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Tanxishan Glass Landscape

Message from the President

David Harvey, P.Eng.
SEABC President

Forensic Structural Engineering II

SEABC branched into forensics with a bold leap when Don Kennedy gave the 2021 Pinnacle Lecture to an appreciative on-line audience. Don talked about many structural failures and their significance, but largely focused on the Florida International University Bridge collapse and the underlying causes.

Don's talk was that of the knowledgeable observer, commenting on the findings of the inquiry and analysis and tests carried out by investigators. Since then, IStructE held an event on the same subject, exploring the same material but from a slightly different perspective:

Both presenters had the same misgivings about the structural design chosen which seemed to place building an icon structure at a higher priority than public safety. They also had the same concerns about prestressing a heavily loaded compression member and the truss node details. Neither presenter could understand that with the nodal cracks opening up, no attempt was made to close the road beneath the failing structure.

Fast forward to last year's June 24 collapse of the Champlain Towers South building dating from 1981. The sudden failure with little warning and mass casualties (98 people perished) has shocked residents of high-rise towers across the world and provoked much speculation as to the cause. The subsequent investigation and debris removal eliminated several theories, but it took in-depth modeling and analysis to uncover the smoking guns.

Washington University's Dawn Lehman has led a detailed investigation of the accident to the Surfside, Florida building on behalf of the Miami Herald. Using supercomputers, Dawn has been able to recreate the story revealed by witness statements linked with evidence uncovered at the scene and point to multiple likely contributors to the tragedy. These include the sagging parking garage roof, water penetration into the pool deck and subsequent corrosion, missing column rebar, late omission of garage roof support beams from the plans, and undersized columns in the basement area. Dawn's research points to a questionable engineering design, poor quality control during construction, and uninformed or absent maintenance.

This emerging story is an important object lesson for structural engineers. Dawn has graciously offered to share her findings with SEABC members. The Education Committee is currently considering a suitable date for an on-line presentation and April appears likely. Look out for event registration details that will be circulated in due course.

SEABC – How are we doing?

With the AGM just around the corner on March 7, followed by the Pinnacle Lecture on March 9, it is the time of year to provide a quick health check on SEABC. I am happy to report that, as in previous years, your Association is in excellent shape. Financially, we remain strong – a fact confirmed by our auditors which allows SEABC to develop new programs that support structural engineering activities which educate or otherwise benefit structural engineers.

The Board of Directors are stewards of the resources, human and financial, which we use to further the aims of the Association. With the election of the 2022 Board members fast approaching, we are delighted that for the first time, four new candidates are standing for election. The new candidates come from diverse backgrounds, potentially broadening industry representation on the Board, and underpinning SEABC's succession plans. For more details of Association activities, attend the 2022 on-line AGM on March 7 at 5.30 pm. We are also holding the Pinnacle Lecture on-line on March 9 at 5.30 pm. This year's speaker will be Paul Fast. Paul will take us on a journey through his stellar 40-year career, focusing on lessons learned. During this time, Paul has garnered international recognition for structural engineering excellence, and was the 2021 recipient of the prestigious IStructE Gold Medal. Congratulations, Paul! Watch for registration details to be circulated shortly, and we'll see you there.

Dr. Boguslaw (Bogue) Babicki

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

A Vancouver Structural Engineer Marks the Passing of a Friend and Colleague

The Vancouver design community lost one of its more visionary and colourful structural engineers on October 27, 2021. Dr. Boguslaw (Bogue) Babicki, P.Eng., was born in 1924 in Poland. During the Nazi occupation, he joined the resistance and fought in the Warsaw uprising of 1944. He then studied engineering at Warsaw University of Technology, immigrated to Canada in 1958, and found employment with the Vancouver firm Read Jones Christoffersen. In 1962, he established Bogue Babicki Associates, which very quickly established itself as a firm with a reputation for creative design. His eagerness to push the envelope with structurally and architecturally ambitious designs led to collaborations with many prominent architects, including Arthur Erickson and Geoff Massey, Paul Merrick, Bruno Freschi, Rand Iredale, and Bill Rhone.

His relationship with Arthur Erickson led to some of the most notable additions to the Greater Vancouver building landscape: the first constructed buildings on the SFU campus, including the steel-timber lattice-roof structure for Convocation Mall; the steel and glass roof over the Robson Square Law Courts; and the large portal structures at the Museum of Anthropology, all which bear his engineering genius.

However, his greatest impact on Vancouver's skyline was the column-free 12-storey Westcoast Transmission Building (now known as "The Cube"), with the floors suspended via steel cables off a central concrete core. It still stands proudly but is now cluttered by surrounding tall buildings as a beacon of gutsy engineering, and was the topic of Bogue's doctoral dissertation.

I had the privilege of working with Bogue during the EXPO '86 era on his ingenious design of the International Modular Pavilion System and the double-layer geodesic dome housing the Preview Centre (now known as Science World). Those days had a formative impact on my career, and led to a lifelong friendship with Bogue. He was Socratic and headstrong by nature, and never one to shy away from controversy; however, we enjoyed hours of stimulating conversation covering a broad range of subjects, often ending with talk about life, death, and the hereafter.

Along with his wife Maria, daughter Dominica, son-in-law Alastair and two granddaughters, he leaves behind a legacy of bold structural designs that serve to inspire future generations of engineers.

Dr. Boguslaw (Bogue) Babicki

Committee Reports

Young Members Group

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

The year 2022 is looking promising as the YMG is eager to continue organizing events and exciting competitions with a record number of participants. With the launch of the SEABC LinkedIn and Instagram accounts at the end of 2021, the expansion of our social media presence led by the YMG has been gaining followers everyday as students and professionals stay up to date on the latest SEABC news and activities. You too can follow us on LinkedIn and Instagram to stay informed on upcoming events, such as the highly anticipated 11th annual SEABC Competition just around the corner, using the following links:

LinkedIn- linkedin.com/company/seabc
Instagram- instagram/seabc_social

This issue of the YMG report highlights the results of the first quarterly Geoguessr Contest of 2022 along with the success of this year's annual UBC CSCE Industry Night.

SEABC Geoguessr Contest 2022-Q1

The SEABC YMG Committee is pleased to announce Ryan Meyer as the winner of the latest SEABC Geoguessr Contest. As a reward, Ryan will receive a $25 gift card to Starbucks.

Geoguessr is a geography game which took participants on a journey around British Columbia, challenging their ability to recognize surroundings and pinpoint the locations of notable BC structures. The notable structures featured in this round of Geoguessr are as listed below.

1. Kicking Horse Pedestrian Bridge – Golden, BC

"Golden is celebrating the 20th anniversary of the Kicking Horse Pedestrian Bridge, which spans the river of the same name. At 46 meters (151 feet) across, it's the longest freestanding timber frame bridge in Canada. In 2001, over 100 members of the Timber Framers Guild came from the US, Europe and all over Canada to help raise the bridge." (Tourism Golden) tourismgolden.com

2. The Arc- Vancouver, BC

"The ARC, is a 28-storey mixed-use development located at the Cambie Street Bridge entrance into downtown Vancouver featuring Canada's highest, large scale glass bottom swimming pool The structurally unique building rises from the ground plane as two separate towers with unique lobby structures, and portrays a 'wavey' building profile with sloping columns at the upper levels. The two towers are bridged at the 20th level (approximately 200ft above grade) to create an arch containing the iconic glass bottom swimming pool." (Glotman Simpson) glotmansimpson.com

This building was the focus of the most recent SEABC photo contest winner in 2021. More information can be found on SEABC's Photo Contest website: seabc.ca/photo

3. AMS Student Nest – University of British Columbia, BC

"The Nest features five levels above grade. A full-height central atrium is characterized by breathtaking views and exposed heavy-wood structural components. A saw-tooth roof design used a hybrid structure of glazed glulam trusses (27m long) and cross-laminated timber (CLT) panels. The glazed west façade continues the wood expression with 18m tall twin-glulam columns." (SEABC Notable Structures) seabc.ca/notable-structures

4. Grandview Heights Aquatic Centre- Surrey, BC

"Grandview Heights Aquatic Centre is a 9,000m^2 world-class aquatic centre with fitness facilities, administration space and parking. The facility uses an extensive amount of wood, a renewable resource with low-embodied energy and carbon sequestering capabilities. The spaghetti-like glue-laminated wood roof 'cables' were erected in just 12 days. With a free span of 55 m, the roof is believed to be the world's most slender long-span timber catenary roof." (SEABC Notable Structures, SEABC.com) seabc.ca/notable-structures

5. Alex Fraser Bridge- Delta, BC

"The Alex Fraser Bridge is a six-lane highway bridge with pedestrian walkways/ cycle paths on each side. The main bridge has a five-span cable-stayed configuration, with a main span of 465m, side-spans of 183m and flanking spans of 50m. The main-span structure was the first cable-stayed bridge to utilize a composite concrete deck. At the time of its completion in 1986, the Alex Fraser Bridge was the longest span cable-stayed bridge in the world." (SEABC Notable Structures, SEABC.com) seabc.ca/notable-structures

If you would like to participate in the next round of the SEABC YMG Geoguessr contest, please look out for an e-mail blast coming soon!

UBC CSCE Industry Night 2022

The UBC CSCE recently hosted their Industry Night 2022. This event is originally planned to be in person but due to the current circumstances surrounding the recent surge in COVID-19 cases, the team has decided to shift the venue to online. Of course, this decision has been made in the best interests of the health and safety of the attendees. As engineers, we are expected to both prioritize safety and be able to adapt to unforeseen challenges- our current situation in the industry is a prime example of this.

Despite the abrupt pivot from an in-person event to an online one, the event had a great turnout of almost 200 attendees. The sponsorship from SEABC is allocated to cover the cost of the online platform and food vouchers. To give the attendees the closest experience to an in-person industry night, all attendees received food vouchers for attending the event. Students and industry members were paired according to their area of interest to ignite fruitful conversations.

The event was a huge success in bringing industry members and students together to create meaningful connections.

UBC CSCE Industry Night with the 2022 Sponsors

On the Web

Stephen Pienaar, P.Eng

Outgoing SEABC Webmaster

I would like to introduce our new SEABC webmaster: Ricardo Ruiz. Ricardo took the reins in January and will continue to maintain and enhance SEABC's online presence. I am moving into the background and will assist as needed.

My journey as SEABC volunteer started with the Vancouver Structural Engineering Group Society (VSEGS) in 2007. That was the year before the VSEGS, the Division of Structural Engineers of APEGBC (DSE) and Structural Engineering Consultants of British Columbia (SECBC) amalgamated to form SEABC. My duties as webmaster were quite simple in those early days. But that changed as SEABC grew into the vibrant and active professional society it is today.

I inherited a simple, nice-looking website that Tom Abbühl built for VSEGS, which I expanded with membership and event registration functionality. Member needs and expectations grew over time – we needed a website that was mobile-friendly and offered simple access to member services. The result was a complete redevelopment and launch of the current incarnation of the website in 2017. Things have been running smoothly since, but there is still room for improvement.

I felt incredibly honoured in 2014 when (in recognition for my work for SEABC) I was awarded Life Membership in SEABC.

Stepping back from the webmaster role is bitter-sweet for me, but necessary as I turn my focus to a new business venture. I rest assured in the knowledge that Ricardo will do an excellent job.

On the Web

Ricardo Ruiz,

B.Sc., M.Sc.

Warm greetings to all members and partners of SEABC association! I'm excited and eager to take on the role of SEABC webmaster.

I have a long and varied background in software application design and development. A few years ago, I started my own company which provides IT services and consultation, primarily for small to medium sized not-for-profit organizations and associations, which makes SEABC a great fit! I'm looking forward to using all my knowledge, ideas, and experience towards this new position. Many thanks to Cecilia, David and of course Stephen for this opportunity and the support they've given me so far.

The first month and a half of 2022 has quickly gone by and there's been a lot of activities with the website.

- Video recordings of 2 recent seminars are available for viewing:
    - Multi-criteria and Multi-level Framework for Seismic Risk Management of Existing Buildings in Canada – SEABC November evening seminar. Available on seabc.ca/events-archive (member login required).
    - ATC Design Guide 3: Serviceability Design of Tall Buildings Under Wind Loads – Webinar by Applied Technology Council. View this webinar on Youtube
- The Eleventh Annual Young Members Presentation Competition registration page is available for event details and audience sign-up: seabc.ca/event/eleventh/
- Registration for the April 2022 Term Courses is open.
    - C56 Practical Topics in Bridge Engineering 2: Asset Management & Supplemental Topics *NEW COURSE*
    - E16-3 Cables and Cable Systems 3 *NEW COURSE*
    - E11 National Building Code (NBC) Part 4 – Structural Design
    - E25 Structural Health Monitoring
    - C5 Topics in Practical Structural Design

Courses will run Mondays through Thursdays between April 5 and June 30. Please refer to seabc.ca/current-term for all the course details.

- The minutes of the Board of Directors Meeting on Nov 8, 2021, has been posted to the site: seabc.ca/minutes
- An article on the SEABC Task Force and UBC Research on Seismic Design of Basement Walls is undergoing review and will be posted on the website soon.

Important SEABC Events to Remember

Annual General Meeting May 7th 5:30pm

Pinnacle Lecture May 9th 5:30pm

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

Communications Committee

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

Director SEABC

Regular readers will note that I report regularly in SEABC newsletters on communications. Hopefully that is OK with you and that my column is of interest. The main issue is that communications is not an end product, it is a vehicle for information on activities, and therefore "no news is good news". Happily, I can report that I have no news – exactly the situation when all is working smoothly.

The pandemic has had little impact on SEABC communications – SEABC has always published newsletters electronically and communicated with its members by email. We have not needed to introduce changes – preferring small adjustments, which have enabled SEABC's activities to adapt to changes stemming from remote working. So, the newsletter continues to be published, and the SEABC Diary emails, which keep everyone posted on internal and external events of interest, are distributed as usual. You may have noticed receiving additional notifications because there is an increase in the availability of on-line events.

However, we still need articles for our quarterly newsletter. With plenty taking place locally in structural engineering, the committee aims to bring as much of that to you as we are able. We appreciate all the generous contributions you have made, but we need to do better. Everyone has a story to tell – just do not forget to tell us!

Articles can be full- or half-page and should be illustrated. Abbreviated research papers are also acceptable. You can also send in photos with a descriptive paragraph. Contributions should be newsworthy and/or inform our readers on structural engineering. We also invite feedback from you. If you have a great idea – share it with us!

Please send your information for publication to: newsletter@seabc.ca – we look forward to hearing from you.

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 2022 Engineers and Geoscientists BC Awards, recently announced by Engineers and Geoscientists British Columbia. The 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.

This year, the Engineers and Geoscientists BC Awards recognise exemplary professional, technical and volunteer contributions made by registrants in advancing public safety and wellbeing. This year there are new awards for Equity, Diversity, and Inclusion; and for Innovation in Sustainability. The term of reference for all awards have been updated to reflect the objectives of the Professional Governance Act. Award Nominations are now open and must be received by 5.00 pm Friday April 1, 2021. The awards will be presented in the fall of 2022.

Full details of the 2022 awards and the nomination procedure are posted on the EGBC website:

egbc.ca2022-Award-Nominations

IStructE News

David Harvey, P.Eng.
Struct.Eng

Pandemic control measures that were implemented in the UK hit London harder than we experienced in BC. Notwithstanding, business at the Institution continues as usual in a lockdown – the distanced IStructE staff did a remarkable job. Meetings were held remotely, and events were webcast. Restrictions in the UK have now generally been lifted; however, this month's Council meeting will be conducted via videoconference – similarly to the other Council meetings of the last two years.

The activity most affected was the IStructE Chartered Membership exam, with exam sessions having to be postponed – due to the difficulties with arranging the in-person exam sessions. However, all exams took place and plans for future exams continue as usual – the main difference being that the Examination Panel meetings are now held on-line.

IStructE has demonstrated commitment to hosting two Chartered Membership exam sessions every year – only the dates were adjusted. So, many thanks to all who helped make this happen. Also, special congratulations are due to those who sat one of the exam sessions during the pandemic – it must have been much tougher than usual. Regardless, the number of candidates attempting the exam was more-or-less normal and several BC-based candidates managed to pass – very well done all of you!

2022 IStructE President

Jane Entwhistle

Jane Entwhistle, a Technical Director for Thomasons, was recently elected as the Institution president for 2022. A Conservation Accredited Engineer, Jane particularly specialises, and enjoys, working on historic structures. She has over 30 years' experience of working with old and existing buildings and has for many years committed to their repair and reuse rather than replacement.

Jane has worked for small, specialised businesses for the majority of her career and is familiar with controlling a multiplicity of relatively small projects concurrently. Over the years she has become familiar with many building types and enjoys the discovery of their construction details.

Jane's Presidential Address took place on January 13th at Institution Headquarters in London. Jane explained how she arrived in structural engineering and why she quickly focused on building restoration. Taking us through some of the details of her work and the limitations on the building information, it was easy to see why this area of structural engineering is endlessly fascinating. Restoration and reuse has come under increasing focus as we adjust to the challenges of climate change and carbon accounting – an influence which Jane touched on during her address, which can be viewed at:

www.istructe.org//jane-entwistle

Jane has been actively involved with the Institution for over two decades, serving in many capacities. Jane is the 101st Institution president.

Structural Design Software Survey

Stephen Pienaar, P.Eng.
Centroid Structural Inc.

We thought many structural engineers would want to know what design software their peers use, how much they invest, and what benefits and shortcoming they experience with their software. With that in mind, we conducted a survey on structural design software late last year.

While only 15 people completed the survey, the responses were still insightful. A summary of the survey results is below.

Thank you to everyone that participated in the survey. We hope others will find the information of value as well. And thank you to SEABC for featuring an advert for the survey in the SEABC Newsletter.

Survey Results and Comments

1. Specialist structural design software

In order of number of mentions, respondents listed the following design software:

1. Hilti PROFIS (90%)
2. ETABS (47%)
3. WoodWorks (47%)
4. SAFE (33%)
5. SAP-2000 (33%)
6. S-FRAME (33%)
7. Simpson Strong-Tie (33%)
8. 14 other products mentioned with lesser use

A notable number of the above products are from the Computers & Structures stable. More important than any specific products identified, is the fact that most respondents use three or more products – there is no "one size fits all" solution.

2. Worksheet software

All respondents use Microsoft Excel. One third use Mathcad, some use SMath Studio (a free alternative to Mathcad) and Jabacus (an online structural design tool).

Weighing their peace of mind about peer reviews, independent reviews, and EGBC audits, respondents rated their confidence in their worksheets as follows:

- No one expressed major concerns
- 33% felt neutral
- 33% positive
- 33% very positive; worksheets are well tested and detailed

Structural engineers seem confident using worksheets for design calculations.

3. Handheld calculators and mobile apps

Almost everyone uses a handheld calculator for simple design calculations, with 74% of respondents doing so on a daily or weekly basis. 20% of respondents use custom design routines on programmable calculators. None of the respondents used mobile apps for design calculations.

4. Software expenditure

Two thirds of respondents provided approximate dollar values for annual expenditure on structural design software. Of the responses received:

- 60% indicated $5,000 per year or higher per user
- The average value was between $2,500 and $3,000 per year per user

Structural engineers seem willing to pay good money for good products.

5. Benefits and shortcomings

Respondents indicated that they were pleased with the following aspects of their software:

- Can solve complex problems (73%)
- Is user friendly and intuitive (67%)
- Provides comprehensive design reports (47%)
- Makes it easy to collaborate on designs (33%)

- Received timely updates from the vendor (33%)

They reported the following annoyances:

- It is a pain to exchange data between software packages (62%)
- Design reports lack detail on assumptions and calculation steps (46%)
- It is not user friendly or intuitive (31%)
- Design features have not improved much over time (31%)

A few items listed as benefits by some were listed as shortcoming by others. This contradiction could indicate that firms have different software requirements, or perhaps that there is a reluctance to replace existing (limited) software with new products.

In the comments, multiple respondents expressed a wish for better help/documentation. Several also expanded on their desire for more detailed and customizable design reports.

Some respondents suggested that software vendors should work on improving the user experience:

- They want easier data exchange between software.
- They want detailed design reports to show assumptions, code references and calculation steps.
- They want to see continuous product improvements that enhances workflow and features.

6. Cloud-based design software and data

To the question whether respondents would like their design software and data to be cloud-based, available on all their devices, and easily shared with team members, they indicated:

- This would be very welcome (36%).
- Would use such features only occasionally (47%).
- Would not be useful at all or prefer existing systems such as VPN (13%).

2022 Executive Board - Candidates for Election

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 nine 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 reelection to the SEABC Board, having has served as a Director of SEABC for two years. If elected, Robert will serve as a Director.

Stanley Chan P.Eng

A design engineer with Read Jones Christoffersen Ltd., Stanley is the outgoing chair of 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 four years. If elected, Stanley will continue to serve as a Director.

Allison DenToom, P.Eng

Allison has ten years of experience in structural engineering and is a Practice Advisor with Engineers and Geoscientists BC. If elected, Allison will serve as a Director.

Tim Dunne, P.Eng

Tim is the founder and principal of Dunne Enterprises Ltd with three decades of industrial experience. If elected, Tim will serve as a Director.

Gregory Gislason, P.Eng

Gregory is a structural engineer with Bush Bolman & Partners, has served as Network Coordinator with the Young Members Group and is the incoming YMG Chair. If elected, Gregory will serve as a Director.

Tejas Goshalia, P.Eng., SE

A Senior Associate with Stantec, Tejas has served as a Director of SEABC for nine 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 twelve 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 currently chairs the SEABC Communications Committee and has served as President for six years. 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, he will continue to serve in that capacity.

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

A structural engineering principal and manager, working for Vancouver-area firms, Kitty has served as a Director of SEABC for seven 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 Preston, P.Eng

Kevin is facade structural specialist with Morrison Hershfield Ltd. If elected, Kevin will 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 seven 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 three years. If elected, Calvin will continue to serve as a Director.

Andrew Seeton, P.Eng.

Structures Engineer with the City of Vancouver, Andrew was a founding Director of the SEABC and former chair of its Education Committee. If elected, Andrew will continue to serve as a Director.

John Sherstobitoff, P.Eng.

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

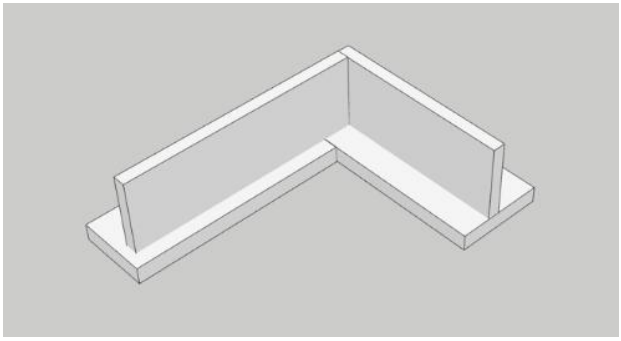
Rebar in the Middle

Robert Bourdages, P.Eng.
LEED AP

As students of concrete design, we are taught to place reinforcing on the tension face of a flexural element for maximum efficiency. Over the years however, I have seen some noteworthy examples that can deviate from this guideline.

Intersecting Retaining Walls

Cantilevered retaining walls that are free to displace at their tops, develop a single curvature and are typically reinforced with rebar placed at the tension (earth) side of the walls for maximum efficiency. In many cases, walls will intersect and the single curvature cannot be maintained at the intersection. If the rebar pattern does not change, tension cracks will likely develop where the curvature reverses near the wall intersection. Additional reinforcing is required to handle both vertical and horizontal moments. This condition can be avoided if rebar is sized appropriately for flexure and placed at the wall centerline. Investigation of local flexural stresses in both directions near the wall intersection will be necessary. Footing dowels can be located at the optimum “d”, but the rebar wall mat need could be moved to mid-depth.



Thin Slabs

Congestion can be avoided by placing a single mat at the slab mid-depth for thin slabs. Although rebar efficiency is lost, the cost of placement, provision of clearances and cover tolerances can be improved.

Continuous Strip Footings

Occasionally there is a need for continuous buried strip footings that support signs or other discreet elements. These footings do not have an integral wall. In some cases, I have seen this type of footing reinforced with bottom rebar only at the post locations. This will not address the reverse curvature from continuity or potentially from post construction settlement. Moving the rebar from the bottom face to mid-depth will adequately address this condition.

Isolated Footings with Cantilevered Columns

Isolated footings occur under some cantilevered columns, such as those supporting free standing canopies. Typically, there will be a bottom rebar mat to handle flexure from gravity loads, and localized top reinforcing to handle column base moments. An alternate and potentially optimal solution can be realized by placing the rebar mat at mid-depth.

Of course, in all the cases noted above rebar amounts will increase if they are controlled by flexure, rather than minimum temperature reinforcing. However, placing one mat in the middle has the benefit of providing flexural capacity where moment reversals can occur, simplifying layout, and reducing congestion.

Finally, this discussion does not address the impact of other design criteria, such as shear, deflection, and crack control.

Certificate in Structural Engineering Program

Shannon Remillong,
CSE Program
Co-ordinator

Registration for the **April 2022 term** is now open through the SEABC website

The CSE Program is offering a spring term! …

Five courses will be offered this term with online classes **Monday through Thursday** beginning the week of April 4th and ending the week of June 30th, 2022.

The following courses will be offered in April 2022:

- **C56** Practical Topics in Bridge Engineering: Asset Management & Supplemental Topics ***NEW COURSE!***
- **C5** Topics in Practical Structural Design
- **E11** National Building Code (NBC) Part 4 – Structural Design
- **E16-3** Cables and Cables Systems 3 ***NEW COURSE!***
- **E25** Structural Health Monitoring

Course outlines are available: seabc.ca/certificate-program

NEW COURSE ALERT!

C56 Practical Topics in Bridge Engineering: Asset Management & Supplemental Topics:

This new course is the second of two new practical bridge courses in 2022!

Course C56 is a continuation of Course C55- Core Bridge Topics, however neither course are a pre-requisite for the other. Both courses cover a range of smaller bridge topics; each class is led by a different instructor, a local specialist on each lecture topic.

While intended for bridge engineers with 1-5 years working experience, we expect many aspects will be relevant to bridge engineers of all experience levels. A detailed course description and further information on instructors to be provided on the SEABC website: seabc.ca/C56. A site visit to Oak Street Bridge is planned.

E16-3 Cables and Cables Systems 3

This course provides a number of applications of the cable and bar solution methods introduced in E16-2 including overhead transmission line systems considering flexible attachments, stay cable bridge tuning, suspension cable bridge tuning as well as hybrid suspension bridge systems.

The course will also include a presentation on the history of the development of cable-stayed bridge forms. This course uses the cable and bar solution methods introduced in E16-1 and E16-2 for solving small 3 dimensional, non-linear structural systems using functions previously developed in Mathcad15. Thus, E16-2 is a pre-requisite for E16-3. Please see the SEABC website for topics covered in this course: seabc.ca/e16-3

Course Delivery:

- All courses will **only** be available **ONLINE** format only
- Five courses will be offered once a week for 2 hours in the evening.
- Courses are 13 consecutive weeks.

Program Details:

The Certificate in Structural Engineering Program offers courses on a wide range of structural engineering topics. In addition to promoting the Certificate in Structural Engineering, we also welcome auditing of courses:

- **Credit**: Take a course with the goal of obtaining a final grade of 68% of higher, a Certificate in Structural Engineering will be provided.
- **Audit**: Take a course to expand your knowledge, **without** an evaluation of assignments or exams. Letter of audit will be provided.

Important Dates:

- Registration open: Tuesday, February 8, 2022.
- Early-bird deadline: Friday, March 18, 2022.
- Registration will remain open until Monday, April 4, 2022.
- First lecture: Week of April 4, 2022.
- Last lecture: Week of June 30, 2022.
- Withdrawal Deadline: Monday, April 18, 2022 ($75 administration fee will be applied to refund course registration fee).

Course Fees and Discounts:

- Live webcast $650 + GST.
- Early-bird discount of $50 per course applicable until Friday, March 18, 2022
- SEABC Member's discount of $50 apply at registration.

Courses will fill up fast so make sure to 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

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Mark Your Calendar

Upcoming Seminars, Webinars and Events

Meet an Expert Session #1

Date: Wednesday, March 2, 2022
Time: Log-In: 12:45 PM–1:00 PM PST
Webinar: 1:00 PM–2:15 PM PST
Location: Virtual Event
For more info: egbc.ca/Events

SEABC AGM

Date: Monday, March 7, 2022
Time: 5:30pm
Zoom Webinar
For more info: seabc.ca/event

Meet an Expert Session #2

Date: Wednesday, March 9, 2022
Time: Log-In: 12:45 PM–1:00 PM Pacific Time
Webinar: 1:00 PM–2:00 PM Pacific Time
Location: Virtual Event
For more info: egbc.ca/Events

2022 Pinnacle Lecture

Date: Wednesday, March 9, 2022
Time: 5:30pm
Location: Zoom Webinar
For more info: seabc.ca/event

Women in Engineering and Geoscience Book Discussion

Date: Thursday, March 10, 2022
Time: 12:00 PM–1:00 PM
Location: Webinar
For more info: egbc.ca/Events

Design of Stormwater Ponds

Date: Tuesday, March 29, 2022
Time: 8:15 AM–8:30 AM Pacific: Registration
8:30 AM–4:30 PM Pacific: Design of Stormwater Ponds
Location: Webinar
For more info: egbc.ca/Events

Emotional Intelligence and Team Effectiveness

Date: Thursday, April 7, 2022
Time: 8:15 AM–8:30 AM Pacific Time: Login
8:30 AM–12:30 PM Pacific Time: Webinar
Location: Webinar
For more info: egbc.ca/Events

Virtual Bridge Building Competition Showcase

Date: Thursday, April 14, 2022
Time: 6:00 PM–6:15 PM Pacific Time: Opening Remarks
6:15 PM–7:00 PM Pacific Time: Announcement of Test Results
7:00 PM–7:45 PM Pacific Time: Tutorial About Bridge Building
7:45 PM–8:00 PM Pacific Time: Closing Remarks
Location: Virtual, 93 seats available
For more info: egbc.ca/Events
Note: Registration deadline is March 28, 2022

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.

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Trivia Answer (November 2021)

Which world-famous historic structure is David Harvey standing next to? **No correct answers were received!!**

Answer: David is standing under the famous Iron Bridge in England, which dates from 1785 and is the oldest iron bridge in the world. It was made locally in Ironbridge, Shropshire, is still in good condition and carries pedestrians. Ironbridge Gorge was declared a World Heritage Site in 1986.