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Final Words

Burrard Bridge: Photo Credit: Alex Cosovanu, PBX Engineering

Message from the President

David Harvey, P.Eng.
SEABC President

FIU Bridge Failure – Part II

In the November 2019 Newsletter, I commented on the National Transportation Safety Board's abstract report on the March 5, 2018 tragic collapse of the Florida International University Bridge. I summarized its findings, which blamed most parties involved, and that most of the responsibility was directed at the designers, FIGG Bridge Engineers, for design errors, commissioning an inadequate peer review and not taking action to mitigate the collapse.

Since the collapse, there has been time to think about the many issues that have been raised and what it might mean for those of us involved with bridges, design/build projects, peer reviews, and structural design. In this message I raise some key lessons which may help us improve product quality and help prevent or minimize future failures. My commentary on the FIU failure (with the huge benefit of hindsight) follows – feel free to disagree!

The 'signature structure' issue was a vital part of the project. To win the work, Figg developed a concrete truss which was precast on site and erected above the road. The precast truss section was intended to be made continuous with a cast-in-place side span and ultimately, a tower at the interior pier and cable-stays added above the concrete roof. The stays would resist imposed loads and control live-load-induced vibrations. The resulting stay-supported truss provided the 'signature' look, but for aesthetic reasons, the truss-web members needed to align with the cables. Therefore, every web member was at a different angle which was a sub-optimal layout for truss behaviour. The web member that failed at the lower node was at the flattest angle – roughly 66 degrees from vertical. This angle significantly magnified demands under erection loading to critical levels which created design and construction issues.

This looks like a case of an aesthetic objective overriding, perhaps clouding structural judgement, which seems unwise unless properly executed.

Earlier, the proposed design was commented on by the Florida Department of Transportation, who recommended that substantial fillets be added in the truss nodal connections. It appears that FDoT were attempting to mitigate the very high connection stresses in the truss. Figg rejected the suggestion (which would have significantly altered the appearance) noting that the fillets would occupy too much of the user-space. Had suitably reinforced fillets been added, quite possibly the failure may have been averted.

Did FDoT, a knowledgeable reviewer, spot something the designer had overlooked? Might more have been done to follow up this concern? Clearly the designers were reluctant to change anything, and the opportunity for a second look at what turned out to be a fatal design-flaw was missed. Designers can have difficulty when their designs are reviewed, but we should consider submittal-review as an important quality-management tool and respond appropriately. Review comments can identify design improvements and alternatives which can add value.

The external peer review process is the highest level of technical validation practiced anywhere. In this case, Figg commissioned only a limited review of their design. As a result, only reanalysis of the structure using a coarse mesh took place – the lack of detail at the connections may have masked the key issue. During later interviews, the reviewer appears to have merely carried out the limited scope and not conducted a questioning review.

Again, Figg missed the to opportunity to add integrity to their design. Independent reviews are used to reduce risk where perceived to be unusually high. If that review is limited by scope or budget, its value is affected. To be valuable, an independent review should be conducted by a firm with specialist knowledge, with an appropriate scope. A subject-matter specialist will typically find design weaknesses which less experienced individuals miss.

Clearly, we should not simply get carried away by a glamourous idea – design rigour is still required. Also, the quality process is optimal when carried out diligently; we should not be tempted by short-cuts. These are key lessons to us all.

2020 Executive Board for Elections

Perry Adebar, Ph.D., P.Eng., University of British Columbia

Professor in the Department of Civil Engineering at the University of British Columbia, Perry has served as a Director of SEABC for seven years. If elected, Perry will continue to serve in that capacity.

Robert Bourdages, P.Eng., SE, LEED® AP

A Principal with Stantec, Robert is standing for election to the SEABC Board. If elected, Robert will serve as a Director.

Stanley Chan, P.Eng.

A project structural engineer with Read Jones Christoffersen Ltd., Stanley currently chairs SEABC's Young Members Group. He has been involved with the Young Members Group since 2011 and has served as a Director of SEABC for two years. If elected, Stanley will continue to serve as a Director.

Paul Fast, P.Eng., Struct.Eng.

Managing Partner with the firm he founded, Fast + Epp Structural Engineers, Paul has served as a Director of SEABC for ten years. If elected, Paul will continue to serve as a Director.

Tejas Goshalia, P.Eng., SE

A Senior Associate with Stantec, Tejas has served as a Director of SEABC for seven years and currently chairs its Education Committee. If elected, Tejas will continue to serve as a Director.

Adrian Gygax, P.Eng, Struct.Eng.

A Principal with with his own firm, Gygax Engineering Associates Ltd., Adrian has served as a Director of SEABC for ten years. If elected, Adrian will continue to serve as a Director.

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

A Principal with Associated Engineering, David was a founding Director of SEABC. David chairs the SEABC Communications Committee and is currently serving as President. If elected, David will continue to serve in that capacity.

Cameron Kemp, P.Eng., LEED® AP, Past President

A Principal and Chairman of Omicron Canada Inc., Cameron was a founding Director of the SEABC. Having served five years as SEABC President, Cameron is currently Past President, and if elected, will continue to serve in that capacity.

Kitty Leung, P.Eng., Struct.Eng.

A principal and structural engineering team leader with Stantec, Kitty has served as a Director of SEABC for five years. If elected, Kitty will continue to serve as a Director.

Surinder Parmar, P.Eng., PMP

Manager- Portfolio Capital Projects with BC Hydro, Surinder was a founding Director of the SEABC and has served as Secretary/Treasurer since its inception. If elected, he will continue to serve as a Director.

Kevin Riederer, P.Eng.

Project Structural Engineer with Read Jones Christoffersen Ltd., Kevin has served as a Director of SEABC for five years and currently chairs the SEABC Technical Committee. If elected, Kevin will continue to serve as a Director.

Calvin Schmitke, P.Eng., Struct.Eng.

Director, Structural Engineering of Omicron Canada Inc., Calvin has served as a Director of SEABC for one year. If elected, Calvin will continue to serve as a Director.

Andrew Seeton, P.Eng.

An Associate with Aspect Structural Engineers, Andrew was a founding Director of the SEABC and former chair of its Education Committee. If elected, Andrew will continue to serve as Director.

John Sherstobitoff, P.Eng.

A senior structural engineer specializing in earthquake engineering and a Principal with Ausenco, John has been a SEABC Director for five years. If elected, John will continue to serve as a Director.

Committee Reports

Young Members Group

Amr Farag, E.I.T. M.Eng

The SEABC YMG ended 2019 with another successful joint networking and trivia night with the ACEC-BC Young Professionals Group. The year 2020 has already kicked-off with a SEAQ event, promising an exciting year to come for the YMG.

YMG Joint Young Professionals Mixer and Trivia Night

SEABC Young Members Group and the Association of Consulting Engineers Canada-BC (ACEC-BC)- Young Professionals Group joined forces to host a networking mixer and trivia night on Dec 04, 2019. The event was also attended by members of the Architectural Institute of British Columbia (AIBC)- Intern Architect Committee. Young professionals gathered at the Mahony & Sons Irish Pub at the Stamps Landing, to build relationships while enjoying a fun night of trivia. Young professionals from SEABC expanded their network by connecting with young engineering professionals from different disciplines.

Networking Mixer and Trivia Night

Structural Engineers Ask/Answer Questions (SEAQ) Event – Academic Research

The first SEAQ session of the new year offered the young engineers that attended, an intimate space to share their thoughts and explore the topic of research and academia. Hercend Mpidi Bita led the discussion by offering a fresh perspective on the world inside a research institution, digging into the complexity of undertaking a doctoral degree and contributing to the structural engineering body of knowledge. The information gleaned from that discussion was a very helpful reminder to the participants about the nuances of academia and academic publishing.

Communications Committee

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

Director SEABC

Your vibrant Communications Committee loves communicating with our members. Your feedback encourages us to keep doing so and to get better at it. We were therefore thrilled when Mark Budd, a structural engineer and freelance technical writer, joined the team last fall. Mark has helped us with article review – extra eyes are always welcome – and has authored new articles as well. In this issue, Mark provides useful comment on some of the SEABC Certificate Program's flagship courses, for which we always encourage constructive suggestions. However, SEABC is a member-services organization – we still need our members to send us their articles, photographs, news and opinions to keep our readers well informed.

So, we really thank you for submitting anything of interest to structural engineers. Please keep sending your interesting articles, but we need more. We also need readers, so do keep them lively, readable and relevant. Kindly send information for publication to: newsletter@seabc.ca

On the Web

Stephen Pienaar, P.Eng.

Webmaster

Current activities on the website

Happening right now:

- 2020 Annual Dinner & Presentation
  The President and Board of Directors of SEABC will host the Annual Dinner & Presentation on March 11. This year's keynote speaker is sought out structural engineer Ron Klemencic of Magnusson Klemencic Associates (MKA). This event is not to be missed.
  seabc.ca/adm2020
- April 2020 Term of the Certificate in Structural Engineering Program:
  With the February term winding down. The CSE Program is now accepting registrations for the April Term. The upcoming term offers four courses, all available in classroom and live interactive webcast formats:
    - E7 Seismic Strengthening of Existing Structures
    - C12 Practical Design of Reinforced Concrete
    - C13 Structural Steel Design for Buildings
    - E13 Computer Software Applications in Structural Engineering

  Registration will be open until April 6, with an early-bird discount available until March 13.
  seabc.ca/cse-current
- Structural Design of the Gerber Girder Cantilever System and Updates in CSA S16-19
  Registration has been brisk for the Education Committee's seminar on February 26.
  seabc.ca/events

Video recordings of recent seminars

The Education Committee endeavours to make video recordings of all seminars (when possible) to allow access for members that were not able to attend in person:

- Developing High-Performance Structural Systems for Seismic Applications (January 2020 evening seminar)
  Prof. Tony T.Y. Yang (University of British Columbia) presented a novel design procedure named Equivalent Energy-based Design Procedure (EEDP) for fused structures in earthquake application. EEDP allows engineers to select their structure's performance objectives at different levels of seismic shaking intensities. With this methodology, engineers can efficiently select their structural member sizes to achieve the desired structural period, strength and deformation with simplified hand calculation and without iteration.
- Rehabilitation of Westham Island Bridge and Alexandra Bridge (October 2019 evening seminar)
  Casey Leggett and Arman Shahnaz (Mott MacDonald) presented the notable rehabilitation of the Westham Island Bridge, one of Metro Vancouver's oldest and historic structures. Jason Dowling, (Associated Engineering,) presented the equally notable rehabilitation of the Alexandra Bridge, a 257-meter long riveted steel arch across the Frazer River.

View these and other recordings:
seabc.ca/events-archive

Change of phone service provider

While email is often the easiest way for our volunteers to respond to inquiries, we recognise that our members, students of the CSE Program, and the general public may prefer a phone call. For this reason, SEABC maintains a toll-free phone number.

Rising costs prompted us to consider alternatives, and we switched to a new phone service provider at the beginning of February. If you did not notice any change, then it is because the transition went smoothly.

Showcase your firm

Let the SEABC website work for your firm:

1) **Directory of Structural Firms:** The Directory currently lists 80 firms across the province. Member feedback confirms that listings are generating valuable leads. Listing in the Directory is free and available for firms that employ one or more SEABC members. seabc.ca/directory
2) **Photo of the Month:** The SEABC website consistently receives more than 3,000 unique visitors every month. Your firm can get free exposure by featuring projects as the website's photo of the month. seabc.ca/photo-of-the-month
3) **Newsletter:** Take out a paid advert in the quarterly SEABC Newsletter. With a circulation of over 1,000 (as of August 2019), the Newsletter is a great vehicle to get your message across to the B.C. structural engineering community. seabc.ca/newsletter

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

Technical Committee

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

Director SEABC

The SEABC Technical Committee is comprised of a number of Subcommittees and Task Groups. These groups are made up of many volunteers who make a significant contribution to the Association and the Profession. Their efforts are greatly appreciated.

The task group assembled to prepare a Practice Guideline for Structural Condition Assessments of Existing Buildings has completed the document.

The guideline has been reviewed by Engineers and Geoscientists BC and in 2020, the document will be peer reviewed by an independent group of SEABC volunteers. The document will be sent to the Engineers and Geoscientists BC Council and will be published for use by members. The Task group consisted of Nick Bevilacqua P.Eng., Struct.Eng., Patrick McGrath Ph.D., P.Eng., Kevin Riederer P.Eng., P.E. and Kenny Yip P.Eng., P.E., S.E.

In 2020/2021 the SEABC Technical Committee, Subcommittees and Task Groups will continue to move the current initiatives forward as well as explore areas where a review of technical information concerning the practice of structural engineering in BC is warranted. The Technical Committee and the Board of Directors will continue to provide support to Engineers and Geoscientists BC when they are seeking SEABC input on a technical matter.

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 the committee.

IStructE News

David Harvey, P.Eng.
Struct.Eng

100th President

Don McQuillan

IStructE recently announced that for 2020, Don McQuillan, a consulting engineer from Belfast, Northern Ireland, has been appointed the 100th President of The Institution of Structural Engineers.

A Director of RPS, a global energy resources and environmental consultancy, Don specialises in project managing multidisciplinary projects and in structural and forensic engineering. Don has spent his entire 44-year career with RPS and its predecessor firms. He has also enjoyed a long involvement with the Institution, through service on its Board, Education Committee and as a past chairman of the Northern Ireland Regional Group.

Don was elected to the Institution Council in 1989 and has since continued his Institution involvement with the development of The Structural Engineer, serving for many years on the Editorial Advisory Group. A prolific author of technical papers, Don won the Institution's prestigious Sir Arnold Waters Medal twice. A visiting Professor at Queen's University Belfast, Don is passionate about mentoring younger engineers, providing technical support and guidance to members and promoting the Institution as a world leader in structural engineering.

"In appointing me its 100th President, the Institution has conferred upon me a tremendous honour and provided me with an amazing opportunity for which I am thankful. The weight of responsibility is enormous but the road ahead, although challenging, is exciting, and I count on your support as we walk it together," said Don.

Don gave his inaugural address, cleverly entitled *"2020 Vision – For an Understanding of the Future, Look to the Past"* at the Institution's headquarters in London on February 1. Addressing the in-the-room and on-line audience, Don noted that the Institution has embarked upon an across-the board initiative to support and develop the future of the structural engineering profession. After recounting a brief history of the Institution and acknowledging past contributions, Don explored 'presidential milestones' by examining the 1st, 10th, 25th, 50th and 75th inaugural addresses to see if history repeats itself. He found that the primary topics of communication, competence, communities and collaboration (the four Cs) have been constant considerations for the Institution over the years.

Don added two more values, 'construction materials' and 'competition' to outline his 2020 vision. He looked at how others deal with continuing competence and the issues that demand it.

Next, Don analyzed our structural community and how we communicate, before turning to the Institution's charitable status and how its governance is evolving. He then moved to the structures that had inspired him to be a structural engineer, including in his youth the Chinyingi Bridge in Zambia and the Victoria Falls Bridge; and as an engineer the Waterfront Hall in Belfast. Don's career has since moved into forensic and expert witness work which he finds fascinating. Highlighting structural safety, Don noted that the Institution's CROSS model is now being replicated in other parts of the world.

Tackling the frightening issue of climate change, Don looked closely at what this implies for the Institution's goal to foster sustainable design practices. He observed that action to reduce operational and embodied carbon levels is urgently needed, a key component of which is client education. This was followed by internationalizing the Institution which Don observed is driven by

offshore membership growth and facilitated by vast improvements in communications. Don ended by commenting that the well-established observation – anticipation – planning system builds on itself and is analogous to the Institution moving in an ever-changing world. He postulated how this might influence and what we might experience in future years.

Now having launched himself into his presidency, Don deserves our support. The Institution's 100th president has the future of our profession very much at heart and we wish him every success.

You can view Don's address at:-

www.istructe.org/resources/career-profiles/don-mcquillan-presidents-inaugural-address/

Examination Training

The Institution's Chartered Membership Examination is still as popular as ever and candidates sitting the exam are increasing 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. 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:-

seabc.ca/resources/struct-eng/

You will see examinations and examiners' reports up to 2019, and Archived Possible Solutions are available. The past examinations provide plenty of practice material and gives you useful 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. Great tips on what to avoid can be found. The archived solutions are not definitive but provide clues to what the question writers are looking for, 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 a novel on-line course ***Understanding Structural Behaviour.*** For a course fee of only $8, there are 200 sample questions available to you to test your skills against. The course is great preparation for the ***Certificate in Structural Behaviour*** – the first on-line examination offered by the Institution. Exam fees are $260 for Institution members, $130 for students and $350 for non-members.

Last year, the Institution launched the ***CM Exam Online Preparation Course,*** with access to study material for up to 12 months. The cost is about $500 for Institution members, which is similar to the cost of the one-day course SEABC has run in past years. The on-line course cost is much less than the in-classroom courses run in London. This strong E-learning trend will continue, fuelled by the international membership base, and the convenience of accessing recorded material.

These on-line resources will be especially valuable for recent graduates who are currently gaining design experience as part of their professional training.

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 choose 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

Certificate in Structural Engineering Program

Shannon Remillong,
CSE Program Co-ordinator

January 2020 term has begun!

The following four courses are being offered this January 2020 at UBC Robson Square:

- C5 Topics in Practical Structural Design
- C11 Light Timber Design for Residential/Commercial Buildings
- C50 Highway Bridge Design Loadings & Load Ratings
- E22 Introduction to Heavy Timber

Due to popular demand, the addition of an April term is being added this year!

Registration for the April 2020 term will open Friday, February 7th through the SEABC website:

www.seabc.ca/certificate-program

The April 2020 Term will run between **April 7 and July 2, 2020**

Course delivery

- Courses will be held in Room C485, UBC Robson Square, 800 Robson Street, Vancouver.
- All courses will also be available via live webcast.
- Courses are once a week for 2 hours at either 4:00-6:00pm or 6:30-8:30pm.
- Courses are 13 consecutive weeks on a Tuesday or Thursday evening.

April 2020 Term Courses

- E7 Seismic Strengthening of Existing Structures
  Instructor: John Sherstobitoff
  Tuesdays 4:00pm- 6:00pm
- C12 Practical Design of Reinforced Concrete
  Instructor: John Pao
  Tuesdays 6:30pm- 8:30pm
- C13 Structural Steel Design for Buildings
  Instructor: Andy Metten
  Thursdays 4:00pm- 6:00pm
- E13 Computer Software Applications in Structural Engineering
  Instructor: Armin Bebam Zadeh
  Thursdays 6:30pm- 8:30pm

Course Fees

- Classroom: $650 + GST.
- Live webcast $850 + GST.

Discounts

- SEABC members: $50 per course reduction in tuition.
- "Early Bird" registration: $50 per course reduction in tuition for online registrations received and mail-in registration postmarked on or by Friday, March 13th, 2020.

Registration

Register on the Certificate Program website (powered by Class-Bit). You can pay by credit card (PayPal) or cheque.

Important Dates

- Early-bird deadline: Friday, March 13, 2020.
- Registration close: Monday, April 6, 2020.
- First lecture: Tuesday, April 7 and Thursday, April 9, 2020.

- Last Lecture: Tuesday, June 30 and Thursday, July 2, 2020.
- Withdrawal Deadline: April 20, 2020.

These 4 courses will fill up fast so as not to be disappointed, register early and take advantage of the savings!

Registration Inquiries and Requests/Suggestions: Please contact Shannon Remillong, Certificate Program Administrative Assistant, at email: courses@seabc.ca

CSE Board of Directors

Chair: John Pao, M.Eng., P.Eng. Struct.Eng., Bogdonov Pao Associates Ltd. (cse-chair@seabc.ca)

Executive Assistant: Shannon Remillong (courses@seabc.ca)

Farshid Borjian, M.A.Sc., P.Eng., PE., C.Eng., M.I.Struct.E., Struct.Eng., Borjian Engineering Ltd.

Svetlana Brzev, Ph.D., P. Eng., FEC, University of British Columbia

Anthony El-Araj, P. Eng, Struct Eng, PE, SE, LEED AP, Glotman Simpson Consulting Engineers

Darrel Gagnon, M.Sc., P. Eng., COWI North

Chris Jacques, P. Eng., Struct.Eng., Read Jones Christoffersen Ltd

Yavuz Kaya, Ph.D., P.Eng., Ministry of Transportation and Infrastructure

Bishnu Pandey, Ph.D., P. Eng, British Columbia Institute of Technology

Carlos Ventura, Ph.D., P.Eng., University of British Columbia

Nominate a Colleague

David Harvey, P.Eng. Struct.Eng

Do you have a deserving colleague that has contributed strongly to the profession and/or the community? Is that person serving as a role model and inspiring others? If so, consider nominating him/her for the 2020 President's Awards, recently announced by Engineers and Geoscientists British Columbia. The President's Awards are B.C.'s premier awards for professional engineers and geoscientists. To nominate an individual, you will need to prepare a letter of nomination, or support for a nomination, outlining that person's outstanding achievements. To streamline and standardize the process, nominations are now made on-line.

The President's Awards include awards for meritorious achievement; community service; professional service; young professionals; and the R.A. McLachlan Memorial Award – BC's top award for professional engineers. Nominations must be received by Friday April 3, 2020.

Full details of the awards and the nomination procedures are available at:

www.egbc.ca/awards

For further information or assistance on any aspect of the EGBC President's Awards, contact Laurel Buss, Manager, Communications at: lbuss@egbc.ca

Professional Development Resources

Mark Budd, P.Eng.

Few written reviews of SEABC's certificate program exist. Of course, the education committee has been established to guide the learning process, but why not share our experiences, as students, to engage in a collaborative learning experience to an already well-established program? In that respect, here is my succinct review of a few courses: what they focus on, how they are delivered, and the important lessons they provide us. Hopefully this may help others plan ahead in their continuing education. Let's hear about your experiences!

E10 Structural Analysis Fundamentals: A decent refresher course on undergraduate mechanics with a heavier focus toward shear concepts and some analysis methods. Take this course to review hand calculation methods that can help validate analysis results. The presentations were delivered using informative PowerPoint© slides and an assignment given every second or third week. The lectures offered well-guided derivations and problem solutions, limited slightly by the graphical format of the slides. The assignments were challenging textbook problems with a similarly difficult final exam.

C1 Analytical Methods in Structural Engineering: While I have yet to witness a grey-haired engineer solving column stability differential equation problems in practice, I am sure those unicorns exist. But in nearly every office there is quite likely a copy of Roark's formulas in the library or a brain. Regardless of that probability, you're likely to come across a tool, a method, a reference, or something that can be developed from analytical methods. This course continued where E10 left off, extending deeper into stability and shear solutions. Lectures and assignments often had the underlying reminder that simple analytical reasoning can solve otherwise complex, indeterminate problems.

C10 Design of Earth-Supported Structures: Geotechnical problems are kind-of interesting. As key elements in our load path, foundations are important for structural engineers to understand. I mean, don't get me wrong, I like to build up beyond the ground. However, it's satisfying and necessary to understand what you are standing on first. This course reinforced the structural design procedures for footings, slabs-on-grade, and retaining walls. Single lectures were dedicated to additional topics such as soil properties, Appendix D, and jet grouting as a potential soft ground solution. Information that references the Canadian Foundation Engineering Manual, geotechnical engineering interactions, or more complex foundation problem solving would be a beneficial supplement to this course.

C11 Timber Design of Light Residential and Commercial Buildings: We live in a heavily forested region of the country and while responsible usage is important for all resources, wood's advantages yield a reliable and available building material in our region. This course focuses on material behaviour and common applications in wood-framed residential applications. Assignments were important exercises that worked on practical solutions and sketches rather than rigorous analysis. It was a reminder that wood buildings rely on critical consideration of layout and constructability, not just number crunching. Lectures had a well-balanced approach of code provisions, example problems, and experienced insight.

C13 Structural Steel Design for Buildings: A well-paced structural steel design course. Basic member sizing techniques were established to help you become as efficient as your material's elasticity. The course material was introduced with proven processes that emphasized a practical approach. This was as much a steel course as it was a series of lectures designed to help strengthen engineering awareness of the full project scope.

These courses have allowed me to interact with current methods in practice. The opportunity to

interact with other designers, methods, and ideas has helped me find more consistency in my process. While the extension of a work-day into evening classes can seem like a daunting task, I'm thankful for the availability of an informed and accessible program like SEABC's.

A Tribute

Dr. Perry Adebar, P.Eng.
Director SEABC

James Gordon Mutrie

February 22, 1940- December 23, 2019

The Structural Engineering Community of BC suffered a great loss with the recent passing of James G. Mutrie. Jim's professional legacy will live on in the many high-rise building projects he worked on as a structural consultant over his 40-year career, and through the enormous contributions Jim made to the writing of CSA Standard A23.3 for concrete buildings.

His colleagues and friends will remember Jim for his open, honest and direct approach – Jim would always tell you exactly what he thought; and they will remember him for his sense of humour and his great laugh. You always knew when Jim was in a room because of his distinctive, loud laugh.

Jim Mutrie graduated with a B.A.Sc. degree in Civil Engineering from UBC in 1966. He immediately went to work as a design engineer for Read Jones Christoffersen, and subsequently become a partner of that firm. In 1984, he was invited to be a partner of Jones Kwong Kishi, and for many years, was the managing principal of JKK. After working for more than 40 years as a structural consultant, Jim retired in 2007.

During his career, Jim was the Engineer of Record for many notable buildings such as: Living Shangri-La (currently the tallest building in BC), Shangri-La Toronto, Shaw Tower, Surrey Central City, The Crystal, Waterfront Centre, Pacific Landmark, Nelson Square, Royal Center, Granville Square, … to name just a few.

In 1998, Jim Mutrie worked on the design of a Canadian-style high-rise building in Bellevue Washington called Lincoln Square. To verify the design, Jim used nonlinear response history analysis, which was peer reviewed. While a number of BC consultants are doing this today, when Jim did it over

20 years ago, it was very innovative.

In 2005, Jim designed plastic hinges in the end of the 12 ft. deep transfer girders that framed into the core near the base of the Living Shangri-La building so that the building could tolerate large interstory drifts without overloading the gravity-load columns that supported the other end of the transfer girders. Engineers are currently struggling with how to ensure their buildings have that level of drift capacity in order to meet CSA A23.3 Clause 21.11 referenced by the 2018 BCBC, which has just come into effect. Jim Mutrie provided a solution 15 years ago.

Many seemingly knowledgeable people in the construction industry believe that you can hire any structural engineer and you will get essentially the same building in the end because all structural engineers must follow the same building code. Of course, nothing could be further from the truth. Jim Mutrie provided excellent engineering solutions for the buildings he worked on because he was technically very competent and because he cared about the people that will live in the buildings. Jim would ask, 'What if a family member will be living in the building?'

Jim was a member of CSA Technical Committee A23.3 since 1979 and was active on that Committee for 40 years. Jim chaired the Clause 21 Technical Group that wrote the seismic design provisions for a number of editions. Even after Jim retired from consulting, stepped down as Clause 21 chair, and was struggling with health challenges, he remained very active on CSA A23.3. There are many new and revised clauses in the 2019 edition of CSA A23.3 that 'bear his mark'.

After hearing about Jim's passing, structural engineers from CSA A23.3 paid tribute. Here is some

of what they wrote:-

"Jim will be remembered as a significant figure in Canadian engineering and one of the leading and innovative contributors to the development of Canadian seismic design provisions."

"I will miss him personally and the wisdom that he brought to the table."

"A great person, thinker and engineer."

"A very special guy."

A structural engineer from Vancouver wrote:-

"I learned a lot from his positive good-humor style of doing engineering. Over the years, I have appreciated working with Jim on various engineering committees and the meals shared afterwards. It was always a pleasure to spend time in Jim's presence."

Finally, the structural engineers Jim worked with at JKK wrote about his passion for writing structural analysis computer programs, his professionalism and his big heart.

Nine years ago, Jim Mutrie was given six months to live; but Jim was a fighter and won round after round of his battle with cancer. In the final round, Jim told his doctor "it was time to let him go," and passed away peacefully with his wife Sandy at his side.

A Celebration of Life was held on February 15th at the Boel Chapel in North Vancouver with a standing room only audience that came to pay tribute to a wonderful person and a great structural engineer.

Jim Mutrie

Mark Your Calendar

Upcoming Seminars/Webinars and Events

Hydraulic Modelling of Water Distribution Systems

Date: Tuesday, March 3, 2020
Time: 8:00 AM–8:30 AM: Registration and Continental Breakfast
8:30 AM–4:30: Hydraulic Modelling of Water Distribution Systems
Location: Burnaby, BC.
For more info: www.egbc.ca/Events
Note: Participants are required to bring a laptop computer

For Project Teams: Wood Construction Costing Beyond 2020 – Drilling Down Through Details

Date: Wednesday, March 4, 2020
Time: 7:30 AM–4:00 PM
Location: Fairmont Waterfront Hotel, Waterfront Ballroom, 900 Canada Place, Vancouver, BC
For more info: wood-works.ca/event

Geotechnical Earthquake Engineering

Date: Monday, March 9, 2020 – Wednesday March 11, 2020
Time: 8:00 AM–8:30 AM: Registration Day 1
8:30 AM–4:30: Geotechnical Earthquake Engineering, Day 1-3
Location: Vancouver, BC.
For more info: www.egbc.ca/Events

Electrical Vehicle Infrastructure Training

Date: Thursday, April 16, 2020
Time: 6:00 PM–6:30 PM: Registration, networking and refreshment
6:30 PM – 8:30: Training seminar
8:30 PM – 9:30PM Facility Tour
Location: 1405 Broadway Street, Port Coquitlam
For more info: www.egbc.ca/Events

NEGM Popsicle Stick Building Bridge Competition

Date: Saturday, April 4, 2020
Time: 9:30 AM–3:30 AM
Location: L.V. Rogers Secondary School, Nelson, BC.
For more info: www.egbc.ca/Events
Note: Please register by March 16, 2020

Airport Asset Management

Date: Tuesday, April 22, 2020
Time: 8:00 AM–8:30 AM: Registration and Continental Breakfast
8:30 AM–4:30: Airport Asset Management
Location: Richmond, BC.
For more info: www.egbc.ca/Events
Note: A minimum number of registrations are needed by April 08, 2020 to proceed with this seminar. Please register early to avoid cancellation.

Performance Under Pressure

Date: Tuesday, May 5, 2020
Time: 8:00 AM–8:30 AM: Registration and Breakfast
8:30 AM–4:30: Performance Under Pressure
Location: Vancouver, BC.
For more info: www.egbc.ca/Events
Note: A minimum number of registrations are needed by April 21, 2020 to proceed with this seminar. Please register early to avoid cancellation.

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.

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

- Committee Chair: David Harvey
- Newsletter Editor: Catherine Porter
- Editorial Assistant: Mark Budd
- 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.

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

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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.

Please address advertising enquiries to: newsletter@seabc.ca.

Please support our advertisers!

SEABC Annual Dinner Meeting & Presentation

Date :	**Wednesday - March 11, 2020**
Time:	**Networking at 5:00 pm, followed by Dinner at 6:00 pm**
Venue:	**Ballroom Versailles-A at Sutton Place Hotel, 845 Burrard Street, Vancouver**
ADM:	**Address from SEABC President followed by Dinner**
Keynote:	**Ron Klemencic, P.E., S.E., Hon AIA** **Chairman and CEO of Magnusson Klemencic Associates (MKA)**
Cost:	**$85+GST (SEABC Members), $150+GST (Non-Members)** **Three-course plated dinner is included**
Registration:	**www.seabc.ca/adm2020 or use attached mail-in form**

Sponsorship opportunity is available and welcomed. Register online or email to adm@seabc.ca

Keynote Presentation:

You can see the FUTURE standing on top of a tall building! (Well, almost)

Tall buildings have always challenged our imaginations and pushed technology toward new advancements. Since the early 1960s, the unique challenges posed by the design and construction of tall towers has inspired new ways of thinking and new materials, engineering methods, and construction techniques. Today, with towers of unprecedented geometry, slenderness, and height spread around the globe, the velocity of advancement has never been greater.

Looking back at what history has taught us provides some clues as to what the future might hold. In his presentation, Ron Klemencic will set the scene by reviewing some of the key advancements of the past, summarize current state-of-the-art practices, and will provide a peek at what the future might hold.

Ron Klemencic is the Chairman and C.E.O. of MKA, a structural and civil engineering firm with offices in Seattle and Chicago. Ron earned his B.S. in Civil Engineering from Purdue University and his M.S. in Structural Engineering from the University of California Berkeley. His work in 25 US states and 24 countries include multiple-block developments up to 11.5 million square feet and towers up to 112 stories.

Ron is sought out internationally by developers, architects, and contractors for his creativity, “big picture” approach, and unique ability to consistently produce cost-effective, innovative designs. He continues to lead the advancement of performance-based seismic design of tall buildings through initiatives, such as the PEER TBI Guidelines and design of buildings such as the 1,070-foot-tall Transbay Tower in San Francisco.

Structural Engineers Association of British Columbia

Mail-in Registration Form: ADM & Presentation March 11, 2020

You can also register online!
www.seabc.ca/adm2020
(secure credit card payment via PayPal)

Contact Information:

Name of Company or Individual _____
(Receipt will be issued in this name to email provided below)

Street Address _____ City, Province _____ Postal Code _____

Telephone _____ Email (receipt will be issued to this email address) _____

Registration Fees:

REGISTRATION DEADLINE February 28, 2020

	Name(s) of Attendee(s)	SEABC Membership Number (Required for Member discount)	SEABC Member $85	Non-Member $150	Fees
1.			☐	☐	$
2.			☐	☐	$
3.			☐	☐	$
4.			☐	☐	$
5.			☐	☐	$
6.			☐	☐	$

Check one box per attendee

Three-course plated dinner is included.
Please indicate any special dietary requirements.

SUBTOTAL: $_____

ADD 5% GST $_____

TOTAL (PAYMENT ENCLOSED) $
Cheque payable to SEABC

Please make cheque payable to SEABC
Mail this form and cheque to:
SEABC
c/o M. Fung
288 West 8th Avenue
Vancouver, BC V5Y 1N5

Contact: adm@seabc.ca

Registration will be confirmed via e-mail. Registration cannot be guaranteed if received after February 28, 2020.
An administration fee of $25 will apply to any cancellations received by February 28, 2020.
No refunds given after February 28, 2020.

Structural Engineers Association of BC

2020 Annual Dinner Meeting & Presentation

Date: Wednesday - March 11 2020

Time: Networking at 5:00 pm, followed by Dinner at 6:00 pm

Venue: Ballroom Versailles-A at Sutton Place Hotel, 845 Burrard Street, Vancouver

SPONSORSHIP OPPORTUNITY

Annual Dinner Meeting Sponsors will be recognized in a looping PowerPoint slideshow that will display projects and information from sponsoring companies. This slideshow will appear on the main projection screens at the front of the room, whenever other presentations are not being made, throughout the evening.

The sponsorship formula is as follows:

- $500 for 4 slides (max.)
- Sponsorship roster will be limited to 10 companies on a first-come first-served basis.

Please respond soon if your company is interested!

PowerPoint slides or digital photographs shall be emailed to adm@seabc.ca by Feb 28, 2020.

- Limit total size of attachments to 15MB per email.
- We recommend for following information be provided on each slide:
  - ☐ Company name,
  - ☐ Company logo,
  - ☐ Project name for each photo

Sponsorship payments options:

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  SEABC,
  c/o M. Fung
  288 West 8th Avenue
  Vancouver, BC V5Y 1N5

For additional information about sponsoring this event contact Melanie Fung: adm@seabc.ca

Thank you for supporting the Structural Engineers Association of British Columbia!

Structural Engineers Association of BC

Annual Dinner Meeting & Presentation - Sponsorship Form

You can also submit your sponsorship online!
seabc.ca/adm2020-sponsorship

Company Name: _____

Contact Name: _____

Street: _____

City, Province: _____

Postal Code: _____

Telephone: _____

Email: _____
(Receipt will be issued to the above email address)

Number of Slides to be submitted (4 max): _____

Sponsorship Fee enclosed: $500 (Five Hundred Dollars)
(cheque payable to SEABC)

Thank you for supporting the Structural Engineers Association of British Columbia!