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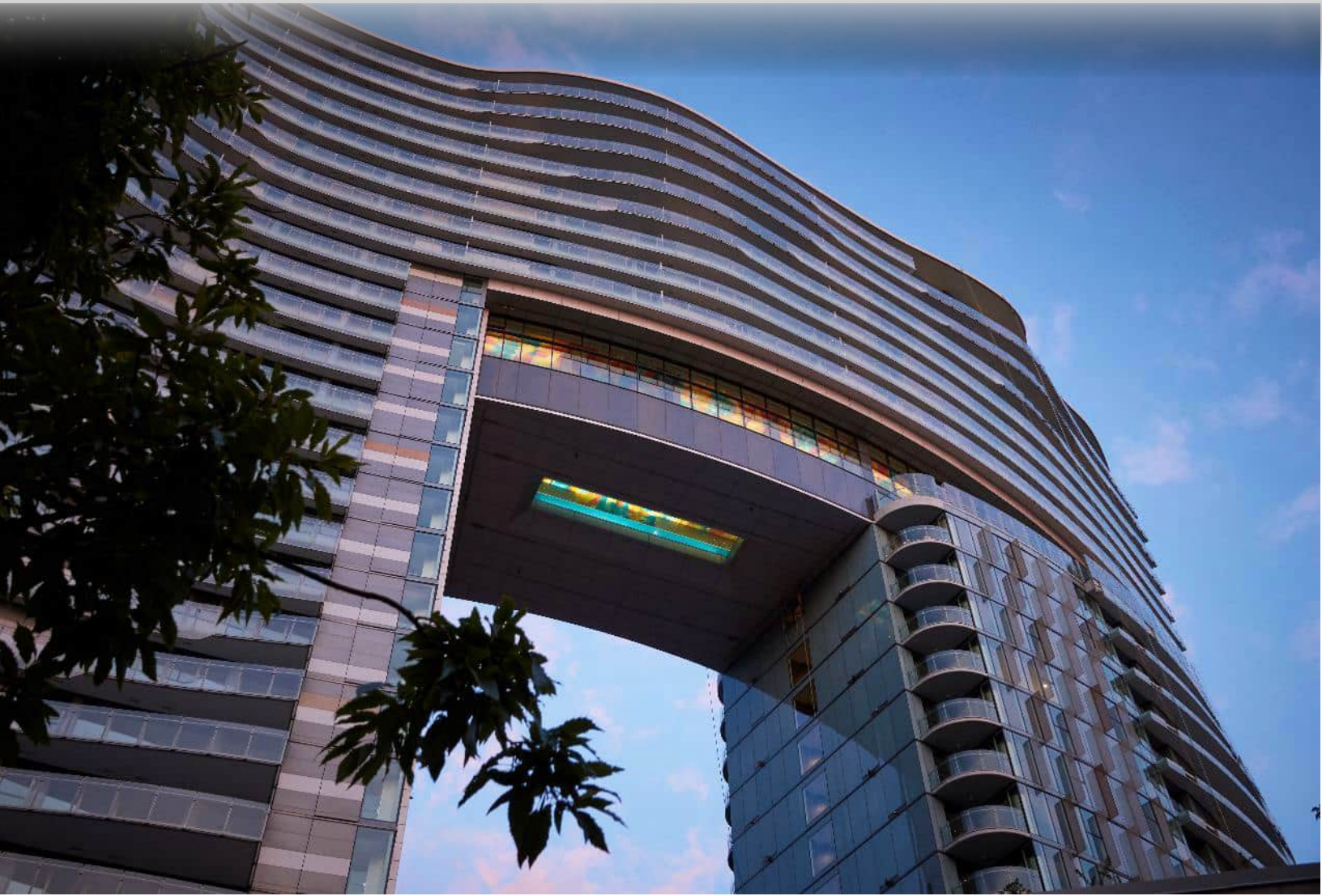
Association News

Final Words

The Arc, Vancouver, B.C. By Omar AlHarras, SEABC Trivia



Message from the President

David Harvey, P.Eng.

SEABC President

SEABC – Where are we?

Adjusting to the pandemic has become 'normal' for everyone including structural engineers. Happily, our work has kept going throughout and now is becoming slightly overheated (which brings its own challenges). So where is SEABC in all this? I am happy to report that SEABC is in good shape, having quickly adapted to conducting business during the various public health orders that have been imposed.

We are fortunate that SEABC was established with no premises, using electronic communication, and conducting most transactions on the website. Further, SEABC staff (and other labour) are paid for services rendered, and the bulk of our work is by volunteers. So, we have low overheads and incur limited costs. While most SEABC events are free to members, our paid courses and seminars cover costs and often yield a financial write-up.

Your Association is particularly blessed by a healthy financial position stemming in part from legacy funds accrued by the three preceding organizations which combined to become SEABC. This picture became brighter still with a significant financial write-up from hosting the 2017 IABSE Conference in Vancouver. The combined funds allow SEABC to make the financial commitments to organize conferences and seminars; invest in technology upgrades; and provide funding for the Legacy Awards and new programs.

SEABC's flagship event is the Annual Dinner. This is made as accessible as possible to members by seeking commercial sponsorships and subsidising costs. The Dinner is traditionally followed by a keynote speaker, (and has recently been coupled with the Pinnacle Lecture) delivered by a high-profile international speaker. As we were not able to organize an in-person dinner this year, we held the Annual Meeting on-line and drew a record number of attendees. Given the current period of uncertainty, the Board has elected to also hold next year's Annual Meeting and AGM on-line, with the intent that we reconvene in-person in 2023.

Several recent IStructE Gold Medalists, including Bill Baker, Chris Wise, Tristram Carfrae, Mike Schlaich, James O'Callaghan, and Michael Cook have been keynote speakers. Last May the news broke that local structural engineer and co-founder of Fast + Epp, Paul Fast, had been chosen as IStructE's latest Gold Medallist. Paul was recognized for his pioneering work developing wood and hybrid structures. Paul's Gold Medal address took place on September 22 in London – see the report on IStructE News which follows. Aware of the excellent opportunity to showcase local talent, the SEABC Board selected Paul to deliver the Pinnacle Lecture at the Annual Meeting which is scheduled as an on-line event for Wednesday March 9, 2022 at 5.30 pm. Paul has graciously accepted the opportunity to present his engineering journey with a different message for SEABC members. Paul's story is not to be missed!

Paul Fast at Institution Headquarters

Mexico City Subway Update

Poor construction was cited as the main cause of the Mexico City Subway collapse on May 3, 2021, in which 26 people died. A DNV report found that interface shear failure had resulted in overloading of the steel I-girder superstructure. Shear studs were insufficient, and ceramic ferrules had been left in place covering defective welds – pointing to improper inspection procedures.

Structural Awards 2021

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

Recently the Institution of Structural Engineers held the Structural Awards covering 2020 and 2021 projects. With last year's event cancelled in view of the pandemic restrictions, there was plenty of pent-up excitement among the long list of entrants – eagerly awaiting the announcement of the winners.

The impressive judging panel comprised 24 prominent and well-credentialed structural engineers, including BC's own Paul Fast. Award entries pored in from across the globe, covering the length and breadth of structural engineering. Many glittering projects were apparent, but there were plenty of entries of modest proportions as well. The one common thread was the excellence of the structural engineering.

There were many great projects receiving awards, but here are a few that caught my attention.

The Award for Construction Innovation was given to Apple Marina Bay Sands, designed by Eckersley O'Callaghan + Foster + Partners. While many fine Apple buildings in structural glass have gone before it, this Apple building in Singapore is the world's largest building using structural glass as the primary bracing system.

The eye-catching 30 m dome features an ultra-slender steel frame, braced by the 114 conical glass panels. The apparent simplicity of the structural system belies its complexity and the two decades of research underpinning the design.

In the same category, the King's Scholar's Pond Sewer Rehabilitation received a worthy Commendation. Heavily hemmed in by adjacent infrastructure, and located in a busy London street, the ancient sewer needed a new support system to be installed. This was achieved by the lightest of touches. Remarkably, all of the structural components were delivered to the sewer through a manhole and assembled inside the sewer, while few passers by were aware that the project was under construction.

In the Award for Long Span Structures (buildings) there was another winner from Singapore. The Jewel Changi Airport, designed by the Architecture Design & Research Institute of Tsinghua University features a colossal 200 m diameter glass and steel gridshell which encloses an interior tropical forest. The special feature is an oculus that showers rainwater into the garden which will be enjoyed by 85M airport users annually. The ellipsoidal toroid gridshell layout requires each of the 9000+ triangular glass panels to have unique dimensions.

The Award for Minimal Structural Intervention was given to the Elizabeth Line Gantry OLE Rigorous Assessment project. By opting for in-depth structural analysis of railway overhead line equipment, Buro Happold was able to salvage most of the existing gantry structures that had been in service for up to 70 years, achieving significant project cost savings for London's newest rail line.

Buro Happold were also winners of the Award for Pedestrian Bridges for Lille Langbro in Denmark. This unique foot and cycle bridge features two movable sections that pivot in plan to allow ship passage through the navigation opening. Unusually, the bridge's four sections connect with full moment and shear connections to resist imposed loads and minimize displacements. The elegantly shaped box section is a beautiful addition to the Copenhagen harbourfront.

The Award for Small Projects went to **The Viper Elevated Walkway at The Newt** in Somerset, UK. Cited for its organic shape and sculptural beauty, this winding walkway snakes through the trees and minimally impacts the floor of its forest environment. This is achieved by installing three micropiles to support each column's tripod base. The delicate structural design was optimised to consume the minimum of materials and display meticulous detailing. Unusually, the structure was designed and manufactured in South Africa, before shipment to the UK for assembly.

Taiyuan Botanical Garden Domes in China won the Award for Structural Artistry. The three domes, ranging from 43 to 88 m in diameter are greenhouses, featuring aquatic, desert and tropical biomes. The domes push the boundaries of timber gridshell design, the two directional timber beams and cable stiffening are arranged to resemble the ribbing of seashells. With the buckling design critical, the stiffness and capacity of the hidden connections were verified by full-scale testing. Viewed as the world's longest-span structure of its type, the domes were designed, and components manufactured by local firm StructureCraft.

The Award for Structural Heritage was won by **Christchurch Town Hall**. New Zealand designer Homes Consulting reconstructed the building which had been heavily damaged by the earthquakes of a decade ago and could well have been considered irreparable. In opting to restore the structure's unique architecture and prime acoustics, the designers had to tackle significant upgrades and areas of complete rebuild. The team employed high-end analysis to minimize strengthening work while preserving character throughout and achieving 100% of the code-specified seismic resistance. Intensive cooperation between structural and geotechnical designers was needed to battle subgrade liquefaction and optimize the foundations.

The Award for Tall or Slender Structures went to **Tianjin CTF Finance Centre** in China. Structural designers Skidmore Owings & Merrill and ECADI created a dramatic 530 m tall mixed-use tower with a distinguished undulating profile, synthesising architectural structural and functional requirements. The structure's sloping column 'soft braces' were used to optimize the seismic performance.

The **Rose Fitzgerald Kennedy Bridge** snagged the Award for Vehicle Bridges. Crossing the River Barrow in Ireland, the 887 m long, nine-span bridge features three towers with a single plane of extrados cables and is fully continuous between the abutment expansion joints. Designers Arup and Carlos Fernandez Casado SL used extensive analysis to optimize the design of this elegant bridge.

The inaugural Award for Zero Carbon Ambition was won by London's **York House** refurbishment project. The deteriorated existing building was rescued by designer Webb Yates Engineering, and extended by new CLT building additions in front of and on top of the existing structure, demonstrating strong commitment to sustainability. In the same category, a Commendation went to the **Oregon Forest Science Complex** by local designer Equilibrium Consulting Inc.

Two winners of the Supreme Award for Engineering Excellence were announced by the judging panel. These were the **Christchurch Town Hall** and **Lille Langbro –** both exceptional projects in two very different categories. Each of the Supreme winners displays excellent decision-making backed by technically advanced engineering – one painstakingly rescuing a much-loved community building that had been reduced to rubble over a decade of painstaking work, and the other adding a beautiful new pedestrian bridge along a busy corridor with the lightest of touches. You can find full details of all the winners at:

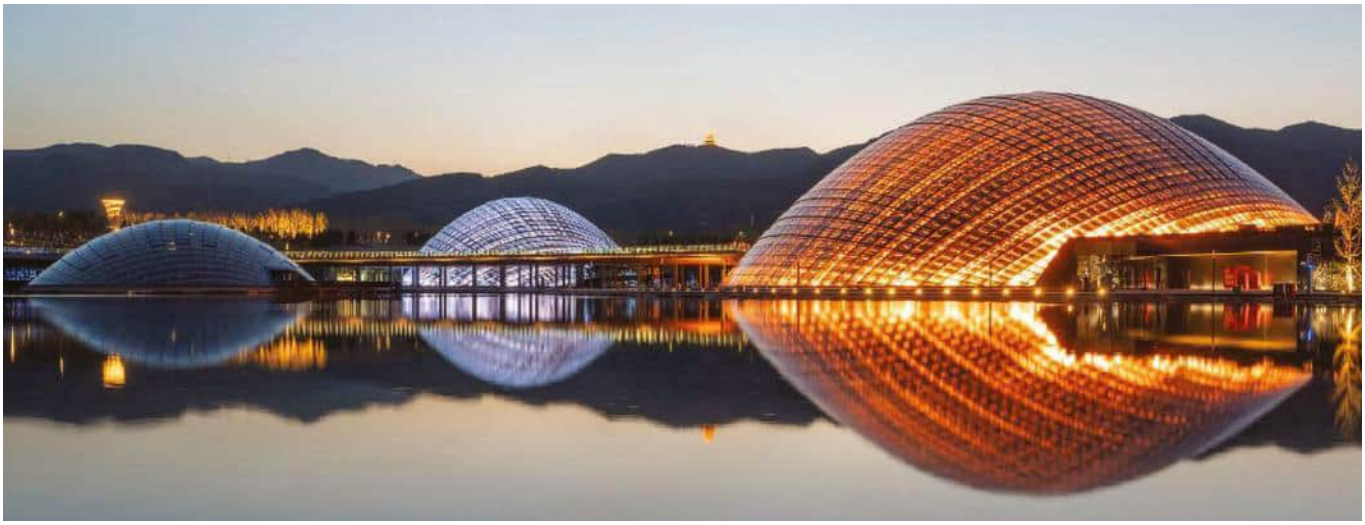
istructe.structural-awards-2021

Structural Awards Winners

Apple Marina Bay Sands

Lille Langbro

Jewel Changi Airport Credit: Timothy Hursley



Taiyuan Botanical Domes

Christchurch Town Hall

Rose Fitzgerald Kennedy Bridge
Credit: Royston Palmer

The Viper Elevated Walkway

Tianjin CTF Finance Centre Credit: Sethpowers/SOM

Committee Reports

Young Members Group

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

As another year comes to an end, teams from UBC and BCIT reflect on the highlights and achievements of 2021 promising an exciting year to come. The SEABC YMG is also expanding its social media presence to provide updates on current activities and announce upcoming events such as the highly anticipated 11th Annual Presentation Competition (see competition flyer at the end of the newsletter). Keep an eye out for new SEABC pages coming soon on Instagram and LinkedIn.

UBC Design Team Updates and Future Events

The UBC Civil Engineering Design Teams racked up first-place awards this year both in national and international competitions. Below is the list of awards achieved by our talented students.

- EERI Seismic Design Team:
  First Place in the EERI Seismic Design Competition
- Steel Bridge Team:
  First Place in the Canadian National Steel Bridge Competition 2021
- Concrete Canoe Team:
  First Place in the Canadian National Concrete Canoe Competition
- Third Quadrant Design:
  First Place in the Mixed-Use Multifamily Division of the U.S. Department of Energy's Solar Decathlon Design Challenge

As for future events, our chapter is hosting our annual Industry Night event on Friday, January 28th, 2022 at 5 pm. The UBC CSCE Industry Night is a networking event that aims to connect undergraduate civil engineering students at UBC with industry professionals. It provides an excellent opportunity for students to expand their network but also provides companies and professionals with an opportunity to share knowledge and experience with the next generation of engineers. The venue is still indeterminate at the moment but the team is very hopeful about having an in-person event. Feel free to message us at ubc.csce@gmail.com if you have any questions about the event.

UBC CSCE Industry Night

BCIT Chapter Highlights and Future Events

Troitsky Bridge Building Competition

For the last 7 years, the BCIT Troitsky Team has participated in the Troitsky Bridge Building Competition hosted by Concordia University in Montreal, Quebec. Every year we design, test, and manufacture a wooden model bridge to compete with universities across Canada. The team allows students to apply their academic knowledge to a fun and challenging bridge design problem.

Last year, due to the COVID-19 pandemic, the team chose not to participate in the competition. This academic year we have a strong team membership of 25 students. The BCIT team has already begun looking at previous year's bridges to optimize design, address previous modes of failure and test modified

components for a winning bridge. SEABC's funding towards this team goes directly to materials, equipment, airfare, and accommodation.

Intramural Civil Engineering Teams

There is substantial research that suggests positive associations between physical activity and academic achievement (Rasberry et al., 2011). In the spirit of student well-being and success, the BCIT CSCE encourages members to participate in physical activities. This year we proudly support nine intramural teams across all years of civil engineering students at BCIT. The intramural teams include futsal, floor hockey, dodgeball, volleyball and badminton.

BCIT Co-ed Futsal Intramural Team

Canadian Society for Civil Engineering (CSCE)

The BCIT CSCE executive team has been working hard in planning and adapting events to keep within the restrictions imposed by the current pandemic. We started this year off with a welcome back BBQ which set an encouraging tone for future events planned throughout the year. In addition to the Troitsky competition, BCIT CSCE is planning our annual Professional Night. Due to BCIT's COVID-19 protocols, Professional Night is being planned to accommodate for social distancing in a larger off-campus venue. Last year's event was held online for the first time with an attendance of over 200 students and professionals. The event planning team is working hard to keep within provincial health orders and BCIT protocols to provide a successful and safe in-person Professional Night for 2022.

BCIT CSCE Executive Team

SEABC Geoguessr Contest

The SEABC YMG Committee is pleased to announce Nima Seraj as the winner of the inaugural SEABC Geoguessr Contest. For her efforts, Nima 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. Burrard Bridge- Vancouver, BC

"The Burrard Bridge is a massive board-formed concrete and riveted steel truss bridge spanning False

Creek on Burrard Street, connecting the downtown peninsula with the community of Kitsilano to the south. The iconic ArtDeco style structure opened on July 1, 1932, and remains one of the most recognizable landmarks in the City of Vancouver." (Notable Structures, SEABC)

More information can be found in the SEABC Notable Structures article: notable_structures

2. Pharmaceutical Sciences Building- University of British Columbia, BC

"The novel design of the Faculty of Pharmaceutical Sciences building combines four structurally distinct buildings into a single complex, connecting the buildings with three large atriums. Signature features are a large, two-level open entrance, abundant natural light, and sloped walls at the base." (Notable Structures, SEABC)

More information can be found in the SEABC Notable Structures article: notable_structures

3. Revelstoke Suspension Bridge- Revelstoke, BC

The Revelstoke suspension bridge opened in 1961, and includes features normally seen in older, heritage suspensions bridges. These features include the use of visually pleasing v-lacing on the built-up beams of the stiffening truss. The bridge is unique in that it only has two suspended slabs, as opposed to the more typical one span or three spans: historicbridges.org

4. The Bastion- Nanaimo, BC

The Bastion is one of British Columbia's oldest buildings, having been built in 1853-1855 by the Hudson's Bay Company. The three floors of the Bastion were skillfully crafted using traditional wood working techniques. Over the years, politics and land deals saw this sturdy wooden fort moved twice. Today it is Nanaimo's most recognizable landmark. While the Bastion's timbers are original, the interior represents activities of the early mining post from 1853 – 1862. Today, this former Hudson's Bay Company building is a symbol of Nanaimo's history: nanaimomuseum.ca

5. Surrey Public Library (City Centre Branch)- Surrey, BC

The Surrey City Centre Library is the main branch of Surrey Libraries and opened in September 2011, acting as a key facet in the re-vitalization of the City Centre area. The building was designed by the late famous architect Bing Thom, and is the basis on the "Grand Library" building model of the popular computer game Cities Skyline. The library was also featured as one of the winners in SEABC's inaugural photo contest.

If you would like to participate in the next round of the SEABC YMG Geoguessr contest, please look out for an e-mail blast in Q1 of 2022! Thank you to all 22 participants who participated in the inaugural contest!

SEABC Photo contest

After reviewing over 30 photo submissions, the SEABC is pleased to announce the winner of the 2021 Photo Contest as **Omar AlHarras**. For his winning photo submission, he will receive a cash prize of $500.

The ARC
Vancouver, BC

Description

The structurally unique building rises from the ground plane as two separate towers with separate 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. The suspended swimming pool provided a structural challenge given the extremely low deformation tolerance of the pool's acrylic panels.

The bridge consists of two concrete beams spanning over 70 ft, supporting multiple levels of residential levels above. To realize the architectural vision, the structural engineers carried out several analytical studies and provided creative solutions to control the deformations of the bridge structure during and after construction.

Judge's Comments

This is a pleasant photo of an interesting, recognizable structure in downtown Vancouver. The picture employs a nice use of colours to accentuate the soothing, gentle curves of the building.

Honorable Mentions

Metrotown Skytrain Station
Burnaby, BC
Submitted By: Miguel Fraino

Judge's Comments

The composition and symmetry put a beautiful touch on this classic view of a space truss. The photo focuses on the elements of a structure that is relied upon by so many commuters, yet noticed by few.

VanDusen Botanical Gardens
Vancouver, BC

Submitted By: Lois Tso

Judge's Comments

A beautiful photo of which effectively captures the complex roof shape, accentuated through great lighting and cloud formations above.

Vancouver Island Branch

Daniel Gao, BEng, P.Eng

Branch Chair

Mission

To provide a focal point for SEABC members on the Island to meet, discuss SEABC issues and to take benefit in the form of exchange of items of technical interest.

2021 Branch Executive

- Chair: Daniel Gao, Read Jones Christoffersen Ltd.
- Miles Cornwell, Read Jones Christoffersen Ltd.
- Michael Hind, Sorensen Trilogy Engineering Ltd.
- Dean Hynes, Herold Engineering Ltd.
- James Macauley, Glotman Simpson Group of Companies
- Vincent Malazo, University of Alberta
- Stephen Pienaar, Prokon Software Consultants (Canada) Ltd.
- Thor Tandy, UNISOL Engineering Ltd
- Dan Weber, P.Eng, Read Jones Christoffersen Ltd.

Branch Demographic

- Members in the local Victoria and Gulf Islands area
- A central island group centred on the Nanaimo, Port Alberni area
- A small North Island group

Recent Events

- Tours of The Vista in Esquimalt – We ran two tours at The Vista project in Esquimalt, comprised of 12 storeys of steel framed primary structure over concrete piles and laterally restrained with eccentric braced frames.
- Executive Meetings – We have started meeting every month to keep current with local events and topics. Several new faces have joined us recently and we are always happy to include more of the community. Please reach out to an executive committee member if you would like to join us.

Proposed Events

- Impacts of Long-Duration Earthquakes Series – Presentation on the impact of long duration earthquakes and their associated research, seismology, and design consideration in practice. We are aiming to set up the research presentation this year as a virtual presentation.
- Non-structural Components – "What Not To Do". This is slated for early in 2022 as a virtual presentation.

On the Web

Stephen
Pienaar, P.Eng.

Webmaster

Getting closer to the end of the year, I thought it may be insightful to take a snapshot in time and reflect on some of the successes of the SEABC online presence…

Member services:

SEABC currently has 827 active members. Members enjoy benefits such as discounted event registration fees and access to video recordings of past seminars and workshops, all accessible for the Member Dashboard at seabc.ca/members.

Website:

The most popular pages on the SEABC website so far in 2021 were:

- Home page, which includes a snapshot of upcoming events (± 6,100 page views per month). seabc.ca
- Course list and details for the current term of the Certificate in Structural Engineering Program (±830 page views per month). seabc.ca/current-term
- The "Find an Engineer" search page for the Directory of Structural Firms (±260 searches per month). We currently have 118 firms listed. seabc.ca/find-an-engineer
- The Struct.Eng. page with IStructE exam resources (±160 page views per month). seabc.ca/struct-eng
- Member Dashboard (±110 logins per month; many more during membership renewal season). seabc.ca/members
- Events archive (± 90 page views per month), including video recordings of past presentations (±2.5 members with ±6 video views per month). seabc.ca/events-archive

A subjective observation is that members seem to love using SEABC for continuing education but under-utilize the video archive of past presentations.

Inbound searches from Google (90%) and other search engines (10%) correlate with the most popular web pages:

- Most popular search keywords: "SEABC" and "Structural Engineers Association of BC".
- Followed by "SEABC courses" and "Certificate in Structural Engineering".

Social media:

SEABC has an active social media presence:

- 228 Twitter followers. twitter.com/seabc
- 227 members of the SEABC Young Members Group on LinkedIn. linkedin.com

The very similar numbers for Twitter and the LinkedIn Young Members Group suggest that it is a mostly younger demographic that engages with SEABC on social media.

Our email broadcast system reaches far and wide:

- 1,012 email addresses subscribed to receive this quarterly SEABC Newsletter. Some members are subscribed twice: both their work and personal email addresses.
- 1,187 subscribers to the (SEABC and industry) seminars and courses email list.
- The Young Members Group email list has 911 subscribers.

We find that other industry groups consider the SEABC email broadcast system to be a powerful way for creating awareness of their events. We think that we may even have saved some events from the brink of cancellation by mentioning them to SEABC members.

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

Sincerely,

Stephen Pienaar, P.Eng

SEABC Webmaster

Communications Committee

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

Director SEABC

I regularly remind you that your hardworking Communication Committee publishes the quarterly newsletter and is looking for articles – you may have noticed! With plenty going on locally in structural engineering, it is the intent of the committee to bring as much of that to you as we are able. Our success stems from many of you making significant contributions. We are most grateful for your continued support, but we are constantly trying to do better. A big thank you to Robert Bourdages and Mark Budd for their interesting 'practice note' articles, so if Robert and Mark can do it – what about you? We all have a story to relate, so maybe you should give it a go?

Articles can be full- or half-page and should be illustrated. Short research papers are also acceptable. You can just submit photos with a descriptive paragraph. The main criterion is to that contributions should be newsworthy or informative for our readers on a structural engineering topic. We are also looking for feedback from you and if you think you can make an improvement, kindly tell us how.

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

Burrard and Granville Bridges

Photo Credit: Andrea Sunderland Photography

IStructE News

David Harvey, P.Eng.
Struct.Eng

As we work our way through the pandemic, business at IStructE continues as normal. The Institution has switched to on-line meetings and educational events, attracting larger audiences. At this stage the plans for the future are not certain, but the most popular option seems to be mixing live audiences with on-line participation – which makes a great deal of sense given the distributed nature of the Institution's global membership. Members have benefitted not only from the increased access to on-line services, but also from the zero-subscription increase adopted by IStructE during the pandemic.

So, what has happened to the Institution's flagship event, the Structural Awards, which since its inauguration in 1968 has been held in-person in London? You may recall that last year the event was cancelled as meetings and international travel were infeasible, but award submissions were invited, the entries were showcased on-line, and a public vote was held. These submissions were combined with this year's entries for the blockbuster 2021 competition which featured additional categories. Thankfully, outstanding projects are still being delivered and the quality of the entries were as good as ever. Check out the report on the Structural Awards 2020/21 elsewhere in this issue.

The stunning news for structural engineers in BC was that SEABC Director **Paul Fast** was awarded the Institution's Gold Medal for 2021. This is an amazing story. The Institution established the Gold Medal, its highest award, in 1922. Since then, there have been 55 gold medalists, and the list reads like a who's who of structural engineers of the past century. Names of past legends such as Freyssinet, Arup, Leonhardt, Kerensky, Happold and Robertson stand out, while current structural engineering giants Michel Virlogeux and William Baker are among the more recent awardees. The list of names comes from across the globe; Paul is only the second Canadian winner – the first being wind engineering pioneer Alan Davenport in 1987. SEABC is delighted that a board member is among the select few Gold Medal recipients and could not be more thrilled for Paul.

Paul's address took place in London on September 22, to a small in-person audience and some 200 people participating on-line. Paul's personal journey took us through his structural engineering career which set the stage for the amazing structures he and his colleagues developed along the way. He considers this as a modern adventure and links his exploits to adventurous examples from the 19th century. Always a pioneer, Paul found many opportunities to push boundaries and create the new concepts that he has become famous for. He cites stepping outside the box and not getting too hemmed in by code restrictions, established practices, and computer modelling as necessary for good engineering.

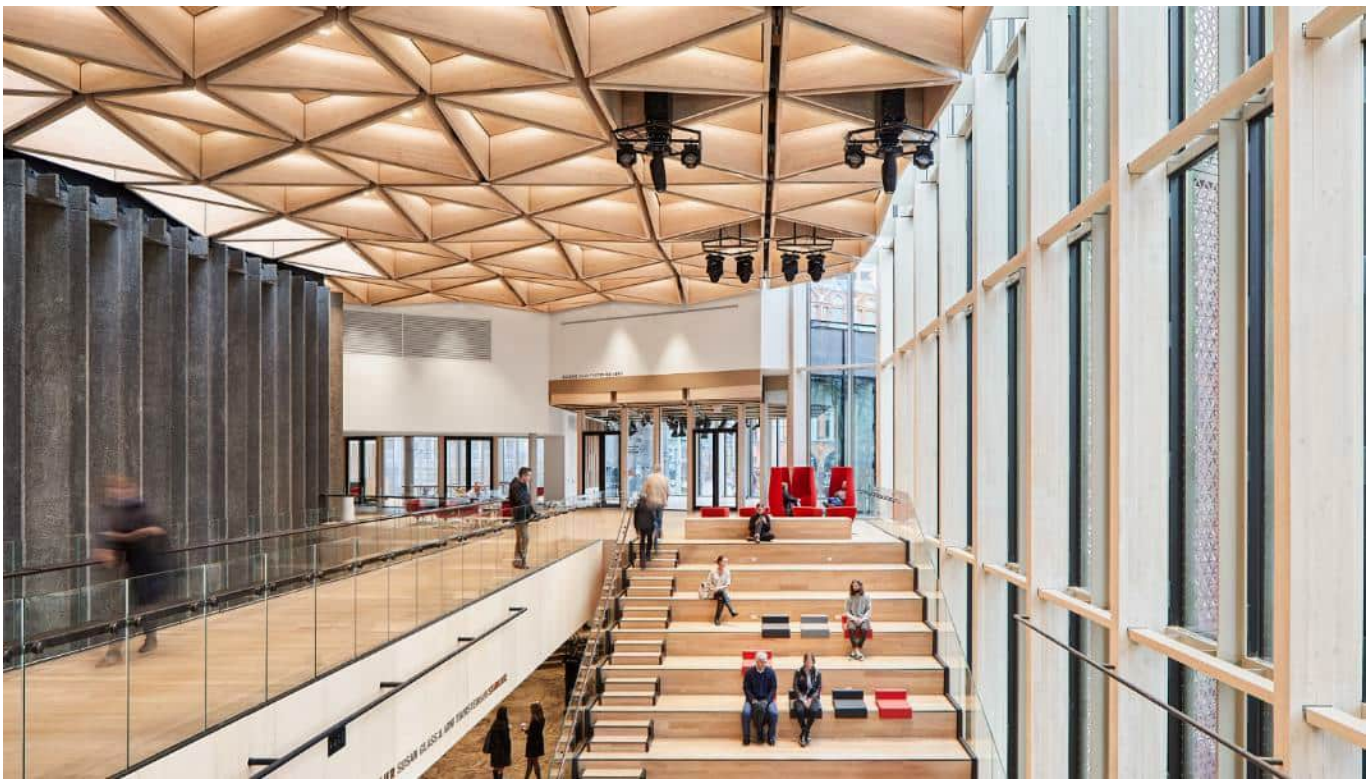
Paul believes strongly in holistic engineering, i.e., solving multidiscipline solutions with one structural form. Thankfully many of Paul's structures are expressed architecturally and we can enjoy the beauty of pure form and creative engineering. This includes one of Paul's design signatures – hybrid structures, very often steel and wood working together to achieve more than the sum of the parts. This is perhaps best exemplified by the massive arches he championed for the Richmond Olympic Oval. This impressive structure retains a warmth which is seldom seen in massive structures, largely due the expanse of wood covering the cavernous interior space.

Paul interlaced his remarks with exemplars of his designs – many recognizable across the world, others small-scale and little-known. Paul added some personal photos of life in the back country and explained how he drew inspiration from the great creation of the world we live in. Paul's project images display his tenacious commitment to doing what is right. Closing with his 'ultimate' objective of bringing joy to his clients while embracing the challenges and hardships of getting the job done. Paul's elegant structures invite us to share the joy that he and his clients have experienced in abundance. Some of these images follow. You can view Paul's Gold Medal address at: paul-fast-gold-medal-address-2021

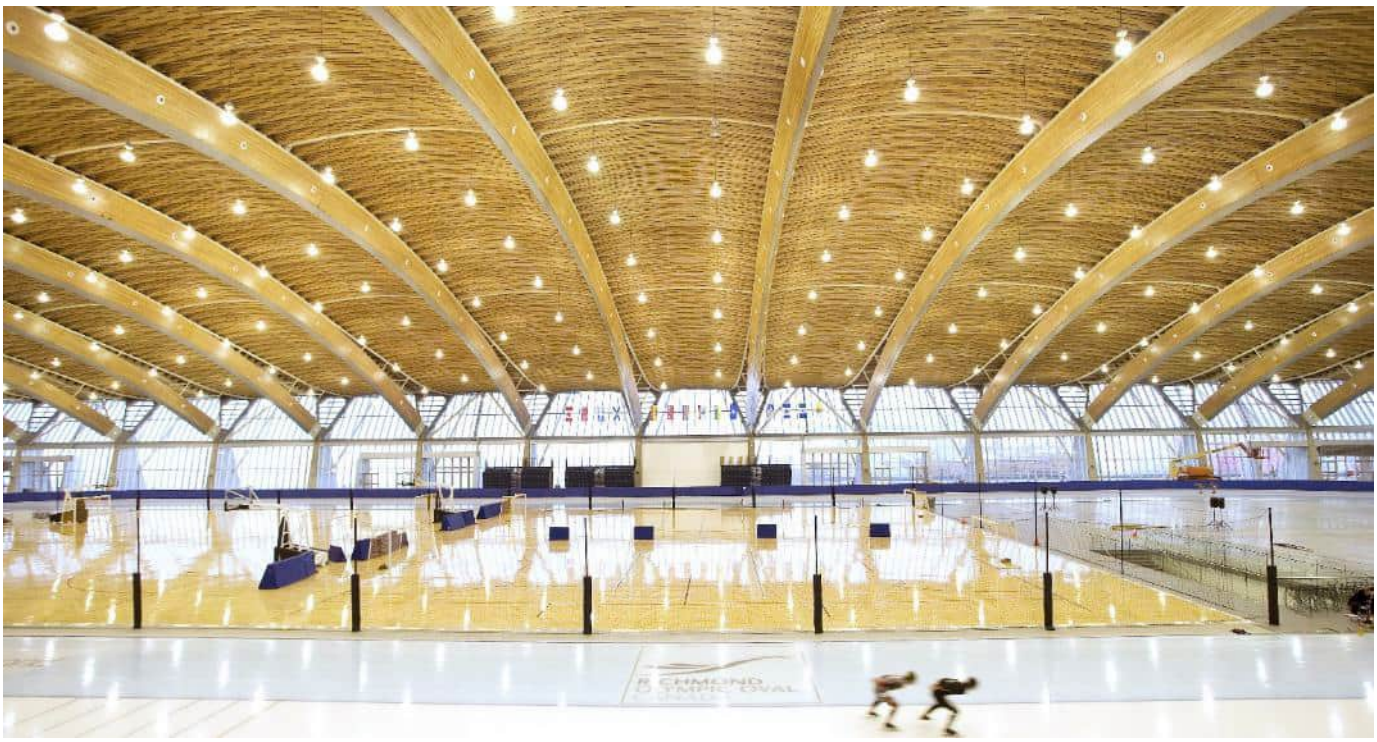
Gold Medal Address Images

Gilmore Skytrain Station

Grandview Heights Aquatic Centre
Credit: Ema Peter Photography



National Arts Centre
Credit: Younes Bounhar



Richmond Olympic Oval
Credit: Stephanie Tracey

Online Calculators for Structural Engineers

As the quantity and complexity of information explodes in this digital age, a number of folks have created online tools and calculators that help structural engineers deal with this explosion.

The following are some online tools that SEABC members, and others, may find helpful. This newsletter article will be re-published periodically as new information is brought forward.

SEABC is not endorsing the use of these online tools nor is SEABC accepting any liability for the use of them. Each user of the tools assumes full liability for determining if the chosen tool is appropriate for the situation that the user uses the tool for and professional responsibility for the results of the use of these tools.

If you have a suggestion for an online tool that should be added to this list in a future SEABC newsletter, please contact the list maintainers by email at: online-calculators@seabc.ca.

Schedule Filler

Online tools to fill in, save, and print Letters of Assurance and other similar forms for:

- BC Building Code
- Alberta Building Code
- Vancouver Building Bylaw
- EGBC Schedule S
- EGBC Independent Review Checklist

If you sign-in and create a profile, some of the form fields can be pre-populated, which is a time saving.

Jabacus

Online calculators for snow, wind and seismic coefficients and various strength calculations for steel, timber and concrete.

Marklasby.ca

Online calculators for structural steel members; laterally unsupported beams and beam columns.

NBCC Seismic Hazard Values

Interpolated values of the acceleration spectrum based on longitude and latitude of a particular site.

ATC Hazard Values

Interpolated climatic values for sites in the United States.

Engineering Toolbox

Online calculators for a broad scope of engineering in practice.

Centroid Concrete Section

Designs or check reinforced concrete beam sections to A23.3-19. Works on desktop and mobile and provides detailed calculation steps.

List maintainers

Jeremy Atkinson

Mark Budd

Mark Lasby

Stephen Pienaar

Subscriptions Renewal

David Harvey, P.Eng.
SEABC President

Log in by December 31st to renew your membership for 2022, or to become an SEABC member. A group renewal option is available to assist firms wanting to bulk-renew their staff memberships. As a result of SEABC's fiscal strength, subscriptions remain unchanged for next year. Go to: seabc.ca/membership

Structural Design Software Survey

Do you sometimes wonder what design software other structural engineers use? Or how much your peers invest in their software, and what benefits and shortcoming they experience? Well, we are conducting an online survey to answer these questions.

You can benefit from the survey results and help make the survey meaningful **by participating yourself**.

Who is conducting this survey?
We are Centroid Structural, a software start-up in Victoria BC. We are on a mission to develop compelling new design software for structural engineers.

Will the survey results be available?
Yes! We will share a summary of the results in the February 2022 edition of the SEABC Newsletter.

To participate in the survey, please go to:

structuralsurvey.ca

Please invite friends and colleagues to participate as well.

Photo by Jason Leung, unsplash.com

Structural Thermal Breaks

Robert Bourdages, P.Eng.
LEED AP

Sustainable and restorative building practices are now being embraced by the majority of the design community.

For structural engineers looking through the sustainability lens, it is recognized that structural and reinforcing steel is over 90% recyclable, concrete containing fly ash is an important component with cementitious properties, and timber can be a rapidly renewable recyclable building material. But what else can structural engineers do to support sustainable designs?

Thermal breaks are an important building component that contribute to energy savings and thus contribute to a sustainable solution with respect to building construction. Wherever there is a structural element projecting through a thermal barrier, there is heat loss, and often this can be significant. Examples include canopies, balconies, railings, fall arrest posts, and roof top mounted supports for mechanical equipment. Lack of thermal isolation across thermal barriers leads to potential mold growth, heat loss, and a potential for thermal discomfort.

Concrete balconies for example behave more like radiators than insulators. Imagine a high-rise structure with balconies on all levels at all exterior faces. Typical construction methodology has been to pour a cantilevered slab with no provisions for thermal breaks. This can lead to unacceptable heat losses in colder climates.

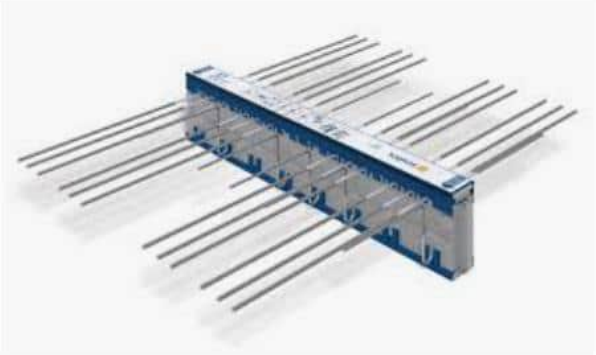
There are a number of proprietary products available to address this concern, and there are other simpler solutions such as interrupting a portion of the concrete section with insulative material to prevent a portion of the total heat loss.

There are also materials available that are thermal insulators and yet can provide a high level of compressive and shear strength, allowing for moment transfer across structural steel joints.

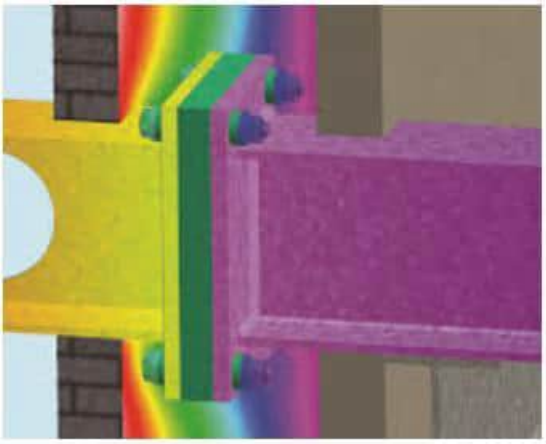
For a more detailed discussion relating to the thermal isolation of structural steel, refer to the article in Modern Steel Construction entitled,

“Breaking Up Is(n’t) Hard to Do” by Geoff Weisenberger, September 2018.

www.aisc.org/breakingupisnthardtodo

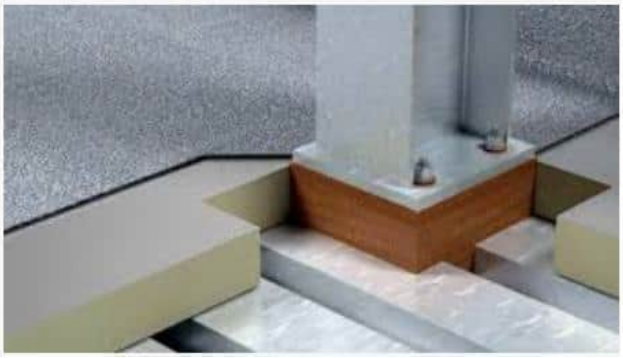


How Structural Thermal Breaks Support….
forconstructionpros.com



New ‘Thermal Breaks’ CPD Certified….
greenbuilding.co.uk

Thermal Breaks in Structural Steel....
uaa.alaska.edu



Thermal Breaks Specialists Improve....
armatherm.co.uk

Certificate in Structural Engineering Program

Shannon Remillong,
CSE Program
Co-ordinator

The CSE Program Returns to UBC Robson January 2022!

We look forward to welcoming students into the classroom at UBC Robson Square this January, while simultaneously offering the online format.

Six courses will be offered with classes running Monday through Thursday from 4:00-6:00pm and 6:30-8:30pm, beginning the week of January 3rd and ending the week of March 31, 2022. Three of the six courses will be online format ONLY, while the remaining three will be both online and in-person simultaneously.

The following courses will be offered in the January 2022 term:

- C8 Geotechnical Aspects of Foundation Design (note: online format only)
- C13 Structural Steel Design for Buildings
- C52 Bridge Conceptual Design 1
- C55 Practical Topics in Bridge Engineering 1 - ***NEW COURSE!***
- E16-2 Cables and Cable Systems 2 - ***NEW COURSE!*** (note: online format only)
- E10 Structural Analysis Fundamentals: A Refresher (note: online format only)

New Course Alert!

Practical Topics in Bridge Engineering:

We are excited to be offering two new practical bridge courses in 2022. The CSE Program already covers several major bridge topics including loading (C50), analysis (C51), conceptual design (C52), and seismic (C54). However, a gap for smaller bridge topics was identified (i.e. joints, bearings, etc.), none of which were suited to a course on their own but useful when combined. A recent membership survey helped to gauge interest in potential bridge topics and, from that, CSEP committee members Keith Holmes and Darrel Gagnon (both local bridge engineers) have developed two courses in "Practical Topics in Bridge Engineering":

- C55 Practical Topics in Bridge Engineering 1 (Core Bridge Topics)
- C56 Practical Topics in Bridge Engineering 2 (Asset Management & Supplemental Topics)

Given the wide range of topics, each class will be led by a different instructor, a local specialist on that class 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. C55 will be offered in January 2022 and C56 will be offered in April 2022.

Cables and Cable Systems 2:

This new course is a continuation of the Cables and Cable Systems 1 course: expanding the cable and bar solution methods introduced in E16-1 for use in solving small 3-dimensional, non-linear structural systems using stiffness matrices in Mathcad15. Numerical examples will cover a 2-dimensional three linked bar system, suspension bridge erection cases and a simple 3-dimensional guyed structure. The course will also include a presentation of a 350 m long suspension bridge as a case study.

Course details are available through Certificate in Structural Engineering Program website: seabc.ca/certificate-program

Registration opens Monday, November 15 and will close Monday, January 3, 2022. SEABC Members will receive a $50 discounted rate.

Course delivery:

The January 2022 term plans to return to both in-person classroom (at UBC Robson) and online versions.

Courses are once a week for 2 hours at either 4:00-6:00 PM or 6:30-8:30 PM PST.

Courses are 13 consecutive weeks; some courses have a mid-term break.

Courses are $650+GST

Important Dates:

Registration open: Monday, November 15, 2021

Early-bird deadline: Friday, December 17, 2021

Registration close: Monday, January 3, 2022

First lecture: Week of Monday, January 3, 2022

Last lecture: Week of Monday, March 28, 2022

Withdrawal Deadline: Monday, January 17, 2022

Courses 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 Executive Assistant, at email: courses@seabc.ca

CSE Board of Directors:

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

Mark Your Calendar

Upcoming Seminars, Webinars and Events

Important Announcement!

Due to low registration it has been decided to postpone the **EMTC Workshop** which was planned for November 17 2021 until **February 1, 2022**

Problem-Solving and Creativity in Engineering and Geoscience

Date: Monday, December 6, 2021
Time: Registration: 11:45 AM–12:00 PM Pacific Time
Webinar: 12:00 PM–1:30 PM Pacific Time
Location: Webinar
For more info: egbc.ca/Events

People Management Excellence

Date: Tuesday, December 14, 2021
Time: Registration: 8:15 AM-8:30 AM Pacific Time
Webinar: 8:30 AM-12:30 PM Pacific Time
Location: Webinar 23 seats available
For more info: egbc.ca/Events

Embrace Your Leadership Identity

Date: Wednesday, January 19, 2022
Time: 9:45 AM–10:00 AM Pacific Time: Login
10:00 AM–11:00 AM Pacific Time: Webinar
Location: Webinar
For more info: egbc.ca/Events

Women in Leadership Series

Date: Wednesday, January 19, 2022- Wednesday, February 9, 2022
Time:

- Embrace Your Leadership Identity: Wednesday, January 19, 2022 from 10:00 AM–11:00 AM Pacific Time
- Share Your Ideas with Confidence: Wednesday, January 26, 2022 from 10:00 AM–11:00 AM Pacific Time
- Adopt a Powerful Presence: Wednesday, February 2, 2022 from 10:00 AM–11:00 AM Pacific Time
- Build Your Leadership Brand: Wednesday, February 9, 2022 from 10:00 AM–11:00 AM Pacific Time

Location: Webinar
For more info: egbc.ca/Events

SEABC AGM

Date: Monday, March 7, 2022
Time: 5:30-6:30pm
Location: On-line Meeting

SEABC Annual Meeting and Pinnacle Lecture

Date: Wednesday, March 9, 2022
Time: 5:30-7:30pm
Location: On-line Event

CSCE 2022 Annual Conference

Date: May 25th-28th 2022
Location: Whistler Conference Centre
For more info: CSCEconference

Adopt a Powerful Presence

Date: Wednesday, February 2, 2022
Time: 9:45 AM–10:00 AM Pacific Time: Login
10:00 AM–11:00 AM Pacific Time: Webinar
Location: Webinar
For more info: egbc.ca/Events

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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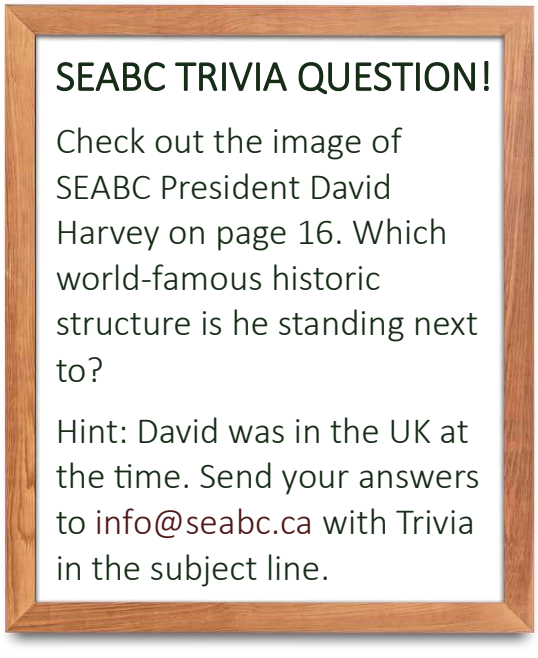
Advertising

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!



11TH ANNUAL

SEABC PRESENTATION COMPETITION

Hosted virtually February 22nd & 24th, 2022

Share a cool project or research topic related to structural engineering for a chance to win a grand prize of $1000, plus two additional $250 people's choice awards.

Apply online by January 7th

Apply through our online form at
https://forms.gle/uBr7roc2KLVqHg8k6

SHOW OFF YOUR SKILLS

For students, EITs, or Engineers with less than 10 years' experience

SEABC ANNUAL MEMBERSHIPS ARE $85, AND FREE FOR STUDENTS

Submit your application with an abstract about your structural engineering topic. Examples include:

- A project you've been involved in
- Post-disaster investigation work
- A project completed at school
- Your research work
- A personal reflection about industry practice
- And more!

The competition will include a 10-15 minute live presentation via video conference. Scores will be based on:

- Presentation skills
- Ability to answer questions
- Topics and content

Apply through our online form at https://forms.gle/uBr7roc2KLVqHg8k6

EMAIL YMG@SEABC.COM WITH ANY QUESTIONS