletter. Submissions, letters to the Editor, questions and comments can be sent to: [newsletter@seabc.ca](mailto:newsletter@seabc.ca).

The Committee reserves the right to include or exclude submitted material and in some cases edit submitted material to suit overall space requirements. If content is not to be edited, please advise so at submission time.

## SEABC Board of Directors

President:	David Harvey
Past President:	Cameron Kemp
Secretary / Treasurer:	Surinder Parmar
Other Directors:	Perry Adebar, Stanley Chan, Paul Fast, Tejas Goshalia, Adrian Gyga, Kitty Leung, Kevin Riederer, Andrew Seeton, John Sherstobitoff

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Seismic Resilience:	Andrew Seeton,
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### Branch Chairs:

- Vancouver Island: Thor Tandy
- Okanagan: Meagan Harvey

## Advertising

### Pre-paid rates per edition:

- \$270 (quarter page), \$360 (half page) or \$450 (full page) plus GST. Rates include a banner advert on the Events page of the SEABC website.
- 50-word "Available for Employment" ads are free.

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